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# ALAMITOS ENERGY CENTER

## Final Staff Assessment, Part 1 for Alamitos Energy Center (AEC)


CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown, Jr., Governor

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# ALAMITOS ENERGY CENTER (13-AFC-01)
# FINAL STAFF ASSESSMENT – Part 1

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# EXECUTIVE SUMMARY

Keith Winstead

## INTRODUCTION

This Final Staff Assessment (FSA) of the Alamitos Energy Center, LLC's, Supplemental Application for Certification (13-AFC-01) contains staff's final, independent, objective evaluation and testimony for the proposed Alamitos Energy Center (AEC), a nominal 1,040-megawatt electrical generating facility. The FSA examines engineering, environmental, public health, and safety aspects of the proposed AEC project, based on the information provided by the applicant, government agencies, interested parties, independent research, and other sources available at the time the FSA was prepared. The FSA contains analyses and responses to comments similar to those normally contained in a Final Environmental Impact Report (FEIR) required by the California Environmental Quality Act (CEQA). When evaluating a proposed project and making a determination on issuing a license, the Energy Commission is the lead state agency under CEQA and its certified regulatory program functions as a CEQA equivalent process.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and identify the potential impacts on the environment, the public's health and safety, and determine whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). Upon identifying any potentially significant environmental impacts, staff recommends mitigation measures in the form of conditions of certification for construction, operation and eventual closure of the project.

This FSA is not a decision document for these proceedings, nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local, state, and federal LORS. The FSA serves as staff's formal testimony in evidentiary hearings to be held by the Energy Commission Committee assigned to hear this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by the staff, the applicant, intervenors, government agencies, and the public, prior to proposing its decision. The full Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

On October 26, 2015, AES Southland Development, LLC (AES) submitted a Supplemental Application for Certification (SAFC) to the California Energy Commission for the AEC project. The SAFC replaces the original Application for Certification (AFC) filed on December 27, 2013.

## PROPOSED PROJECT LOCATION AND DESCRIPTION

The AEC would be constructed on the site of the Alamitos Generating Station (AGS), an existing and operating power plant located at 690 North Studebaker Road in the city of Long Beach, Los Angeles County, California. The AEC project would be located on an approximately 21-acre site within the larger 71-acre AGS site. The project site is approximately 10 to 15 feet above mean sea level. The proposed project site is bounded to the north by Southern California Edison's (SCE) Alamitos switchyard and State Route 22 (East 7th Street); to the east by the San Gabriel River and, beyond that, the Los Angeles Department of Water and Power Haynes Generating Station; to the south by the former Plains West Coast Terminals petroleum storage facility and undeveloped property; and to the west by the Los Cerritos channel, AGS cooling-water canals, and the residences west of the channel. Land use in the region primarily includes urban development, industrial areas, undeveloped land, parklands, open space, and wetlands preserves. The AGS facility was built between 1955 and 1967. The facility included natural gas/oil, steam-turbine power generating units and was originally owned and operated by SCE. During the late 1990s, the electric industry was restructured, and SCE sold most of its generating facilities. In 1998, AES Southland purchased AGS from SCE.

The project site comprises Assessor's Parcel Numbers (APN) 7237-017-805, 7237-017-806, 7237-017-807, 7237-017-808, 7237-017-809, 7237-018-807, 7237-018-808, 7237-019-005 and 7237-019-808, and the construction lay down area consists of 10-acres of an adjacent parcel to the south (APN 7237-019-006).

The project description in the SAFC for the proposed AEC has changed from what was described in the AFC filed on December 27, 2013. The revised AEC would be a nominal 1,040-MW, natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility consisting of two power blocks to provide fast starting and stopping, reliable, and flexible multistage generating resources. Power Block 1 would consist of two natural-gas-fired combustion turbine generators (CTG) in a combined-cycle configuration (collectively AEC CCGT), with two unfired heat recovery steam generators (HRSG), one steam turbine generator (STG), an air-cooled condenser, an auxiliary boiler, and related ancillary equipment for a nominal 640 MW. Power Block 2 would consist of four natural gas-fired, simple-cycle CTGs with fin-fan coolers and ancillary facilities (collectively AEC SCGT) for a nominal 400 MW. The AEC is proposed to use potable water provided by the city of Long Beach Water Department (LBWD) for construction, operational process, and sanitary uses. This water would be supplied through existing onsite potable water lines.

The AEC would interconnect to the existing SCE 230-kilovolt (kV) switchyard adjacent to the northern side of the property. No new offsite natural gas lines would be necessary for the project. AEC would be supplied via the existing service pipeline for AGS Units 5 and 6 from the offsite 30-inch-diameter, high-pressure pipeline owned and operated by Southern California Gas Company (SoCalGas). Natural gas compressors, water treatment facilities, emergency services, and administration and maintenance buildings would be constructed within the existing site footprint. Storm water would be discharged into two retention basins and then ultimately to the San Gabriel River via existing storm water outfalls.

As described in the SAFC, the AEC CCGT would be located on the southern-most portion of the AEC site, on the former AGS fuel oil-storage site. AEC CCGT would include the following principal design elements:

- Two General Electric (GE) 7FA.05 CTGs with a nominal rating of 227 MW each. The CTGs would be equipped with evaporative coolers on the inlet air system and dry low oxides of nitrogen (NOx) combustors;
- Two HRSGs with no supplemental firing, each equipped with a selective catalytic reduction (SCR) unit in the ductwork for the control of NOx emissions, and an oxidation catalyst to control carbon monoxide (CO) and volatile organic compound (VOC) emissions;
- One, single-flow, impulse, down-exhaust-condensing STG with a nominal rating of approximately 229 MW;
- One air-cooled condenser;
- A new natural gas compressor and compressor building for the CCGT;
- One generator step-up (GSU) transformer per each GE 7FA combustion turbine generator and one for the steam turbine generator; and
- One 230-kV interconnection to the existing SCE switchyard, which is adjacent to the site.

The AEC SCGT would be located on the northern portion of the AEC site, adjacent to the San Gabriel River. The AEC SCGT would include the following principal design elements:

- Four GE Energy LMS 100 PB natural gas-fired CTGs with a nominal rating of 100 MW each;
- Each CTG would be equipped with SCR equipment containing catalysts to further reduce NOx emissions, and an oxidation catalyst to reduce CO emissions;
- Auxiliary equipment associated with each CTG would include an inlet-air-filter house with evaporative cooler, turbine intercooler and associated intercooler circulating pumps;
- Each pair of CTGs would share one fin-fan heat exchanger and one GSU transformer;
- A new natural gas compressor and compressor building for the SCGT; and
- One 230-kV interconnection to the existing onsite SCE 230-kV switchyard.

The two power blocks would share the following design elements:

- Direct connection to an existing SoCalGas 30-inch-diameter natural gas pipeline and metering station;
- Connection to existing onsite municipal and industrial water lines;
- Fire water and suppression systems;

- A new 1,000-linear-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system at the east end of East Vista Street in Long Beach;
- An existing storm water retention pond; and
- Water treatment and storage systems.

## OFFSITE INFRASTRUCTURE IMPROVEMENTS

The AEC would include a new 1,000 linear-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system and would eliminate the current practice of treatment and discharge of process/sanitary wastewater to the San Gabriel River. The upgrading of approximately 4,000 linear feet of the existing offsite LBWD sewer line downstream of the first point of interconnection discussed in the SAFC is no longer necessary and has been removed from the project design.

## PROJECT OBJECTIVES

The applicant's SAFC identifies the project's primary objective to design a project that provides local area capacity at the existing AGS site. In addition to the primary objective, these are the basic project objectives:

- Develop a project capable of providing energy, generating capacity, and ancillary electrical services (voltage support, spinning reserve, inertia) to satisfy Los Angeles Basin Local Reliability Area requirements and transmission grid support, particularly in the western subarea of the Los Angeles Basin.
- Provide fast starting and stopping, flexible, controllable, generation with the ability to ramp up and down through a wide range of electrical output to allow the efficient integration of renewable energy sources into the electrical grid, and replace older, once-through cooled and less efficient generation.
- Develop on a brownfield power plant site and use existing infrastructure, including the existing switchyard and related facilities, the SCE switchyard and transmission facilities, the SoCalGas natural gas pipeline system, the LBWD water connections, process water supply lines, and existing fire suppression and emergency service facilities.
- Use qualifying technology under the South Coast Air Quality Management District's Rule 1304(a)(2) exemption that allows for the replacement of older, less-efficient electric utility steam boilers with specific new generation technologies on a megawatt-to-megawatt basis (that is, the replacement megawatts are equal or less than the megawatts from the electric utility steam boilers).

Staff's alternatives analysis broadly interprets the applicant's project objectives to foster a complete and robust discussion of potential alternatives to the applicant's proposed project.

## PROJECT ALTERNATIVES

As required by CEQA staff evaluated a reasonable range of alternatives to the proposed project that would feasibly attain most of the basic objectives of the project and would avoid or substantially lessen any of the significant effects of the project. As a starting point, staff reviewed the alternatives analysis provided by the applicant in the SAFC. The applicant found that the alternatives considered in the SAFC were either infeasible, unable to reduce or avoid any adverse environmental impacts, or would not attain most of the basic objectives of the project; staff concurs with the applicant's assessment of their alternatives. The alternatives considered by staff in the FSA include one off-site alternative and the no-project alternative. The No-Project Alternative presented in staff's analysis evaluated a no-build scenario at the project site. Subsequently, the off-site alternative was eliminated from further consideration as infeasible, while the no-project alternative was carried forward for further evaluation. Staff also considered "preferred resources" (energy efficiency, demand response, utility-scale and distributed renewable generation, and storage) as alternatives to dispatchable natural gas-fired generation such as the proposed AEC. Staff has not identified a feasible alternative that would be environmentally superior to the proposed AEC.

## PUBLIC AND AGENCY COORDINATION

On January 15, 2014, the Energy Commission staff issued a notification of receipt of the Application for Certification, together with a project description, to property owners within 1,000 feet of the proposed project and those located within 500 feet of the linear facilities (such as transmission lines, gas lines and water lines.  See California Code of Regulations Title 20 section 1709.7(a)). These notices informed the public and agencies of the Commission's receipt and availability of the Supplemental AFC, discussed the Energy Commission's siting certification process, provided information on how the public can comment and participate in the proceeding, as well as provided a brief description of the project, and a link to a Commission-maintained project website http://www.energy.ca.gov/sitingcases/alamitos/index.html

## LIBRARIES

On January 15, 2014, the Energy Commission staff also sent copies of the Alamitos Energy Center AFC to the following libraries:

**Long Beach Main Library**
**101 Pacific Avenue**
**Long Beach, CA 90822**

**Long Beach Public Library – Los Altos Neighborhood**
**5614 E Britton Drive Long Beach, CA 95801**

**Bay Shore Neighborhood Library**
**195 Bay Shore Avenue**
**Long Beach, CA 90803**

**Los Alamitos-Rossmoor Library**
**12700 Montecito Road**
**Seal Beach, CA 90740**

**Brewitt Neighborhood Library**
**4036 E. Anaheim**
**Long Beach, CA 90804**

In addition to these local libraries, copies of the AFC were also made available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as state libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

## ENERGY COMMISSION'S PUBLIC ADVISER'S OFFICE

The Energy Commission's outreach program is also facilitated by the Public Adviser's Office (PAO). The PAO engages in continuous public outreach that has included placing a notice in the April 19, 2014 issue of the Long Beach Press-Telegram and Impacto USA newspapers announcing the Informational Hearing and Site Visit for this project that was held on April 29, 2014. The PAO also issued public notices informing the public of the availability of the project website where the public can obtain more information. The PAO requested public service announcements at a variety of organizations and distributed notices informing the public of the Commission's receipt of the AEC AFC.

## CONSULTATION WITH LOCAL NATIVE AMERICAN COMMUNITIES

Energy Commission staff sent written correspondence to the Native American Heritage Commission, as well as to a number of Native American tribes who have expressed an interest in being contacted about development projects in the AEC area. This correspondence served as an invitation for tribes to consult on the project. Please see the **CULTURAL RESOURCES** section of this staff assessment for details of staff's consultation with Native American tribes to date.

# SUMMARY OF PROJECT IMPACTS, MITIGATION, AND LORS COMPLIANCE

Staff concludes that with implementation of staff's recommended mitigation measures described in the conditions of certification, the AEC would comply with all applicable laws, ordinances, regulations, and standards (LORS). Staff also concludes that for all areas, significant adverse direct, indirect, and cumulative impacts would not occur. In the technical area of Air Quality, additional information is needed to demonstrate that all applicable LORS would be met, and all impacts would be mitigated to less than significant.

The conclusions reached in each technical area (chapter) are summarized in the table and discussed below. For a detailed review of potentially significant impacts, related mitigation measures, and LORS compliance, please refer to each chapter of the FSA.

**Executive Summary - Table 1**
**Summary of Environmental and Engineering Assessment**

| Technical Area | Complies with LORS | Impacts Mitigated | Additional Information Required |
|---|---|---|---|
| Air Quality/Greenhouse gases | | | **Yes** |
| Biological Resources | Yes | Yes | No |
| Cultural Resources | Yes | Yes | No |
| Facility Design | Yes | Yes | No |
| Geology and Paleontology | Yes | Yes | No |
| Hazardous Materials Management | Yes | Yes | No |
| Land Use | Yes | Yes | No |
| Noise and Vibration | Yes | Yes | No |
| Power Plant Efficiency | Yes | Yes | No |
| Power Plant Reliability | N/A | N/A | No |
| Public Health | Yes | Yes | No |
| Socioeconomics | Yes | Yes | No |
| Soil and Water Resources | Yes | Yes | No |
| Traffic and Transportation | Yes | Yes | No |
| Transmission Line Safety and Nuisance | Yes | Yes | No |
| Transmission System Engineering | Yes | N/A | No |
| Visual Resources | Yes | Yes | No |
| Waste Management | Yes | Yes | No |
| Worker Safety and Fire Protection | Yes | Yes | No |

## AIR QUALITY/GREENHOUSE GASES

Mitigation for operations would be provided in the form of Regional Clean Air Incentives Market (RECLAIM) Trading Credits and emission reduction credits to fully mitigate the project’s emissions of all nonattainment pollutants and their precursors at a minimum ratio of one-to-one. These mitigation measures are expected to reduce potential operational impacts of the proposed project to less than significant. However, staff cannot conclude whether or not the proposed project would comply with all applicable LORS. The South Coast Air Quality Management District (SCAQMD) has not yet published a Final Determination of Compliance (FDOC) and air quality impacts have not been fully mitigated because the applicant has not yet identified the source of offset credits for sulfur dioxide. Once these two items are addressed and assuming the FDOC contains sufficient information, staff concludes that with the adoption of the proposed conditions of certification, the AEC would not result in significant air quality related impacts during project construction or operation, and the project would comply with all applicable federal, state and SCAQMD air quality LORS.

The applicant expects to operate the proposed gas turbines below an annualized plant capacity factor of 60 percent. Therefore the proposed AEC would not be considered a base load facility and the turbines would not be subject to California’s Greenhouse Gases Emission Performance Standard. The project would emit over 25,000 metric tonnes of carbon dioxide equivalent emissions and therefore would be subject to mandatory state and federal greenhouse gas reporting and state cap-and-trade requirements.

## BIOLOGICAL RESOURCES

Vegetation in the project area is limited to weedy species and landscaping, and there is no natural wildlife habitat on site. Rare plants and special-status wildlife are not expected to occur on the site; however, nearby marshes and other natural areas support special-status species including the Pacific green sea turtle (federally listed threatened), Belding's savannah sparrow (state listed endangered), western snowy plover (federally listed threatened), California least tern (federally and state listed endangered), and California brown pelican (state fully protected). Staff concludes that the project, with implementation of proposed conditions of certification, would comply with all applicable LORS and direct, indirect, and cumulative impacts would be avoided, minimized, or mitigated to less than significant levels.

## CULTURAL RESOURCES

Staff concludes that the proposed AEC could result in significant, direct impacts on buried archaeological resources, which may qualify as historical or unique archaeological resources under CEQA. The adoption and implementation of staff's proposed conditions of certification would ensure that the applicant would be able to respond quickly and effectively in the event that archaeological resources are found buried beneath the project site during construction-related ground disturbance, and ensure the project complies with applicable LORS. In regard to historic built environment resources, staff concludes that two historical resources are present in the project area of analysis: the San Gabriel River and Los Cerritos channels. Both are historic-age engineered structures that figured prominently in regional flood control management. Staff concludes, however, that the proposed project would not affect either channel. In regard to ethnographic resources, staff concludes that a tribal cultural resource, the Puvunga Ceremonial Site Complex, is present in the project area of analysis. The Puvunga Ceremonial Site Complex is recommended as eligible for the California Register of Historical Resources under criteria 1–3. However, staff's analysis concludes that the construction and operation of the proposed project would not have a direct or indirect impact on this ethnographic tribal cultural resource.

## FACILITY DESIGN

Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the SAFC, and concludes that the design, construction, and eventual closure of the proposed project would comply with applicable engineering LORS. Staff's proposed conditions of certification would ensure that AEC is designed and constructed in accordance with applicable engineering LORS. This would be accomplished through design review, plan checking, and field inspections that would be performed by the Delegate Chief Building Official (CBO). Energy Commission staff would audit the CBO to ensure satisfactory performance.

## GEOLOGY AND PALEONTOLOGY

Staff concludes that the proposed AEC can be designed and constructed in accordance with all applicable LORS and in a manner that both protects environmental quality and assures public safety. The site is located in a geologically active area along the right bank of the San Gabriel River in coastal Southern California that could be subject to very strong levels of earthquake-related ground shaking. Therefore the effects of this shaking on structures must be mitigated. In addition to strong seismic shaking, the project may be subject to soil failure caused by liquefaction and/or dynamic compaction. A design-level geotechnical investigation required for the project by the California Building Code and staff's proposed conditions of certification would present standard engineering design requirements for mitigation of strong seismic shaking, liquefaction and potential excessive settlement due to dynamic compaction.

While not likely to occur during the project design life, the site is subject to inundation by tsunami. Sea level rise could exacerbate the potential for inundation. Staff recommends conditions of certification that would require the applicant to consider potential impacts from tsunami inundation on facility design and require the applicant to develop a tsunami hazard mitigation plan for preparedness and evacuation methods that would ensure public health and safety.

Fossils have not been found in close proximity to the project site. Potential impacts to paleontological resources due to construction activities are not likely. However if discovered during construction, they would be mitigated through worker training and monitoring by qualified paleontologists, as required by staff's proposed conditions of certification.

## HAZARDOUS MATERIALS MANAGEMENT

Staff concludes that the proposed project's storage and use of hazardous materials at the site would not present a significant impact to the public and the project would comply with all applicable LORS. In response to California Health and Safety Code, the applicant would be required to develop a risk management plan. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Long Beach Environmental Health Bureau and Energy Commission staff. In addition, staff's proposed conditions of certification require staff review and approval of the risk management plan prior to delivery of any hazardous materials to the AEC project site. Other proposed conditions of certification address the issue of the transportation, storage, and use, of aqueous ammonia and site security.

## LAND USE

The proposed project would be consistent with the applicable state and local LORS pertaining to land use planning, and would not cause a significant land use impact under the CEQA Guidelines. With the implementation of staff's proposed condition of certification, the applicant would be required to provide evidence that the project meets the design standards of the General Industrial Zone District of the Long Beach Zoning Code.

## NOISE AND VIBRATION

If built and operated in conformance with the proposed conditions of certification, it is staff's position that AEC would comply with all applicable noise and vibration LORS. Staff concludes that the project would produce no significant adverse noise impacts under CEQA guidelines on people within the project area, directly, indirectly, or cumulatively. Staff recommends conditions of certification addressing worker and employee protection, measurement and verification that noise performance criteria are met at project's noise-sensitive residential receptors, and restrictions on construction activities (i.e, construction noise restrictions, steam blow restrictions, and pile drive management). Also, staff's proposed conditions of certification require that nighttime concrete pouring activities remain within the required noise limits, and provide for a process of noise complaint investigation and resolution.

## POWER PLANT EFFICIENCY

Power Block 1 would be in a combined-cycle configuration with a maximum thermal efficiency of 56 percent lower heating value (LHV) at maximum full load and average design conditions. Power Block 2 would be a simple-cycle configuration with a maximum thermal efficiency of 41 percent LHV at maximum full load at average design conditions. While the project would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of providing fast-ramping capabilities and ancillary load-following services. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

## POWER PLANT RELIABILITY

Staff concludes that AEC would be built to operate in a manner consistent with industry norms for reliable operation and would be able to achieve the equivalent availability factor of approximately 98 percent predicted in the AFC. (The equivalent availability factor of a power plant is the percentage of time it is available to generate power, accounting for both planned and unplanned outages.) No conditions of certification are proposed for power plant reliability.

## PUBLIC HEALTH

Staff has conducted a health risk assessment for the proposed AEC and found no potentially significant adverse impacts for any receptors, including sensitive receptors. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the California Environmental Protection Agency Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased towards protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project, including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions, would not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure.

Staff incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health impact on any population in the area. Therefore staff concludes that construction and operation of the AEC would comply with all applicable LORS regarding long-term and short-term project impacts in the area of public health.

## SOCIOECONOMICS

Staff concludes that construction and operation of the AEC would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the project area's housing, schools, law enforcement services, or parks. Staff also concludes the project would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, parks, or law enforcement services. Staff's proposed conditions of certification would ensure project compliance with applicable LORS (i.e., school and police facility impact fees).

## SOIL AND WATER RESOURCES

Staff concludes that the proposed project would not have significant impacts on water quality and supply, and would comply with applicable LORS with the implementation of staff's proposed conditions of certification. The AEC proposes to use potable water during construction at an annual rate not to exceed approximately 22-acre-feet per year (AFY) (about 100 AF total) and 130 AFY for process and sanitary uses during operation. Once the Alamitos Generating Station ceases operation, after completion of construction of the AEC, the reduction in potable water use would be about 272 AFY, which would result in additional supplies for other beneficial uses.

Although the project would reduce potable water use relative to baseline conditions, staff conducted additional analysis to evaluate whether reclaimed water from nearby wastewater treatment plants or the city of Long Beach could be used as an alternative supply. Staff concluded that due to the small volume of water needed for operation, long distances to treatment plants and the nearest interconnection to the city's reclaimed water distribution system, it would be economically infeasible to use reclaimed water at this time. The AEC would include use of air cooled condensers for cooling of the steam cycle. This technology significantly reduces the potential for use of other water supplies and is encouraged in accordance with the Energy Commission's water policy. Development of alternative water supplies for remaining industrial uses does not appear to be feasible. Staff believes the project water use is consistent with Energy Commission water policy.

In addition, the project would use a number of systems to reuse wastewater and reduce wastewater volume. The proposed project would result in a reduction of 0.24 million gallons per day (mgd) in industrial wastewater discharge to the San Gabriel River and ultimately the Pacific Ocean and a similarly proportional decrease in pollutant loading associated with industrial wastewater, which would improve the water quality in the ocean and the Alamitos Bay.

The proposed project is located in Zone X and is separated from the 100-year flood stage (flood with a 1 percent probability of occurrence in any year) by at least six feet.

Recent Energy Commission studies show the project site and vicinity to be at increased risk of flooding due to relative sea level rise. However the proposed site would be sufficiently above sea level to ensure power plant reliability. Even with high-end estimates of relative sea-level rise of 61 centimeters (2.0 feet) by 2050 (relative to 2000), the site would still be about 4.0 feet above the current (2012) 100-year floodplain.

## TRAFFIC AND TRANSPORTATION

Staff concludes that the proposed project would comply with all applicable LORS and impacts on the transportation system would be less than significant with the implementation of staff's proposed conditions of certification. Conditions are proposed to require the applicant to comply with applicable local and state agency requirements for vehicle size and weights, vehicle licensing, truck routes, and other applicable limitations, and to obtain all necessary permits for roadway use and encroachment. In addition, the applicant would be required to prepare and implement a traffic control plan to minimize the project's effects on the levels of service of impacted roadways.

In regard to aviation safety, conditions of certification are proposed to require the applicant to notify the Federal Aviation Administration (FAA) prior to the use of tall construction equipment at the site and to install aviation warning marking and lighting on any construction equipment as required by FAA regulations. A condition of certification is proposed to require the applicant to request that the FAA implement various notifications advising pilots of the location of the power plant and the potential aviation hazards associated with thermal plumes, and to avoid direct overflight of the facility, consistent with the FAA's Aeronautical Information Manual.

## TRANSMISSION LINE SAFETY AND NUISANCE

The applicant proposes to build two new single-circuit or double-circuit 230-kilovolt (kV) lines to connect the proposed AEC to the existing California Independent System Operator (California ISO)-operated and SCE-owned 230-kV substation located within the AGS site. The proposed lines would lie entirely within the boundaries of the AGS site and no offsite lines would be necessary. Since the proposed 230-kV lines would be operated within the SCE service area, they would be designed, constructed, operated, routed, and maintained according to SCE's guidelines for line safety and field management which conform to applicable LORS. The proposed lines would lie within the boundaries of an existing, operating, power plant that would cease operations once AEC construction is complete. Since this is an existing power plant site and the connecting transmission lines would be short in length with no nearby residences, there would be no potential for the residential electric and magnetic field exposures, which have been of some health concern. With staff's proposed conditions of certification, any safety and nuisance impacts from construction and operation of the proposed line would be less than significant.

## TRANSMISSION SYSTEM ENGINEERING

The proposed project facilities from the generator to the interconnection with the SCE Alamitos switchyard, including the step-up transformer, the project switchyards, the 230-kV overhead transmission line, and the termination are acceptable, in accordance with good utility practices, and would comply with LORS. Staff expects the California ISO will find the AEC project to be substantially unchanged from the existing AGS plant and to have no significant impacts on the existing transmission system. The applicant has requested exemption from the California ISO generator interconnection study process in accordance with section 25.1 of the California ISO tariff which allows the California ISO to exempt a generator from the interconnection queue study process if the new generator is found to be substantially unchanged from the generator it replaces. The applicant is expected to submit the California ISO study report allowing exemption before staff publishes the Final Staff Assessment.

## VISUAL RESOURCES

The proposed project would be constructed at the site of the existing Alamitos Generating Station. Staff did not identify significant visual resources impacts at three of the four critical offsite viewpoints, referred to as key observation points or KOPs, used in the analysis. Impacts at the fourth, KOP 4, were found to be less than significant with mitigation. Staff evaluated the potential effects of the long-term schedule for the proposed construction of the AEC. Staff concludes that construction and commissioning activities would not substantially degrade the existing visual character and quality of the site and its surroundings. In addition, staff analyzed the potential for lighting of the project site and structures during construction, commissioning, and operation to create new sources of substantial light or glare. Staff proposes conditions of certification to reduce potential effects of lighting and glare on nighttime and daytime views to less than significant.

The project site is in the state's Coastal Zone. Section 30251 of the California Coastal Act requires that the scenic and visual qualities of coastal areas be considered and protected as resources of public importance. Permitted development must be sited and designed to restore and enhance visual quality in visually degraded areas where feasible. The applicant has indicated that a landscape design plan would be prepared for the AEC prior to commencement of construction. The plan would provide details as to how the project owner intends to enhance visual quality at the project site. Staff proposes a condition of certification to require preparation of landscaping plans prior to project implementation to satisfy the requirements of the city of Long Beach's South East Area Development and Improvement Plan Specific Plan, the certified local coastal program for this area of the state.

## WASTE MANAGEMENT

The proposed project would be located on 21-acres within the existing Alamitos Generating Station. The AGS site is a highly disturbed brownfield site that requires remediation. AES, the current property owner, or Southern California Edison, the previous owner, would ensure that impacted or contaminated areas on the AEC site are remediated where necessary. The applicant would also implement a Soil Management Plan to provide guidance for proper identification, handling, disposal, and containment of contaminated soil during demolition, construction and ground-disturbing activities. The AEC project's proposed waste management methods and mitigation measures, along with the proposed conditions of certification and demolition waste recycling and diversion requirements, would ensure that wastes generated by the proposed project would not result in a significant impact to local waste management and disposal facilities.

## WORKER SAFETY AND FIRE PROTECTION

Staff concludes that with the implementation of proposed conditions of certification there would be adequate levels of worker safety and fire protection, and the proposed project would comply with the applicable LORS. Staff recommends the applicant provide a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program to set forth the procedures to ensure worker safety and fire protection at the AEC. Staff confirmed that the Long Beach Fire Department would have the continued ability to provide emergency response for fires, hazardous materials spills, rescue, and routine code inspections during the construction and operation of the AEC.

## CUMULATIVE IMPACT ANALYSIS

Preparation of a cumulative impact analysis is required under CEQA. In the CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" (Cal. Code Regs., tit. 14, §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (Cal. Code Regs., tit. 14, §15130(a)(2)). Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (Cal. Code Regs., tit. 14, §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, "but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact" (Cal. Code Regs., tit. 14, §15130(b)).

## DEFINITION OF THE CUMULATIVE PROJECT SCENARIO

Cumulative impacts analysis is intended to identify past, present, and probable future actions that are closely related either in time or location to the project being considered, and consider how they have harmed or may harm the environment. Most of the projects on the Master Cumulative Project List presented in **Executive Summary Table 2** have, are, or will be required to undergo their own independent environmental reviews under CEQA. Staff created the AEC Master Cumulative Project List by contacting planning staff with the city of Long Beach, reviewing proposed project information from other agencies, including the cities of Cypress, Huntington Beach, Los Alamitos, Paramount, and Seal Beach, as well as the California Department of Transportation and the CEQAnet database.

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the “list approach” and the “projections approach.” The first approach would use a “list of past, present, and probable future projects producing related or cumulative impacts.” (Cal. Code Regs., tit. 14, §15130(b)(1)(A)). The second approach is to use a “summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.” (Cal. Code Regs., tit. 14, §15130(b)(1)(B)). This FSA uses the “list approach” for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of the proposed project. All projects used in the cumulative impacts analyses for this FSA are listed in the cumulative projects table (**Executive Summary Table 2**), and locations are shown on **Executive Summary Figure 1**.

## APPROACH TO CUMULATIVE IMPACT ANALYSIS

This FSA evaluates cumulative impacts within the analysis of each resource area, following three steps:

- Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the AEC could combine with those of other projects.
- Evaluate the effects of the AEC in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
- Evaluate the effects of the AEC with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

## Executive Summary Table 2
## AEC Master List of Cumulative Projects

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 1 | Alamitos Generating Station (AGS) Units 1 through 6 | Existing units to remain operational during AEC construction. After construction of the AEC, decommissioning of AGS is expected as the means to comply with the state's once-through-cooling policy. Based on a memorandum of understanding with the City of Long Beach, demolition of the existing Units 1–6 is to occur at a currently unknown time in the future, | 690 N. Studebaker Rd., Long Beach | 0.2 | Unknown |
| 2 | Los Cerritos Wetlands Conceptual Restoration Plan and Mitigation Bank | Synergy intends to establish a mitigation bank and wetlands habitat restoration area on the Synergy Oil Field. The mitigation bank would cover 76 acres. Restored wetlands would cover 72 acres of the 152-acre Synergy Oil Field. Project includes construction of public access improvements. Synergy would remove approximately 37 oil wells from the restoration area. It would conduct oil production activities, including drilling of 70 new oil wells. | Between the Pacific Coast Highway (PCH), Los Cerritos Channel, Studebaker Rd., and 2nd St., Long Beach | 0.2 | Environmental Review |
| 3 | Alamitos Generating Station Battery Energy Storage System (BESS) | BESS project at the AGS to include three 100 MW containment buildings, constructed in sequential phases from east to west. Each would contain two battery storage levels, electrical controls, and HVAC units. Construction proposed to start 3rd quarter 2019, after major mechanical completion of the AEC CCGT power block, with completion of the first 100-MW building planned for late 2020. The second and third 100-MW buildings to then be constructed and operational in 2021/2022. | North side of AEC project site, Long Beach | 0.3 | Planning Phase |
| 4 | Alamitos Barrier Improvement Project | This project has been recognized to produce significant noise and ground disturbance. Project involves construction and operation of up to 20 injection wells, four monitoring wells, and four piezometers along the existing alignment of the Alamitos Barrier. The project will be conducted under Orange County Water District Contract # AB-2014-1. | Multiple locations along the Los Alamitos Channel between San Gabriel River, El dorado Dr. and Canoe Brook Dr., Orange County | 0.4 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 5 | Los Angeles Dept. of Water and Power Haynes Generating Station | Addition of six LMS100 simple cycle gas turbines and two emergency diesel-powered generators. Project is a stationary emission source with active emission permit. | 6801 2nd St., Long Beach | 0.6 | Operational |
| 6 | Alamitos Bay Bridge Improvement Project | Improvements to the bridge are needed to enhance the safety of the structure and to maintain the level of service. Project could result in new bridge. | Project crosses the El Cerritos Channel on Pacific Coast Hwy., Long Beach | 0.9 | Environmental Review |
| 7 | PCH and 2nd | Demolition of the existing Seaport Marina Hotel and construction of a commercial center totaling approximately 250,000 sq ft of retail and restaurant space and a three-level enclosed parking structure. The proposed commercial structures would be one- and two- story buildings with a maximum height of 35 feet. The project is on a 10.93-acre site. | 6400 E Pacific Coast Hwy., Long Beach | 0.9 | Environmental Review |
| 8 | CalTrans #12, San Diego Freeway I-405 Improvement Project | I-405 Improvement Project would add one general purpose lane in each direction on I-405 from Euclid Street to the I-605 interchange, plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. | I-405 between SR-73 and I-605, Costa Mesa, Seal Beach | 1.0 | Planning Phase |
| 9 | Rehabilitation of Western Regional Sewers, Project No. 3-64 | Orange County Sanitation District proposes to rehabilitate and/or replace entire lengths of the Orange Western Sub-Trunk, Los Alamitos Sub-trunk, Westside Relief Interceptor, and the Seal Beach Interceptor regional pipelines. In addition to pipeline and manhole replacement and/or rehabilitation, project includes rehabilitation/replacement of the Westside Pump Station force main, reconstruction of the Westside Pump Station wet well, and construction of a new vent line from the wet well to the downstream manhole or construction of an odor control scrubber. | Follows public rights-of-way (streets and easements) in cities of La Palma, Buena Park, Cypress, Anaheim, Los Alamitos, Seal Beach, and community of Rossmoor. | 1.3 | Environmental Review |
| 10 | Alamitos Bay Marina Rehabilitation Project | Renovate the existing Marina facilities and enhance existing recreational boating facilities in the Marina. The project encourages boating use by providing upgraded ADA-compliant facilities, upgraded restrooms, and dredged basins to ensure safe navigation. Project would provide longer average slip lengths. The existing 1,967 slips in Basins 1 through 7 would be replaced by 1,646 slips in these Basins, at a loss of approximately 321 slips. | Alamitos Bay Marina adjacent to and northwest of the mouth of the San Gabriel River, Long Beach | 1.3 | Under Construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 11 | Ocean Place Residential Development | Construct single-family homes and open space park on about 11 acres (6-acre park). Approval of proposed 32 lots merged into a single lot for overnight lodging. | Area south of Marina Dr. between 1st St. and San Gabriel River, Long Beach | 1.6 | Planning Phase |
| 12 | Colorado Lagoon Restoration Project | The lagoon is an approximately 11.7-acre tidal water body that is connected to Alamitos Bay and the ocean through an underground tidal culvert to Marine Stadium. Project is to create habitat that can successfully establish and support native plant and animal communities in the long term, implement long-term water quality control measures, and enhance the Lagoon's value as a recreational resource. | Southeast portion of Long Beach, northwest of San Gabriel River mouth, and upstream from Marine Stadium and Alamitos Bay, Long Beach | 1.9 | Under Construction |
| 13 | Leeway Sailing Center Pier and Dock D3 | Rebuild Leeway Sailing Center with 5,300 sq ft of office and facilities, and 3,200 sq ft of boat storage. | 5437 E Ocean Blvd., Long Beach | 2.0 | Planning Phase |
| 14 | Sunset Gap Monitoring Well Project | Project involves destroying three wells that have reached the end of their lifespans and constructing six new wells. New wells will be installed on the Naval Weapons Station Seal Beach. Only off-site work is destruction of two wells to the south in Huntington Beach. | Near Case Rd. and Bolsa Ave., Seal Beach | 2.5 | Under Construction |
| 15 | Belmont Pool Revitalization | Demolition of the existing Belmont Pool complex (the indoor and outdoor features) and construction of a replacement indoor/outdoor pool complex. Spectator seating for approximately 3,500 people through a combination of permanent and portable seating. | 4000 East Olympic Plaza, Long Beach | 2.7 | Under Construction |
| 16 | Safran Senior Housing Project | Conversion of the Immanuel Community Church into a senior housing project consisting of 24 independent low- or very-low-income senior dwelling units, a manager's unit and associated amenities/common areas in 31,006 sq ft of floor area. Project includes demo of the existing single-family home and detached garage at 304 Obispo Avenue, for construction of a surface parking lot to serve the project. | 3215 E. 3rd St., Long Beach | 3.1 | Under Construction |
| 17 | Sunset / Huntington Harbor Maintenance Dredging and Waterline Installation Project | The City of Huntington Beach and the County of Orange are responsible for proposed Maintenance Dredging and Waterline Installation project components. | Edinger Ave. and Sunset Way, Huntington Beach | 3.2 | Under Construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 18 | Los Alamitos Medical Center Specific Plan | Replacing and adding new buildings to the existing facility on an 18-acre site, including constructing two four-story hospital buildings. Planned in three phases with anticipated construction period of 25 years. | 3751 Katella Ave., Los Alamitos | 3.2 | Under Construction |
| 19 | City of Long Beach East Division Police Substation | City of Long Beach is seeking a transfer of land under the Base Realignment and Closure (BRAC) program (or a transition of surplus military property to civilian uses); the project is also subject to environmental review under the National Environmental Policy Act (NEPA) (to be reviewed and approved by the U.S. Department of the Army). | 3800 East Willow St., Long Beach | 3.7 | Completed |
| 20 | Humboldt Bridge Preventative Maintenance Project | Maintenance activities on the existing Humboldt Drive bridge to restore the integrity of its original design. | Humboldt Dr. bridge, west of Humboldt Dr. and Wimbledon Lane intersection, Huntington Beach | 3.8 | Planning Phase |
| 21 | Barton Place | Project includes two components: a senior residential community and commercial/retail improvements along Katella Ave. It includes the subdivision of the site into nine separate lots. | Northeast corner of Katella Ave. and Enterprise Dr., Cypress | 3.8 | Planning Phase |
| 22 | Tennis Estates Tree Trimming and Management Plan | Analyzes environmental impacts associated with a proposal to permit the establishment of a Tree Trimming and Management Plan for the Tennis Estates Homeowners Association property in the Coastal Zone. Addresses maintenance and management procedures of trees that have provided heronry functions for birds protected under the Migratory Bird Treaty Act. | 16380 Wimbledon Lane, Huntington Beach | 3.9 | Under Construction |
| 23 | Rofael Marina and Caretaker Facility | Construction of marina on a 6,179 sq ft property. | 16926 Park Ave., Huntington Beach | 3.9 | Under Construction |
| 24 | Harmony Cove Marina Development | Amend the city's zoning map on the project site to allow the development of a 23-boat slip marina, an eating and drinking establishment with outdoor dining area and alcoholic beverage sales, and ancillary uses to the marina. | 3901 Warner Ave., Huntington Beach | 4.4 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 25 | Pacific Pointe East Development Project | Project involves construction of three industrial buildings on an approximately 25-acre site with a paved surface parking lot. Buildings would have an open floor plan and are intended for light industrial, light manufacturing, warehouse, office, and/or research and development land uses. | Southeast corner of Lakewood Blvd. and Conant St., Long Beach | 4.6 | Planning Phase |
| 26 | Airport Circle Residential Project | General plan amendment and zoning map amendment to change existing designations to Residential Medium High Density on a 2.5 acre site. Development of the site includes 45 condominium subdivision and associated open space. The site layout consists of 8 detached three-story buildings with four to eight attached dwelling units. Units are approximately 1,250-1,940 sq ft. | 16911 Airport Circle, Huntington Beach | 4.9 | Plan Check |
| 27 | 925 East Pacific Coast Highway Lease Acquisition Project | Demolition or rehabilitation of the existing project site building for the purposes of blight removal. The project site totals 15,795 sq ft (about 0.36 acre). | 925–945 E. Pacific Coast Hwy., Long Beach | 4.9 | Planning Phase |
| 28 | Douglas Park Rezone Project | Based on 2009 project description from addendum to the final Environmental Impact Report (EIR): Revised project to include up to approximately 3.75 million sq ft of commercial/light industrial uses (research and development uses), 250,000 sq ft of retail uses, and a hotel with 400 rooms. 10 acres of open space planned. The site covers 261 acres. | Bound by Carson St. on the north, the Airport south and southwest, Lakewood Blvd. on the east, and Lakewood Country Club Golf Course on the west. | 5.0 | Under Construction |
| 29 | Douglas Park Medical Office | Construction of three new industrial buildings with new parking stalls. | 3828 Schaufele Ave., Long Beach | 5.0 | Under construction |
| 30 | Brightwater | Construction of 347 single-family units, a community pool and clubhouse, and over 37 acres for habitat restoration and trails. 105.3 acres of the upper bench portion of the Bolsa Chica mesa. | 4884 Brightwater Dr., Huntington Beach | 5.1 | Under construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 31 | 207 Seaside Way Project | Construction of 113-unit multi-family apartment complex on the 0.67-acre site. Project would include a single structure consisting of eight levels (one subterranean level and seven aboveground levels). Bottom three levels would provide 144 on-site parking spaces. Apartment structure would be 85 feet above the East Seaside Way grade. Apartment units would include a mix of studios, and one- and two-bedroom configurations. Amenities include a cafe, fitness center, retail space, and a lobby. | 207 E Seaside Way Long Beach | 5.2 | Environmental Review |
| 32 | Urban Village on Long Beach | Project would improve three abutting parcels with a five-story building containing 129 condominium units and 175 parking stalls located in an integrated five-level parking garage. | 1081 Long Beach Blvd., Long Beach | 5.3 | Planning Phase |
| 33 | 1235 Long Beach Boulevard Mixed-Use Project | Construct 42,000 sq ft of ground floor commercial space, 186 senior rental housing units, and 170 condominium units. Requires demo of two existing commercial buildings. | 1235 Long Beach Blvd., Long Beach | 5.3 | Complete |
| 34 | Parkside Estates | Includes 111 single family residences, 23 acres of preserved, restored and enhanced open space, 1.6-acre neighborhood park, public trails, creation of a water quality treatment system that will treat over 25% of the dry-weather flow from Slater watershed that currently flows untreated to Bolsa Chica and the ocean. | West side of Graham St., south of Warner Ave., along East Garden Grove Wintersburg Flood Channel 17221, Huntington Beach | 5.3 | Planning Phase |
| 35 | Oceanaire Apartment | Construction of a 216-unit multi-family/mixed-use apartment complex on the 1.76-acre site. | 150 West Ocean Blvd., Long Beach | 5.3 | Under Construction |
| 36 | Pine Square Theater Conversion to Residential | Conversion of movie theater into 69 residential apartment units. | 250–270 Pacific Ave., Long Beach | 5.4 | Under Construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 37 | New Civic Center Project | Construction of new City Hall, new Port Building for Harbor Department administration, new and relocated Main Library, redeveloped Lincoln Park, residential development, and commercial mixed use development. Includes demolition of the former Long Beach Courthouse. | Downtown Long Beach on 15.87 acres. Separated into 2 discontinuous parcels generally bounded by 3rd St. to north, Pacific Ave. to east, Magnolia Ave. to west, and Ocean Blvd. to south., Long Beach | 5.5 | Under Construction |
| 38 | Aquarium of the Pacific "Pacific Visions" Expansion | Construction of a 23,330 sq ft addition to an existing 166,447 sq ft aquarium. The project will be designed and built to the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Gold standards with "add-alternate" design plans to bring the project to Platinum status if funding is available. | 100 Aquarium Way, Long Beach | 5.6 | Under Construction |
| 39 | 442 W. Ocean Boulevard Project | Construction of a 95-unit multi-family apartment complex on the 24,000 sq ft site. | 442 West Ocean Blvd., Long Beach | 5.6 | Environmental Review |
| 40 | Cypress Village Shopping Center | Remodel and upgrade the shopping center. Project includes: demolition of 6,982 sq ft of retail area, exterior façade remodel of existing buildings, and improvements to existing parking lot. | 9515–9575 Valley View St., Cypress | 5.7 | Environmental Review |
| 41 | Golden Shore Master Plan | Project includes three development options, a Residential Option and two Hotel Options, and all would be entitled through the city of Long Beach. The option ultimately constructed would be selected based on market conditions prevailing at the time entitlement is complete. | 6-9 Golden Shore, Long Beach | 5.9 | Planning Phase |
| 42 | Edinger Walmart | Proposed to establish a community oriented anchor use within the Beach and Edinger Corridors Specific Plan by occupying existing 100,865-sq ft vacant retail building within existing commercial center. Exterior building improvements include new paint and new primary entry doors. | 6856 Edinger Ave., Huntington Beach | 5.9 | Complete |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 43 | Drake Park Soccer Field | Create 64-acre park from Cesar E. Chavez Park to Drake Park and Loma Vista Park. Two new soccer fields are part of the project. Work primarily consists of demolition and grading, installation of drainage system, basketball court, synthetic soccer field, constructing Portland cement concrete infrastructure, installing asphalt paving, park furnishings, lighting and electrical, prefabricated restroom installation, underground water, sewer pipelines, electrical service, and landscape irrigation for approximate 8-acre site. | Along lower Los Angeles River in Long Beach to link Cesar E. Chavez Park to Drake Park and Loma Vista Park, Long Beach. | 5.9 | Under Construction |
| 44 | Shoemaker Bridge Replacement Project | Replace Shoemaker Bridge over the Los Angeles River with a new bridge located south of the existing bridge. Alternative 1 (no build), alternative 2 (re-purpose existing bridge for non-motorized transportation and recreational use, and alternative 3 (removal of existing bridge). Alternatives 2 and 3 include street improvements along West Shoreline Dr., 3rd St., 6th St., 7th St., Ocean Blvd., and Broadway Ave. NOP was published April of 2016. | Southern end of I-710, bisected by Los Angeles River, Long Beach | 5.9 | Environmental Review |
| 45 | Mackay Place Specific Plan | Construct 47 detached single-family homes around a central street system. Demolish all on-site buildings, parking lots, and grass and landscaped areas. | East of Walker St. and Delong St. intersection, Cypress | 6.0 | Planning Phase |
| 46 | Monogram Apartments (formerly Pedigo) | Four-story with lofts apartment building: 510 dwelling units, 25,815 sq. ft. public open space, 55,396 sq. ft. private open space, and approximately 5,097 sq. ft. leasing office wrapped around a six-level 862-space parking structure. (5 parcels located at the SW corner of Edinger Ave and Gothard St.) | 7262 Edinger Ave., Huntington Beach | 6.2 | Plan Check |
| 47 | Huntington Beach Lofts | 385 luxury residential units in five residential stories, located above approximately 10,000 square feet of street level retail and commercial uses. | 7400 Center Ave., Huntington Beach | 6.3 | Under Construction |
| 48 | Mitsubishi Cement Facility Modification Project | Modify existing cement import facility, including construction of four, 10,000-metric-ton storage and truck-loading silos; upgrade existing facilities and ship unloading equipment; and modify operating permit issued by South Coast Air Quality Management District for the facility. | 1150 Pier F Ave., Long Beach | 6.4 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 49 | Pacific Crane Maintenance Company Chassis Support Facility Project | Project is a chassis facility for the distribution, storage and maintenance of chassis used to move cargo containers. Facility components include: ingress and egress gates, admin and staff trailers, on-site parking spaces and designated areas for chassis storage, chassis maintenance, parts/miscellaneous storage, and tire support. | 1402 Pier B St., Long Beach | 6.4 | Planning Phase |
| 50 | The Boardwalk (Murdy Commons) | Construction of 487 dwelling units and 14,500 sq ft commercial area. First two phases have opened for occupancy. | 7461 Edinger Ave., Huntington Beach | 6.4 | Under Construction |
| 51 | The Village at Bella Terra | Planning Commission approved General Plan Amendment No. 10-001, Zoning Text Amendment No. 10-001, and Site Plan Review No. 10-001 for The Village at Bella Terra-Costco Wholesale, facilitating development of a regional commercial big-box retail with gasoline service station and a mixed-use retail and residential project. Construction of 154,113 sq ft Costco Wholesale store with tire sales/installation center, 16-pump gas station, and addition of two elevators on west side of the existing public parking structure. Project includes 467 multi-family residential units within four-story building along with approximately 13,500 sq ft of residential amenities, 17,500 sq ft of mixed-use retail and restaurant uses; additional 12,000 sq ft of freestanding retail and restaurants and a 1,920 sq ft pavilion building within landscaped greenbelt area. | 7777 Edinger Ave., Huntington Beach | 6.6 | Completed |
| 52 | Gerald Desmond Bridge Replacement Project | The Gerald Desmond Bridge Replacement Project will provide three lanes in each direction to improve traffic flow, emergency lanes on both sides to reduce traffic delays and safety hazards, and 205 feet of vertical clearance to accommodate the world's largest, "greener" vessels. | Gerald Desmond Bridge, Port of Long Beach | 7.0 | Under Construction |
| 53 | Riverwalk Residential Development Project | Construction of 131 detached single family homes on lots. | 4747 Daisy Ave., Long Beach | 7.8 | Planning Phase |
| 54 | Oregon Park | Develop a 3.3-acre lot with a neighborhood park. Proposed improvements would include a regulation soccer field with lights, a tot lot, group picnic area, walking path and prefabricated restrooms. A total of 42 parking spaces would be added and a portion of the public right of way. | 4951 Oregon Ave., Long Beach | 8.0 | Environmental Review |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 55 | North Village Center Redevelopment Project | Project involves redeveloping an approximately 6.3-acre site in Long Beach. Project is a mixed-use "village center" with the following primary components: up to 61 units of multi-family housing in a mix of row houses, courtyard units, and units built atop ground floor non-residential space; up to 36,000 sq ft of commercial retail space, including restaurant space, oriented primarily toward Atlantic Avenue, and; a public library and community center totaling 30,000 sq ft fronting Atlantic Avenue on the east block. A General Plan Amendment and Zoning Ordinance Amendment would be required to allow the proposed mix of uses and density. Parking for the project's residential components of the project would be provided as follows: two spaces per residential unit, and; guest parking to be provided through shared parking with the retail and institutional spaces based on the results of a shared parking analysis. The commercial components of the project would be parked at the shopping center standard of five spaces per 1,000 sq ft. | Bounded by South St., Linden Ave., 59th St., and Lime Ave, Long Beach | 8.1 | In Progress |
| 56 | Weber Metals Large Press Expansion | Proposed project includes expansion of the existing facility through installation of a new 60,000 ton forging press on the property. This proposed building would require an 85-foot deep excavation pit to house the press and a 65-foot high main roof to accommodate the height of the press. | 16706 Garfield Ave., Paramount | 8.9 | Planning Phase |
| 57 | Huntington Beach Energy Project | The 2014 Energy Commission licensed project is a natural gas fired, combined cycle, air-cooled 939-MW electrical generating facility. Project would require demolition of existing power plant and construction of project. The 2015 Petition to Amend the 2014 licensed project is a natural gas-fired, combined-cycle and simple-cycle, air-cooled 844-MW electrical generating facility. | Huntington Beach Generating Station, Huntington Beach | 10.9 | Licensed 2014. Demo in process with project completion 7.5 years later in the third quarter of 2022. PTA license submitted to Energy Commission is currently under review. Demo started in the first quarter of 2016 with project completion estimated 10 years later in the fourth quarter of 2025. |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| AQ-1 | U.S Government, Veterans Affairs Medical Center | Stationary emission source with active emission permit | 5901 E 7th St., Long Beach | 1.4 | Active |
| AQ-2 | Trend Offset Printing Services, Inc. | Stationary emission source with active emission permit | 3722 Catalina St., Los Alamitos | 3.3 | Active |

## ENVIRONMENTAL JUSTICE

The California Resources Agency recognizes that environmental justice (EJ) communities are commonly identified as those where residents are predominantly minorities or live below the poverty level; where residents have been excluded from the environmental policy setting or decision-making process; where they are subject to a disproportionate impact from one or more environmental hazards; and where residents experience disparate implementation of environmental regulations, requirements, practices, and activities in their communities. Environmental justice efforts attempt to address the inequities of environmental protection in these communities.

An EJ analysis is composed of the following:

- Identification of areas potentially affected by various emissions or impacts from a proposed project;
- Providing notice in appropriate languages (when possible) of the proposed project and opportunities for participation in public workshops to EJ communities;
- A determination of whether there is a significant population of minority persons, or persons below the poverty level living in an area potentially affected by the proposed project; and
- A determination of whether there may be a significant adverse impact on a population of minority persons or persons below the poverty level caused by the proposed project alone, or in combination with other existing and/or planned projects in the area.

California law defines EJ as “the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (Gov. Code §65040.12; Pub. Resources Code, §§ 71000-71400). All departments, boards, commissions, conservancies and special programs of the Resources Agency must consider EJ in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require EJ consideration may include:

- adopting regulations;
- enforcing environmental laws or regulations;
- making discretionary decisions or taking actions that affect the environment;

- providing funding for activities affecting the environment; and
- interacting with the public on environmental issues.

## DEMOGRAPHIC SCREENING ANALYSIS

As part of its CEQA analysis for the Alamitos Energy Center AFC, Energy Commission staff used 2010 U.S. Census data to identify the minority populations and the most recent U.S. Census data from the American Community Survey (ACS) to identify below-poverty level populations within the six-mile radius of the AEC. The demographic screening is based on: Environmental Justice: Guidance Under the National Environmental Policy Act (CEQ, 1997) and Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses (US EPA, 1998), which provides staff with information on outreach and public involvement.

**Socioeconomics Figure 1** shows that the presence of an EJ population based on race and ethnicity within the six-mile radius of the AEC site. **Socioeconomics Table 3** shows that the cities of Long Beach and Hawaiian Gardens have a higher percent of people living below the federal poverty level compared with those in the reference geographies of Long Beach-Lakewood Census County Division (CCD), North Coast CCD, and Anaheim-Santa Ana-Garden Grove CCD. Staff concludes that the below-poverty-level population constitutes an EJ population based on poverty. Please refer to the **SOCIOECONOMICS** section of this document for a discussion of how staff identifies the presence of EJ populations within the six-mile radius.

Staff in the 11 technical areas of Air Quality, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, and Waste Management has considered the impacts of the AEC on the EJ population.

## ADDITIONAL ENVIRONMENTAL JUSTICE POPULATION CONSIDERATIONS

Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses (US EPA 1998) encourages outreach to community-based organizations and tribal governments to identify those minority groups who utilize or are dependent upon natural and cultural resources that could be potentially affected by the proposed action. The Public Adviser's Office is responsible for outreach to local communities affected by a project. Cultural Resources staff initiates consultations with tribal governments to discern whether a proposed energy facility may impact cultural resources and related Native Americans practices.

## RESPONSE TO COMMENTS

**Comment:** *Page 1-2, Proposed Project Location and Description, 2nd paragraph – Assessor Parcel Number (APN) 7237-019-005 was inadvertently omitted from the list of applicable parcels. Please include this parcel in the list of AEC parcels.*

**Staff response:** Staff will add APN 7237-019-005.

**Comment:** *Page 1-5, Public and Agency Coordination, 1st paragraph – This paragraph indicates that property owners within 1,000 feet of the linears received a notification of the SAFC. However, page 2-4 (under the heading Initial Outreach Efforts) notes that staff issued the required notice within 500 feet of the linear facilities. Please reconcile these two conflicting statements.*

> **Staff response:** The minimum requirements for pubic noticing of the acceptance of any application for certification and initial information hearing under Title 20 section 1709.7 and section (a)(1)(E) of Appendix B is residence located 500 feet from linears and 1000 from the power plant. The language in the FSA will reflect these numbers.

All other comments and responses will be provided in each staff's technical analysis.

## CONCLUSION

The staff for the topics of Air Quality, Hazardous Materials Management, Noise and Vibration, Soil and Water Resources, Traffic and Transportation, Visual Resources, and Waste Management has proposed conditions of certification to reduce project impacts to less than significant. Therefore, with implementation of these conditions, impacts would be reduced to less than significant for any population in the project's six-mile radius, including the EJ population.

Land Use, Public Health, and Transmission Line Safety and Nuisance staff concludes that the project impacts related to their technical area would be less than significant and therefore would have a less than significant impact to any population in the project's six-mile radius, including the EJ population.

## REFERENCES

**AEC 2015f** – Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.CH2 2016y – CH2MHill (TN 212487). Preliminary Staff Assessment Initial Comments, dated July 27, 2016. Submitted to CEC/Dockets on July 27, 2016

**CEQ 1997** – Council on Environmental Quality. Environmental Justice: Guidance Under the National Environmental Policy Act. December 10, 1997, http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf .

**US EPA 1998** – United States Environmental Protection Agency, Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. April 1998. http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_epa0498.pdf

The AEC Master Cumulative Project List presented in **Executive Summary Table 1** was created by contacting planning staff with the city of Long Beach, reviewing proposed project information from other agencies including the cities of Cypress, Huntington Beach, Los Alamitos, Paramount, and Seal Beach, as well as the California Department of Transportation and the CEQANet database.

## Executive Summary Table 1
## AEC Master List of Cumulative Projects

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 1 | Alamitos Generating Station (AGS) Units 1 through 6 | Existing units to remain operational during AEC construction. After construction of the AEC, demolition of the existing Units 1–6 to occur according to MOU with the City. | 690 N. Studebaker Rd., Long Beach | 0.2 | Unknown |
| 2 | Los Cerritos Wetlands Conceptual Restoration Plan and Mitigation Bank | Synergy intends to establish a mitigation bank and wetlands habitat restoration area on the Synergy Oil Field. Mitigation bank would cover 76 acres and restored wetlands would cover 72 acres of the 152 acre Synergy Oil Field. Project includes construction of public access improvements. Synergy would remove approximately 37 oil wells from the restoration area. It would conduct oil production activities, including drilling of 70 new oil wells. | Between the PCH, Los Cerritos Channel, Studebaker Rd., and 2nd St., Long Beach | 0.2 | Environmental Review |
| 3 | Alamitos Energy Station Battery Energy Storage System (BESS) | BESS project at the AGS to include three 100 MW containment buildings, constructed in sequential phases from east to west. Each would contain two battery storage levels, electrical controls, and HVAC units. Construction proposed to start 3rd quarter 2019, after major mechanical completion of the AEC CCGT power block, with completion of the first 100-MW building planned for late 2020. The second and third 100 MW buildings to then be constructed and operational in 2021/2022. | North side of AEC project site, Long Beach | 0.3 | Planning Phase |
| 4 | Alamitos Barrier Improvement Project | This project has been recognized to produce significant noise and ground disturbance. Project involves construction and operation of up to 20 injection wells, four monitoring wells, and four piezometers along the existing alignment of the Alamitos Barrier. The project will be conducted under Orange County Water District Contract # AB-2014-1. | Multiple locations along the Los Alamitos Channel between San Gabriel River, El dorado Dr. and Canoe Brook Dr., Orange County | 0.4 | Planning Phase |
| 5 | Los Angeles Dept. of Water and Power Haynes Generating Station | Addition of six LMS100 simple cycle gas turbines and two emergency diesel-powered generators. Project is a stationary emission source with active emission permit. | 6801 2nd St., Long Beach | 0.6 | Under Construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 6 | Alamitos Bay Bridge Improvement Project | Improvements to the bridge are needed to enhance the safety of the structure and to maintain the level of service. Project could result in new bridge. | Project crosses the El Cerritos Channel on Pacific Coast Hwy., Long Beach | 0.9 | Environmental Review |
| 7 | PCH and 2nd | Demolition of the existing Seaport Marina Hotel and construction of a commercial center totaling approximately 250,000 sq ft of retail and restaurant space and a three level enclosed parking structure. The proposed commercial structures would be one- and two- story buildings with a maximum height of 35 feet. The project is on a 10.93-acre site. | 6400 E Pacific Coast Hwy., Long Beach | 0.9 | Environmental Review |
| 8 | CalTrans #12, San Diego Freeway I-405 Improvement Project | I-405 Improvement Project would add one GP lane in each direction on I-405 from Euclid Street to the I-605 interchange, plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. | I-405 between SR-73 and I-605, Costa Mesa, Seal Beach | 1.0 | Planning Phase |
| 9 | Rehabilitation of Western Regional Sewers, Project No. 3-64 | Orange County Sanitation District proposes to rehabilitate and/or replace entire lengths of the Orange Western Sub-Trunk, Los Alamitos Sub-trunk, Westside Relief Interceptor, and the Seal Beach Interceptor regional pipelines. In addition to pipeline and manhole replacement and/or rehabilitation, project includes rehabilitation/replacement of the Westside Pump Station force main, reconstruction of the Westside Pump Station wet well, and construction of a new vent line from the wet well to the downstream manhole or construction of an odor control scrubber. | Follows public rights-of-way (streets and easements) in cities of La Palma, Buena Park, Cypress, Anaheim, Los Alamitos, Seal Beach, and community of Rossmoor. | 1.3 | Environmental Review |
| 10 | Alamitos Bay Marina Rehabilitation Project | Renovate the existing Marina facilities and enhance existing recreational boating facilities in the Marina. The project encourages boating use by providing upgraded ADA- compliant facilities, upgraded restrooms, and dredged basins to ensure safe navigation. Project would provide longer average slip lengths. The existing 1,967 slips in Basins 1 through 7 would be replaced by 1,646 slips in these Basins, at a loss of approximately 321 slips. | Alamitos Bay Marina adjacent to and northwest of the mouth of the San Gabriel River, Long Beach | 1.3 | Under Construction |
| 11 | Ocean Place Residential Development | Construct single-family homes and open space park on about 11 acres (6-acre park). Approval of proposed 32 lots merged into a single lot for overnight lodging. | Area south of Marina Dr. between 1st St. and San Gabriel River, Long Beach | 1.6 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 12 | Colorado Lagoon Restoration Project | The lagoon is an approximately 11.7 acre tidal water body that is connected to Alamitos Bay and the ocean through an underground tidal culvert to Marine Stadium. Project is to create habitat that can successfully establish and support native plant and animal communities in the long term, implement long-term water quality control measures, and enhance the Lagoon's value as a recreational resource. | Southeast portion of Long Beach, northwest of San Gabriel River mouth, and upstream from Marine Stadium and Alamitos Bay, Long Beach | 1.9 | Under Construction |
| 13 | Leeway Sailing Center Pier and Dock D3 | Rebuild Leeway Sailing Center with 5,300 sq ft of office and facilities, and 3,200 sq ft of boat storage. | 5437 E Ocean Blvd., Long Beach | 2.0 | Planning Phase |
| 14 | Sunset Gap Monitoring Well Project | Project involves destroying three wells that have reached the end of their lifespans and constructing six new wells. New wells will be installed on the Naval Weapons Station Seal Beach. Only off-site work is destruction of two wells to the south in Huntington Beach. | Near Case Rd. and Bolsa Ave., Seal Beach | 2.5 | Under Construction |
| 15 | Belmont Pool Revitalization | Demolition of the existing Belmont Pool complex (the indoor and outdoor features) and construction of a replacement indoor/outdoor pool complex. Spectator seating for approximately 3,500 people through a combination of permanent and portable seating. | 4000 East Olympic Plaza, Long Beach | 2.7 | Under Construction |
| 16 | Safran Senior Housing Project | Conversion of the Immanuel Community Church into a senior housing project consisting of 24 independent low- or very-low-income senior dwelling units, a manager's unit and associated amenities/common areas in 31,006 sq ft of floor area. Project includes demo of the existing single-family home and detached garage at 304 Obispo Avenue, for construction of a surface parking lot to serve the project. | 3215 E. 3rd St., Long Beach | 3.1 | Under Construction |
| 17 | Sunset/Huntington Harbor Maintenance Dredging and Waterline Installation Project | The City of Huntington Beach and the County of Orange are responsible for proposed Maintenance Dredging and Waterline Installation project components. | Edinger Ave. and Sunset Way, Huntington Beach | 3.2 | Under Construction |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 18 | Los Alamitos Medical Center Specific Plan | Replacing and adding new buildings to the existing facility on an 18-acre site, including constructing two four-story hospital buildings. Planned in three phases with anticipated construction period of 25 years. | 3751 Katella Ave., Los Alamitos | 3.2 | Under Construction |
| 19 | City of Long Beach East Division Police Substation | City of Long Beach is seeking a transfer of land under the Base Realignment and Closure (BRAC) program (or a transition of surplus military property to civilian uses); the project is also subject to environmental review under NEPA (to be reviewed and approved by the U.S. Department of the Army). | 3800 East Willow St., Long Beach | 3.7 | Completed |
| 20 | Humboldt Bridge Preventative Maintenance Project | Maintenance activities on the existing Humboldt Drive bridge to restore the integrity of its original design. | Humboldt Dr. bridge, west of Humboldt Dr. and Wimbledon Lane intersection, Huntington Beach | 3.8 | Planning Phase |
| 21 | Barton Place | Project includes two components: a senior residential community and commercial/retail improvements along Katella Ave. It includes the subdivision of the site into nine separate lots. | Northeast corner of Katella Ave. and Enterprise Dr., Cypress | 3.8 | Planning Phase |
| 22 | Tennis Estates Tree Trimming and Management Plan | Analyzes environmental impacts associated with a proposal to permit the establishment of a Tree Trimming and Management Plan for the Tennis Estates Homeowners Association property in the Coastal Zone. Addresses maintenance and management procedures of trees that have provided heronry functions for birds protected under the Migratory Bird Treaty Act. | 16380 Wimbledon Lane, Huntington Beach | 3.9 | Under Construction |
| 23 | Rofael Marina and Caretaker Facility | Construction of marina on a 6,179 sq ft property. | 16926 Park Ave., Huntington Beach | 3.9 | Under Construction |
| 24 | Harmony Cove Marina Development | Amend the City's Zoning Map on the project site to allow the development of a 23-boat slip marina, an eating and drinking establishment with outdoor dining area and alcoholic beverage sales, and ancillary uses to the marina. | 3901 Warner Ave., Huntington Beach | 4.4 | Planning Phase |
| 25 | Pacific Pointe East Development Project | Project involves construction of three industrial buildings on an approximately 25-acre site with a paved surface parking lot. Buildings would have an open floor plan and are intended for light industrial, light manufacturing, warehouse, office, and/or research and development land uses. | Southeast corner of Lakewood Blvd. and Conant St., Long Beach | 4.6 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 26 | Airport Circle Residential Project | General Plan Amendment and Zoning Map Amendment to change existing designations to Residential Medium High Density on a 2.5 acre site. Development of the site includes 45 condominium subdivision and associated open space. The site layout consists of 8 detached three-story buildings with four to eight attached dwelling units. Units are approximately 1,250-1,940 sq ft. | 16911 Airport Circle, Huntington Beach | 4.9 | Plan Check |
| 27 | 925 East Pacific Coast Highway Lease Acquisition Project | Demolition or rehabilitation of the existing project site building for the purposes of blight removal. The project site totals 15,795 sq ft (about 0.36 acre). | 925–945 E. Pacific Coast Hwy., Long Beach | 4.9 | Planning Phase |
| 28 | Douglas Park Rezone Project | Based on 2009 project description from addendum to the final EIR: Revised project to include up to approximately 3.75 million sq ft of commercial/light industrial uses (research and development uses), 250,000 sq ft of retail uses, and a hotel with 400 rooms. 10 acres of open space planned. The site covers 261 acres. | Bound by Carson St. on the north, the Airport south and southwest, Lakewood Blvd. on the east, and Lakewood Country Club Golf Course on the west. | 5.0 | Under Construction |
| 29 | Douglas Park Medical Office | Construction of three new industrial buildings with new parking stalls. | 3828 Schaufele Ave., Long Beach | 5.0 | Under construction |
| 30 | Brightwater | Construction of 347 single-family units, a community pool and clubhouse, and over 37 acres for habitat restoration and trails. 105.3 acres of the upper bench portion of the Bolsa Chica mesa. | 4884 Brightwater Dr., Huntington Beach | 5.1 | Under construction |
| 31 | 207 Seaside Way Project | Construction of 113-unit multi-family apartment complex on the 0.67-acre site. Project would include a single structure consisting of eight levels (one subterranean level and seven aboveground levels). Bottom three levels would provide 144 on-site parking spaces. Apartment structure would be 85 feet above the East Seaside Way grade. Apartment units would include a mix of studios, and one- and two-bedroom configurations. Amenities include a cafe, fitness center, retail space, and a lobby. | 207 E Seaside Way Long Beach | 5.2 | Environmental Review |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 32 | Urban Village on Long Beach | Project would improve three abutting parcels with a five-story building containing 129 condominium units and 175 parking stalls located in an integrated five-level parking garage. | 1081 Long Beach Blvd., Long Beach | 5.3 | Planning Phase |
| 33 | 1235 Long Beach Boulevard Mixed-Use Project | Construct 42,000 sq ft of ground floor commercial space, 186 senior rental housing units, and 170 condominium units. Requires demo of two existing commercial buildings. | 1235 Long Beach Blvd., Long Beach | 5.3 | Complete |
| 34 | Parkside Estates | Includes 111 single family residences, 23 acres of preserved, restored and enhanced open space, 1.6-acre neighborhood park, public trails, creation of a water quality treatment system that will treat over 25% of the dry-weather flow from Slater watershed that currently flows untreated to Bolsa Chica and the ocean. | West side of Graham St., south of Warner Ave., along East Garden Grove Wintersburg Flood Channel 17221, Huntington Beach | 5.3 | Planning Phase |
| 35 | Oceanaire Apartment | Construction of a 216-unit multi-family/mixed-use apartment complex on the 1.76-acre site. | 150 West Ocean Blvd., Long Beach | 5.3 | Under Construction |
| 36 | Pine Square Theater Conversion to Residential | Conversion of movie theater into 69 residential apartment units. | 250–270 Pacific Ave., Long Beach | 5.4 | Under Construction |
| 37 | New Civic Center Project | Construction of new City Hall, new Port Building for Harbor Department administration, new and relocated Main Library, redeveloped Lincoln Park, residential development, and commercial mixed use development. Includes demolition of the former Long Beach Courthouse. | Downtown Long Beach on 15.87 acres. Separated into 2 discontinuous parcels generally bounded by 3rd St. to north, Pacific Ave. to east, Magnolia Ave. to west, and Ocean Blvd. to south., Long Beach | 5.5 | Under Construction |
| 38 | Aquarium of the Pacific "Pacific Visions" Expansion | Construct of a 23,330 sq ft addition to an existing 166,447 sq ft aquarium. The project will be designed and built to the USGBC's LEED Gold standards with "add-alternate" design plans to bring the project to Platinum status if funding is available. | 100 Aquarium Way, Long Beach | 5.6 | Under Construction |
| 39 | 442 W. Ocean Boulevard Project | Construction of a 95-unit multi-family apartment complex on the 24,000 sq ft site. | 442 West Ocean Blvd., Long Beach | 5.6 | Environmental Review |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 40 | Cypress Village Shopping Center | Remodel and upgrade the shopping center. Project includes: demolition of 6,982 sq ft of retail area, exterior façade remodel of existing buildings, and improvements to existing parking lot. | 9515–9575 Valley View St., Cypress | 5.7 | Environmental Review |
| 41 | Golden Shore Master Plan | Project includes three development options, a Residential Option and two Hotel Options, and all would be entitled through the City of Long Beach. The option ultimately constructed would be selected based on market conditions prevailing at the time entitlement is complete. | 6-9 Golden Shore, Long Beach | 5.9 | Planning Phase |
| 42 | Edinger Walmart | Proposed to establish a community oriented anchor use within the Beach and Edinger Corridors Specific Plan by occupying existing 100,865-sq ft vacant retail building within existing commercial center. Exterior building improvements include new paint and new primary entry doors. | 6856 Edinger Ave., Huntington Beach | 5.9 | Complete |
| 43 | Drake Park Soccer Field | Create 64-acre park from Cesar E. Chavez Park to Drake Park and Loma Vista Park. Two new soccer fields are part of the project. Work primarily consists of demolition and grading, installation of drainage system, basketball court, synthetic soccer field, constructing Portland cement concrete infrastructure, installing asphalt paving, park furnishings, lighting and electrical, prefabricated restroom installation, underground water, sewer pipelines, electrical service, and landscape irrigation for approximate 8-acre site. | Along lower Los Angeles River in Long Beach to link Cesar E. Chavez Park to Drake Park and Loma Vista Park, Long Beach. | 5.9 | Under Construction |
| 44 | Shoemaker Bridge Replacement Project | Replace Shoemaker Bridge over the Los Angeles River with a new bridge located south of the existing bridge. Alternative 1 (no build), alternative 2 (re-purpose existing bridge for non-motorized transportation and recreational use, and alternative 3 (removal of existing bridge). Alternatives 2 and 3 include street improvements along West Shoreline Dr., 3rd St., 6$^{th}$ St., 7$^{th}$ St., Ocean Blvd., and Broadway Ave. NOP was published April of 2016. | Southern end of I-710, bisected by Los Angeles River, Long Beach | 5.9 | Environmental Review |
| 45 | Mackay Place Specific Plan | Construct 47 detached single-family homes around a central street system. Demolish all on-site buildings, parking lots, and grass and landscaped areas. | East of Walker St. and Delong St. intersection, Cypress | 6.0 | Planning Phase |

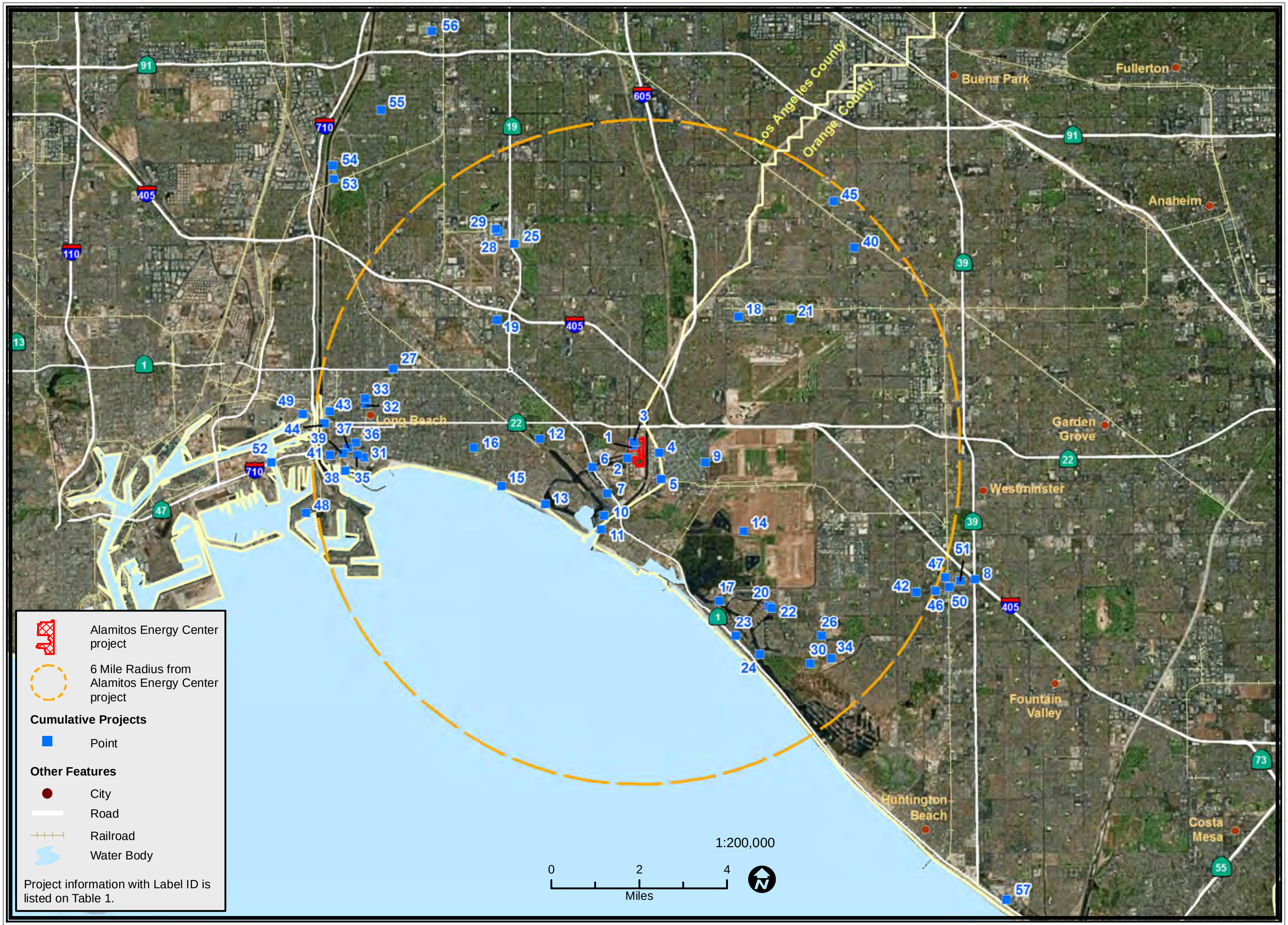
| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 46 | Monogram Apartments (formerly Pedigo) | Four-story with lofts apartment building: 510 dwelling units, 25,815 sq. ft. public open space, 55,396 sq. ft. private open space, and approximately 5,097 sq. ft. leasing office wrapped around a six-level 862-space parking structure. (5 parcels located at the SW corner of Edinger Ave and Gothard St.) | 7262 Edinger Ave., Huntington Beach | 6.2 | Plan Check |
| 47 | Huntington Beach Lofts | 385 luxury residential units in five residential stories, located above approximately 10,000 square feet of street level retail and commercial uses. | 7400 Center Ave., Huntington Beach | 6.3 | Under Construction |
| 48 | Mitsubishi Cement Facility Modification Project | Modify existing cement import facility, including construction of four, 10,000-metric-ton storage and truck loading silos; upgrade existing facilities and ship unloading equipment; and modify operating permit issued by SCAQMD for the facility. | 1150 Pier F Ave., Long Beach | 6.4 | Planning Phase |
| 49 | Pacific Crane Maintenance Company Chassis Support Facility Project | Project is a chassis facility for the distribution, storage and maintenance of chassis used to move cargo containers. Facility components include: ingress and egress gates, admin and staff trailers, on-site parking spaces and designated areas for chassis storage, chassis maintenance, parts/miscellaneous storage, and tire support. | 1402 Pier B St., Long Beach | 6.4 | Planning Phase |
| 50 | The Boardwalk (Murdy Commons) | Construction of 487 dwelling units and 14,500 sq ft commercial area. First two phases have opened for occupancy. | 7461 Edinger Ave., Huntington Beach | 6.4 | Under Construction |
| 51 | The Village at Bella Terra | Planning Commission approved General Plan Amendment No. 10-001, Zoning Text Amendment No. 10-001, and Site Plan Review No. 10-001 for The Village at Bella Terra-Costco Wholesale, facilitating development of a regional commercial big-box retail with gasoline service station and a mixed-use retail and residential project. Construction of 154,113 sq ft Costco Wholesale store with tire sales/installation center, 16-pump gas station, and addition of two elevators on west side of the existing public parking structure. Project includes 467 multi-family residential units within four-story building along with approximately 13,500 sq ft of residential amenities, 17,500 sq ft of mixed-use retail and restaurant uses; additional 12,000 sq ft of freestanding retail and restaurants and a 1,920 sq ft pavilion building within landscaped greenbelt area. | 7777 Edinger Ave., Huntington Beach | 6.6 | Completed |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 52 | Gerald Desmond Bridge Replacement Project | The Gerald Desmond Bridge Replacement Project will provide three lanes in each direction to improve traffic flow, emergency lanes on both sides to reduce traffic delays and safety hazards, and 205 feet of vertical clearance to accommodate the world's largest, "greener" vessels. | Gerald Desmond Bridge, Port of Long Beach | 7.0 | Under Construction |
| 53 | Riverwalk Residential Development Project | Construction of 131 detached single family homes on lots. | 4747 Daisy Ave., Long Beach | 7.8 | Planning Phase |
| 54 | Oregon Park | Develop a 3.3-acre lot with a neighborhood park. Proposed improvements would include a regulation soccer field with lights, a tot lot, group picnic area, walking path and prefabricated restrooms. A total of 42 parking spaces would be added and a portion of the public right of way. | 4951 Oregon Ave., Long Beach | 8.0 | Environmental Review |
| 55 | North Village Center Redevelopment Project | Project involves redeveloping an approximately 6.3-acre site in Long Beach with a mixed-use “village center” project. Project is a mixed-use “village center” with the following primary components: up to 61 units of multi-family housing in a mix of row houses, courtyard units, and units built atop ground floor non-residential space; up to 36,000 sq ft of commercial retail space, including restaurant space, oriented primarily toward Atlantic Avenue, and; a public library and community center totaling 30,000 sq ft fronting Atlantic Avenue on the east block. A General Plan Amendment and Zoning Ordinance Amendment would be required to allow the proposed mix of uses and density. Parking for the project's residential components of the project would be provided as follows: two spaces per residential unit, and; guest parking to be provided through shared parking with the retail and institutional spaces based on the results of a shared parking analysis. The commercial components of the project would be parked at the shopping center standard of five spaces per 1,000 sq ft. | Bounded by South St., Linden Ave., 59th St., and Lime Ave, Long Beach | 8.1 | In Progress |
| 56 | Weber Metals Large Press Expansion | Proposed project includes expansion of the existing facility through installation of a new 60,000 ton forging press on the property. This proposed building would require an 85- foot deep excavation pit to house the press and a 65-foot high main roof to accommodate the height of the press. | 16706 Garfield Ave., Paramount | 8.9 | Planning Phase |

| ID # | Project Name | Project Description | Location | Distance to AEC (Miles) | Status |
|---|---|---|---|---|---|
| 57 | Huntington Beach Energy Project | The 2014 Energy Commission licensed project is a natural gas fired, combined cycle, air-cooled 939-MW electrical generating facility. Project would require demolition of existing power plant and construction of project. The 2015 Petition to Amend the 2014 licensed project is a natural gas fired, combined cycle and simple-cycle, air-cooled 844-MW electrical generating facility. | Huntington Beach Generating Station, Huntington Beach | 10.9 | Under Construction |
| AQ-1 | U.S Government, Veterans Affairs Medical Center | Stationary emission source with active emission permit | 5901 E 7th St., Long Beach | 1.4 | Active |
| AQ-2 | Trend Offset Printing Services, Inc. | Stationary emission source with active emission permit | 3722 Catalina St., Los Alamitos | 3.3 | Active |

**EXECUTIVE SUMMARY - FIGURE 1**

Alamitos Energy Center - Cumulative Projects




**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**

SOURCE: OpenStreetMap January 2014, ESRI, Bing Aerial Image

# INTRODUCTION

Keith Winstead

## PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA) is the California Energy Commission (Energy Commission) staff's independent analysis of the proposed Alamitos Energy Center (AEC). This FSA is a staff document. It is not a Committee document, nor a draft decision. The FSA describes the following:

- the proposed project;
- the existing environment;
- staff's analysis of whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations, and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- the potential impacts of the project in conjunction with other existing and known planned developments;
- mitigation measures proposed by the applicant, interested agencies, intervenor, city of Long Beach and staff, which may lessen or eliminate potential impacts;
- staff's proposed conditions of certification (conditions) under which the project should be constructed and operated, if it is certified; and
- project alternatives.

Information for the analysis contained in this PSA comes from the following:

- the Application for Certification (AFC) and Supplemental AFC;
- responses to data requests;
- information from the local, state, federal agencies, interested organizations, and individuals;
- existing documents and publications;
- independent research; and
- comments made at public workshops or submitted in writing.

The analyses contained in this FSA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent research, and 6) public comments. The FSA presents conclusions about potential environmental impacts and conformity with LORS, as well as proposed mitigation in the form of conditions of certification (COCs) that apply to the design, construction, operation and closure of the facility. The analyses for most technical areas include discussions of proposed COCs. The COCs contain staff's recommended measures to mitigate the project's environmental impacts and to ensure conformance with LORS. Each proposed COC is followed by a proposed means of "verification" to ensure the COCs are implemented. The Energy Commission analysis was prepared in accordance with Public Resources Code section 25500 et seq., Title 20, California Code of Regulations section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.).

## ORGANIZATION OF THE FSA

The FSA contains the Executive Summary, this Introduction, and a Project Description. The report then discusses 21 environmental and engineering technical sections and potential alternatives to the proposed project. Finally, the report will conclude with a discussion of facility closure, project demolition, construction, and operation compliance monitoring plans, and a list of staff that assisted in preparing this report, including their declarations and resumes.

Each section of the environmental and engineering assessment includes:

- applicable laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- Response to comments received on the PSA
- conclusions and recommendations; and
- conditions of certification for both construction and operation, if applicable.

## ENERGY COMMISSION SITING PROCESS

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). The Energy Commission must review thermal power plant applications for certification (AFC) to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts, and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25519 and § 25523(d)).

The Energy Commission's siting regulations require staff to independently review the AFC, assess whether all of the potential environmental impacts have been properly identified, and whether additional mitigation or other more effective mitigation measures are necessary, feasible, and available (Cal. Code Regs., tit. 20, § 1742). In addition, staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1742). Staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations, and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of CEQA. No additional Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Secretary of the California Natural Resources Agency as meeting all requirements of a certified regulatory program (Pub. Resources Code, § 21080.5 and Cal. Code Regs., tit. 14, § 15251 (j). The Energy Commission is the CEQA lead agency.

Staff prepares both a Preliminary Staff Assessment (PSA) and FSA. The PSA was published on July 13, 2016 and contains staff's preliminary analysis, conclusions, and recommendations. Staff provided a 30-day public comment period that follows the publication of the PSA. The comment period is also used to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During this time, staff conducted two workshops in Long Beach to discuss its conclusions, proposed mitigation, and proposed verification measures. Based on the workshop dialogue and any written comments received, staff may refine its analysis, correct any errors, and finalize conditions of certification to reflect any changes agreed to between the parties. These revisions and changes are presented in the FSA which is published and made available to the public and all interested parties. The FSA serves as staff's primary testimony for evidentiary hearings.

The FSA is only one piece of evidence that will be considered by the Committee (two Energy Commission Commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public evidentiary hearings t, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project and the mitigation to be imposed, will be contained in a document entitled the Presiding Member's Proposed Decision (PMPD). Following publication, the PMPD is circulated for 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD if necessary. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision.

## AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, staff is required to provide notice of the proposed project to relevant agencies that administer LORS that are applicable to proposed projects or have other related expertise. Staff coordinates with these agencies in developing the staff assessment. The agencies associated with the AEC include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Wildlife, Caltrans, the California Air Resources Board, the South Coast Air Quality Management District, the city of Long Beach, and the Long Beach Fire and Police Departments.

## OUTREACH

The Energy Commission's outreach program is primarily facilitated by the Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of public outreach, regardless of outreach efforts conducted by the applicant or other parties.

### LIBRARIES

On January 15, 2014, Energy Commission staff sent the AEC AFC to the Long Beach Main Library; the Los Altos, Brewitt, and Bay Shore branches of the Long Beach Public Library; and the Los Alamitos-Rossmoor Library in Seal Beach. Copies were also provided to state libraries in Eureka, Sacramento, Fresno, San Francisco, Los Angeles and San Diego. On December 14, 2015, the Supplement to the AFC was also sent to the libraries.

### INITIAL OUTREACH EFFORTS

The Public Adviser's Office (PAO) reviewed related information available from the applicant and others and then conducted its own, extensive outreach efforts to identify certain local officials, as well as interested entities, within a five-mile radius around the proposed site for the AEC. These entities include schools, as well as business, environmental, governmental, and ethnic organizations. By means of e-mail, the PAO notified these entities of the Informational Hearing and Site Visit for the project, held on April 29, 2014, at Grand Ballroom Recreation Park 18-hole Golf Course in Long Beach.

The PAO also identified and similarly notified local officials with jurisdiction in the project area. Notices directed the public to the website for more information. In addition, the PAO placed notices in the April 19, 2014 issues of the Long Beach Press-Telegram and Impacto USA newspapers announcing the Informational Hearing and Site Visit for this project.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines, and water lines). This was done for the project. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the **Executive Summary** section of the FSA.

# PROJECT DESCRIPTION

Keith Winstead

## INTRODUCTION

On October 26, 2015, AES Southland Development, LLC (AES) submitted a Supplemental Application for Certification (SAFC) (13-AFC-01) to the California Energy Commission for the Alamitos Energy Center AEC) project. The SAFC replaces the original Application for Certification (AFC) filed on December 27, 2013. The AEC would be constructed on the site of the 1,950 MW Alamitos Generating Station (AGS), an existing and operating power plant located at 690 North Studebaker Road in the city of Long Beach, California. The new facility would utilize approximately 21 acres of the 71-acre, privately owned brownfield AGS site. The project site is approximately 10 to 15 feet above mean sea level.

The proposed project site is bounded to the north by the SCE switchyard and State Route 22 (East 7th Street); to the east by the San Gabriel River and, beyond that, the Los Angeles Department of Water and Power Haynes Generating Station; to the south by the former Plains West Coast Terminals petroleum storage facility and undeveloped property; and to the west by the Los Cerritos channel, AGS cooling-water canals, and the residences west of the channel. Land use in the region primarily includes urban development, industrial areas, undeveloped land, parklands, open space, and wetlands preserves. The AGS facility was built between 1955 and 1967. The facility included natural gas/oil, steam-turbine power generating units and was originally owned and operated by Southern California Edison (SCE). During the late 1990's, the electric industry was restructured, and SCE sold most of its generating facilities. In 1998, AES Southland purchased AGS from SCE.

AEC as currently proposed, would be a nominal 1,040-megawatt (MW), natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility consisting of two power blocks to provide fast starting and stopping, reliable, flexible multistage generating resources. Power Block 1 would consist of two natural-gas-fired combustion turbine, 640-megawatt (MW), generators (CTG) in a combined-cycle configuration (collectively AEC CCGT), with two unfired heat recovery steam generators (HRSG), one steam turbine generator (STG), an air cooled condenser, an auxiliary boiler, and related ancillary equipment. Power Block 2 would consist of four natural gas-fired, simple-cycle CTGs with fin-fan coolers and ancillary facilities (collectively, AEC SCGT) for a nominal 400-MW.

The existing AGS generating units, which utilize once-through-cooling, (OTC) are expected to operate until around 2020, at which time the units will be shut down as the AEC units are expected to come online. Regardless whether the AEC facility is licensed or constructed, these older units are scheduled to be shut down under the State Water Resources Control Board phase out of OTC.

AES intends to demolish all six AGS operating units, the demolition is not part of the proposed AEC project, but would take place through a Memorandum of Understanding with the city of Long Beach after the AEC begins commercial operation. Demolition is expected to occur after 2020.  Some demolition will occur as part of the proposed AEC project: The retired Unit 7 remaining components. Construction activities at the project site are anticipated to last 56 months, from first quarter 2017 until third quarter 2021.

The demolition of the older AGS units 1-6 will be considered as part of the staff's cumulative impacts analysis. It is expected that operations at AEC will be occurring during any demolition of AGS. Concurrent construction at AES with demolition at AGS is not expected to occur.

The AEC is proposed to use potable water provided by the city of Long Beach Water Department (LBWD) for construction, operational process, and sanitary uses. This water would be supplied through existing onsite potable water lines.

Construction of the AEC would require the use of onsite laydown areas, approximately 8 acres, dispersed throughout the existing site, and an additional approximately 10-acre laydown area located adjacent to the AGS site south of existing generating Units 5 and 6.

The AEC would interconnect to the existing SCE 230-kilovolt (kV) switchyard adjacent to the northern side of the property. No new offsite natural gas lines would be necessary for the project. AEC would be supplied via the existing service pipeline for AGS Units 5 and 6 from the offsite 30-inch-diameter, high-pressure pipeline owned and operated by SoCalGas. AEC would require a new natural gas metering facility and construction of two new natural gas compressor buildings (one for each power block) within the AEC footprint. Water treatment facilities, emergency services, and administration and maintenance buildings would be constructed within the existing site footprint. Storm water would be discharged into two retention basins and then ultimately to the San Gabriel River via existing storm water outfalls.

The AEC would include a new 1,000 linear-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system and would eliminate the current practice of treatment and discharge of process/sanitary wastewater to the San Gabriel River. The upgrading of approximately 4,000 linear feet of the existing offsite LBWD sewer line downstream of the first point of interconnection discussed in the SAFC is no longer necessary and has been removed from the project design.

As described in the SAFC, the AEC CCGT will be located on the southern-most portion of the AEC site, on the former AGS fuel oil-storage site. AEC CCGT would include the following principal design elements:

- Two General Electric (GE) 7FA.05 CTGs with a nominal rating of 227 MW each. The CTGs would be equipped with evaporative coolers on the inlet air system and dry low oxides of nitrogen (NOx) combustors;

- Two HRSGs with no supplemental firing, each equipped with a selective catalytic reduction (SCR) unit in the ductwork for the control of NOx emissions, and an oxidation catalyst to control carbon monoxide (CO) and volatile organic compound (VOC) emissions;
- One, single-flow, impulse, down-exhaust-condensing STG with a nominal rating of approximately 229 MW;
- One air-cooled condenser that would replace the once-through system utilizing ocean water currently used for cooling the AGS and a closed-loop fin-fan cooler;
- A new natural gas compressor and compressor building for the CCGTs;
- One generator step-up (GSU) transformer per each GE 7FA gas turbine and one for the steam turbine; and
- One 230-kV interconnection to the existing SCE switchyard, which is adjacent to the site.

The AEC SCGT would be located on the northern portion of the AEC site, adjacent to the San Gabriel River. The AEC SCGT would include the following principal design elements:

- Four GE Energy LMS 100 PB natural gas-fired combustion turbine generators (CTGs) with a nominal rating of 100 MW each;
- Each CTG is equipped with selective catalytic reduction (SCR) equipment containing catalysts to further reduce NOx emissions, and an oxidation catalyst to reduce carbon monoxide (CO) emissions;
- Auxiliary equipment associated with each CTG would include an inlet-air-filter house with evaporative cooler, turbine intercooler and associated intercooler circulating pumps;
- Each pair of CTGs would share one fin-fan heat exchanger and one GSU transformer;
- A new natural gas compressor and compressor building for the SCGT; and
- One 230-kV interconnection to the existing onsite SCE 230-kV switchyard (see Section 3.0, Transmission System Engineering).
- The two power blocks would share the following design elements:
- Direct connection to an existing Southern California Gas Company 30-inch-diameter natural gas pipeline and metering station;
- Connection to existing onsite municipal and industrial water lines;
- Fire water and suppression systems;
- A new 1,000-linear-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system at the east end of East Vista Street in Long Beach;
- An existing storm water retention pond; and
- Water treatment and storage systems.

## ENERGY COMMISSION JURISDICTION

The Energy Commission has exclusive permitting jurisdiction for the siting of thermal power plants of 50 MW or more and related facilities in California. The Energy Commission also has responsibility for ensuring compliance with the California Environmental Quality Act (CEQA) through the administration of its certified regulatory program and is the lead agency under CEQA.

## PROJECT FACILITY FEATURES, DESIGN AND OPERATION

**Project Description Figure 1** shows the regional location project site map.

**Project Description Figure 2** shows the project boundary, sewer line, & project laydown area**.**

**Project Description Figure 3** shows the arrangement and layout of the existing AGS facility. The AGS currently has six operating steam generating units (units 1-6), and one retired unit (unit 7).

**Project Description Figure 4** shows the general arrangement and layout of the AEC. Primary access to the AEC is located at the existing entrance at 690 North Studebaker Drive, just south of the State Route CA 22.

## MAJOR GENERATING FACILITY COMPONENTS CCGT POWER BLOCK

### Combustion Turbine Generators

Natural gas combustion in the CTGs would produce thermal energy, which is converted into mechanical energy required to drive the combustion turbine compressors and two electrical generators. Each CTG system would contain supporting systems and associated auxiliary equipment.

Each combustion turbine would drive a hydrogen-cooled synchronous generator. Each CTG would be equipped with the following systems and components:

- Inlet air filters, inlet silencers, and evaporative coolers
- Metal acoustical enclosure for noise reduction
- Lubrication oil system for the combustion turbine and the generator
- Dry low-NOx combustion system
- Compressor wash system
- Fire detection and protection system (using either carbon dioxide or water mist spray)
- Fuel gas system, including flow meter, strainer, and duplex coalescing filter
- Static starter system
- Turbine controls

- Generator controls, protection, excitation, power system stabilizer, automatic voltage regulator (AVR) and automatic generation control

### Heat Recovery Steam Generators

The HRSGs would transfer heat from the exhaust gases of the CTGs to the feedwater to produce high-pressure, intermediate pressure, and low-pressure steam. Each HRSG is a triple pressure, reheat, natural circulation, horizontal unit equipped with inlet and outlet ductwork, insulation, lagging, SCR/CO catalyst assemblies, and exhaust stack. The HRSGs would not employ duct burners.

### Steam Turbine System

The steam turbine system consists of a condensing steam turbine, gland steam seal system, lubricating oil system, hydraulic control system, and steam admission/induction valves.

The steam turbine is a triple-pressure, reheat, side-exhaust turbine with a totally enclosed water to air-cooled generator. Turbine configuration is a single combined high-pressure/intermediate pressure casing and a single double flow low-pressure turbine.

## MAJOR GENERATING FACILITY COMPONENTS SCGT POWER BLOCK

### Combustion Turbine Generators

Natural gas combustion in the CTGs would produce thermal energy, which is converted into mechanical energy required to drive the combustion turbine compressors and electrical generators. Each CTG system would contain supporting systems and associated auxiliary equipment.

The combustion turbine would drive an air-cooled, 3-phase, 2-pole synchronous generator.

The CTGs would be equipped with the following systems and components:

- Inlet air filters, and evaporative coolers
- Intercooler
- Weather proof acoustical enclosure for noise reduction
- Lubrication oil system for the combustion turbine and the generator
- Dry low-$NO_x$ combustion system
- Oxidation catalyst and SCR emissions control systems
- Compressor wash system
- Fire detection and protection system (using carbon dioxide)
- Fuel gas system, including strainer, and duplex filter
- Starter system

- Fire Protection System
- Turbine controls
- Generator controls, protection, excitation, power system stabilizer, and automatic generation control for each generator

## SITE ARRANGEMENT AND LAYOUT

Primary access to the AEC site would be provided via the existing main entrance off of North Studebaker Road, north of the intersection of Westminster Avenue. The 71-acre AGS parcel is bounded to the north by the SCE switchyard and State Route CA 22 (East 7th Street); to the east by the San Gabriel River and, beyond that, the Los Angeles Department of Water and Power Haynes Generating Station; to the south by the former Plains West Coast Terminals petroleum storage facility and undeveloped property; and to the west by the Los Cerritos channel, AGS cooling-water canals, and the residences west of the channel.

The existing AGS currently has six operating generating units (Units 1 through 6). Units 1, 2, and 5 would be retired once the AEC CCGT reaches the commissioning stage of development and becomes operational. The remaining units will retire consistent with the OTC regulations and local reliability needs. The existing plant has various ancillary facilities that would be used to support the AEC, such as the administration, maintenance, and certain warehouse buildings; existing SoCalGas natural gas pipeline; LBWD water connections; the southernmost existing stormwater retention pond and outfalls; and the existing SCE switchyard. Other existing infrastructure at the AGS, such as fire water distribution, including two emergency electric-driven fire water pumps and process water distribution and storage systems, would be reused to the greatest extent possible.

## MAJOR ELECTRICAL EQUIPMENT AND SYSTEMS

### Major Electrical Equipment and Systems CCGT Block

Electric power produced by the AEC CCGT blocks would be transmitted to the electrical grid through the 230-kV generation tie line connecting the project to the existing onsite SCE switchyard. A small amount of electric station power would be used onsite to power auxiliaries such as gas compressors, pumps and fans, control systems, and general facility loads including lighting, heating, and air conditioning. A station battery system also would be used to provide direct current (DC) voltage as backup power for control systems and other critical uses. Transmission and auxiliary uses are discussed in the following subsections.

## Major Electrical Equipment and Systems SCGT Power Block

The SCGT power block would consist of two sets of two CTGs operating at 13.8 kV and connected to a three-winding GSU transformer by way of isolated-phase bus duct. Each CTG would have a 13.8-kV generator circuit breaker located in-line in the isolated-phase bus duct to synchronize the CTG to the grid during startup. Each GSU transformer would step the output voltage of two CTGs to 230 kV for transmission to the grid. Each of the two GSU transformers would be connected to a 230-kV collector bus through 230-kV gas circuit breakers. The collector bus includes a 230-kV line disconnect switch to isolate the collector bus from the transmission system.

Surge arresters would be provided at the high-voltage bushings of the GSU transformers to protect from surges on the 230-kV system caused by lightning strikes or other system disturbances. The transformers would be set on concrete pads within berms designed to contain transformer oil in the event of a leak or spill.

## Plant Cooling Systems

The California State Water Resources Control Board's (SWRCB) *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (policy)* adopted on May 4, 2010*,* regulates the use of seawater for power generation plants utilizing the once-through-cooled (OTC) method. This policy requires AGS to cease or greatly reduce OTC impacts by December 31, 2020.

### CCGT Plant Cooling

The steam turbine cycle heat rejection system would consist of an air-cooled condenser, which would eliminate the need for ocean water for once-through cooling. The heat rejection system would receive exhaust steam from the low-pressure section of the steam turbine and condense it to water (condensate) for reuse. The condenser would be designed to operate at a pressure of approximately 1.8 pounds per square inch absolute during base load operation at summer design conditions of 89°F dry bulb and 70°F wet bulb. It would transfer approximately 1,300 MMBtu/hr to the ambient air as a result of condensing steam at these operating conditions.

Balance of plant systems would be cooled by closed-loop fluid coolers using water. CTG, STG, gas compressors, and other balance-of-plant auxiliary equipment requiring cooling would be integrated into the closed cooling water loop.

### SCGT Plant Cooling

The simple-cycle heat rejection system would consist of one air-cooled closed loop fluid cooler per two CTGs to reject waste heat from the intercooler and other gas turbine auxiliaries. Each cooler would reject approximately 222 MMBtu/hr to the ambient air.

## Water Supply and Use

The AEC would use water provided by the LBWD for process and potable uses. The project would continue to use the existing water main connection along Studebaker Road.

Plant makeup water would be fed directly from LBWD service connections through metering equipment into the new service water tank. A new 340,000-gallon deionized water tank would be added to the project to provide operational service water storage.

#### AEC Summary Water Requirements

For the site average ambient conditions, AEC would use approximately 68 gpm. Maximum water consumption at the highest ambient conditions would be 357 gpm. The maximum annual AEC water consumption would be 130 acre-feet per year.

### Stormwater Drainage System

Stormwater that falls within process equipment containment areas would be collected and discharged to a process drain system, which would consist of oil/water separators, sump, and a retention basin. Stormwater that falls within the plant in pavement area and outside the process equipment containment areas would either percolate directly into the soil or drain over the surface and be directed into the retention basin to assist with the removal of suspended solids. The stormwater collected in the retention basin would be discharged through the existing outfalls. The residual oil containing sludge collected in the oil/water separation tanks would be collected via vacuum truck and disposed of as hazardous waste.

## FIRE PROTECTION

The existing fire protection system would be modified for the AEC and the rest of the AGS site and equipment to meet all LORS while reusing existing equipment to the maximum extent possible. The system design would protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be a connection to the existing water distribution system. A new 8-inch onsite fire water loop and hydrants would be constructed around each of the new power blocks and tied into existing onsite firewater hydrant lines. No new offsite linears would be needed for fire protection.

The secondary source of fire protection water would be the 600,000-gallon service water storage tank, which would provide 2 hours of protection for the onsite worst-case single fire.

Two existing electric fire pumps, connected to two independent power feeds from the SCE distribution system, would pump water from the onsite storage tank. Fire protection water from the existing water supply connection and service water storage tank would be provided to a dedicated underground fire loop piping system. Fixed fire-suppression systems would be installed at determined fire risk areas. Sprinkler systems also would be installed in the administration and maintenance buildings as required by NFPA and local code requirements. The CTG units would be protected by a carbon dioxide fire protection system. Hand-held fire extinguishers of the appropriate size and rating would be located in accordance with NFPA 10 throughout the facility. Please refer to the **Worker Safety and Fire Protection** and **Socioeconomics** sections of this FSA for more specifics related to fire response and emergency services for the AEC demolition, construction and operation.

## HAZARDOUS MATERIALS

There would be a variety of hazardous materials used and stored during demolition, construction, and operation of the project. The storage, handling and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations and standards (LORS). Hazardous materials that would be used during demolition and construction would include gasoline, diesel fuel, oil, lubricants, solvents and paints. All hazardous materials used during demolition, construction, and operation would be stored on site in storage tanks, vessels and containers specifically designed for the characteristics of the materials to be stored; when appropriate, the storage facilities would include secondary containment in case of tank/vessel failure. The **Hazardous Materials Management** section of this FSA provides additional data on the hazardous materials that would be used during demolition, construction and operation, including quantities, associated hazards, and permissible exposure limits, storage methods, and special handling precautions.

## EMISSIONS CONTROL AND MONITORING

Air emissions from the combustion of natural gas in the CTGs and auxiliary boiler would be controlled using state-of-the-art systems. To ensure that the systems perform correctly, continuous emission monitoring of stack exhaust flow rate, temperature, oxygen, $NO_x$, and CO would be performed as well as the natural gas heat input, generator output, and ammonia injection rate into the pollution control system. To ensure that the system performs correctly, continuous emission monitoring would include stack exhaust flow rate, temperature, oxygen, $NO_x$ and carbon monoxide, as well as the natural gas heat input, generator output, and ammonia injection rate into the pollution control system as required by the South Coast Air Quality Management District (SCAQMD). The **Air Quality** section of this FSA discusses in detail the anticipated emissions resulting from project demolition, construction, and operation, the types of equipment proposed to limit emissions, as well as mitigation measures that would ensure emissions are at levels consistent with required LORS.

## WASTE MANAGEMENT

Waste Management is the process whereby all wastes produced at the project site are properly collected, treated (if necessary), and disposed. Wastes include process and sanitary wastewater, nonhazardous waste, and hazardous waste, both liquid and solid. The AEC waste would include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other solid wastes, including the typical municipal refuse generated by workers. The **Waste Management** section of this FSA details the types of waste generated by the project and the process by which both hazardous and nonhazardous wastes from project demolition, construction, and operation would be appropriately stored, transferred, and disposed.

## PROJECT CONSTRUCTION SCHEDULE

If the Energy Commission approves the AEC AFC, construction activities at the project site are anticipated to last approximately 57 months, from the first quarter of 2017 to the third quarter of 2021. All construction equipment and supplies would be trucked directly to the project site laydown areas. **Project Description Figure 4** shows the simulated site appearance for the proposed aboveground facilities, laydown area and parking for the proposed AEC.

If approved, the AEC would include the following principal schedule elements:

- Begin Site Preparation – Q1, 2017
- Begin Construction of CCGT Power Block – Q2, 2017
- Commercial Operation of CCGT – Q1 2020
- Begin Construction of SCGT Power Block – Q2, 2020
- Commercial Operation of SCGT – Q3, 2021.

For the CCGT, there would be an average and peak workforce of approximately 182 and 306, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction. Peak workforce would occur in July 2019 (month 26).

For the SCGT, there would be an average and peak workforce of approximately 222 and 512, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction. Peak workforce would occur in January 2021 (month 44). The **Socioeconomics** section of this FSA contains more information on the workers and their expected impact on the surrounding area.

The construction plan is based on a single shift composed of a 10-hour workday, Monday through Friday, and a single 8-hour shift on Saturday. Construction would typically take place between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 9:00 a.m. and 6:00 p.m. on Saturday, consistent with city of Long Beach ordinances. Overtime and additional shift work may be used to maintain the construction schedule or to complete critical construction activities (for example, pouring concrete at night during hot weather, working around time-critical shutdowns and constraints). During the commissioning and startup phase of each of the power blocks, some activities may continue 24 hours per day, 7 days per week.

## RESPONSE TO COMMENTS FROM LOS CERRITOS WETLANDS LAND TRUST:

**Comment**: *Because there is a fundamental flaw in the assumptions used in several subject categories in the PSA, the environmental review in those subject areas must be re-analyzed and re-circulated for public comment.*

**Response:** Staff disagrees with the underlying assertion that there is a fundamental flaw in the assumptions used in developing the PSA. See the response to comments in the Alternatives section for a detailed response to the technical issues raised. Under the Commission's Title 20 regulations and the Commission's certified regulatory program, there is no requirement to re-circulate the PSA. Updates based on comments received on the PSA, other information and responses to comments are included in the Final Staff Assessment (FSA). Because the Commission's process is iterative with additional opportunity for public engagement, re-circulation is not necessary and duplicative. Following publication of the FSA, public hearings are held culminating in a presiding member's proposed decision (PMPD) which has a 30-day comment period. Following the comment period, another public hearingwill provide opportunity for public commentwhen the Commission considers whether to approve the PMPD prior to release of the Final Decision.

**Comment:** *The PSA improperly segments the construction and operation of the project from the demolition of the Alamitos Generation Station.*

**Response:** The staff analysis properly excluded analysis of the demolition of the AGS. As an initial matter, demolition is typically a ministerial action not subject to CEQA. The AGS is not subject to the Commission's jurisdiction because the facility was licensed and built prior to the creation of the Energy Commission and is not obligated to shut down or to undergo demolition due to the AEC facility. The driver for shutting down AGS is the OTC policy which was subject to an Environmental Impact Report by the State Water Board. (See WATER QUALITY CONTROL POLICY ON THE USE OF COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING: Final Substitute Environmental Document, State Water Resources Control Board May, 4 2010)

The appropriate environmental review under CEQA and the Commission's certified regulatory program would be to consider the decommissioning of AGS, due to the OTC policy, and a potential demolition of the existing facilities at some point after 2020, to be part of staff's cumulative impact analysis section for each of the relevant technical areas. But decommissioning and potential demolition is not a direct impact from the proposed AEC project.

CEQA mandates that "environmental considerations do not become submerged by chopping a large project into many little ones—each with minimal potential impact on the environment—which cumulatively may have disastrous consequences." In order to avoid this piecemealing issue, the California Supreme Court set forth a piecemealing test: an EIR must include an analysis of environmental effects of future expansion/action if (1) it is a reasonably foreseeable consequence of the initial project; and (2) the future action will be significant in that it will likely change the scope of nature of the initial project or its environmental effects.

The piecemealing test set forth in *Laurel Heights Improvement Association v. Regents of the University of California*, 47 Cal. 3d 376, 396 (1988) implies that where land use activities are a reasonable foreseeable consequence of the initial project approval, later land use activities must be considered as part of the whole project. Similarly, if an individual project is a “necessary precedent” for a larger project, or commits the lead agency to a larger project with significant environmental impacts, then the scope of the CEQA document must encompass the larger project.

In Alamitos the facts are different. In 2010, the State Water Resources Control Board adopted a policy on the use of coastal and estuarine waters for power plant cooling. The policy establishes technology-based standards pursuant to section 316(b) of the Clean Water Act and phases out once-through cooling facilities due to impacts on marine ecology. The policy applies to 19 existing power plants in California, including the AGS. The existing units are being shut down and decommissioned not because of the proposed new Alamitos facility but because of the once-through cooling restrictions imposed by the State Water Resources Control Board.

In the AFC the applicant noted that an agreement was reached with the city to demolish the existing units sometime after 2020 and upon approval by the CAISO and CPUC. This third party agreement does not make the demolition of the existing units a foreseeable consequence of the construction and operation of the new facility. The new facility is not a necessary precedent for the demolition of the existing facility. Parts of the existing facility can continue to operate with or without the new facility and the entire existing facility, units 1-6, can continue in existence even with the full construction of the new facility. Given that demolition is not a foreseeable consequence of construction and operation of the new Alamitos facility, the appropriate environmental assessment for the potential demolition would fall under cumulative impacts.

Under CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts” (14 Cal. Code Regs., § 15130(a)(1).) Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” (14 Cal. Code Regs., § 15130(a).) Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (14 Cal. Code Regs., § 15164(b)(1).) Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

As noted in the FSA, **Executive Summary Table 2**, AGS is identified as a facility to be considered in cumulative impacts analysis. Based on the information provided, demolition of AGS, if it occurs, will coincide with operations of AEC. (See Project Description p. 3-1)

## REFERENCES


**AEC 2013a** – Alamitos Energy Center (TN 201620-1 to -72) Application for Certification Volume 1 & 2, dated December 27, 2013. Submitted to CEC/Docket Unit on December 27, 2013.

**AEC 2014a** – Alamitos Energy Center (TN 201751) Data Adequacy Supplement, dated February 17, 2014. Submitted to CEC/Docket Unit on February 17, 2014

**AEC 2014b** – Alamitos Energy Center (TN 202381) Data Response Set 1A, dated May 27, 2014. Submitted to CEC/Dockets Unit on May 27, 2014.

**AEC 2015a**- Alamitos Supplemental AFC Appendix 1-B 1000 of AEC (TN 206427-6) Submitted on October 26, 2015. CEC/Docket Unit on October 26, 2015.

**AEC 2015b** – Alamitos Supplemental AFC Appendix 1-B 500 of sewer Line (TN 206427-5). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**AEC 2015c** – Alamitos Supplemental. AFC Appendices 5.10 to 5.15A (TN 206427-4). Docket on October 26, 2015. CEC/Docket Unit on October 26, 2015.

**AEC 2015d** – Alamitos Supplemental. AFC Appendices 5.1G to 5.10B (TN 206427-3). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015e** – Alamitos Supplemental. AFC Appendices 1A to 5.1F (TN 206427-2). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**AEC 2015f** – Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015g** – Alamitos Supplemental. AFC Appendices 5.1G to 5.10B (TN 206428-3). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015h** – Alamitos Supplemental. AFC Appendices 1A to 5.1F (TN 206428-2). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015i** – Alamitos Energy Center Supplemental AFC (TN 206428-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**AEC 2015j** – SAFC Cultural Resources Figure 5.3-1. Figure 5.3-1 (TN 206505). Submitted on November 3, 2015. CEC/Docket Unit on November 3,2015.

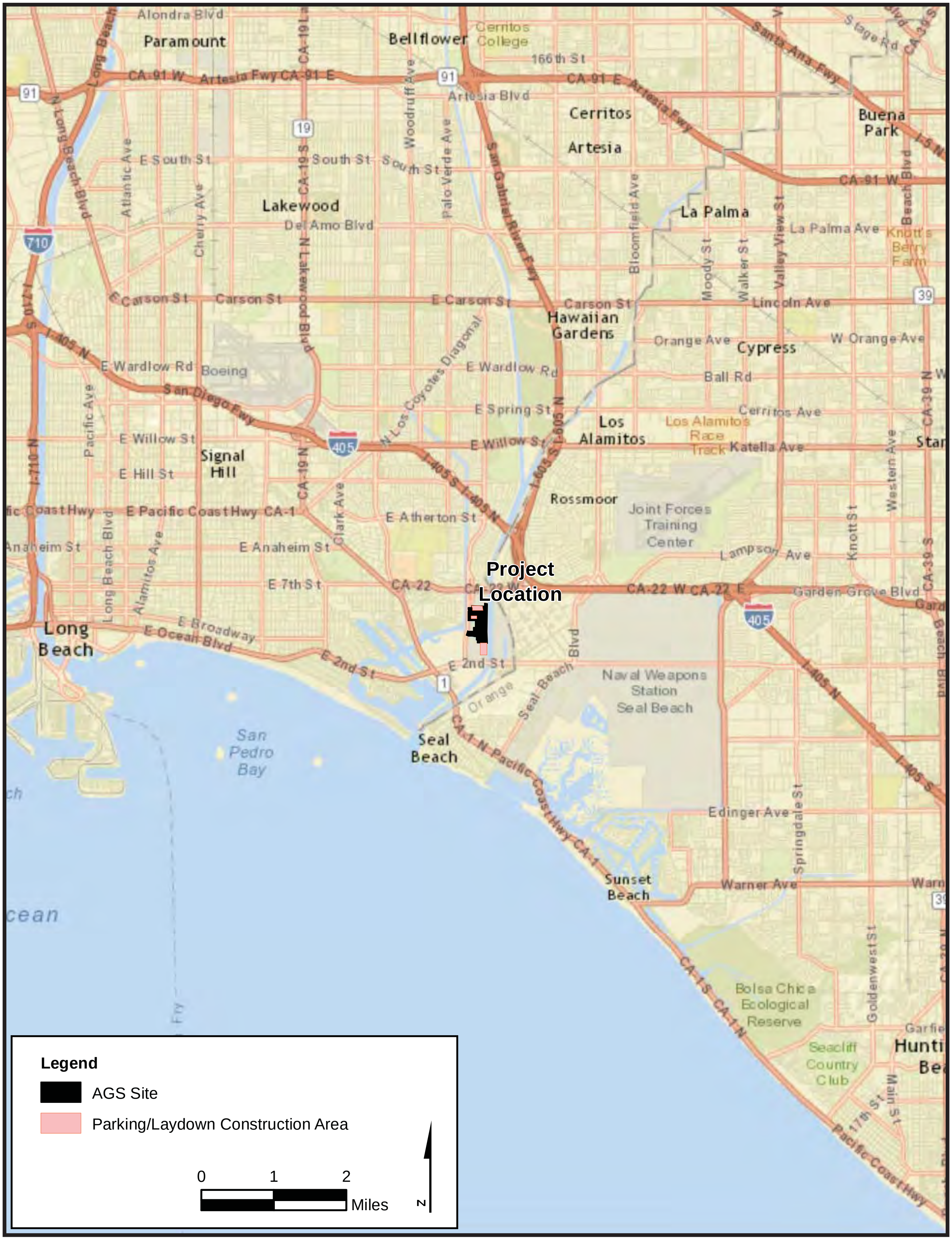
**AEC 2015l** – Alamitos Suppl. AFC Appendix 1-B 1000' of AEC (TN 204627-6) Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015s** – Alamitos Data Response Set 6 (TN 207013) dated December 14, 2015. Submitted on CEC/Docket on December 14, 2015.

**CEC 2016k** – Alamitos Energy Center Status Report 15 (TN 210341) dated February 16, 2016. Submitted to CEC/Dockets on February 16, 2016

**LCW 2016a** – Michelle N. Black, Chatten-Brown & Carstens LLP (TN 212764-1 to 212764-4 ) Los Cerritos Wetlands Land Trust Comments on PSA for AEC, dated August 11, 2016. Submitted to CEC/Docket Unit on August 12, 2016

**PROJECT DESCRIPTION - FIGURE 1**
Alamitos Energy Center - Regional Location Map




**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**
SOURCE: AFC, Volume 1, Figure 1 1-2, December 2013, Ch2MHill

**PROJECT DESCRIPTION - FIGURE 2**

Alamitos Energy Center - Project Boundry and Sewer Lines


**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**

SOURCE: Ch2MHill Figure 1.1-3

**PROJECT DESCRIPTION - FIGURE 3**
Alamitos Energy Center - Existing View




SOURCE: AFC, Volume 1, Figure 11-4, December 2013, Ch2MHill

**PROJECT DESCRIPTION - FIGURE 4**
Alamitos Energy Center - Simulated View

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC, Volume 1, Figure 1 1-1, December 2013, Ch2MHill

# Environmental Assessment

# BIOLOGICAL RESOURCES

Testimony of Jennifer Lancaster and Scott D. White

## SUMMARY OF CONCLUSIONS

Staff has completed review of the Alamitos Energy Center (AEC) relative to the biological landscape on the project site and surrounding area. Vegetation in the project area is limited to weedy species and landscaping, and there is no natural wildlife habitat on site. Rare plants and special-status wildlife are not expected to occur on the site; however, nearby marshes and other natural areas support special-status species including the Pacific green sea turtle (federally listed threatened), Belding's savannah sparrow (state listed endangered), western snowy plover (federally listed threatened), California least tern (federally and state listed endangered), and California brown pelican (state fully protected).

Construction and operation of the proposed project would result in direct and indirect effects to biological resources near the site. Staff concludes that the project, with implementation of proposed conditions of certification, would comply with the laws, ordinances, regulations, and standards listed in **Biological Resources Table 1** and direct, indirect, and cumulative impacts would be avoided, minimized, or mitigated to less than significant levels (refer to **Biological Resources Table 4** in the subsection "Conclusions" below for a summary of the proposed project's impacts, applicable conditions of certification, and determination of significance).

## INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from the construction, demolition, and operation of the proposed AEC.

This analysis addresses potential impacts to special-status species, wetlands, and other waters of the state and waters of the U.S. It includes a detailed description of the existing biotic environment, an analysis of potential impacts to biological resources and, where necessary, specifies mitigation measures (conditions of certification) to reduce impacts to less than significant. Additionally, this analysis assesses compliance with applicable laws, ordinances, regulations, and standards (LORS).

This analysis is based, in part, on information provided in the AEC Application for Certification (AFC) for an earlier proposed project configuration (AEC 2013a), Data Adequacy Supplement (AEC 2014a), responses to staff data requests (AEC 2014b), staff's observations during a site visit of the proposed AEC on March 25, 2014; the supplemental AFC for the proposed project as analyzed here (AEC 2015f), ongoing communications with professional biologists in the region, the California Department of Fish and Wildlife (CDFW), the National Oceanic and Atmospheric Administration (NOAA) Fisheries, and the U.S. Fish and Wildlife Service (USFWS), and comments received on the Preliminary Staff Assessment (TN 212284).

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant must comply with the LORS listed in **Biological Resources Table 1** during project construction, demolition, and operation.

**Biological Resources Table 1**
**Laws, Ordinances, Regulations, and Standards**

| Applicable LORS | Description |
|---|---|
| **Federal** | |
| Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.) | Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat. Take of federally listed species as defined in the Act is prohibited without incidental take authorization, which may be obtained through Section 7 consultation (between federal agencies) or Section 10 Habitat Conservation Plan. The administering agencies are the USFWS and NOAA (National Marine Fisheries Service). |
| Marine Mammal Protection Act (Title 16, United States Code, Chapter 31) | Protects all marine mammals, including cetaceans (whales, dolphins, and porpoises), pinnipeds (seals and sea lions), sirenians (manatees and dugongs), sea otters, and polar bears within the waters of the United States. The National Marine Fisheries Service is responsible for the protection of cetaceans and pinnipeds; the United States Fish and Wildlife Service is responsible for the protection of sea otters. |
| Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26)) | Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge of dredged or fill materials into Waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. |
| Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711) | Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird including nests with viable eggs). The administering agency is the USFWS. |
| **State** | |
| California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098) | Protects California's rare, threatened, and endangered species. The administering agency is CDFW. |

| Applicable LORS | Description |
|---|---|
| California Code of Regulations (Title 14, sections 670.2 and 670.5) | Lists the plants and animals of California that are declared rare, threatened, or endangered. Take of state listed species is prohibited without incidental take authorization, according to Section 2081 or 2080.1 of the Act. The administering agency is CDFW. |
| Fully Protected Species (Fish and Game Code sections 3511, 4700, 5050, and 5515) | Designates certain species as fully protected and prohibits the take of such species unless for scientific purposes (see also Title 14, California Code of Regulations, section 670.7). The administering agency is CDFW. |
| Nest or Eggs (Fish and Game Code section 3503) | Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. The administering agency is CDFW. |
| Migratory Birds (Fish and Game Code section 3513) | Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds. The administering agency is CDFW. |
| Lake and Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.) | Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process. The administering agency is CDFW. |
| California Coastal Act (Public Resources Code, sections 30000 et seq.) | Establishes comprehensive land use planning along the California coast; sets forth general policies (§30200 et seq.) which govern the California Coastal Commission's review of permit applications and local plans. Specific to energy facilities, requires that the Coastal Commission designate specific locations within the coastal zone where a thermal power plant subject to the Warren-Alquist Act could prevent the achievement of the objectives of the Coastal Act (30413(b)). Section 30231 requires actions that minimize adverse impacts to biological productivity of coastal waters. Section 30240 mandates protection of environmentally sensitive habitats from the degradation of habitat value. The administering agency is the California Coastal Commission. |

| Applicable LORS | Description |
|---|---|
| Porter-Cologne Water Quality Control Act | Regulates discharges of waste and fill materials to waters of the state, including “isolated” waters and wetlands. The administering agency is the State Water Resources Control Board. |
| **Local** | |
| City of Long Beach General Plan/Southeast Area Development and Improvement Plan (SEADIP)/Local Coastal Program (LCP) | The city of Long Beach regulates new development through design review and permit issuance to ensure consistency with Coastal Act requirements and minimize adverse impacts to identified environmentally sensitive habitats and wetland areas. New development projects that are contiguous to wetlands or environmentally sensitive habitat areas must include a buffer. |

# SETTING

## PROJECT OVERVIEW

The proposed project is described in detail in Section 2 of the AFC and Section 3 of this Final Staff Assessment (FSA). Those project components pertinent to biological resources are briefly summarized in the following paragraphs. The proposed AEC would be constructed on the site of the existing AGS, an operating power plant in Long Beach, California. The project would be constructed on approximately 21 acres entirely within the 71.1-acre footprint of the existing AGS. AEC would consist of two new power blocks. The first power block would consist of combined-cycle combustion gas turbine (CCGT) generators and the second would consist of simple-cycle combustion gas turbine (SCGT) generators. Construction would require the removal of the remaining components of AGS Unit 7 (previously decommissioned and much of it already removed from the site) and two existing wastewater retention basins and a small maintenance shop to provide the necessary space for the AEC. Natural gas would be supplied via an existing 30-inch diameter pipeline that currently serves Units 5 and 6 of the AGS. Construction of the first power block and demolition of the existing unit would occur over approximately 56 months (about 4½ years), scheduled to begin in the second quarter of 2017. Construction of the second power block would continue through the third quarter of 2021.

During AEC operation, stormwater would be directed to oil/water separators, held on the site in an existing retention basin, and ultimately discharged to the Los Cerritos Channel via existing outfalls. The AEC would include a new 1,000 linear foot process/sanitary wastewater pipeline to the first point of interconnection with the existing Long Beach Water Department sewer system and would eliminate the current AGS practice of treatment and discharge of process/sanitary wastewater to the San Gabriel River. Construction of the new wastewater line would take approximately 4 months. The alignment would be in the road shoulder along Studebaker Road and Loynes Drive.

AEC construction would require onsite laydown areas comprising approximately 8 acres dispersed throughout the site, and an approximately 10-acre area adjacent to the site.

## REGIONAL SETTING

The regional setting addressed in this section encompasses the area within 10 miles of the AEC. Land use proximate to the proposed project area primarily includes urban development, industrial areas, the San Gabriel River, parklands and open space, and wetlands preserves.

The 71.1-acre AGS site is bounded on the west by Studebaker Road, and to the south by a tank farm. The AEC project area consists of 21 acres within the larger AGS site (see Project Description - Figure 2). The eastern edge of the AEC site is bounded by the San Gabriel River, about two miles upstream from its terminus at the Pacific Ocean. The Haynes Generating Station is located on the east side of the river, opposite the proposed project.

The river in this area has a soft bottom and riprap banks, and it is channelized between levees. The Los Cerritos Channel is located just west of the project site, across Studebaker Road, and terminates about one mile to the southwest, at Alamitos Bay. Two side channels deliver cooling water from the Los Cerritos Channel to the operating AGS; the cooling water is discharged to the San Gabriel River via existing outfalls. Los Cerritos Channel, Alamitos Bay, and the portion of the San Gabriel River in the project site vicinity are all tidal waters.

Extensive urban development throughout the region has replaced most of the natural open space. Natural habitats are now limited to scattered open space preserves and other protected areas. Much of the undeveloped open space south and west of the site is former oil production land.

### Regional Wetlands and Other Protected Areas

Several ecological reserves, wetland preservation sites, and designated open space areas are located in the region. These protected areas represent some of the most significant remaining habitat in the region; provide wintering, feeding, and resting habitat for migratory birds along the Pacific Flyway; and provide habitat for several special-status plants and animals. Following is a brief description of each of these areas:

#### Los Cerritos Wetlands

The Los Cerritos wetlands complex consists of over 500 acres of coastal open space on both sides of the San Gabriel River, located south of Cerritos Channel, west of Studebaker Road, and south of East 2nd Street. Within the Los Cerritos complex, the nearest tidal wetland habitat to proposed project components is located west of Studebaker Road, about 800 feet from the proposed AEC. Several organizations, including the Los Cerritos Wetlands Authority and Los Cerritos Land Trust, are working to acquire and restore habitat within the open space area. Portions of the wetlands are undergoing restoration, with additional phases being planned. Several listed and other special-status species occur there year-round or seasonally; these include southern tarplant (*Centromadia parryi* ssp*. australis*), Coulter's goldfields (*Lasthenia glabrata* ssp*. coulteri*), Lewis' evening primrose (*Camissoniopsis lewisii*), California box-thorn *(Lycium californicum)*, California least tern (*Sternula antillarum browni*), Pacific green sea turtle (*Chelonia mydas*), and Belding's savannah sparrow (*Passerculus sandwichensis beldingi*).

### Bolsa Chica Wetlands

The Bosla Chica wetlands are located five miles to the southeast of the AEC site, and encompass over 1,400 acres. Approximately 80 percent of the wetlands comprise a mixture of salt marsh and open mudflats with the remaining 20 percent consisting of open water with tidal flows controlled by flood gates. Many bird species occur at these wetlands, including 32 special-status birds such as the California least tern, western snowy plover, Belding's savannah sparrow, and light-footed clapper rail (*Rallus longirostris levipes*). Several special-status plants, reptiles, and mammals also are found in this area including southern tarplant, Coulter's goldfields, San Diego horned lizard (*Phrynosoma coronatum blainvillii*), western pond turtle (*Emys marmorata*), silvery legless lizard (*Anniella pulchra*), and the southern California salt marsh shrew (*Sorex ornatus salicornicus*).

### Seal Beach National Wildlife Refuge

The Seal Beach National Wildlife Refuge is located approximately two miles southeast of the proposed AEC site within the boundaries of the Seal Beach Naval Weapons Station. The refuge includes 911 acres of remnant saltwater marsh in the Anaheim Bay estuary. It provides important habitat for migratory birds and four threatened or endangered species including the Pacific green sea turtle, light-footed clapper rail, California least tern, and Belding's savannah sparrow.

### Jack Dunster Marine Biological Reserve

The Jack Dunster Marine Biological Reserve is a 2.7–acre site on the northwestern side of the Los Cerritos Channel, containing 1.5 acres of land and 1.2 acres of shallow water. Habitats in this small reserve include coastal sage scrub, coastal marsh, intertidal mudflats, and rocky intertidal zone (City of Long Beach 2012a). The reserve is located approximately one mile west of the project site and provides habitat for waterfowl and fish.

### Golden Shore Marine Biological Reserve Park

In 1997, the city of Long Beach's Golden Shore Marine Biological Reserve Park, originally a launch ramp and parking lot, was converted into 6.4 acres of intertidal and subtidal wetlands habitat (City of Long Beach 2012b). This park is located approximately six miles west of the AEC project site. This reserve park has salt marsh habitat that contains cordgrass, pickleweed, and saltgrass at slightly higher elevations, which provides habitat for waterfowl and fish.

### El Dorado Nature Center and Regional Park

The city of Long Beach's El Dorado Regional Park is a 105-acre park located between the San Gabriel River and the 605 freeway, about three miles north of the proposed AEC site. Two miles of dirt trails and a ¼ mile paved trail wind around two lakes, a stream, and forested areas.

### Colorado Lagoon

Colorado Lagoon is located about 1.7 miles west of the AEC site, and just northwest of Alamitos Bay. The site was historically confluent with the larger Los Cerritos Wetlands area. It includes recreational beach sports areas, as well as ongoing wetland habitat restoration areas.

### Sims' Pond Biological Reserve

Sims Pond is a 6-acre reserve area maintained by the city of Long Beach, located at the northwest corner of the intersection of Loynes Drive and Pacific Coast Highway, about 1 mile west of the AEC site. The site supports seasonal open waters, freshwater marshland, and riparian forest habitats.

## Critical Habitat

Critical habitat is a formal designation under the federal Endangered Species Act. It is designated based on presence of the physical and biological features essential to the conservation of the species that may require special management considerations or protection. There is designated critical habitat for one federally listed species within 10 miles of the proposed AEC: the western snowy plover.

Critical habitat for western snowy plover includes the Bolsa Chica State Beach and Bolsa Chica Preserve, which are located approximately five miles southeast of the proposed AEC site (USFWS 2012a). The beach habitats for western snowy plover within the designated critical habitat are generally characterized by large, flat, and open spaces.

# EXISTING VEGETATION AND WILDLIFE

The applicant conducted a reconnaissance-level survey of biological resources within the proposed project area in September 2011. Supplemental surveys were conducted in July 2013 and January 2014, to assess biological resources along the 1,000-foot offsite sewer pipeline alignment and in April 2015 in support of the Supplemental AFC. The supplemental reconnaissance survey in January 2014 encompassed the pipeline alignment and a 100-foot buffer, while the other surveys focused on the proposed power plant site and laydown areas. The following text summarizes the applicant's biological surveys, as verified during staff's site visit on March 25, 2014, and updated in the Supplemental AFC.

## Vegetation

The proposed AEC site and laydown areas are in industrial land use. The majority of the project area is paved and any unpaved areas are subject to regular chemical weed control. Landscaped areas, including trees, shrubs and lawns are present on portions of the project site, but no natural habitats or wetlands are present. Other than the landscaping plants, species on the site are primarily "ruderal" (i.e., weedy species characteristic of disturbed areas) and most are not native. Typical species include landscape plants and fan palm (*Washingtonia robusta*), gum tree (*Eucalyptus* sp.), great bougainvillea (*Bougainvillea spectabilis*), iceplant (*Carpobrotus edulis*), mustard (*Brassica* sp.), and tree tobacco (*Nicotiana glauca*).

Land uses within one mile of the AEC site are briefly characterized as follows:

- **Urban.** Urban developed areas include residential, commercial, and light industrial uses, as well as public schools and other municipal facilities. The majority of the land uses to the north, northeast, southwest, south, and northwest of the AEC site consist of urban development.
- **Industrial.** Industrial areas include the existing AGS, SCE 230-kV switchyard, and former fuel oil tank farm. Additional industrial areas are located across the San Gabriel River channel to the east and include the Los Angeles Department of Water and Power Haynes Generating Station.
- **Parks and open space.** Parks and open space include natural and landscaped areas that have been designated for recreational uses or provide undeveloped green space. Parks and open space are located west and south of the AEC site.
- **Wetland Preserves.** As described above (see "Regional Wetlands and Other Protected Areas"), the Los Cerritos Wetlands complex is approximately 700 feet west and 2,000 feet south of the AEC site (about 800 feet south of the adjacent laydown area).

Although there are no natural habitats on or adjacent to the site, the following sensitive natural communities are present within 10 miles, as identified by the CDFW's California Natural Diversity Database (CNDDB) (excerpted from AEC 2013a and verified by staff).

### Southern Coastal Salt Marsh

Southern coastal salt marsh is found in areas subject to regular tidal flooding such as sheltered inland bays, estuaries, and lagoons. Vegetation and habitat within the salt marsh are in distinct zones based on the frequency and duration of tidal flooding. Typically California cordgrass (*Spartina folosia*) is found at the lowest intertidal levels, subject to regular, prolonged tidal inundation. Mid-tidal areas are typically characterized by pickleweed (*Salicornia virginica*) and are generally subject to cyclical inundation during high tides and drying during low tides. The upper intertidal marsh zone is generally subject to flooding for short durations and only during higher high tides. It supports a more diverse mixture of plant species including pickleweed, saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), alkali weed (*Cressa truxilensis*), California seablite (*Suaeda californica*), and marsh jaumea (*Jaumea carinosa*). The margin of the upper high tide zone, intergrading to upstream sources of freshwater influx or upland habitat, may support brackish marsh or alkaline meadow habitats. Dominant species may include those listed above, as well as other herbaceous salt-tolerant species. Brackish marsh and alkaline meadow communities are reported in the Los Cerritos Wetlands Complex (Tidal Influence 2016).

The historical extent of salt marsh habitat in the south coast region has been dramatically reduced by urban coastal development. Today, this community is limited to isolated patches surrounded by development. Southern coastal salt marsh habitat is found in several of the protected areas in the regional vicinity, listed above. The nearest southern coastal salt marsh is in the Los Cerritos Wetlands complex just west and south of the AEC, though this location is not recorded in the CNDDB.

### Southern Foredunes

Southern California coastlines once featured extensive dune systems extending inland from beaches, but recreation and other land uses have largely eliminated these habitats. Southern foredunes were a component of these larger systems, and remnant foredunes are still found in a few areas. They are located shoreward of beaches and active coastal sand dunes, where they are subject to less wind, have more stable sand, and greater availability of groundwater. The foredune area supports plant species that tend to stabilize the dune sand. Native plant species commonly found in this habitat include beach morning glory (*Calystegia soldanella*), silver bur ragweed (*Ambrosia chamissonis*), and common eucrypta (*Eucrypta chrysanthemifolia*). Southern foredune habitat is located approximately five miles southeast of the AEC site within the Bolsa Chica Ecological Reserve.

### Southern Dune Scrub

Southern dune scrub is a coastal scrub community of scattered shrubs, subshrubs, and herbs that are typically less than one meter tall and often constitute dense cover. This habitat is drier, warmer, and experiences less onshore wind than central and northern dune scrub habitats. Native plants commonly found in this habitat include beach saltbush (*Atriplex leucophylla*), California croton (*Croton californicus*), California ephedra (*Ephedra californica*), mock heather (*Ericameria ericoides*), dune lupine (*Lupinus chamissonis*), desert thorn (*Lycium brevipes*), prickly pear (*Opuntia* sp.), lemonade berry (*Rhus integrifolia*), and jojoba (*Simmondsia chinensis*). Southern dune scrub occurs approximately five miles southeast of the AEC in the Bolsa Chica Ecological Reserve.

## Common Wildlife

Due to the existing industrial AGS land use, the proposed AEC site does not provide important habitat for native wildlife. Species observed during project surveys include American crow (*Corvus brachyrhynchos*), Anna’s hummingbird (*Calypte anna*), bufflehead (*Bucephala albeola*), western gull (*Larus occidentalis*), rock pigeon (*Columba livia*), and western fence lizard (*Sceloporus occidentalis*). Species observed during the same dates in the surrounding area within one mile of the AEC site included great egret (*Ardea alba*), cormorant (*Phalacrocorax* spp.), great blue heron (*Ardea erodias*), killdeer (*Charadrius vociferous*), green heron (*Butorides virescens*), red-tailed hawk (*Buteo jamaicensis*), black phoebe (*Sayornis nigricans*), and western fence lizard. Special-status birds are not expected to use the project site, except for incidental flyover or possibly roosting. Common birds that are protected under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code, may nest in open areas and in unused structures on the AEC site. Examples include killdeer, hummingbirds, and house finch (*Carpodacus mexicanus*).

The nearby marshes provide habitat for a greater diversity of common wildlife species. Birds observed in this habitat include American crow*,* barn swallow (*Hirundo rustica),* common yellowthroat (*Geothlypis trichas*)*,* double-crested cormorant (*Phalacrocorax auritus*)*,* elegant tern (*Thalasseus elegans*), great blue heron, great egret (*Ardea alba*)*,* great horned owl (*Bubo virginianus*), hooded oriole (*Icterus cucullatus*)*,* long-billed curlew (*Numenius americanus*)*, s*nowy egret (*Egretta thula*)*,* turkey vulture (*Cathartes aura*), and a variety of other species. Reptiles and amphibians include gopher snake (*Pituophis melanoleucus*), red-diamond rattlesnake (*Crotalus ruber*), southern alligator lizard (*Gerrhonotus multicarinatus*), and Baja California treefrog (*Pseudacris hypochondriaca*). Mammals include coyote (*Canis latrans*), opossum (*Didelphis virginiana*), Botta's pocket gopher (*Thomomys bottae*), and raccoon (*Procyon lotor*). A wide variety of invertebrates and fish have also been recorded in the Los Cerritos Wetlands (Tidal Influence, 2012).

## SPECIAL-STATUS SPECIES

Special-status species are plant and wildlife species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Federally or state listed, proposed, or candidate for listing, as rare, threatened or endangered under the Endangered Species Act or California Endangered Species Act;
- Protected under other state or federal regulations (e.g., Migratory Bird Treaty Act);
- Identified as a California Species of Special Concern by the CDFW;
- California Fully Protected Species;
- A plant species ranked by the California Native Plant Society and CDFW as "rare, threatened, or endangered in California" (California Rare Plant Rank [CRPR] 1A, 1B, and 2) as well as CRPR 3 and 4 species;
- A plant listed as rare under the California Native Plant Protection Act;
- A locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
- Any other species receiving consideration during environmental review under the California Environmental Quality Act (CEQA).

Most special-status plants and wildlife are not expected to occur on the site due to its existing industrial land use. However, nearby marshes, parks, and other natural areas support special-status species. Special-status species known from the surrounding areas are identified in this section, and potential impacts of construction or operation of the proposed project to those species (if any) are identified in the subsection titled "Impact Assessment." **Biological Resources Table 2** identifies special-status species reported within 10 miles of the project site in the California Natural Diversity Database (CDFW 2016) and California Native Plant Society's (CNPS 2016) Inventory of Rare and Endangered Plants, but the majority of the species would not be likely to occur on site.

**Biological Resources Table 2**
**Special-status Species in the AEC Area and Vicinity**

| **Common Name (*Scientific Name*)** | **Conservation Status Fed/State/CRPR/ G-Rank/S-Rank** | **Potential for Occurrence in Project Impact Area** |
|---|---|---|
| **PLANTS** | | |
| Chaparral sand-verbena (*Abronia villosa* var. *aurita*) | __/__/1B.1/ G5T2T3/S2 | **Not Likely to Occur.** No chaparral or coastal scrub habitat on the project site or pipeline alignment. |
| Ventura Marsh milk-vetch (*Astragalus pycnostachyus var. lanosissimus*) | FE/SE/1B.1/ G2T1/S1 | **Not Likely to Occur.** No coastal salt marsh habitat on the project site or pipeline alignment. |
| Coulter's saltbush (*Atriplex coulteri*) | __/__/ 1B.2/ G3/S2 | **Not Likely to Occur.** No coastal dunes, scrub, or valley and foothill grasslands on the project site or pipeline alignment. |
| Parish's brittlescale (*Atriplex parishii*) | __/__/1B.1/ G1G2/S1 | **Not Likely to Occur.** No alkali meadows, vernal pools, chenopod scrub, or playas on the project site or pipeline alignment. |
| Davidson's saltscale (*Atriplex serenana* var. *davidsonii*) | __/__/1B.2/ G5T1/S1 | **Not Likely to Occur.** No coastal scrub habitat on the project site or pipeline alignment. |
| Plummer's mariposa-lily (*Calochortus plummerae*) | __/__/4.2/ G4/S4 | **Not Likely to Occur.** No coastal scrub, chaparral, valley and foothill grassland, woodlands, or forests on the project site or pipeline alignment. |
| Intermediate mariposa-lily (*Calochortus weedii* var. *intermedius*) | __/__/1B.2/ G3G4T2/S2 | **Not Likely to Occur.** No coastal scrub, chaparral, or valley and foothill grassland on the project site or pipeline alignment. |
| Santa Barbara Morning-glory (*Calystegia sepium* ssp. *binghamiae*) | __/__/1A/ G5TXQ/SX | **Not Likely to Occur.** No coastal marsh habitat on the project site or pipeline alignment. |
| Lewis' evening primrose (*Camissoniopsis lewisii*) | __/__/3/ G4/S4 | **Not Likely to Occur.** No coastal scrub, woodlands, dunes, or valley and foothill grassland on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Southern tarplant (*Centromadia parryi* ssp. *australis*) | __/__/1B.1/ G3T2/S2 | **Not Likely to Occur.** No suitable marsh or swamp margins or valley and foothill grassland on the project site; not found during protocol survey of marginal habitat on the pipeline alignment during summer 2016. |
| Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) | FE/SE/1B.2/ G4?T1/S1 | **Not Likely to Occur.** No coastal salt marsh or dune habitat on the project site or pipeline alignment. |

| Common Name (*Scientific Name*) | Conservation Status Fed/State/CRPR/ G-Rank/S-Rank | Potential for Occurrence in Project Impact Area |
|---|---|---|
| Many-stemmed dudleya (*Dudleya multicaulis*) | __/__/1B.2/ G2/S2 | **Not Likely to Occur.** No coastal scrub, chaparral, or valley and foothill grassland on the project site or pipeline alignment. |
| Los Angeles sunflower (*Helianthus nuttallii* ssp. *parishii*) | __/__/1A/ G5TH/SH | **Not Likely to Occur.** No marshes or swamps on the project site or pipeline alignment. Presumed extinct. |
| Southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*) | __/__/4.2/ G5T5/S4 | **Not Likely to Occur.** No marshes or swamps, meadows or seeps, or dunes on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*) | __/__/1B.1/ G4T2/S2 | **Not Likely to Occur.** No vernal pools, coastal salt marshes, valley and foothill grasslands, or playas on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| California box-thorn (*Lycium californicum*) | __/__/4.2/ G4/S4 | **Not Likely to Occur.** No coastal scrub or coastal bluff scrub on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Mud nama (*Nama stenocarpa*) | __/__/2B.2/ G4G5/S1S2 | **Not Likely to Occur.** No marshes or swamps on the project site or pipeline alignment. |
| Gambel's water cress (*Nasturtium gambelii*) | FE/ST/1B.1/ G1/S1 | **Not Likely to Occur.** No marshes or swamps on the project site or pipeline alignment. |
| Prostrate vernal pool navarretia (*Navarretia prostrata*) | __/__/1B.1/ G2/S2 | **Not Likely to Occur.** No vernal pools, coastal scrub, or valley and foothill grasslands on the project site or pipeline alignment. |
| Coast woolly-heads (*Nemacaulis denudata* var. *denudata*) | __/__/1B.2/ G3G4T2/ S2 | **Not Likely to Occur.** No coastal dune habitat on the project site or pipeline alignment. |
| California Orcutt grass (*Orcuttia californica*) | FE/SE/1B.1/ G1/S1 | **Not Likely to Occur.** No vernal pools on the project site or pipeline alignment. |
| Lyon's pentachaeta (*Pentachaeta lyonii*) | FE/SE/1B.1/ G1/S1 | **Not Likely to Occur.** No coastal scrub, chaparral, or valley and foothill grassland on the project site or pipeline alignment. |
| Brand's star phacelia (*Phacelia stellaris*) | __/__/1B.1/ G1/S1 | **Not Likely to Occur.** No coastal scrub or dunes on the project site or pipeline alignment. |
| Sanford's arrowhead (*Sagittaria sanfordii*) | __/__/1B.2/ G3/S3 | **Not Likely to Occur.** No marshes or swamps on the project site or pipeline alignment. |
| Salt spring checkerbloom (*Sidalcea neomexicana*) | __/__/2B.2/ G4/S2 | **Not Likely to Occur.** No coastal scrub, chaparral, alkali playas, marshes, desert scrub, or coniferous forests on the project site or pipeline alignment. |
| Estuary seablite (*Suaeda esteroa*) | __/__/1B.2/ G3/S2 | **Not Likely to Occur.** No marshes or swamps on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Woolly seablite (*Suaeda taxifolia*) | __/__/4.2/ G3?/S4 | **Not Likely to Occur.** No marshes or swamps, coastal bluff scrub, or dunes on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| San Bernardino aster (*Symphyotrichum defoliatum*) | __/__/1B.2/ G2/S2 | **Not Likely to Occur.** No meadows or seeps, coastal scrub, woodlands, forest, grasslands, marshes, or swamps on the project site or pipeline alignment. |

| WILDLIFE | | |
|---|---|---|
| **Invertebrates** | | |
| Western tidal-flat tiger beetle (*Cicindela gabbii*) | __/SA/__/ G2G4/S1 | **Not Likely to Occur.** No estuary or mudflat habitat on the project site or pipeline alignment. |
| Sandy beach tiger beetle (*Cicindela hirticollis gravida*) | __/SA/__/ G5T2/S1 | **Not Likely to Occur.** No areas adjacent to non-brackish water on the project site or pipeline alignment. |
| Western beach tiger beetle (*Cicindela latesignata latesignata*) | __/SA/__/ G2G4T1T2 /S1 | **Not Likely to Occur.** No beaches or mudflats on the project site or pipeline alignment. |
| Senile tiger beetle (*Cicindela senilis frosti*) | __/SA/__/ G2G3T1T3 /S1 | **Not Likely to Occur.** No marine shoreline on the project site or pipeline alignment. |
| Monarch butterfly (winter roosts) (*Danaus plexippus*) | __/SA/__/ G4T2T3 /S2S3 | **Not Likely to Occur.** No wind-protected tree groves for winter roosting on the project site or pipeline alignment. |
| Wandering (saltmarsh) skipper (*Panoquina errans*) | __/SA/__/ G4G5/S2 | **Not Likely to Occur.** No salt marsh habitat on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Dorothy's El Segundo Dune weevil (*Trigonoscuta dorothea dorothea*) | __/SA/__/ G1T1/S1 | **Not Likely to Occur.** No coastal sand dune habitat on the project site or pipeline alignment. |
| Mimic tryonia (=California brackishwater snail) (*Tryonia imitator*) | __/SA/__/ G2/S2 | **Not Likely to Occur.** No coastal lagoon, estuary, or salt marsh habitat on the project site or pipeline alignment. |
| **Fish** | | |
| Tidewater goby (*Eucyclogobius newberryi*) | FE/CSC/__/ G3/S3 | **Not Likely to Occur.** No aquatic habitat on the project site or pipeline alignment, and true estuarine conditions do not occur in the project vicinity. |
| Pacific seahorse (*Hippocampus ingens*) | __/__/__/ IUCN Red List | **Not Likely to Occur.** No aquatic habitat on the project site or pipeline alignment<br>**Present off-site.** Recently reported in Alamitos Bay near the project site. |
| **Reptiles and Amphibians** | | |
| Southern California legless lizard (*Anniella stebbinsi*) | __/CSC/__/ G3G4/S3 | **Not Likely to Occur.** No suitable wooded or shrubland habitat, leaf litter, organic soils, or similar habitat on the project site or pipeline alignment. |
| Orange-throated whiptail (*Aspidoscelis hyperythra*) | __/CSC/__/ G5/S2 | **Not Likely to Occur.** No coastal scrub, chaparral, or valley-foothill hardwood woodlands on the project site or pipeline alignment. |
| Pacific green sea turtle (*Chelonia mydas*) | FT/__/__/ G3/S1 | **Not Likely to Occur.** No aquatic habitat within the project site or pipeline alignment.<br>**Present off-site.** Pacific green sea turtles inhabit the lower San Gabriel River and vicinity and congregate near the existing AGS outfall adjacent to the project site. |
| Western pond turtle (*Emys marmorata*) | __/CSC/__/ G3G4/S3 | **Not Likely to Occur.** No aquatic habitat on the project site or pipeline alignment, but could occur in freshwater marsh areas in the Los Cerritos wetlands. |
| Coast horned lizard (*Phrynosoma blainvillii*) | __/CSC/__/ G3G4/S3S4 | **Not Likely to Occur.** No sandy natural habitats on the project site or pipeline alignment. |

| Common Name (*Scientific Name*) | Conservation Status Fed/State/CRPR/ G-Rank/S-Rank | Potential for Occurrence in Project Impact Area |
|---|---|---|
| Western spadefoot (*Spea hammondii*) | __/CSC/__/ G3/S3 | **Not Likely to Occur.** No grasslands or valley-foothill hardwood woodlands on the project site or pipeline alignment. |
| **Birds**[1] | | |
| Tricolored blackbird (*Agelaius tricolor*) | BCC/CSC/__/ G2G3/S1S2 | **Low.** No marsh or grain fields for nesting and foraging on the project site or pipeline alignment. Recorded approximately 0.5 mile from the project site. |
| Short-eared owl (*Asio flammeus*) | __/CSC/__/ G5/S3 | **Moderate.** No marsh or grassland foraging habitats on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. Outside of breeding range. |
| Burrowing owl (*Athene cunicularia*) | BCC/CSC/__/ G4/S3 | **Moderate** (foraging only)**.** No grasslands or similar open habitats with abundant burrows on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands and may forage on the site or fly over; low probability of nesting on the site. |
| Ferruginous hawk (*Buteo regalis*) | BCC/WL/__/ G4/S3S4 | **Low.** No grassland, shrub, or desert habitats on the project site or pipeline alignment. Outside of breeding range. |
| Western snowy plover (*Charadrius alexandrinus nivosus*) | FT, BCC/CSC/__/ G3T3/S2 | **Moderate.** No salt flats or beaches for nesting and foraging on the project site or pipeline alignment. Nests at Bolsa Chica; rarely at Seal Beach National Wildlife Refuge. |
| Northern Harrier (*Circus cyaneus*) | __/CSC/__/ G5/S3 | **Moderate** (foraging only). No grassland or marsh breeding and foraging habitats on the project site or pipeline alignment, but forages in Los Cerritos Wetlands. |
| Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) | FT, BCC/SE/__/ G5T2T3/S1 | **Not Likely to Occur.** No riparian woodlands for breeding and foraging on the project site or pipeline alignment, and presumed extirpated from the area. |
| White-tailed kite (*Elanus leucurus*) | __/FP/__/ G5/S3S4 | **Moderate.** No grassland, agricultural, wetland, oak-woodland, or savannah habitats for nesting and foraging on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Southwestern willow flycatcher (*Empidonax traillii extimus*) | FE/SE/__/ G5T2/S1 | **Not Likely to Occur.** No riparian habitat for breeding and foraging on the project site or pipeline alignment. |
| Yellow-breasted chat (*Icteria virens*) | __/CSC/__/ G5/S3 | **Low.** No riparian or shrubby habitats for foraging and nesting on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Loggerhead shrike (*Lanius ludovicianus*) | BCC/CSC/__/ G4/S4 | **Moderate** (foraging only). No riparian habitats, woodlands, or open natural habitats for foraging and nesting on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Osprey (*Pandion haliaetus*) | __/WL/__/ G5/S4 | **Moderate.** No open water for foraging on the project site or pipeline alignment, but recorded in Los Cerritos Wetlands. |
| Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) | __/SE/__/ G5T3/S3 | **Moderate.** No salt marsh habitat for breeding or foraging on the project site or pipeline alignment, but a breeding population is present in the Los Cerritos Wetlands to the west and south of the project. |

| Common Name (*Scientific Name*) | Conservation Status Fed/State/CRPR/ G-Rank/S-Rank | Potential for Occurrence in Project Impact Area |
|---|---|---|
| California brown pelican (*Pelecanus occidentalis californicus*) | FD/SD, FP/__/ G4T3/S3 | **High.** No aquatic habitat for foraging or coastal island habitat for roosting on the project site or pipeline alignment. Roosts offshore approximately 6 miles southwest of the project site. Routinely observed throughout the area, including the Los Cerritos Wetlands. |
| Coastal California gnatcatcher (*Polioptila californica californica*) | FT/CSC/__/ G3T2/S2 | **Not Likely to Occur.** No coastal sage scrub habitat on the project site or pipeline alignment. Occurs at Bolsa Chica Ecological Reserve and on the Palos Verdes Peninsula. |
| Light-footed clapper rail (*Rallus longirostris levipes*) | FE/SE, FP/__/ G5T1T2/S1 | **Moderate.** No salt marsh habitat for breeding or foraging on the project site or pipeline alignment. Nests at Seal Beach National Wildlife Refuge and may use the Los Cerritos Wetlands as a corridor to travel among occupied habitats in the region. |
| Bank swallow (*Riparia riparia*) | __/ST/__/ G5/S2 | **Not Likely to Occur.** No riparian habitat for breeding and foraging on the project site or pipeline alignment. Nesting populations are considered extirpated in southern California. |
| Black skimmer (*Rynchops niger*) | BCC/CSC/__/ G5/S2 | **Moderate.** No gravel bars or sandy beaches for nesting on the project site or pipeline alignment, but forages in the Los Cerritos Wetlands to the west and is present year-round on sandy beaches in the vicinity. |
| California least tern (*Sternula antillarum browni*) | FE/SE, FP/ G4T2T3Q/S2 | **Moderate.** No sandy beaches or alkali flats for nesting on the project site or pipeline alignment, but forages and trains offspring in the Los Cerritos Wetlands to the west of the project. Historically nested in the Los Cerritos wetlands, but current closest nesting grounds are at the Seal Beach National Wildlife Refuge and Bolsa Chica. |
| Least Bell's vireo (*Vireo bellii pusillus*) | FE/SE/__/ G5T2/S2 | **Not Likely to Occur.** No riparian habitat for breeding and foraging on the project site or pipeline alignment. |
| **Mammals** | | |
| Western mastiff bat (*Eumops perotis californicus*) | __/CSC/__/ G5T4/S3S4 | **Not Likely to Occur.** No woodlands, coastal scrub, grasslands, chaparral, or other open arid to semi-arid habitats on the project site or pipeline alignment. |
| Silver-haired bat (*Lasionycteris noctivagans*) | __/SA/__/ G5/S3S4 | **Low.** No coastal or montane forest habitats on the project site or pipeline alignment. Could forage in the nearby Los Cerritos wetlands complex. |
| Western yellow bat (*Lasiurus xanthinus*) | __/CSC/__/ G5/S3 | **Low.** No riparian, desert wash, or palm oasis habitat on the project site or pipeline alignment, but could occur in the nearby Los Cerritos wetlands complex. |
| South coast marsh vole (*Microtus californicus stephensi*) | __/CSC/__/ G5T1T2/S1S2 | **Not Likely to Occur.** No tidal marsh habitat on the project site or pipeline alignment, but could occur in salt marsh habitats in the nearby Los Cerritos wetlands. |
| Pocketed free-tailed bat (*Nyctinomops femorosaccus*) | __/CSC/__/ G4/S3 | **Not Likely to Occur.** No rocky areas with high cliffs on the project site or pipeline alignment. |
| Big free-tailed bat (*Nyctinomops macrotis*) | __/CSC/__/ G5/S3 | **Not Likely to Occur.** No rocky outcrops or high cliffs on the project site or pipeline alignment. |

| Common Name (*Scientific Name*) | Conservation Status Fed/State/CRPR/ G-Rank/S-Rank | Potential for Occurrence in Project Impact Area |
|---|---|---|
| Pacific pocket mouse (*Perognathus longimembris pacificus*) | FE/CSC/__/ G5T1/S1 | **Not Likely to Occur.** No coastal strand, coastal dune, river alluvium, or coastal sage scrub habitat on the project site or pipeline alignment. Presumed extirpated in the area. |
| Southern California saltmarsh shrew (*Sorex ornatus salicornicus*) | __/CSC/__/ G5T1? /S1 | **Not Likely to Occur.** No coastal marsh habitat on the project site or pipeline alignment, but could occur in salt marsh habitats in the nearby Los Cerritos wetlands. |
| American badger (*Taxidea taxus*) | __/CSC/__/ G5/S3 | **Not Likely to Occur.** No shrub, forest, or grasslands with friable soils on the project site or pipeline alignment. |

Sources: CDFW 2016; CNPS 2016; Tidal Influence 2012

1. Most special-status birds could occasionally fly over the site, or briefly roost or rest on the site; these casual occurrences are not included in the indicated occurrence probabilities.

## Biological Resources Table 2 – Notes

| STATUS CODES: |
|---|
| **State** |
| CSC: California Species of Special Concern. Species of concern to CDFW because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. |
| SE: State listed as endangered |
| SR: State listed as rare |
| ST: State listed as threatened |
| SFP: Fully protected |
| WL: Watch List: includes species formerly on California Species of Special Concern List (Remsen 1978) but which did not meet the criteria for the current list of special concern bird species (Shuford and Gardali 2008). |
| SA: Special Animal. Species is tracked in the CNDDB (due to rarity, limited distribution in California, declining throughout the range, etc.) but holds no other special status at the state or federal level. |
| **Federal** |
| FE: Federally listed endangered: species in danger of extinction throughout a significant portion of its range |
| FT: Federally listed, threatened: species likely to become endangered within the foreseeable future |
| BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities |
| http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf |
| D: Delisted taxon that is considered recovered |
| **California Rare Plant Rank (CRPR)** |
| CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere |
| CRPR 1B: Rare, threatened, or endangered in California and elsewhere |
| CRPR 2A: Rare, threatened, or endangered in California but more common elsewhere |
| CRPR 2B: Plants rare, threatened, or endangered in California, but more common elsewhere |
| CRPR 3 = Plants which need more information |
| CRPR 4 = Limited distribution – a watch list |

| STATUS CODES: |
| --- |
| 0.1: Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat) |
| 0.2: Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat) 0.3: : Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known) **Global Rank/State Rank** |
| **Global rank (G-rank)** is a reflection of the overall condition of an element throughout its global range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values |
| G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. |
| G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. |
| G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. |
| G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors. |
| G5 = Secure – Common; widespread and abundant. |
| **State rank (S-rank)** is assigned much the same way as the global rank, except state ranks in California often also contain an imperilment status only within California's boundaries. |
| S1 = Critically Imperiled – Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state. |
| S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state. |
| S3 = Vulnerable – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state. |
| S4 = Apparently Secure – Uncommon but not rare in the state; some cause for long-term concern for population within state due to declines or other factors. |
| S5 = Secure – Common, widespread, and abundant in the state/province. |
| SH = All California occurrences historical (i.e., no records in > 20 years). |
| **Potential Occurrence:** |
| **High –** Suitable habitat is present within or near the proposed site: occurrence records exist for species in proximity to the site; species expected to occur on or near site |
| **Moderate –** Low quality habitat is present within or near the proposed site; species was not identified during reconnaissance surveys of the site; species may occur on or near site |
| **Low –** Marginal habitat is present on or adjacent to site; no recent records within 10 miles of the site |
| **Not Likely to Occur** – No recent records within 10 miles, no suitable habitat occurs on or near site |

## Special-Status Plants

Rare plant surveys were not conducted at the project site due to existing urbanized and industrial land uses. However, several special-status plant species have been documented in the regional vicinity, including at the nearby marshes. In addition, southern tarplant (CRPR 1B.1) has been recorded near the offsite pipeline alignment at Loynes Drive and Studebaker Road (CDFW 2016). It is unlikely that special-status plants would colonize or persist at the project site due to landscape maintenance and weed management practices. Special-status plants are not expected to occur on the off-site pipeline route due to habitat requirements (for most species) and a protocol survey with negative results for southern tarplant.

### Southern Tarplant

Southern tarplant is a CRPR 1B.1 annual herb in the sunflower family (Asteraceae) that blooms between May and November. It ranges from Santa Barbara County south into Baja California, and on Santa Catalina Island. Typical habitat includes the margins of marshes and swamps, vernally mesic sites within valley and foothill grassland, and vernal pools below 1,400 feet. It is usually found on alkaline soils, including disturbed sites. Southern tarplant occurs in the Los Cerritos Wetlands complex. The nearest record is in the northwest corner of the wetlands complex, about 200 feet south of the offsite pipeline alignment at Loynes Drive and Studebaker Road. Although the record is across Loynes Drive from the pipeline location, and the pipeline would be constructed in the ruderal road shoulder, southern tarplant can be found on disturbed sites. A focused survey for southern tarplant was conducted during summer 2016 along the pipeline route, concluding that the plant was not present (CH2MHill 2016 TN 212917). Energy Commission staff independently verified that southern tarplant was detectable during the time of the survey by confirming that it was located, in flower, at the Port of Long Beach (independent field observation by Justin Wood, Aspen Environmental, August 2016). Staff concludes that southern tarplant  is not likely to occur on the developed industrial AEC site or on the pipeline route.

## Special-Status Wildlife

The applicant conducted general reconnaissance surveys of the project site and offsite pipeline alignment (including a 4,000-foot alignment no longer proposed as part of the AEC) in September 2011, July 2013, January 2014, and April 2015. No protocol or focused surveys were performed due to the low potential for special-status wildlife species to occur within the site (except during casual stopover or flyover). The following accounts focus on species with a moderate or high potential to occur near the site, and that could be affected by project construction and operation.

### Birds

The project site is located within the Pacific Flyway, a very broad migration corridor stretching along the Pacific Coast from Mexico north to Alaska and into Siberia, Russia. Birds in the region include year-round resident breeding birds, migratory birds that breed in the region but winter elsewhere, birds that forage and rest in the area during migration between breeding and wintering grounds, and species that winter in the project region. Nesting habitat on the site is limited to landscaped areas including trees where common upland birds such as house finches may nest, and open gravelly substrates where ground-nesting birds such as killdeer could nest. There is no suitable nesting habitat for special-status birds of the surrounding marshlands. Small mammals, reptiles, and landscape plants provide some cover and foraging opportunities for birds on site. Although the site itself provides relatively little nesting and foraging habitat for native birds, the nearby wetlands are regionally important for many bird species. Native birds, regardless of any additional conservation status at the local, state, or federal level, are afforded protection by the federal MBTA and California Fish and Game Code (**Biological Resources Table 1**).

### ***Belding's Savannah Sparrow***

The Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) is a state-listed endangered species. It is a subspecies of the more common savannah sparrow, and is endemic to the coastal salt marshes of southern California. It is one of few birds that reside year-round in the local marshes. It ranged historically from Goleta in Santa Barbara County in California south to El Rosario, Baja California, Mexico.

Belding's savannah sparrow is found in tidal and non-tidal coastal wetlands where it is closely associated with pickleweed. Breeding territories can be very small and the birds nest semi-colonially or in localized concentrations within a larger block of habitat. They forage on the ground for insects, snails and other invertebrates, and seeds. Breeding begins in early March. The Belding's savannah sparrow occupies the Los Cerritos Wetlands complex and breeds in the coastal salt marsh wetlands in the immediate vicinity of the AEC site (Merkel & Associates 2004; CDFW 2016; Zembal and Hoffman 2010). It is also found in the Bolsa Chica wetlands and the Seal Beach National Wildlife Refuge. Surveys conducted in 2010 documented 23 Belding's savannah sparrow territories in the Los Cerritos Wetlands; larger populations also occur at the Seal Beach National Wildlife Refuge (326 territories in 2010) and Bolsa Chica (280 territories in 2010) (Zembal and Hoffman 2010).

There is no suitable habitat within the proposed AEC or pipeline alignment, and no Belding's savannah sparrows were observed during reconnaissance-level project surveys.

### ***California Least Tern***

The California least tern (*Sternula antillarum browni*) is federally and state-listed as endangered. It nests along the west coast of North America, from Baja California, Mexico, north to the San Francisco Bay area (USFWS 1980). It was listed as endangered by federal and state agencies due to a population decline resulting from loss of nesting habitat (Cogswell 1977). It forages for fish in open water habitats including near shore ocean waters, tidal channels, and estuaries. It breeds colonially on sandy soils with little vegetation or other open sites along the ocean, lagoons, and bays. Its nests are shallow depressions lined with shells or other debris (Massey 1974). California least terns are generally present at nesting areas between mid-April and late September (Massey 1974; Cogswell 1977; Patton 2002), often with two waves of nesting during this time period (Massey and Atwood 1981).

In the project region, California least terns nest at the Bolsa Chica wetlands and Seal Beach National Wildlife Refuge (CDFW 2016; Frost 2013; Marschalek 2008, 2009, 2010). There is no suitable nesting habitat for the California least tern at the AEC site and it has very limited potential to occur on the site, except while flying overhead. However, it uses the neighboring Los Cerritos Wetlands for foraging, loafing, and training young (Tidal Influence 2012).

### *Light-Footed Clapper Rail*

The light-footed clapper rail (*Rallus longirostris levipes*) is federally and state listed as endangered. It occupies coastal salt marshes from Santa Barbara County, California, to San Quintin Bay, Baja California, Mexico. Within its historical range the amount of suitable habitat has been severely reduced by conversion of marshes for other uses.

The light-footed clapper rail forages for mollusks and crustaceans in coastal salt marshes, mudflats, and along tidal channels. Nest sites are usually in areas of dense marsh vegetation including pickleweed and cord grass (*Schoenoplectus* spp.). It breeds from early March through August.

The light-footed clapper rail breeds in wetland habitats in the regional vicinity including the Bolsa Chica wetlands and Seal Beach National Wildlife Refuge (Zembal et al. 2010; Zembal and Hoffman 2012). Although not documented breeding in the Los Cerritos Wetlands complex, it could use the wetlands as a corridor for traveling between regional breeding and foraging grounds (Tidal Influence 2012).

### *Western Snowy Plover*

The western snowy plover (*Charadrius alexandrinus nivosus*) is a federally listed threatened species and a California Species of Special Concern. It typically forages for small invertebrates in wet or dry beach sand, in salt marshes, and within low foredune vegetation. The range of the Pacific coast breeding population of the western snowy plover extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. This population breeds primarily above the high-tide line on coastal beaches and other open, sandy or salt panne areas, sometimes including dredged material disposal sites, salt pond levees, and dry salt ponds. The snowy plover winters mainly in coastal areas from southern Washington to Central America. In winter, snowy plovers are found on many of the beaches used for nesting as well as on beaches where they do not nest, in man-made salt ponds, and on estuarine sand and mud flats. The breeding season normally extends from March 1 through September 15, however the first nest at Bolsa Chica in 2009 occurred on February 23 and courting behavior has been observed as early as late January (Knapp and Peterson 2009).

Poor reproductive success resulting from human disturbance, predation, and inclement weather, combined with permanent or long-term habitat loss from urban development and recreation has led to the decline in active nesting colonies and an overall decline in the breeding and wintering population along the Pacific coast (USFWS 2007).

Designated critical habitat for western snowy plover includes the Bolsa Chica State Beach and Bolsa Chica Reserve (USFWS 2012). Bolsa Chica State Beach supported an average wintering flock of 27 western snowy plover from 2003 through 2010 (USFWS 2012). The site annually supports a significant wintering flock of western snowy plover in a location with high-quality breeding habitat. The Bolsa Chica Reserve is located east of Highway 1 in Orange County. It supported 47 breeding adult western snowy plover in 2009 (Knapp and Peterson, 2009).

Although no breeding or wintering habitat occurs on the AEC site or pipeline alignment, the western snowy plover could fly over as it travels among occupied habitats in the region.

### *White-Tailed Kite*

The white-tailed kite is a fully protected species in California. It forages over open grasslands, savannahs, wetlands and marshes, oak woodlands, and agricultural habitats and nests in trees, generally on edges of forging habitats. In California, it is a year-round resident and its range includes nearly all areas from the coast to the western Sierra Nevada foothills, and south through the deserts. Its  overall range is expanding, and the present distribution is the largest in the species' known history (Dunk 1995). White-tailed kites forage in the nearby Los Cerritos Wetlands complex. Although no foraging habitat is found on the AEC site or pipeline alignment, the white-tailed kite could fly over as it moves among occupied habitats in the region.

### *Osprey*

The osprey is on CDFW's Watch List. It is a large raptor that feeds almost exclusively on fish. It is found in coastal areas, and inland near rivers and lakes. The osprey is globally distributed. In southern California, it is primarily an uncommon winter visitor, but has been nesting in recent years in Upper Newport Bay and surrounding areas (Reicher 2010). It has been observed in the Los Cerritos Wetlands complex, and could fly over the AEC site while moving among habitats in the region.

### *Burrowing owl*

The burrowing owl is a California Species of Special Concern. It has been documented in the project vicinity, but not on the project site. Habitat for burrowing owl is typically level, sparsely vegetated, open areas such as grassland, agricultural land, scrubland, and disturbed or landscaped open areas. The burrowing owl forages on the ground for small reptiles, mammals, and invertebrates. It shelters and nests in burrows, and tends to take cover in its burrow rather than flee from disturbance. It may use abandoned burrows of ground squirrels or other animals, dig its own burrow if soil conditions allow, or use "surrogate burrows" such as construction debris or drain pipes. Burrowing owls may occupy a burrow or surrogate burrow at any time of year. Burrowing owl has a moderate potential for foraging and a low potential for nesting or taking refuge on the project site.

### *Black Skimmer*

The black skimmer is a California Species of Special Concern and a USFWS Bird of Conservation Concern. It is a coastal waterbird, and the western population breeds from Orange and San Diego counties in California south to Nayarit, Mexico (Gochfeld and Burger 1994). It nests on open sandy or gravelly areas with sparse vegetation or on broad mats of dead vegetation in salt marshes. It is a colonial nester that prefers areas with other species such as terns that provide early warning of intruders. It forages in the Los Cerritos Wetlands complex, and nests at Bolsa Chica (CDFW 2016). Although the AEC site and pipeline alignment support no nesting or foraging habitat, black skimmers could fly over while moving among habitats in the region.

### *California Brown Pelican*

The California brown pelican (*Pelecanus occidentalis*) is a California state fully protected species. It was formerly state and federally listed as endangered, but was de-listed in 2007 due to recovery of the population (Burkett et al. 2007). Brown pelicans feed on fish which they catch by diving from the air into the water. It nests in colonies, usually on offshore islands where predators are absent, on the ground.

The open space and wetland habitats immediately surrounding the site provide resting and loafing habitat for brown pelicans; however, there is no natural habitat on the AEC site. Brown pelicans may fly over or (occasionally) land on the facilities or on the ground, but there is no potential for feeding, breeding, or other important activity on the site. Although California brown pelican is not expected to breed in nearby marshes due to lack of suitable breeding habitat, it is routinely observed foraging and loafing in the marshes and Alamitos Bay.

## Reptiles

### *Pacific Green Sea Turtle*

The green sea turtle (*Chelonia mydas*) is federally listed as threatened. It is found in tropical and subtropical waters world-wide. It breeds on tropical beaches; the hatchling turtles enter the ocean immediately and, over the course of five to ten years, grow to juvenile size and move to nearshore areas where they feed largely on plant material such as algae and eelgrass. On reaching sexual maturity, green sea turtles migrate to their natal beaches to breed, but otherwise spend most of their time in shallow nearshore waters (Arthur et al. 2008).

Green sea turtles are found year-round in the San Gabriel River mouth and surrounding areas and have been resident there at least since 2008 (Lawson et al. 2014). The number of turtles is unknown, but sizes range from juvenile to adults. Genetic work indicates that these turtles originate from an unknown breeding population, related to populations breeding in Mexico. They are often observed at the warm water discharges from the Alamitos Generating Station adjacent to the project site, and the Los Angeles Department of Water and Power’s (LADWP’s) Haynes Generating Station, just across the river from the project site (D. Lawson, pers. comm.). The turtles visit other local estuaries seasonally (Anaheim Bay, Seal Beach National Wildlife Refuge, and Alamitos Bay), but the warm water discharged from the power plants may be the primary reason for the species’ presence in the area (Moffatt and Nichol 2015). Studies suggest that the resident turtles are more likely to move among locations in local waters during the summer and fall months when ocean temperatures are warmer, and stay in the warm effluent in the river during the winter (Lawson et al. 2014).

## JURISDICTIONAL WETLANDS AND WATERS

The proposed AEC site and laydown areas are in industrial land use. The majority of the project area is paved. Some portions of the site are landscaped with trees, shrubs and lawns, but no natural habitats are present. Federal jurisdiction as waters of the United States includes navigable waters and their tributaries, based on presence of an "ordinary high water mark" (OHWM). Jurisdictional waters of the state include all waters within California, including those that may be isolated from navigable waters and their tributaries. The project site is above the OHWMs of the adjacent water bodies, and runoff from the site is collected in a retention basin on-site and discharged into the San Gabriel River by outfalls (AEC 2015f). These features are not regulated as waters of the US or waters of the state.

Wetlands are generally defined according to three criteria (or parameters): Hydric soil characteristics, caused by saturation; hydrophytic vegetation, adapted to wetland conditions; and hydrology, the seasonal or long-term presence of water. Under the federal definition, a site must ordinarily meet all three criteria to be considered a wetland. Under state criteria a site may be defined as a wetland if it meets only one or two of the criteria and, if so, it may be regulated by the CDFW or California Coastal Commission as waters of the state. Soils on the site are covered by existing land use (pavement, industrial structures, or landscaping) or are strongly compacted for use as staging areas. Water (e.g., from precipitation or runoff) does not reach the soil profile to cause development of hydric soil characteristics. Vegetation is limited to landscaped areas and scattered weedy areas (AEC 2015f). Water may be present on the ground's surface in temporary puddles (after rainfall) or in the lined retention basin, but these conditions do not meet the hydrology criterion for wetland determination. Therefore, the site does not meet criteria as a wetland, under applicable definitions of state or federal agencies.

# IMPACT ASSESSMENT

## METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

A significant impact is defined under CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (Cal Code Regs. tit. 14, [hereinafter CEQA Guidelines] section 15382). In this analysis, impacts to biological resources are considered significant if the project would result in the following:

- a substantial adverse effect to wildlife species that are federally-listed or state-listed or proposed to be listed; a substantial adverse effect to wildlife species of special concern to CDFW, candidates for state listing, or animals fully protected in California;
- a substantial adverse effect to plant species considered by CDFW, USFWS, or CNPS to be rare, threatened, or endangered in California or with strict habitat requirements and narrow distributions; a substantial impact to a sensitive natural community (i.e., a community that is especially diverse; regionally uncommon; or of special concern to local, state, and federal agencies);

- substantial adverse effects on habitats that serve as breeding, foraging, nesting, or migrating grounds and are limited in availability or that serve as core habitats for regional plant and wildlife populations;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- substantial adverse effect on important riparian habitats or wetlands and any jurisdictional waters of the U.S. or waters of the state; or
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

## Direct and Indirect Impacts and Mitigation

The CEQA Guidelines define direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance and are still reasonably foreseeable and related to the project. Direct or indirect impacts on biological resources could be permanent or temporary in nature. All impacts that result in the irreversible removal of biological resources are considered permanent. Any impact considered to have reversible effects on biological resources can be viewed as temporary.

This section evaluates the potential direct, indirect, permanent, and temporary impacts to biological resources from proposed AEC construction and associated demolition activities, operation, maintenance, and decommissioning, and provides mitigation, as necessary, to reduce impacts to less than significant levels.

## General Biological Resources Conditions of Certification

In order to avoid or minimize potentially adverse impacts to biological resources, staff recommends that the project owner appoint a Designated Biologist and, if needed, additional Biological Monitor(s) to ensure impact avoidance and minimization measures described below and protection of sensitive biological resources described above are implemented. The selection criteria and minimum qualifications of the Designated Biologist and Biological Monitor(s) are described in staff’s proposed Conditions of Certification **BIO-1** (Designated Biologist Selection) and **BIO-3** (Biological Monitor Selection). The duties and authority of the Designated Biologist and Biological Monitor are described in staff’s proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor Authority). The Designated Biologist would be responsible, in part, for developing and implementing the Worker Environmental Awareness Program (WEAP) (see Condition of Certification **BIO-5**), which is a training program for the on-site personnel on how to protect sensitive biological resources and the consequences of non-compliance.

Staff’s proposed Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan [BRMIMP]) requires preparation of a BRMIMP, which consolidates all biological resource mitigation, monitoring, and compliance measures, as well as other information necessary to ensure compliance with, and effectiveness of, all impact avoidance, minimization, and mitigation measures.

## CONSTRUCTION AND DEMOLITION IMPACTS AND MITIGATION

### Construction and Demolition Impacts to Native Vegetation

Construction and demolition impacts to vegetation could occur through the direct removal or crushing of plants by equipment or vehicles. As these impacts would be localized and primarily temporary, they are not usually considered significant unless the habitat type is regionally unique or supports special-status species.

The developed industrial project area and ruderal lands along the wastewater pipeline do not provide regionally unique habitat or important habitat for special-status species. Significant impacts to native vegetation would not occur and no mitigation is proposed.

### Construction and Demolition Impacts to Common Wildlife

Direct loss of small mammals, reptiles, and other less mobile species could occur during construction and demolition activities. This loss would result primarily from vehicles and equipment which could collapse underground burrows or drive over animals. Additionally, construction and demolition activities and increased human presence may temporarily disrupt breeding or foraging activities of some common wildlife species.

Wildlife could become entrapped in open trenches during construction, especially if trenches remain open during inactive construction periods. Staff recommends Condition of Certification **BIO-7**, which would require exclusion measures for open trenches (e.g., fencing or covering), inspection of trenches prior to resuming construction activities each day, and installation of escape ramps so that animals that fall in the trench could escape. Implementation of this measure would mitigate adverse impacts to wildlife from entrapment.

Common birds could nest in the ornamental plantings, on facilities and equipment, or on the ground within the AEC site. Many adult birds would flee from equipment during project construction. However, nestlings and eggs of ground-nesting birds or birds nesting on ornamental trees, other landscaping, or equipment and facilities would be vulnerable to impacts during project construction. Nests, nestlings, and eggs of native birds are protected by the MBTA and Fish and Game Code Sections 3503 and 3513. Construction and demolition activities during nesting season could destroy bird nests, including eggs or nestling birds.

The applicant proposes to conduct a preconstruction active nest survey and, if determined necessary, monitor active nests during construction and demolition activities (AEC 2015f; p. 5.2-17). Staff agrees with the need for preconstruction nest surveys and has incorporated the applicant's proposed measure into Condition of Certification **BIO-8** (Preconstruction Nest Surveys and Impacts Avoidance and Minimization Measures for Breeding Birds). This condition would require a survey for birds in advance of work conducted between January 1 and August 31, on the project site and the wastewater pipeline route, and establishment of a no-disturbance buffer if a nest is identified. Additionally, general measures presented in Condition of Certification **BIO-7** (Impact Avoidance and Minimization Measures) (e.g., limited disturbance areas) would avoid and minimize impacts to nesting birds. With implementation of Conditions of Certification **BIO-7** and **BIO-8**, no significant impacts to nesting birds would result from proposed project construction and demolition activities and the project would comply with MBTA and California Fish and Game Code.

Wildlife habitat in the project region has been significantly fragmented by urban development. The AEC site does not provide biological connectivity or wildlife movement routes among local habitat areas; therefore, there would be no significant impacts to wildlife movement or habitat fragmentation. An analysis of impacts to wildlife from noise and lighting is presented under "General Construction and Demolition Impacts," below.

## Construction and Demolition Impacts to Special-Status Plants

No special-status plants are expected to occur on the project site or off-site pipeline route. Some special-status plants occur in the marshes adjacent to the AEC site; however, recruitment into the project site would be unlikely and limited to landscaped or unpaved areas. Ongoing maintenance and weed control would prevent any rare plants from persisting. The project is not expected to have direct impacts to special-status plants.

Special-status plants that inhabit the Los Cerritos Wetlands, such as Lewis' evening primrose, southern tarplant, southwestern spiny rush, Coulter's goldfields, California box-thorn, estuary seablight, and wooly seablight, could be indirectly impacted from runoff of sediment or toxic substances from the project site, dust, or spread of invasive weeds during construction and demolition. These potential impacts are discussed under "General Construction and Demolition Impacts," below.

## Construction and Demolition Impacts to Special-Status Wildlife

Although most special-status wildlife species are not expected to occur at the project site (except during casual flyover or resting), several may forage, roost, or breed in nearby marshes. These species include the wandering saltmarsh skipper, silver-haired bat, western yellow bat, and several bird species. The federally listed green sea turtle occupies the lower San Gabriel River adjacent to the AEC site, and surrounding bays and inlet areas, and the Pacific seahorse has been reported from Alamitos Bay. Project demolition and construction could indirectly affect special-status wildlife, possibly including the state-listed threatened Belding's savannah sparrow, in the marshes and river near the AEC site by causing noise and lighting disturbance, and habitat degradation from invasive weeds, stormwater runoff, or groundwater contamination.

These impacts, should they occur, may be adverse to the species, but would not be considered “take” under applicable state or federal law (described further in the following paragraph). The impacts and corresponding conditions of certification are discussed under “General Construction and Demolition Impacts,” below.

Nesting special-status birds in the nearby Los Cerritos Wetland complex could be disturbed by construction and demolition detailed in the following subsections. The state-listed Belding’s savannah sparrow breeds in the Los Cerritos Wetlands, and the local breeding populations of light-footed clapper rail (federally and state-listed), western snowy plover (federally listed), and California least tern (federally and state-listed) may use the wetlands as a corridor for traveling between regional breeding and foraging grounds. The Los Cerritos Wetlands are approximately 700 feet from the nearest construction and demolition activities on the AEC site, and general construction and demolition disturbance would not affect birds that far away. These impacts, should they occur, may be adverse to the species, but would not be considered “take” as it is defined by the California Fish and Game Code (i.e., “hunt, pursue, catch, capture, or kill,” or to attempt same). Under the federal ESA, “take” is defined more broadly to include harassment, although none of the project’s potential effects to federally listed species are expected to result in harassment or other “take” as defined by the ESA. Impacts from construction and demolition noise are analyzed below.

Condition of Certification **BIO-8** would require pre-construction surveys for all breeding birds, including special-status birds, within 300 feet of construction and demolition activities on the project site and the wastewater pipeline route. Where pre-construction surveys identify breeding birds, **BIO-8** would require a no-disturbance buffer around the nest site(s). Implementation of **BIO-8** would reduce impacts to special-status breeding birds in the project vicinity to less than significant. In addition, **BIO-8** would require year-round surveys for active burrowing owls, either in burrows or burrow surrogates such as construction debris or drain pipes.

The monarch butterfly (*Danaus plexippus*) is notable for its long-distance multiple-generational annual migration. The International Union for Conservation of Nature (IUCN) recognizes the monarch butterfly migration as an Endangered Phenomenon. On the west coast, monarchs overwinter in coastal California. They migrate over multiple generations northward, and possibly south into Mexico, during spring and summer, and then return to coastal overwintering areas. Well known roost sites are also found on the central California coast. These roost sites are important to the larger migration phenomenon. Monarch butterflies have been reported in the vicinity of the project site, but there are no known overwintering trees or forests in the vicinity. Any potential project impacts to monarch butterflies would be less than significant and no mitigation is recommended.

## Construction and Demolition Impacts to Jurisdictional Wetlands and Waters

The proposed AEC project would not result in direct loss or fill of jurisdictional wetlands or waters, as there are none present within the project area.

The AEC site is near the Los Cerritos wetlands which includes estuarine and marine wetland habitats. These areas appear to meet criteria as jurisdictional waters of the state and waters of the U.S. Indirect impacts to wetlands may result if construction contaminants, sediment, or untreated stormwater effluent from the AEC project enter these sensitive areas. The applicant has committed to implementing Best Management Practices (BMPs) to control site runoff during construction and demolition activities in accordance with the project's Stormwater Pollution Prevention Plan (SWPPP) (AEC 2015f, p. 5.2-13); this requirement is subsumed as a requirement of Condition of Certification **SOIL&WATER-1**. With implementation of these measures, indirect water quality impacts to adjacent wetland habitats would be less than significant.

## General Construction and Demolition Impacts

### Noise

Noise from construction and demolition activities could discourage special-status wildlife from foraging and nesting near the proposed project area, due to interference with communication, disturbance or disruption of activities, or startling from loud noises. Noise may affect birds in several ways, including reducing reproductive success; raising the level of stress hormones; interfering with sleep; causing permanent injury to the auditory system; and interfering with acoustic communication by masking important sounds, such as an approaching predator (Halfwerk et al 2011; Dooling 2006; Kight and Swaddle 2011). Many bird species rely on vocalizations to communicate with mates or offspring, or defend territories. Loud noise from surrounding areas can "mask" these vocalizations. However, most demolition and construction noise is at lower frequencies than bird vocalizations, or is intermittent (e.g., pile driving). These project-related noises are not expected to mask bird vocalizations. If birds are startled by loud noises, they may flush from their nests, leaving eggs or young unattended. Or an adult bird delivering food may avoid the nest area due to disturbance. These effects could adversely affect nesting success. Special-status species present in the Los Cerritos Wetlands complex may be affected by construction and demolition noise. Special-status birds that may be affected include the Belding's savannah sparrow (state-listed endangered), California least tern (federally and state-listed endangered), burrowing owl (California Species of Special Concern [CSC]), short-eared owl (CSC), northern harrier (CSC), yellow-breasted chat (CSC), loggerhead shrike (CSC), black skimmer (CSC), and California brown pelican (state fully protected). Of these, only Belding's savannah sparrow is known to nest in the marshes. Loggerhead shrike and black skimmer are year-round residents in the marshes and may breed there. The remaining special-status species only occur seasonally, or forage but do not nest in the marshes.

Construction and demolition noise would occur over 56 months in proximity to the Los Cerritos wetlands complex. Noise staff estimated daytime ambient noise to be approximately 53 dBA in the northeast corner of the Los Cerritos Wetlands west of the AEC site (i.e., the marsh location nearest to project construction and demolition activities). The loudest noise generated by the proposed project during construction and demolition would be from pile driving; this is also the noise most likely to cause startling effects to birds. Unsilenced pile driving would be approximately 76 dBA at the northeast corner of the Los Cerritos Wetlands (about 1,200 feet from nearest pile driving and based on 104 dBA at 50 feet). However, several methods are available to reduce pile-driving noise; these include 1) use of pads or plywood impact cushions, 2) dampened driving using a blanket or enclosure around the hammer, and 3) use of vibratory pile drivers. These methods reduce noise by about 8 dBA to 15 dBA compared to unsilenced impact drivers.

Human receptors are located closer to the AEC site than the Los Cerritos Wetlands, and include residential neighborhoods to the west, north, and east of the site as well as a school adjacent to the northern boundary of the site. Conditions of certification proposed in the **Noise and Vibration** section of this FSA would require effective measures to control construction and demolition noise at its source, which benefits all of the surrounding area including the Los Cerritos Wetlands complex. Noise staff's proposed Condition of Certification **NOISE-8** requires noise and vibration minimization measures for pile driving, and Condition of Certification **NOISE-6** requires mitigation measures for all noisy construction activities. With implementation of these conditions of certification, construction and demolition noise impacts to special-status species in the vicinity of the AEC would be less than significant.

**Lighting**

Construction and demolition activities would typically occur between 7:00 a.m. and 7:00 p.m. Monday through Friday, and between 9:00 a.m. and 6:00 p.m. on Saturday. Overtime and additional shift work may be used to maintain the construction schedule or to complete critical construction activities (for example, pouring concrete at night during hot weather, or working around time-critical shutdowns and constraints). During the commissioning and startup phase of each of the power blocks, some activities may continue 24 hours per day, 7 days per week. Bright lighting at night could disturb the nesting, foraging, or mating activities of wildlife in the nearby marshes and make wildlife more visible to predators. Night lighting could disorient migratory birds and, if placed on tall structures, may attract birds and increase the likelihood of collision. Although local wildlife have presumably acclimated to lighting from the existing operations at the AGS and traffic on adjacent roadways, project-related increased night lighting could significantly increase these effects to special-status wildlife.

If night construction were required, the applicant proposes to use task-specific lighting to the extent practicable and shield and direct lighting onsite (AEC 2015f, p. 5.13-15). These measures are incorporated into Condition of Certification **VIS-1** (refer to the **Visual Resources** section for the full text of this condition). With implementation of these measures, impacts to wildlife from construction night lighting would be less than significant.

### Construction Dust

Fugitive dust would result from operating vehicles and equipment on unpaved surfaces on the AEC site, including grading and bulldozing during construction and demolition. Demolition activities such as the top-down removal of the boilers and stacks, and loading waste haul trucks with materials and debris could also generate dust. Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities for feeding wildlife.

The applicant has proposed mitigation measures to reduce fugitive dust emissions during demolition and construction (AEC 2015f, p. 5.1-44 to 5.1-45). Staff proposes conditions of certification to avoid and minimize impacts of dust generated by construction and demolition activities. Condition of Certification **AQ-SC3** requires specific measures to minimize fugitive dust, and Condition of Certification **AQ-SC4** requires construction monitoring for visible dust plumes and remediation measures in the event visible dust plumes are observed. With implementation of these conditions of certification, impacts to plants and habitat in the Los Cerritos Wetlands from project-related dust would be less than significant.

### Invasive Weeds

The spread of invasive weeds degrades or destroys wildlife habitat and forage, threatens native plants, including special-status species, and often increases soil erosion and groundwater loss. Demolition and construction activities and related soil disturbance could further spread weeds already present in the project vicinity, introduce new invasive weeds to the area, and perhaps lead to weed infestation in the Los Cerritos Wetlands. Invasive weeds can easily colonize areas of ground disturbance. Special-status plants and wildlife in the Los Cerritos Wetlands could be adversely affected by new or worsened weed infestations. In addition, portions of the wetlands are undergoing restoration, or will be restored over the 56-month demolition and construction period. Early phase restoration sites will be particularly vulnerable to weed infestations.

No substantial invasive weed populations are known within the proposed project area. However, to avoid or minimize the spread of existing weeds and the introduction of new ones, staff proposes weed management measures in Condition of Certification **BIO-7** (Impact Avoidance and Minimization Measures). This condition would require limiting vegetation and ground disturbance to the minimum required for safe project completion, and limiting ingress/egress to defined routes. Staff also proposes Condition of Certification **SOIL&WATER-1,** which would require a site-specific construction SWPPP to manage runoff. Stormwater runoff would be contained and prevented from draining to adjacent sensitive habitats; therefore weed propagules would be prevented from washing into the wetlands. Further, straw bales and other sediment control features would be weed free, and invasive non-native species would be prohibited from use as landscape plantings. Implementation of these recommended conditions of certification would reduce potential impacts from introduction and spread of invasive weeds into sensitive habitat to less than significant.

### Stormwater Runoff

There are no creeks, drainages, wetlands, or other aquatic resources on the project site or pipeline alignment. However, the San Gabriel River is adjacent to the proposed AEC site. There is a tall berm separating the project site from the river, and during construction and demolition all stormwater on site will be routed into the existing stormwater collection system. Toxic materials, if allowed to wash from the site into the river or nearby marshes, can injure or kill wildlife and vegetation, and degrade habitat. During construction and demolition, the existing stormwater collection system would collect stormwater from the project site and route it to the oil/water separator before discharge to the San Gabriel River via existing permitted outfalls. The applicant has committed to the following measures to avoid, minimize, and mitigate potential impacts from construction and operational stormwater runoff (AEC 2015f, p. 5.15-14):

- Implement Best Management Practices designed to minimize soil erosion and sediment transport during construction of the AEC in compliance with the statewide General Construction Permit.
- Design appropriate erosion and sediment controls for slopes, catch basins, culverts, stream channels, and other areas prone to erosion in compliance with both the statewide General Construction Permit and General Industrial Permit.

In addition, staff's proposed Condition of Certification **SOIL&WATER-1**, would require the project owner to prepare and implement a site-specific construction SWPPP. With implementation of this measure and the applicant's commitment to the impact minimization measures listed above, project impacts to biological resources from stormwater runoff would be less than significant.

### Groundwater Contamination

Construction materials could contaminate groundwater if not properly used and stored. If the proposed project caused groundwater contamination (including spills of toxic materials from equipment leakage), adverse effects to vegetation and wildlife at the Los Cerritos Wetlands could occur. Such construction impacts would be minimized or avoided through implementation of a SWPPP and associated BMPs (pursuant to Condition of Certification **SOIL&WATER-1**). Implementation of Condition of Certification **SOIL&WATER-1** would minimize or avoid the potential for adverse impacts to vegetation and wildlife in nearby marshes from groundwater contamination and this impact would be less than significant.

## OPERATION IMPACTS AND MITIGATION

## <u>Noise</u>

The proposed AEC is on an industrial site that is currently occupied by the operating AGS and is near other industrial and commercial land uses and heavily travelled roadways. However, it is also located adjacent to the Los Cerritos Wetlands, which support sensitive biological resources including special-status birds. The existing AGS, urban development, and roadways in the area contribute to ambient noise. Potential noise effects to wildlife are described above under "Construction Impacts and Mitigation." Operational noise from the AEC also has the potential to affect wildlife.

The anticipated steady-state operational sound level from the AEC would be 55 dBA at noise monitoring location M1, a residence approximately 500 feet west of the project site (AEC 2015f, p. 5.7-12). At the nearest point, the Los Cerritos Wetlands are more than twice that distance from the AEC site. Operational noise levels in the wetlands would be similar to existing conditions, including noise from the existing AGS. Therefore, operational noise impacts to wildlife at the Los Cerritos Wetlands would be less than significant.

## Lighting

Potential lighting effects to wildlife are described above under “Construction Impacts and Mitigation”. The applicant states that operational lighting for the proposed AEC would minimally increase the current light from the project site, as the existing AGS is brightly lit at night and the new AEC facility would conform to current night lighting standards, which require minimal lighting, directional lights, and switched lighting circuits for areas where lighting is not required for normal operation or safety. The AEC would also have enclosed stairwells, so lighting from these areas would not be visible. Once the existing AGS generating units are retired, the amount of lighting at the site, even with the lighting required by the AEC, would be less than under existing conditions (AEC 2015f; p 5.13-14). To minimize backscatter of light to the sky and ensure that lighting does not obtrude beyond the project site, staff proposes Condition of Certification **VIS-4** (refer to the **Visual Resources** section for the full text of this condition). To minimize potential for birds to be attracted to any aviation lighting on tall structures, Condition of Certification **BIO-7** requires blinking lights with the minimum intensity allowed, as feasible. Impacts to wildlife from proposed operation night lighting are potentially adverse, but less than significant.

## Bird Collision and Electrocution

The Los Cerritos Wetlands and other regional wetlands attract resident and migratory birds for foraging, resting, and breeding. Birds moving among these habitats could be subject to collision or electrocution with proposed AEC facilities and appurtenant structures including transmission lines and transmission support structures.

Birds can collide with transmission lines, exhaust stacks, and other project structures, causing injury or mortality. Bird collisions with power lines and structures generally occur when a power line or structure transects a daily flight path used by a concentration of birds and these birds are traveling at reduced altitudes (Brown 1993). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 2012).

Although collision may occur, it is not likely that the frequency of bird injury or mortality due to collision with AEC transmission lines and facilities would significantly increase from existing levels, or significantly affect populations of any bird species. The AEC would not present significant new collision hazards and would remove or reduce some collision risk of the existing AGS, once that facility is retired. The proposed AEC exhaust stacks for the CCGT generators would be 140 feet tall and the stacks for the SCGT generator would be 80 feet tall, much shorter than 350 feet (the height above which is considered dangerous to migrating birds), and shorter than the existing AGS stacks which are over 200 feet tall. When the AGS facility is retired, the reduction would lower bird collision risk compared with existing conditions.

AEC would connect to the regional electrical grid using the existing SCE 230-kV switchyard located on a parcel owned by SCE within the existing AGS site. No new offsite transmission lines are proposed. The AEC power blocks would connect into the existing SCE switchyard via new double-circuit or single-circuit 230-kV generation tie lines. Direct and indirect impacts to birds from collision with structures are expected to be minimal and consistent with baseline conditions, given the project location and existing power lines, tall structures, and facilities on the site.

Osprey and other large birds, including those afforded state or federal protection, are susceptible to transmission line electrocution. Because raptors and other large birds often perch or build nests on tall structures that offer views of potential prey, the design characteristics of transmission towers and poles are a major factor in raptor electrocutions (APLIC 2012). Electrocution occurs when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower or pole with insufficient distance between these elements.

The majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1 kV and 60 kV. The likelihood of electrocutions occurring on transmission lines carrying voltages greater than 60 kV is low because wider phase-to-phase and phase-to-ground clearances for lines greater than 60 kV are typically sufficient to prevent bird electrocution (APLIC 2006). Therefore, the new 230 kV onsite generation tie lines have a low likelihood of causing bird electrocution.

The new onsite generation tie lines, while posing a collision risk to birds, would be entirely within the developed site, near the existing transmission lines and tall generation facility structures. The new AEC generation tie lines would not appreciably increase collision risk over baseline conditions. Nonetheless, because of the large numbers of shorebirds, including listed species, in the nearby Los Cerritos Wetlands and the likelihood that many birds fly over the project site en route to the marshes, staff’s proposed Condition of Certification **BIO-7** (Impact Avoidance and Minimization Measures) includes a requirement that the project owner construct the generation tie lines in accordance with Avian Power Line Interaction Committee (APLIC) standards to minimize or avoid bird collisions and electrocutions. With implementation of this component of Condition of Certification **BIO-7**, this impact would be less than significant.

## Stormwater Runoff

Potential effects of stormwater runoff to biological resources are described above under Construction Impacts and Mitigation. Similar effects could result from stormwater runoff during operation of the project. Stormwater runoff from the power block areas will be directed to oil/water separators and to an existing retention basin and then ultimately discharged to the Los Cerritos channel via existing stormwater outfalls. Stormwater runoff would be conveyed in accordance with NPDES General Industrial Permit requirements. For more information on water quality impacts, please see the **Soil And Water Resources** section.

The applicant has committed to BMPs to avoid, minimize, and mitigate potential impacts from construction and operational stormwater runoff (AEC 2015f). These measures are described above under "General Construction and Demolition Impacts – Stormwater Runoff." In addition, staff's recommended Condition of Certification **SOIL&WATER-4** would require the project owner to obtain a National Pollutant Discharge Elimination System permit for industrial waste and stormwater discharge to the Pacific Ocean through the existing AGS outfall. With implementation of this measure, potential project impacts from stormwater runoff during operation would be less than significant.

## Air Emissions – Nitrogen Deposition

Nitrogen deposition is the input of nitrogen oxide ($NO_x$) and ammonia ($NH_3$) derived pollutants from the atmosphere to the biosphere. These pollutants are deposited as "atmospherically derived nitrogen" (ADN), primarily nitric acid ($HNO_3$). The chemical conversion from $NO_x$ and $NH_3$ to ADN takes place in the atmosphere over a period of hours after the pollutants are discharged from their sources. Nitrogen deposition sources are primarily vehicle and industrial emissions, including power plants. Nitrogen deposition increases soil fertility for weedy plants, leading in some situations to increased weed growth rates and abundance. As weeds become more dominant, they may outcompete native species (including special-status species), leading to native habitat degradation (Fenn et al. 2003; Weiss 2006). The increased dominance and growth of invasive annual grasses is especially prevalent in low-biomass habitats where growth rates are naturally limited by low nitrogen availability.

Regional Clean Air Incentives Market ("RECLAIM") Trading Credits would offset the AEC's annual $NO_x$ increase in a 1-to-1 ratio so that the proposed project would not result in a net increase in $NO_x$ basin-wide (see the **Air Quality** section for more information on the RECLAIM program) (AEC 2014b). This offset would mitigate the project's effects to basin-wide nitrogen deposition. The biological effects of nitrogen deposition analyzed here are distinct from regional basin-wide $NO_x$ effects because the potential effect to biological resources is localized, limited to the area where atmospheric nitrogen pollutants specifically attributed to the project's exhaust plume may be deposited on the soil.

Staff considered occupied habitat of listed threatened or endangered species within a 6-mile radius of the project site to be potentially sensitive to nitrogen deposition from the AEC. The 6-mile radius is based on staff's experience that in-plume nitrogen concentrations are indistinguishable from background concentrations at greater distances. However, staff notes that much of the emitted $NO_x$ and $NH_3$ would not convert to ADN and deposit to ground within the 6-mile radius due to the time lag from initial emission of nitrogen pollutants through conversion to ADN and subsequent deposition (see **Biological Resources Appendix 1**). Habitats within six miles of the AEC that support listed species are located at the Bolsa Chica Ecological Reserve, Los Cerritos wetlands complex, and Seal Beach National Wildlife Refuge. State- and federally listed species that inhabit these protected areas include the western snowy plover (federally listed threatened), Belding's savannah sparrow (state-listed endangered), light-footed clapper rail (federally and state-listed endangered), California least tern (federally and state-listed endangered), and coastal California gnatcatcher (federally listed threatened). In addition, designated critical habitat for the western snowy plover is located at the Bolsa Chica Ecological Reserve, approximately five miles from the AEC site. Figure 5.2-1 in the AFC (AEC 2013a) shows critical habitat and protected areas in the project vicinity. These habitat areas may be sensitive to nitrogen deposition if it were to cause increased weed abundance.

Adverse effects of nitrogen deposition vary according to habitat type, based on natural availability of soil nitrogen and vulnerability to invasive weeds. "Critical load" (CL) is the threshold nitrogen deposition rate that causes adverse effects to nitrogen-sensitive ecosystems. If a project would cause nitrogen deposition to exceed CL for a sensitive native habitat type, or deposit additional nitrogen in a sensitive habitat where the CL is already exceeded, this impact would meet the CEQA significance criteria for adverse impacts to sensitive habitats.

A given habitat's CL is difficult to determine for a variety of reasons, including limited data or a wide range of values reported in the literature; data from regions that are not comparable to the project region in terms of climate regime, other unrelated disturbance, and stressors on target habitats; and other confounding factors.

The most abundant habitat supporting listed species in the region is coastal salt marsh, where the nitrogen CL ranges from 63 to 400 kg/ha/yr. These habitats are not as sensitive as uplands to atmospheric nitrogen deposition because tidal sea water influx and flushing create open nitrogen cycles (Pardo et al. 2011; Greaver et al. 2012). Small areas of natural and restored coastal dunes, coastal sage scrub, coastal dune scrub, and riparian woodland in the project region may be sensitive to nitrogen deposition (Pardo et al. 2011).

The critical nitrogen load for coastal sand dunes, which includes nesting habitat for federally listed western snowy plover and federally and state-listed California least tern, ranges from 10 to 20 kg/ha/yr. However, western snowy plover and California least tern nest on areas with little to no vegetation, and nesting sites in the project vicinity are managed to maintain appropriate nesting conditions (Knapp and Peterson 2013; USFWS 2006a).  Very limited coastal sage scrub is located on some upland areas in Bolsa Chica Ecological Reserve; this vegetation has a CL of 7.8 kg/ha/yr.

Air quality staff modeled the estimated nitrogen deposition from the AEC within a six-mile radius of the project site, including the Los Cerritos wetlands complex, Bolsa Chica Ecological Reserve and western snowy plover critical habitat, and the Seal Beach National Wildlife Refuge. An Energy Commission Public Interest Energy Research study modeled total nitrogen deposition throughout California (Tonneson et. al. 2007); results of this study were used to determine baseline nitrogen deposition in the protected areas and critical habitat. **Biological Resources Table 3** presents the results of the modeling exercise along with the primary vegetation in each area and associated CL (Pardo et al. 2011).

**Biological Resources Table 3**
**Modeled AEC Nitrogen Deposition on Listed Species Habitats within Six Miles**

| Location | Primary Vegetation Type | CL for N-Dep (kg N ha-1 yr-1)[a] | Baseline N-Dep (kg N ha-1 yr-1)[b] | AEC Point Source N-Dep (kg N ha-1 yr-1)[c] | Total Predicted N-Dep (kg N ha-1 yr-1) |
|---|---|---|---|---|---|
| Los Cerritos Wetlands Complex | Intertidal salt marsh | 63-400 | 2.42-13.24 | 0.2-0.7 | 2.62-13.94 |
| Seal Beach National Wildlife Refuge | Intertidal salt marsh | 63-400 | 2.42-12.34 | 0.08-0.14 | 2.50-12.48 |
| Bolsa Chica Ecological Reserve | Intertidal salt marsh | 63-400 | 2.15-11.10 | 0.04-0.06 | 2.19-11.16 |
| Western snowy plover Critical Habitat | Coastal dunes; coastal mud flats | 10-20; >34 | 2.19-11.01 | 0.04-0.06 | 2.23-11.07 |

a – Pardo et al., 2011; Bobbink and Hettelingh, 2011; van Dobben et al., 2013.
b – Tonneson et. al. 2007
c – Values based on CH2 2016o and CH2 2016s, cited in Biological Resources Appendix 1.

Air quality staff prepared a technical analysis of the nitrogen deposition modeling for the project and the baseline data; see **Biological Resources Appendix 1.** Air quality staff determined that, while the AERMOD model used for this analysis is the best available model for estimating nitrogen deposition, its results are likely to be 10-fold higher than actual nitrogen deposition due to several conservative assumptions in the model. Further, baseline values at present are likely to be half of what they were in 2002 (the year of the baseline data reported by Tonneson et. al. 2007; see **Biological Resources Appendix 1**).

Even with the substantial overestimation of modeled nitrogen deposition, the nitrogen deposition rates of the proposed AEC would not approach CL for most sensitive vegetation and habitat in the 6-mile radius of the project site. According to the model, the upper range of baseline nitrogen deposition in coastal dunes exceeds the lower estimate of CL for that habitat. The project's estimated additional nitrogen deposition would be minimal (0.04 to 0.06 kg/ha/year, or less than one percent of the upper baseline estimate). Additionally, staff believes that nitrogen emissions inventory and baseline nitrogen deposition level has decreased since 2002 by more than 50 percent (refer to **Biological Resources Appendix 1** for additional details).

The estimated baseline for coastal salt marsh and mud flat habitats are well below the critical load thresholds, and additional project-related nitrogen deposition would not cause the total to exceed the critical loads. This is due to the naturally high nitrogen availability in these habitats.

Based on (1) the over-estimate of nitrogen deposition inherent to the AERMOD model, (2) the limited area of potentially affected native vegetation, (3) weed management practices at nest sites for listed birds, and (4) the current overestimate and continuing downward trend of baseline NOx and $NH_3$, staff concludes that nitrogen deposition impacts to listed species and sensitive habitats would be less than significant.

## CUMULATIVE EFFECTS

Cumulative effects are those that result from the incremental effects of a proposed action considered with other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time.

A project may result in a significant adverse cumulative effect if its effects contribute considerably to an overall cumulatively significant impact. The existing operational AGS Units 1 through 6 are nearing the end of their useful life and utilize once-through cooling (OTC). In 2010, the SWRCB approved an OTC policy that includes phasing out the use of OTC in part to protect marine life. More than 4,000 MW of existing OTC generation are expected to be retired by December 31, 2020 in the Los Angeles basin local reliability area (AEC 2015f, p. 4-1). Therefore, the existing AGS Units 1 through 6 are expected to be decommissioned within a few years. The demolition of the existing Units 1 through 6 would then be conducted pursuant to a Memorandum of Understanding between the project owner and the city of Long Beach. The schedule for decommissioning and demolition of Units 1 through 6 has not been determined. In addition, there are currently proposed projects near the AEC that may impact local biological resources, especially those in and near the Los Cerritos wetlands complex and other regional wetlands. These projects include the Alamitos Barrier Improvement Project and a planned retail development at Pacific Coast Highway and 2nd Street. Other cumulative projects identified within six miles of the AEC would be too far from the site to contribute cumulatively to impacts to biological resources.

As with the AEC, decommissioning or demolition of existing AGS Units 1 through 6 would not be likely to have direct effects to special-status species or other biological resources, as special-status species are unlikely to occur on these industrial brownfield sites. If operation and demolition of the AGS or activities of other nearby projects overlap with those of the AEC, cumulative indirect impacts to wildlife from noise, dust, lighting, spread of invasive weeds, or stormwater runoff could occur. However, implementation of Conditions of Certification **BIO-1** through **BIO-7, SOIL&WATER-1, AQ-SC3, AQ-SC4, NOISE-6, NOISE-8,** and **VIS-1** would minimize these impacts from the proposed AEC. The combined effects on biological resources from the construction and operation of AEC with other expected projects in the area described above, would not be cumulatively significant because of the dispersed nature of the projects in location and time, and the expected use of readily available mitigation by other projects to address similar impacts. In addition AEC's, comprehensive mitigation measures coupled with the use of an existing industrial site, and the temporary nature of construction impacts, ensure that AEC's contribution to any cumulative effects would not be cumulatively considerable.

**Green Sea Turtles.** The Pacific green sea turtles inhabiting the San Gabriel River and surrounding bays and inlets are observed congregating near the warm water outfalls of the existing AGS plant and the adjacent LADWP Haynes power plant on occasion. This area appears to be the warmest location in the river during winter months, although temperatures upstream are warmer during the summer. Turtles are more widely distributed during the summer but appear to congregate near the outfalls in winter. Turtle distribution and movement throughout the area is the subject of ongoing research, and limited data is available for this population.

A population of green sea turtles also inhabits San Diego Bay, where the South Bay Power Plant (SBPP) had discharged warm water effluent from 1960 until it was decommissioned in 2010. The San Diego population has been studied intensively for over two decades, and although the ecological characteristics of the San Diego Bay differ from those at the San Gabriel River, this population's response to power plant decommissioning is useful in considering the effects of the AGS's elimination of warm water discharge on local sea turtles. It is important to note that decommissioning and possible demolition of AGS is not part of the AEC project, and therefore assessment of any impacts from the decommissioning and demolition of AGS is outside the scope of this FSA. In addition, because the AEC project does not use OTC and would not be contributing to the existing warm water discharge, there is no contribution to any impacts on the Pacific green sea turtles in relation to the species congregation near the AGS outfall. Because staff received some public comments on the green sea turtles, staff has included this discussion to address public interest in the nearby sea turtle population.

Following the SBPP's decommissioning, green sea turtles remained in the bay but their distribution is changing. The turtles are more dispersed and no longer congregate at high densities near the plant (Turner-Tomaszewicz and Seminoff 2012). Green sea turtles are behaviorally and physiologically adapted to survive seasonally cool waters in more natural habitats; these adaptations include temporarily leaving cold areas, hibernating, and overwintering (Turner-Tomaszewicz and Seminoff 2012). Artificially warmed water may allow turtles to be active year-round in areas where they would otherwise aestivate or vacate during winter.

The slow transition period for eliminating warm water outfall from the existing AGS plant is expected to allow sea turtles to gradually adapt to the changing temperature regime by adjusting their local activities. In addition to directly affecting the turtles themselves, the changing water temperatures are likely to affect other habitat conditions, such as abundance, productivity, and distribution of food resources (including eelgrass, algae, and invertebrates).

The AGS is not the only source of warm water inputs to the local river and Alamitos Bay. Water treatment plants, urban runoff, the adjacent LADWP Haynes power plant, and physical characteristics of local sea turtle habitats all contribute to warm year-round temperatures. Even in the absence of the existing power plants' warm water outfalls, the river and surrounding bays and inlets are suitable habitat for sea turtles (D. Lawson, pers. comm.). Further, ongoing and planned future restoration of the Los Cerritos Wetlands and San Gabriel River mouth could increase habitat quality and quantity for sea turtles in these areas.

In summary, the San Gabriel River is in a highly urbanized and developed area, with little natural habitat available to sea turtles. The elimination of warm water effluent may cause sea turtles to disperse more widely or decrease activity during colder months. But little is known about the seasonal activity of this population and response to the cessation of warm water discharge from the AGS is difficult to predict. Staff concludes that it is unlikely that elimination of OTC would result in adverse effects to sea turtles because the warm water outfalls are only one of many factors that are likely to contribute to favorable water temperatures. Additionally, the turtles will have the opportunity to adapt local activities to the temperature shifts over a period of several years.

The LADWP's Haynes Generating Station on the east side of the San Gabriel River, opposite the AEC site, is in the process of converting from OTC to dry cooled technology. A portion of the plant has already been replaced over the last nine years, and repowering of Haynes Units 1 and 2 is scheduled for completion at the end of 2023. Haynes Unit 8 repowering is scheduled for completion at the end of 2029 (P. Chua, pers. comm.).

Elimination of OTC from the Haynes Generating Station, combined with decommissioning of the AGS, would eventually eliminate of warm water effluent at this location. However, the elimination of OTC and the associated warm water effluent would occur gradually over more than a decade, and sea turtles in the area will have time to adapt activity and habitat use to the changes in temperature regime. In addition, the AGS and Haynes Generating Station are not the only sources of warm water inputs to the San Gabriel River, and it is unlikely that sea turtles are dependent on these unnatural warm water sources especially during the summer months.

The proposed AEC would not directly contribute to impacts to green sea turtles from the cessation of warm water effluent because the AGS units would need to be retired or converted to a differently technology to comply with the OTC policy regardless of whether the AEC is built, and the AEC would not contribute to or eliminate any warm water discharges currently occurring. Therefore, the proposed AEC would not contribute to cumulative effects to sea turtles.

Once operational, the AEC would not result in a substantial change from baseline conditions for other biological resources. Operational noise and nitrogen deposition impacts would not differ substantially from baseline conditions, and the AEC's contribution to these impacts would not be cumulatively considerable.

In conclusion, the proposed AEC would not contribute considerably to cumulative effects to biological resources.

## FACILITY CLOSURE

When the AEC is closed in the future, whether planned or unexpected, it must be done so that closure activities protect the environment and public health and safety. A Closure Plan would be prepared by the project owner and approved by the Energy Commission compliance project manager (CPM). Facility closure requirements are discussed in more detail in the **Compliance Conditions and Compliance Monitoring Plan** section. Facility closure mitigation measures would also be included in the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) prepared by the project owner and described in staff's proposed Condition of Certification **BIO-6.**

Upon decommissioning and permanent facility closure, reclamation would be necessary to prevent adverse effects such as contamination from hazardous substances, erosion, dust, invasion and spread of weeds, and hazards to wildlife from abandoned project infrastructure. Staff concludes that these potential effects of facility closure and decommissioning would be a significant impact absent mitigation. Decommissioning activities are likely to cause similar indirect impacts to adjacent sensitive biological resources as described above for the construction and demolition phases of the proposed project.

To ensure that public health and safety and the environment are protected during decommissioning, the applicant has committed to developing a decommissioning plan that would be submitted to the Energy Commission for approval prior to decommissioning (AEC 2015f, p. 2-32). If possible, unused chemicals would be sold back to the suppliers or other purchasers or users. All equipment containing chemicals would be drained and shut down to ensure public health and safety and to protect the environment. All nonhazardous wastes would be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes would be disposed of according to all applicable LORS.

Decommissioning and site closure would be likely to result in similar types of impacts to biological resources as construction and demolition. It is anticipated that conditions of certification similar to **BIO-1** through **BIO-9** would minimize or avoid these impacts to biological resources, and impacts to biological resources would be less than significant.

## COMPLIANCE WITH LORS

The proposed project must comply with LORS that address state and federally listed species, as well as other sensitive biological resources. Applicable LORS are described in **Biological Resources Table 1**.

With implementation of staff's proposed conditions of certification, the proposed AEC would comply with LORS pertaining to biological resources. No state- or federally listed species occur on the project site or pipeline alignment, and therefore no "take" of listed species would occur.

The proposed project would not result in loss or fill of wetlands or waters of the US (as defined by the US Army Corps of Engineers) or wetlands or waters of the state (as defined by CDFW, California Water Resources Control Board, or California Coastal Commission), as there are none present on the site or pipeline alignment. Indirect impacts resulting from degradation of adjacent wetlands and coastal waters from construction runoff or operational discharges would be less than significant with implementation of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-4**. These conditions would ensure compliance with the federal Clean Water Act, California Fish and Game Code 1600 et seq., California Coastal Act, and the Porter Cologne Water Quality Act by requiring control of runoff from the project area and operational discharges to be treated in accordance with NPDES permit requirements.

## NOTEWORTHY PUBLIC BENEFITS

The proposed AEC Project would not result in direct noteworthy public benefits for biological resources as analyzed in this section but would result in public benefits to other resources, such as water quality, benefitting aquatic life in adjacent waters.

## RESPONSE TO PSA COMMENTS

Staff received comments on the Biological Resources section of the Preliminary Staff Assessment (PSA) from the Applicant (AES), Intervenor Los Cerritos Wetlands Land Trust (LCWLT), and others. This section provides a summary of comments received and staff's response to each one.

### AES SOUTHLAND DEVELOPMENT, LLC; JULY 27, 2016; TN 212487 – PRELIMINARY STAFF ASSESSMENT INITIAL COMMENTS

**Comment:** *The comment summarizes staff's discussion of potential southern tarplant occurrence on the proposed wastewater line route from PSA page 4.3-1. The applicant describes habitat along the wastewater line route and recommends revising the occurrence probability for southern tarplant from "high" to "moderate or low" based on habitat suitability. Further, the applicant recommends excluding Condition of Certification **BIO-9.** In addition, the applicant states that it will conduct a preconstruction clearance survey for southern tarplant during the appropriate floristic period (May through November; CNPS, 2016).*

> **Response:** As follow-up to this comment, the applicant provided a protocol botanical survey along the wastewater line route, documenting that southern tarplant could not be found there during August 2016. In addition, staff independently verified that southern tarplant could be found at another reference location during the same week. Therefore staff concludes that southern tarplant is unlikely to occur on the pipeline route (or the project site); that the project would not affect southern tarplant; and no mitigation is recommended. Staff's formerly recommended Condition of Certification **BIO-9** has been excluded from the FSA.

**Comment:** *The comment notes that PSA pages 4.3-10 to 4.3-11 identify several off-site marshes, parks, and other natural areas supporting special-status species that may be affected by construction or operation of the proposed project, and recommends that the PSA should identify how the project may have impacts on these off-site resources.*

> **Response:** The pages noted identify the special species occurring in the project vicinity. The FSA identifies potential impacts to special-status species in the subsection titled "Impact Assessment," beginning on page 4.3-24. For example special status species in nearby areas may be impacted by construction noise, dust, light and runoff. Project noise may discourage special status bird species from nesting or foraging in nearby natural areas. It is well understood that the construction and operations of large projects may impact wildlife and plants even if those species are located offsite. Staff has made minor text revisions for clarification.

**Comment:** *Regarding the potential for future breeding light-footed clapper rail, western snowy plover, and California least tern in the Los Cerritos Wetlands, the comment recommends that impacts should be clearly defined and not speculative. The comment points out that there is no suitable nesting habitat for these species within the Los Cerritos Wetlands, and no impacts to them are anticipated. Additionally, the comment points out that suitable habitat for Belding's savannah sparrow will not be removed for the project. The comment quotes the definition of take from the California Fish and Game Code as follows: "to, or attempt to, 'hunt, pursue, catch, capture, or kill'" and concludes that impacts to Belding's savannah sparrow are not anticipated.*

> **Response:** Staff has revised the language regarding potential future nesting with wording consistent with occurrence probability as described earlier in the document. With regard to potential impacts to Belding's savannah sparrow, staff agrees that the project would not remove suitable habitat nor would the project result in take as defined by the California Fish and Game Code. However, project construction and demolition could affect Belding's savannah sparrow, as it was described in the PSA. Text has been added in the FSA to clarify that impacts (if any) to this species would not constitute take according to the Code. Staff's analysis is not limited to project activities that result in the hunting, pursuing, capturing or killing of a special status species. These affirmative actions are rarely at issue, especially on an existing industrial site. Rather, the analysis is more concerned with the potential secondary offsite impacts that may disrupt normal species behavior such as nesting, feeding, hunting or foraging which can be detrimental to the species.

**Comment:** *The comment quotes from PSA page 4.3-29, regarding potential effects of noise to wildlife (i.e., project-related noise could discourage wildlife from foraging and nesting). The applicant requests that staff clarify this statement, since discouragement of nesting and foraging is not a violation of federal and state regulations or codes.*

**Response:** The Staff Assessment analyzes potential impacts to biological resources, whether or not the potential impacts would violate regulations or codes. A direct take of a special status species that violates a federal or state regulation would subject one to enforcement actions. CEQA and the Commission's certified regulatory program go beyond impacts that trigger statutory or regulatory violations. As set forth in Appendix G of the CEQA Guidelines for example, staff considers whether the project would have a substantial adverse effect, either directly or through habitat modification, on a special status species or whether the project would have a substantial effect on the movement of local migratory wildlife. In the case of a power plant project, the primary means of causing off-site impacts to special status species are through the generation of dust, noise, light and traffic. The end result does not have to be a take, as defined by state or federal law, for staff to perform an impacts analysis or to recommend mitigation.

**Comment:** *The comment recommends that the Biological Resources analysis should identify the project's noteworthy public benefits as identified in other sections of the PSA.*

**Response:** As the comment notes, those benefits are recognized in the respective sections of the FSA. Staff has added text to indicate that public benefits are noted in other FSA sections, and that water quality improvements would also benefit aquatic life in the affected waters.

**Comment:** *The comment requests adding the following language to the Verification section of Condition of Certification* ***BIO-1****: "The Project Owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Designated Biologist (DB) for review and approval. A proposed DB previously approved by Commission Staff within the preceding five (5) years shall be deemed approved ten (10) days after project owner provides a resume and statement of availability of the proposed DB. The CPM may disapprove a previously approved DB within seven (7) days of Project Owner submission of the Proposed DB's resume and statement of availability only if non-compliance or performance issues events were documented in the compliance record for the previous CEC project work conducted by the proposed DB previously approved within the last five (5) years by the Commission shall be automatically approved and the project owner shall provide a resume and statement of availability. The CPM may disapprove a previously approved DB if non-compliance or performance issues were documented in the record during the previous project work by the DB or the DB's qualifications are not applicable to the specific biological resources identified in the project area."*

**Response:** The Designated Biologist performs an important function with regard to implementing project-specific mitigation for biological resources. Therefore, it is imperative that Designated Biologist's qualifications are reviewed on a project-specific basis, dependent on the specific biological resources and conditions of certification for each project. Additionally, the necessary qualifications of a Designated Biologist may change over time, even for similar projects, so that a Designated Biologist approved previously may not meet current qualification requirements. A conflict of interest may exist preventing a Designated Biologist to be approved for this specific project. Lastly, as with any profession, there is the possibility that a Designated Biologist who was qualified for an earlier project has subsequently engaged in compromising job-related conduct outside the narrow circumstances proposed by the Applicant. For example, the proposed Designated Biologist may have engaged in such conduct on a project not under Energy Commission oversight that disqualifies him or her from the current project. In this context such conduct could include failure to report required data to resource agencies, falsifying data records, gross negligence, or dereliction of duty. While staff would hope that such instances would be rare, nevertheless, it remains a possibility. Staff concludes that the applicant's proposed approval window is insufficient for CPM review, even for a candidate who has served as designated biologist on a prior project. Therefore, a blanket approval process, based solely on prior acceptance within the last 5 years and a ten day review period, is not appropriate for the AEC.

Typically the CPM approves the Designated Biologist in a relatively quick manner which eliminates any benefit of the Applicant's proposed automatic approval process.

**Comment:** *The applicant requests several wording changes to Condition of Certification* ***BIO-5,*** *regarding the Worker Environmental Awareness Program (WEAP), as follows: removal of light-footed clapper rail, western snowy plover, California least tern from the list of species needing special emphasis during the training; revision of the submittal date for the draft WEAP from "45 days prior to the start of any planned project-related site disturbance" to "… ground disturbance" and addition of an option to present the WEAP in person or via video.*

**Response:** Staff has revised wording to refer more generally to nesting and foraging habitat for protected birds, without naming these species. Staff has added the requested wording regarding video presentation of the WEAP (which is common on many Energy Commission-regulated projects). Regarding "site disturbance" vs. "ground disturbance," staff notes that project activities such as demolition which may not cause ground disturbance, but still may affect biological resources and therefore warrant WEAP training. The FSA language accepts the term "ground disturbance," and adds language to address other possible project-related activities that may affect biological resources.

**Comment:** *The applicant requests wording revisions to Condition of Certification* ***BIO-7*** *for consistency with the habitat and land use located along the southeastern fence line as follows: "Spoils shall not be stockpiled adjacent to the outlet channel fence line to minimize potential for spoils to enter into adjacent waterways.*

**Response:** Staff has made the requested revisions.

**Comment:** *The applicant requests revising the starting date for requiring pre-construction nesting surveys from January 1 to February 1.*

**Response:** Staff declines to make the requested revision. There is adequate data in the literature that several raptor and hummingbird species may nest in January (Kiff and Irwin 1987), and could be affected by project activities. Please note the addition of year-round pre-construction surveys for burrowing owl activity (i.e., active burrows or surrogate burrows), made in response to recommendations from the Los Cerritos Wetlands Land Trust (Tidal Influence, TN 212764-4), below.

**Comment:** *The applicant requests deletion of Condition of Certification **BIO-9**, based on its assessment of occurrence potential for southern tarplant.*

**Response:** Staff's formerly-recommended Condition of Certification **BIO-9** has been excluded from the FSA. Please see staff's response to earlier comments regarding southern tarplant.

## ELLISON, SCHNEIDER & HARRIS LLP; AUGUST 12, 2016; TN# 212771 – PRELIMINARY STAFF ASSESSMENT SUMMARY OF PSA WORKSHOP AND SUPPLEMENTAL COMMENTS.

**Comment:** *Commenter notes that the survey information relating to the AEC's offsite sewer pipeline is available at TN 201751.*

**Response:** The cited document refers to a reconnaissance-level survey conducted for the AFC. Staff reviewed the cited information during preparation of the PSA and used it as a part of the analysis presented therein.

## CH2MHILL; AUGUST 19, 2016; TN 212917 – SUPPLEMENTAL RARE PLANT SURVEY FOR ALAMITOS ENERGY CENTER.

**Comment:** *The report summarizes the methods and results of a rare plant survey along the proposed off-site wastewater line, concluding that southern tarplant and other special-status plants were not found*.

**Response:** Staff has reviewed the survey report and incorporated the results into the FSA. Please see staff's response to earlier comments regarding southern tarplant.

## CHATTEN-BROWN & CARSTENS LLP; AUGUST 11, 2016; TN 212764-1 – LOS CERRITOS WETLANDS LAND TRUST COMMENTS ON PRELIMINARY STAFF ASSESSMENT OF ALAMITOS ENERGY CENTER, DOCKET NO. 13-AFC-01.

**Comment:** *The comment states that Los Cerritos Wetlands Land Trust (LCWLT) and its members are concerned about the AEC project's potential impacts on the Los Cerritos Wetlands and adjacent habitat, which are important foraging areas and nurseries for marine and terrestrial species. The LCWLT letter includes an attachment containing detailed comments from Eric Zahn of Tidal Influence. Those comments recommend additional analysis or consideration of the following special-status species:*

- *Southern California legless lizard;*
- *Pacific seahorse;*

- *Burrowing owl, including requirement for a burrowing owl survey prior to the commencement of construction activities;*
- *Short-eared owl;*
- *Northern harrier; and*
- *Loggerhead shrike.*

**Response:** Please see responses to the Tidal Influence comments (TN 212764-4), below. Staff has added the Southern California legless lizard and Pacific seahorse to the list of special status species. Staff has also modified the occurrence of the other identified species from low to moderate.

**Comment:** *The commenter believes that exclusion of these species from the analysis represents a failure to disclose information about the project and precludes informed decision-making, in violation of CEQA. Mitigation that is developed to avoid impacts to these important species must be concrete and enforceable.*

**Response:** Staff disagrees that the exclusion of the legless lizard or Pacific sea horse in the PSA precludes informed decision-making. The PSA analysis, impacts to plant and animal species and the proposed mitigation, does not change by the addition of the legless lizard and Pacific sea horse because neither of these species are likely to be found on site and the existing mitigation addresses potential offsite impacts. While the FSA incorporates the recommendations made by Tidal Influence regarding the addition of the legless lizard and Pacific sea horse, staff already included on the list of potentially impacted special status species the burrowing owl, short eared owl, northern harrier and the loggerhead shrike. Please see responses to the Tidal Influence comments (TN 212764-4), below. Additional specific mitigation for potential impacts to burrowing owl (i.e., pre-construction surveys year-round for active burrows or surrogate burrows) has been added to Condition of Certification **BIO-8**, enforceable through the verification requirements. No additional mitigation recommendations are made for the other species named in the comments because the existing mitigation contained in the recommended conditions of certification would mitigate any significant impacts on the species identified by the commenter. In addition, because the project site is an existing industrial facility with no habitat, there will be limited presence, some flyover and possible foraging, of any of the listed bird species.

**Comment:** *The commenter refers to recommendations contained in the attachment (TN 212764-4) regarding marine mammals, sea turtles, and southern tarplant, including:*

- *Analysis of the potential environmental impacts of construction and operation of the AEC project on Pacific green turtles and marine mammals that could enter the forebays at the current AGS and a monitoring requirement to prevent adverse impacts to marine mammals and sea turtles; and*
- *A 1:1 replacement ratio for southern tarplant reintroduction, based on field surveys during the appropriate flowering season for the plant.*

**Response:** The AGS facility is not part of the project before the Commission which is the AEC project. The AEC project would not affect AGS intake forebays or wildlife that may enter the forebays. Because there are no impacts on the AGS intake forebays due to the AEC, no mitigation can be imposed. Based on additional field surveys, staff concludes that southern tarplant does not occur on the pipeline alignment and mitigation is not recommend in the FSA. Please see staff's response to earlier comments regarding southern tarplant and responses to the Tidal Influence comments (TN 212764-4), below.

**Comment:** *The commenter refers to several recommendations contained in the attachment (TN 212764-4) regarding mitigation of "potentially significant impacts" including monitoring of restoration sites, a sea turtle monitoring program, a Belding's savanna sparrow monitoring program, and an endowment for non-native weed management at the Los Cerritos Wetlands.*

**Response:** Under CEQA, mitigation is imposed to reduce significant project impacts on the environment. In this case the detailed analysis performed by staff found the project would not significantly affect the resources identified in the comment. As detailed in the project description section of the PSA, the project site is an existing industrial site with no natural habitat. While staff assessed offsite environmental impacts to biological resources, staff concluded that any potentially significant impacts were mitigated by the implementation of Conditions of Certification Bio 1 through Bio 8. Staff declines to adopt the monitoring measures and endowment as recommended by the commenter because there is no information to support the need for this additional mitigation. Please see responses to the Tidal Influence comments (TN 212764-4), below.

**Comment:** *Beginning on page 13, the commenter makes several references to the Biological Resources cumulative effects analysis as a part of a larger discussion of the PSA's approach to cumulative effects. The commenter quotes from the PSA that "there would be some overlap between the construction and operation phase of the AEC and the operation and then demolition of the AGS units." The commenter states that "none of this 'overlap' in demolition and operation, and/or the foreseeable cumulative impacts, is discussed in any detail in the PSA." Additionally, the comment cites text regarding other proposed projects in the vicinity, and states that the PSA does not contain analyses of their cumulative impacts.*

**Response:** Please refer to the **Executive Summary** regarding the Staff Assessment's overall approach to cumulative effects. The FSA has been revised to indicate that the AGS decommissioning and demolition schedule are unknown. Therefore, staff is not aware if there may be some overlap between these activities. For biological resources, concurrent on-site activities such as construction, operation, and demolition would not affect the analysis of direct impacts to on-site biological resources (plants, wildlife, and habitats). The biological resources analysis of other effects, such as nitrogen deposition and noise, take into account the existing or ambient conditions, including operation of the existing AGS. The project's contribution to any cumulative effects would not be considerable by incorporating conditions of certification cited in the cumulative effects analysis in this and other sections of the FSA.

**Comment:** *Under the title, "Impacts versus Cumulative Impacts," the commenter addresses the biological resources analysis, particularly with regard to cumulative noise impacts. The comment notes that the biological resources analysis regarding noise focuses primarily on pile driving during construction, and not on operational noise of the project, or on the cumulative effect of ongoing construction and beginning operation of one or more new generators.*

**Response:** Pile driving was selected for discussion in the Biological Resources analysis of potential noise effects on wildlife because it is the loudest activity noted in the AFC. The effects of operational noise are addressed in the Biological Resources section, with the conclusion that operational noise would be similar to existing conditions, including noise from the existing AGS. Therefore, operational noise impacts to wildlife at the Los Cerritos Wetlands would be less than significant. For detailed information on noise impacts see the **Noise and Vibration** section and the recommended mitigation.

**Comment:** *The commenter quotes from the PSA regarding cumulative impacts to biological resources that would be mitigated through several conditions of certification cited in the analysis, as well as likely mitigation measures for any concurrent projects, particularly the future demolition of the AGS. The commenter believes that the reasoning avoids a thorough cumulative impacts analysis.*

**Response:** Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" (14 Cal. Code Regs., § 15130(a)(1).) Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (14 Cal. Code Regs., § 15130(a).) Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (14 Cal. Code Regs., § 15164(b)(1).) Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

Staff has clarified the conclusion regarding potential cumulative effects..

The combined effects on biological resources from the construction and operation of AEC with other expected projects in the area described above, would not be cumulatively significant because of the dispersed nature of the projects in location in time and the expected use of readily available mitigation by other projects to address similar impacts.

In addition, with the implementation of Conditions of Certification, **BIO- 1**-**BIO- 8** and recommended mitigation detailed in the **Noise and Vibration** section, the project's potential contribution to any cumulative effects on biological resources would not be cumulatively considerable.

**Comment:** *The commenter states that "the PSA needs to be revised to remedy these errors and re-circulated for public comment prior to preparation of the Final Staff Assessment."*

**Response:** The Staff Assessment has been revised as appropriate in response to comments and with the addition of supplemental information. Under the CEQA Guidelines section 15088.5 an agency is required to recirculate an EIR when significant new information is added to the EIR. Such significant new information may include a new significant environmental impact, a substantial increase in the severity of an impact or a new feasible mitigation measure that would clearly lessen a significant impact. Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

In this case the revisions do not rise to the level of change that would warrant re-circulation of the environmental document as the information clarifies or provides additional support for existing analysis.

In addition, under the Commission's Title 20 regulations and certified regulatory program, there is no requirement to re-circulate the PSA. Updates based on comments received on the PSA, other information, and responses to comments, are included in the FSA. Because the Commission's process is iterative with additional opportunity for public engagement re-circulation is not necessary and would be duplicative. Following publication of the FSA, public hearings are held culminating in a presiding member's proposed decision (PMPD) which has a 30-day comment period. Following the comment period another public hearing is scheduled for the Commission to take action on the PMPD prior to release of the Final Decision.

**Comment:** *The commenter believes that the remainder of the cumulative impacts analysis in the Biological Resources section of the PSA fails to meet CEQA standards for similar reasons as those identified in the example of "noise" above. The commenter concludes that the "entire document needs to be thoroughly reviewed and modified to remedy the errors and then re-circulated for public review and comment prior to preparing a Final Staff Assessment."*

**Response:** The Staff Assessment has been revised to clarify the cumulative impacts section.

The combined effects on biological resources from the construction and operation of AEC with other expected projects in the area described above, would not be cumulatively significant because of the dispersed nature of the projects in location in time and the expected use of readily available mitigation by other projects to address similar impacts.

In addition, with the implementation of Conditions of Certification **BIO-1** - **BIO-8** and recommended mitigation detailed in the **Noise and Vibration** section, the project's potential contribution to any cumulative effects on biological resources would not be cumulatively considerable.

See above response related to the issue of re-circulation.

## LOS CERRITOS WETLANDS LAND TRUST; AUGUST 10, 2016; TN 212764-4 – ATTACHMENT 3 - TIDAL INFLUENCE FINAL MEMO RE - AES PSA AUG 2016.

**Comment:** *The introductory paragraphs describe the commenter's intent to address the PSA analysis from the perspective of conserving and protecting the biological resources of the Los Cerritos Wetlands and environs. The comment states that the impacts of new developments must be first eliminated or reduced and if that is not possible then they must be mitigated. The comments are presented from a "community perspective for conservation."*

**Response:** Staff recognizes the commenter's concerns, interests, and professional efforts.

**Comment:** *The commenter recommends adding southern California legless lizard and Pacific seahorse to the special-status species addressed in the Staff Assessment, and briefly describes habitat for each species.*

**Response:** Entries for both species have been added to **Biological Resources Table 2** (Special-status Species in the AEC Area and Vicinity).

**Comment:** *The commenter states that burrowing owls have a moderate probability of occurrence on the project site, notes observations in vicinity, and notes that burrowing owls could fly over the project site as described in the PSA for other special-status birds. The comment recommends a pre-construction survey, and monitoring for burrowing owls throughout project construction.*

**Response:** Several revisions to the Staff Assessment have been made to reflect the comment, including revisions to **Biological Resources Table 2** (Special-status Species in the AEC Area and Vicinity), Condition of Certification **BIO-5** (Worker Environmental Awareness Program), and Condition of Certification **BIO-8** (Pre-Construction Nest Surveys And Impact Avoidance And Minimization Measures For Breeding Birds).

**Comment:** *The comment recommends revising the occurrence probability for short-eared owl, northern harrier, and loggerhead shrike from "low" to "moderate," for consistency with the PSA's occurrence probability for white-tailed kite. Further, the comment notes that vegetation and temporarily pooled water on the site could attract prey for these birds.*

**Response:** **Biological Resources Table 2** (Special-status Species in the AEC Area and Vicinity) has been revised to indicate that these species have a moderate probability of occurrence for foraging.

**Comment:** *The comment notes that historic aerial photography shows that shrubs and vegetation were present in some years, and absent in later years. The commenter believes that "this type of vegetation management would require a coastal development permit" and that, absent such a permit, this work could be considered as an unpermitted modification of the project site done to influence this staff assessment.*

**Response:** The existing facilities are managed as an industrial site, including regular chemical weed control in unpaved areas. The occurrence and later absence of landscaping plants or naturalizing ruderal species is consistent with the baseline conditions described in the Staff Assessment, regardless of any permitting related to the operation and maintenance activities.

**Comment:** *The commenter notes presence of the water intake channels for the existing AGS cooling system, and notes that Pacific green sea turtles and marine mammals could enter these forebays. The comment recommends requiring a biological monitor to perform sea turtle and marine mammal surveys before construction commences each day.*

**Response:** The proposed project would not affect the operation or structure of the intake channels or their forebays, and therefore would not affect sea turtles or marine mammals that may enter the forebays. Staff declines to adopt the recommended mitigation because there is no nexus to the AEC project.

**Comment:** *The commenter supports the PSA's recommended Condition of Certification* ***BIO-9****, and recommends conducting the survey during the plant's flowering season, between May and November. The commenter believes that the threshold for requiring such mitigation as stated in* ***BIO-9*** *(i.e., 10 percent or more of the plants or occupied habitat within the 0.25 mile survey area) is an arbitrary value. Instead, the commenter recommends that all impacted southern tarplant individuals be replaced at a 1:1 ratio.*

**Response:** The field survey has been completed and staff concludes that southern tarplant would not be affected by the project. Therefore, Condition of Certification **BIO-9**, including the 10 percent threshold, is no longer applicable and has been excluded from the FSA. Please see revisions in the Staff Assessment and responses to comments (above) regarding southern tarplant.

**Comment:** *The commenter notes that project construction will last approximately 57 months (early 2017 through late 2021) and that impacts to biological resources of Los Cerritos Wetlands may be difficult to predict over that timespan. The comment cites the possibility that previously undocumented wildlife could become established in the Wetlands, or that wildlife already present may begin breeding activities not previously documented. These possible changes to wildlife occurrence or activities in the Wetlands may be especially likely due to planned future habitat restoration during the proposed AEC construction period.*

*The comment states that the AEC project may deter these ecological processes and recommends establishing light, noise, dust, and non-native plant monitoring stations at two planned restoration sites and any future restoration project site that may be initiated during the project's construction timeline. The recommendation specifies that monitoring should begin at least 45 days before construction commences and that continue throughout the entire construction period.*

**Response:** Staff recognizes the expectation of future habitat restoration at the Los Cerritos Wetlands. However, the impacts analysis to habitat and wildlife are based on baseline conditions described in the Staff Assessment. Thus, the Staff Assessment does not address the possibility of future wildlife range extensions or new breeding activities in the Wetlands. Even so, the Staff Assessment evaluates the project's potential to affect wildlife and its habitat (including occupied Belding's savannah sparrow breeding habitat at the Los Cerritos Wetlands) through light, noise, dust, and introduction or spread of non-native plants. The analysis concludes that these impacts would be less than significant, and no mitigation is recommended. Staff declines to adopt the commenter's recommended mitigation.

**Comment:** *The commenter notes that there is limited data on the Pacific green sea turtles found in the mouth of the San Gabriel River, and quotes from the PSA that "the slow transition period for eliminating warm water outfall from the existing AGS plant is expected to allow sea turtles to gradually adapt to changing temperature regime by adjusting their local activities." The comment states that the word "expected" makes this statement appear to be an assumption. The commenter emphasizes habitat differences between San Diego Bay (location of a well-studied sea turtle occurrence) and the San Gabriel River. Finally, to be certain of how the local sea turtle population may respond to environmental changes, the commenter recommends including a sea turtle monitoring program requirement for the project, to begin least 45 days before construction begins and last until at least one year past when the discharge of warm water effluent has ceased.*

**Response:** The elimination of warm water discharge from the existing AGS and Haynes Generating Station are not a part of the proposed AEC project. In addition, because the AEC project does not use OTC and would not be contributing to the existing warm water discharge, there is no contribution to any impacts on the Pacific green sea turtles in relation to the species congregation near the AGS outfall. Because staff received some public comments on the green sea turtles, staff has included this discussion to address public interest in the nearby sea turtle population.

Since AEC would not contribute to expected temperature changes. The AEC project would not affect Pacific green sea turtles or their habitat, and it would not contribute to any cumulative effects on the turtles or their habitat. In the absence of such effects, mitigation cannot be imposed, and staff declines to adopt the recommended monitoring program.

**Comment:** *The commenter describes the limited available information on Belding's savannah sparrow occurrence in the Los Cerritos Wetlands, and quotes from the staff assessment that "project related noise are not expected to mask bird vocalizations." The commenter recommends including a Belding's savannah sparrow monitoring program requirement for the project, to begin least 45 days before construction begins and last until at least one breeding season following demolition. The purpose of the monitoring program would be to be certain that the AEC project will not impact the communication of Belding's savannah sparrow during project construction.*

**Response:** The potential effects of noise on Belding's savannah sparrow and other wildlife in the Los Cerritos Wetlands are addressed in in the Staff Assessment under "General Construction and Demolition Impacts." The analysis notes that conditions of certification identified in the **Noise and Vibration** section of the Staff Assessment would require effective measures to control construction and demolition noise at its source, which benefits all of the surrounding area including nearby residences and the Los Cerritos Wetlands complex. Proposed Condition of Certification **NOISE-8** requires noise and vibration minimization measures for pile driving, and Condition of Certification **NOISE-6** requires mitigation measures for all noisy construction activities. With implementation of these conditions of certification, construction and demolition noise impacts to special-status species, including Belding's savannah sparrow, in the vicinity of the AEC would be less than significant. Therefore, there is no need for additional mitigation, and staff declines to adopt the recommended monitoring program.

**Comment:** *The commenter agrees with the PSA, that coastal salt marsh habitat is naturally high in nitrogen, but notes that other sensitive habitats, including special-status wildlife habitat, in the Los Cerritos Wetlands may be more sensitive to nitrogen deposition. These are: alkali meadows, brackish marsh, mulefat scrub, and willow scrub. The comment recommends analyzing the potential effects of nitrogen deposition in these habitats. In addition, the commenter recommends an endowment for non-native weed management for the Los Cerritos Wetlands, to be structured in similar fashion to an agreement between AES and the Huntington Beach Wetlands Conservancy.*

**Response:** The potential effects of nitrogen deposition are addressed in the "Operation Impacts And Mitigation" subsection of the Staff Assessment. Staff is unaware of published data identifying critical nitrogen loads for the specific habitats cited in the comment. However, staff's analysis is based on overestimates of baseline nitrogen deposition levels and a model that heavily overestimates the project's local nitrogen deposition for several reasons, described in **Biological Resources Appendix 1**. Staff's conclusion that potential effects of nitrogen deposition on local sensitive habitats would be less than significant is unchanged. This conclusion applies to the habitats at the Los Cerritos Wetlands. There is no need for mitigation, and staff declines to adopt the recommended endowment.

**Comment:** *The commenter recommends review and revision of several points in the Biological Resources section of the Staff Assessment:*

- *The Marine Mammal Protection Act should be included in the list of LORS based on the potential presence of marine mammals in the forebays, Los Cerritos Channel, and San Gabriel River;*
- *Descriptions of Colorado Lagoon and Sims' Pond Biological Reserve should be included in the "Regional Wetlands and Other Protected Areas" section;*
- *Descriptions of alkali meadows and brackish marsh should be added to the "Existing Vegetation and Wildlife" section; and*
- *On Page 4.3-33 the document states that "Once the existing AGS generating units are retired (expected by the end of 2010)…" The year 2010 certainly is not accurate since the AGS units are currently still operating.*

**Response:** Staff has added the Marine Mammal Protection Act to **Biological Resources Table 1**, added brief descriptions of Colorado Lagoon and Sims Pond to the list of regional protected areas, added text regarding alkali meadow and brackish marsh to the description of southern coastal salt marsh, and deleted the anticipated retirement date of the AGS units.

**Comment:** *The commenter provides a summary of the recommendations detailed in earlier sections of the memorandum*.

**Response:** Please refer to the responses to comments above.

## PLAINS WEST COAST TERMINALS LLC/NGIABI GICUHI; AUGUST 12, 2016; TN 212754 – PLAINS WEST COAST TERMINALS COMMENTS: AES APPLICATION FOR CERTIFICATION.

**Comment:** *The comment notes that there are two intake channels used to supply water to the AES facility that AES will no longer utilize, and requests that both channels be refilled.*

**Response:** Alterations to the intake channels are not proposed as a part of this project. Potential environmental effects of filling the channels (e.g., to marine life) are not addressed in this FSA. Please refer to the **Project Description** section of the FSA.

## DAVE SHUKLA; AUGUST 12, 2016; TN 212781 – FORWARD PROGRESS.

**Comment:** *The comment expresses agreement with the Memo by Eric Zahn of Tidal Influence regarding greater study and measurement of local wetlands species in and around the project site, notes the local importance of the wetlands, and recommends that the final project plan should reflect a strong commitment to the local unique eco-tone.*

**Response:** Please see the responses to comments from Eric Zahn of Tidal Influence, (Los Cerritos Wetlands Land Trust; August 10, 2016; TN 212764-4 – Attachment 3 - Tidal Influence Final Memo Re - AES PSA Aug 2016), above.

## PUBLIC WORKSHOP COMMENTS

**Comment:** *One member of the public commented that field surveys for southern tarplant may be of limited value due to the ongoing drought; that construction oversight is important to ensure follow-through on conditions of certification; and that burrowing owls or other raptors may use the site.*

**Response:** Regarding southern tarplant, please see staff's responses to the applicant's Initial PSA Comments (TN 212487, above). Staff agrees with the importance of construction oversight; please refer to the verification language accompanying each condition of certification. Staff agrees with the comment regarding burrowing owls and raptors; please refer to staff's responses to comments by Tidal Influence (TN 212764-4, above).

## CONCLUSIONS

Special-status plants and wildlife are not expected to occur on the AEC site, although there is a potential for impacts to one special-status plant species on the proposed wastewater pipeline route. The nearby Los Cerritos wetlands and other natural areas support special-status birds, including the Belding's savannah sparrow (state-listed endangered), western snowy plover (federally listed threatened), California least tern (federally and state-listed endangered), and California brown pelican (state fully protected). Project construction and operation could result in the direct and indirect effects presented in **Biological Resources Table 4**. All potential impacts to biological resources can be reduced to less than significant by implementing mitigation measures recommended in this staff assessment.

**Biological Resources Table 4**
**Summary of Impacts to Biological Resources from the AEC**

| Impact | Condition of Certification | Significance Determination |
|---|---|---|
| **CONSTRUCTION IMPACTS** | | |
| **Native vegetation**: removal of native vegetation | **None** | Less than significant |
| **Common wildlife:** disturbance and injury or mortality to common wildlife, including nesting birds | • **BIO-7** limits disturbance area;<br>• **BIO-8** requires pre-construction nest surveys and impact avoidance. | Less than significant with implementation of conditions of certification |
| **Special-status plants**: potential direct impacts on wastewater line; potential off-site impacts from runoff, dust, or invasive weeds | • **BIO-7** controls invasive weeds;<br>• **SOIL&WATER-1** requires a SWPPP to control runoff and prevent contamination;<br>• **AQ-SC3** requires measures to minimize fugitive dust;<br>• **AQ-SC4** requires construction monitoring and remediation for visible dust plumes. | Less than significant with implementation of conditions of certification |
| **Special-status wildlife:**<br>disturbance from noise and lighting, habitat degradation from invasive weeds, stormwater runoff, groundwater contamination | • **BIO-7** confines work to delineated areas and controls invasive weeds;<br>• **BIO-8** requires pre-construction nest surveys and impact avoidance;<br>• **NOISE-6** minimizes general construction noise;<br>• **NOISE-8** minimizes noise and vibration from pile driving;<br>• **SOIL&WATER-1** requires a SWPPP to control runoff and prevent contamination;<br>• **VIS-1** minimizes offsite lighting. | Less than significant with implementation of conditions of certification |

| Impact | Condition of Certification | Significance Determination |
|---|---|---|
| **Jurisdictional wetlands and waters**: potential degradation from runoff of sediment or toxic substances from the project site | • **SOIL&WATER-1** requires a SWPPP to control runoff and prevent contamination. | Less than significant with implementation of condition of certification |
| **Stormwater runoff:** degradation of adjacent habitat | • **SOIL&WATER-1** requires a SWPPP to control runoff. | Less than significant with implementation of conditions of certification |
| **Groundwater contamination:** degradation of adjacent habitat | • **SOIL&WATER-1** prevents contamination. | Less than significant with implementation of condition of certification |
| **OPERATION IMPACTS** | | |
| **Noise:** disturbance resulting in mortality or decreased productivity of special-status birds and wildlife | **None** | Less than significant |
| **Lighting:** disturbance resulting in altered behavior or increased predation | • **BIO-7** requires any aviation lighting to be configured to minimize attraction of birds;<br>• **VIS-4** minimizes offsite lighting. | Less than significant with implementation of condition of certification |
| **Avian collision and electrocution:** injury or mortality | • **BIO-7** minimizes risk by complying with APLIC design standards. | Less than significant with implementation of condition of certification |
| **Stormwater runoff:** degradation of adjacent habitat | • **BIO-7** minimizes runoff;<br>• **SOIL&WATER-4** requires compliance with NPDES permit requirements for discharge. | Less than significant with implementation of conditions of certification |
| **Nitrogen deposition:** degradation of habitat by enhancing invasive weeds | **None** | Less than significant |

With implementation of proposed conditions of certification, compliance with LORS would be achieved and direct, indirect, and cumulative impacts would be avoided, minimized, or mitigated to less than significant levels.

## PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following Biological Resources conditions of certification:

## DESIGNATED BIOLOGIST SELECTION

**BIO-1** The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and

3. At least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

**Verification:** The project owner shall submit the specified information at least 75 days prior to the start of site mobilization or construction-related ground disturbance activities. No pre-construction site mobilization or construction related activities shall commence until a Designated Biologist has been approved by the CPM.

If a Designated Biologist is replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

## DESIGNATED BIOLOGIST DUTIES

**BIO-2** The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, demolition, and construction activities. At the direction of the CPM, the project owner may terminate the Designated Biologist's function during plant operation. However, the project owner shall appoint a replacement Designated Biologist at any time as directed by the CPM, and will ensure the same duties are performed during closure and restoration activities. If no Designated Biologist is available at any time during the life of the project (including operation phase) and the CPM determines that project-related actions may affect biological resources, the CPM may direct the project owner to assign a Biological Monitor or replacement Designated Biologist, for short-term or long-term monitoring and reporting. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner and CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;

3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect or direct the site personnel how to inspect active construction areas where animals may have become trapped prior to construction commencing each day. Inspect or direct the site personnel how to inspect the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way. Inspect soil or spoil stockpiles and dust abatement watering for compliance with Condition of Certification **BIO-7**. Inspect erosion control materials (e.g., hay bales) to confirm weed-free certification. Inspect weed infestations and monitor eradication measures to determine success. Inspect trash receptacles, monitor site personnel compliance with trash handling, pet prohibitions, and all other WEAP components (Condition of Certification **BIO-5**);

6. Notify the project owner and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and all permits; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFW, USFWS, and CPM, including notifying these agencies of dead or injured listed species and reporting special status species observations to the California Natural Diversity Database.

**Verification:** The Designated Biologist will notify the CPM of any non-compliance or special-status species injury or mortality within one (1) working day of the incident. The Designated Biologist shall submit in the monthly compliance report to the CPM copies of all written reports and summaries that document construction activities that have the potential to affect biological resources. The Designated Biologist's written records will be made available for the CPM's inspection on request at any time during normal business hours. During project operation, the Designated Biologist(s) shall submit record summaries in the annual compliance report unless their duties cease, as approved by the CPM.

## BIOLOGICAL MONITOR SELECTION

**BIO-3** The project owner's CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitor(s) to the CPM for approval. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

**Verification:** The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any project-related site disturbance activities. Within 10 days of completion of training, the Designated Biologist shall submit a written statement to CPM confirming that individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval at least 10 days prior to their first day of monitoring activities.

## DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

**BIO-4** The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification.

If required by the Designated Biologist or Biological Monitor(s), the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities;

3. Notify the CPM if there is a halt of any activities and advise the CPM of any corrective actions that have been taken or would be instituted as a result of the work stoppage; and

4. The CPM, in coordination with CDFW or USFWS, as appropriate, will determine if corrective action has been effective and will direct the project owner to take further corrective action as needed.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

**Verification:** The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem within one (1) working day of initiating the corrective action.

## WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

**BIO-5** The project owner shall develop and implement a project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor’s employees, supervisors, inspectors, and subcontractors. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting electronic media and written material is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, explain the reasons for protecting these resources, and the function of flagging in designating sensitive resources and authorized work areas;

3. Discuss federal and state resource protection laws and explain penalties for violation of applicable laws, ordinances, regulations, and standards (e.g., federal and state endangered species acts);

4. Place special emphasis on protected birds including Belding’s savannah sparrow and burrowing owl, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection and status, penalties for violations, reporting requirements, and protection measures;

5. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers to dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

6. Include a discussion of the biological resources conditions of certification;

7. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

8. Include a training acknowledgment form to be signed by each worker indicating that they received the WEAP training and shall abide by the guidelines.

The project-specific WEAP shall be administered by a competent individual(s) acceptable to the Designated Biologist.

**Verification:** At least 45 days prior to the start of any planned project-related ground disturbance activities, or any other project-related activities that could affect biological resources (including disturbance or demolition of existing structures or vegetation), the project owner shall provide to the CPM a copy of the draft WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program. The Notice to Proceed will not be issued until the WEAP has been revised according to the CPM's direction, and approved by the CPM.

The project owner shall provide in the monthly compliance reports the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

Throughout the life of the project, the worker education program shall be repeated annually for permanent employees, and shall be routinely administered either in person or via video within one week of arrival to any new personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to the CPM upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate indicating that they have completed the required training.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least six months after the completion of all project construction activities. During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

## BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN (BRMIMP)

**BIO-6** The project owner shall develop and implement a BRMIMP. The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include the following:

1. All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resource conditions of certification identified in the Commission Decision as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring, and compliance measures required in other state agency terms and conditions, such as those provided in the National Pollution Discharge Elimination System (NPDES) Construction Activities Stormwater General Permit;

4. A list or tabulation of all sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. A detailed description of measures that shall be taken to avoid or mitigate disturbances from construction and demolition activities;

7. All locations, shown on a map at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;

8. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities *prior* to any site disturbance or related facilities mobilization, for comparison with aerial photographs at the same scale to be provided *subsequent* to completion of project construction (see **Verification**).

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards from each biological resource condition of certification to determine if mitigation and conditions are or are not successful;

11. Remedial measures to be implemented if performance standards are not met;

12. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s);

13. A process for proposing BRMIMP modifications to the CPM and appropriate agencies for review and approval; and

14. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the project site, or during project surveys, to the California Natural Diversity Database (CNDDB) per CDFW requirements.

**Verification:** No fewer than 45 days prior to planned start of construction, the project owner will submit a draft BRMIMP to the CPM for review and approval. The Notice to Proceed will not be issued until the BRMIMP has been revised according to the CPM's direction, and approved by the CPM.

If there are any federal permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition and submitted to the CPM within 10 days of their receipt by the project owner.

The project owner shall notify the CPM no less than 5 working days before implementing any proposed modifications to the approved BRMIMP and will implement changes only after obtaining CPM approval.

Implementation of all BRMIMP measures shall be reported in the monthly compliance reports by the designated biologist (i.e., survey results, construction activities that were monitored, species observed). Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed; a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases; and which mitigation and monitoring items are still outstanding. The Construction Closure Report will include a set of aerial photographs of the site at an approved scale for comparison with the pre-construction set (Item 8 above).

## GENERAL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

**BIO-7** The project owner shall ensure implementation of the following measures during site mobilization, construction, operation, and closure to manage their project site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. The boundaries of all areas to be temporarily or permanently disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to demolition or construction activities in consultation with the Designated Biologist. Spoils shall be stockpiled in disturbed areas which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, vehicles, and equipment shall be confined to the flagged areas.

2. At the end of each work day, the Designated Biologist, Biological Monitor, and/or site personnel shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled. If site personnel are inspecting trenches, bores, and other excavations and wildlife is trapped, they will immediately notify the Designated Biologist and/or Biological Monitor. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access. Should wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the animal to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

3. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee’s (APLIC’s) Suggested P*ractices for Avian Protection on Power Lines* (APLIC 2006) and *Reducing Avian Collisions with Power Lines* (APLIC 2012) to reduce the likelihood of large bird electrocutions and collisions.

4. Spoils shall not be stockpiled adjacent to the outlet channel fence line to minimize potential for spoils to enter into adjacent waterways.

5. Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

6. To the extent feasible, any aviation warning lighting shall employ only strobed, strobe-like or blinking incandescent lights, preferably with all lights illuminating simultaneously. Minimum intensity, maximum “off-phased” duel strobes are preferred, and no steady burning lights (e.g., L-810s) shall be used.

7. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards to prevent the formation of puddles, which could attract predators of special-status species to construction sites. During construction, site personnel shall patrol these areas to ensure water does not puddle and attract crows and other wildlife to the site, and shall take appropriate action to reduce water application rates where necessary.

8. Report all inadvertent deaths of special-status species to the appropriate project representative, including road kill. Species name, physical characteristics of the animal (sex, age class, length, weight), and other pertinent information shall be noted and reported in the monthly compliance reports. For special-status species, the Designated Biologist or Biological Monitor shall contact CDFW and USFWS within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. Injured animals shall be reported to CDFW and/or USFWS and the CPM, and the project owner shall follow instructions that are provided by CDFW or USFWS. During construction, injured or dead animals detected by personnel in the project area shall be reported immediately to a Biological Monitor or Designated Biologist, who shall remove the carcass or injured animal promptly. During operations, the Project Environmental Compliance Monitor shall be notified.

9. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed immediately of any hazardous spills. Any on-site servicing of vehicles or construction equipment shall take place only at a designated area approved by the Designated Biologist. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

10. During construction all trash and food-related waste shall be placed in self-closing containers and removed weekly or more frequently from the site. Workers shall not feed wildlife, or bring pets to the project site.

11. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.

12. The project owner shall implement the following measures during construction and operation to prevent the spread and propagation of nonnative, invasive weeds:

    a. Limit the size of any vegetation and/or ground disturbance to the minimum area needed for safe completion of project activities, and limit ingress and egress to defined routes;

    b. Use only weed-free straw, hay bales, and seed for erosion control and sediment barrier installations. Invasive non-native species shall not be used in landscaping plans and erosion control. Monitor and rapidly implement control measures to ensure early detection and eradication of weed invasions.

13. During construction and operation, the project owner shall conduct pesticide management in accordance with standard BMPs. The BMPs shall include non-point source pollution control measures. The project owner shall use a licensed herbicide applicator and obtain recommendations for herbicide use from a licensed Pest Control Advisor. Herbicide applications must follow EPA label instructions. Minimize use of rodenticides and herbicides in the project area and prohibit the use of chemicals and pesticides known to cause harm to non-target plants and wildlife. The project owner shall only use pesticides for which a “no effect” determination has been issued by the EPA’s Endangered Species Protection Program for any species likely to occur within the project area or adjacent wetlands. If rodent control must be conducted, zinc phosphide or an equivalent product shall be used.

**Verification:** All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the monthly compliance reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written Construction Completion Report identifying how measures have been completed (see Condition of Certification **BIO-6** verification).

Monthly and annual compliance reports will include results of all regular inspections by the Designated Biologist and Biological Monitor(s), including but not limited to the requirements cited above and in Condition of Certification **BIO-2.**

The project owner will maintain written records of vehicle and equipment inspection and maintenance, and will provide summaries in each monthly and annual compliance report. The complete written vehicle maintenance record will be available for the CPM’s inspection during normal business hours.

The BRMIMP (Condition of Certification **BIO-6**) will include affirmation by the project owner that:

- All electrical component design conforms to applicable APLIC guidelines; and
- All soil binders conform to the requirements stated above.

## PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE AND MINIMIZATION MEASURES FOR BREEDING BIRDS

**BIO-8** Pre-construction nest surveys shall be conducted if construction or demolition activities on the project site or wastewater pipeline will occur from January 1 through August 31. In addition, burrowing owl surveys shall be conducted prior to any ground disturbing activity year-round. The Designated Biologist or Biological Monitor shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting, burrow, or surrogate burrow habitat and substrate within the project site and areas surrounding the project site within 300 feet of the project boundary.

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. Pre-construction surveys shall be conducted no more than 14 days prior to initiation of construction activity. One survey needs to be conducted within the 3-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks during January 1 through August 31 in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation.

3. If active nests, burrows, or surrogate burrows are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest) shall be established around each nest. Specific buffer distances are provided below for applicable avian groups (**Biological Resources Table 5**); these buffers may be modified with the CPM's approval. For special-status species, if an active nest is identified, the size of each buffer zone shall be determined by the Designated Biologist in consultation with the CPM (in coordination with CDFW and USFWS). Nest locations shall be mapped using GPS technology.

**Biological Resources Table 5**
**AEC Construction and Demolition Buffers for Active Nests**

| Avian Group | Species Potentially Nesting in the Project Vicinity | Buffer for Construction and Demolition Activities (feet) |
|---|---|---|
| Bitterns and herons | Black-crowned night heron, great blue heron, great egret, green heron, snowy egret | 250 |
| Cormorants | Double-crested cormorant | 100 |
| Doves | Mourning dove | 25 |

| Avian Group | Species Potentially Nesting in the Project Vicinity | Buffer for Construction and Demolition Activities (feet) |
|---|---|---|
| Geese and ducks | American widgeon, blue-winged teal, cinnamon teal, Canada goose, gadwall, mallard, northern pintail, ruddy duck | 100 |
| Grebes | Clark's grebe, eared grebe, horned grebe, pied-billed grebe, western grebe | 100 |
| Hummingbirds | Allen’s hummingbird, Anna’s hummingbird, black-chinned hummingbird | 25 |
| Plovers | Black-bellied plover, killdeer | 50 |
| Raptors (Category 1) | American kestrel, barn owl, red-tailed hawk | 50 |
| Raptors (Category 2) | Cooper’s hawk, red-shouldered hawk, sharp-shinned hawk | 150 |
| Raptors (Category 3) | Northern harrier, white-tailed kite, burrowing owl | These are special-status species; buffer determined in consultation with CPM |
| Stilts and Avocets | American avocet, black-necked stilt | 150 |
| Terns | Elegant tern, Forster's tern, royal tern | 100 |
| Passerines (cavity and crevice nesters) | House wren, Say’s phoebe, western bluebird | 25 |
| Passerines (bridge, culvert, and building nesters) | Black phoebe, cliff swallow, house finch, Say’s phoebe | 25 |
| Passerines (ground nesters, open habitats) | Horned lark | 100 |
| Passerines (understory and thicket nesters) | American goldfinch, blue-gray gnatcatcher, bushtit, California towhee, common yellowthroat, red-winged blackbird, song sparrow, Swainson’s thrush | 25 |
| Passerines (scrub and tree nesters) | American crow, American goldfinch, American robin, blue-gray gnatcatcher, Bullock’s oriole, bushtit, Cassin's kingbird, common raven, hooded oriole, house finch, lesser goldfinch, northern mockingbird | 25 |
| Passerines (tower nesters) | Common raven, house finch | 25 |
| Passerines (marsh nesters) | Common yellowthroat, red-winged blackbird | 25 |
| Species not covered under MBTA | Domestic waterfowl, including domesticated mallards, feral (rock) pigeon, European starling, and house sparrow | N/A |

4. If active nests are detected during the survey, the Designated Biologist or Biological Monitor shall monitor all nests with buffers at least once per week, to determine whether birds are being disturbed. If signs of disturbance or distress are observed, the Designated Biologist or Biological Monitor shall immediately implement adaptive measures to reduce disturbance in coordination with the CPM. These measures could include, but are not limited to, increasing buffer size, halting disruptive construction activities in the vicinity of the nest until fledging is confirmed, or placement of visual screens or sound dampening structures between the nest and construction activity.

5. If active nests are detected during the survey, the Designated Biologist will prepare a Nest Monitoring Plan. The Designated Biologist or Biological Monitor shall monitor the nest until he or she determines that nestlings have fledged and dispersed or the nest is no longer active. Activities that might, in the opinion of the Designated Biologist or Biological Monitor, disturb nesting activities (e.g., exposure to exhaust), shall be prohibited within the buffer zone until such a determination is made.

**Verification:** Within ten (10) days of completion of the field work, the project owner shall provide the CPM, CDFW, and USFWS a letter-report describing the findings of the preconstruction nest surveys, including a description and representative photographs of habitat; the time, date, methods, and duration of the surveys; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the surveys, the reports shall include a map or aerial photo identifying the location of the nest(s) and shall depict the boundaries of the proposed no disturbance buffer zone around the nest(s). The CPM will consider any timely comments received from CDFW and USFWS in review of the letter-report.

Additionally, the nest monitoring plan shall be submitted to the CPM for review and approval prior to any planned demolition or construction activities in the vicinity of any active nest. No such demolition or construction activities may proceed without CPM approval of the monitoring plan, in consultation with CDFW and USFWS. All impact avoidance and minimization measures related to nesting birds shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the monthly compliance reports by the Designated Biologist.

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# BIOLOGICAL RESOURCES-APPENDIX-1
# NITROGEN DEPOSITION ANALYSIS

Testimony of Wenjun Qian, Ph.D., P.E.

## INTRODUCTION

The following provides a technical description of the nitrogen deposition analysis for the Alamitos Energy Center (AEC) project.

## PROJECT DESCRIPTION

The AEC would be a natural-gas-fired, air-cooled, combined-cycle and simple-cycle, electrical generating facility with a nominal generating capacity of 1,040 megawatts (MW). The AEC would have two power blocks. The combined-cycle power block would consist of two natural gas-fired combustion turbine generators (CTGs) in a combined-cycle configuration, two unfired heat recovery steam generators (HRSGs), one steam turbine generator, one air-cooled condenser, one auxiliary boiler, and related ancillary equipment. The simple-cycle power block would consist of four simple-cycle LMS-100 CTGs with fin-fan coolers and their ancillary facilities (AEC 2015f).

## NITROGEN DEPOSITION

Nitrogen deposition is the term used to describe the input of reactive nitrogen species from the atmosphere to the biosphere. The pollutants that contribute to nitrogen deposition derive mainly from oxides of nitrogen (NOx) and ammonia ($NH_3$) emissions. NOx emissions (a term used for nitric oxide [NO] and nitrogen dioxide [$NO_2$]), generally the result of industrial or combustion processes, are much more widely distributed than $NH_3$. Reduced forms of nitrogen (NHx) are primarily emitted from intensive animal operations (e.g., dairies) and vehicles with catalytic converters.

In the atmosphere NOx is transformed to a range of secondary pollutants, including nitric acid ($HNO_3$), nitrates ($NO_3$) and organic compounds, such as peroxyacetyle nitrate (PAN), while $NH_3$ is readily absorbed by surfaces such as water and soil as well as being rapidly transformed to ammonium (NH4+) by reaction with acidic compounds. Both the primary and secondary nitrogen-based pollutants may be removed by wet deposition (scavenging of gases and aerosols by precipitation) and by dry deposition (direct turbulent deposition of gases and aerosols) on the earth’s surface.

## NITROGEN DEPOSITION MODELS

Staff used the American Meteorological Society/Environmental Protection Agency Regulatory Model known as AERMOD to evaluate the potential nitrogen deposition impacts of this power plant project. AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and is applicable for use in both simple and complex terrain.

AERMOD is used for chemically inert pollutants and cannot account for transformation of the nitrogen species which are time and reaction dependent. When using AERMOD, the analysis must assume these transformations have already occurred at the exit of the stack. Therefore, it is a conservative model that overestimates transformation rates and deposition impacts. But, it is also approved for regulatory purposes for near-field impacts analyses (used by the Energy Commission and the air district), is most familiar to users and regulatory agencies, and it is generally used to estimate nitrogen deposition.

Staff used several assumptions with regard to nitrogen formation and deposition, all of which tend to overestimate impacts. These assumptions include:

- One hundred percent conversion of oxides of nitrogen (NOx) and ammonia ($NH_3$) into atmospherically derived nitrogen (ADN) within the exhaust stacks rather than allowing the conversion of NOx and $NH_3$ to occur over distance and time within the plume and atmosphere, which is beyond the scope of AERMOD as noted above;
- Maximum settling velocities derived from the parameters for nitric acid ($HNO_3$, which, of all the depositional species, has the most affinity for soils and vegetation and the tendency to adhere to what it is deposited on) to produce maximum, or conservatively estimated, deposition rates;
- Emissions rates based upon the proposed project's maximum potential to emit as required by local air district rules, rather than annually averaged likely emissions based on previous equipment performance and expected actual operations; and
- Ammonia emissions are modeled at a conservatively averaged level of 2.5 ppm, which is half of the permitted level of 5 ppm. In reality, ammonia emissions are generally less than 1 ppm until near the end of the catalyst life. Plant operators have an extraordinary impetus to avoid exceedances of their NOx permit limits, because they can be fined. Owners keep their catalyst clean and active, which keeps NOx level low and limits unreacted ammonia in the exhaust. The permit would require the catalyst to be replaced or cleaned whenever the ammonia emissions exceed 5 ppm.

Assuming 100 percent of the NOx and $NH_3$ conversion to ADN within the exhaust stacks ignores the fact that the conversion process requires sunlight, moisture, and time. Since staff analyzes habitat areas within a 6-mile radius of the project, it is unlikely that there would be sufficient time for all of the emitted nitrogen to convert to ADN. Therefore, it is likely that a less than significant amount of the project's nitrogen emissions would actually deposit on these habitat areas. However, at this time staff does not have refined data on the amount of time needed for this conversion to occur. Therefore, staff conservatively assumes total conversion at the stack. The project could contribute to annual nitrogen deposition, but not at the levels predicted by AERMOD due to the limited time it takes for the plumes to travel to the habitat areas and the conservative assumptions used for nitrogen formation and deposition.

**Appendix Bio-1Table Ndep-1** shows the emission rates of NOx and $NH_3$ from the proposed AEC that staff used to model nitrogen deposition impacts.

**Appendix Bio-1Table Ndep-1**
**AEC, Modeled Nitrogen Species Emissions (tons per year [tpy])[a]**

| Source | NOx | $NH_3$ | Depositional Nitrogen from NOx | Depositional Nitrogen from $NH_3$ | Total Depositional Nitrogen |
|---|---|---|---|---|---|
| Facility Total | 135.8 | 49.4 | 41.3 | 40.7 | 82.0 |

Source: CH2 2016o, CH2 2016s, and Energy Commission staff analysis
Note: [a.] Nitrogen emissions are calculated based on the ratios between the molecular weight of nitrogen (14), the molecular weight of NOx as $NO_2$ (46), and molecular weight of $NH_3$ (17).

For average meteorological conditions, it would take the AEC plumes less than 2 hours to reach the furthest habitat of interest. However, in urban atmospheres, the oxidation rate of NOx to nitric acid ($HNO_3$) is approximately 20 percent per hour, with a range of 10 to 30 percent per hour (ARB 1986). Nighttime NOx oxidation rates are generally much lower than typical daytime rates. $HNO_3$ is readily taken up by soil, vegetation, and water surfaces. $HNO_3$ also reacts with gaseous $NH_3$ to form ammonium nitrate ($NH_4NO_3$), but the reaction is reversible and dependent on temperature, relative humidity, and concentrations of other pollutants. The ambient concentration of nitrate is limited by the availability of $NH_3$ which is preferentially scavenged by sulfate (Scire et al 2000).

On the other hand, because $NH_3$ is readily taken up by damp soils and vegetation and by water bodies, a significant portion of the emitted $NH_3$ can be deposited to vegetation depending on the type of land cover and on meteorological conditions (Hatfield and Follett 2008). $NH_3$ is also readily taken up by aerosol particles of sulfuric acid ($H_2SO_4$) to form ammonium sulfate ($(NH_4)_2SO_4$ [Metcalfe et al 1999]). But since most $(NH_4)_2SO_4$ particles deposit to ground by rain (wet deposition), it is likely that less than a significant amount of the $(NH_4)_2SO_4$ particles would actually deposit on the habitat areas within the 6-mile radius of the project (since the average annual rainfall in Long Beach is only about 12 inches, with the majority falling between November and March). Instead, the $(NH_4)_2SO_4$ particles may travel hundreds or even thousands of miles away from the project before they deposit on the earth's surface.

The Energy Commission's 2007 report *Assessment of Nitrogen Deposition: Modeling and Habitat Assessment* (Tonnesen et al 2007) reviewed two other air dispersion models which can represent chemically reactive emissions and formation and deposition of aerosols: CALPUFF and the Community Multiscale Air Quality (CMAQ) model. The CMAQ version used in the Tonnesen report sometimes produced relatively large numerical errors. Thus, the report concluded that CMAQ cannot be used reliably for single point source impact simulations.

CALPUFF is a non-steady-state Lagrangian Gaussian puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation, and removal. It does so by modeling parcels of air as they move along their trajectories. Different from AERMOD, CALPUFF uses simplified chemistry to attempt to represent nitrogen partitioning and transformation with relatively low computational cost compared to CMAQ. The Tonnesen report concluded that the CALPUFF model can be used to simulate nitrogen deposition, and its results were generally similar in magnitude to the CMAQ-simulated nitrogen deposition. However, CALPUFF is more appropriate for long-range transport (i.e., greater than 50 kilometers – at less than 50 km, and for complex terrain, it requires regulatory approval for its use by the relevant reviewing agency). In addition, CALPUFF allows users to define certain parameters in its meteorological processor, which makes it difficult to be standardized for regulatory review purposes at the current time.

Both AERMOD and CALPUFF have strengths and weaknesses in modeling nitrogen deposition as mentioned above. Based on staff's modeling experience and U.S. Fish and Wildlife Service's analysis on the Russell City Energy Center Project (USFWS 2010), nitrogen deposition rates at habitat areas within 6 miles of the project predicted from CALPUFF are usually an order of magnitude lower (i.e., $1/10^{th}$) than those from AERMOD. At this time, staff continues to believe AERMOD, with the overlay of conservative assumptions mentioned above, is the most conservative model to use for nitrogen deposition modeling.

## NITROGEN DEPOSITION IMPACTS AND MITIGATION CALCULATIONS

Staff used AERMOD with the assumptions mentioned above to conservatively estimate nitrogen deposition incremental impacts from AEC. Staff's analysis covers the habitat areas within the 6-mile radius from the project (see details in the **Biological Resources** section of this staff assessment).

The analysis does not account for the net benefit from discontinued operation of the existing boilers at the Alamitos Generating Station (AGS). At its current capacity factors, AGS produces only a fraction of the maximum annual nitrogenous emissions that the proposed project would be permitted to produce. But the comparison of past actual emissions to future permitted emissions is another conservative assumption, as it is unlikely that the AEC units would ever approach their permitted level of operation as California moves to a high renewable, low carbon (greenhouse gas or GHG) electricity generation system.

Staff emphasizes that its modeling provides an overestimation of nitrogen deposition of the project, based on conservatisms layered upon conservatisms. However, it is the best tool we currently have that is accepted to provide a consistent, albeit extremely conservative result.

Staff used the conservatively modeled project nitrogen deposition impact and baseline nitrogen deposition (see more descriptions regarding baseline below) to compute the total nitrogen deposition rates on habitat areas. Staff calculated nitrogen deposition rates from the project in the surrounding area (**Appendix Bio-1 Figure Ndep-1**), however staff believes the modeling tools and background deposition rates identify a much higher rate of nitrogen deposition than is reasonably expected to occur.

The results could be used to assess the extent of affected habitat to include areas where the total nitrogen deposition exceeds the critical load for each vegetation type. Staff considers that vegetation types below critical load are not significantly impacted by the project and does not require mitigation (see more details in the **Biological Resources** section of this staff assessment). The baseline nitrogen deposition rates used in staff's analysis are based on emission inventory for calendar year 2002 (see more details below). Staff believes that additional conservatisms are introduced by using the 2002 baseline nitrogen deposition rates as discussed below.

## California and South Coast Air Basin Baseline Nitrogen Deposition

The baseline nitrogen deposition rates used in staff's analysis are from the Energy Commission's 2007 report (Tonnesen et al 2007), which provided the total nitrogen deposition on a rather coarse 4-km (2.5-mile) grid (4 km x 4 km, or 16 $km^2$) throughout California. The report used emission inventory data that were previously developed through the Western Regional Air Partnership (WRAP) to simulate annual air quality and visibility for calendar year 2002. The source categories included for the calendar year 2002 include: area sources, point sources, mobile sources, non-road mobile sources, road dust, off shore sources, Mexico emissions inventory, and biogenic emissions for volatile organic compounds (VOC).

However, the U.S. EPA's enforcement efforts, implemented through the State Implementation Plan (SIP) enforced by the regional air district's Air Quality Management Plan (AQMP, see more details in the **Air Quality** section of this staff assessment), have significantly reduced nitrogen emissions from mobile and stationary sources sectors since 2002, and these downward trends are expected to continue. **Appendix Bio-1 Figures Ndep-1a** and **Ndep-1b** show that both the actual and forecasted nitrogen emissions calculated from the NOx and $NH_3$ emissions (red solid lines) for all sources in South Coast Air Basin decrease significantly from year 2000 to year 2035. The nitrogen emissions from the NOx and $NH_3$ emissions are based on the mass fraction of nitrogen in NOx and $NH_3$. It should be noted that nitrogen constitutes about 82 percent of $NH_3$ by weight while it only constitutes about 30 percent of NOx by weight.

The emissions from stationary sources, including electric generation facilities, are also presented (green dashed lines) in the figures for comparison. NOx emissions from the stationary sources only account for 8 to 22 percent of those from all sources and also show a steady decrease over the years. Although the $NH_3$ emissions from the stationary sources, mainly waste disposal and fuel combustion, show a modest increase, they only account for 22 to 47 percent of the total emissions from all sources. The majority of the NOx emissions come from mobile sources and the majority of the $NH_3$ emissions come from area wide sources such as livestock operations, fertilizer applications, and mobile sources.

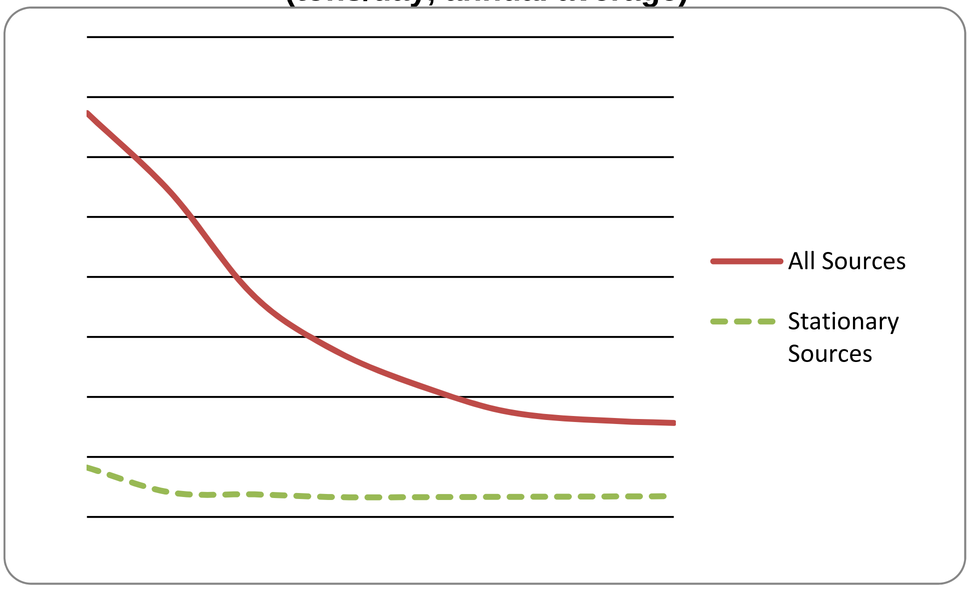
**Appendix Bio-1 Figure Ndep-2** shows measured annual averaged nitrates ($NO_3$) and sulfates ($SO_4$) concentrations of dry particles at the San Gabriel monitoring station (located in South Coast Air Basin) from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network. This is representative of depositional particles in ambient air at the station. The nitrates ($NO_3$) concentrations have decreased more than 50 percent from 2002 to 2015, while the sulfates ($SO_4$) concentrations have decreased more than 30 percent from 2002 to 2015. This indicates that the reductions in the nitrogen emissions shown in **Appendix Bio-1 Figures Ndep-1a** and **Ndep-1b** are effective in reducing the background nitrates and sulfates in the South Coast Air Basin.

Considering the decreasing nitrogen emission inventory trend (an overall reduction of over 50 percent from 2002 to 2015, shown in **Appendix Bio-1 Figures Ndep-1a** and **1b** from the two trends for all sources combined), the relatively small contribution from the stationary sources, and the decreasing nitrates and sulfates concentration measurements, the use of 2002 emissions inventory in the baseline nitrogen deposition rates (as discussed in **Biological Resources** section of this staff assessment) probably overestimates baseline deposition by a factor of 2. Certain map zones that staff considered would be significantly impacted by the project, based on overestimated baseline as well as overestimated project impact, might have total nitrogen deposition below critical load. Thus the acreage of affected habitat is probably overestimated using 2002 baseline and conservatively estimated project impacts. Unfortunately, the 2007 Tonnesen work for the 2002 model year has not been updated and there aren't any more recent background data to use.

Staff assumes that total nitrogen loading is directly proportional to NOx and ammonia inventories. Since deposition pathways are complex and dependent on components such as time, humidity, sunlight exposure, and uniform mixing of needed reactants, deposition rates at the habitat areas near the project may be reduced more than the percentage change to nitrogen inventories.

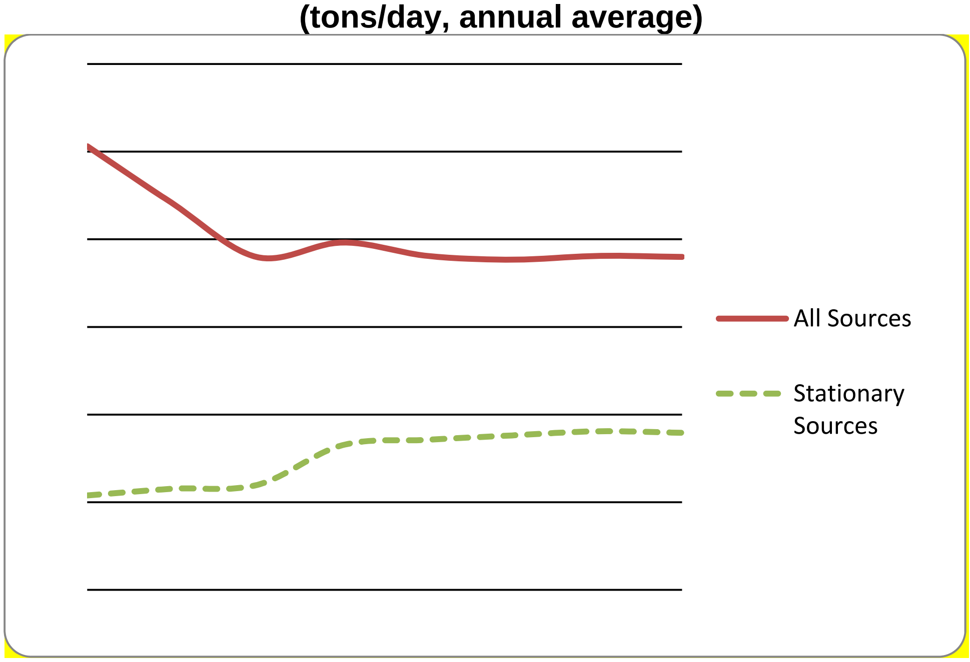
In addition, the South Coast Air Quality Management District (SCAQMD) implemented the Regional Clean Air Incentives Market or RECLAIM program on January 1, 1994. Facilities subject to this program, such as AEC, are required to purchase RECLAIM Trading Credits (RTCs) to offset their annual NOx emission increase in a 1-to-1 offset ratio. As a result, any new stationary source like AEC would not result in a net increase in NOx emissions basin wide (see details in the **Air Quality** section regarding AEC RECLAIM participation and compliance). In addition, since AEC would be located in Zone 1 (South Coast Air Basin coastal zone) RTCs may only be obtained from Zone 1. The resulting new emissions (potential NOx increases) from AEC and the required RTCs (NOx reductions or offsets) would be balanced to zero, or no net increase, annually in the more local coastal zone. So the baseline nitrogen from NOx would not change due to NOx emissions from AEC.

**Appendix Bio-1 Figure Ndep-1a**
**Nitrogen Portion[a] of the NOx Emissions Trends in South Coast Air Basin (tons/day, annual average)**



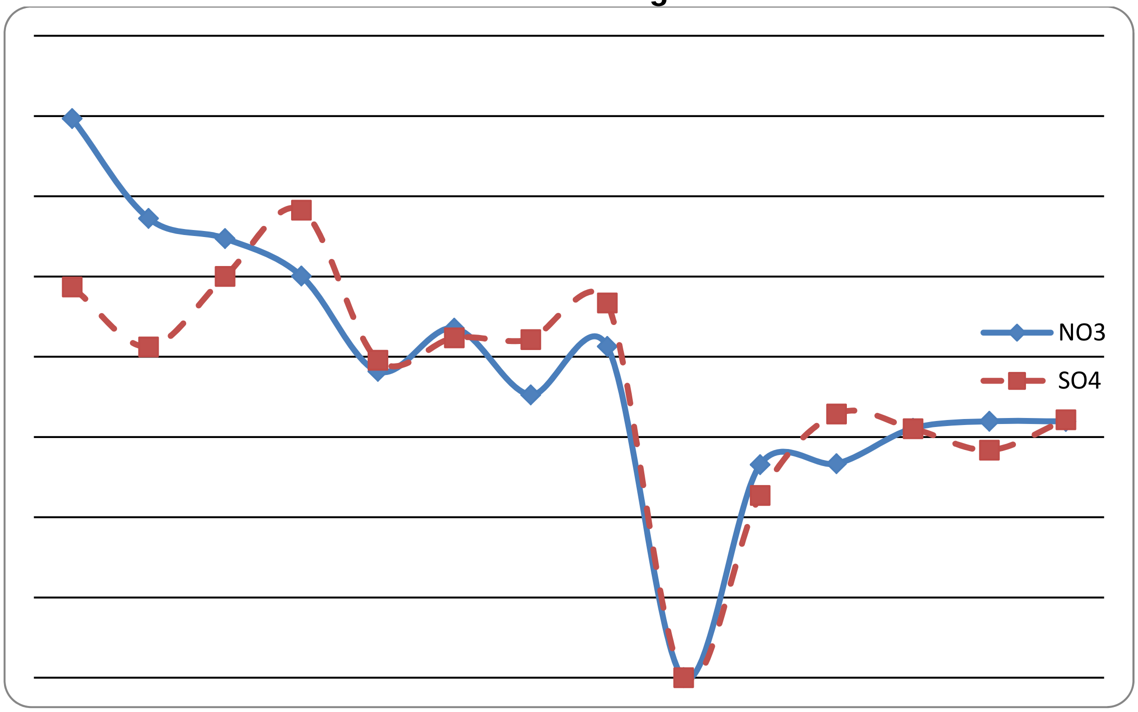

Source: The California Almanac of Emissions and Air Quality - 2013 Edition, Air Resources Board (ARB 2013) and Energy Commission staff analysis
Note: [a] The nitrogen portion of the NOx emissions is calculated based on the ratio between the molecular weight of nitrogen (14) and the molecular weight of $NO_2$ (46).

**Appendix Bio-1 Figure Ndep-1b**
**Nitrogen Portion[a] of the $NH_3$ Emission Trends in South Coast Air Basin (tons/day, annual average)**




Source: The California Almanac of Emissions and Air Quality - 2013 Edition, Air Resources Board (ARB 2013) and Energy Commission staff analysis
Note: [a] The nitrogen portion of the $NH_3$ emissions is calculated based on the ratio between the molecular weight of nitrogen (14) and the molecular weight of $NH_3$ (17).

**Appendix Bio-1 Figure Ndep-2**
**Nitrates ($NO_3$) and Sulfates ($SO_4$) Concentrations ($\mu g/m^3$) Measured at San Gabriel Monitoring Station**




Source: Interagency Monitoring of Protected Visual Environments (IMPROVE) and Energy Commission staff analysis

Note: The gap between the data for 2009 and 2011 means there was no data for 2010.

## CONCLUSIONS

Staff believes that because AERMOD does not account for the transformation of the nitrogen species, which is time and reaction dependent, the nitrogen deposition impacts of the project have been overestimated by as much as a factor of 10 using AERMOD. Further, the nitrogen emission inventory in the South Coast Air Basin has decreased more than 50 percent from 2002 to 2015 for oxides of nitrogen and ammonia combined. The use of the 2002 emissions inventory in the baseline nitrogen deposition rates probably overestimates baseline nitrogen deposition by a factor of 2. In addition, AEC is required to purchase RTCs to offset their annual NOx emissions on a 1-to-1 offset ratio. AEC would not result in a net increase in NOx emissions in South Coast Air Basin coastal zone. Lastly, since staff modeled ammonia emissions at their conservatively averaged value, they were modeled at a rate 2.5 times higher than what is reasonably expected.

Staff calculated ~~a~~ nitrogen deposition rates from the project in the surrounding area (**Appendix Bio-1 Figures Ndep-1**), however, staff believes the modeling tools and background deposition rates identify a much higher rate of nitrogen deposition than is reasonably expected to occur.  For more information on nitrogen deposition, refer to the **Biological Resources** section of this document.

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# CULTURAL RESOURCES

Testimony of Matthew Braun, Melissa Mourkas, and Gabriel Roark[1]

## SUMMARY OF CONCLUSIONS

Staff concludes that the proposed Alamitos Energy Center could result in significant, direct impacts on buried archaeological resources, which may qualify as historical or unique archaeological resources under the California Environmental Quality Act. The adoption and implementation of Conditions of Certification **CUL-1** through **CUL-8** would ensure that the applicant would be able to respond quickly and effectively in the event that archaeological resources are found buried beneath the project site during construction-related ground disturbance.

Staff's analysis of the proposed Alamitos Energy Center with regard to historic built environment resources concludes that two historical resources are present in the project area of analysis: the San Gabriel River and Los Cerritos channels. Both are historic-age engineered structures that figured prominently in regional flood control management. Staff concludes, however, that the proposed project would not have a direct, indirect or cumulative impact on either resource.

Staff's analysis of the proposed Alamitos Energy Center with regard to ethnographic resources concludes that a tribal cultural resource, the Puvunga Ceremonial Site Complex, is present in the project area of analysis. The Puvunga Ceremonial Site Complex is recommended as eligible for the California Register of Historical Resources under criteria 1–3. However, staff's analysis concludes that the construction and operation of the proposed Alamitos Energy Center would not have a direct or indirect impact on this ethnographic tribal cultural resource.

Staff has considered environmental justice populations in its analysis of the proposed project. Staff has not identified significant adverse direct, indirect, or cumulative cultural resources impacts that would affect environmental justice populations.

## INTRODUCTION

This cultural resources assessment identifies the potential impacts of the proposed Alamitos Energy Center (AEC) on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, areas, places, records, manuscripts, and historic districts (Cal. Code Regs., tit. 14, §§ 4852a, 5064.5(a)(3); Pub. Resources Code, §§ 5020.1(h, j), 5024.1[e][2, 4]). Three broad classes of cultural resources are considered in this assessment: prehistoric, ethnographic, and historic.

[1] Braun, ethnographic resources; Roark, archaeological resources; Mourkas, historic built environment resources, technical assistance by Josh Smallwood and Victoria Smith of Applied Earthworks.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include tribal cultural resources (as defined under Pub. Resources Code, § 21074 (a)), traditional resource collecting areas, ceremonial sites, topographic features, value-imbued landscapes, cemeteries, shrines, or ethnic neighborhoods and structures. Ethnographic resources are variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources "ethnographic" depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their lifeways.[2]

Historic-period resources are those materials, archaeological and architectural, usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled corridors, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be 50 years or older to be considered of potential historic importance. A resource less than 50 years of age may be historically important if the resource is of exceptional significance.

For the proposed AEC, staff provides an overview of the environmental setting and history of the project vicinity, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts from the proposed AEC using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines whether there may be a project-related impact to them. If the cultural resources cannot be avoided, staff evaluates whether any of the impacted resources qualifies as a historical resource or unique archaeological resource, as defined by CEQA (Cal. Code Regs., tit. 14, § 15064.5[a]; Pub. Resources Code, §§ 21074, 21083.2[g]). If impacted resources qualify as historical resources or unique archaeological resources, staff recommends mitigation measures that ensure that impacts to the identified cultural resources are reduced to a less-than-significant level.

[2] A "lifeway," as used herein, refers to any unique body of behavioral norms, customs, and traditions that structure the way a particular people carry out their daily lives.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects proposed before the Energy Commission are reviewed to ensure that the proposed facilities would comply with all applicable laws, ordinances, regulations, and standards (LORS) (Pub. Resources Code, § 25525; Cal. Code Regs., tit. 20, §§ 1201[r], 1744[b]).

See **Cultural Resources Table 1** for a summary of applicable LORS.

**Cultural Resources Table 1**
**Laws, Ordinances, Regulations, and Standards**

| Applicable LORS | Description |
|---|---|
| **State** | |
| Pub. Resources Code, §§ 5097.98(b) and (e) | Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until s/he confers with the Native American Heritage Commission (NAHC)-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance. |
| Pub. Resources Code, § 5097.99 | Section 5097.99 prohibits the acquisition, possession, sale, or dissection with malice or wantonness of Native American remains or artifacts taken from a Native American grave or cairn. |
| Health and Safety Code, § 7050.5 | This code prohibits the disturbance or removal of human remains found outside a cemetery. It also requires a project owner to halt construction if human remains are discovered and to contact the county coroner. |
| Government Code, § 6250.10—California Public Records Act | Provides for non-disclosure of records that relate to archaeological site information and reports maintained by, or in the possession of, the Department of Parks and Recreation (DPR), the State Historical Resources Commission, the State Lands Commission, the NAHC, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency. |
| **Local** | |
| City of Long Beach Cultural Heritage Commission Ordinance (Municipal Code: Title 2, Chapter 2.63) | The ordinance contains no requirements that apply to the proposed facility. |
| City of Long Beach Historical Landmarks Ordinance (Municipal Code: Title 16, Chapter 16.52) | The ordinance contains no requirements that apply to the proposed facility. |
| City of Long Beach Historic Preservation Element (2010) | The Historic Preservation Element of the city's General Plan Update 2030 (in preparation) contains no requirements that apply to the proposed facility. |
| Southeast Area Development and Improvement Plan (SEADIP) | The SEADIP contains no cultural resources requirements (City of Long Beach 2006). |
| Southeast Area Specific Plan (SEASP) | The SEASP contains no cultural resources requirements (City of Long Beach 2016). |
| Local Coastal Program (LCP) | The City of Long Beach's (1994) LCP contains no cultural resources requirements that pertain to the proposed project. |

## SETTING

Information provided regarding the setting of the proposed AEC places it in its geographical and geological contexts. Additionally, the archaeological, ethnographic, and historical backgrounds provide the contexts for the evaluation of the historical significance of cultural resources identified within the project area of analysis (PAA).

## ENVIRONMENTAL SETTING

Identifying the kinds and distribution of resources necessary to sustain human life in an environment, and the changes in that environment over time is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the region in which the AEC would be located has undergone several climatic shifts. These shifts have resulted in variable availability of vital resources, and that variability has influenced the scope and scale of human use of the project vicinity. Consequently, it is important to consider the historical character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the area and its ecology. The supplemental application for certification (SAFC) primarily summarizes the regional paleoenvironment (AES 2015a:5.3-3–5.3-6); staff adds brief site-specific information below, with a detailed environmental setting in **Cultural Resources Appendix CR-1**.

### Overview

The proposed project site is situated at elevations of 8–15 feet above sea level on fill, paralic[3], and alluvial fan sediments. Current land uses in the project vicinity include residential and commercial development, industrial, wetland preserves, parklands and open space, landfill, and marinas. (AES 2015a:5.4-2, 5.6-3, 5.6-5; USGS 1896.)

The modern climate of the project vicinity is influenced by the adjacent open coastline and its presence in a semi-permanent high-pressure zone. Consequently, the local weather conditions are typically mild, with average daily highs of 63–84 degrees Fahrenheit (° F) and average daily lows of 45–63 ° F. Summers are dry and warm, punctuated by very hot weather, often caused by southeasterly Santa Ana winds. Winters are mild and wet, most precipitation falling between November and April, averaging about 12 inches annually. (AES 2015a:5.1-3; Engstrom 2006:847.)

The geology of the project site has been defined on the basis of four soil borings, four cone penetration tests, and logs from 43 monitoring wells (JA 2011:5; Ninyo & Moore 2011:2). The project site is situated on placed fill, Quaternary[4] (Holocene to late Pleistocene epochs) undivided alluvial fan deposits, and paralic deposits. The SAFC states that sediments in the PAA are Holocene in age to a depth of at least 15 feet below ground surface. (AES 2015a:5.8-3–5.8-5.)

[3] Paralic sediments are "the complex of sedimentary environments associated with the sea shore, and it is intended to include the transitions from wave zone to beach to dune environments, and from there to estuarine and lagoonal habitats as well" (AES 2015a:5.8-3, fn).

[4] The Quaternary Period encompasses the Pleistocene (2.588 million years ago–11,700 B.P.) and Holocene (11,700 B.P.–present day) epochs (Cohen et al. 2013). Without further description, therefore, Quaternary geologic formations may be taken to date anywhere from 2.588 million years ago to the present day.

Geotechnical Boring 2, conducted within proposed Power Block 2, revealed paralic deposits in borings at a relatively shallow depth and intergrading with alluvial sediments to about 50 feet below ground surface. Root casts[5] and shell fragments were found in the boring starting at 15 feet below ground surface, in silty clay alluvium that likely is Early Holocene in age. (AES 2015a:5.8-5; Ninyo & Moore 2011:Appendix A.) The presence of root casts suggests that a former land surface is preserved about 15 feet below the ground surface (Vogel 2002:14). Jamison and Associates' study on the project site notes that the sand and silty clay layers from 15 to 30 feet below ground surface "are distinguished by the presence of organic material in the form of roots. The silty clay layer appears to trend through the entire section." (JA 2011:5.) It therefore appears likely that a former land surface extends across the project site at approximately 15 feet below ground surface or 4 feet below mean sea level.

## PREHISTORIC SETTING

Staff finds much of the SAFC's prehistoric setting to be correct and does not repeat it at length here. The regional prehistoric setting is discussed in four parts: ancient sites (commonly referred to as the Paleoindian and Paleo-Coastal traditions), Early Holocene (11,500–7550 B.P.), Middle Holocene (7950–1450 B.P.), and Late Holocene (1450 B.P.–present). (AES 2015a:5.3-6–5.3-8.) However, staff provides supplementary information in **Cultural Resources Appendix CR-1** in order to analyze the AEC's potential to affect archaeological resources.

## ETHNOGRAPHIC SETTING

The Gabrielino people and representative tribes are the Native Americans most directly related to the project vicinity. The Gabrielino Tongva have traditionally been split into four subgroups based on the dialect of the Gabrielino Tongva language spoken: those of the Los Angeles Basin/Gabrielino proper, those of the northern mountainous area including the inland San Fernando Valley/Fernandeño, those of Santa Catalina and San Clemente islands, and those of San Nicolas Island (Harrington 1962:viii). Today, the names Gabrielino, Tongva, or Gabrielino Tongva seem to be the preferred references of the indigenous groups from the Los Angeles Basin. The name Gabrielino Tongva will be used for the purposes of this staff assessment, except when referring to specific tribal entities that identify by other names.

The proposed AEC is located in the coastal portion of the Gabrielino Tongva's mainland territory and adjacent to the, now channelized, San Gabriel River, about 1.5 miles north of where the San Gabriel River empties into the Pacific Ocean. Various historians and anthropologists provide maps of Gabrielino Tongva ethnographic village and camp locations (Heizer 1968:Map; Johnston 1962:Map; Kroeber 1976:Plate 57). All of the maps and accompanying text previously mentioned identify a village that is about 0.5 miles north-northwest of the AEC. The village name, provided in the literature variously as 'Puvunga', 'Pubunga', 'Puvú, 'Pubuna', 'Povuu'nga' and 'Pubu' is located on Alamitos Mesa. Additional information concerning this village site is discussed under "Cultural Resource Descriptions and Significance Evaluations" below.

[5] Voids in a stratum that filled with soil particles after plant roots decomposed.

## Contemporary Tribal Entities with Ethnographic Affiliations

There are various Gabrielino Tongva tribes, nations and other organizations. Names are very similar and it is difficult at first glance to differentiate between the groups. The Native American Heritage Commission (NAHC) list provided to staff (Singleton 2014) provides additional tribal names that represent Gabrielino Tongva people and culture. Tribal entities are listed below.

- Gabrielino Band of Mission Indians – Kizh (Kitc) Nation
- Gabrielino/Tongva San Gabriel Band of Mission Indians
- Gabrielino/Tongva Nation
- Gabrielino-Tongva Tribe
- Gabrielino/Tongva Indians of the California Tribal Council
- Tongva Ancestral Territorial Tribal Nation
- Ti'at Society/Intertribal Council of Pimu
- Los Angeles City/County Native American Indian Commission

Staff provides additional information about traditional Gabrielino culture and current tribal entities in **Cultural Resources Appendix CR-1**.

# HISTORIC SETTING

The historic period of the project vicinity can be divided into three major periods: the Spanish (1769–1821), Mexican (1822–1848), and American (1848–present) periods. The Spanish built 21 missions in California and established a series of fortified pueblos. Pasture lands were divided among the missions and beneficiaries who were awarded land grants by the Spanish and Mexican governors of Alta California. These beneficiaries were often former soldiers or others who had served the government. In 1784, Pedro Fages, Spanish governor of California at that time, granted 300,000 acres, which included today's Long Beach area, to Manuel Nieto, as a reward for his military service. Nieto built an adobe home and raised cattle, sheep, and horses on his Rancho Los Coyotes.

The Mexican Period was characterized by land grants and ranchos awarded by Mexican Governor Juan Bautista Alvarado. In 1822, Mexico achieved independence from Spain, and California became an outpost of the Mexican Republic. In 1834, Nieto's Rancho Los Coyotes was divided into five smaller ranchos. American settlers in the 1840's were granted citizenship and some obtained land grants in the greater Long Beach area. War broke out between the United States and Mexico in May 1846. The American victory over Mexico was formalized in February 1848 with the signing of the Treaty of Guadalupe Hidalgo, and Mexico ceded all its land holdings above the Gila and Rio Grande rivers, including California, to the United States.

The early American period was characterized by ranching, providing cattle products to the northern Gold Rush settlers. Two ranchos, Rancho Los Cerritos and Rancho Los Alamitos, were predominant in the Long Beach area. In 1884, the town of Long Beach was laid out to occupy the southwest corner of the Rancho Los Cerritos. The City of Long Beach was incorporated on February 10, 1888. In the early twentieth century, Long Beach's economy was built upon shipbuilding, the development of a successful harbor and transportation hub, and oil production. Today, the city of Long Beach is the sixth largest city in California, has a population of over 470,000 people and spans 50 square miles.

More detailed historic period information and citations are included in **Cultural Resources Appendix CR-1**.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

### California Environmental Quality Act

CEQA and the State CEQA Guidelines define significant cultural resources under two regulatory constructs: historical resources and unique archaeological resources. An historical resource is defined as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR [California Register of Historical Resources]", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code," or "any object , building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record." (Cal. Code Regs., tit. 14, § 15064.5[a].) Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the National Register of Historic Places (NRHP) and California Registered Historical Landmarks from No. 770 onward (Pub. Resources Code, § 5024.1[d]).

Under CEQA, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. In addition to being at least 50 years old,[6] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

[6] The Office of Historic Preservation (OHP 1995:2) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852[c]).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code, sections 5020.1(j) and 5024.1.

Archaeological artifacts, objects, or sites can meet CEQA's definition of a unique archaeological resource, even if it does not qualify as a historical resource (Cal. Code Regs., tit. 14, § 15064.5[c][3]). Archaeological artifacts, objects, or sites are considered unique archaeological resources if "it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person." (Pub. Resources Code, § 21083.2[g].)

To determine whether a proposed project may have a significant effect on the [cultural resources] environment, staff analyzes the proposed project's potential to cause a substantial adverse change in the significance of historical or unique archaeological resources. The magnitude of an impact depends on:

- The cultural resource affected;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact will change those integrity appraisals.

The State CEQA Guidelines define a substantial adverse change as “physical demolition, destruction, relocation or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired” (Cal. Code Regs., tit. 14, § 15064.5[b]).

### California Native American Tribes, Lead Agency Tribal Consultation Responsibilities, and Tribal Cultural Resources

Assembly Bill 52 (AB 52) amended CEQA to define California Native American tribes, lead agency responsibilities to consult with California Native American tribes, and tribal cultural resources. “California Native American tribe” means a “Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission [NAHC] for the purposes of Chapter 905 of the Statutes of 2004” (Pub. Resources Code, § 21073). Lead agencies implementing CEQA are responsible to conduct tribal consultation with California Native American tribes about tribal cultural resources within specific time frames, observant of tribal confidentiality, and if tribal cultural resources could be impacted by project implementation, are to exhaust the consultation to points of agreement or termination.

Tribal cultural resources, a type of historical resource, are either of the following.

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following.
    a. Included or determined to be eligible for inclusion in the CRHR.
    b. Included in a local register of historical resources as defined in the Public Resources Code, section 5020.1(k).
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in the Public Resources Code, section 5024.1(c). In applying the aforesaid criteria, the lead agency shall consider the significance of the resource to a California Native American tribe. (Pub. Resources Code, § 21074[a].)

A cultural landscape that meets the criteria of Public Resources Code, section 21074(a), is a tribal cultural resource to the extent that the landscape is geographically defined in terms of its size and scope (Pub. Resources Code, § 21074[b]).

Historical resources, unique archaeological resources, and non-unique archaeological resources, as defined at Public Resources Code, sections 21084.1, 21083.2(g), and 21083.2(h) may also be a tribal cultural resource if they conform to the criteria of Public Resources Code, section 21074[a], two paragraphs above.

This final staff assessment (FSA), therefore, assesses the proposed project’s impacts on all types of historical resources and unique archaeological resources.

AB 52 also amended CEQA to state that a project with an impact that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment (Pub. Resources Code, § 21084.2).

## HISTORICAL RESOURCES INVENTORY

The development of the inventory of historical resources in and near the proposed AEC is the requisite first step in the assessment of whether the AEC would cause a substantial adverse change in the significance of a historical resource, and could, therefore, have a significant effect on the environment (Pub. Resources Code, § 21084.1). The effort to develop the inventory for the proposed AEC involved a sequence of investigatory phases that includes background research, consultation with local Native American communities, primary field research, interpretation of the results of the inventory effort as a whole, and evaluation of the significance of cultural resources found in the PAA. This section discusses the methods and the results of each inventory phase, develops the historical resources inventory for the analysis of the proposed AEC, and interprets the inventory to assess how well it represents the cultural resources in the PAA.

### Project Area of Analysis

The PAA defines the geographic area in which the proposed project has the potential to affect cultural resources. Effects may be immediate, further removed in time, or cumulative. They may be physical, visual, auditory, or olfactory in character. The PAA may or may not be one uninterrupted expanse. It could include the project area, which would be the site of the proposed plant (project site), the routes of requisite transmission lines and water and natural gas pipelines, and other offsite ancillary facilities, in addition to one or several discontiguous areas where the project could be argued to potentially affect cultural resources.

Staff defines the AEC's PAA as comprising (a) the proposed project site and new process water/sanitary wastewater pipeline, (b) an ethnographic study area, and (c) an architectural study area set one parcel beyond the proposed project site.

Staff defines the archaeological component of the PAA as the proposed project site and the new process water/sanitary wastewater pipeline, with a 200-foot buffer surrounding the project site and a 50-foot buffer around the proposed pipeline. Demolition and excavation are proposed within the project site to variable depths. The applicant expects much of the construction-related excavation to reach as deep as 10–20 feet below the current ground surface, except for the driving of foundation piles, which would require ground disturbance to approximately 50 feet below finished grade (AES 2015a:5.3-24–5.3-25, 5.8-5; Ninyo & Moore 2011:22–23). Other construction activities would involve digging to various depths (see **Cultural Resources Appendix CR-1, Table 1**). This information defines the vertical limits of the PAA. The PAA for archaeological resources is presented in **Cultural Resources Figure 1**.

For ethnographic resources, the PAA is expanded to take into account sacred sites, tribal cultural resources, traditional cultural properties (places), and larger areas such as ethnographic landscapes that can be vast and encompassing, including viewsheds that contribute to the historical significance of such historical resources. The NAHC assists project-specific cultural resources consultants and agency staff in identifying these resources, and consultation with Native Americans and other ethnic or community groups may contribute to defining the area of analysis. For the proposed AES, staff identified one ethnographic resource in the area, the Puvunga Ceremonial Site Complex (PCSC), and so defined an area of analysis that includes Puvunga and the related village camp sites on Alamitos Mesa (**Cultural Resources Figure 2**).

In the urban context of the proposed AEC, the PAA for built environment resources is defined as the proposed project site, any linear facilities, and a buffer of a single parcel around the project site and facilities (**Cultural Resources Figure 3**). The proposed project site at the Alamitos Generating Station (AGS) consists primarily of buildings, structures, pavement, hardscape, and modest landscape elements, most of which date to the historic period. To the north of the AGS, the PAA includes a vacant lot between the Los Cerritos Channel and the San Gabriel River, and the existing Southern California Edison (SCE) Switchyard, constructed during the late 1950s concurrent with the AGS. To the east, the PAA includes a segment of the San Gabriel River and the Haynes Generating Station (HGS) property on the east side of the river. To the south of the project site, the PAA includes an industrial parcel, ending at Westminster Boulevard/2nd Street. To the west, the PAA includes a segment of the Los Cerritos Channel and two residential parcels in the southeast corner of the University Park Estates subdivision.

## Background Research

The background research for the FSA employs information that the applicant and Energy Commission staff gathered from literature and record searches, and information that staff obtained as a result of consultation with affiliated Native American entities. The purpose of the background information is to help formulate the initial cultural resources inventory for the present analysis, to identify information gaps, and to inform the design and the interpretation of the field research that will serve to complete the inventory.

### Literature Review and Records Search

The literature review and records search are purposed to gather and interpret documentary evidence of the known cultural resources in the PAA. The source for the present search was the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System.

CH2M Hill Engineers (CH2M) archaeologist, Gloriella Cardenas, requested a records search from the SCCIC for the proposed AEC on August 30, 2011 (Noyes 2011:1). The records search covered the proposed AEC and a 1-mile buffer around it (AES 2013:5.3-20; AES 2015a:5.3-18). The records search, conducted by SCCIC staff on August 31, 2011 (SCCIC # 11786.8528), included examinations of the SCCIC's base maps of previous cultural resource studies and known cultural resources as well as:

- The NRHP listings.

- The CRHR listings.
- California Historical Landmarks listings.
- California Points of Historical Interest listings.
- Historic Property Data File (Noyes 2011:1; OHP 2011:204; OHP 2012:256–269).
- Archeological Determinations of Eligibility (COHP 2011:98, 2012a:101, 2012b:154, 156).
- Historic maps (COE 1942; USGS 1896). (Noyes 2011.)

CH2M also conducted a records search at the SCCIC on July 2, 2013 to ensure coverage of the proposed process/sanitary wastewater pipeline. This records search covered the proposed pipeline and a 0.5-mile buffer surrounding it. The same sources were consulted as listed above. CH2M conducted additional records searches on February 25, 2014 to answer staff data requests during the data adequacy review and discovery period. (AES 2014a:5.3-4, 2014b, 2015a:5.3-18.)

The literature review and records search indicate that 81 previous cultural resource studies have been conducted in the PAA. Of these, 12 cultural resource studies have been conducted within or adjacent to the archaeological and historic built environment portion of the PAA and 80 in the ethnographic portion of the PAA. These studies are tabulated and bibliographic information provided in **Cultural Resources Appendix CR-1, Tables 2–3**. The studies include an initial study/mitigated negative declaration (CLB, with Rincon 2010), a cultural resources overview of the city of Seal Beach (Stickel 1991), a cultural resources overview of the Southeast Area Development and Improvement Plan/Southeast Area Specific Plan (McKenna 2016), an archaeological resources protection plan for the Seal Beach Naval Weapons Station (Davy 1997a), four negative-findings cultural resource inventories (Billat 2003; Cardenas et al. 2012; McKenna 1990, 2001), a survey and NRHP evaluation of the Bixby Ranch Oil Field Office[7] (Strudwick et al. 1996), a salvage excavation at CA-LAN-306/H (Zahniser 1974), an inventory and CEQA evaluation of the AGS Fuel Oil Tank Farm[8] (Strudwick 2004), and an inventory and CEQA evaluation of the project site (AES 2015a:Section 5.3; Cardenas et al. 2013).

The literature review and records search indicate that a total of 98 cultural resources have been previously recorded in the records search area (**Cultural Resources Appendix CR-1, Table 4**). Of these, thirty-one are located in the PAA (**Cultural Resources Table 2**).

[7] P-19-187657.

[8] P-19-186880.

## Cultural Resources Table 2
## Literature Review Results: Previously Recorded Cultural Resources in the PAA

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| **Archaeological Resources** | | | | | |
| P-19-000234 (CA-LAN-234/H) | Prehistoric and historic | Shell, lithic debitage, human remains | Ethnographic PAA | NRHP/CRHR listed | Dixon 1960a, 1973; Leonard 1974; Mellon 1981; Noguchi and Wilson 1979; Sutherland 1981 |
| P-19-000235 (CA-LAN-235/H) | Prehistoric and historic | Human remains, shell, lithic debitage | Ethnographic PAA | NRHP/CRHR listed | Dixon 1960b, 1973; Noguchi and Wilson 1979 |
| P-19-000272 (CA-LAN-272) | Prehistoric human remains | Deeply buried human skull | Ethnographic PAA | Unevaluated | Brooks et al. 1965 |
| P-19-000274 (CA-LAN-274) | Prehistoric archaeological site | Shell fragments | Ethnographic PAA | Unevaluated | Dixon 1961 |
| P-19-000306 (CA-LAN-306) | Prehistoric archaeological site | Puvunga Indian Village: midden, shell, manos, pestles, metate fragments, steatite bowls, bifaces, projectile points, debitage, shell ornaments, asphaltum, stone disc and shell beads | Ethnographic PAA | NRHP/CRHR listed | Dixon 1964, 1973; Milliken et al. 1997; Noguchi and Wilson 1979 |
| P-19-100485 | Prehistoric archaeological site | Shell bead scatter | Ethnographic PAA | | Mason 2009a:Table 1 |
| P-19-120038 (Trace A) | Prehistoric archaeological site | Midden | Ethnographic PAA | Unevaluated | CSULB 1977a |
| P-19-120045 (Trace H) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Ethnographic PAA | Unevaluated | CSULB 1977b; Mason 2009a:Table 1 |
| P-19-120048 (Trace K) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Ethnographic PAA | Unevaluated | CSULB 1977c; Mason 2009a:Table 1; Underwood 1993 |
| P-19-120049 (Trace L) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Ethnographic PAA | Unevaluated | CSULB 1977d; Mason 2009a:Table 1; Underwood 1993 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-19-120050 (Trace B – second location) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Ethnographic PAA | Unevaluated | CSULB 1977e; Mason 2009a:Table 1 |
| P-30-000143 (CA-ORA-143)/P-30-000265 (CA-ORA-265), Landing Hill #10 | Prehistoric archaeological site/historic ranch house and structures (the latter not formally recorded) | Shell midden, burials, steatite bowl fragments, hammerstone, bone, scrapers, siltstone charmstone, fossil bone, rubbing stones, obsidian and CCS debitage, shell bead, effigy, points, manos, pestles, drills, bowl mortars, metates, maul, shell; buildings and structures | Ethnographic PAA | Destroyed in 1960s | Brotman 1965a, 1965b; Davy 1997b; McKinney 1964, 1969a; Redwine 1958; Singer 1965 |
| P-30-000256 (CA-ORA-256), Landing Hill #1 | Prehistoric archaeological site | Midden, shell | Ethnographic PAA | Destroyed about 1958 | McKinney 1969b; Redwine 1958; SRS 1981; Stickel 1996a, 1996b |
| P-30-000257 (CA-ORA-256), Landing Hill #2 | Prehistoric archaeological site | Two manos, two metate fragments, two pieces of worked stone | Ethnographic PAA | Destroyed about 1958 | McKinney 1969c; Redwine 1958; SRS 1981; Stickel 1996a, 1996c |
| P-30-000258 (CA-ORA-258), Landing Hill #3 | Prehistoric archaeological site | Possible hearth, shell, metates, manos, hammerstones, mortars, pestles, polishing stones, projectile points, grooved axe | Ethnographic PAA | Destroyed about 1958 | PCAS 1969; Redwine 1958; SRS 1981; Stickel 1996a, 1996d |
| P-30-000259 (CA-ORA-259), Landing Hill #4 | Prehistoric archaeological site | Shell midden, metates, manos, mortars, hammerstone, polishing stone, projectile point, blade, chert debitage, worked stone, faunal bone | Ethnographic PAA | Unevaluated | McKinney 1969d; Redwine 1958; Stickel 1996a, 1996e |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-000260 (CA-ORA-260), Landing Hill #11 | Prehistoric archaeological site, possible ceremonial site | Domestic habitation (Millingstone–Intermediate period occupation), shell, metate, net weight, burnt bone, manos, mortars, stone fragments, ground flakes | Ethnographic PAA | Significant, regulatory criteria unstated | Cleland et al. 2007; Flaherty and Stickel 1996; McKinney 1996e; Redwine 1958; SRS 1981; Stickel 1996a, 1996f; York et al. 1997 |
| P-30-000261 | Prehistoric archaeological site | Shell midden, metate, human remains; Late Intermediate Period occupation | Ethnographic PAA | Significant, regulatory criteria unstated | Cleland et al. 2007; SRS 1981; York et al. 1997 |
| P-30-000262 (CA-ORA-262), Landing Hill #7 | Prehistoric archaeological site | Campsite, shell midden, mano, hammerstones, pestle, human remains; Millingstone and Late Prehistoric–Protohistoric occupations | Ethnographic PAA | Significant, regulatory criteria unstated | Cleland et al. 2007; McKinney 1969f; Redwine 1958; SRS 1981; Stickel 1996a, 1996g; York et al. 1997 |
| P-30-000263 (CA-ORA-263), Landing Hill #8 and P-30-000852 (CA-ORA-852), Area 5 | Prehistoric archaeological site | Shell midden, manos, pestle chopper, bone awl, human burials & cremations; Millingstone and Intermediate period occupations; Late Prehistoric ceremonial use | Ethnographic PAA | Significant, regulatory criteria unstated | Cleland et al. 2007; Colquehoun n.d.a; McKinney 1969g; Redwine 1958; SRS 1981; Stickel 1996a, 1996h, 1996k; York et al. 1997 |
| P-30-000264 (CA-ORA-264), Landing Hill #9 | Prehistoric archaeological site | Occupation site with human remains, shell, metates, manos, mortars, pestles, hammerstones, pelican stone, cog stone, medicine tube; Millingstone–Late Prehistoric | Ethnographic PAA | Significant, regulatory criteria unstated | Cleland et al. 2007; McKinney 1969h; Redwine 1958; York et al. 1997 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-000298 (CA-ORA-298), Hog Island | Prehistoric archaeological site | Shell scatter, metate | Ethnographic PAA | Recommended NRHP-eligible (Criterion D) | Clevenger et al. 1993 |
| P-30-000322 (CA-ORA-322) and P-30-001118 (CA-ORA-1118) | Prehistoric archaeological site | Midden, shell midden, shell, bone tool, bone fragments core, CCS debitage, potsherd | Ethnographic PAA | Recommended NRHP-eligible (Criterion D) | Clevenger and Crawford 1997; Clevenger et al. 1993 |
| P-30-000850 (CA-ORA-850), Area 3 | Prehistoric archaeological site | Shell scatter | Ethnographic PAA | Not evaluated | Colquehoun n.d.b Stickel 1996a, 1996i; York et al. 1997 |
| P-30-000851 (CA-ORA-851), Area 4 | Prehistoric archaeological site | Shell scatter, CCS flake or core | Ethnographic PAA | Not evaluated | Colquehoun n.d.c Stickel 1996a, 1996j; York et al. 1997 |
| P-30-001352 (CA-ORA-1352) | Prehistoric archaeological site | Redeposited shell scatter | Ethnographic PAA | Capped by building | Mason 2009a:Table 1 |
| P-30-001455 | | | Ethnographic PAA | | |
| P-30-001502 (CA-ORA-1502) | Prehistoric archaeological site | Shell midden, human remains, stone disk, manos, mortars, cores, debitage | Ethnographic PAA | Recommended eligible for NRHP | Mason 2009a, 2009b |
| P-30-001505 | Prehistoric archaeological site | Shell, debitage | Ethnographic PAA | | Mason 2009a:Table 1 |
| P-30-001568 (CA-ORA-1568) | Prehistoric archaeological site | Shell, burned animal bone, debitage | Ethnographic PAA | | Mason 2009a:Table 1 |
| ***Historic Built Environment Resources*** | | | | | |
| P-19-186880 | Historic industrial structures | AGS Fuel Tank Farm | PAA (1-parcel buffer): 609 N. Studebaker Rd | NRHP/CRHR-ineligible, 2004 (demolished 2010) | AES 2013:5.3-25; Cardenas et al. 2013; Strudwick 2004 |

Notes: AGS = Alamitos Generating Station; CA = California; CCS = cryptocrystalline silicate stone (chert, jasper, etc.); CRHR = California Register of Historical Resources; CSULB = California State University, Long Beach; LAN = Los Angeles County; NRHP = National Register of Historic Places; ORA = Orange County; PAA = project area of analysis; PCAS = Pacific Coast Archaeological Society; Rd = Road; SRS = Scientific Resource Surveys

The records search and literature review indicates that 88 archaeological resources have been identified within the 1-mile buffer surrounding the proposed AEC, but outside the archaeological component of the PAA. The previously recorded archaeological resources consist of 79 prehistoric archaeological resources, two historic archaeological resources, six archaeological resources containing prehistoric and historic materials, and one archaeological resource of unknown properties.

Prehistoric archaeological resources in the records search area include shell middens, middens, lithic scatters, human remains (including isolated human remains), ochre deposits, villages (including an NRHP-eligible district), ceremonial locations, redeposited and redistributed middens, and refuse pits. Archaeological resources with both prehistoric and historic archaeological components consist of glass and ceramic scatters among shell scatters, and human remains. Historic archaeological resources consist of refuse deposits. Thirteen of the previously recorded archaeological resources were identified in buried contexts, with no surface indication of their presence (P-19-000272, P-19-000705, P-19-001000, P-19-002616, P-19-002629, P-19-002630, P-30-001542, P-30-001644, Burial 4, Burial 23, Burial 25, Burial 31, and Prehistoric Trash Pit). (**Cultural Resources Table 2; Cultural Resources Appendix CR-1, Table 4**.)

Within the 1-mile literature review and records search area, the applicant identified seven previously recorded built environment resources of historic age (AES 2015a:Table 5.3-2). The resources include residential, commercial, industrial, civic, and military properties. Three of these resources have not been previously evaluated; one is listed on the NRHP and is, therefore, automatically listed in the CRHR, one is a California Historical Landmark (CHL) and is also automatically listed in the CRHR; two have been determined ineligible for the NRHP; and one was determined ineligible for the NRHP and CRHR and subsequently demolished. These resources, along with a brief description and location of each, are included in **Cultural Resources Table 2** and **Cultural Resources Appendix CR-1**, **Table 4**.

The applicant's literature review identified one previously recorded built environment resource of historic age (45 years or older as of the date of the survey) within the PAA: the AGS Fuel Tank Farm (P-19-186880). The large-capacity petroleum storage tank farm was built in 1955 as part of the original AGS. The resource consisted of four large-capacity storage tanks, each 40 feet in height and 60 feet in diameter (Strudwick 2004). The tank farm, located adjacent to the project site, was recorded by Ivan Strudwick in 2004 and determined ineligible for both the NRHP and CRHR. The tanks were removed in 2010. Since all of the associated structures have been removed, the tank farm is no longer considered a historic built environment resource by the applicant or staff and is not included in staff's analysis of potential impacts.

### Additional Literature Review

CH2M contacted the County of Los Angeles Department of Regional Planning and the City of Long Beach Development Services as part of their literature search efforts (AES 2015a:5.3-18; Cardenas et al. 2013:3-1; Hungerford 2011).

Staff conducted an online search for proposed projects and environmental impact analyses using the websites of the cities of Long Beach and Seal Beach, Seal Beach Naval Weapons Station, Los Angeles Department of Water and Power, and County of Orange. The purpose of this search was to identify cultural resource analyses that might not have been submitted to the SCCIC or were submitted after August 31, 2011 or July 2, 2013.

Staff consulted the City of Long Beach Planning website[9] and Long Beach Heritage website[10] for a map and list of designated historic districts and historic landmarks. Staff confirmed through those sources that no designated historic districts are present within a 1-mile radius of the proposed AEC. However, one City of Long Beach Historic Landmark—the Rancho Los Alamitos adobe ranch house and gardens and site of Puvunga Village—is located less than 0.5 mile northwest of the proposed AEC. This resource was identified by the applicant as listed on the NRHP and is included in **Cultural Resources Appendix CR-1**, **Table 4**.

Staff also consulted the California Office of Historic Preservation website (http://ohp.parks.ca.gov/ListedResources/) for the status of the listing of resources on the NRHP, CRHR, California Points of Historical Interest, and CHL. No additional historic built environment resources within the review area were identified through that search. The City of Seal Beach in Orange County, located within the 1-mile literature search radius, established a Historic Preservation Committee on August 10, 2015 with the adoption of Resolution 6591. The purpose of the Committee is to advise the City Council in the protection and preservation of certain archaeological, paleontological, and historical resources. The City of Seal Beach General Plan of December 2003 calls for the establishment of a City Inventory of Historic and Cultural Landmarks (City of Seal Beach 2003). However, the City of Seal Beach does not currently maintain a list of designated historical resources.

Staff also consulted the California Department of Transportation's (Caltrans) Bridge Inventory regarding bridges within the PAA. That research identified three previously evaluated bridges within the PAA dating to the historic period that were not identified by the applicant in their literature review in the AFC (AES 2013), Data Adequacy Supplement (AES 2014a), or SAFC (AES 2015a). These three historic built environment resources are summarized in **Cultural Resources Table 3** below.

**Cultural Resources Table 3**
**Built Environment Resources in the Literature Search Area Not Summarized by Applicant**

| No. | Resource Designation | Type & Description | Location | Year Built | Local/NRHP/CRHR Status |
|---|---|---|---|---|---|
| **Long Beach** | | | | | |
| 1 | Bridge 1563 (Caltrans' Bridge 53C0801L and R). | Transportation: concrete vehicular bridge | *PAA (1-parcel buffer)*; over AGS's North Intake Channel on Studebaker Road | 1966 | Determined ineligible for NRHP by Caltrans (2015) |
| 2 | Bridge 3460 (Caltrans' Bridge 53C0802L and R). | Transportation: concrete vehicular bridge | *PAA (1-parcel buffer)*; over AGS's South Intake Channel on Studebaker Road | 1966 | Determined ineligible for NRHP by Caltrans (2015) |
| 3 | Bridge 2750 (Caltrans' Bridge 53C0730). | Transportation: concrete vehicular bridge | *PAA (1-parcel buffer)*; over Los Cerritos Channel on Loynes Drive | 1966 | Determined ineligible for NRHP by Caltrans (2015) |
| Abbreviations: AGS = Alamitos Generating Station; Caltrans = California Department of Transportation; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places; PAA = project area of analysis | | | | | |

[9] http://www.lbds.info/planning/historic_preservation/historic_landmarks.asp

[10] http://www.lbheritage.org

Staff conducted additional research at the Energy Commission library through inter-library loans services, California History Room of the California State Library in Sacramento, and online sources, as well as consulted the reports contained in the applicant's records searches to improve the historic map coverage acquired by the applicant (AES 2015a; Cardenas et al. 2013:3-1, Appendix 5.3C). The purpose of this research was to obtain a visual understanding of the natural and cultural development of the land in and around the PAA, identify locations of potential historic built environment and archaeological resources, and have a partial, chronological record of disturbances in the PAA. To this end, staff attempted to locate detailed maps of the PAA at 10-year intervals[11], beginning about A.D. 1769 and moving toward the present. All consulted historic maps are presented in **Cultural Resources Table 4**.

Staff conducted ethnographic research at Loyola Marymount University's Special Collections in Los Angeles, and also retrieved additional cultural resources technical reports and DPR forms from the SCCIC at California State University, Fullerton.

**Cultural Resources Table 4**
**Historic Maps Consulted**

| Map Name | Scale | Survey Date | Reference |
|---|---|---|---|
| Plat of Rancho Los Alamitos | 1 inch = 40 chains | About 1873 | GLO 1873 |
| Downey Sheet | 1 inch = 1 mile | 1893–1894 | USGS 1896 |
| Southern California, Sheet 1 | 1:250,000 | About 1901 | EDR 2011b |
| Downey Quadrangle | 1 inch = 5,208 feet | About 1902 | EDR 2011b |
| Plat of Township 5 South Range 12 West | 1 inch = 40 chains | 1914 | GLO 1914 |
| Long Beach | 1 inch = 2,000 feet | About 1925 | EDR 2011b |
| Aerial Photograph | 1 inch = 500 feet | 1928 | EDR 2011a |
| Aerial Photograph | 1 inch = 555 feet | 1938 | EDR 2011a |
| Downey Quadrangle | 1 inch = 1 mile | Surveyed 1923, aerial photographs taken 1941 | COE 1942 |
| Aerial Photograph | 1 inch = 666 feet | 1947 | EDR 2011a |
| Downey Quadrangle | 1:50,000 | About 1947 | EDR 2011b |
| Los Alamitos Quadrangle | 1 inch = 2,000 feet | About 1950 | EDR 2011b |
| Long Beach Vicinity Quadrangle | 1 inch = 2,000 feet | About 1951 | EDR 2011a |
| Aerial Photograph | 1 inch = 400 feet | 1956 | EDR 2011a |
| Los Alamitos | 1 inch = 2,000 feet | About 1964 | EDR 2011b |
| Aerial Photograph | 1 inch = 480 feet | 1968 | EDR 2011a |
| Los Alamitos Quadrangle | 1 inch = 2,000 feet | About 1972 | EDR 2011b |
| Aerial Photograph | 1 inch = 666 feet | 1976 | EDR 2011a |
| Los Alamitos Quadrangle | 1 inch = 2,000 feet | About 1981 | EDR 2011b |
| Aerial Photograph | 1 inch = 666 feet | 1989 | EDR 2011a |
| Aerial Photograph | 1 inch = 500 feet | 1994 | EDR 2011a |
| Aerial Photograph | 1 inch = 500 feet | 2005 | EDR 2011a |
| Abbreviations: COE = Corps of Engineers; EDR = Environmental Data Resources; GLO = General Land Office; USGS = U.S. Geological Survey | | | |

[11] Five- to 10-year intervals are widely regarded as a reasonable basis on which to observe mapped changes in landscapes and settlement patterns in historical research (Conzen 1990:189).

### Native American Consultation

The Governor's Executive Order (E.O.) B-10-11, executed on September 19, 2011, directs state agencies to engage in meaningful consultation with California Indian Tribes on matters that may affect tribal communities. The California Resources Agency has adopted a Final Tribal Consultation Policy on November 20, 2012. The adopted policy exhorts informed decision making by collaboratively working with tribes to seek positive, achievable, and durable outcomes. The Energy Commission tribal consultation policy, adopted in December 2014, furthers the Energy Commission's effort to engage in effective dialogue concerning proposed power facility potential impacts to cultural resources of concern to tribes. Because the AES application was submitted prior to July 1, 2015, the AB 52 CEQA consultation procedures do not apply to this proceeding. In addition to agency requirements to consult tribes, the Energy Commission Siting Regulations require applicants to contact the NAHC for information on Native American sacred sites and a list of Native Americans interested in the project vicinity. The applicant is then required to notify those Native Americans on the NAHC's list about the project and include a copy of all correspondence with the NAHC and Native Americans, including any written responses received, as well as a written summary of any oral responses in the SAFC (Cal. Code Regs., tit. 20, § 1704[b][2], Appendix B[g][2][D]).

The NAHC is the primary California government agency responsible for identifying and cataloging Native American cultural resources, providing protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction, and preventing irreparable damage to designated sacred sites and interference with the expression of Native American religion in California. It also provides a legal means by which Native American descendents can make known their concerns regarding the need for sensitive treatment and disposition of Native American burials, skeletal remains, and items associated with Native American burials.

The NAHC maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands database has records for areas, places, sites, and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specific areas.

#### *Applicant's Methods*

The applicant's consultant, CH2M, contacted the NAHC on August 26, 2011 and requested a search of the Sacred Lands File and a list of Native American contacts in the project vicinity. The NAHC responded on August 31, 2011 that no Native American cultural resources were identified in the project area and provided a list of Native American representatives for CH2M to contact. CH2M sent letters to the representatives on this list on September 2, 2011, and made follow-up telephone calls on September 21 and 23, 2011 (to the Gabrielino/Tongva San Gabriel Band of Mission Indians), as well as March 16, 2012 (to all other NAHC-listed contacts). (AES 2013:5.3-30, Appendix 5.3A; AES 2015a:5.3-27; Cardenas et al. 2013:3-3.)

### *Staff's Methods*

In an effort to conduct an independent analysis of ethnographic resources, staff requested information from the NAHC on the presence of sacred lands in the vicinity of the proposed project, as well as a list of Native Americans to whom inquiries should be sent to identify both additional cultural resources and any concerns the Native Americans may have about the proposed AEC.

Staff contacted the NAHC on March 10, 2014 and requested a search of the Sacred Lands File and a Native American contacts list. The NAHC responded on March 11, 2014 with a list of Native Americans interested in consulting on development projects in the project area. A check of the NAHC sacred lands files resulted in negative findings within the project site. Staff sent letters to all of the NAHC-listed tribes on April 1, 2014 inviting them to comment on the proposed AEC and offered to hold face-to-face consultation meetings if any tribal entities so requested. Staff made follow-up phone calls on April 30 and May 1, 2014. Subsequent email and phone conversations also occurred on May 6 and 16, 2014. Staff met with Gabrielino Tongva individuals and groups on June 6 and 7, 2014.

In November of 2014, the applicant obtained a power purchase agreement which necessitated the submission of an SAFC, filed in October of 2015. Staff contacted interested tribes with updates during the 11 month period, and again formally contacted them in November of 2015 regarding the SAFC. No responses have been received. Staff also notified the interested tribes by email when the preliminary staff assessment (PSA) was published and the PSA workshop announced.

### *Results*

The tribes and organizations contacted by the applicant's consultant did not reply with any comments regarding potential impacts from the proposed AEC (AES 2015a:5.3-27; Cardenas et al. 2013:3-3).

Staff received several comments from tribal entities that because the project region is highly sensitive for cultural resources (specifically, the sites and burials at Landing Hill south of the project site and at LeisureWorld, east of the project site, were mentioned), tribal monitors should be required during project ground-disturbing activities, and that the project should proceed with caution. Additionally, several responses were received that expressed concern regarding potential impacts to the ceremonial site of Puvunga, which was the focus of meetings held on June 6–7, 2014.

## Consultation with Others

The applicant contacted the Los Alamitos Museum Association, Historical Society of Long Beach, Long Beach Heritage Coalition, Historical Society of Southern California, County of Los Angeles Department of Regional Planning, and City of Long Beach Development Services (AES 2015a:5.3-27–5.3-28; Cardenas et al. 2013:3-4). That consultation was performed via written correspondence and, in the case of the City of Long Beach, via phone calls. The consultation performed by the applicant sought information regarding historical resources or values within the project area or concerns regarding issues related to the overall project. Documentation of agency consultation performed by the applicant is provided as Appendix 5.3A of the SAFC (AES 2015a).

The documentation provided indicates that only the City of Long Beach Development Services responded to the applicant's consultation efforts, informing the applicant that the City's Historic Landmark List of significant properties was located online.

Staff consulted with the Los Angeles County Department of Public Works and Los Angeles District of the U.S. Army Corps of Engineers by phone on June 23, 2014. The purpose of the calls was to identify whether staff at either of the two agencies responsible for management of the San Gabriel River were aware of prior inventory and evaluations of the engineered portions of the river as a historic built environment resource. Both agencies responded that they were unaware of any prior inventory studies or CRHR/NRHP evaluations or determinations of eligibility for the San Gabriel River.

Staff visited the Rancho Los Alamitos and consulted with rancho personnel. Rancho Los Alamitos staff gave Energy Commission staff documents, briefed them regarding contemporary Native American use of the Rancho, and gave staff a valuable tour of the grounds.

### Environmental Justice/Socioeconomic Methods

In accordance with federal and state law, regulations, policies, and guidance, staff considered the proposed project's potential to cause disproportionate significant adverse impacts to environmental justice (EJ) populations (E.O. 12898; 40 C.F.R. §§ 1508.8, 1508.14; Cal. Code Regs., tit. 14, §§ 15064(e), 15131, 15382; Cal. Code Regs., tit. 14, § 1704(b)(2), App. B(g)(7); CEQ 1997). **Socioeconomics Figure 1** shows the presence of an EJ population based on race and ethnicity within the 6-mile radius; **Socioeconomics Table 5** shows that the cities of Long Beach and Hawaiian Gardens have below-poverty-level populations large enough to be considered EJ populations. Please refer to the **Socioeconomics** section of this document for a full explanation of how staff determines the presence of EJ populations. In addition, staff reviewed the ethnographic and historical literature, and corresponded with Native American tribes, to determine whether any additional EJ populations use or reside in the PAA. These efforts are documented in the "Ethnographic Setting" and "Native American Consultation" subsections of this FSA. Based upon additional review staff concludes that there is not an EJ impact to Native Americans.

## Cultural Resources Distribution Models

One critical use of the background research is to inform the design and the interpretation of the field investigation that will complete the cultural resources inventory for the analysis. A further role of background research is to help develop predictive or anticipatory models of the distribution of cultural resources across the PAA. Such models of the types and patterns of archaeological, ethnographic, and built-environment resources, distributed across and beneath the surface of the landforms of the PAA, provide the means to tailor more appropriate research designs for the field investigations that will complete a cultural resources inventory, and gauge the degree to which the results of those investigations reflect the actual population of archaeological, ethnographic, and built-environment resources in the PAA. Such models also provide important contexts for the ultimate interpretation of the results of those investigations.

Models of the distribution of prehistoric archaeological sites, ethnographic resources, and historical archaeological resources are developed here and draw on information in the “Environmental Setting,” “Prehistoric Setting,” “Ethnographic Setting,” “Historic Setting,” and “Background Research” subsections (this section and **Cultural Resources Appendix CR-1**). Staff formulated data requests during the discovery phase of the present certification process on the basis of these models to ensure the collection of enough information to factually support the conclusions of this analysis. The discussions in the “Interpretation of Results” subsection below also employ the models.

### Model of Prehistoric Archaeological Resources

The analysis of the information in the “Environmental Setting,” “Prehistoric Setting,” and “Background Research” leads to the hypotheses that the likelihood of prehistoric archaeological deposits across the surface of the PAA is low, and subsurface prehistoric archaeological deposits might be present in the archaeological component of the PAA.

Staff expects that the potential to encounter prehistoric archaeological resources on the surface of the archaeological portion of the PAA is low because most of it is paved.

Despite the low potential to identify prehistoric archaeological resources on the surface of the archaeological component of the PAA, staff hypothesizes that prehistoric archaeological resources might be found below the present ground surface. The archaeological component of the PAA is located primarily on an alluvial fan of the now-channelized San Gabriel River and partially on land that was marsh or wetland at the beginning of the twentieth century (Mesmer 1903:Soil Map). Fourteen previously recorded archaeological resources are identified in settings similar to the archaeological portion of the PAA, three of which are buried under 3–32 feet of fill and natural sediments (P-19-000272, P-30-001542, and P-30-001644). Prior to 5000–4500 B.P., mean sea level was lower and watercourses and other aquatic features were positioned differently than in modern times, altering the suitability of the archaeological resources PAA for human habitation. Since pre-5000–4500-B.P. landforms in the project vicinity are buried under the present land surface (unless eroded), staff assesses the potential to encounter buried prehistoric archaeological resources during construction.

The SAFC discloses that construction would extend 1–4 feet below engineered fill at the project site, while another section of the SAFC states that construction of the AEC could require excavations up to 20 feet below current grade (disturbing 10–14 feet of natural soils or sediments). Pile-driving for certain project components would disturb soils and sediments up to 50 feet below current grade. (AES 2015a:5.3-24–5.3-25, 5.8-5.)

Whether the applicant would encounter buried prehistoric archaeological deposits during construction depends on several factors, including the depositional character and the ages of the sedimentary deposits that construction would disturb, the presence of buried land surfaces or buried surfaces of paleosols[12], the duration or stability of any paleosols, the post-depositional character of geomorphic processes in the PAA, and the nature of past human activities in the area. Given the character (described in the preceding paragraphs) of the archaeological resources PAA, staff concludes that the archaeological resources PAA might contain buried archaeological resources.

### Model of Ethnographic Resources

Ethnography fulfills a supporting role for other anthropological disciplines as well as providing contributions on its own merits. For example, ethnography provides a supporting role to the discipline of archaeology by providing a cultural and historic context for understanding the people associated with the material remains of the past. By understanding the cultural milieu in which archaeological sites and artifacts were manufactured, used, or cherished, this ethnographic information can provide greater understanding for identification efforts, making significance determinations per the National Historic Preservation Act (NHPA) or CEQA, as applicable; eligibility determinations for the NRHP or the CRHR, as applicable; and for assessing if and how artifacts are subject to other cultural resources laws, such as the Native American Graves Protection and Repatriation Act.

In addition, ethnography has merits of its own by providing information concerning ethnographic resources that tend to encompass physical places, areas, or elements or attributes of a place or area. Ethnographic resources have overlap and affinity to historic preservation property types referred to as cultural landscapes, traditional cultural properties (TCPs), sacred sites, heritage resources, historic properties, or historical resources that are areas or places, and specific historic property or historical resource types of sites, objects, buildings, structures, districts, areas or places. There is notable overlap in terminology when referring to ethnographic resources. Studies that focus on specific ethnographic resource types may also take on names such as ethnogeography, ethnobotany, ethnozoology, ethnosemantics, ethnomusicology, etc. In general, the ethnographic endeavor attempts to minimize human conflict by facilitating an iterative cross-cultural understanding and, by extension, self-awareness.

#### *Ethnographic Resources*

While several definitions of ethnographic resources can be found in historic preservation literature, the National Park Service (NPS) provides the most succinct and commonly used definition (NPS 2007:Chapter 10):

> *Ethnographic resources are variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources "ethnographic" depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their life ways.*

[12] A term used in geology and geoarchaeology to refer to a former soil or stable surface preserved by burial underneath either natural or cultural deposits (Vogel 2002:29).

The term ethnographic resources can also include resources that are also referred to as tribal cultural resources, traditional cultural properties, sacred sites, cultural or ethnographic landscapes, heritage resources, historic properties, or historical resources that are sites, areas or places.

### *Traditional Cultural Properties/Places*

TCPs were defined in order to provide a layer of meaning, relevancy, and significance from a communal or localized perspective to the cultural resources profession that is otherwise dominated by archaeology and the knowledge and perspectives that archaeologists promote (King 2003:21–33). An explanation of "traditional cultural significance" is provided in the following quote from NPS Bulletin 38 (Parker and King 1998:1):

> *One kind of cultural significance a property may possess, and that may make it eligible for inclusion in the Register, is traditional cultural significance. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.*

Such places of traditional cultural significance can include: a location that a Native American group associates with their traditional beliefs concerning their origins, cultural history, or nature of the world; the buildings, structures, or patterns of land use that reflect the cultural tradition valued by the long-term residents of a rural community; a cultural group's traditional home in an urban environment that reflects its beliefs and practices; a location where ceremonial activities conducted by Native American practitioners have historically, or are known or thought to have occurred; or, a location where the economic, artistic, or other cultural practices that are important in maintaining a community's historic identity have traditionally been carried out (Parker and King 1998:1).

Thus, a property that is eligible for inclusion in the NRHP or CRHR because of its association with cultural practices or beliefs of a living community that "(a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" is a traditional cultural property (Parker and King 1998:1).

While the TCP definition provided in NPS Bulletin 38 addresses many types of special places, some confusion exists with language added during the 1992 amendments to the NHPA at Section 101(d)6. This section states that "properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may be determined eligible for inclusion on the National Register." The section further exhorts agencies to consult with Indian tribes and Native Hawaiians concerning the values that their communities may attach to special places. This has led some to erroneously interpret the Act's Section 101 language to limit TCPs to only Native Americans and Native Hawaiians. However, the specific language of the act does not prohibit diversity beyond the two specific ethnicities called out; but rather, affirms that Native Americans asserting TCPs during the consultation process must be considered.

Staff considers the terms “sacred site” to be different than the term TCP, although they are often used interchangeably, even when it is erroneous to do so. The term sacred site is derived from the American Indian Religious Freedom Act, Religious Freedom Restoration Act, and E.O. 13007. Without elaborating further on information concerning the history and resulting inter-relation of the acts and the order, suffice to say that E.O. 13007 provides the best guidance and definition of the term “sacred site”. E.O. 13007 calls for the federal government to accommodate access to, and ceremonial use of, sacred sites by Indian religious practitioners and to avoid adversely affecting the integrity of sacred sites through federal land manager actions (ACHP 2002). The definition is as follows:

> *Any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, an Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.*

Therefore, these two terms are not interchangeable because sacred sites can only be located on federal lands and the definition calls out the limited geographic extent of sacred sites as “specific, discrete [and] narrowly delineated.” However, TCPs are often identified as a result of federal undertakings and tend to be geographically more expansive than “specific, discrete [and] narrowly delineated sacred sites.” TCPs tend to be larger because aspects such as view shed and changes through time need to be considered when defining the boundaries of a TCP (Parker and King 1998:20).For the purposes of this analysis, the research focus is with Native American sites, places, and areas otherwise referred to as ethnographic resources, located in and around the proposed project area. Having said this, and based upon the discussion provided above, the reader should be aware that there are multiple overlaps of terminology. Staff will primarily use the term “places” or “areas” in reference to the type of historical resources discussed in this report; however, where applicable, staff will use the term that a source document or tribal participant uses.

### *Ethnographic Methods*

Ethnographic methods, when applied to projects of limited size and scope involve four steps.[13]

Step 1 involves reviewing the project description and mapped project location and, based upon the geographic and environmental setting, formulating preliminary guiding questions that may be asked of people with cultural affiliation to the project area.

Step 2 involves contacting, informally discussing with, or formally interviewing people who might have a cultural relationship or affiliation to a given area.

[13] See Pelto 2013, Chapter 16 for an overview of applied ethnographic methods for conducting focused inquiry conducted in limited timeframes.

As Step 2 is being conducted, a parallel Step 3 involves an archival “search, retrieve, and assess” process that should be undertaken to provide supporting or conflicting information to what is being discovered through the discussion process. In addition to archives, book stores, and other informational repositories (e.g., the internet), the people themselves or other ethnographers with previous experiences with the same people, may provide source materials. Findings in Step 3 may require a repetition of Step 2.

Step 4 involves field visit(s) that are intended to help the ethnographer triangulate between what people currently say, what people have written in the past, and what is actually or perceived to be in the project vicinity as a potential ethnographic resource.

Preliminary Guiding Topics

Based upon the project description and project location maps three preliminary Guiding Topics were developed.

- Research contemporary Gabrielino Tongva connections with the Puvunga site and Alamitos Mesa.
- Research the role of *Chingichnich* in traditional Gabrielino Tongva society and the importance of the religion associated with *Chingichnich* to the Puvunga settlement.
- Research the role that Puvunga played in the long distance trade/trail network for which the project region was one of the trade network hubs and the western end of one of the most extensive trade/trail networks of western North America.

As documented previously in this cultural resources section (*Native American Consultation*), staff contacted Native Americans affiliated with the project area.

Several meetings were held around the proposed AEC in June 2014. One meeting was held with a representative of the Gabrielino/Tongva Nation on June 6, who expressed a need to have Native American monitors present during ground disturbing activities, and noted that the tribe would also be submitting written comments regarding the project.

A meeting on June 7, 2014 was held with some of the members of the Ti’at Society/Intertribal Council of Pimu and a representative of the Gabrielino Tongva Indians of California Tribal Council. These Native Americans urged a landscape approach to the analysis of cultural resources in the PAA, provided knowledge concerning this landscape and the site of Puvunga, and remarked on the high potential for buried cultural resources in the AEC vicinity. Staff and these members also travelled to the Rancho Los Alamitos to examine the Puvunga site and to get a view of the project site from the Alamitos Mesa. A desire to see the project site more closely was also expressed, and a site visit was requested.

A meeting on June 21, 2014 was held with some members of the Ti'at Society/Intertribal Council of Pimu and a representative of the Gabrielino Tongva Indians of California Tribal Council at the existing AGS. A representative of AES Southland provided a PowerPoint presentation of the proposed AEC and led the group on a tour of the project site. Later that day, staff was invited to and attended a semi-annual song fest and summer solstice ceremony held at the site of Puvunga on the California State University, Long Beach (CSULB) campus.

Interviews

Staff completed limited ethnographic interviews and consultation while conducting archival research. The conversations that were undertaken were productive and informative concerning the Native American values related to the Puvunga Ceremonial Site Complex (PCSC).

Archival Research

Staff made efforts to seek, obtain, and assess culturally relevant information from various archival sources. Information specifically sought related to the relationship between Puvunga and the Gabrielino Tongva, as well as the relationship between *Chingichnich* and the Puvunga settlement. The California History Room of the California State Library, located in Sacramento, was also used for retrieving ethnographic information, in addition to the Special Collections at Loyola Marymount University in Los Angeles.

Field Visit

Ethnographic staff visited the project site and its surroundings on June 6–7 and 20–21, 2014. Staff's visual observation of the project site and vicinity did not result in the field identification of ethnographic resources because of the paved character and industrial nature of the area.

### *Ethnographic Method Constraints*

Listed below are two constraints on the ethnographic methods described above.

1. There has been a significant amount of loss of traditional cultural knowledge on the part of the Gabrielino Tongva and only recently have they felt comfortable expressing their understandings of the Long Beach region during the environmental review process.

2. There has been debate within the archaeological and anthropological community regarding the location of the PCSC (see Boxt and Raab 2000; Dixon 2000; Lightfoot 2000; Milliken et al. 1997; Ruyle 2000), and while this debate has not influenced the Native American's understanding of this place, the debate does act as a constraint in that it provides contradictory lines of scientifically-based evidence.

### Model of Historic Archaeological Resources

The analysis of the information in the “Environmental Setting,” “Historic Setting,” and “Background Research” (**Cultural Resources Appendix CR-1**) leads to the hypotheses that historic archaeological deposits are unlikely to occur on the surface of the archaeological resources PAA, but might be present below ground surface.

Staff expects that the potential to encounter historic archaeological resources on the surface of the archaeological portion of the PAA is low because most of it is paved.

Historic maps show that the archaeological resources PAA occupies land that primarily sat on an alluvial fan of the now-channelized San Gabriel River. In addition, historic aerial photographs dating to 1928, 1938, and 1947 show a residence, numerous associated structures, and roads adjacent to the project site, in the vicinity of existing generating units 3–4 (compare AES 2015a:Figures 2.1-1, 2.1-2; EDR 2011a). McCormick and Ferraro (2002:15–16) also report buried historic archaeological features in a setting similar to the project site, about 1 mile to the west.

## Cultural Resources Inventory Fieldwork

This section discusses the methods and the results of each field inventory phase and interprets the resultant inventory relative to the cultural resources distribution models above to assess how well the inventory represents the cultural resources of the project area. Descriptions of each cultural resource in the inventory, evaluations of the eligibility of each resource for inclusion in the CRHR, assessments of project impacts on each known historical resource, consideration of and potential impacts on archaeological resources that might be buried in the PAA, and proposed mitigation measures for significant impacts may be found in the “Cultural Resource Descriptions and Significance Evaluations” subsection below.

The field efforts to identify cultural resources in the PAA consist of the applicant’s pedestrian archaeological and historic built-environment surveys, and staff’s field visits to the PAA. Six newly identified cultural resources have been found in the PAA as a result of the applicant’s and staff’s efforts. On the basis of research by staff and the applicant for the present analysis and the results of the field efforts that are presently available, the cultural resources within the PAA includes  a Gabrielino Tongva traditional cultural place (also containing archaeological and ethnographic components), and nine built-environment resources.

### Pedestrian Archaeological Surveys

#### *Methods*

CH2M Hill Engineers archaeologists, Gloriella Cardenas and Natalie Lawson, surveyed the project site on September 28–29, 2011, April 15, 2015, and October 5, 2015. The project site was covered by buildings, structures, roads, and other paved surfaces constituting the AGS, rendering ground surface visibility to zero except in a few areas of broken pavement or sparse gravel. These areas were visually inspected as they were encountered. Within the 200-foot survey buffer, the archaeologist encountered exposed soil where fuel oil tanks had been removed, streets, sidewalks, Los Cerritos Channel, San Gabriel River, an open area in the southeastern corner of the project site (a proposed parking/laydown area), and an open area in the northwestern corner of the project site. The open areas were landscaped or covered with fill. The archaeologist surveyed the open areas by walking transects spaced 30 feet apart. (AES 2013:5.3-26–5.3-27, Figure 5.3-1; AES 2015a:5.3-24; AES 2015b:Figure 5.3-1R; Cardenas et al. 2013:iii, 4-7–4-8, Figures 1–2.)

Ms. Lawson surveyed the proposed process water/sanitary wastewater pipeline corridor on July 2, 2012. The archaeologist surveyed a 50-foot buffer on both sides of the proposed pipeline. The proposed pipeline route intersects the former site of fuel oils tanks adjacent to the project site, a portion of Los Cerritos Wetlands, sidewalks, Studebaker Road, Loynes Drive and the bridge carrying it over Los Cerritos Channel, and a portion of E. Vista Street. The majority of the proposed route is paved. (AES 2013:5.3-26–5.3-27, Figures 5.2-5f, 5.3-1; AES 2015a:5.3-24; AES 2015b:Figure 5.3-1R; Cardenas et al. 2013:iii, 4-7–4-8, Figures 1–2.)

#### *Results*

The applicant did not identify any archaeological resources in the PAA as a result of the archaeological surveys (AES 2013:5.3-27, 5.3-29; AES 2015a:5.3-24; Cardenas et al. 2013:iii, 1-3, 4-8, 4-10).

### Results of Ethnographic Resources Investigations

Staff research and site visits leads staff to conclude that an ethnographic resource, the PCSC, is present in the PAA.

### Historic Built Environment Survey

#### *Methods*

The built-environment inventory by the applicant consisted of a pedestrian inventory survey of the project site and properties within a one-parcel extent of its boundary and a reconnaissance (windshield) survey covering a one parcel extent from the originally proposed offsite linear alignment of the proposed process/sanitary wastewater pipeline (AES 2015a:5.3-25). The applicant’s coverage of the windshield survey for the offsite linear alignment for the pipeline consisted of 42 parcels along East Vista Street located within the University Park Estates residential subdivision, which was developed between 1960 and 1962. The windshield survey was performed to assess the potential for the presence of historic resources that could be impacted by the proposed project. As mentioned above, the length of the proposed pipeline was reduced to 1,000 linear feet since the time of the applicant’s windshield survey, such that only two residential parcels within the University Park Estates remain within staff’s PAA.

The applicant's survey area encompassed a mix of industrial, water control/distribution, transportation, and residential properties. The applicant's historic built environment survey was performed by an architectural historian meeting the Secretary of the Interior's professional qualifications for that discipline (AES 2013:5.3-27). The applicant recorded and evaluated extant buildings and structures within the survey area that had been constructed before 1969, (i.e., structures which at the time of the 2014 survey were 45 years or older). Fieldwork was conducted by the applicant in September 2011, and resulted in the identification of two historic-period built environment resources: the Alamitos Generating Station and the University Park Estates residential subdivision.

Staff's review of the applicant's documentation of the historic built environment and preliminary review of historic maps of the project area concluded that the historic built environment survey did not inventory and evaluate all historic period built environment resources within the required survey area (CEC 2014a:20).

At staff's request, additional architectural survey was performed by the applicant in February 2014. Two additional historic-period built environment resources were recorded as a result: the San Gabriel River and Haynes Generating Station (HGS). The applicant submitted the results of the inventory survey and evaluation of those resources along with corresponding DPR 523 forms on February 17, 2014 (AES 2014a:Appendix 5.3).

On March 25, 2014, staff performed a reconnaissance survey of the PAA, including the project site and offsite linear alignment, properties within a one-parcel extent of those areas, and the immediate surrounding area. Staff's reconnaissance survey was performed to identify potential impacts of the proposed AEC on historic built-environment resources and any cultural resources present within the PAA that may not have been recorded and evaluated by the applicant in the AFC (AES 2013) or Data Adequacy Supplement (AES 2014a). In addition to the four historic built environment resources identified by the applicant (AGS, HGS, Los Cerritos Channel and the San Gabriel River), staff identified five more built environment resources within the PAA, for a total of nine. The five additional resources identified include Los Cerritos Channel, Studebaker Road, and three bridges (Bridge #s 1563, 3460, and 2750).

The AGS and HGS were not evaluated by the applicant under CRHR eligibility Criterion 3 in the AFC (AES 2013) or Data Adequacy Supplement (AES 2014a). Five structures that appeared to be historic in age at the AGS—three retention basins and two intake channels—were not recorded or included in the eligibility evaluation of the resource. The San Gabriel River was not adequately defined or recorded as an engineered historic-period structure and was not evaluated for CRHR eligibility as such; only the levees were recorded by the applicant and considered in their analysis presented in the Data Adequacy Supplement (AES 2014a). Additionally, the records search and literature review performed by the applicant was too narrow in coverage to determine if the San Gabriel River had been previously recorded as a cultural resource and if any previous recommendations or determinations of eligibility were on record for the resource.

Staff cannot assess the potential effects of the proposed AEC on historical resources if cultural resources within the PAA are absent from the analysis or if staff lacks sufficient information as to whether the cultural resources in the PAA are significant. Consequently, staff submitted Data Requests 44–47 (CEC 2014b) asking the applicant to provide the missing information needed for staff analysis.

The *AEC Data Response Set 1B* (Responses to Data Requests 45–47) was docketed on August 12, 2014 (AES 2014c). The applicant provided an adequate response to Data Requests 45–46. However, the applicant only responded partially to Data Request 47, which requested survey, formal CRHR eligibility evaluation, and DPR forms for three bridges (1563 over North Intake Channel, 3460 over South Intake Channel, and 2750 over Los Cerritos Channel on Loynes Drive), Studebaker Road, and Los Cerritos Channel. Of the five resources identified in Data Request 47, the applicant only complied with the full request for information for Los Cerritos Channel. In order to fill the information gaps, staff conducted an independent analysis and evaluation for the three bridges and Studebaker Road, included later in this section.

#### *Results*

The inventory of cultural resources in the PAA is the collective result of archival and literature research, discussions with local governments and public interest groups, and field investigations conducted both by staff and the applicant. For the proposed AEC, these efforts have led to the identification of nine extant built-environment cultural resources in the PAA dating to the historic period (45 years of age or older). Descriptions of the resources, staff conclusions regarding historical significance, and recommendations as to whether the resource warrants further consideration under CEQA are located below in the *Determining the Historical Significance of Cultural Resources* subsection of the FSA.

## Cultural Resource Descriptions and Significance Evaluations

Staff has identified 10 cultural resources in the PAA. Of these, one is an archaeological and ethnographic resource (PCSC) and nine are historic-period built-environment resources (AGS, HGS, San Gabriel River, the University Park Estates residential subdivision, El Cerritos Channel, Studebaker Road, and three vehicular bridges [California Department of Transportation—Caltrans—bridge #s: 1563, 3460, and 2750]).

### Archaeological and Ethnographic Resources

#### *Puvunga Ceremonial Site Complex*

The PCSC is an archaeological and ethnographic resource, a traditional cultural place of the Gabrielino Tongva. The archaeological components of the PCSC consist of sites, artifacts, and features related to prehistoric and protohistoric occupation and use of the natural resources on and around Alamitos Mesa. The ethnographic components of the PCSC include associations with the village sites identified as Puvunga located on Alamitos Mesa, and the natural resources on and around Alamitos Mesa. The archaeological components of the PCSC are discussed first, followed by the ethnographic.

## Archaeological Components

The village of Puvunga was first formally recorded by archaeologist Keith Dixon in 1964 as CA-LAN-306, a midden site located at Rancho Los Alamitos. At the time, Dixon (1964) suggested that the site was an unlikely candidate for Puvunga because he assumed it was of Middle Holocene origin[14], rather than a Late Prehistoric site. Researchers expected Puvunga to be a Late Prehistoric site because of its mention in mission baptismal records as the home rancheria of 35 Indians at Mission San Gabriel and two at Mission San Juan Capistrano (located about 30 miles southeast of the AEC). However, eight years later, Dixon revised his opinion regarding the location of Puvunga, arguing that CA-LAN-306 is likely one of the locations on Alamitos Mesa that corresponded to the village (Dixon 1972). In 1973 Dixon nominated the Puvunga village (and it was subsequently accepted) to the NRHP, including not only CA-LAN-306, but also sites CA-LAN-234/235, which are located about 1 mile west of the rancho, on the CSULB campus. Dixon nominated these sites as a district, and suggested that "[r]emnants of the living areas still exist in at least nine places in an area of about 500 acres. It is probable that the Puvunga village was moved around gradually over time within this small area" (Dixon 1973:2). The "small area" to which Dixon refers is the Alamitos Mesa. Dixon does not mention the site numbers or names of the nine places on the mesa he suggests are also locations of Puvunga, but the sites included in **Cultural Resources Appendix CR-1**, **Table 5** are those recorded prehistoric sites (including isolated finds) located on the mesa that contain (or, in some cases contained) archaeological deposits that indicate prehistoric or protohistoric occupation of the mesa. Some of these sites are recorded as distinct archaeological deposits, but this distinction between sites may simply be a product of modern development which destroyed portions of sites, obscuring the contiguity of the deposits. Some of the sites included in **Cultural Resources Appendix CR-1**, **Table 5** are not located on the mesa itself, but are, according to Hudson's (1971) model of proto-Gabrielino settlement patterns, secondary gathering camps affiliated with the primary Puvunga settlement.

The archaeological evidence also indicates that Puvunga was a locale of trading. The presence of steatite and obsidian, non-local natural resources, at sites in the PCSC suggest that Puvunga was located within the trading network that encompassed the Channel Islands and extended into the Southwestern desert. Several researchers, including staff on other proposed energy projects, have documented and evaluated other portions of this vast trail system, arguably the most extensive trade network in the western United States (e.g. Bean and Smith 1978:547; Davis 1961; Dobyns 1984; Gates et al. 2013; Latta 1936). The ethnographic component of the trail system in the PAA consists of associations with the trail corridors (including those out to the Channel Islands), associations with the site of Puvunga and the spread of the *Chingichnich* religion along the trail corridors, and understanding the trails and movement along trails, and the landscape in which they are situated. For example, a contemporary Gabrielino Tongva woman had a dream that inspired her to build a *ti'at*, a traditional Gabrielino Tongva plank canoe, and make trips to the Channel Islands, harkening back to the prehistoric activities of movement between the mainland and the Channel Islands (Regents of the University of California 2014; Williams 2013). Coupled to this theme are the occupation sites (and for AEC, especially those occupation sites associated with the

[14] Test excavations of the site later that year showed the site to be of Late Prehistoric age.

PCSC; see **Cultural Resources Appendix CR-1, Table 5**) that might have changed over time, where Gabrielino Tongva first dwelt as villagers, perhaps as a place that accommodated long distance traders from neighboring tribes. The archaeological record also suggests that the sites in the PCSC were occupied at least for the past 2,000 years, further indicating the long-term occupation and historical importance of Puvunga.

Archaeologist William McCawley (1994:2-1–2-2) equated Puvunga with the whole of Alamitos Mesa because it was a rancheria, which typically “included a central town (or primary habitation site) as well as hunting and plant-gathering areas, ceremonial sites, workshops, and other special activity areas”. The archaeological sites and features on Alamitos Mesa bear this theory out as seen in **Cultural Resources Appendix CR-1**, **Table 5**, and is reiterated by McCawley (1994:3-14), “The primary settlement (town) of *Povuu'nga* could, in fact, have extended across much of the mesa with scattered clusters of houses, windbreaks, sweathouses, storage structures, ceremonial sites, playing fields, and work areas.” Thirty-two of the 38 archaeological sites in **Cultural Resources Appendix CR-1**, **Table 5** are contributing elements to the PCSC traditional cultural place.

Ethnographic Components

The site of Puvunga is understood by the Gabrielino Tongva, as well as other Southern California indigenous groups, to be the place of emergence of the deities *Ouiot* and *Chingichnich*, and in one version of *Chingichnich's* death, it is also the place where he died. Puvunga is also understood to have been an important location for trading and ceremonies, and continues to be used for ceremonies by Gabrielino Tongva today. The first mention of Puvunga in the written historical record appears in the records of missions San Gabriel and San Juan Capistrano; Puvunga (written as Puvuit and Pububit) was documented as the home of 35 baptized Indians at San Gabriel and two baptized Indians at San Juan Capistrano (Heizer 1968:110). According to mission register analysis, Puvunga likely had a contact-period population of at least 60 to 90 people (Milliken et al. 1997:16).

Franciscan missionary Gerónimo Boscana was the first non-Native American to document the religion associated with *Chingichnich*, and to document Puvunga (written as Pubuna) as the birthplace of *Ouiot* and *Chingichnich*. Boscana's description of the location of Puvunga is that it is located about 20–24 miles northeast of Mission San Juan Capistrano, somewhere in western Riverside County; however this location does not agree with mission register marriage patterns for Puvunga, and information obtained subsequently suggests that Boscana likely meant northwest, instead of northeast, from Mission San Juan Capistrano (Milliken et al. 1997:18).

Hugo Reid, a Scottish-American immigrant living in the Los Angeles area during the mid nineteenth century, married a Gabrielino Tongva woman, and they worked together to document aspects of Gabrielino Tongva culture. Reid's letters were subsequently published in the *Los Angeles Star* newspaper in 1852. Reid documented various aspects of Gabrielino Tongva lifeways, but more importantly for the purposes of this analysis, he equated Puvunga (written as Pubug-na) with Alamitos in a list of known Gabrielino Tongva villages (Reid 1968:8).

Alfred Kroeber's work among the Gabrielino Tongva in the early 1900s was important because he acknowledged that much of the Luiseño and Juaneño religion was derived from the Gabrielino Tongva belief system, providing one of the bases for ethnographic analogy among these groups with regard to understandings of *Chingichnich* and the practices associated thereof. It appears Kroeber followed Reid's lead in equating Puvunga with the Rancho Los Alamitos, and stated that it was northwest of Mission San Juan Capistrano (Kroeber 1976:636). However, he does not provide references for why he contradicted Boscana's northeast designation or why he equated Puvunga with the Rancho.

Another anthropologist in the early part of the twentieth century, J. P. Harrington, worked closely with Juaneño and Luiseño informants who informed him, and physically showed him that Puvunga (written as Puvú') was located at the old Los Alamitos ranch house (Harrington 1933:148–149). Harrington also commented upon the contradiction in Boscana's narrative concerning the distance and direction of Puvunga, and suggests that Boscana was mistaken when describing Puvunga's location relative to the Mission San Juan Capistrano and he meant northwest when he wrote northeast (Harrington 1933:148).

Staff's independent research and consultation efforts with Native American representatives of various Gabrielino Tongva organizations confirm that Puvunga has been, and continues to be, an important traditional cultural place. Contemporary Gabrielino Tongva visit Puvunga regularly, primarily at sites CA-LAN-234/235 on the CSULB campus and CA-LAN-306 at the Rancho Los Alamitos. Tribal members visit Puvunga because they understand it to be a sacred place that provides them the ability to spiritually connect with their ancestors. They understand that this is the location where their ancestors lived, died and were buried, and practiced the *Chingichnich* religion, and where *Ouiot* and *Chingichnich* appeared to their ancestors. Puvunga maintains a strong sense of place for tribal members; ancestor poles are erected at various locations, a fire pit is dug out and used at the site, some tribal members continue the *Chingichnich* religion-related tradition of sand painting here, and members hold regular ceremonies at Puvunga, such as the solstice ceremony that staff attended in June 2014.

In order to evaluate the PCSC as a historical resource under CEQA, one must establish a theme that derives from a historic context, provide a bounded area, define a period of significance, identify significance per at least one of the four criteria, and determine integrity.

The historic context is provided in the ethnographic section contained in **Cultural Resources Appendix CR-1**, but also in the present section under the Archaeological and Ethnographic Components. The contextual themes of the PCSC are those of origins, ceremony, trade and travel, and contemporary indigenous connections to the past. The theme of origins is applicable because *Ouiot* and *Chingichnich* emerged at Puvunga, and with the emergence of *Chingichnich* came the beginnings of the traditional religion practiced by the Gabrielino Tongva. Once *Chingichnich* emerged, he taught the Gabrielino Tongva the ways to live in accordance with his rules, and how to properly perform the necessary ceremonies to show him veneration, thus the theme of ceremony is applicable to the PCSC. Trade is an important theme to the PCSC because of the role that trading of physical objects played in the lives of the Gabrielino Tongva, but more importantly for this place, the trading of ideas and cultural dispersion concerning the *Chingichnich* religion. The theme of connections to the past fits hand-in-hand with the themes of origin and ceremony (see **Cultural Resources Appendix Figure 1**). The PCSC is not only a place of emergence of deities and ceremonial beginnings, but was also an important habitation site for the Gabrielino Tongva, thus allowing contemporary tribal members to walk on the same grounds and practice at the same locales as their ancestors.

Periods of significance are comprised of beginning and ending dates. The beginning date for this traditional cultural place is indeterminate because there is little knowledge of how early the place was used or occupied. Native Americans understand that this resource has been used forever, since time immemorial. The limited radiocarbon dating samples from sites in the PCSC suggest that people were living at Puvunga as early as A.D. 100, but were likely living here earlier than this. However, the alluvium from the San Gabriel River likely has covered these older deposits. There is no end date for the period of significance for the PCSC because it is still used and venerated by the Gabrielino Tongva today.

Staff recommends that the PCSC traditional cultural place is eligible for the CRHR under Criterion 1 at the local and state level for the unique historic events that contribute to Native American understandings of their origins and those of *Ouiot* and *Chingichnich,* in addition to the trade and ceremonies which occurred, and ceremonies that still occur at Puvunga.

Staff recommends that the PCSC traditional cultural place is eligible for the CRHR under Criterion 2 at the local and regional level for the association of Puvunga with the deities *Ouiot* and *Chingichnich.* As previously noted, there are Native American oral traditions that tell of the monster chief *Ouiot* and the supreme creator-god *Chingichnich* as both making their initial appearance to the world at Puvunga.

Staff recommends that the PCSC traditional cultural place is also eligible for the CRHR under Criterion 4 at the local, state, and national level for the information concerning habitation and subsistence practices, and radiocarbon dating that the resource has already yielded, but also for the potential of the place to yield additional ethnographic and archaeological information about the Gabrielino Tongva, cultural lifeways in the Los Angeles Basin, and trade with the greater Southwest.

The integrity of the PCSC has been compromised by the historic activities associated with the Rancho Los Alamitos, the construction of numerous buildings and associated infrastructure, including those on the CSULB campus, the Veteran's Affairs Hospital, schools, and surrounding neighborhoods. However, despite the intrusions to this traditional cultural place, the PCSC continues to convey a valuable and important sense of place to the Gabrielino Tongva who continue to visit and celebrate at this significant place. Therefore, the PCSC maintains integrity of location, materials, feeling, and association.

### Historic Built Environment Resources

Staff reviewed the built environment resources within the records search area (1-mile radius from the PAA), and did not discover any resources outside of the PAA that had the potential to be impacted by the proposed AEC. Those resources are summarized in **Cultural Resources Appendix CR-1, Table 4**.

The applicant provided inventory and evaluation data for four historic-era built environment resources located within the PAA (the AGS, HGS, San Gabriel River Channel, and Los Cerritos Channel). The applicant also provided the results of a reconnaissance level (windshield) survey covering 42 lots within the University Park Estates residential subdivision (1960–1962) that are located along either side of the originally proposed linear process/sanitary wastewater pipeline alignment (AES 2013:5.3-29). However, since the applicant's original architectural survey was performed, the majority of the pipeline was removed from the proposed AEC and is now limited to the crossing of Los Cerritos Channel and the southeastern corner of the University Park Estates subdivision. Consequently, only two residential parcels and Bridge 2750 now lie within a one parcel extent of the reduced linear pipeline alignment. Those two residential parcels were included in the applicant's original windshield survey, which found no historical resources present in the University Park Estates subdivision that could be impacted by the proposed installation of the offsite linear process/sanitary wastewater pipeline. Staff concurs with that finding. Therefore, no formal evaluation of the University Park Estates or the two subject parcels within it that border the proposed offsite linear pipeline alignment is required, and the two parcels are not further considered in the following analysis.

Staff identified four other historic built environment resources present within the historic built environment portion of the PAA that the applicant did not identify, inventory, or evaluate as part of their architectural survey efforts for this project. Those four built environment resources include Studebaker Road and three vehicular bridges (Bridge #s 1563, 3460, and 2750).

For this FSA, staff reviewed the four CRHR-eligibility evaluations of historic-period built environment resources provided by the applicant: AGS, HGS, San Gabriel River Channel, and Los Cerritos Channel. None of those resources were previously recorded and, therefore, they are not listed in **Cultural Resources Appendix CR-1, Table 4**. The resources include two industrial properties and two engineered floodwater control/distribution structures. Staff concurs with both the AGS and HGS evaluations provided by the applicant and concludes that neither of these two resources appears eligible for listing on the CRHR under criteria 1–4. Staff also concurs with the applicant's evaluations of both the San Gabriel River Channel and Los Cerritos Channel and concludes that both of these engineered flood control structures appear eligible for the CRHR under Criterion 1. Staff adds that upon further research and investigation, these two flood control structures also appear eligible for the CRHR under Criterion 3 for their high artistic values and engineering merits.

What follows is a descriptive summary based on research performed by the applicant and staff regarding the historic-period built environment resources located within the PAA. A summary of each resource's CRHR-eligibility is presented along with staff conclusions regarding the subject cultural resource as a potential historical resource for the purposes of CEQA.

***Alamitos Generating Station, 609 N. Studebaker Road. 1955–1990s***

The AGS is a once-through-cooling (OTC), steam-electric power plant built by SCE, encompassing approximately 120 acres located between the San Gabriel River and Los Cerritos Channel. The majority of the facility's buildings and structures date between 1956 and 1969, placing them within the age threshold of 45 years or older for consideration as a potential historical resource (under CRHR guidelines). The historic-period resource is composed of three pairs of power generating units (Units 1–6), a peaker unit (Unit 7), the original main administration building, a separate administration building for Units 5 and 6, a switchyard at the north end of the plant, various warehouses and maintenance facilities, a bag house, transformers, and numerous support facilities such as a circulating water system, retention basins, intake channels, outfalls, a compressor house, and storage house (see **Cultural Resources Table 5**). The SCE switchyard, known historically as the Stadium Substation, was constructed in 1956–1960 concurrently with the AGS as part of the operating system. Therefore, it is a historical component of the AGS.

**Cultural Resources Table 5**
**Alamitos Generating Station**

| No. | Resource Designation | Type & Description | Date | 45 Years or Older? | Other |
|---|---|---|---|---|---|
| 1 | Original Administration Building | One-story, Midcentury Modern building | Ca. 1958 | Yes | No longer used as administration building. Now leased by charter school. |
| 2 | Units 1 and 2 | Conventional steam drum, outdoor steam generating units | 1956–1957 | Yes | Each consists of boiler, turbine, generator, control systems, and associated auxiliary equipment. |
| 3 | Units 3 and 4 | Conventional steam drum, outdoor steam generating units | 1961–1962 | Yes | Each consists of boiler, turbine, generator, control systems, and associated auxiliary equipment. |
| 4 | Units 5 and 6 | Conventional steam drum, outdoor steam generating units | 1966 | Yes | Each consists of boiler, turbine, generator, control systems, and associated auxiliary equipment. |
| 5 | Administration Building for Units 5 and 6 | One-story, concrete block Mid-Century Modern building | Ca. 1966 | Yes | |
| 6 | Unit 7 | Concrete building housing air-cooled peaker unit with turbine | 1969 | Yes | No longer in use; decommissioned and retired in January 2004. |

| No. | Resource Designation | Type & Description | Date | 45 Years or Older? | Other |
|---|---|---|---|---|---|
| 7 | SCE Switchyard (Stadium Substation) | | Circa 1956–1960 | Yes | Located at north end of plant. The Applicant mentions this feature, but did not include it within the boundaries of the AGS, although it was constructed concurrently as a feature of the AGS system. |
| 8 | Guard House | Small concrete building with modest Midcentury Modern features | 1965 | Yes | Located at main entry to complex. |
| 9 | Division Maintenance Storeroom | Concrete block building | 1961 | Yes | Includes adjacent warehouse and tool storage area. Also known as Division Maintenance Shop. |
| 10 | Storeroom Building 1 | Industrial concrete block building | 1961 | Yes | Includes AGS Locker Room. |
| 11 | Insulation and Storage Building | Industrial concrete block building with corrugated metal addition | Ca. 1961 | Yes | Date of addition unknown. |
| 12 | Administration Building | Contemporary Modern-style stuccoed concrete block building with four units, forming horseshoe arrangement around central courtyard. | Ca. 1980s–1990s | No | Built by SCE |
| 13 | Weld Shop | Industrial corrugated metal rectangular building | Ca. 1980s–1990s | No | Built by SCE; located in Administration Building complex |
| 14 | Machine Shop | Industrial corrugated metal rectangular building | Ca. 1980s–1990s | No | Built by SCE; located in Administration Building complex |
| 15 | Memorial Park | Small landscaped park with benches | Ca. 2005 | No | |
| 16 | South Intake Channel | Poured-in-place concrete water intake structure | Ca. 1966 | Yes | Located south of Loynes Drive, this intake was constructed to draw water from Los Cerritos Channel to provide cooling water to Plants 5 and 6 |

| No. | Resource Designation | Type & Description | Date | 45 Years or Older? | Other |
|---|---|---|---|---|---|
| 17 | North Intake Channel | Poured-in-place concrete water intake structure | Ca. 1956 | Yes | Located north of Loynes Drive, this intake was constructed to draw water from Los Cerritos Channel to provide cooling water to Plants 1–4. |
| 18 | South Retention Basin | Rectangular poured in-place concrete water retention basin | Ca. 1960s | Yes | Located northeast of Plants 5 and 6 and west of San Gabriel River levee. |
| 19 | Central Retention Basin | Square poured in-place concrete water retention basin | Ca. 1960s | Yes | Located southeast of Plant 4 and west of San Gabriel River levee. |
| 20 | North Retention Basin | Square poured in-place concrete water retention basin | Post-1972 | No | Located east of Plant 4 and west of San Gabriel River levee. |
| Notes: AGS = Alamitos Generating Station; SCE = Southern California Edison Company | | | | | |

Several changes to the AGS property have occurred since the historic period. Three new buildings were added to the facility in the 1980s–1990s, including a new administration building, weld shop, and machine shop. With construction of a new administration building, the original administration building was no longer needed for AGS operations and currently is leased out to a charter school. Based on past aerial imagery analyzed by staff, a small memorial park was added to the AGS property sometime in the past 15 years. It is located south of the main entrance into the facility and adjacent to Studebaker Road. The park contains two concrete picnic tables and benches, a memorial plaque, open lawn surrounded by ornamental shrubs and trees, and a volley ball area.

Located on the project site and historic in age, the AGS is the primary focus of the investigation. The applicant submitted an inventory and CRHR-eligibility evaluation of the AGS as part of the SAFC (AES 2013, 2014c, 2015a:5.3-25–5.3-26; Cardenas et al. 2013:5-3–5-4, Appendix A). Staff reviewed the submitted reports and accompanying DPR 523 forms. The AGS was evaluated by the applicant for historical significance as a historic district and the constituent buildings, structures, and features were also considered for individual significance (AES 2014c:Attachment DR46-1, 2015a:5.3-25–5.3-26). The irregularly shaped district encompasses approximately 63 acres, comprised of two contiguous parcels roughly bounded by the San Gabriel River on the east, Studebaker Road and Los Cerritos Channel on the west, East 7th Street on the north, and Westminster Boulevard on the south. Parcel number 7237019005, located near the center of the AES property, previously contained four fuel oil tanks, which were part of the original AGS. The parcel is not owned by AES and the tanks were removed in 2004. Consequently, the parcel is not included within the district boundaries.

The applicant concluded that the AGS is not significant under CRHR eligibility criteria 1–4 and recommended that the AGS is not a historical resource for purposes of CEQA (AES 2014c:Attachment DR46-1, 2015a:5.3-25–5.3-26). Staff concurs with the applicant's evaluation of the AGS under the four CRHR eligibility criteria.

The AGS is not significant within the historic context of the SCE, steam generation of electricity, or development of post-World War II steam generation plants (Criterion 1). The AGS was one of several steam generating plants built by SCE in the mid-twentieth century. SCE's new steam plants were part of a larger trend among California electric companies during that time period to meet the rapidly growing post-war energy demands. In 2008, twenty-one examples of the OTC steam generation units from the same general time period remained in southern California alone, including the AGS. Nationwide, in 2008 there were more than 1,200 of these steam generation units remaining that used the OTC process (Tetra Tech 2008, cited in AES 2015a:5.3-26). The AGS is not a precursor or early example of this historic pattern of steam plant generation development and is not unique or significant within the context of the time and other contemporary power plants. Staff concurs with the applicant and concludes that the AGS is not eligible for the CRHR under Criterion 1.

Background research performed both by the applicant and staff did not identify any evidence that the AGS was associated with the life of one or more historically significant individuals. Consequently, staff concurs with the applicant and concludes that the AGS is not eligible for the CRHR under Criterion 2.

The applicant stated in their original AGS DPR 523 form set that "The buildings and structures do not embody characteristics of a type, period, region or method of construction. They are not the work [of] a master and do not have high engineering value (Criterion C and 3)" (Price 2013:2). However, the evaluation summary was only presented on the DPR 523 form and not included within the AFC (AES 2013) or appended cultural report (Cardenas et al. 2013), nor was any justification for that conclusion provided in those documents. Therefore, staff requested the formal evaluation of AGS under CRHR eligibility Criterion 3 as part of Data Request 46 (CEC 2014b:19). The applicant formally objected to Data Request 46 in *Data Responses Set 1A to CEC Staff Request* (AES 2014b:22), but later provided the requested information in *AEC Data Response Set 1B* (AES 2014c:4). The buildings and structures at the AGS are found to be typical components of a mid-century electrical power generating facility, of which there are several similar remaining examples, and that they do not display any architectural style and are unexceptional examples of standard design (Price 2013:6). Staff concurs with the applicant and concludes that the AGS is not eligible for the CRHR under Criterion 3.

The AGS does not appear to hold data potential or informational value that would be important for the understanding of prehistory or history (Criterion 4). The property is well documented in company records and construction documents and it is not a principal source of important information. Staff, therefore, concurs with the applicant and concludes that the AGS does not appear eligible for the CRHR under Criterion 4.

Based on the eligibility evaluation summarized above, staff concludes that the AGS does not appear eligible for the CRHR under criteria 1–4 and it does not qualify as an historical resource for purposes of CEQA.

***Haynes Generating Station, 6801 E. 2nd Street. 1962–1970***

The HGS was built as an OTC, steam-generating power plant by the Los Angeles County Department of Public Works (LACDPW) to replace the 1920s-era Seal Beach Steam Generating Plant. The HGS facility is located on 120 acres on the east side of the San Gabriel River, across from AGS. The HGS historically contained seven power generator units, electrical switchyards, a compressor station, aboveground oil storage tanks, settling basins, an administrative building, and various small storage and support buildings. The property is surrounded by an earthen dike.

Originally cooled via an OTC process, some power generating units were recently converted to a dry cooling system. Alterations to the plant include the addition of Units 8–10 in 2004, the decommissioning of Units 3–4, alterations to Unit 6, and removal of four large aboveground storage tanks in the north end of the property. In 2013, six new natural gas-fired combustion turbine generators (Units 11–16) with dry cooling towers and pollution control systems were added to HGS, along with ancillary facilities. Units 5–6 were decommissioned when those new units began operation (Price 2014a:2). With the exception of Units 11–16, HGS units are cooled using the OTC process, drawing ocean water from a circulating water channel extending south from HGS for approximately 1 mile where it is then piped under the San Gabriel River and then continues onward to an intake structure in the Alamitos Bay Marina. The cooling water, after use, is discharged into the San Gabriel River.

The applicant recommended that the HGS was not significant under CRHR eligibility criteria 1–4 and that HGS was not an historical resource for purposes of CEQA (AES 2014a:5.3-5). However, the applicant did not provide an evaluation of the resource under Criterion 3 with the evaluation under the other eligibility criteria in either the Data Supplement (AES 2014a:5.3-6) or the appended DPR 523 forms (Price 2014a:2). Therefore, staff requested the evaluation of HGS under CRHR eligibility Criterion 3 in Data Request 44 (Roark and Smith 2014:17). The applicant provided the requested information in *Data Responses Set 1A to CEC Staff Request* (AES 2014b:21–21), recommending the HGS as also ineligible for listing on the CRHR under Criterion 3. Staff concurs with the applicant's eligibility evaluation of the HGS and concludes the HGS does not appear eligible for the CRHR under criteria 1–4 and does not qualify as an historical resource for purposes of CEQA.

The HGS is not significant within the historic context of the LACDPW, steam generation of electricity, or the development of post-World War II steam generation plants (Criterion 1). Like the AGS, the HGS was one of several steam generating plants built in the mid-twentieth century to meet the rapidly growing post-war energy demands. In 2008, twenty-one examples of the OTC steam generation units from the same general time period remained in southern California alone, including the HGS. Nationwide, in 2008 there were more than 1,200 of these steam generation units remaining that used the OTC process (Tetra Tech 2008, cited in AES 2015a:5.2-26). The HGS is not a precursor or early example of this historic pattern of steam plant generation development and is not unique or significant within the context of the time and other contemporary power plants. Staff concurs with the applicant and concludes that the HGS is not eligible for the CRHR under Criterion 1.

Background research performed on the HGS did not identify any evidence that the facility was associated with the life of a historically significant individual. Staff concurs with the applicant and concludes that the HGS is not eligible for the CRHR under Criterion 2.

The buildings and structures at the HGS do not embody distinctive characteristics of a type, period, region, or method of construction. They do not reflect the work of a master engineer or architect and do not hold high engineering values. The HGS is typical in its constituent buildings, structures, engineering, layout, and execution for a mid-century electrical power generating facility and is not a unique, rare, or significant example of the type. The buildings and structures do not communicate a particular architectural design or stylistic expression and represent unremarkable, standard designs. Additionally, a large proportion of the original units (Units 3–6) have been physically altered through decommissioning or decreased generating capacity. Staff concurs with the applicant and concludes that the HGS is not eligible for the CRHR under Criterion 3.

The HGS does not appear to hold data potential or informational value that would be important for the understanding of prehistory or history (Criterion 4). Information about the facility can be more readily found in the archival record. Staff, therefore, concludes that the HGS does not appear eligible for the CRHR under Criterion 4. Based on the eligibility evaluation summarized above, staff concludes that the HGS is not eligible for the CRHR under criteria 1–4 and it does not qualify as an historical resource for purposes of CEQA.

***The San Gabriel River Channel, ccirca 1920–1960***

A segment of Reach 7 of the engineered San Gabriel River Channel passes through the PAA immediately east of the project site and is part of the AES property on which the AGS is located (**Cultural Resources Figure 3**). The San Gabriel River—from the Whittier Narrows Dam southward to the Pacific Ocean—is considered a cultural resource given that it was modified through human intervention during the historic period such that it is an engineered feature and no longer a natural river. Segments of the river were dammed, channelized (straightened), and their depth increased. The river modifications were accompanied by the construction of levees along the river's banks and other associated features as part of large-scale flood control efforts in the Los Angeles County Drainage Area extending from the early to mid-twentieth century.

Staff recommended that the applicant record and evaluate the San Gabriel River (CEC 2014a). The recording and evaluation of the San Gabriel River provided by the applicant in the *Data Adequacy Supplement* (AES 2014a:5-3.3–5-3.4, Attachment DA5.3-4) was found by staff to be incomplete and inconclusive for determining eligibility of the resource. The applicant only recorded and evaluated the river's levees within the PAA as built environment structures; the channelized river and other associated features that comprise the larger historic built environment resource were not recorded or considered in the applicant's evaluation. As part of Data Request 45, staff requested the applicant provide an updated and complete CRHR-eligibility evaluation of the San Gabriel River as an engineered structure and a corresponding updated assessment of integrity for the portion of Reach 7 that lies within the PAA (CEC 2014b:17). The applicant initially objected to the data request (AES 2014b:21), but later submitted an evaluation and revised DPR forms as part of the *AEC Data Response Set 1B* (AES 2014c:2–3).

Based on additional literature review by the applicant and agency consultation by staff, the overall linear resource of the San Gabriel River Channel does not appear to have been previously evaluated for the NRHP or CRHR. The applicant's evaluation found that the San Gabriel River is likely eligible for the CRHR under Criterion 1 (AES 2014c: Attachment DR45-1). Namely, it appears to be historically significant for its association with events that have made a significant contribution to the broad patterns of California's history and cultural heritage as a part of the greater Los Angeles Basin flood control system (Price 2014b:10). The massive flood control program, which included substantial alteration of the entire length of the San Gabriel River's natural course, allowed for growth, development, and protection of the population and industry in the Los Angeles basin during the middle and late twentieth century. It appears that the segment of the San Gabriel River Channel within the PAA would contribute to the potential eligibility of the overall resource as part of the larger Los Angeles Basin flood control system. The applicant found that the evaluated segment of the San Gabriel River "retains the soft bottom channel, levees, and outfalls much as they were initially constructed in the mid-twentieth century. Although the levees and outfalls have been modified somewhat through ongoing maintenance and upgrades, such as replacing the riprap, the structures retain good integrity" (AES 2014c:3). The applicant found that the evaluated segment of the San Gabriel River channel located within the PAA retains sufficient levels of historical integrity as a built environment resource to convey its significance.

Staff concurs with the applicant's eligibility evaluation and historical integrity assessment of the subject segment of the San Gabriel River Channel under CRHR Criterion 1. However, the applicant did not evaluate the eligibility of the San Gabriel River under CRHR criteria 2–4, leaving staff to develop its own evaluation under these three criteria. Under CRHR Criterion 2, the San Gabriel River Channel does not appear to be directly associated with the productive life of an important historical figure. It was designed and built by the Los Angeles County Flood Control District and U.S. Army Corps of Engineers and has no known direct connection with the productive life of any single person. Under CRHR Criterion 3, the San Gabriel River Channel, as part of the larger Los Angeles Basin flood control system, appears eligible as part of a substantial region-wide, complex engineered flood control system. Under CRHR Criterion 4, the San Gabriel River Channel is unlikely to have any important data potential, as its physical manifestation is not the principal or only definitive source of information on early and mid-twentieth century flood control design and construction.

### *Los Cerritos Channel, circa 1939–1947*

The applicant did not identify, provide inventory data, or include a CRHR-eligibility evaluation of Los Cerritos Channel in the AFC (AES 2013) or Data Adequacy Supplement (AES 2014a). Therefore, as part of Data Request 47, staff asked the applicant to record and evaluate Los Cerritos Channel for CRHR-eligibility and submit the results to Energy Commission for staff review and analysis (CEC 2014b:20–21). The applicant initially objected to the data request (AES 2014b:21), but later submitted an evaluation and DPR forms for Los Cerritos Channel as part of the *AEC Data Response Set 1B* (AES 2014c:7–8).[15]

Los Cerritos Channel is an engineered structure that pre-dates construction of the AGS in 1955 and lies within the PAA. Historic aerial photographs contained in the AFC indicate that the Los Cerritos Channel was constructed sometime after 1938 and by at least 1947 (EDR 2011a).

Based on background research, the applicant found that the overall linear resource of Los Cerritos Channel has not been evaluated for the NRHP or CRHR, but that it is likely eligible for the CRHR under Criterion 1 for its association with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (AES 2014c:Attachment DR47-1). As a part of the greater Los Angeles Basin flood control system, the alteration of the entire length of the Los Cerritos' natural course allowed for growth, development, and protection of the population and industry in the Los Angeles basin during the middle and late 1900s. It appears that the subject segment of the Los Cerritos Channel would contribute to the potential eligibility of the overall resource as part of the larger Los Angeles Basin flood control system. The applicant found that "Although much of the setting of the channel has been altered by intensive modern development, this segment of the channel appears to have had few physical changes and retains good integrity" (AEC 2014c:7–8). The applicant concluded that the evaluated segment of the Los Cerritos Channel as a built environment resource retains sufficient levels of historical integrity to convey its significance (Price 2014c:2).

Staff concurs with the applicant's finding for the eligibility of the Los Cerritos Channel under CRHR Criterion 1 and the historical integrity of the evaluated segment. However, the applicant did not evaluate the channel under CRHR criteria 2–4, leaving Staff to develop its own evaluation under these three criteria. Under CRHR Criterion 2, the Los Cerritos Channel does not appear to be directly associated with the productive life of an important historical figure. It was designed and built by the Los Angeles County Flood Control District and U.S. Army Corps of Engineers and has no known direct connection with the productive life of any single person. Under CRHR Criterion 3, the Los Cerritos Channel, as part of the larger Los Angeles Basin flood control system, appears eligible for its "high artistic values" as part of a substantial region-wide, complex engineered flood control system. Under CRHR Criterion 4, the Los Cerritos Channel is unlikely to have any important data potential, as its physical manifestation is not the principal source, nor is it the only definitive source of information on early and mid-twentieth century flood control design and construction.

[15] The SAFC does not discuss the CRHR eligibility of Los Cerritos Channel (AES 2015a:Section 5.3).

In summary, the subject segment of Los Cerritos Channel appears to be eligible for the CRHR. As such, staff concludes that the Los Cerritos Channel qualifies as a historical resource for purposes of CEQA.

### *Studebaker Road, circa 1957–1968*

The applicant did not identify, provide inventory data, or a CRHR-eligibility evaluation of Studebaker Road in the AFC (AES 2013) or Data Adequacy Supplement (AES 2014a). Studebaker Road is a historic-period engineered transportation structure that lies within the PAA. Historic aerial photographs contained in the AFC indicate that the segment of Studebaker Road within the PAA was constructed sometime after 1956 and by at least 1968 (EDR 2011a). Therefore, as part of Data Request 47, staff asked the applicant to record and evaluate Studebaker Road for CRHR-eligibility and submit the results to Energy Commission staff (CEC 2014b). The applicant objected to the data request (AES 2014b:24) and did not inventory or formally evaluate Studebaker Road in the SAFC (AES 2015a:Section 5.3).

In *AEC Data Response Set 1B* (AES 2014c:7), the applicant responded that despite their background research, Studebaker Road appears to be a standard public roadway with none of the attributes of a historic road, and no information has been obtained to indicate that it is historically significant. They state, "it does not meet any of the generally accepted historic road criteria—it is not an aesthetic or cultural route, and as an engineered route, it is a basic city roadway that does not possess any outstanding engineering or safety improvements (technology, materials, design, etc.)" (AES 2014c:7). Furthermore, the applicant states, "For Studebaker Road, no DPR form was prepared. Rather than an adjacent parcel, this is merely a public roadway that abuts the site" (AES 2014c:7). For these reasons, the applicant did not feel that DPR 523 recording forms or a formal CRHR evaluation of Studebaker Road were necessary.

Based on staff's historical research, it appears that this segment of Studebaker Road, as well as Loynes Drive, three Caltrans bridges along Studebaker Road and Loynes Drive, and the AGS south intake channel were all constructed in 1966 when the southern portion of the AGS was expanded with Plants 5–6 and numerous tanks (Caltrans 2015; Teledyne 1968; USGS 1964, 1972). Thus, it is apparent that all of these structures were built around the same time to accommodate the growth and development occurring primarily at the AGS at that time.

Based on this conclusion, staff concludes that the subject segment of Studebaker Road is not eligible for the CRHR under any of the four criteria for eligibility. There is no apparent evidence that the subject segment of road is directly associated with a significant historical event (CRHR Criterion 1), or with the productive life of a prominent historical figure (CRHR Criterion 2). The road appears to be of standard design and construction, lacking any apparent architectural or engineering merits (CRHR Criterion 3). Finally, under CRHR Criterion 4, the road does not contain any important information potential, as it is not the sole source of information for mid-twentieth century road construction and design standards. Thus, staff finds that the subject segment of Studebaker Road does not qualify as a historical resource under CEQA.

### *Caltrans' Bridges 53C0730, 53C0801L and R, and 53C0802L and R*

The applicant did not identify, provide inventory data, or a CRHR-eligibility evaluation of three bridges located within the PAA in the AFC (AES 2013) or Data Adequacy Supplement (AES 2014a): Bridge 2750 over Los Cerritos Channel along Loynes Drive (Caltrans Bridge 53C0730); Bridge 1563 over AGS's North Intake Channel (Caltrans Bridge 53C0801L and R); and Bridge 3460 over AGS's South Intake Channel on Studebaker Road (Caltrans Bridge 53C0802L and R), all of which were built in 1966. Each of these bridges is a historic-period engineered transportation structure. The applicant proposes to hang a segment of the offsite process/sanitary wastewater pipeline along the length of Caltrans Bridge 53C0730.

Staff has identified that all three of these bridges was previously evaluated by Caltrans (2015) and found ineligible for the NRHP, but information regarding their CRHR-eligibility is not indicated in Caltrans's (2015) online bridge inventory. As part of Data Request 47 (CEC 2014b), staff requested that the applicant research, record, and evaluate these three bridges for CRHR-eligibility, and submit the results to the Energy Commission. The applicant objected to the data request (AES 2014b:24) and did not inventory or formally evaluate any of these three bridges in the SAFC (AES 2015a:Section 3.5).

In *AEC Data Response Set 1B* (AES 2014c:6–7), the applicant responded that Caltrans policy is that NRHP eligibility criteria are the same as CRHR eligibility criteria, and therefore, because Caltrans has determined the bridge is not eligible for the NRHP, it is automatically not eligible for the CRHR (AES 2014c:6–7).

The basis for Caltrans's determination of NRHP-ineligibility for the bridges is not indicated in their online bridge inventory, nor was it provided by the applicant. Based on staff's own historical background research, it appears that all three of these bridges, as well as the segment of Studebaker Road adjacent to AGS, and Loynes Drive were all constructed in 1966 when the southern portion of the AGS was expanded with Plants 5–6 and numerous tanks (Caltrans 2015; USGS 1964, 1972). Thus, it is apparent that all of these structures were built around the same time to accommodate the growth and development occurring primarily at the AGS at that time.

Staff concludes that none of these three Caltrans bridges appear to be eligible for the CRHR under any of the four eligibility criteria. There is no evidence that any of these bridges is directly associated with a significant historical event (CRHR Criterion 1), or with the productive life of a prominent historical figure (CRHR Criterion 2). The bridges are all similar in appearance and appear to be of standard design and construction, lacking any apparent architectural or engineering merits (CRHR Criterion 3). Finally, under CRHR Criterion 4, none of these bridges contains any important information potential, as they are not the sole source of information for mid-twentieth century bridge construction and design standards. Thus, staff finds that none of these three bridges qualify as a historical resource for the purposes of CEQA.

## Interpretation of Results

### Model of Prehistoric Archaeological Resources

The SAFC hypothesized that the PAA has little potential to contain prehistoric archaeological resources on the ground surface because of the degree of surface disturbances and development (AES 2015a:5.3-17). These expectations were borne out by the cultural resources inventory described in this final staff assessment (FSA).

Regarding the potential to encounter buried, prehistoric archaeological resources, the depth of placed fill on the project site is known to range from 6 to 9 feet thick (AES 2015a:5.3-24). The applicant proposes construction excavations up to 10, 20, and 50 feet below ground surface (AES 2015a:5.3-24–5.3-25, 5.8-5), indicating that construction-related digging would intersect natural soils to depths of 1–4, 14–24, and 41–44 feet below ground surface. Staff conducted additional analysis to estimate the depth of fill across the project site; whether and where proposed excavation would penetrate native sediments; and the age, characteristics, and preservation potential of any underlying native sediments.

Geotechnical borings indicate that the project site rests atop 6–9 feet of fill dirt (AES 2015a:5.3-4, 5.3-24, 5.4-3, 5.11-2, 5.11-4; Cardenas et al. 2013:2-1, 4-8; Ninyo & Moore 2011:5, Appendix A, Figure 3). Project-specific borings and cone-penetration tests indicate that the underlying natural sediments are younger alluvium to a depth of 51.5 feet below ground surface (Ninyo & Moore 2011:5). The younger alluvium is primarily Holocene in age, potentially with late Pleistocene sediments toward the base of the borings (AES 2015a:Table 5.8-1). *Since humans have occupied the southern California coast throughout the Holocene and terminal Pleistocene epochs (AES 2015a:5.3-6–5.3-8;* ***Cultural Resources Appendix CR-1****), the younger alluvium is of the right age to harbor archaeological remnants of past cultures*.

The fill deposits in the PAA are less likely to contain prehistoric archaeological deposits that would retain sufficient integrity to qualify as historical resources or unique archaeological resources under CEQA, compared to prehistoric archaeological resources found in natural soils or sediments. However, fill deposits could contain archaeological materials with compromised integrity or human remains, depending on where the existing fill material was obtained. Additionally, an archaeologist should not assume that prehistoric archaeological materials—with or without human remains—found in fill or other secondary contexts could not qualify as historical resources or unique archaeological resources for the purposes of CEQA. The significance criteria contained in CEQA *must* still be applied, particularly considering that prehistoric archaeological resources can qualify as historical resources under criteria 1–3 of the CRHR as well as under Criterion 4 for demonstrated or potential ability to contribute information important to resolving pressing research questions (Cal. Code Regs., tit. 14, § 15064.5[a][3]; see also Waters 1992:128 for the information potential of archaeological resources in secondary contexts). Furthermore, archaeological materials—with or without human remains—could qualify as tribal cultural resources under CEQA irrespective of the materials' information potential (see Pub. Resources Code, § 21074).

Naturally occurring soils and sediments have variable potential to contain archaeological materials, hinging principally on four factors:

1. the age of the sediments concerned
2. whether humans were likely or known to have inhabited the area concerned
3. the manner in which naturally occurring soils and sediments accumulated in the area of study
4. what disturbances might have occurred after any archaeological resources were deposited. (Butzer 1982:98; Meyer et al. 2009:3; Schiffer 1987:250–251; Waters 1992:138.)

The following paragraphs will demonstrate that the project site's subsurface possesses characteristics favorable to both the presence and preservation of buried archaeological resources.

Not only are the soils and sediments beneath project-site fill of the right age to contain archaeological resources, archaeological resources P-19-000272 and P-30-001644 are located on a landform similar to the project site, and were found in buried contexts (see **Cultural Resources Appendix CR-1**, **Table 4**). This provides indirect support for the general Holocene age assignment to project-site sediments. The proposed process/sanitary wastewater pipeline is also situated in fill over a Holocene-aged landform (AES 2015a:Figures 5.4-1A, 5.4-1B; Jennings 1962; Mesmer 1903:1286, Soil Map).

The project site also meets the second criterion for buried archaeological resources potential because it is situated in an area that was desirable for human habitation. **Cultural Resources Appendix CR-1**, **Table 4** shows that 85 archaeological resources containing prehistoric materials are recorded within 1 mile of the archaeological PAA. About 14 of these resources are located on alluvium, alluvium–marsh, or marsh lands similar to the archaeological PAA. Thirteen of the archaeological resources within 1 mile of the project site are buried sites with no surface indication of their presence. No prehistoric archaeological resources have been identified in the archaeological PAA, but this is likely the result of sample bias: archaeologists did not conduct a surface examination of the AGS property until 2004 and 2011 (AES 2012:5.3-16–5.3-17; AES 2015a:5.3-24; Cardenas et al. 2012:4-3; Cardenas et al. 2013:4-7; Strudwick 2004:16), whereas the AGS was built and paved over beginning about 1955 (see "Historic Setting" in **Cultural Resources Appendix CR-1**)—forty-nine years before archaeologists surveyed the area. *The opportunity to identify any archaeological resources was precluded by the mid-century development of the project site*.

Similarly, archaeologists did not survey the proposed process/sanitary wastewater pipeline until July 2, 2012 or July 2, 2013 (AES 2015a:5.3-24; Cardenas et al. 2013:4-7). Development and alteration of the ground surface in the vicinity of the proposed process/wastewater pipeline began about 1928 with the advent of agricultural activities, although long-term concealment of the natural ground surface did not commence until 1939, when Los Cerritos Channel was built through the proposed pipeline route (EDR 2011a). Additional areas were paved or subjected to long-term alteration between 1956 and 1960, an interval in which construction of Studebaker Road and the University Parks Estates neighborhood began (AES 2015a:5.3-26; EDR 2011a). In short, archaeologists did not survey the proposed process/wastewater pipeline route until the natural ground surface was almost completely obscured, and had been for more than 50 years. Therefore, *the absence of archaeological finds on the ground surface cannot be taken at face-value as an indication that the archaeological PAA was undesirable for human habitation*.

The soil characteristics in the PAA suggest that the project's underlying soils possess the potential to preserve any buried archaeological materials that are present. The four borings reported in Ninyo & Moore (2011:Appendix A) exhibit variable stratigraphy. The native alluvium underneath fill on the project site alternates between interbedded layers of silty sand and clayey silt, sandy clay, and sand, with occasional lenses of gravel. These alternating textures indicate changes in how native soils were deposited. Fine-textured sediments, such as clay and silt, are associated with overbank flooding and subsequent settlement of fine particles suspended in floodwaters. Suspended, fine particles are deposited as floodwaters lose energy or flow, and therefore represent environments or locations where archaeological resources existing at the time of flooding could be capped and preserved for future discovery. Broadly speaking, naturally occurring sands and gravels in an alluvial setting such as the proposed project site are deposited during levee breaks and other high-energy water actions. These actions are more apt to scour and damage archaeological resources present during the time of a high-energy event rather than to cap and preserve them. *Archaeologists therefore regard deposits of fine particles (silt and clay) as possessing greater archaeological preservation potential than coarse deposits (sand and gravel) (Waters 1992:120–122, Figures 3.4, 3.5.)* Layers of fine materials, such as silt and clay, therefore possess higher preservation potential for buried archaeological resources. **Cultural Resources Table 6** identifies the depth of low-energy strata revealed by each of the geotechnical borings reported by Ninyo & Moore (2011:Appendix A).

**Cultural Resources Table 6**
**Depth of Low-Energy Strata beneath the Project Site**

| Boring 1 | Boring 2 | Boring 3 | Boring 4 |
|---|---|---|---|
| 9–19 | 10.5–15.0 | 8–13 | 9–14 |
| | 15–27 (paleosol) | 13.0–18.5 | 30.5–34.0 |
| | | 35–43 | 34–39 |
| | | 50.5–51.0 | 39.0–41.5 |
| | | | 45–46 |
| Note: All figures are in feet below the current ground surface. | | | |

Preservation potential is also improved by the development of paleosols, or former land surfaces (Waters 1992:59–60). Boring 2 provides evidence that portions of the project site's substrate have still greater preservation potential for buried archaeology. The boring log reveals root casts and shell fragments beginning about 15 feet below ground surface, in alluvium likely to be of Early Holocene age (AES 2015a:5.8-5; Ninyo & Moore 2011:Appendix A). As stated in the "Environmental Setting" portion of this chapter, the presence of root casts in Boring 2 and monitoring wells suggests that a former land surface is present about 15 feet below ground surface in portions of the project site. Former land surfaces indicate periods of landscape stability, when flooding was not a deterrent to human habitation or use of the area.

### Model of Historical Archaeological Resources

As discussed previously in this cultural resources section, the extent of disturbance and amount of pavement and superstructure covering the archaeological PAA makes it unlikely that historic archaeological resources would be or could be found on the present ground surface. The cultural resources inventory results corroborate this expectation, since no historic archaeological resources were identified on the surface of the archaeological PAA.

The archaeological PAA has the potential to contain buried historic archaeological deposits. Historic artifacts could have been brought to the archaeological PAA within the fill deposits. Such deposits cannot be disqualified as historical resources or unique archaeological resources without first being formally evaluated using CEQA criteria; historic archaeological deposits in secondary contexts have yielded information important to the study of history and historical archaeology (see Van Bueren 2009). Fill on industrial sites, however, can also bury historic artifacts and features such as structural remnants—artifact scatters formed of metal, concrete, and glass building fragments (resulting from demolition)—and refuse scatters associated with industrial disposal practices. In addition, historic aerial photographs indicate that domestic archaeological remnants might be preserved under the project site, as a residence and several outlying structures sat adjacent to the proposed project site from 1928 till sometime between 1951 and 1956 (EDR 2011a, 2011b).

### Historic Built Environment

Two CRHR-eligible cultural resources have been identified in the PAA. The San Gabriel River Channel and Los Cerritos Channel both appear eligible for listing on the CRHR under criteria 1 and 3, and thus, both appear to qualify as historical resources as defined by CEQA.

Staff concurs with the applicant's recommendation that neither the AGS nor the HGS appears eligible for the CRHR, and that neither appears to qualify as a historical resource for the purposes of CEQA. Staff has reached its own conclusions as to the CRHR eligibility of the subject segment of Studebaker Road and bridges 1563, 3460, and 2750 based on staff's own historical research. Staff concludes that none of these four built-environment resources—all of which were built in 1966 and were associated with the expansion of the AGS—appear to meet any of the criteria of the CRHR, and none appear to qualify as historical resources under CEQA.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

Direct impacts to cultural resources are those associated with project development, construction, and operation. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources can result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be demolished or removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, feeling and association. New structures might also produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility to resources by non-project-affiliated personnel and the potential for vandalism or greater weather exposure becomes possible.

Ground disturbance accompanying construction at a plant site has the potential to directly affect archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

### Construction Impacts and Mitigation

#### Identification and Assessment of Direct Impacts on Archaeological Resources and Proposed Mitigation

##### *Archaeological Resources on the Surface of the Archaeological PAA*

No archaeological resources have been identified on the surface of the archaeological PAA. Staff concludes that appropriate methods were employed to identify archaeological resources on the ground surface and therefore construction and operation of the proposed AEC would not result in direct impacts on this class of cultural resource.

##### *Buried Archaeological Resources in the Archaeological PAA*

The sediments under the project site are of the right age to have supported the formation and preservation of archaeological resources throughout the span of human occupation in the Long Beach area. The AEC could result in damage to buried archaeological resources, if any are present.

Consulting **Cultural Resources Appendix CR-1**, **Table 1**, the record shows that numerous project elements are known to involve construction to a depth that would intersect non-fill sediments, where archaeological resources could be preserved. These project elements include the (1) proposed combustion turbine generator and heat recovery steam generator foundation slabs and deep piles; (2) foundation pad and deep piles for the generator step-up unit transformers; (3) overhead transmission line pole foundations; (4) air-cooled condenser (ACC) deep piles; (5) steam turbine generators foundations and deep piles; (6) deep piles for the clear water storage, water, and ammonia tanks; (7) fuel gas compressor/conditioning structure; (8) fire water piping and hydrants; (9) relocated gas metering station; and (10) process/sanitary wastewater pipeline.

The foundation slabs within the proposed power blocks would require approximately 1–4 feet of excavation into native sediments; excavation would most likely be accomplished via mass soil removal, assisted by an excavator. These excavations would encounter low-energy sediments and therefore have the potential to encounter buried archaeological resources (see **Cultural Resources Table 6**).

Deep-pile foundations would be excavated in excess of 40 feet into native sediments. Unlike the foundation slabs, which require mass excavation, the deep piles would likely be 14 inches in diameter (Ninyo & Moore 2011:23) and driven or hammered into the substrate. Deep piles would intersect as many as five low-energy strata (including the paleosol) (see **Cultural Resources Table 6**). Pile driving therefore would have potential to damage buried archaeological resources. Driven piles, however, preclude the ability to observe the affected sediments and produce little to no spoils to examine.

The proposed fuel gas compressor/conditioning structure and relocated gas metering station would be mechanically excavated 2–4 and 4 feet into native sediments, respectively. Excavation for both proposed structures would intersect low-energy sediments and possibly the paleosol identified in Boring 2; construction of the structures therefore has the potential to encounter buried archaeological resources.

The proposed fire water piping and hydrants would require excavation into native sediments to a depth of 0–1.5 feet. The intersected natural sediments represent low-energy deposits and have the potential to contain buried archaeological resources (see **Cultural Resources Table 6**).

Should the construction activities outlined above encounter buried archaeological resources, and such resources meet the CEQA criteria for historical or unique archaeological resources, damage to the resources would pose a significant environmental impact.

Fill placed in previously inhabited or built areas is sometimes used to bury structural remnants and features to facilitate subsequent construction. The presence of fill often precludes the discovery of intact prehistoric archaeological resources within the fill, but might blanket historic or prehistoric archaeology that rests on an earlier land surface. Third and finally, fill is sometimes obtained from properties that contain archaeological materials and human remains; such materials can become incorporated into the fill and be redeposited elsewhere. The CEQA significance criteria must still be applied to any such discoveries and as such pose a resource management consideration. The discovery of human remains—regardless of context—must be handled according to the applicable portions of the Public Resources Code and California Health and Safety Code.

***Mitigation of Impacts to Buried Archaeological Resources***

Staff concludes that expectable ground-disturbance impacts on buried archaeological resources would best be mitigated by implementing a comprehensive cultural resources mitigation and monitoring program for the proposed AEC. Implementation of a well-planned mitigation and monitoring program would reduce the potential project impacts to a less-than-significant level.

The SAFC contains an outline of such a program, consisting of eight parts:

1. Designated Cultural Resources Specialist
2. Construction Worker Training
3. Emergency Discovery
4. Site Recording and Evaluation
5. Mitigation Plan
6. Curation
7. Report of Findings
8. Inadvertent Discovery of Human Burials. (AES 2015a:5.3-29–5.3-32.)

Although staff agrees that these components are important to an effective mitigation and monitoring program, three important elements are missing from it. The first is a cultural resources mitigation and management plan (CRMMP) with an explicit research design and procedures for the treatment of archaeological and human remains discoveries that could occur during construction. The absence of explicit consideration of the resource types expectable in the PAA and the methods required to evaluate any such resources leaves important decision-making to the time least amenable to responsible historic preservation practice—the moment of inadvertent discovery. The second element missing from the SAFC's proposed mitigation and monitoring program is a provision for construction monitoring by local tribal representatives. As described earlier under *Native American Consultation*, a consulted tribal representative urged that tribal monitors be present during construction because archaeological materials encountered in the PAA would likely be related to their Gabrielino culture. The third missing element from the proposed mitigation program is construction monitoring by qualified archaeologists[16]. Staff's analysis identifies archaeological potential in the archaeological PAA using multiple lines of evidence. Staff therefore proposes Conditions of Certification (Conditions) **CUL-1** through **CUL-8**, incorporating portions of the applicant's proposed mitigation measures, to reduce the AEC's potential impacts to a less-than-significant level.

### Identification and Assessment of Direct Impacts on Archaeological and Ethnographic Resources

Staff has identified one ethnographic resource in the PAA that also contain archaeological components: the Puvunga Ceremonial Site Complex (PCSC). This resource was identified in consultation with Gabrielino/Tongva individuals, whose input is partially responsible for staff's conclusion that the PCSC is a historical resource and tribal cultural resource for the purposes of CEQA. The PCSC retains sufficient integrity to convey its significance for associative values to local tribes under CRHR criteria 1 and 2. Staff concludes that despite the presence of the PCSC in the PAA the proposed AEC will not impact the resource. Staff also consulted several other technical areas, i.e., air quality, biology, noise and vibration, and visual resources, to determine if visitors to the PCSC could be subjected to significant impacts from the proposed AEC. Staff concludes that there would not be an impact to visitors to the PCSC from the proposed AEC. However, if any buried archaeological resources are encountered during construction of the proposed AEC, these resources should be evaluated as potential contributing elements to the PCSC, and potential ethnographic/tribal cultural resource that could be valuable to the Gabrielino Tongva.

### Identification and Assessment of Direct Impacts on Built-Environment Resources and Proposed Mitigation

Staff concludes that both the San Gabriel River Channel and Los Cerritos Channel are eligible for listing on the CRHR under criteria 1 and 3 and qualify as historical resources under CEQA. Therefore, under the Public Resources Code, section 21084.1, an assessment of whether or not the proposed project will result in a substantial adverse change in the significance of these two historical resources must be made.

#### *San Gabriel River Channel*

Staff has not identified any direct impacts to the San Gabriel River Channel or levees as resulting from the proposed project. The existing AGS outfall gates that expel cooling water into the San Gabriel River Channel would remain intact and would not be removed or altered. Storm water at the AGS would continue to be discharged to the San Gabriel River via the existing storm water outfalls (AES 2015b:3). As such, the proposed project has no potential to alter, destroy, or damage any historical features of the San Gabriel River Channel or otherwise negatively affect the historical integrity of this portion of the San Gabriel River Channel in a way that would diminish its historical significance.

[16] The SAFC contains a mitigation measure entitled, "Monitoring," but the discussion therein argues that archaeological monitoring is unnecessary rather than describing appropriate archaeological monitoring methods (see AES 2015a:5.3-30–5.3-31).

The significance of the San Gabriel River Channel is based on its importance to the residential, commercial, and industrial growth and development of the region, as well as for its high artistic values in regard to the engineering design and planning of the larger Los Angeles Basin flood control system. The AGS is merely one of many examples of industrial use along this channelized waterway. Thus, decommissioning and potential future removal of the AGS itself also would not result in a substantial adverse change in the significance of the San Gabriel River Channel, as the Channel was not created solely for the use of the AGS; rather, the AGS was built at this location to take advantage of the potential for drawing water from nearby Los Cerritos Channel for cooling purposes and discharging it into the adjacent San Gabriel River.

***Los Cerritos Channel***

Staff has not identified any direct impacts to the Los Cerritos Channel that would result from implementation of the proposed project. The existing AGS intake channels that draw cooling water from the Los Cerritos Channel would remain intact and would not be removed or altered. As such, the proposed project has no potential to alter, destroy, or damage any historical features of the Los Cerritos Channel or otherwise negatively affect the historical integrity of this portion of the Los Cerritos Channel in a way that would diminish its historical significance.

The significance of the Los Cerritos Channel is based on its importance to the residential, commercial, and industrial growth and development of the region, as well as for its high artistic values with regard to the engineering design and planning of the larger Los Angeles Basin flood control system. The decommissioning and potential future removal of the AGS would not result in a substantial adverse change in the significance of the Los Cerritos Channel, as the Channel was not created for the use of the AGS; rather, the AGS was built at this location to take advantage of the potential for drawing water from Los Cerritos Channel for cooling purposes and discharging it into the adjacent San Gabriel River.

## Indirect Impacts

A segment of the offsite process/sanitary wastewater pipeline will be hung along Bridge 2750 over Los Cerritos Channel along Loynes Drive as part of this project. While the bridge is not a historical resource, it crosses over Los Cerritos Channel, which is a historical resource. The pipeline, however, would be hung inconspicuously along the outside edge of the bridge and would have no potential for any indirect visual effect on the integrity or significance of the Los Cerritos Channel. Staff concludes that mitigation for indirect impacts is not necessary for the proposed project.

## Operation Impacts and Mitigation

During operation of the proposed AEC, if a leak should develop in buried pipelines within the project site, repair of the buried utility could damage previously unidentified, subsurface archaeological resources in areas unaffected by the original excavation. The measures proposed above and below for the mitigation of impacts to previously unknown archaeological resources found during construction would also mitigate impacts that occur during operation-phase repairs.

Staff has not identified any potential operational impacts to any CRHR-eligible historical built-environment resources qualifying as historical resources under CEQA. Both the San Gabriel River Channel and the Los Cerritos Channel are located outside of the boundaries of the proposed AES, and therefore, future operations within the facility are unlikely to cause any impacts to the significance of these two resources. However, any future operation or maintenance activities of AEC that will result in alteration, modification, or destruction of any part of these two flood control structures will require a project impacts assessment.

## Environmental Justice Impacts

Staff has considered environmental justice (EJ) populations in its analysis of the proposed project. Staff has not identified significant adverse direct, indirect, or cumulative cultural resources impacts that would affect EJ populations including Native Americans.

## Cumulative Impacts and Mitigation

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130). Cumulative impacts to cultural resources in the project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed AEC, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to construction of the proposed AEC and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric and historic. The alteration of the setting which could be caused by the construction and operation of the proposed AEC and other proposed projects in the vicinity could be cumulatively considerable, but may or may not be a significant impact to cultural resources.

### Cumulative Archaeological and Ethnographic Impacts and Mitigation

For the purposes of this cumulative impacts analysis, staff has determined that the cumulative area of analysis for archaeological resources comprises a 6-mile-diameter semicircle from the project site and its off-site linear (**Executive Summary Figure 1**). The cumulative projects area of analysis encompasses the project site and geographic qualities that were likely of concern to the prehistoric inhabitants of the project vicinity. Archaeological research indicates that prehistoric settlement patterns changed over time and suggests that the project vicinity hosted one or more gathering camps and at least one major village, from which people moved up to 5–6 miles to obtain nearby resources and return home (Hudson 1971:60–61, Map 2). Doubtlessly, California Indians forayed much further in all directions for resource procurement, socializing, and trading, but day-to-day activities of a settlement would have occurred nearby, over more limited distances. A 6-mile radius from the project site therefore appears to form a geographic unit that was probably meaningful to the prehistoric human inhabitants of the project vicinity, and a useful basis for assessing cumulative impacts on archaeological resources. In selecting projects that could contribute to cumulative impacts, staff identified those projects in the 6-mile radius that would result in ground disturbance because excavation is the primary vehicle for archaeological resource impacts for the proposed project. Staff presents its list of cumulative projects for archaeological resources in **Cultural Resources Appendix CR-1**, **Table 5**. Cumulative projects were identified by consulting planning staff and websites for the municipalities in the 6-mile radius: the cities of Anaheim, Artesia, Buena Park, Cypress, Garden Grove, Hawaiian Gardens, Huntington Beach, Lakewood, Long Beach, Los Alamitos, Seal Beach, Stanton, and Westminster; the community of Rossmoor; ports of Long Beach and Los Angeles; Long Beach Unified School District; California Department of Transportation; and counties of Los Angeles and Orange. In some cases, copies of environmental review documents were not available online for staff's perusal; such projects are listed as yielding "No information" in the Resources Affected/Level of Significance column of **Cultural Resources Appendix CR-1**, **Table 6**.

Staff identified a total of 76 cumulative projects in the 6-mile buffer. Staff was unable to locate environmental impact reviews for 14 of the projects summarized in **Cultural Resources Appendix CR-1**, **Table 6**. These are summarized by type of finding below.

- Seventeen cumulative projects reportedly would result in no impacts on archaeological resources.
- Eleven cumulative projects report less-than-significant impacts on archaeological resources because none were identified in their respective impact areas.
- Two cumulative projects report less-than-significant impacts on archaeological resources because some unknown potential exists to encounter archaeological resources during construction of the proposed projects.
- The Riverwalk Residential Development Project reportedly would have a potentially significant impact on as-yet-unidentified archaeological resources.
- Twenty-eight cumulative projects would result in less-than-significant impacts on archaeological resources with the implementation of mitigation measures; three of these project areas contain known archaeological resources.
- The Parkside Estates project in Huntington Beach would result in significant impacts on archaeological resources.
- Six archaeological sites are recorded in the Los Cerritos Wetlands Conceptual Restoration Plan and Mitigation Bank, but that project is categorically exempt from CEQA.
- The Beach Boulevard/Edinger Corridors Specific Plan environmental assessment concludes that the proposed project would likely affect as-yet-unidentified archaeological resources, and that such effects would be significant and unavoidable. (**Cultural Resources Appendix CR-1**, **Table 6**.)

Although staff concludes that the proposed AEC could result in significant impacts on as-yet-unidentified archaeological resources that qualify as either historical or unique archaeological resources (as defined under CEQA), staff-proposed Conditions **CUL-1** through **CUL-8** would reduce project-specific impacts to a less-than-significant level. Therefore, the proposed project's contribution to cumulative impacts on archeological resources would be less than cumulatively considerable.

### Cumulative Built Environment Impacts and Mitigation

Considered in conjunction with the potential removal and reconstruction of nearby steam-generating plants also dating to the historic-period (El Segundo Steam Station, Redondo Beach Generating Station and Huntington Beach Generating Station), the decommissioning and future removal of the AGS would add to the loss of information relative to the development of electric steam power generation in the twentieth century in California. These post-war power plants have been recorded, their operations and expansion activities documented and evaluated, and through the associated licensing and/or permitting processes, that historical information has been made available to the public. Due to the existence of this recorded historical information, the likelihood of there being a cumulative impact from the AEC is negligible.

There is no overall potential for cumulative impacts to the San Gabriel River Channel and the Los Cerritos Channel, the only two CRHR-eligible historical built-environment resources in the PAA that qualify as historical resources under CEQA. Both Channels are located outside of the boundaries of the proposed AES, and staff has not identified any potential for cumulative impacts that would affect the significance of these two resources.

## RESPONSE TO PSA COMMENTS

Staff received nine public comments on the cultural resources analysis contained in the preliminary staff assessment (PSA) for the proposed AEC. Comments are summarized and responded to immediately below.

**Applicant Comment*:*** *Page 4.4-23, EJ/Socioeconomic Methods – The applicable standard should be clarified to read, "In accordance with federal and state law, regulations, policies, and guidance, staff considered the proposed project's potential to cause disproportionate significant adverse impacts to environmental justice (EJ) populations" (AES 2016:15).*

> **Staff Response:** Staff agrees with the applicant's addition to the EJ standard above.

**Applicant Comment:** *Page 4.4-61, 1st full paragraph – The following sentence should be clarified as follows: "Although staff concludes that the proposed AEC could result in significant impacts on* ***unidentified*** *archaeological resources that qualify as either historical or unique archaeological…" (AES 2016:15).*

> **Staff Response:** Staff agrees with this proposed change.

**Applicant Comment:** *Page 4.4-64, Condition* ***CUL-1*** *– The applicant finds the scope of the potential activities requiring a Cultural Resource Specialist (CRS) and Cultural Resource Monitor (CRM) in the verification unclear and broad. The Applicant recommends deleting the following text under the "Duties of Cultural Resources Specialist": "The conditions described in this subsection of the PSA shall continue to apply during operation of the proposed power plant." (AES 2016:15.)*

**Staff Response:** Staff is agreeable to the applicant's proposed deletion of this sentence.

**Applicant Comment:** *Page 4.4-64, Condition **CUL-1** – The Applicant also requests clarification of the activities that are denoted with " " in the verification (AES 2016:15).*

**Staff Response:** In an effort to clarify the scope and timing of Condition **CUL-1**, staff revised Verification 1 to read, "The project owner shall submit the specified information at least 75 days prior to the start of ground disturbance associated with site mobilization and construction (as defined in the Compliance Conditions section)."

**Applicant Comment:** *Page 4.4-64, Condition **CUL-1** – The applicant requests that staff add to condition **CUL-1** a provision guaranteeing automatic approval of a prospective CRS that has served as a CRS on Energy Commission projects within the last 5 years, except under limited circumstances (AES 2016:16).*

**Staff Response:** CRSs perform an important function with regard to implementing mitigation for cultural resources. No two projects present identical cultural resources impact potential, even projects in close proximity. Therefore, it is imperative that CRSs be approved with the specific project they will be working on in mind. Past approval of a CRS on one project does not automatically qualify the same CRS for another project that may require different regional knowledge or expertise. Additionally, the qualifications of a CRS may change over time as missing information comes to light or inaccurate information is corrected, whereby a CRS approved several years previously may not be considered qualified subsequently. A conflict of interest may exist preventing a CRS to be approved for this specific project. Lastly, as with any profession, there is the possibility that a CRS that was previously found adequate subsequently engages in compromising job-related conduct that disqualifies them from being considered an adequate candidate for overseeing implementation of project mitigation. In this context such conduct could include divulging confidential information about cultural resources, or conviction of looting, gross negligence, or dereliction of duty. While staff would hope that such instances would be rare, nevertheless, it remains a possibility. Therefore, a blanket approval process, based solely on prior acceptance within the last 5 years, is not appropriate for the AEC.

Typically the CPM approves the CRS in a relatively quick manner which eliminates any benefit of the Applicant's proposed automatic approval process.

**Applicant Comment:** *Page 4.4-66, Condition **CUL-2** – Given the broad project area of analysis, the Applicant recommends limiting the National Register of Historic Places (NRHP)/CRHR-eligible cultural resources to those located in the power plant site, linear facilities, access roads, and laydown areas (AES 2016:16).*

**Staff Response:** Staff appreciates the applicant's intent behind this comment and suggests a compromise based on the compact archaeological project area of analysis: "Maps shall include any cultural resources, including any historic built environment resources, identified in the Final Staff Assessment's **archaeological** project area of analysis."

The archaeological project area of analysis encompasses the power plant site, linear facilities, access roads, and laydown areas, plus 50–200-foot buffers around these project elements (see **Cultural Resources Figure 1**). In this way, staff is assured that the CRS is cognizant of cultural resources within and adjacent to the proposed project while not requiring the mapping of resources distant from construction activities.

**Applicant Comment:** *Page 4.4-70, Condition **CUL-4** – The Applicant is concerned about the potential burden of having to prepare a Cultural Resources Report (CRR) for a short-term suspension of ground disturbance and/or construction activities, and suggests that **CUL-4** only require preparation of a CRR upon suspension of all construction activities for more than 30 days or completion of all proposed ground disturbance (AES 2016:16).*

**Staff Response:** Staff agrees to the applicant's proposed changes to **CUL-4**.

**Applicant Comment:** *Page 4.4-72, Condition **CUL-6** – The Applicant proposes that the Condition **CUL-6** language approved by the Commission in the Final Decision for the Huntington Beach Energy Project (HBEP) be adopted instead, as summarized below (AES 2016:16–19).*

**Staff Response:** Staff respectfully rejects the applicant's proposed **CUL-6**. The applicant's proposed **CUL-6** does not follow logically from the PSA or FSA, as demonstrated earlier in this assessment in "*Buried Archaeological Resources in the Archaeological PAA*". A version of **CUL-6** that does not include archaeological and tribal monitoring prior to discovery of cultural resources would fail to account for public and tribal concerns about the likelihood and importance of such inadvertent discoveries (see "Public Comment" below and "Native American Consultation" earlier in this FSA). Staff also notes that the HBEP is an inappropriate analog to the proposed AEC; the conditions of certification in one project have little bearing on those applicable to the other, as they depend entirely upon the project site-specific characteristics of the respective projects.

**Public Comment:** *At the PSA workshop held on August 9, 2016, Ms. Anne Cantrell informed the workshop participants that she is aware that Tongva (Gabrielino) burials have been found near the proposed AEC and that sacred sites are located at California State University, Long Beach. Ms. Cantrell emphasized the need to have adequately qualified personnel overseeing excavations in the event that Tongva sites or burials are encountered during construction of the AEC.*

**Staff Response:** At the PSA workshop, staff affirmed that it was aware of and analyzed the AEC's potential to affect resources of concern to the Gabrielino Indians and the public. Staff summarized its efforts and those of the applicant to assess potential impacts on cultural resources. Finally, staff suggested that Ms. Cantrell consult the cultural resources sections of the SAFC, PSA, and this FSA for additional information.

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

If the conditions of certification proposed by staff below are properly implemented, the proposed AEC would result in less-than-significant impacts on any archaeological resources identified during construction. The proposed project would therefore be in compliance with the applicable state laws, ordinances, and standards (LORS) listed in **Cultural Resources Table 1**. Staff's conclusions of LORS compliance are detailed in **Cultural Resources Table 7**. To summarize applicable LORS, state laws stipulate specific courses of action and notifications in the event that human remains and grave- or cairn-associated artifacts are found during construction (see **Cultural Resources Table 7**; Pub. Resources Code, §§5097.98[b] and [e], 5097.99; Health and Safety Code, §7050.5). Staff's proposed conditions **CUL-3** and **CUL-5** would ensure compliance with these laws through the preparation of a Cultural Resources Mitigation and Monitoring Plan (CRMMP) and implementation of a Workers' Environmental Awareness Program (WEAP).

**Cultural Resources Table 7**
**Compliance with Laws, Ordinances, Regulations, and Standards**

| Applicable LORS | Description | Condition of Certification Demonstrating Compliance |
|---|---|---|
| **State** | | |
| Pub. Resources Code, §§ 5097.98 (b and e) | Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until s/he confers with the NAHC-identified MLDs to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance. | **CUL-3** requires the preparation of a CRMMP, which would describe the response and notification procedures described in these sections of the Public Resources Code. **CUL-5**, the WEAP, would inform construction staff of the legal response to discovery of Native American human remains and artifacts. |
| Pub. Resources Code, § 5097.99 | Section 5097.99 prohibits the acquisition, possession, sale, or dissection with malice or wantonness of Native American remains or artifacts taken from a Native American grave or cairn. | **CUL-3** requires the preparation of a CRMMP, which would contain provisions for the disposition of Native American remains or artifacts. **CUL-5**, the WEAP, would inform construction staff of the legal response to Native American human remains and artifacts. |
| Health and Safety Code, § 7050.5 | This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. It also requires a project owner to halt construction if human remains are discovered and to contact the county coroner. | **CUL-3** requires the preparation of a CRMMP, which would describe the response and notification procedures described in this section of the Health and Safety Code. Construction staff would be instructed in these matters during the WEAP required by **CUL-5**. |
| Abbreviations: CRMMP = cultural resources mitigation and monitoring plan; MLD = most likely descendant; NAHC = Native American Heritage Commission; Pub. Resources Code = Public Resources Code; WEAP = workers' environmental awareness program | | |

## CONCLUSIONS AND RECOMMENDATIONS

Staff finds that the proposed AEC could result in damage to as-yet-unidentified archaeological resources that qualify as historical or unique archaeological resources under CEQA, which is a significant impact under that act. However, staff finds that implementation of Conditions **CUL-1** through **CUL-8** would reduce these impacts to a less-than-significant level.

**CUL-1** through **CUL-2** are administrative conditions that set out who will implement the balance of the conditions, what the qualifications and roles of those people will be, and the information that the project owner will supply them to help them fulfill those roles. **CUL-3** requires the project owner to provide a CRMMP to guide construction monitoring and the evaluation and treatment of inadvertently discovered archaeological resources or human remains, in light of what is known about regional prehistoric, ethnography, and history. **CUL-5** provides for training of project owner staff and the construction management/implementation team regarding basic cultural resource identification and compliance with these proposed conditions and the provisions of the CRMMP. **CUL-6** defines the scope of monitoring by qualified archaeologists and Native Americans, required to implement the CRMMP and other proposed Conditions. **CUL-7** defines the protocols, responsibilities, and timeframes involved in responding to inadvertent archaeological or human remains discoveries. **CUL-8** describes the manner in which the project owner is to conduct cultural resources inventory and analysis in the event that procurement of construction materials must occur at off-site, non-commercial properties. **CUL-4** requires that the project owner prepare a final report of all cultural resources activities undertaken during construction of the proposed AEC and the Energy Commission's responsibility as lead agency to review this document to verify accuracy and complete implementation of the cultural resources mitigation and monitoring program.

## PROPOSED CONDITIONS OF CERTIFICATION

### CUL-1 APPOINTMENT AND QUALIFICATIONS OF CULTURAL RESOURCES SPECIALIST (CRS)

A. CULTURAL RESOURCE SPECIALIST

1. Appointment and Qualifications

   The project owner shall assign a Cultural Resources Specialist (CRS) to the project. The project owner may elect to assign one or more alternate CRSs as well. The project owner shall submit the resumes of the proposed CRS and Alternative CRS(s), with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for review and approval.

The CRS and Alternate CRS(s) shall have training and background that conform to the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61. In addition, the CRS and Alternate CRS(s) shall have the following qualifications:

1. A background in anthropology, archaeology, history, architectural history, or a related field;

2. At least 10 years of archaeological or historical experience (as appropriate for the project site), with resources mitigation and fieldwork;

3. At least one year of field experience in California; and

4. At least three years of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The project owner may replace the CRS by submitting the required resume, references and contact information of the proposed replacement CRS to the CPM.

2. Duties of Cultural Resources Specialist

The CRS shall manage all cultural resource monitoring, mitigation, curation, and reporting activities, and any pre-construction cultural resource activities, unless management of these is otherwise provided for in accordance with the cultural resource conditions of certification (conditions). The CRS shall serve as the primary point of contact on all cultural resource matters for the Energy Commission. The CRS may elect to obtain the services of Cultural Resource Monitors (CRMs), Native American Monitors (NAMs), and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner.

After all ground disturbances are completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, after receiving approval from the CPM.

B. CULTURAL RESOURCES MONITORS

1. Appointment and Qualifications

   The CRS may assign Cultural Resources Monitors (CRMs). CRMs shall have the following qualifications:

   1. B.S. or B.A. degree in anthropology, archaeology, historical archaeology, or a related field; and one year of archaeological field experience in California; or

   2. A.S. or A.A. degree in anthropology, archaeology, historical archaeology, or a related field, and four years of archaeological field experience in California; or

   3. Enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology, or a related field, and two years of archaeological field experience in California.

C. NATIVE AMERICAN MONITORS

1. Appointment and Qualifications:

   Preference in selecting NAMs shall be given to Native Americans with:

   1. traditional ties to the area to be monitored, and

   2. the highest qualifications as described by the Native American Heritage Commission (NAHC) document entitled: *Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites* (2005).

D. CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialist(s), e.g., geoarchaeologist, historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval. The resume of each proposed specialist shall demonstrate that their training and background meet the U.S. Secretary of Interior's Professional Qualifications Standards for their specialty (if appropriate), as published in Title 36, Code of Federal Regulations, part 61, and show the completion of appropriate graduate-level coursework. The resumes of specialists shall include the names and telephone numbers of contacts familiar with the work of these persons on projects referenced in the resumes and demonstrate to the satisfaction of the CPM that these persons have the appropriate training and experience to undertake the required research. The project owner may name and hire any specialist prior to certification. All specialists are under the supervision of the CRS.

**Verification:**

1. The project owner shall submit the prospective CRS's and any Alternate CRS's qualifications at least 75 days prior to the start of ground disturbance associated with site mobilization and construction (as defined in the Compliance Conditions section).

2. The project owner may replace a CRS by submitting the required resume, references and contact information to the CPM at least 10 working days prior to the termination or release of the then-current CRS. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent CRS is proposed to the CPM for consideration.

3. At least 20 days prior to Cultural Resources Ground Disturbances, the CRS shall provide proof of qualifications for any anticipated CRMs and additional specialists for the project to the CPM.

4. If efforts to obtain the services of a qualified NAM are unsuccessful, the project owner shall inform the CPM of this situation in writing at least 30 days prior to the beginning of post-certification cultural resources field work or construction-related ground disturbance.

5. At least 5 days prior to additional CRMs or NAMs beginning on-site duties during the project, the CRS shall review the qualifications of the proposed CRMs or NAMs and send approval letters to the CPM, identifying the monitors and attesting to their qualifications.

6. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

7. At least 10 days prior to the start of construction-related ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

8. No Cultural Resources Ground Disturbances shall occur prior to CPM approval of the CRS and alternates, unless such activities are specifically approved by the CPM.

**CUL-2 INFORMATION TO BE PROVIDED TO CRS**

Prior to the start of ground disturbance, the project owner shall provide the CRS with copies of the AFC, data responses, confidential cultural resources reports, all supplements, the Energy Commission cultural resources Final Staff Assessment (FSA), and the cultural resources Conditions from the Final Decision for the project, if the CRS does not already possess copies of these materials. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:24,000 and 1 inch = 200 feet, respectively) for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

Maps shall include any cultural resources, including any historic built environment resources, identified in the FSA's archaeological project area of analysis.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

The project owner shall provide the documents described in the first paragraph of this condition to new CRSs in the event that the approved CRS is terminated or resigns.

**Verification:**

1. At least 40 days prior to the start of ground disturbance, the project owner shall provide the CPM notice that the AFC, data responses, confidential cultural resources documents, all supplements, FSA, and Final Commission Decision have been provided to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

4. Weekly, during ground disturbance, a schedule of the next week's anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

6. If a new CRS is approved by the CPM as provided for in CUL-1, the project owner shall provide the CPM notice that the AFC, data responses, confidential cultural resources documents, all supplements, FSA, Final Commission Decision, and maps and drawings have been provided to the new CRS within 10 days of such approval.

**CUL-3 CULTURAL RESOURCES MITIGATION AND MONITORING PLAN (CRMMP)**

Prior to the start of ground disturbance, the project owner shall submit the CRMMP, as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The CRMMP shall identify measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM. Portions of the CRMMP that describe or map the location(s) of cultural resources shall be designated as confidential.

The CRMMP shall include the following elements and measures.

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A specific mitigation plan shall be prepared for any unavoidable impacts to any CRHR-eligible (as determined by the CPM) resources. A prescriptive treatment plan may be included in the CRMMP for limited data types.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related effects.

7. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's (SHRC's) *Guidelines for the Curation of Archaeological Collections* (1993, or future updated guidelines from the SHRC), into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

9. A statement demonstrating when and how the project owner will comply with Health and Human Safety Code 7050.5(b) and Public Resources Code 5097.98(b) and (e), including the statement that the project owner will notify the CPM and the NAHC of the discovery of human remains.

10. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

11. A description of the contents, format, and review and approval process of the final Cultural Resource Report (CRR), which shall be prepared according to *Archaeological Resource Management Report (ARMR)* guidelines.

**Verification:**

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the project owner an electronic copy of the draft model CRMMP for the CRS.

2. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

3. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials generated or collected as a result of the archaeological investigations (survey, testing, data recovery).

4. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were generated or collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the SHRC's *Guidelines for the Curation of Archaeological Collections* (1993, or future updated guidelines from SHRC), to accept the cultural materials from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

**CUL-4 FINAL CULTURAL RESOURCES REPORT (CRR)**

The project owner shall submit the final CRR to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, DPR 523 forms, data recovery reports, and any additional research reports not previously submitted to the CHRIS shall be included as appendices to the final CRR.

If the project owner requests a suspension of all construction activities for more than 30 days, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

**Verification:**

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

3. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the CHRIS, the curating institution, if archaeological materials were collected, and to the tribal chairpersons of any Native American groups requesting copies of project-related reports.

**CUL-5 CULTURAL RESOURCES WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)**

Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The cultural resources part of this training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS is encouraged to include a Native American presenter in the training to contribute the Native American perspective on archaeological and ethnographic resources. During the training and during construction, the CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes.

The training shall include:

1. A discussion of applicable laws and penalties under law;

2. Samples or visuals of artifacts that might be found in the project vicinity;

3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;

4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;

5. Instruction that the CRS, Alternate CRS, and CRMs have the authority to halt ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

6. Instruction that employees, if the CRS, Alternate CRS, or CRMs are not present, are to halt work on their own in the vicinity of a potential cultural resources discovery, and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

7. An informational brochure that identifies reporting procedures in the event of a discovery;

8. An acknowledgement form signed by each worker indicating that they have received the training; and

9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

**Verification:**

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the cultural resources WEAP training program draft text and/or training video, including Native American participation, and graphics and the informational brochure to the CPM for review and approval.

2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

3. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

**CUL-6 UNDISCOVERED CULTURAL RESOURCES**

The project owner shall ensure that a CRS, alternate CRS, or CRMs shall be on site for any ground disturbance that extends into sediments or soils below the artificial fill, which varies from 6 to 9 feet in depth across the AEC project site.

Ground disturbance that occurs in the following areas shall be subject to this condition.

- Combustion turbine generator/heat recovery steam generator foundation slabs (Blocks 1, 3, and 4).
- Generator step-up transformer foundation pads (Blocks 1, 3, and 4).
- Overhead transmission line pole foundations.
- Steam turbine generator foundations.
- Fuel gas compressor/conditioning structure.

- Fire water piping and hydrants surrounding Power Block 4.
- Relocated gas metering station.
- Process/sanitary wastewater pipeline.

Prior to the start of ground disturbance, the project owner shall notify the CPM and all interested Native Americans of the date on which ground disturbance will ensue. The project owner is not required to monitor construction of other project components (that is, those not listed immediately above) unless the CRS or CPM determine that observable conditions in the field warrant monitoring. Where excavation equipment is actively removing dirt and hauling the excavated material farther than 50 feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no farther than 50 feet from the location of active excavation, one monitor shall observe both the location of active excavation and inspect the dumped material.

In the event that the CRS believes that the required number of monitors is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the number of monitors shall be provided to the CPM for review and approval prior to any change in the number of monitors.

The project owner shall obtain the services of one or more NAMs to monitor construction-related ground disturbance in areas slated for excavation into non-fill (native) sediments, as described in the previous bulleted list. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the NAHC. Preference in selecting an NAM shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified NAM are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow construction-related ground disturbance to proceed without an NAM.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered. On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. The daily monitoring logs shall at a minimum include the following information.

- First and last name of the CRM and any accompanying NAM.
- Time in and out.
- Weather. Specify if weather conditions led to work stoppages.
- Work location (project component). Provide specifics—.e.g., power block, landscaping.

- Proximity to site location. Specify if work conducted within 1000 feet of a known cultural resource.
- Work type (machine).
- Work crew (company, operator, and foreman).
- Depth of excavation.
- Description of work.
- Stratigraphy.
- Artifacts, listed with the following identifying features:
- Field artifact #: When recording artifacts in the daily monitoring logs, the CRS shall institute a field numbering system to reduce the likelihood of repeat artifact numbers. A typical numbering system could include a project abbreviation, monitor's initials, and a set of numbers given to that monitor: e.g., AEC-MB-123.
- Description.
- Measurements.
- Universal Transverse Mercator (UTM) coordinates.
- Whether artifacts are likely to be isolates or components of larger resources.
- Assessment of significance of any finds.
- Actions taken.
- Plan for the next work day.
- A cover sheet shall be submitted with each day's monitoring logs, and shall at a minimum include the following:
    - Count and list of first and last names of all CRMs and of all NAMs for that day.
    - General description (in paragraph form) of that day's overall monitoring efforts, including monitor names and locations.
    - Any reasons for halting work that day.
    - Count and list of all artifacts found that day: include artifact #, location (i.e., grading in Unit X), measurements, UTMs, and very brief description (i.e., historic can, granitic biface, quartzite flake).
    - Whether any artifacts were found out of context (i.e., in fill, caisson drilling, flood debris, spoils pile).

Copies of the daily monitoring logs and cover sheets shall be provided by email from the CRS to the CPM, as follows:

- Each day's monitoring logs and cover sheet shall be merged into one PDF document

- The PDF title and headings, and emails shall clearly indicate the date of the applicable monitoring logs.
- PDFs for any revised or resubmitted versions shall use the word "revised" in the title.

Daily and/or weekly maps shall be submitted along with the monitoring logs as follows:

- The CRS shall provide daily and/or weekly maps of artifacts at the request of the CPM. A map shall also be provided if artifact locations show complexity, high density, or other unique considerations.
- Maps shall include labeled artifacts, project boundaries, previously recorded sites and isolates, aerial imagery background, and appropriate scales.

From the daily monitoring logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

- The Cultural Resources section of the MCR shall be prepared in coordination with the CRS, and shall include a monthly summary report of cultural resources-related monitoring. The summary shall:
- List the number of CRMs and NAMs on a daily basis, as well as provide monthly monitoring-day totals.
- Give an overview of cultural resource monitoring work for that month, and discuss any issues that arose.
- Describe fulfillment of requirements of each cultural mitigation measure.
- Summarize the confidential appendix to the MCR, without disclosing any specific confidential details.
- Include the artifact concordance table (as discussed under the next bullet point), but with removal of UTMs.
- Each MCR, prepared under supervision of the CRS, shall be accompanied by a confidential appendix that contains completed DPR 523A forms for all artifacts recorded or collected in that month. For any artifact without a corresponding DPR form, the CRS shall specify why the DPR form is not applicable or pending (i.e. as part of a larger site update).
- A concordance table that matches field artifact numbers with the artifact numbers used in the DPR forms shall be included. The sortable table shall contain each artifact's date of collection and UTM numbers, and note if an artifact has been deaccessioned or otherwise does not have a corresponding DPR form. Any post-field log recordation changes to artifact numbers shall also be noted.
- DPR forms shall be submitted as one combined PDF.

- The PDF shall organize DPR forms by site and/or artifact number.
- The PDF shall include an index and bookmarks.
- If artifacts from a given site location (in close proximity of each other or an existing site) are collected month after month, and if agreed upon with the CPM, a final updated DPR for the site may be submitted at the completion of monitoring. The monthly concordance table shall note that the DPR form for the included artifacts is pending.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM.

The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

**Verification:**

1. At least 30 days prior to the start of ground disturbance, the CPM will notify all Native Americans with whom the Energy Commission communicated during the project review of the date on which the project's ground disturbance will begin.

2. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log and information to be included in the cover sheet for the daily monitoring logs.

3. While monitoring is on-going, the project owner shall submit each day's monitoring logs and cover sheet merged into one PDF document by email within 24 hours.

4. The CRS and/or project owner shall notify the CPM of any incidents of non-compliance with the conditions and/or applicable LORS by telephone or email within 24 hours.

5. The CRS shall provide daily maps of artifacts along with the daily monitoring logs if more than 10 artifacts are found per day, or as requested by the CPM.

6. The CRS shall provide weekly maps of artifacts if there more than 50 artifacts are found per week, or as requested by the CPM. The map shall be submitted within two business days after the end of each week.

7. Within 15 days of receiving from a local Native American group a request that a NAM be employed, the project owner shall submit a copy of the request and a copy of a response letter to the group notifying them that a NAM has been employed and identifying the NAM.

8. While monitoring is on-going, the project owner shall submit monthly MCRs and accompanying weekly summary reports. The project owner shall attach any new DPR 523A forms, under confidential cover, completed for finds treated prescriptively, as specified in the CRMMP.

9. Final updated DPRs with sites (where artifacts are collected month after month) can be submitted at the completion of monitoring, as agreed upon with the CPM.

10. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

11. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

12. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

**CUL-7 POWERS OF CRS**

The CRS shall have the authority to halt ground disturbance in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CRS), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. If the discovery includes human remains, the project owner shall comply with the requirements of Health and Human Safety Code § 7050.5(b) and shall additionally notify the CPM and the NAHC of the discovery of human remains. No action with respect to the disposition of human remains of Native American origin shall be initiated without direction from the CPM. Monitoring, including Native American monitoring, and daily reporting, as provided in other conditions, shall continue during the project's ground-disturbing activities elsewhere, while the halting or redirection of ground disturbance in the vicinity of the discovery shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary Record" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary Record" form shall include a recommendation on the CRHR/NRHP eligibility of the discovery. The project owner shall submit completed forms to the CPM.

4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

5. Ground disturbance may resume only with the approval of the CPM.

**Verification:**

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, Alternate CRS, and CRMs have the authority to halt ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

3. Within 48 hours of the discovery of a resource of interest to Native Americans, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery, and the CRS must inform the CPM when the notifications are complete.

4. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

5. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

**CUL-8 FILL SOILS**

If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, the CRS shall survey the borrow or disposal site(s) for cultural resources and record on DPR 523 forms any that are identified. This survey shall not be required if there is a survey of the location that is less than five years old and if the site is approved by the CPM.

When any non–commercial borrow site or non-commercial disposal site survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM. The CPM shall determine, in his/her sole discretion, whether significant archaeological resources that cannot be avoided are present at the borrow or disposal site. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow or disposal site, the project owner must either select another borrow or disposal site or implement **CUL-7** prior to any use of the site. The CRS shall report on the methods and results of these surveys in the final CRR.

**Verification:**

1. As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

2. In the absence of documentation of recent archaeological survey, at least 30 days prior to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

## CULTURAL RESOURCES ABBREVIATION AND ACRONYM GLOSSARY

| | |
|---|---|
| AB | Assembly Bill |
| ACC | Air-Cooled Condenser |
| ACHP | Advisory Council on Historic Preservation |
| AEC | Alamitos Energy Center |
| AFC | Application for Certification |
| AGS | Alamitos Generating Station |
| B.P. | Before Present (A.D. 1950) |
| CA | California |
| Cal. Code Regs. | California Code of Regulations |
| Caltrans | California Department of Transportation |
| CCS | Cryptocrystalline Silicate Stone |
| CEC | California Energy Commission |
| CEQ | Council on Environmental Quality |
| CEQA | California Environmental Quality Act |
| C.F.R. | Code of Federal Regulations |
| CH2M | CH2M Hill Engineers |
| CHL | California Historical Landmark |
| CLB | City of Long Beach |
| COE | Corps of Engineers, U.S. Army |
| COHP | California Office of Historic Preservation |
| Conditions | Conditions of Certification |
| CRHR | California Register of Historical Resources |
| CRMMP | Cultural Resources Monitoring and Mitigation Plan |
| CSULB | California State University, Long Beach |
| DPR | Department of Parks and Recreation (State of California) |

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|---|---|
| DPR 523 | Department of Parks and Recreation cultural resources recordation form |
| EDR | Environmental Data Resources, Inc. |
| EJ | Environmental Justice |
| E.O. | Executive Order |
| ° F | degrees Fahrenheit |
| FSA | final staff assessment |
| GLO | General Land Office |
| HBEP | Huntington Beach Energy Project |
| HGS | Haynes Generating Station |
| JA | Jamison and Associates |
| LACDPW | Los Angeles County Department of Public Works |
| LAn/LAN | Los Angeles County |
| LCP | Local Coastal Program |
| LORS | Laws, Ordinances, Regulations, and Standards |
| MLD | Most Likely Descendent |
| NAHC | Native American Heritage Commission |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| OHP | Office of Historic Preservation |
| ORA, Ora | Orange County |
| OTC | Once-Through Cooling |
| PAA | Project Area of Analysis |
| PCAS | Pacific Coast Archaeological Society |
| PCSC | Puvunga Ceremonial Site Complex |
| PSA | Preliminary Staff Assessment |

| | |
|---|---|
| Pub. Resources Code | Public Resources Code (State of California) |
| Rd | Road |
| SAFC | Supplemental Application for Certification |
| SCCIC | South Central Coastal Information Center |
| SCE | Southern California Edison Company |
| SEADIP | South East Area Development Improvement Plan |
| SR | State Route |
| SRS | Scientific Resource Surveys |
| Staff | Energy Commission Cultural Resources Technical Staff |
| TCP | Traditional Cultural Property |
| tit. | title |
| USGS | U.S. Geological Survey |
| WEAP | Worker Environmental Awareness Program |

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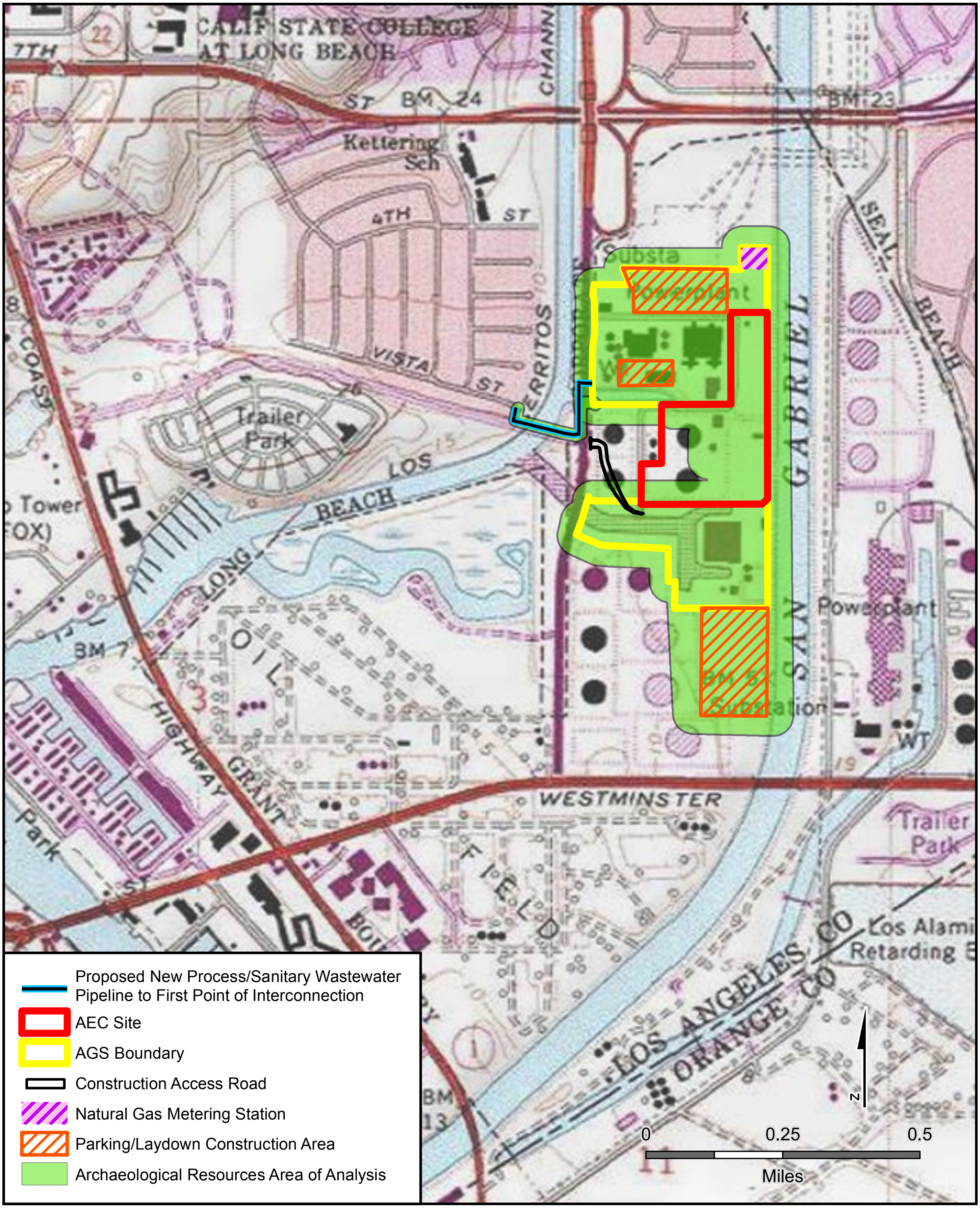
**CULTURAL RESOURCES - FIGURE 1**
Alamitos Energy Center - Archaeological Resources Project Area of Analysis

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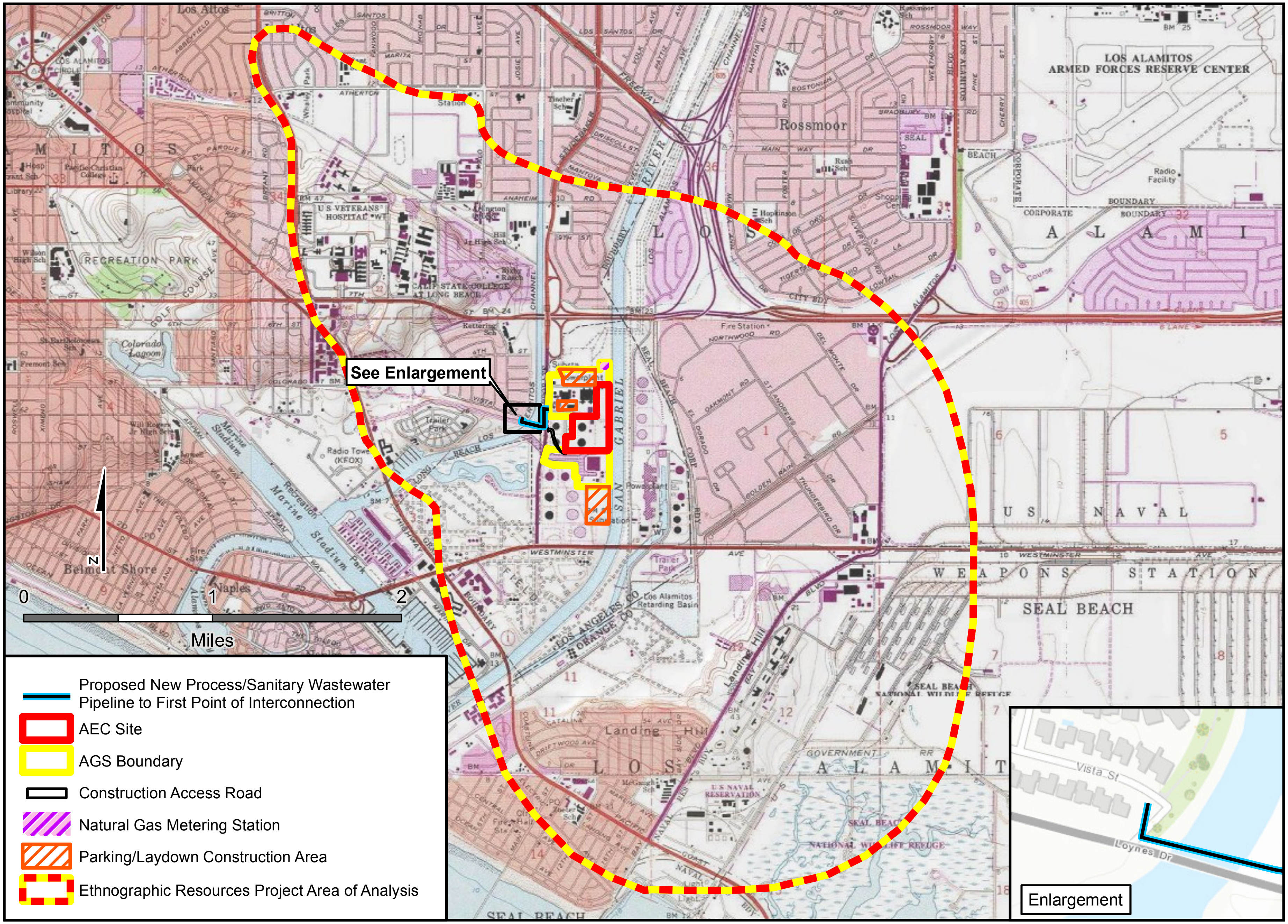
SOURCE: CEC Staff, ESRI, Bing Aerial Image, CH2MHill, Applied Earthworks

**CULTURAL RESOURCES - FIGURE 2**

Alamitos Energy Center - Ethnographic Resources Project Areas of Analysis

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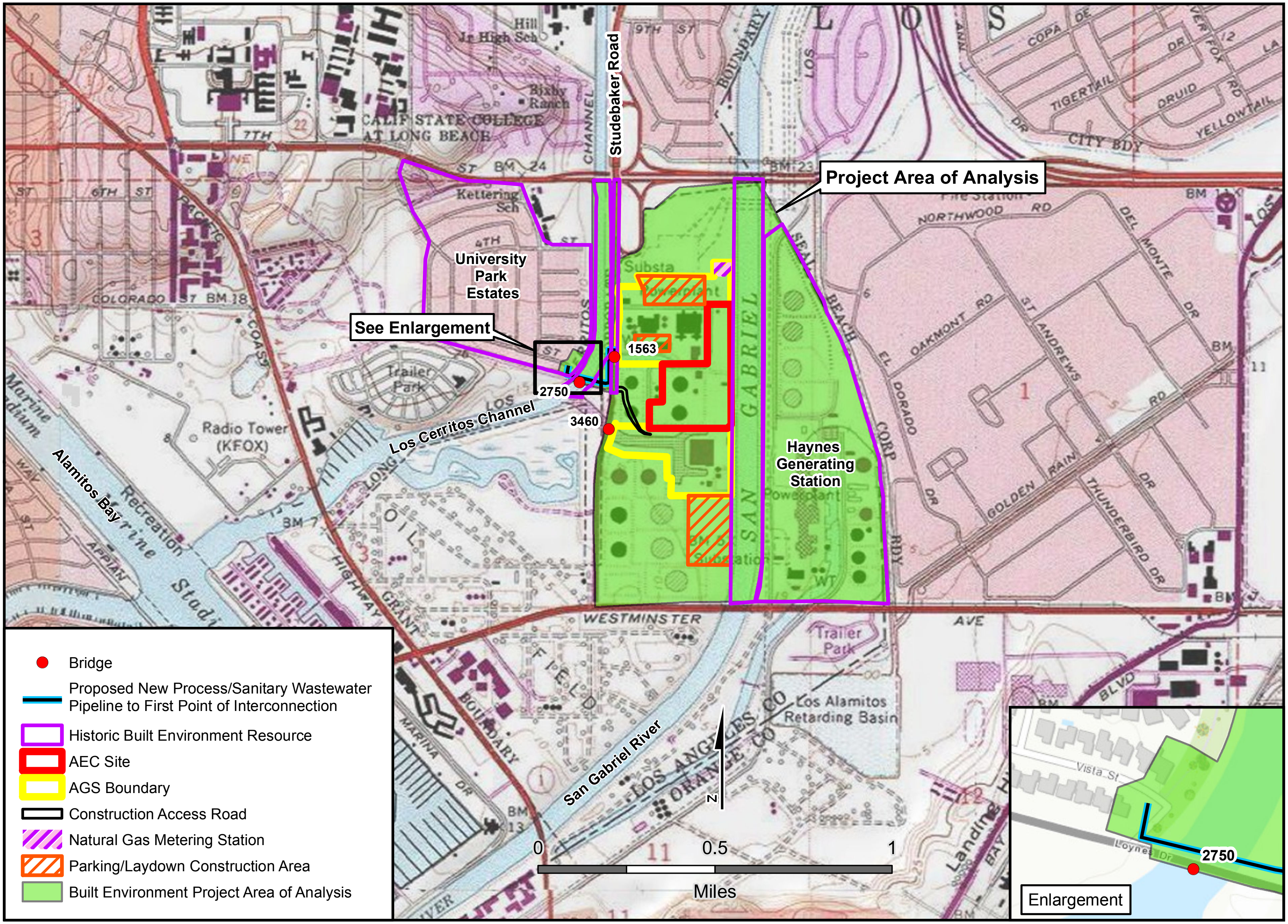
SOURCE: CEC Staff, ESRI, Bing Aerial Image, CH2MHill, Applied Earthworks

**CULTURAL RESOURCES - FIGURE 3**

Alamitos Energy Center - Historic Built Environment Resources within Built Environment Project Area of Analysis

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SOURCE: CEC Staff, ESRI, Bing Aerial Image, CH2MHill, Applied Earthworks

# CULTURAL RESOURCES APPENDIX CR-1

## BACKGROUND INFORMATION NOT INCLUDED IN THE FSA

The information contained in this appendix is included to support the cultural resources topics that staff treated in summary fashion in the **CULTURAL RESOURCES** section of the final staff assessment (FSA).

## ENVIRONMENTAL SETTING

### Paleoclimate and Ecology

The paleoclimate and ecology of the project vicinity is best documented by the Landing Hill and California State University, Long Beach (CSULB) archaeological investigations (both contexts range in elevation from about 8–70 feet above mean sea level), as well as a recent reconstruction of late nineteenth-century coastal geomorphology. The Landing Hill archaeological project assembled a 20,000-year paleoenvironmental record derived from pollen, phytolith17, and diatom18 analyses from a 19-foot-deep sediment core; pollen and phytolith analyses from archaeological soils; pollen, phytolith, starch, and protein analyses of artifacts and soil samples; and an archaeoclimatic (precipitation) model (Cleland et al. 2007:291). The CSULB archaeological investigations garnered a paleoenvironmental record from the last 1,100 years, whereas the coastal geomorphological reconstruction relied on historical records from the last 150 years (Boxt et al. 1999:25; Engstrom 2006). These paleoclimatic studies yield an understanding of the project vicinity's changing landscape and ecology during the span of human habitation of the southern coastline. An accurate picture of paleoclimate and ecology provides explanations for and expectations of the range of cultural resources in the project vicinity.

At the transition from the Pleistocene Epoch's19 Last Glacial Maximum (LGM) to the Holocene Epoch20, mean sea level was significantly lower than present levels. San Pedro Bay did not exist, as the coastline extended some 10–13 miles south and west of the modern shoreline (Masters and Aiello 2007:Figure 3.1); the area in the vicinity of the project, therefore, was between 12 and 15 miles from the ocean about the time that humans began to settle the southern California coast, rather than the current 2-mile distance. The Channel Islands were larger and closer to the mainland during the LGM–Holocene transition as well: at 12,000 B.P., Santa Catalina Island was approximately 15 miles off the coast of what is now Long Beach; two thousand years later, rising sea level increased that distance to 18 miles. Presently, the island is about 32 miles west of the project area of analysis (PAA). (Porcasi et al. 1999:Figure 1.)

[17] Inorganic crystalline structures in plants (Holloway 1997:189).

[18] Unicellular, usually microscopic, algae (Rhodes et al. 1962:150).

[19] The interval of time (epoch) spanning 2.588 million years ago–11,700 B.P. (Cohen et al. 2013). The term "B.P." (Before Present) is an international dating convention that refers to the year 1950 as the present.

[20] The Holocene Epoch is the interval from 11,700 B.P. to the present day (Cohen et al. 2013). Geoscientists divide the Holocene Epoch into three broad divisions: Early (11,500–7550 B.P.), Middle (7000–4000 B.P.), and Late (4000 B.P.–present) (see Meyer et al. 2009:ii; West et al. 2007:20–21). This FSA follows Meyer et al. (2009).

Cleland et al. (2007:291–292) describe an archaeoclimatic model of a Los Angeles Basin that witnessed increased average annual air temperatures beginning approximately 14,000 B.P., the overall trend running from 63.5 to 66.2 degrees Fahrenheit (° F). The temperature does not appear to have changed gradually and consistently, but in rapid rises and drops over time between long periods of stable temperature. For instance, between about 14,000 and 10,000 B.P., average annual air temperature seems to have increased rapidly from 63.5 to 64.4 ° F, dropped to 63.5 ° F, and then warmed again to 65.3 ° F. Temperature remained stable between 10,000 and 8000 B.P., then increased to 66.2 ° F (see also Altschul et al. 2007:35). San Pedro-coastal temperature entered another period of stability thought to have lasted from 8000 to 2000 B.P. Mean annual air temperatures dropped to 65.3 ° F during two volcanic events at 3800 and 1900 B.P. (Cleland et al. 2007:292).

Although the wet winter/dry summer climate of southern California is thought to have persisted for as many as 160,000 years (Masters and Aiello 2007:40), this unimodal rain pattern held for only the last 1,800 years in the project vicinity (Cleland et al. 2007:292). Late Pleistocene/Early Holocene (ca. 14,000–7550 B.P.) annual precipitation appears to have been similar to twenty-first century conditions. The interval of 8000–6000 B.P. hosted a radical increase in precipitation (Altschul et al. 2007:35), mainly occurring in February (Cleland et al. 2007:292). After 6000 B.P., annual precipitation appears to have declined until the Vandal [volcanic] Event of 1900 B.P., at which time the quantity of precipitation increased greatly, the annual timing of rainfall shifted, and mean annual temperature decreased. After the Vandal Event, precipitation declined, the timing of annual rainfall shifted back to pre-Vandal conditions, and mean air temperature increased. (Cleland et al. 2007:292.)

The project vicinity appears to have experienced bimodal precipitation patterns, with precipitation occurring during summer and winter months, at the following intervals.

- 5800–5200 B.P.
- 4400–4000 B.P.
- 3600–3400 B.P. (weak trend)
- 3000–2200 B.P. (weak trend)
- 2200–2000 B.P.

Changes in precipitation patterns are expected to have affected the distribution of plants and animals in the project vicinity. During bimodal distribution intervals, for instance, shellfish procurement declined at Landing Hill but continued at Seal Beach archaeological sites. After 2000 B.P., unimodal precipitation resumed, and so did Landing Hill shellfish procurement. From the Early Holocene into the Middle Holocene, the Landing Hill vicinity alternated between marsh and shrub land, and occasionally developed into submerged, intermittent marsh. (Cleland et al. 2007:292–293.)

Cleland et al. (2007) identifies three pollen zones at Landing Hill. Zone 1 represents environmental conditions from about 20,000 B.P. to approximately 7690 B.P. Pollen profiles of this time period (Terminal Pleistocene and Early Holocene) exhibit a large amount of Pinus (pine) pollen. Also present are fir, spruce, birch, hickory, walnut, ash, juniper, oak, willow, and elm; Pinus, fir, and spruce pollen is thought to have been deposited by wind. The Landing Hill understory consisted of sagebrush, ragweed, sumpweed, dandelions, mustard-family plants, hackberry, chenopods and amaranthus, grasses, rose-family plants, and globemallow. Overall, the overstory and understory plants revealed in the pollen profiles suggest the presence of forested drainages in the area. Regional-scale forest fires likely occurred, inferred from the presence of charcoal. The Landing Hill environment through the Early Holocene may be fairly described as parkland with regular fires and intermittent flooding. (Cleland 2007:297–298, 305.)

Pollen Zone 2 covers the Early–Middle Holocene transition, being identified after a break in the pollen record around 7690 B.P. Pollen Zone 2 exhibits a diminished amount of tree pollen, but a great increase in Poacaea (bunchgrasses) and moderate amounts of Artemisia and highspine Asteraceae pollen. Quercus spp. (oaks) could have established themselves while other trees retreated. Archaeologists interpret these phenomena as the development of shrub land in face of warmer temperatures. Landing Hill at this time probably contained grassland in intermittent marsh, shrub land in the uplands. (Cleland et al. 2007:298.) This period was one of rapid deposition, the sediments anchored by grass roots. Cool season grasses dominate grasslands that were intermittently flooded. At this time, Landing Hill witnessed alternating unimodal and bimodal precipitation regimes. (Cleland et al. 2007:305.)

In Pollen Zone 3, shrub land and highspine Asteraceae dominate the pollen sample. The sunflower family was abundant, and the frequency of tree pollen was slightly greater than in Zone 2, and more varied in types. Artemisia became rare after approximately 6355 B.P. Ragweed/sumpweed and sunflower family were more common. (Cleland et al. 2007:298.) Bunchgrasses occurred in small amounts at 3 feet below ground surface, suggesting a late increase in grasses. Chamise was present by about 6355 B.P. Increased amounts of charcoal correspond with a 6355-B.P. radiocarbon date at Landing Hill. (Cleland et al. 2007:299.)

By approximately 7000 B.P., sagebrush-scrub vegetation replaced grassland communities. About 6 feet of sediment was deposited in Landing Hill's lowlands over a period of 1,335 years (7000–6355 B.P.), representing no fewer than five possible flood events. Large quantities of ragweed or ambrosia were present during the Zone 3 interval. Declining sagebrush led to the resurgence of earlier plant regimes. Occasional to regular grass and shrub fires occurred, as well as intermittent flooding. The pollen record indicates that relatively stable scrub vegetation was present, which is inconsistent with the notion of a well developed marsh. Diatoms show that what marsh existed had no contact with the ocean, but had water fresh enough for human consumption. (Cleland et al. 2007:305–306.)

By the end of the Middle Holocene (5000–4500 B.P.), sea level reached approximately present-day level, changing the character of near-ocean habitats going into the Late Holocene. Sea level rise increased tidal influence and direct reach into near-shore wetlands. (Altschul et al. 2005:286.)

Late Holocene environmental trends in the project vicinity are described by Boxt et al.'s (1999) CSULB archaeological study. Boxt and colleagues note that greater than 100 years of urban development in Long Beach has, "typically entombed the margins of Alamitos Bay beneath meters of construction fill, preserving a record of past cultural and environmental events." Boxt's team obtained 102 radiocarbon dates from CA-LAN-2616 and Bouton Creek, a relict stream on the CSULB campus that once flowed from west to east along the north side of Alamitos Mesa, yielding age estimates spanning 4000–100 B.P. (Boxt et al. 1999:25.) A large flood of slack-water deposits buried Bouton Creek and four prehistoric archaeological sites (including CA-LAN-2616) on the CSULB campus during the 1860s; the flood is likely associated with the San Gabriel River's movement from the west to its current channel. (Boxt et al. 1999:28–29.)

Boxt et al. (1999:28–29) identifies six stratigraphic units at Bouton Creek:

- Construction Fill
- Overbank Alluvium
- Flood Deposit (82–83 B.P.)
- Midden (500–550 B.P.)
- Overbank Alluvium with Sparse Midden (650 B.P.)
- Paleosol[21] (1050–1300 B.P.)

Additionally, Boxt and colleagues identified four pollen units based on 71 pollen samples taken at 2-inch intervals at archaeological site CA-LAN-2616:

3. *Ambrosia*[22] Zone: This pollen zone extends from 11.6 to 10.5 feet below ground surface and is radiocarbon dated to 1450–1050 B.P. 10–15 percent *Ambrosia* and 20–40 percent Liguliflorae[23] pollen. The high percentage of aquatic plants indicates low-energy swamp conditions: *Alnus* (alder), *Thypa latifolia* (common cattail/soft flag), and fern spores[24]. (Boxt et al. 1999:29.)

[21] A term used in geology and geoarchaeology to refer to a former soil or stable surface preserved by burial underneath either natural or cultural deposits (Vogel 2002:29).

[22] *Ambrosia* spp. can include burro bush and beach ragweed or beach-bur, most likely the latter (Schoenherr 1992:435, 438, 693).

[23] Liguliflorae is a subfamily within the sunflower plant family.

[24] Generic and specific plant names were obtained from Heizer and Elsasser (1980:241, 252).

4. *Artemisia*[25] Zone: This pollen zone extends from 10.5 to 9.2 feet below ground surface and dates to the interval 1050–650 B.P. The sagebrush zone contains relatively low pollen concentrations, but an unusually high percentage (40–60 percent) of sagebrush pollen and high degrees of pollen deterioration. The pollen profile of this zone is consistent with sedimentary deposition on a levee of Bouton Creek during paleosol formation and is suggestive of a relatively arid local environment. Fluctuating salinity is indicated by the presence of marine ostracods[26] and non-economic mollusks (*Heterodonax bimaculata* (false beanclam), *Sanguinolaria nuttallii* (purple clam), *Tagelus californicus* (jackknife clam), and *Ostrea lurida* (native oyster)[27]. (Boxt et al. 1999:29.)

5. Liguliflorae Zone: This pollen zone extends from 9.2 to 2.8 feet below ground surface and dates to the interval 650–250 B.P. This division of the sunflower family is associated with disturbed areas, although others of the division native to coastal southern California are not: elegant microseris (*Microseris elegans*) and silver puff or small-flowered Douglas microseris (*M. douglasii*), for example. Thirty to sixty percent Liguliflorae pollen indicates high disturbance levels, consistent with the increased human activity of this time interval. High frequencies of charcoal fragments. (Boxt et al. 1999:29, 32.)

6. *Chenopodiaceae-Amaranthus* Zone: This pollen zone extends from 2.8 feet below ground surface to the modern surface and dates from 250 B.P. through the present day. Vegetation trends observed at this time are the consequences of European occupation and land use. (Boxt et al. 1999:32.)

Pollen data from 1050–650 B.P. (*Artemisia* pollen zone) show significantly more aridity-adapted vegetation communities compared to data from recent centuries. At this time, salt-tolerant species encroached on Bouton Creek from Alamitos Bay, up to 1.8 miles distant, indicating a period of low freshwater (that is, Bouton Creek) discharge. Boxt and colleagues also identified a paleosol at Bouton Creek (Boxt et al. 1999:32, Figure 2). Combined with pollen data from Davis's first Newport Bay core sample, Boxt et al. (1999) hypothesizes that severe and prolonged droughts characterized the 1050–650-B.P. interval (Vellanoweth and Grenda 2002:79).

After 650–550 B.P., rapid sedimentation along Bouton Creek seems to signify the onset of Little Ice Age conditions. Increased freshwater flow and human occupation/use of the Bouton Creek drainage. (Boxt et al. 1999:27–28.)

[25] Sagebrush genus (Ornduff 1974:46).

[26] Ostracods are small, bivalve crustaceans that are abundant in the world's oceans and also live in freshwater (Rhodes et al. 1962:98).

[27] Generic and specific identification according to Johnson and Snook (1967:422, 456, 457).

During the Little Ice Age, after 650 B.P., moisture levels in the Long Beach area dramatically increased. These researchers note that greater than 100 years of urban development in Long Beach has, "typically entombed the margins of Alamitos Bay beneath meters of construction fill, preserving a record of past cultural and environmental events." (Boxt et al. 1999:25.)

The nineteenth-century climate on the southern California coast was a little different than today's climate. Northwesterly winds dominated then as today, although southeasterly winds were more frequent and intense, likened to hurricanes. The turn of the twentieth century heralded reduced influence of southeasterly winds and the Little Ice Age (450–50 B.P.) ended with five El Niño events in a 20-year period. (Engstrom 2006:850–851.)

## PREHISTORIC SETTING

Staff finds much of the supplemental application for certification's (SAFC's) prehistoric setting to be correct and does not repeat it at length here. The regional prehistoric setting is essentially discussed in four parts: ancient sites (commonly referred to in the archaeological literature as Paleoindian and Paleo-Coastal traditions), Early Holocene (11,500–7550 B.P.), Middle Holocene (7950–1450 B.P.), and Late Holocene (1450 B.P.–present). (AES 2015a:5.3-6–5.3-8.) However, staff provides supplementary information in this section in order to analyze the proposed Alamitos Energy Center's (AEC's) potential to affect archaeological resources. Staff provides additional information in the following areas: (1) clarification of the regional chronology and culture history and (2) the character of local archaeological resources.

Regarding chronology, some archaeologists discuss trends in prehistory against either an arbitrary framework or a timescale that is meaningful in other disciplines, such as geology. For example, Byrd and Raab (2007:217) discuss southern coastal archaeology against a geological timeframe: Early Holocene (ca. 11,700–7700 B.P.), Middle Holocene (ca. 7700–3600 B.P.), and Late Holocene (ca. 3600 B.P.–present).

Archaeologists traditionally view the Terminal Pleistocene and Early Holocene archaeology of coastal southern California as the product of people who focused on extracting resources from the terrestrial environment. These Paleoindians were viewed as originally dwelling in the southern California deserts and using lake and lakeside resources—an economic orientation referred to as the Western Pluvial Lakes Tradition (WPLT)—until Pleistocene-age lakes in the deserts and Great Basin dried at the beginning of the Early Holocene, at which time some WPLT peoples migrated west to the coast and adjusted their food-getting strategies. (Byrd and Raab 2007:217.) The presence of archaeological sites on the Channel Islands[28] at the beginning of the Holocene Epoch (Braje et al. 2014:122), however, suggests that the southern California coast was not simply colonized by WPLT peoples, but by one or two distinct groups of

[28] The most reliable earliest dates on Early Holocene archaeological sites in the southern Bight come from San Miguel Island and San Clemente Island (Byrd and Raab 2007:219) and from CA-ORA-64 on the mainland (Erlandson et al. 2007:Table 4.1). The SAFC mentions as examples of Early Holocene (or older) archaeological sites: the "Los Angeles Man" of Baldwin Hills and human remains and artifacts from La Brea Tar Pits (CA-LAN-159) (AES 2015a:5.3-6). Bada (1985), Taylor et al. (1985), and Erlandson et al. (2007:54) have discredited the dating of these finds.

people. The Early Holocene marine economy (fish and shellfish), described in the SAFC (AES 2015a:5.3-6), has long been equated with the San Dieguito Complex because of assumed links with the WPLT and similarities in flaked stone tools (Moratto 1984:Figure 4; Wallace 1955:218). The marine focus, however, clearly represents a distinct lifeway, and early coastal sites—situated on bays and estuaries—are now commonly classified as part of the Paleo-Coastal Tradition (ca. 12,000–8000 B.P.) (Byrd and Raab 2007:218; de Barros et al. 2002:Figure 2-5).

WPLT archaeological sites feature leaf-shaped, Lake Mojave, and Silver Lake projectile points; stone crescents; formal and expediently made flake tools; atlatl (spear-thrower) hooks; and micro-cores[29]. Tools for plant processing are notably absent. Presumably, these assemblages represent an economy focused on game hunting. (de Barros et al. 2002:29, 31.) Paleo-Coastal Tradition sites exhibit a similar flaked stone tool assemblage, but differ from the WPLT sites in that the former have yielded pitted stones, asphaltum, pointed-bone objects, and shell spoons and ornaments (Moratto 1984:104, 109). Marine shellfish, fish, and mammals also are dominant at mainland coastal sites (approximately 73 percent of animal remains) compared to pericoastal[30] and other inland sites (25 percent) (Erlandson et al. 2007:61).

Late in the Early Holocene (about 8000 B.P.), the Los Angeles basin archaeological record presents a new culture and adaptive pattern known as the Millingstone Horizon, which persisted in some nearby mountain areas until 1500–1000 B.P. (de Barros et al. 2002:31). The Millingstone Horizon is a distinctive and widespread archaeological complex, found west of the Sierra Nevada from the Baja Peninsula north to Clear Lake (Jones 2008:Figure 1). In the Landing Hill area, south of the project site, Millingstone occupations date from about 5600 to 3000 B.P. Few residential features (hearths, house pits, and refuse dumps) were identified during Millingstone occupation of Landing Hill, although tightly flexed, east–west or west–east-oriented human burials are dated to 5600–3000 B.P. The burials do not appear to have been segregated from habitation areas. The subsistence focus appeared to have been on shellfish. (Cleland et al. 2007:329.) Millingstone sites are recognizable by abundant millingstones and handstones (locally referred to as metates and manos, respectively). Most of the approximately 40 radiocarbon-dated Millingstone sites are located on or near the coast. The relative lack of interior Millingstone traces might not reflect a low inland population density. Rather, Millingstone archaeology in the interior might be buried under younger soils and sediments, or sometimes cannot be firmly dated to the Millingstone period for lack of dateable materials, such as bone and charcoal. (Glassow et al. 2007:194.)

A second type of archaeological culture or complex is known from Middle and Late Holocene Los Angeles and Orange counties. Known as the Intermediate Cultures (ca. 3000–1350 B.P.), site assemblages are typified by mortars and pestles, basket-hopper mortars, fewer handstones and millingstones, the introduction of the bow and arrow and phasing out of larger dart points, circular fish hooks, and the appearance of stone, bone, and shell beads. Shell beads include two time-sensitive olive snail types and beads made from limpets (*Megathura cremulata*). During major draw-downs of Lake Cahuilla (Salton Sea), Intermediate Culture peoples obtained obsidian from the Obsidian Butte

[29] Cores are masses of stone from which pieces are detached to make tools.

[30] Near the coast.

source, although the majority was procured from the Coso Volcanic Field. (de Barros et al. 2002:33–34, 36–37.) At Landing Hill, there was an overall decline in the use of shellfish, although site CA-ORA-261 exhibits abundant consumption of scallops. Treatment of the dead was markedly different from Millingstone occupants in that cremations were identified at Landing Hill and are clearly spatially separate from habitation areas. (Cleland et al. 2007:329–331.)

The SAFC's description of Late Prehistoric (ca. 1200 B.P.–Spanish contact), termed therein "Late Holocene", accurately describes the major archaeological trends of this period: abandonment of larger projectile points in favor of smaller points suited to the bow and arrow, concentration of populations into larger villages, proliferation of satellite temporary camps and single-task sites, and the development of what became the Gabrielino society known from the historic period. (AES 2015a:5.3-7–5.3-8.)

## ETHNOGRAPHIC SETTING

### Gabrielino Tongva

The Gabrielino people and representative tribes are the Native Americans most directly related to the project vicinity. The Gabrielino Tongva have traditionally been split into four subgroups based on the dialect of the Gabrielino Tongva language spoken: those of the Los Angeles Basin/Gabrielino proper, those of the northern mountainous area including the inland San Fernando Valley/Fernandeño, those of Santa Catalina and San Clemente islands, and those of San Nicolas Island (Harrington 1962:viii). Earlier anthropological linguists asserted that the Gabrielino were a Cupan speaking group (i.e., a language of the Uto-Aztecan stock of the Takic language family) (see Bean and Smith 1978:538), but it is now generally accepted that the Gabrielino language is a stand-alone Takic language, distinct from the Cupan sub-group (Mithun 1999:539).

The name 'Gabrielino' is derived from the Spanish missionaries who established Catholic missions in the Los Angeles basin in the late 1700s. Two missions were established in the soon-to-be-renamed tribe's territory: San Gabriel Archangel (initially established near Montebello in 1771, but moved to San Gabriel in 1776) and San Fernando Rey de España (established in 1797 in what is now Mission Hills), respectively named after the biblical angel Gabriel and Saint Ferdinand, King of Spain. Those indigenous Californians closest to Mission San Gabriel became known as 'Gabrielinos' and those closest to San Fernando Rey de España became known as "Fernandenos". However, today the term 'Gabrielino' is applied to all groups indigenous to the Los Angeles Basin.

Prior to the Spanish period it has been suggested that the Los Angeles Basin Gabrielino referred to themselves as *Kumi vit* and the San Fernando Valley indigenous as *Pasekarum* (Bean and Smith 1978:548). However, a word that is combined with the suffix '*vit*' refers to a person from a specific place or village and therefore would not be suitable in reference to a group of people occupying at least 50, if not 100 villages (Johnston 1962:10).

The word '*Tobikhar*' seems to have been used in self-description by those Gabrielinos in the 1800s that moved to the missions. The name translates as "settlers" and appears to reference the fact that some Gabrielino left their traditional villages, whether willfully or under duress, and settled near the missions (Hodge 1971:480). The name *Pepii'maris,* initially used to identify those from Santa Catalina Island, was also adopted by some Gabrielino during historic times to identify themselves (McCawley 1996:10). The words *Kizh* and *Kij* also appear in the literature, but likely refer to people of a specific house. However, one extant Gabrielino group today, the Gabrielino Band of Mission Indians (aka the Kizh Nation), takes the word 'Kizh' to mean "houses", and referential to all people who lived in the Gabrielino-style willow constructed house. The word '*Tongva*' was provided to anthropologist C. Hart Merriam in 1902 by a Gabrielino speaker (Heizer 1968:105). Loosely translated as "people of the earth"[31], 'Tongva' has gained popularity since the 1990s and is sometimes used in conjunction with the word 'Gabrielino' (McCawley 1996:10), although at least one Gabrielino group (the Gabrielino Band of Mission Indians) rejects use of the word 'Tongva'.

In 1811 about 30 "Kodiak" Indians, equipped with fire-arms for hunting sea otters, set sail on a ship owned by Boardman & Pope from the port of Sitka (in what is currently Alaska). Captain Whiltmore dropped the Alaskan Natives off on San Nicolas, and a "dispute arose between the Kodiaks and the natives of the islands, originating in the seizure of the females by the Kodiaks" (Anonymous 1857:348). The males were slaughtered and Captain Whiltmore returned to the island at the end of the year and took the Kodiaks back to Sitka (Anonymous 1857:348). The remaining San Nicolas Island Gabrielinos were removed in 1835, with the exception of one woman who remained on the island to search for a lost infant. The woman did not find the baby, but continued to live on the island, in isolation. She was removed from the island and brought to the Santa Barbara Mission in 1853, where the Chumash speakers could not understand her dialect (Hardacre 1971:272–284). Additionally, Kroeber corroborates the "Lone Woman of San Nicholas" story (Kroeber 1976:633–635). Recently, archaeologists have re-discovered the cave that the lone woman occupied during her 18 years of isolation (Schwartz and Vellanoweth 2013:391).

Some earlier references to the island dwellers and their immediate mainland coastal neighbors or relatives refer to the entire maritime-adapted culture as the "Canaliño Culture" (Johnston 1962:96; Moriarty 1969:16; Romer 1959:241). However, the usage, a Spanish word attributed by the earliest Spanish maritime explorations in the region, appears to include both the cluster of southern island dwellers that are affiliated with the Gabrielino, in addition to the cluster of northern island dwellers that are affiliated with the Chumash. The Santa Catalina Island is named *Pimu* or *Pipimar*, and the Gabrielino Tongva from *Pipimar* were called *Pepimares* (translated as "people of Pipimar") (Kroeber 1976:634, McCawley 1996:10). Despite not having a common name for the dwellers of the island, some ethnographers suggest the island cultures (and particularly those from Santa Catalina Island), were the originators of the Gabrielino Tongva culture (Moriarty 1969:2). Kroeber (1976:621–622) suggests that the religious practices affiliated with *Chinigchinix* may have originated at the Islands as well, and was then propagated to the Luiseño and Diegueño groups to the south.

[31] McCawley (1996:9–10) suggests that the world Tongva originally named either the Gabrielinos living near Tejon or a separate Gabrielino village called *Tonjwe*.

Today, the names Gabrielino, Tongva, or Gabrielino Tongva seem to be the preferred references of the indigenous groups from the Los Angeles Basin. The name Gabrielino Tongva will be used for the purposes of this staff assessment, except when referring to specific tribal entities that identify by other names.

### Traditional Territory of the Gabrielino Tongva

The prehistoric Gabrielino Tongva are recognized as one of the groups with great wealth and population, and who controlled one of the most resource-rich territories in all of indigenous Southern California. Their territory consisted of ocean islands and waters, coast line, riverine basins, and mountains that provided a diversity of resources. (Bean and Smith 1978:538.)

The territorial boundaries, while imprecise, are defined here in a counterclockwise direction and starting in the southwestern area of the territory at the mouth of Aliso Creek.[32] The boundary follows the Aliso Creek northeast into the Santa Ana Mountains and crosses the Santa Ana Mountains near Trabuco Peak. Descending the eastern slopes of the Santa Ana Mountains the boundary runs towards the Santa Ana River and follows the river course up to where the San Andreas Rift and the Santa Ana River intersect. The boundary follows the rift in a northwest direction. The territory includes the area south of the crest of the San Gabriel Mountains. The boundary curves back towards the ocean, following generally the area defined by Soledad Canyon. The territory includes all of the San Fernando Valley, the eastern slopes of the Simi Hills and crosses the Santa Monica Mountains where the boundary line comes down to the coastline at approximately where the present town of Malibu is located. The territory includes the three ocean islands of San Nicolas, San Clemente and Santa Catalina, the ocean waters surrounding the islands, and between the islands and the mainland. (Heizer 1968:End Papers map; Hodge 1971:480 (Vol 1); Johnston 1962:Map; Kroeber 1976:620–621, Plate 57; McCawley 1996:3, 22–25; Moriarty 1969:5.) The territory includes the Verdugo Mountains of which the central and highest peak was named “Tongva Peak” in 2006 (Chambers 2001:1–2).

The proposed AEC is located in the coastal portion of the Gabrielino Tongva’s mainland territory and adjacent to the, now channelized, San Gabriel River, about 1.5 miles north of where the San Gabriel River empties into the Pacific Ocean. Various historians and anthropologists provide maps of Gabrielino Tongva ethnographic village and camp locations (Heizer 1968:Map; Johnston 1962:Map; Kroeber 1976:Plate 57). All of the maps and accompanying text previously mentioned identify a village that is about 0.5 mile north-northeast of the AEC. The village name, provided in the literature variously as ‘Puvunga’, ‘Pubunga’, ‘Puvú, ‘Pubuna’, ‘Povuu’nga’ and ‘Pubu’ is located on Alamitos Mesa. Additional information concerning this village site is discussed below.

[32] C. Hart Merriam (1968) suggests that the boundary is to the north along the Santa Ana River.

## Sources of Ethnographic Data

The earliest ethnographic sources of information can be found in the records of the Spanish explorers and later missionary records. Of the various documents related to Spanish exploration and subsequent colonization, Father Boscana's manuscript on the religious beliefs of the Gabrielino Tongva and neighboring tribes has provided invaluable information, especially with regard to the *Chingichngish* religion. The earliest attempt at a comprehensive Gabrielino Tongva ethnography is attributed to Hugo Reid, a Scotsman, settler, naturalized Mexican citizen, and spouse of a Gabrielino Tongva woman, Victoria Bartholomea Reid. Reid documented place names and locations of Gabrielino villages, relying, it is assumed, extensively on his wife and her relatives and contacts for his information. Reid's notes and letters were initially published in the *Los Angeles Star* in 24 weekly installments beginning in February of 1852, and reprinted in the *Star* in 1869. These letters were since republished by Robert Heizer (1968), with extensive notes to provide clarification and context. Friar Zephyrin Englehardt, an historian of the Franciscans, details some ethnographic information in his writings on the California Missions in general (Englehardt 1974) and specifically the two missions located within Gabrielino Tongva territory (Englehardt 1927a, 1927b). C. Hart Merriam conducted ethnographic research with a Gabrielino woman that produced valuable ethno-linguistic information, the notes of which are housed at the University of California, Berkeley's Bancroft Library. Alfred Kroeber wrote the authoritative Gabrielino Tongva section included in his *Handbook of the Indians of California* (Kroeber 1976:620-635). John P. Harrington conducted ethnographic and linguistic studies that included ethnographic inquiry into the *Chingichngish* cult (Harrington 1933) and he produced a Gabrielino Tongva cultural element distribution list (Harrington 1942). Bernice Johnston wrote a summary of Gabrielino Tongva ethnohistory (Johnston 1962). Lowell Bean and Charles Smith co-wrote the Gabrielino section for the encyclopedic *Handbook of North American Indians, Volume 8: California* (Bean and Smith 1978). More recently William McCawley produced a Gabrielino ethnohistory (McCawley 1996) which was followed by a publication, co-written by Claudia Jurmain that is, in part, an ethnography of contemporary Gabrielino Tongva people (Jurmain and McCawley 2009). Additionally, ethnographies of the Gabrielino's southern neighbors, the Luiseño, written by Constance Dubois (1908) and Raymond White (1963) provide valuable information regarding the *Chingichngish* religion and social organization, respectively.

## Gabrielino Tongva Trade Affiliations, and their Economy, Resources and Material Culture

The Gabrielino Tongva maintained solid trade relations with all groups that surrounded them, including the Chumash, Tataviam, Serrano, Cahuilla, Luiseño, and Juaneño (Bean and Smith 1978:547; Davis 1961:22). Through these intermediaries, the Gabrielino Tongva were known as far north as the San Joaquin Valley, homelands of the Yokuts, and to the east among the Yuman tribes of the Colorado River. Steatite, some of the highest quality found in all of California, was traded from a source located on Santa Catalina Island as far east as present day central Arizona. In addition, coastal shellfish provided excellent source material for shell disc money and shell. Marine mammals were abundant along the Channel Islands, mainland shores, and off-shore rookeries, providing a valuable source of edible and utilitarian resources. Through long-distance exchange, the Gabrielino Tongva received goods such as deer hides, obsidian and white clay pottery. A more localized Los Angeles Basin trading network facilitated the exchange of the resources that result from the rich, local environment that constituted Gabrielino Tongva and neighboring territories. There is some suggestion that local Gabrielino Tongva trading occurred, between the Islands and the coast as already noted, but also between the coast and inland villages. *Najquqar* (Isthmus Cove) on Santa Catalina Island appears to have been the primary steatite export location on the island, and the villages at San Pedro and Redondo were likely two of the main trading hubs for steatite on the mainland (Kroeber 1976:629).

The nearby village site of Puvunga was also likely a major trading center. One of the interpretations of the name of the village is “gathering place”, and Native Americans with whom cultural resources staff has consulted suggest that this means the village was a trading center. It has also been suggested the name Puvunga means “the place of the crowd”, corroborating the indications given to Boscana that this was an important location for large gatherings of Indians (Dixon 1973:3). Moreover, the location of Puvunga, adjacent to the San Gabriel River and relatively near El Camino Viejo de Los Angeles (Latta 1936:End Map), also suggests that it was likely an important trading village.

The Gabrielino Tongva territory is located at the western terminus of one of the most established and extensive indigenous trade networks of North America, previously documented by staff as the Pacific to Rio Grande Trails Landscape (PRGTL) (Gates et al. 2013:4.3-136–4.3-141). The extensive trail system guided people, goods, and ideas between the Southern California Coast and the Southwest (Davis 1961:2–3), and has been used as a migration and movement corridor for at least the last 10,000 years, and probably more than 15,000 years. There are three major travel corridors emanating from the Southern California Coast (in the case of steatite and other goods exported from the Southern Channel Islands, the network extended into the ocean and thus includes the islands) within the PRGTL, and these continue to be major travel corridors today. Interstate highways now overlay all three, and in general, there is a strong, positive correlation between prehistoric Indian trails and modern thoroughfares (e.g., Davis 1961:47–48). The Mojave Desert corridor generally followed the Mojave River, at least at the points where it is above ground, as well as Historic Route 66, and what today are the Interstate 40 (I-40) and I-15 freeways in southeastern California. The southernmost corridor follows for some distance the I-8 freeway, although the trail heads northeast towards Lake Cahuilla (what is now the Salton Sea) instead of cutting across the desert to go to Yuma, before heading southeast again. This trail connected the Pacific with inland areas but also provided access between the Baja California peninsula and interior central Mexico. The middle trail corridor of the PRGTL follows the same route as the I-10 between Los Angeles and Phoenix. After heading in a northeast direction out of the Los Angeles Basin, the trails heads east, paralleling the Transverse Ranges, then continues east towards the Colorado River. From there, the trail continues east towards the Phoenix Basin and onward across the Colorado Plateau, down into the northern Rio Grande Valley.

Long-distance trade networks extended beyond interior California; *Olivella*[33] (olive snail) shell beads from southern California were identified in portions of the northern and western Great Basin (Howard and Raab 1993) and parts of the southern Great Basin, some of which were dated to as early as 10,300–10,000 B.P. (Fitzgerald et al. 2005:Table 2). Shell beads identified from the northern and western Great Basin were dated to the Middle Holocene (5460–4365 B.P.) (Vellanoweth 2001:Table 1), indicating that this interaction sphere extended at least through this period. Evidence for exchange between the Pacific Coast and the Great Basin was identified in the form of stone spheres discovered in both the Great Basin and on the coast (Sutton and Koerper 2005:1), as well as obsidian sourced from the northwestern Great Basin, found in Orange County (Macko et al. 2005:97–98), and additional coastal sites with obsidian sourced from points all over California (Jackson and Ericson 1994:394). The closest obsidian source to the proposed AEC is Obsidian Butte, near the edge of the current-day Salton Seashore. When the water level was low enough to access Obsidian Butte, people obtained this obsidian and traded it, but likely to a somewhat lesser degree than other high-quality obsidian sources (Jackson and Ericson 1994:398).

Once the Spanish arrived in the area, they affected the trade between the indigenous groups. The Padres encouraged trading and as they considered the Indians to be free nations, they regarded stopping the trade as a breach of international law. However, military authorities disagreed, particularly on the grounds that trade between indigenous groups was a pretense to start trouble (Farmer 1935:156–157). Thus, there was disagreement between the Padres and military regarding how to treat the indigenous trading relationships, but by 1800 most of the Gabrielino Tongva were either missionized, dead, or had fled to other areas (Bean and Smith 1978:Table 1).

Interaction spheres in Western North America were not limited to the Pacific Coast and the Great Basin, but variously included the Gulf of California, Puebloan groups in the Southwest, and the Colorado River area (Jackson and Ericson 1994:398), and even played a role in the massive trade network of which Chaco Canyon in New Mexico was a major hub ca. 1,100 years ago (Mathien 1993:36). It is important to understand that Southern California, and the Los Angeles Basin more specifically, has likely been a place of migration and movement since not long after initial settlement in the New World. Not only does archaeological evidence allow such an interpretation, but ethnographic evidence confirms this as well. Indigenous understandings of their origins are tied directly to the immediate landscape and homeland in which they live. For example, in versions of the coastal Juaneño[34] creation story, two influential deities, *Ouiot*, the monster-chief, and *Chingichngish*, the supreme-creator god, emerged, at different times, at the village of Puvunga (Boscana 1978:32, 33). Also, Boscana (1978:119) documented that one of the places *Chingichngish* is understood to have died was at Puvunga. Milliken et al. (1997:15) provide a useful summary of the roles of *Ouiot* and *Chingichngish* in the origin stories among the Juaneño and Luiseño,

[33] Biologists now classify olive snails as belonging to the genus *Callianax* (Lightfoot and Parrish 2009:234).

[34] The Gabrielino Tongva were missionized and their culture so thoroughly affected before their oral histories could be documented by Euro-Americans, that there is scant ethnography concerning their origin stories, and thus ethnographic analogy with neighboring groups, such as the Juaneño, is necessary. Moreover, it would be a mistake to assume that there is any one “correct” version of the creation story or *Chingichngish* story (Milliken et al. 19997:16).

*[T]hree successive sets of power entities or beings were involved with the creation of the world and institution of religious life. The first generation, a brother/sister set of entities took the form of sky and earth. They created the second generation, the First People, entities whose essences are now found in certain animals, certain ritual objects, and certain rocks, hills, and mountains. One of those entities, Wiyut (Ouiot), became the "captain" or "father" of all the First People. Following the death of Wiyut, the First People assumed their present forms and humans as we know them were created. Chingichngish, the third generation of power entities, appeared among people for a short time as a teacher. He remains active in the background of existence, as the source of both positive power and punishment for behavior.*

The village of Puvunga was also the location where, after *Ouiot* was killed, a very large gathering of *Ouiot's* people conferred and cremated his body. After the ceremonies, the elders consulted each other regarding the collection of food stuffs, and it was at this time that the god *Chingichngish* appeared to the people. It was at the village of Puvunga that *Chingichngish* first taught the people "explaining the laws and establishing the rites and ceremonies necessary to the preservation of life" (Boscana 1978:33). He also taught the people what to wear, how to heal the sick, how to build the ceremonial structure (*yovaar),* how to rear the young, and how to live according to *Chingichngish's* laws (Boscana 1978:33–34).

Moreover, several ethnographic accounts suggest that the Gabrielino Tongva were the center of the Jimson weed/datura/toloache religion (also referred to as the *Chingichngish*[35] religion) and that the neighboring Luiseño, Juaneño, and Chumash fashioned similar ceremonies following the Gabrielino Tongva lead (Bean and Smith 1978:548; Kroeber 1976:626–627; Moriarity 1969:2). The spread of this religion likely followed the same routes that goods and other cultural ideas followed within the Southern California portion of the PRGTL, with the site of Puvunga playing an important role in both the *Chingichngish* religion, because it was the place of emergence of deities, as well as a trading center along the trails which were part of the PRGTL. **Cultural Resources Appendix Figure 1** depicts the spread of the *Chingichngish* religion amongst several Southern California tribes.

As stated earlier, the Gabrielino Tongva territory consists of a wide array of landforms and a related diversity of resources. The territory includes ocean islands, the ocean itself, coastline beaches, estuaries, salt marshes, rivers, riverine basins or piedmonts, foothills, and mountains. The Gabrielino Tongva were proficient at gathering acorns, sage, yucca, cacti, and a variety of other plants, animals, and birds associated with the interior mountains/adjacent foothills, prairie, exposed coast, and the sheltered coastal regions. Saltwater fish, such as tuna, and dolphins (i.e., cetacean mammals) were taken from the ocean using plank canoes and tule rafts, and deer were hunted from the piedmont to the mountains. Salt was gathered for daily consumption and for trade inland, notably at Old Salt Lake near the Redondo Beach Generating Station. The coastline extending between San Pedro and Newport Bay, characterized as exposed

[35] There are at least six variant spellings of the name of the religious tradition. Bean and Smith (1978:548) clarify that the linguistic source is Luiseño and there is no known Gabrielino word for the religious tradition despite being considered to have originated with the Gabrielino and diffused to neighboring tribes.

coast, was an area of secondary subsistence gathering camps adjacent to the coast, with the primary subsistence villages located farther inland (Bean and Smith 1978:539). The closest inland village to the proposed project area is Puvunga (about 0.5 mile north-northwest of the project area), a village important for its religious associations, influence on trade, and historical significance.

Steatite was traded inland, in both raw and fashioned form, and used to construct animal effigies, pipes, cooking vessels, arrow straighteners, ritual objects, plaques known as comals and palettes (a type of armor plate) (Bean and Smith 1978:542, 547). Asphaltum was used to seal water tight vessels including baskets and canoes, and was used to attach rare minerals, shells, and beds to everyday objects and ceremonial dress. Bedrock and portable mortars were the predominant food processing materials. In particular, the Gabrielino Tongva were known for the unique practice of specific ownership and transportation of personal mortars. Other items of common use were metates, mullers (pestles), mealing brushes, wooden stirrers, shell spoons, and wooden bowls. Deer scapulae were fashioned into saws. Other bones, shell, wood and chert were fashioned into needles, awls, fishhooks, scrapers, flakers, wedges, shovels, projectile points, cane knives, and drills. Salt was used as a trade item, consumed only in moderation because it was understood to have the potential to cause one's hair to go grey, used in ceremony, and figured in the creation story (Davis 1961; Heizer 1968:23; Johnston 1962:62, 64, 70, 93).

Shell disc bead money was manufactured and used as local currency, and recognized as legitimate currency as far east as the Colorado River. Business transactions, and obligations and payments on debt, were tracked by knotting cordage. Ceremonial rattles were fashioned from gourds. Pottery does not show up in the archaeological record of the area until the Late Mission Period, and was made by coiling and the paddle and anvil technique. Baskets were woven from rushes, grass, and various bushes. Basket types included mortar hoppers, flat baskets, carrying and serving baskets, storage baskets and ceremonial baskets for grave offerings. Baskets were made by women who used the stems of rushes (*Juncus* sp.), grass (*Muhlenbergia rigens*), and squawbush (*Rhus trilobata).* Weapons for war and hunting consisted of war clubs, self- and sinew-backed bows, tipped and untipped cane arrows and throwing clubs and slings.

Planked canoes, fashioned from wooden planks that were tied together with cordage and caulked with asphaltum are a technological feat shared with the Chumash to the north. The large boats were ocean-worthy vessels, capable of handling rough seas, which allowed for deep-sea fishing and travel to the Channel Islands. Marsh and estuary bodies of water were traveled by rush rafts made from tule reeds. (Bean and Smith 1978:542; Heizer 1968:43–46; Kroeber 1976:628–632; McCawley 1996:111–142.)

Men and children went without clothing in the temperate climate. Women wore aprons of deerskin or skirts made from the inner bark of willow or cottonwood trees. Capes used during cold or rainy seasons were made of deerskin, rabbit fur or bird skins woven together with milkweed or yucca fiber. Otter skins were also used, in addition to being traded inland. Ritual regalia were constructed of bird plumage, shells, and beads. Body paint was used during ceremonial events. (Bean and Smith 1978:540; Heizer 1968:23–24; McCawley 1996:11–13.)

Houses were domed, circular and covered with tule, fern or Carrizo reed mats. A large house could hold up to three or four families (~ 50 people), and was perhaps 60 feet in diameter. Smaller homes were as little as 12 feet in diameter. Willow posts (and along the coastline and on the Islands sometimes whale rib bones) were inserted about a pace apart around the circumference of the house. A smoke hole was left at the top of the dome and was covered with a tule mat when not in use. Houses along the coastline had a door which opened towards the sea to avoid the north wind, and the entryway was also covered with mats. A trench was dug inside the door to catch any run-off that might make its way through the matted doorway. The floor was dirt, sprinkled with water and compacted. A hearth was fashioned with cobbles in the center of the house. The interior of the house was covered with more mats and rugs fashioned out of animal skin and fur. Inland houses and those at higher elevations were semi-subterranean (~ 2 feet deep) in order to conserve heat. Adjacent to houses were wind screens fashioned from posts buried in the ground and from which matting was suspended. These wind screens served as open air kitchens that were used during fair weather; during inclement weather, cooking occurred around the indoor house hearth. Also placed adjacent to the main dwelling were large granary baskets. The granary baskets, sometimes coated with asphaltum, sat upon posted platforms and were the primary storage receptacle for acorns.

Common sweathouses were small semi-circular, semi-subterranean earth covered buildings reserved for adult male use. Sweathouses were sometimes built into banks of washes. The sweathouses were heated by direct fires placed near the door, as the sweathouse was not fashioned with a smoke hole. The sweathouse was positioned near water to provide access for bathing. A larger ceremonial sweathouse probably was also fashioned similar to the common sweathouse, but somewhat larger inside (12 feet in diameter), and featured a smoke hole at the top that also functioned as an entrance into the structure via a ladder. Menstrual huts were also constructed. It is not clear if the menstrual hut was also used for birthing (Heizer 1968:29).

Ceremonial open-aired enclosures, *yoyovars*, were located near Chiefs' houses and the center of villages, and were made of willow posts and willow wicker. The interiors were decorated with feathers and painted posts. The ceremonial enclosures were used for rituals associated with the *Chingichngish* religion, and within the enclosure an effigy of the god *Chingichngish* was placed, and ceremonial sand paintings featuring depictions of the sun and moon were drawn on the ground, which were used for divination. Only the most revered of the village's male leadership, male initiates and female singers were permitted to enter. McCawley (1994:3–17) suggests that the ceremonial house was usually situated near a permanent sources of water. In the case of Puvunga, the closest permanent water source was a spring located on the southeastern slope of Alamitos Mesa, near the present land holdings of the Rancho Los Alamitos. During funeral ceremonies the grieving family members were allowed to enter the sacred enclosure. Some villages featured a second ceremonial enclosure that was not consecrated and was used for instruction and practicing upcoming rituals.

Villages also featured leveled fields surrounded by posted fences for sporting events. Larger villages were thought to have populations of as many as 1,500 people. Cemeteries were located outside of but immediately adjacent to villages. Gravesites were sometimes marked by baskets or slabs made from sandstone, or blue schist on Catalina Island, decorated with etched figures commemorating the deceased. (Bean and Smith 1978:542; Kroeber 1976:628; McCawley 1996:27–30.)

### Gabrielino Tongva Political Organizations and Religious Practices

The missionary conversion process, coupled with a high rate of disease caused many deaths and a loss of traditional knowledge, thus leaving the Gabrielino Tongva cultural traditions incredibly fragmented by the time that anthropologists arrived to document what remained of the traditional culture. Therefore, less is known about traditional Gabrielino political organization and religious practice than some of the neighboring tribes, such as the Luiseño, Cahuilla, Serrano and Chumash. However, some analogs between these neighboring groups and the Gabrielino Tongva can provide interesting and valuable information.

Based on the limited information available regarding Gabrielino Tongva social organization, they most likely adhered to a moiety kinship structure, somewhat mirroring the organization of their Juaneño and Luiseño neighbors. In addition, crosscutting the kinship system were three social classes. Social classes tend to appear in societies that have evolved in environments that provide an abundance and diversity of resources. Gabrielino Tongva society maintained an elite class who spoke a specialized language, and included hereditary chiefs and the very wealthy. There was a middle or commoner class who were modestly wealthy and from fairly reputable lineages. There was a lower class of everyone else: the poor, disreputable, slaves, or those of ill fate. Marriage or wealth accumulations were the prime avenues for social movement within the class system. There were also social organizations and guilds of craftsmen that cross-cut village social structure and could include members from neighboring tribes. Property ownership was practiced by some Gabrielino Tongva and these property boundaries were marked by painting a copy of the owner’s personal mark on nearby trees, posts and rocks (Bean and Smith 1978:543, 545; McCawley 1996:10).

Villages comprised non-localized segmentary lineages. One or two lineages may have dominated a particular village for a period of time but dominance was not permanent or guaranteed. Regardless of moiety or class affiliation, political autonomy occurred most effectively at the village or “tribelet” level, with the dominant lineage’s leader assuming the village chief position. The leadership was manifest in the possession of the village sacred bundle and possession of a chief name. Leadership tended to be passed through male descent, unless the other village lineage leads could agree, either that there was no one in the controlling lineage that existed, or there was no one of the dominant lineage that was competent to lead. Leadership at times could be passed to daughters. Village chiefs could combine and preside over more than one village, and this could be done by alliance agreement or by having multiple wives, each in a different village. Larger villages could segment with some of the lineage forming a hamlet that still held allegiance to the parent village. A large and wealthy village could have multiple radiating hamlets or camps. Over time these smaller villages could rise to dominance and overshadow the parent village (Bean and Smith 1978:544).

A village leader's responsibility was to protect the sacred bundle, collect taxes from the village houses, settle disputes, make decisions of war, negotiate peace treaties, and to generally live an exemplary life. The village leader could be assisted by an announcer, a tax collector/treasurer, general assistants and messengers/runners. However villages also had shamans who from time to time could trump the authority base of the village leader (Bean and Smith 1978:544).

Shamans gained their power and knowledge directly from the Great Spirit when in Jimson weed-induced states. Shamans could cure or cause calamity and illness, they were known to divine, and knew, collected and dispensed various herbal and animal remedies including poisons for weapons. Shamans were responsible for conducting the yearly mourning ceremonies for grieving families of the deceased. While village leaders or chiefs protected the sacred bundle, shamans were responsible for the spiritual protection of the sacred bundle. The shamans from the Santa Catalina Island were considered to be the most powerful and were accorded due respect. It was also understood that the *Chingichngish* religion was brought to the mainland by the religious leaders of the island (Bean and Smith 1978:544; Johnston 1962:97; Kroeber 1976:621–622; also see Hudson 1979).

Gabrielino Tongva religious beliefs and practices are not documented as well as other indigenous groups in the region, but it appears that they, and perhaps those living at Santa Catalina Island specifically, were the first to understand the toloache ceremonies which involved ritual consumption of Jimson weed (Kroeber 1976:621–622). This practice spread to distant tribal nations throughout Southern California and into the southern Central Valley (**Cultural Resources Appendix Figure 1**). The consumption of Jimson weed was associated with the deity *Chingichnich*, a deity who emerged at the village site of Puvunga and taught the people how to live according to the tenets of this religion. Father Boscana (1978:33) wrote in the nineteenth century that *Chingichnich* taught the Gabrielino Tongva "the laws and establishing the rites and ceremonies necessary for the preservation of life." These laws included ideas regarding ritual observances, obedience to authority, economic reciprocity, family and social obligations, child rearing and hygiene, and provided the society with a strict moral, political, economic and legal code. Punishment for breaking these rules could include death for the most serious of offenses (McCawley 1994:2-37). Participants of this religion were inducted into the practice during adolescence, at a ceremony in which they gained insight into the nature of the world and the tribal and individual role and place in the universe. This insight provided success in hunting, warring or other activities of importance to the survival of the village over time (Kroeber 1976:626; McCawley 1996:143–169; Moriarty 1969.)

### Gabrielino Tongva Burial Knowledge and Practice

Burial beliefs and practices stem from the instructions of *Chingichnich* before he departed this world. There was a concept of an afterlife, place of heaven, and something similar to the Christian concept of purgatory[36]. Upon death, characterized as the breath leaving the person, it was understood that the heart of the person did not die, but, through proper ritual, was transported to heaven or purgatory. Heaven was understood to exist to the west, beyond San Clemente Island. At this “distant mountain in the sea” a benevolent god presided and all was good. For those who had imperfectly practiced *Chingichnich’s* instructions, a purgatory-type place to the east “in the hills” where one’s heart would reside indefinitely until the god determined that proper penance had been performed.

After death, a wake occurred for three days and general mourning commenced. The body was wrapped in a blanket, mat, net or seaweed. After the wake, the body of the deceased was carried in procession to the village burial area where the burial commenced. Mainland Gabrielino Tongva tended to conduct cremations, while the Island Gabrielino Tongva adhered to flexed burial practice. The hands were placed across the breast, and the entire body was bound. The portion of the coastal mainland, from Ballona Creek to the San Gabriel River, where Island Gabrielino Tongva had the strongest relations, tended to also practice flexed burial internment. For those villages adhering to cremation, the remains were either interred or disposed of to the east of the village. Grave offerings were buried with the deceased or, in the case of cremation, burned with the corpse. Some internments featured dog burials placed above the corpse. The Gabrielino Tongva saw the worlds of the living and the dead to be parallel places; therefore the items buried or burned with the deceased were intended to accompany that person to the afterworld where their statuses were recognized by the items that accompanied them. To loot a grave today is perceived by traditionally minded Gabrielino Tongva to be a robbery of the deceased’s status in another world. After the funeral ceremony, the living mourned for a year, and women singed or cut their hair initiating the mourning period. Every fall, after the harvest ceremonies, an annual mourning ceremony was conducted for all of those who had died in the past year (Bean and Smith 1978:545–546; Heizer 1968:29–31; McCawley 1996:155–158.)

### Contemporary Tribal Entities with Ethnographic Affiliations

There are various Gabrielino Tongva tribes, nations and other organizations. Names are very similar and it is difficult at first glance to differentiate between the groups. The Native American Heritage Commission list provided to staff (Singleton 2014) provides additional tribal names that represent Gabrielino Tongva people and culture. Tribal entities are listed below.

[36] Some scholars (e.g., Hudson and Blackburn 1978:247) suggest that the *Chingichnich* religion was a post-contact concept, which is why there are elements of Christianity in some of the practices. Other scholars (e.g., McCawley 1994:2-33) suggest that these Christian-like elements were present prior to the arrival of Europeans and are a result of organic anthropological religious evolution.

### Gabrielino Band of Mission Indians – Kizh (Kitc) Nation

This tribe does not affiliate with the name "Tongva", asserting that it is a twentieth century appellation, and instead prefers the name 'Kizh' (Kitz). They understand that 'Kizh' refers to houses made of willow, tule and brush, and refers to all the people that lived in such houses, ostensibly all "Gabrielinos". The Tribal Council of seven seeks federal recognition and is an advocate for the protection of cultural resources[37].

#### *Gabrieleno/Tongva San Gabriel Band of Mission Indians*

The apparent website for this tribe, http://www.tongva.com, is not current.

#### *Gabrielino/Tongva Nation*

This tribe ratified their constitution in 2007, and subsequently received a Letter of Recognition from the Mayor of Los Angeles in addition to a resolution from the Los Angeles City Council acknowledging the heritage of the Gabrielino/Tongva Nation. In addition to a nine-member Tribal Council (*Peo'tskome*), this Tribe also maintains a Citizenship Board, an Elections Board, and a Citizenship Advisory Committee[38].

#### *Gabrielino-Tongva Tribe*

The Gabrielino–Tongva Tribe currently has offices in Los Angeles, but the offices were located in Santa Monica as recently as 2007. The tribe ratified their constitution in 2007, and is guided by a council of seven. The tribe has been involved in efforts to establish a casino resort in the Los Angeles area and also maintains a college scholarship program for tribal members[39].

#### *Gabrielino/Tongva Indians of the California Tribal Council*

This tribe does not appear to have an associated website and no background information is currently available.

#### *Tongva Ancestral Territorial Tribal Nation*

This tribe does not appear to have an associated website and no background information is currently available.

#### *Ti'at Society/Intertribal Council of Pimu*

The Ti'at Society was formed in the late 1980s in an effort to resurrect the maritime culture of the Gabrielino Tongva people (Williams 2013). This group constructed a traditional plank canoe which is housed at CSULB, and it participates in the annual Channel Islands crossing off the coast of Southern California[40].

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[37] www.gabrielinoindians.org.

[38] http://gabrielino-tongva.com.

[39] http://www.gabrielinotribe.org.

[40] http://www.csulb.edu/colleges/cla/departments/americanindianstudies/wp-content/uploads/2014/04/Tiat-Fliers.pdf.

### ***Los Angeles City/County Native American Indian Commission***

This commission was established in 1976 through a joint effort of the Los Angeles American Indian community, City of Los Angeles, and Los Angeles County. The "primary purpose of the Commission is to increase the acquisition and application of funding resources to the socioeconomic problems of American Indians in Los Angeles City and County without duplication of any service or activity provided by any other County officer or department" (LACCNAIC 1993).

Currently, none of the Gabrielino Tongva groups are federally recognized tribal entities, and thus are unable to receive federal monies for health programs and other social and economic benefits. However, in 1994 the California Legislature passed Assembly Bill No. 96 (recorded by the Secretary of State on September 13, 1994 as Resolution Chapter 146 of the Statutes of 1994), a bill which recognized the Gabrielino as the original inhabitants of the Los Angeles Basin, and encouraged the President and Congress of the United States to similarly recognize the tribe. Additionally, in 2007 the Mayor of Los Angeles signed a recognition letter congratulating the Gabrielino/Tongva Nation for ratifying their constitution[41], and the Los Angeles City Council also signed a resolution supporting the Gabrielino/Tongva Nation in their efforts for federal recognition[42]. There was a proposed Senate Bill (SB) also in 2007 (SB 1, proposed by Senators Oropeza, Scott, and Yee) which would have established a reservation for the Gabrielino Tongva in the Los Angeles area, but without gaming rights. However, the bill was dropped by its sponsors a short time after being introduced.

# HISTORIC SETTING

## Spanish Period (1769–1821)

By the middle of the sixteenth century, Spain had emerged as the premier naval and military power in Western Europe, with colonies in North and South America and a trading network throughout the Pacific. On September 28, 1542, Juan Rodriguez Cabrillo arrived in San Diego aboard the *San Salvador* and claimed the land in the name of Spain (SDHC 2012). In November 1602, Sebastian Vizcaino arrived in San Diego, surveying the coastline and getting as far north as Oregon (SDHC 2012). In the late 1770s, Antonio Maria de Bucareli, the Viceroy of New Spain, "legitimized Spain's claim to Alta California by making it the new *Provincia de California* [Province of California] with a provisional capitol at the Presidio at Monterey" (Steiner 1999:6). Bucareli's plan was to use the missions to colonize the new province. While the Spanish explored the coast of present-day California in the mid-sixteenth century, it was not until the incursion of Russian and British explorers into what are now Alaska, British Colombia, Washington, and Oregon in the 1750s that the Spanish made serious attempts to colonize Alta California (Steiner 1999:4–6). It was Bucareli who ordered Juan Bautista de Anza to lead an exploration to establish overland routes from Sonora (present day Arizona) and New Mexico in order to facilitate the colonization of California and provide a stable supply route (Steiner 1999:8). Over 150 years passed before the Spanish attempted permanent settlement.

[41] http://gabrielino-tongva.com/documents/Recognition.pdf.

[42] http://gabrielino-tongva.com/documents/resolution.jpg.

The Spanish colonization of California was achieved through a program of military-civilian-religious conquests. Soldiers secured areas for settlement by suppressing Indian and foreign resistance and establishing fortified structures called presidios. Civilians established pueblos (e.g., towns) and Spanish priests led the religious conquest by establishing missions and converting the Indians. The Spanish built 21 missions in California with the local Native American tribes serving as the dominant source of labor at the missions. Pasture lands were divided among the missions and beneficiaries who were awarded land grants by the Spanish and Mexican governors of Alta California. These beneficiaries were often former soldiers or others who had served the government.

In 1784, Pedro Fages, Spanish governor of California at that time, granted 300,000 acres, which included today's Long Beach area, to Manuel Nieto, a Spanish ex-soldier, as a reward for his military service. Nieto built an adobe home and raised cattle, sheep, and horses on his Rancho Los Coyotes. Upon his death in 1804, his rancho passed to his heirs. (APD and HRG 2009:8.)

## Mexican Period (1821–1846)

In 1822, Mexico achieved independence from Spain, and California became an outpost of the Mexican Republic. In 1834, Nieto's Rancho Los Coyotes was divided into five smaller ranchos, including two that would eventually encompass the majority of Long Beach: Rancho Los Alamitos and Rancho Los Cerritos (APD and HRG 2009:8). The other three were known as Rancho Santa Gertrudes, Rancho Las Bolsas, and Rancho Los Coyotes (Hoover et al. 1990:148).

By the 1840s, there was a steady migration of American settlers into California. Unable to stop the incursion, the Mexican government granted citizenship to all who would pledge to follow Mexican law. Many of these foreigners received land grants on which they established grazing and commercial operations. In the Long Beach area, an American ranchero known as Don Abel Stearns purchased Rancho Los Alamitos in 1842 as a summer home and cattle ranch (APD and HRG 2009:8). Massachusetts-born merchant John Temple, a Los Angeles-area land investor, acquired Rancho Los Cerritos in 1843 and maintained a lucrative business raising cattle and shipping hides out of San Pedro Harbor to the west of Long Beach on the opposite side of San Pedro Bay (APD and HRG 2009:9).

War broke out between the United States and Mexico in May 1846, with some decisive battles occurring in California. The American victory over Mexico was formalized in February 1848 with the signing of the Treaty of Guadalupe Hidalgo, and Mexico ceded all its land holdings above the Gila and Rio Grande rivers to the United States.

## American Period (1848–present)

In 1848, the discovery of gold at Sutter's Mill in northern California launched the California Gold Rush. In 1850, California was granted statehood and its first 27 counties were established. Completion of the transcontinental railroad in 1869 and later the reach of Southern Pacific Railway and the Atchison, Topeka and Santa Fe Railway into Southern California in 1876–1877 spurred a development boom. The ranchos gave way to town developments and resort destinations. Shipping and transportation via rail and ship now allowed for related business development to take place along the shoreline and interior areas of Southern California.

The Gold Rush gave a boost to the Southern California cattle industry by providing a need for hide, tallow, and meat. Ranching was a lucrative enterprise for the two Long Beach area rancheros, Stearns and Temple, who profited greatly during the 1850s. However, a catastrophic flood in 1861–1862 and a severe drought during the following years resulted in a substantial loss of cattle, causing Stearns to lose his Rancho Los Alamitos. It was later acquired by John Bixby in 1878–1881 through a lease and partnerships with Jotham Bixby and Isaias Hellman. (APD and HRG 2009:41–42.) Soon after, Jotham Bixby acquired the neighboring Rancho Los Cerritos. Together, they formed the Alamitos Land Company and began to develop town lots with oceanfront property (Jurmain et al. 2011:106–107). In 1884, the town of Long Beach was laid out to occupy the southwest corner of the Rancho Los Cerritos. The land holdings of the Bixby Ranch were slowly sold off for development throughout the late nineteenth and early twentieth century. Meanwhile, the core of the ranch continued to operate as primarily a dairy and alfalfa producer through the 1960s. (APD and HRG 2009:42.)

### Long Beach History

Long Beach was originally planned and developed by William Willmore in 1881 as a 350-acre town site that he named Willmore City (APD and HRG 2009:43). He promoted the town as a tourist destination and settlement, highlighting its fertile soil and beautiful beaches. Willmore was unable to produce adequate interest in the location and soon was facing financial difficulties forcing him to sell his interest in the development.

The San Francisco-based real estate firm of Pomeroy & Mills purchased the property from Willmore in 1884, renamed the town Long Beach, and formed the Long Beach Land and Water Company (APD and HRG 2009:44). Under new management, the town began to prosper by the following year and featured numerous residences, businesses, a church, and a local newspaper. Expansion of the railroad networks in the Los Angeles region brought thousands of families into the area from the Eastern United States resulting in a population explosion that sparked further growth and development of Long Beach. The City of Long Beach was incorporated on February 10, 1888 (APD and HRG 2009:45). By the 1890s, Long Beach had became one of the premier resort beach towns and boasted many attractions including two pleasure piers and a railroad line connecting to Los Angeles.

The population of Long Beach continued to grow at the turn of the twentieth century, leading to the annexation of surrounding areas until the city had expanded to approximately 10 square miles in size. By 1906, the Los Angeles Dock and Terminal Company began dredging the marshlands along the coast to build the Long Beach Inner Harbor (APD and HRG 2009:47). The following year, ship builders from around the nation began to take interest in the facilities and set up ship-building at Long Beach. The Port of Long Beach opened in June, 1911, and the U.S. Navy designated Long Beach as the headquarters for its Pacific Fleet in 1919 (APD and HRG 2009:47, 50). Commercial and residential development continued at a steady pace through the 1920s and the Long Beach Airport was established in 1924 (APD and HRG 2009:50).

Oil discovery at Signal Hill in 1921 brought radical changes to Long Beach as speculators, promoters, and an influx of workers descended on the area within a few short years hoping to make money on the oil industry (APD and HRG 2009:48). The influx of money transformed the downtown area with the construction of high-rise buildings and elegant hotels and apartments. The City's harbor also experienced a growth spurt as a result of the oil boom, as the oil industry depended on the harbor to export its production. In response to the need to expand the harbor, tidelands and submerged areas were dredged and built to support construction of channels, breakwaters, docks, landings, and warehouses. By the 1930s, Long Beach Harbor was handling as much as one million tons of cargo each year. The U.S. Navy had well over 50 ships at Long Beach Harbor and approximately 8,500 servicemen. (APD and HRG 2009:50.)

As in other parts of the country, Long Beach was severely affected by the Great Depression following the stock market crash of 1929. Many businesses closed and their buildings stood vacant or abandoned. Real estate values plummeted and the tourism industry was at a standstill. Meanwhile, the population continued to grow, although at a much slower rate than it had the previous decade.

A magnitude 6.4 earthquake struck Long Beach in 1933, causing the death of 120 residents and over $50 million in damage (CDC 2013). Over 100 public schools were badly damaged, of which 70 were destroyed. Fortunately the quake occurred in the early evening hours when the schools were empty. The earthquake served as an impetus to pass the Field Act of 1933, which required earthquake-resistant design and construction for all public schools.

As the decade of the 1930s progressed, Long Beach's defense industry continued to grow. A naval base on Terminal Island was created in 1937. A second naval base was constructed in 1941 that included a shipyard and hospital. That same year, a substantial breakwater was constructed to protect as many as 30 square miles of anchorage. In 1940, Douglas Aircraft Company built a 242-acre production plant next to the Long Beach Airport, which later proved critical to the United States involvement in WWII. (APD and HRG 2009:51.)

In the 1950s, Long Beach experienced a population boom of ex-servicemen and their families who decided to settle in the area permanently after the war. To meet the demand of a rapidly growing population in the post-war baby boom, the City expanded by annexing 69 new tracts of land, most of which were to the east of the city limits, comprising as much as nine square miles (APD and HRG 2009:52). Many of these former agricultural areas were transformed into suburban communities. To meet the needs of these new communities, numerous commercial centers were also built. In response to a need for educational facilities, California State University, Long Beach was established in 1949. The post-war development boom also brought the need for greater infrastructure and civic improvements, including freeways, hospitals, parks, museums, and marinas.

Military downsizing slowed the growth of Long Beach in the 1960s and 1970s, but an influx of emigrants from Southeast Asia, Mexico, and Central and South Americas in the 1980s spurred a new period of growth. The City of Long Beach spans 50 square miles and has a population of over 470,000 people. At present, the economy is supported by a number of industries, including aerospace, manufacturing, shipping, healthcare, education, and tourism. The Port of Long Beach, per cargo tonnage handled annually, is reported to be the busiest port on the West Coast. (APD and HRG 2009:54.)

## Steam Generation Electric Plants in California

### *Early History*

Built in 1879, the Brush Plant in San Francisco was the first central generating station on the west coast to produce and distribute electricity on demand to customers. Prior to Thomas Edison's invention of the incandescent electric light bulb in 1879, only the electric arc system was available, which turned out to be unsafe for indoor use. (Myers 1983:11.) Edison is also known for improving the generation and distribution systems for electricity, which truly opened up the consumer market. This "central station" concept was to become the cornerstone of the electric utility industry (Myers 1983:11).

Hydroelectric power was the dominant form of electric generation in California in 1920. By 1940, it grew to 89 percent of the state's market. However, by 1960, steam generating plants became the primary source of electricity in California as hydroelectric generation had fallen to 27 percent (JRP 2013:5).

Power generating plants constructed before WW II were typically housed in an architectural shell with a recognizable style of design. In the early part of the twentieth century, this was partly an outgrowth of the City Beautiful Movement, which sought to create order and beauty in the urban landscape. San Diego Consolidated Gas & Electric Company's Station B (1911) and Sacramento's Pacific Gas and Electric Company's Station A are examples of this early Beaux Arts-based Classical Revival presentation of an edifice housing the turbines, generators and various facilities of a steam generating electric plant. The Beaux Arts expression of classicism, popular between 1885 and 1930, was typically more exuberant in surface ornamentation than other Classical Revival styles of the time. The style was influenced by the design principles of ancient Greek and Roman structures. By the end of the nineteenth century, less dramatic forms emerged, known as Classical Revival. The original Pacific Light and Power Company steam plant at Redondo Beach, constructed in 1906, was also emblematic of the

Classical Revival style. All of these featured arched fenestration (e.g., doorways and windows), distinct cornice details, rhythmic patterns with respect to windows and wall relief, columns or piers, and spacious interior volumes housing the equipment.

Later examples adopted the architectural style of their times. The City of Vernon's Station A, built in 1932 is an excellent example of the Art Deco style of architecture popular at the time in Southern California. Art Deco was an early expression of the Modernist style of ornamentation that was popular in American culture during the 1920s and 1930s, appearing in the design of architecture, furniture, jewelry, pottery, and household appliances. A later addition to San Diego's Classical Revival style Station B (1928–1939) was constructed in the Spanish Revival and Art Deco styles. The Spanish Revival style, popular in Southern California during the 1910s–1940s, was inspired by the Spanish Colonial and Mexican adobe buildings of Southern California's earlier centuries.

### *The Southern California Edison Company*

Southern California Edison (SCE) is one of the largest electric utility companies in California, serving more than 13 million people throughout 15 counties (OAC 2009). Headquartered in Rosemead, California, SCE has been providing electric power to the region for more than 120 years. Their service territory covers approximately 430 cities and unincorporated areas, with a total customer base of approximately 4.8 million residential and business accounts. The following discussion of the history of SCE is heavily drawn from William A. Myers' (1983) definitive history, *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*.

The earliest history of the SCE Company dates back to the 1880s, when its first ancestral utility providers were organized (Myers 1983:8, 13). By 1886, the earliest of the predecessor companies, Holt and Knupp, illuminated the streets of Visalia, California (Myers 1983:13). Other small utility companies followed suit and were soon generating electricity for street lights to towns throughout southern and central California. Demand for electricity grew during the 1890s, and several different Southern California electric companies emerged to produce electric power from various hydroelectric facilities in the region.

In Los Angeles, the Los Angeles Electric Company had been operating since 1882, but was unable to fill the demand for residential and industrial electric power service (Myers 1983:32). In 1896, the West Side Lighting Company incorporated after successfully supplying power to the County courthouse and soon after, the Los Angeles No. 1 Station was completed and the company was providing service to residential areas. On December 1, 1897, West Side Lighting Company had merged with Los Angeles Edison Electric Company to form Edison Electric Company of Los Angeles. The new company immediately set to work to install an underground conduit system to provide service between their Los Angeles No. 2 substation and downtown Los Angeles (Myers 1983:37). This was the first Edison-type direct-current underground system to be installed in the Southwestern United States. Continuing to expand the following year; Edison Electric Company purchased the Southern California Power Company, which at the time of purchase, was constructing a power station on the upper reaches of the Santa Ana River.

In February 1899, Edison Electric Company completed the Santa Ana River No. 1 hydroelectric plant and began transmitting 33-kilovolt (kV) to Los Angeles over the 83-mile-long Santa Ana River Line (Myers 1983:38). At that time, it was the highest-voltage, longest-distance transmission line ever built in the U.S. With major sources of electric power assured, the company purchased the systems of existing smaller companies and expanded its customer base in Los Angeles and the surrounding area. Edison Electric Company constructed new hydroelectric plants in the San Bernardino region on Lytle Creek, Santa Ana River, and Mill Creek at the turn of the century. In 1904, they added Los Angeles No. 3, an 8,000 kilowatt steam station near the Los Angeles River, which utilized the newest, highly efficient steam turbine technology (Myers 1983:43).

Between 1902 and 1907, the company built the Kern River hydroelectric plant, which more than doubled the company's generating capacity. Electricity from Kern River No. 1 was delivered to southern California by way of a 118-mile-long, 75-kV transmission line, which at that time was the highest-voltage line in the nation. It was also the first electric line to be carried entirely on steel towers instead of wood poles. The company's accomplishments in the expansion of its facilities and service area during the first decade of the twentieth century led to reincorporation on July 6, 1909 as the Southern California Edison Company (Myers 1983:47). At that time, it served over 600,000 customers throughout Los Angeles, and outward as far east as Redlands and north to Santa Barbara.

Immediately following the reincorporation, the new SCE Company made plans for "a major construction program to upgrade its transmission and generating systems" (Myers 1983:48). The smaller, obsolete steam plants in their system were retired and replaced with larger facilities incorporating the newest steam turbine technology. Construction of the first of these new steam plants, SCE's Long Beach Steam Plant, began in 1910. Three gigantic vertical steam turbines were installed and put into service in 1911–1914, producing a tremendous 47,500 kilowatts of power. Seawater from the Cerritos Channel in Long Beach Harbor provided the system's cooling water. A network of 66-kV steel tower transmission lines connected the plant to SCE's switching station, which then transferred power to Colton, Santa Ana, Santa Monica, and Pasadena (Myers 1983:49).

On May 26, 1917, SCE purchased Henry Huntington's Pacific Light & Power Corporation, including the Big Creek hydroelectric system that had been completed in 1913 at the cost of $12 million. It was able to deliver 60,000 kilowatts (kW) of power to southern California from Powerhouse No. 1 and No. 2 in the Sierra Nevada Mountains. Following the purchase and merger, SCE spent a dozen years (1917–1929) in construction to expand the Big Creek hydroelectric project, enlarging the first two powerhouses and adding three new ones. Big Creek became the major source of southern California electricity until the 1950s.

Construction of the Hoover Dam and Powerhouse between 1930 and 1936 resulted in a hydroelectric facility that would produce five billion kW-hours of electricity per year for southern California, Arizona, and Nevada. SCE held the contract to provide some of that power to its Southern California customers. However, the 1930s was a difficult time for SCE, as it was for most Americans. Debilitating economic problems during the Great Depression meant a lull in activity and decreased sales of electric power. Heavy flooding in 1938 caused the company to shut down some utilities for several days, and the need to rebuild or abandon others (Myers 1983:174–175).

During WWII, electric power demand increased 94 percent to meet the needs of southern California's highly developed industries, such as aircraft plants, shipyards, steel industries, oil refineries, tire plants, automobile factories, ordnance works, and numerous military bases (Myers 1983:193). With electric power coming from the Big Creek system, Hoover Dam, and its other plants, SCE had sufficient electric power capabilities to furnish the needs of the war effort if it operated at full capacity. However, wartime power demand soon absorbed the reserve margin, and the capacity of many of their existing facilities was increased by adding new power generating units.

Amidst a population explosion and development boom in southern California that immediately followed the end of WWII, SCE had to increase capacity to keep up with the new wave of demand. The industries that had settled in the region during the war continued to prosper. Military men who had been stationed or trained in California during the war were now returning with their families and friends. Housing and commercial development spread over the region to fill the needs of the post-war newcomers. On April 12, 1951, SCE placed its one millionth meter into service (Myers 1983:200). The post-war boom lasted through the 1970s. Between 1951 and 1964, another one million customers were added, and in 1978, the total was 3 million customers. The only way the company could keep up with the demand was to undertake an enormous expansion of its generating capacity with construction of new steam plants and additions to existing hydro plants.

Over a period of 27 years between 1946 and 1973, ten new oil and natural gas fired electric power plants were built in southern California by SCE and another utility, California Electric Power Company (Calectric), who merged with SCE in 1964 (Myers 1983:205–208). One of the first steam plants constructed as part of this substantial expansion program was the Redondo Steam Station designed and built between 1946 and 1948 as an indoor facility based on the standards of the pre-WWII era. Over the next few years, SCE transitioned the design of their plants to a semi-outdoor and fully outdoor design, which became the standard during the company's expansion period between 1950 and 1973 (JRP 2013:9). As a result of the post-WWII era construction program, SCE was able to increase their generating capacity from 1.2 million kW in 1945, to 15.5 million kW in 1983.

In 1980, SCE was the first electric utility company to make a large-scale commitment to the development of renewable and alternative energy sources such as wind power, geothermal, solar, fuel cells, cogeneration and hydroelectric generation (Edison International 2013). Throughout the 1990s, SCE expanded their international presence with power generation facilities in the United Kingdom, Australia, Indonesia, Italy, Turkey, the Philippines, and Thailand. By 1996, Edison International was formed as a parent company of SCE to reflect the movement toward a global utility company.

### *Post-War (WWII) Electric Power Generation in Southern California*

After WWII, steam-generated electricity underwent a significant expansion. Beginning in 1948, with the construction of Redondo Beach Steam Station, and over the ensuing several decades, ten new multiple unit oil and gas-fired power plants came on line at coastal and inland sites in Southern California. Seven of these were Edison projects and three were Calectric projects. (Myers 1983:208–209.) Calectric's system merged with Edison's on January 1, 1964 (Myers 1983:205).

The demand for electricity to power the new and abundant electrical appliances that appeared on the market after WWII set utility companies in a scurry to meet capacity. As explained by Hirsh (2002), "(u)sage jumped 14% between 1946 and 1947, but power firms could not get enough equipment to meet demand as labor troubles at manufacturers and reconversion to a peace-time economy stalled deliveries." Between 1947 and 1973, usage rates grew approximately 8 percent per year nationally.

SCE expanded and built many plants in the post-war years to accommodate the demand for electricity. The following plants were built in rapid-fire succession in Southern California: Etiwanda (1951), Redondo Beach Plant No. 2 (1952), El Segundo (1955), and Alamitos (1955). The first outdoor plant, the Highgrove Generating Station in Grand Terrace, was constructed between 1951 and 1955. New units were added to all of these plants in the ensuing years into the mid-1960s. (JRP 2013:9.)

The new units constructed in the 1950s and 1960s were very similar to each other in design (JRP 2013:9). They evidence the transition from indoor steam generating plants, with the components housed in architectural shells, to largely outdoor facilities generally lacking architectural merit or pretense. This is particularly evident at El Segundo, Etiwanda, Alamitos, and Huntington Beach generating stations. This pattern is less evident at Redondo, where the original 1948 Plant 1, housed in an architectural shell in a defined style (Art Moderne) based on pre-WWII standards, transitions to the later Plants 2 and 3 with less architectural embellishment and more open construction (Smallwood 2014).

#### Alamitos Generating Station

The Alamitos Generating Station (AGS) is a natural gas fired steam-electric generating facility that was constructed by SCE between 1955 and 1969. The facility occupies approximately 120 acres along the west bank of the channelized San Gabriel River, two miles northeast of Alamitos Bay and the Long Beach Marina. The facility operates on the once-through cooling process using water diverted from Los Cerritos Channel to the west of the facility. The cooling water runs through the plant and is then discharged into the San Gabriel River on the east.

AGS was built during a period of new steam-power generation facility expansion across California to meet increased post-WWII demand for electricity. The first unit (Unit 1) at AGS began commercial operation in September 1956 and Unit 2 went online in February 1957, both as 175-megawatt (MW) units with a Babcock and Wilcox natural circulation boiler. They were followed by Unit 3, which was installed in December 1961, and Unit 4 in June 1962; both were 320-MW with a controlled circulation boiler. Units 5 and 6, both 480-MW units with a supercritical boiler, were added in 1966—Unit 5 in March and Unit 6 in September. Unit 7 was installed in July 1969 with a combustion turbine and operating capacity of 140 MW. The first six units operated in pairs with Unit 7 serving as a supplemental peak-unit to provide additional power during periods of high usage. All seven units are considered outdoor plants as they are constructed free-standing without a covering structure or building.

The AGS was designed as dual-source, meaning that it could be powered either by oil or natural gas, and once had four large fuel-oil tanks on the premises. In the 1970s, all dual-source fueled plants were required to convert to natural gas only, and by the 1980s, the AGS had completed the conversion. AES-Southland Development acquired the AGS plant from SCE on May 18, 1998. Unit 7 was decommissioned in 2003, and the fuel oil tanks were removed in 2010.

### Los Angeles Basin Drainage and Flood Control

The Los Angeles Basin is dissected by the Los Angeles and San Gabriel rivers as they make their way to the Pacific Ocean, and historically, these rivers flowed freely across the landscape along a natural course that meandered and flooded at will. Devastating floods from winter and spring rainstorms wreaked havoc along the San Gabriel River in the late nineteenth century and the early years of the twentieth century as the population and growth of Los Angeles was beginning to soar. According to the United States Geological Survey heavy flooding occurred on both the Los Angeles and San Gabriel rivers in 1825, 1833, 1842, 1852, 1862, 1867, 1874, 1884, 1886, 1889, 1890, 1909, 1911, 1914, and 1916 (McGlashan and Ebert 1918:40). Their report indicates that the United States Weather Bureau recorded 41 floods in the vicinity of Los Angeles during the period 1878 to 1914.

The most famous of these flooding episodes was the Great Flood of 1861–1862. From December 1861 through January 1862, a series of storms slammed the Pacific Coast from Mexico to Canada, producing the most violent flooding Southern California residents have experienced in history. It rained for almost four weeks producing as much as 66 inches of rain-fall in Los Angeles that year—more than four times the normal annual amount (Ingram 2013:1). Rivers flooded, spreading muddy water for several miles across the landscape. Large brown lakes formed on the normally dry plains of the Los Angeles Basin and covered vast areas of the Mojave Desert and the San Joaquin Valley, the latter of which became “an inland sea 250 to 300 miles long and 20 to 60 miles wide” (Cleland 1941:127). Flooding of the Santa Ana River created a large lake in the Anaheim area that measured four feet deep, stretching as much as four miles wide (Ingram 2013:1). The flooding drowned hundreds of thousands of cattle throughout the State and swept away entire communities and mining settlements statewide. Orchards and farmland washed away, leaving much of the agricultural development on the plains of Los Angeles County in ruins. Small settlements in the Los Angeles Basin were completely submerged and destroyed.

A disastrous flood that occurred in February 1914, which caused over $10 million in property damage in Los Angeles County, prompted the creation of the Los Angeles County Flood Control District (LADPW 2014). Successful bond issues in 1917 and 1924 financed construction of dams and other structures to impound San Gabriel River water and slow its flow in a controlled manner.

***San Gabriel River***

Development booms in the Los Angeles area during the early twentieth century, especially once the Los Angeles Aqueduct was activated in 1913, resulted in an outward expansion and growth of the region toward the Los Angeles Basin, which had previously been used for agriculture and ranching. In an effort to thwart the devastation that periodic rainstorms and flooding could cause, the Los Angeles County Flood Control District proposed impounding the San Gabriel River in an attempt to provide flood control. The project would also recharge groundwater flows and produce hydroelectricity for the San Gabriel Valley and Los Angeles metropolitan areas. Portions of the project were authorized and constructed by the U.S. Army Corps of Engineers with federal funding. Construction of the first dam on the San Gabriel River began in 1929, but engineering flaws in its design and the onset of the Great Depression postponed the project until 1932 (Rogers 2007:82).

Within the decades spanning the 1930s–1950s, five dams were constructed on the San Gabriel River. Extending from the upstream segment of the San Gabriel River in the San Gabriel Mountains to downstream, these are: Cogswell Dam (1932–1934), San Gabriel Dam (1932–1939), Morris Dam (1932–1934), Santa Fe Dam (1941–1949), and Whittier Narrows Dam (1949–1957) (LADPW 2006:2-28–2-30).

Before these dams could be completed, two record storms hit the Los Angeles region during the 1930s, flooding the San Gabriel River. The first flood occurred the night of December 31, 1933, causing the deaths of nearly 100 people, and the loss of 200 homes and 800 automobiles (SEMP 2006). It destroyed whole neighborhoods in the La Crescenta/Montrose areas due to landslides from the neighboring foothill mountains, which had recently burned. The event was so devastating that it inspired singer/songwriter Woodie Guthrie to write a song about it, titled “Los Angeles New Year’s Flood”.

In March of 1938, a pair of Pacific rainstorms caused abnormally high amounts of rainfall in the San Gabriel Mountains and across Southern California, causing the San Gabriel, Los Angeles, and Santa Ana Rivers to burst their banks. The 1938 flood event resulted in the deaths of 115 people, and it destroyed 5,601 homes (SEMP 2006). It damaged 1,500 additional homes leaving them uninhabitable. Both storm debris and mud flows buried people in their homes or drowned them as they attempted to escape. If not for the reservoirs and a portion of the San Gabriel Dam that had been completed in 1938, the damage to the residents of the Los Angeles Basin could have been much worse than it was (SEMP 2006).

In addition to the construction of dams on the San Gabriel River, the U.S. Army Corps of Engineers channelized the entire 34-mile length of the river below the mountains to the Pacific Ocean during stages between about 1928 and the mid-1950s. Its channelized course parallels the I-605 freeway its entire length from Azusa to Alamitos. From the mouth of Azusa Canyon at the southern edge of the San Gabriel Mountains, the river cascades over a series of more than 16 drop structures to slow the flow of flood waters from the mountains before it reaches the Santa Fe Dam. A series of 19 drop structures are positioned along the channel between Santa Fe Dam and Whittier Narrows Dam, within a 400-feet-wide earthen channel with concrete sides. Downstream of Whittier Narrows Dam, the channel narrows from 390 feet wide to 320 feet wide. Upon nearing Firestone Boulevard in Downey, the earthen channel narrows into a 165 feet wide concrete-bottom channel. The concrete bottom channel continues south and merges with Coyote Creek Channel at Rossmoor, at which point their convergence drops into a 350 feet wide earthen channel bordered by earthen dikes lined with rip-rap. This style of construction continues along the balance of the river's course to the Pacific Ocean at Alamitos Bay.

### *Los Cerritos Channel*

Based on historic aerial photographs, it appears that Los Cerritos Channel was built in the 1940s in an effort to control flows in that part of the Los Angeles Basin prior to the area being built over with dense residential and commercial development (EDR 2011). The Los Cerritos Channel is fed by the convergence of several small channelized tributaries that flow from their emergence in the nearby communities of Bellflower, Lakewood, and Bixby Knolls to the north and northwest of Los Alamitos. Each tributary measures less than 80 feet wide and 4 miles in length. Once they convene, their flow enters a segment of Los Cerritos Channel that is a 120-feet wide concrete channel. At Atherton Street, the concrete channel drops into a 200-foot wide segment of Los Cerritos Channel that is earthen and lined with rip-rap boulders. From there, the water is delivered 2.5 miles to the Pacific Ocean at Alamitos Bay. The two intake channels extending from Los Cerritos Channel into the Alamitos Generating Station were built during the late 1950s, at the same time as the power plant it serves (Price 2014:2)

## PROJECT AREA OF ANALYSIS

**Appendix CR-1 Table 1** below defines the applicant's proposed depths of excavation, depths of existing fill (artificial) deposits, and depths of excavation into natural soils or sediments, for each component of the proposed AEC. This information establishes the vertical dimension of staff's project area of analysis (PAA) in the final staff assessment (FSA).

## Appendix CR-1 Table 1
## Depths of Major Excavations for the Proposed Project

| Project Element | Proposed Excavation Depth (feet bg) | Depth of Existing Fill (feet bg) | Depth of Excavation into Natural Soils or Sediments (feet bg) | References |
|---|---|---|---|---|
| **Power Block 1** | | | | |
| CTGs (N = 2) | Concrete pad: ≤10<br>Piles: ~ 50 | Estimated 6–9 | Concrete pad: 1–4<br>Piles: 41–44 | AES 2015a:1-2, 5.3-24–5.3-25 |
| HRSGs (N = 2) | Concrete pad: ≤10<br>Piles: ~ 50 | Estimated 6–9 | Concrete pad: 1–4<br>Piles: 41–44 | AES 2015a:1-2, 5.3-24–5.3-25 |
| STG | Concrete pad: ≤10<br>Piles: ~ 50 | Estimated 6–9 | Concrete pad: 1–4<br>Piles: 41–44 | AES 2015a:1-2, 5.3-24–5.3-25 |
| ACC | Piles: 50 | Estimated 6–9 | Piles: 41–44 | AES 2015a:1-2, 5.3-25 |
| Auxiliary boiler | Concrete pad: ≤10<br>Piles: ~ 50 | Estimated 6–9 | Concrete pad: 1–4<br>Piles: 41–44 | AES 2015a:1-2, 5.3-24–5.3-25 |
| Fin-fan cooler | Piles: 50 | 8 | 42 | AES 2015a:2-3, 5.3-24–5.3-25 |
| GSU transformers (N = 3) | Concrete pad: ≤10<br>Piles: ~ 50 | Estimated 6–9 | Concrete pad: 1–4<br>Piles: 41–44 | AES 2015a:2-9, 2-11, 5.3-24–5.3-25; AES 2015b:4 |
| Fire water and suppression systems, hydrants | ~ 10 | Estimated 6–9 | 1–4 | AES 2015a:2-4, 2-17, 5.3-2, 5.3-24 |
| Water treatment and storage systems | ≤ 10 | Estimated 6–9 | 1–4 | AES 2015a:2-4, 5.3-24 |
| Metal acoustical enclosure | ≤ 10 | Estimated 6–9 | 1–4 | AES 2015a:2-7–2-9, 5.3-24 |
| Ammonia tank deep piles, containment, and injection grid | Piles: 50 | Estimated 6–9 | Piles: 41–44 | AES 2015a:2-14–2-15, 5.3-25; AES 2015b:5 |
| Ammonia refilling station, containment basin, and sump | ≤ 10 | Estimated 6–9 | 1–4 | AES 2015a:2-15, 5.3-24 |
| Related ancillary equipment | ≤ 10 | Estimated 6–9 | 1–4 | AES 2015a:1-2, 5.3-24 |
| **Power Block 2** | | | | |
| CTGs (N = 4) | Concrete pad: ≤10<br>Piles: ~ 50 | 8 | Concrete pad: 2<br>Piles: 42 | AES 2015a:1-2, 5.3-24–5.3-25 |
| CTG inlet air filter house with evaporative cooler (N = 4) | Concrete pad: ≤10<br>Piles: ~ 50 | 8 | Concrete pad: 2<br>Piles: 42 | AES 2015a:2-3, 5.3-24–5.3-25 |
| CTG turbine intercooler and intercooler circulating pumps (N = 4) | Concrete pad: ≤10<br>Piles: ~ 50 | 8 | Concrete pad: 2<br>Piles: 42 | AES 2015a:2-3, 5.3-24–5.3-25 |
| Fin-fan coolers (N = 2) | Piles: ~ 50 | 8 | 42 | AES 2015a:1-2, 2-6, 5.3-25 |

| Project Element | Proposed Excavation Depth (feet bg) | Depth of Existing Fill (feet bg) | Depth of Excavation into Natural Soils or Sediments (feet bg) | References |
|---|---|---|---|---|
| GSU transformer (N = 2) | Concrete pad: ≤10 Piles: ~ 50 | 8 | Concrete pad: 2 Piles: 42 | AES 2015a:2-3, 2-9, 2-11; AES 2015b:4 |
| Fire water and suppression systems | ~ 10 | 8 | 2 | AES 2015a:2-4, 5.3-2 |
| Water treatment and storage systems | ≤ 10 | 8 | 2 | AES 2015a:2-4, 5.3-24 |
| Ammonia tank deep piles, containment, and injection grid | Piles: 50 | 8 | Piles: 42 | AES 2015a:2-14–2-15; AES 2015b:5 |
| Ammonia refilling station, containment basin, and sump | ≤ 10 | 8 | 2 | AES 2015a:2-15, 5.3-24 |
| Ancillary facilities | ≤ 10 | 8 | 2 | AES 2015a:1-2, 5.3-24 |
| **Other Project Components** | | | | |
| Natural gas metering facility | ≤ 10 | 8 | ≤ 2 | AES 2015a:1-3, 2-4, 5.3-24 |
| Natural gas compressor buildings (N = 2) | ≤ 10 | 8 | ≤ 2 | AES 2015a:1-3, 2-3, 2-4, 5.3-24; AES 2015b:4 |
| Gas scrubber/filtering equipment | ≤ 10 | 8 | ≤ 2 | AES 2015a:2-4, 5.3-24, Figure 2.1-2; AES 2015b:4 |
| Construction laydown areas | Estimated < 6 | 6–9 | 0 | AES 2015a:1-3, Figure 1.1-3 |
| New process/sanitary wastewater pipeline (6-inch diameter) | 10–15 (10-ft-wide construction corridor) | Unknown | Unknown | AES 2015a:1-3, 2-5, 5.3-2 |
| Oil/water separators and sumps (N = 2) | ≤ 10 | 6–9 | 1–4 | AES 2015a:2-2, 5.3-24 |
| 600,000-gal onsite fire/service water storage tank | Piles: 50 | 6–9 | 41–44 | AES 2015a:2-5, 5.3-24–25; AES 2015b:4 |
| Station battery system (in Administrative building) | | 6–9 | | AES 2015a:2-9, 5.3-24; AES 2015b:4 |
| Construction/commissioning electrical connection to existing 66-kV power source (includes underground conduit) | 10 | 6–9 | 1–4 | AES 2015a:2-10, 5.3-24; AES 2015b:4 |
| 340,000-gal deionized water tank | Piles: 50 | 6–9 | 41–44 | AES 2015a:2-12, 5.3-24–5.3-25; AES 2015b:4–5 |
| System of floor drains, hub drains, sumps, and piping | ~ 10 | 6–9 | 1–4 | AES 2015a:2-16, 5.3-2 |

| Project Element | Proposed Excavation Depth (feet bg) | Depth of Existing Fill (feet bg) | Depth of Excavation into Natural Soils or Sediments (feet bg) | References |
|---|---|---|---|---|
| Wastewater holding tanks or sumps | 10 | 6–9 | 1–4 | AES 2015a:2-16, 5.3-24; AES 2015b:5 |
| OHTL poles, 6-ft-diameter (N = 3) | 18 | 6–8 | 10–12 | AES 2015a:3-1, Appendix 5.15A |
| A-frame transmission structures, four 2-ft-diameter footings each (N = 2) | 8 | 6–8 | 10–12 | AES 2015a: Appendix 5.15A |
| Condensate receiver, storage tank, pumps, and transfer pumps | Piles: 50 | 6–9 | 41–44 | AES 2015a:2-14, 5.3-24–5.3-25, Figure 2.1-2; AES 2015b:5 |
| Station grounding grid | 2–3 | Power Block 1: 6–9<br>Power Block 2: 8 | Power Block 1: 0<br>Power Block 2: 0 | AES 2015a:5.3-24; AES 2015b:5 |
| **Demolition of AGS Unit 7's Remaining Components** | | | | |
| Demolition | ≤ 10 | 6–9 | 1–4 | AES 2015a:1-3, 2-2, 5.3-3, 5.3-24; AES 2015b:3 |
| **Other Demolition Activities** | | | | |
| Demolish two wastewater retention basins | ≤ 10 | 8 | ≤ 2 | AES 2015a:1-3, 5.3-3, 5.3-24 |
| Notes: ACC = air-cooled condenser; AGS = Alamitos Generating Station; bg = below grade; CTG = combustion turbine generator; ft = feet; gal = gallon(s); GSU = generator step-up; HRSG = heat recovery steam generator; kV = kilovolt(s); OHTL = overhead transmission line; STG = steam turbine generator.<br>Staff estimated the depth of existing fill from AES (2015a:5.3-24) and Ninyo & Moore (2011:Figure 3, Appendix A). | | | | |

## BACKGROUND RESEARCH

As stated in the FSA, the literature review and records search indicate that 80 previous cultural resource studies have been conducted in the PAA. Of these, 11 cultural resource studies have been conducted within or adjacent to the archaeological and historic built environment portion of the PAA and 81 in the ethnographic portion of the PAA (**Appendix CR-1 Tables 2–3**).

### APPENDIX CR-1 TABLE 2
### Literature Review Results within or adjacent to the Archaeological Resources and Built Environment Portions of the PAA

| Author and Date of Study | SCCIC Study Number | Resources Identified |
|---|---|---|
| Strudwick et al. 1996 | LA-1996 | None |
| McKenna 1990a | LA-2114 | P-19-001821 |
| McKenna 2001 | LA-5215 | P-19-000234, P-19-000235, P-19-000306 |
| Zahniser 1974 | LA-4269/LA-5315 | P-19-000306 |
| Billat 2003 | LA-6909 | None |
| Strudwick 2004 | LA-8487 | P-19-186880 |
| CLB, with Rincon 2010 | None | None |
| Cardenas et al. 2012 | Not assigned | None |
| Stickel 1991 | OR-1272 | P-30-000143, P-30-000256, P-30-000257, P-30-000258, P-30-000259, P-30-000261, P-30- |

| Author and Date of Study | SCCIC Study Number | Resources Identified |
|---|---|---|
| | | 000262, P-30-000263, P-30-000264, P-30-000298, P-30-000322, P-30-000850, P-30-000851, P-30-000852, P-30-001118 |
| Davy 1997a | OR-1931 | P-19-000272, P-19-001821, P-30-000143, P-30-000256, P-30-000257, P-30-000258, P-30-000259, P-30-000260, P-30-000261, P-30-000262, P-30-000263, P-30-000264, P-30-000298, P-30-000322, P-30-000850, P-30-000851, P-30-000852, P-30-001118, P-30-001455 |

## APPENDIX CR-1 TABLE 3
## Literature Review Results: Studies in the Ethnographic PAA

| Author and Date of Study | SCCIC Study Number |
|---|---|
| Strudwick et al. 1996 | LA-1996 |
| McKenna 1990a | LA-2114 |
| McKenna 2001 | LA-5215 |
| Zahniser 1974 | LA-4269/LA-5315 |
| Billat 2003 | LA-6909 |
| Strudwick 2004 | LA-8487 |
| Cardenas et al. 2012 | Not assigned |
| Stickel 1991 | OR-1272 |
| Davy 1997a | OR-1931 |
| Cooley 1979 | LA-00522 |
| Dixon 1974a | LA-00503 |
| Leonard 1974 | LA-00057 |
| Allen 1980 | LA-00939 |
| Van Horn and Brock 1981 | LA-00987 |
| Weinman and Stickel 1978 | LA-2399/OR-403 |
| Dixon and Rosenthal 1981 | LA-2792 |
| Desautels 1981; Dixon 1982 | LA-2793 |
| Dixon 1972 | LA-2794 |
| Desautels et al. 1979 | LA-2795 |
| Dixon 1993 | LA-2864 |
| York et al. 2003 | OR-3391 |
| Bucknam 1974 | LA-3583 |
| Milliken at al. 1997 | LA-4091 |
| McLean et al. 1997 | LA-4157 |
| Underwood 1993a | LA-4270 |
| Underwood 1993b | LA-4274 |
| Underwood 1993c | LA-4275 |
| Underwood 1993d | LA-4276 |
| Underwood 1993e | LA-4277 |
| Widell 1994 | LA-4355 |
| Cottrell 1975a | LA-5727 |
| Shepard 2003 | LA-6107/OR-2774 |
| Altschul 1994 | LA-6160 |
| Cottrell 1975b | LA-6163 |
| Shepard 2004 | LA-8494 |
| URS 2003 | LA-8495 |

| Author and Date of Study | SCCIC Study Number |
|---|---|
| Shepard et al. 2004 | Not found in SCCIC bibliography |
| Raab and Boxt 1993 | LA-8497 |
| Raab and Boxt 1994 | LA-8498 |
| MBA 2006 | LA-9839 |
| Wills 2006 | LA-9840 |
| Fulton 2009 | LA-10483 |
| Archaeological Associates 1980 | OR-00493 |
| SRS 1981 | OR-639 |
| Redwine 1958 | OR-01049 |
| Clevenger et al. 1993 | OR-1599 |
| Clevenger and Crawford 1997a | OR-1897 |
| Clevenger and Crawford 1995 | OR-1958 |
| Mason and Cerreto 1995 | OR-1960 |
| Clevenger and Crawford 1997b | OR-1969 |
| Berryman and Pettus 1995 | OR-1989 |
| Mason 1987 | OR-2033 |
| Romani 1981 | OR-2161 |
| Duke 2000 | OR-2164 |
| Ogden 1995 | OR-3174 |
| JRP 1999 | OR-3175 |
| Ritchie 2000 | OR-3371 |
| Wlodarski 2006 | OR-3402 |
| Ehringer 2009 | OR-3762 |
| Cleland et al. 2007 | OR-3828 |
| Mason 2009a, 2009b | OR-3870 |
| Slauson 2009 | OR-3890 |
| USACE 1978 | LA-10527 |
| Whitney-Desautels and Bonner 1994 | LA-3114 |
| Stickel 1996a | OR-1608 |
| York et al. 1997a | OR-1643 |
| York et al. 1997b | OR-1644/1858 |
| Stickel 1996b | OR-1610 |
| Stickel 1996c | OR-1816 |
| Bates 1972 | LA-294 |
| Drover 1993 | LA-2870 |
| SRS 1980 | LA-263 |
| Whitney-Desautels et al. 1986 | LA-1541 |
| Whitney-Desautels 1979 | LA-561 |
| Cameron 1973 | LA-87 |
| Whitney-Desautels et al. 1993 | LA-3303 |
| Carter and Neitzel 1977 | LA-4364 |
| EDAW 2003, cited in LADWP, with AECOM 2010:4.2-4 | None |
| Anonymous 2001, cited in LADWP, with AECOM 2010:4.2-4 | None |
| LSA 2009 | None (associated with Fulton 2009) |
| CLB 2009a | None |
| DON 2013 | None; associated with JRP 1999 |
| Parsons 2014 | None |
| McKenna 2016 | None |

## APPENDIX CR-1 TABLE 4
## Literature Review Results: Previously Recorded Cultural Resources

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| *Archaeological Resources* | | | | | |
| P-19-000102 (CA-LAN-102) | Prehistoric archaeological site | Shell midden, debitage, pestle, mano, projectile point | Records search area | Recorded 1966, destroyed by construction, fall of 1973 | SCCIC 2006; Stevens 1966 |
| P-19-000231 | Prehistoric archaeological site | Midden, shell | Records search area | Recorded 1961 | |
| P-19-000232 | Prehistoric archaeological site | Midden, shell | Records search area | Unevaluated | Dixon 1961a |
| P-19-000233 | Prehistoric archaeological site | Shell midden, lithic debitage | Records search area | Unevaluated | Dixon 1961b |
| P-19-000234 (CA-LAN-234/H) | Prehistoric and historic | Shell, lithic debitage, human remains | Records search area | NRHP/CRHR listed | Dixon 1960a, 1973; Leonard 1974; Mellon 1981; Noguchi and Wilson 1979; Sutherland 1981 |
| P-19-000235 (CA-LAN-235/H) | Prehistoric and historic | Human remains, shell, lithic debitage | Records search area | NRHP/CRHR listed | Dixon 1960b, 1973; Noguchi and Wilson 1979 |
| P-19-000236 (CA-LAN-236/H) | Prehistoric and historic archaeological site | | Records search area | | |
| P-19-000270 (CA-LAN-270) | Prehistoric archaeological site | Human remains, projectile points, knives, mortars, pestles, steatite bowls, charmstones, pigments, bone tools and ornaments, shell ornament, shell ornaments, desert pottery | Records search area | | Bates 1972; Dixon 1960c |
| P-19-000271 (CA-LAN-271) | Prehistoric archaeological site | Shell midden, hammerstone, debitage | Records search area | Unevaluated | Dixon 1959 |
| P-19-000272 (CA-LAN-272) | Prehistoric human remains | Deeply buried human skull | Records search area | Unevaluated | Brooks et al. 1965 |
| P-19-000273 (CA-LAN-273) | Prehistoric archaeological site | Midden, shell, bowl rim, chopper, lithic debitage | Records search area | Unevaluated | Dixon 1961c |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-19-000274 (CA-LAN-274) | Prehistoric archaeological site | Shell fragments | Records search area | Unevaluated | Dixon 1961d |
| P-19-000275 (CA-LAN-275) | Prehistoric archaeological site | Shell fragments | Records search area | Unevaluated | Dixon 1961e |
| P-19-000278 (CA-LAN-278) | Prehistoric archaeological site | Campsite or village; midden, debitage | Records search area | | True 1960 |
| P-19-000306 (CA-LAN-306) | Prehistoric archaeological site | Puvunga Indian Village: midden, shell, manos, pestles, metate fragments, steatite bowls, bifaces, projectile points, debitage, shell ornaments, asphaltum, stone disc and shell beads | Records search area | NRHP/CRHR listed | Dixon 1964, 1973; Milliken et al. 1997; Noguchi and Wilson 1979 |
| P-19-000702 (CA-LAN-702) | Prehistoric archaeological site | Midden, shell, mano fragments, debitage, fish bones, human remains | Records search area | Significant, regulatory criteria unspecified | Allen 1980; Clutter and Howard 1974; Cottrell 1975a, 1975b |
| P-19-000703 (CA-LAN-703/704), The Park Estates Site | Prehistoric archaeological site | Shell fragments, midden, lithic debitage, projectile point, clam shell | Records search area | | Boxt 1994a; Dixon 1974b, 1974c |
| P-19-000705 (CA-LAN-705/H), The CSULB Isabel Patterson Child Development Center Site | Prehistoric/historic archaeological site, including buried prehistoric deposits to north and east | Shell fragments, midden, lithic debitage, shell beads, pestle, steatite bowl fragment, used shell, terrestrial and marine faunal remains, ceramics, glass | Records search area | Recommended as significant (regulatory criteria not specified) | Boxt 1993; Dixon 1974d |
| P-19-001000 (CA-LAN-1000), The CSULB Swimming Pool Site | Prehistoric archaeological site | Buried midden, shell fragments | Records search area | Recommended as significant (regulatory criteria not specified) | Boxt 1994b; Dixon 1979a; Underwood 1993b |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-19-001001 (CA-LAN-1001) | Prehistoric archaeological site | Midden, shell fragments; later study found nothing | Records search area | Unevaluated; no evidence found in 1996 | Boxt 1996; Dixon 1979b |
| P-19-001002 (CA-LAN-1002) | Prehistoric archaeological site | Midden, shell fragments, FAR, CCS flake, CCS biface | Records search area | Unevaluated | Dixon 1979c; Underwood 1993e |
| P-19-001003 (CA-LAN-1003) | Prehistoric archaeological site | Midden, shell fragments, debitage | Records search area | Unevaluated; no evidence found in 1994 | Boxt 1994c; Dixon 1979d |
| P-19-001004 (CA-LAN-1004) | Prehistoric archaeological site | Midden, shell fragments | Records search area | Unevaluated; reportedly a redeposit | Boxt 1994d; Dixon 1979e |
| P-19-001005 (CA-LAN-1005) | Prehistoric archaeological site | Midden, shell fragments | Records search area | Unevaluated; no evidence found in 1994 | Boxt 1994e; Dixon 1979f; Underwood 1993b |
| P-19-001006 (CA-LAN-1006) | Prehistoric archaeological site | Shell midden | Records search area | Appears to have been destroyed by 1994 | Dixon 1979g; Whitney-Desautels and Bonner 1994 |
| P-19-001007 (CA-LAN-1007) | Prehistoric archaeological site | Shell midden, debitage, bone, possible human bone | Records search area | Much of the site destroyed in 1979 | Dixon 1979h |
| P-19-001821 (McKenna 1) | Prehistoric archaeological site | Shell midden | Records search area | Unevaluated | McKenna 1990a, 1990b |
| P-19-002616 (CA-LAN-2616), The CSULB Vivian Engineering Quadrangle Site, Midden Trace D | Prehistoric archaeological site | Shell midden, metates, terrestrial and fish bone, manos, shell beads, scrapers, projectile points, CCS and obsidian debitage, buried midden | Records search area | Recommended as significant (regulatory criteria not specified) | Boxt 1997; Langenwalter et al. 2001 |
| P-19-002629 (Trace F – second location/Midden Trace F/The CSULB Los Cerritos Hall Site) | Prehistoric archaeological site | Buried midden, schist bead, projectile point, scrapers, spokeshave, debitage (chert, steatite, chalcedony), mano fragment, 12 FAR, mollusk remains, faunal remains | Records search area | Undetermined | Boxt 1994f; CSULB 1977a |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-19-002630 (The CSULB Parking Structure Site/Midden Trace G and Temporary Site Nos. 1–4); subsumes P-19-120044 and P-19-120052 | Prehistoric/historic archaeological site | Buried midden, shell beads, Tizon Brownware, bone awls, projectile points, cores, debitage, scraping tools, faunal bones, shell debris, obsidian and steatite, drills, hammerstones, bone tools, human tooth; historic faunal remains, burnt vegetable remains, a glass bead, birdshot, bottle glass, button, pottery | Records search area | Recommended as significant (regulatory criteria not specified) | Boxt 1994g; CSULB 1977b, 1977c |
| P-19-100485 | Prehistoric archaeological site | Shell bead scatter | Records search area | | Mason 2009a:Table 1 |
| P-19-120038 (Trace A) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977d |
| P-19-120039 (Trace B) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Records search area | Unevaluated | CSULB 1977e |
| P-19-120040 (Trace C) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977f; Underwood 1993b |
| P-19-120041 (Trace D) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977g; Underwood 1993b |
| P-19-120042 (Trace E) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977h |
| P-19-120043 (Trace F) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977i |
| P-19-120045 (Trace H) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Records search area | Unevaluated | CSULB 1977j; Mason 2009a:Table 1 |
| P-19-120046 (Trace I) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977k |
| P-19-120047 (Trace J) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977l |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-19-120048 (Trace K) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Records search area | Unevaluated | CSULB 1977m; Mason 2009a:Table 1; Underwood 1993b |
| P-19-120049 (Trace L) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Records search area | Unevaluated | CSULB 1977n; Mason 2009a:Table 1; Underwood 1993b |
| P-19-120050 (Trace B – second location) | Prehistoric archaeological site | Redeposited or disturbed shell scatter | Records search area | Unevaluated | CSULB 1977o; Mason 2009a:Table 1 |
| P-19-120053 (Trace J – second location) | Prehistoric archaeological site | Midden | Records search area | Unevaluated | CSULB 1977p |
| P-19-120062 | Prehistoric archaeological site | Shell midden, stone artifacts; probably redeposited | Records search area | Unevaluated | URS 2003 |
| P-30-000143 (CA-ORA-143)/P-30-000265 (CA-ORA-265), Landing Hill #10 | Prehistoric archaeological site/historic ranch house and structures (the latter not formally recorded) | Shell midden, burials, steatite bowl fragments, hammerstone, bone, scrapers, siltstone charmstone, fossil bone, rubbing stones, obsidian and CCS debitage, shell bead, effigy, points, manos, pestles, drills, bowl mortars, metates, maul, shell; buildings and structures | Records search area | Destroyed in 1960s | Brotman 1965a, 1965b; Davy 1997b; McKinney 1964, 1969a; Redwine 1958; Singer 1965 |
| P-30-000256 (CA-ORA-256), Landing Hill #1 | Prehistoric archaeological site | Midden, shell, | Records search area | Destroyed about 1958 | McKinney 1969b; Redwine 1958; SRS 1981; Stickel 1996b, 1996d |
| P-30-000257 (CA-ORA-256), Landing Hill #2 | Prehistoric archaeological site | Two manos, two metate fragments, two pieces of worked stone | Records search area | Destroyed about 1958 | McKinney 1969c; Redwine 1958; SRS 1981; Stickel 1996b, 1996e |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-000258 (CA-ORA-258), Landing Hill #3 | Prehistoric archaeological site | Possible hearth, shell, metates, manos, hammerstones, mortars, pestles, polishing stones, projectile points, grooved axe | Records search area | Destroyed about 1958 | PCAS 1969; Redwine 1958; SRS 1981; Stickel 1996b, 1996f |
| P-30-000259 (CA-ORA-259), Landing Hill #4 | Prehistoric archaeological site | Shell midden, metates, manos, mortars, hammerstone, polishing stone, projectile point, blade, chert debitage, worked stone, faunal bone | Records search area | Unevaluated | McKinney 1969d; Redwine 1958; Stickel 1996b, 1996g |
| P-30-000260 (CA-ORA-260), Landing Hill #11 | Prehistoric archaeological site, possible ceremonial site | Domestic habitation (Millingstone–Intermediate period occupation), shell, metate, net weight, burnt bone, manos, mortars, stone fragments, ground flakes | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; Flaherty and Stickel 1996; McKinney 1969e; Redwine 1958; SRS 1981; Stickel 1996b, 1996h; York et al. 1997a |
| P-30-000261 | Prehistoric archaeological site | Shell midden, metate, human remains; Late Intermediate Period occupation | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; SRS 1981; York et al. 1997a |
| P-30-000262 (CA-ORA-262), Landing Hill #7 | Prehistoric archaeological site | Campsite, shell midden, mano, hammerstones, pestle, human remains; Millingstone and Late Prehistoric–Protohistoric occupations | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; McKinney 1969f; Redwine 1958; SRS 1981; Stickel 1996b, 1996i; York et al. 1997a |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-000263 (CA-ORA-263), Landing Hill #8 and P-30-000852 (CA-ORA-852), Area 5 | Prehistoric archaeological site | Shell midden, manos, pestle chopper, bone awl, human burials & cremations; Millingstone and Intermediate period occupations; Late Prehistoric ceremonial use | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; Colquehoun n.d.c; McKinney 1969g; Redwine 1958; SRS 1981; Stickel 1996b, 1996j, 1996m; York et al. 1997a |
| P-30-000264 (CA-ORA-264), Landing Hill #9 | Prehistoric archaeological site | Occupation site with human remains, shell, metates, manos, mortars, pestles, hammerstones, pelican stone, cog stone, medicine tube; Millingstone–Late Prehistoric | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; McKinney 1969h; Redwine 1958; York et al. 1997a |
| P-30-000298 (CA-ORA-298), Hog Island | Prehistoric archaeological site | Shell scatter, metate | Records search area | Recommended NRHP-eligible (Criterion D) | Clevenger et al. 1993 |
| P-30-000322 (CA-ORA-322) and P-30-001118 (CA-ORA-1118) | Prehistoric archaeological site | Midden, shell midden, shell, bone tool, bone fragments core, CCS debitage, potsherd | Records search area | Recommended NRHP-eligible (Criterion D) | Clevenger and Crawford 1997a; Clevenger et al. 1993 |
| P-30-000850 (CA-ORA-850), Area 3 | Prehistoric archaeological site | Shell scatter | Records search area | Not evaluated | Colquehoun n.d.a; Stickel 1996b, 1996k; York et al. 1997a |
| P-30-000851 (CA-ORA-851), Area 4 | Prehistoric archaeological site | Shell scatter, CCS flake or core | Records search area | Not evaluated | Colquehoun n.d.b; Stickel 1996b, 1996l; York et al. 1997a |
| P-30-001352 (CA-ORA-1352) | Prehistoric archaeological site | Redeposited shell scatter | Records search area | Capped by building | Mason 2009a:Table 1 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-001455 | | | Records search area | | |
| P-30-001472 (CA-ORA-1472) | Prehistoric archaeological site | Shell scatter, human remains; Millingstone Period | Records search area | Significant, regulatory criteria unstated | Cleland et al. 2007; York et al. 1997a |
| P-30-001473, LH #12, Landing Hill Site #12 | Prehistoric archaeological site | Shell midden | Records search area | Not evaluated | Stickel 1996b; York et al. 1997a |
| P-30-001502 (CA-ORA-1502) | Prehistoric archaeological site | Shell midden, human remains, stone disk, manos, mortars, cores, debitage | Records search area | Recommended eligible for NRHP | Mason 2009a, 2009b |
| P-30-001505 | Prehistoric archaeological site | Shell, debitage | Records search area | | Mason 2009a:Table 1 |
| P-30-001539, Site B-1 | Prehistoric archaeological site | Shell scatter | Records search area | Unevaluated | Underwood 2000a |
| P-30-001540, Site B-2 | Prehistoric archaeological site | Shell midden | Records search area | Unevaluated | Underwood 2000b |
| P-30-001541, Site B-3 | Prehistoric archaeological site | Shell midden | Records search area | Unevaluated | Underwood 2000c |
| P-30-001542, Site B-4/H | Prehistoric and historic archaeological site | Shell scatter with buried shell component, possible mano; historic glass and ceramic scatter | Records search area | Unevaluated | Underwood 2000d |
| P-30-001543, Site B-5H | Historic archaeological site | Refuse deposit | Records search area | Unevaluated | Underwood 2000e |
| P-30-001544, Site B-6 | Prehistoric archaeological site | Shell scatter, midden, mano-hammerstone | Records search area | Unevaluated | Underwood 2000f |
| P-30-001545, Site B-7 | Prehistoric archaeological site | Shell scatter | Records search area | Unevaluated | Underwood 2000g |
| P-30-001546, Site B-8 | Prehistoric archaeological site | Shell deposit | Records search area | Unevaluated | Underwood 2000h |
| P-30-001568 (CA-ORA-1568) | Prehistoric archaeological site | Shell, burned animal bone, debitage | Records search area | | Mason 2009a:Table 1 |
| P-30-001572 (CA-ORA-1572) | Prehistoric archaeological site | Shell | Records search area | | Mason 2009a:Table 1 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-001644 (CA-ORA-1644), Boeing S-1 | Prehistoric archaeological site | Shell midden, burned animal bone, midden; buried under fill | Records search area | Unevaluated | Mason 2009b:Table 1; Willey 2006 |
| Burial 4 (B4) | Prehistoric archaeological site | Buried Millingstone Period human burial | Records search area (no record at SCCIC) | Reburied in preservation area | Cleland et al. 2007:137, Figure 11-1, Table 11-1 |
| Burial 23 (B23) | Prehistoric archaeological site | Buried human burial | Records search area (no record at SCCIC) | Reburied in preservation area | Cleland et al. 2007:137, Figure 11-1 |
| Burial 25 (B25) | Prehistoric archaeological site | Buried human burial | Records search area (no record at SCCIC) | Reburied in preservation area | Cleland et al. 2007:137, 139, Figure 11-1 |
| Burial 31 (B31) | Prehistoric archaeological site | Buried human burial | Records search area (no record at SCCIC) | Reburied in preservation area | Cleland et al. 2007:137, 139, Figure 11-1 |
| Prehistoric trash pit | Prehistoric archaeological site | Intermediate Period, buried trash or hearth pit; FAR, animal bone, shell, and bone awl | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:137, Figure 11-1, Table 11-1 |
| Ochre deposit | Prehistoric archaeological site | Natural ochre deposit | Records search area (no record at SCCIC) | Reburied in preservation area | Cleland et al. 2007:137, Figure 11-1, Table 11-1 |
| ETU Cluster B23 | Prehistoric archaeological resource | Animal bone, Monterey chert bifacial tool, 3 pieces of debitage (quartz and CCS) | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:139 |
| ETU Cluster B25 | Prehistoric archaeological resource | Animal bone | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:139 |
| ETU Cluster B31 | Prehistoric archaeological resource | Animal bone, 7 pieces of debitage (chert, other CCS, quartz), quartz flake scraper, schist charmstone, hammerstone, biface, burnt metate | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:139 |
| ETU Cluster 263 | Prehistoric archaeological resource | Groundstone fragments | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:139 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| ETU Cluster 262/1472 | Prehistoric archaeological resource | Chert core, 1 piece of debitage, volcanic metate, schist groundstone fragments | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:139 |
| Historic trash pits | Historic archaeological site | Unknown | Records search area (no record at SCCIC) | Unknown | Cleland et al. 2007:Figure 11-1 |
| ***Historic Built Environment Resources*** | | | | | |
| P-19-003040 | Historic industrial | Bayshore Oil Tank Farm | Records search area; Bellflower Ave/Colorado St | Not evaluated | Cardenas et al. 2013; Ferraro 2000; McCormick and Ferraro 2002 |
| P-19-178684 | Historic residential | Rancho Los Alamitos | Records search area; 6400 Bixby Hill Rd | NRHP-listed 1981; CRHR-listed | Cardenas et al. 2013; Sanquist 1981; SDM 1981 |
| P-19-186115 | Historic commercial | Long Beach Marine Stadium | Records search area; 5255 Paoli Way | NRHP not eligible 1990; CHL #1014, 1994; CRHR-listed; POHI LAN-056 | Anonymous n.d.; Cameron 1992; Cardenas et al. 2013; City Council 1994; Cryder n.d.; Fulton and Fulton 2009; Goodhue 1992; Kell 1992; Lortie 1993; SHRC 1993, 1994 |
| P-30-186926 | Historic industrial structure | Los Alamitos Retarding Basin-Pump Station | Records search area; 1st St, Seal Beach | Not evaluated | Cardenas et al. 2013; Shepard 2003 |
| P-19-187656 | Historic medical buildings | Long Beach Veterans Medical Center | Records search area; 5901 E. 7th St | NRHP-ineligible, 2003, 2006 | Cardenas et al. 2013; Marvin and Harper 2002; MBA 2006; Taniguchi 2006; Taniguchi and Taniguchi 2006a, 2006b |
| P-19-187657 | Historic ranching | Bixby Ranch Field Office | Records search area; 6433 Westminster Ave | Recommended eligible for the NRHP | Cardenas et al. 2013; Strudwick et al. 1996 |
| P-30-176840 | Historic military | Naval Weapons Station | Records search area; 800 Seal Beach Blvd | NRHP not eligible, 1998 | Cardenas et al. 2013; JRP 1999 |
| P-19-186880 | Historic industrial structures | AGS Fuel Tank Farm | PAA (1-parcel buffer): 609 N. Studebaker Rd | NRHP/CRHR-ineligible, 2004 (demolished 2010) | AES 2013:5.3-25; Cardenas et al. 2013; Strudwick 2004 |

| Resource Designation | Type | Description | Location | Significance | Source |
|---|---|---|---|---|---|
| P-30-179859 | Historic district | Naval Weapons Station Seal Beach Historic District | Records search area | Unknown | Mason 2009a:Table 1 |
| P-30-179863 | Historic object | Ship model: USS *Los Angeles* | Records search area | Unknown | Mason 2009a:Table 1 |
| Notes: AGS = Alamitos Generating Station; Ave = avenue; Blvd = boulevard; CA = California; CCS = cryptocrystalline silicate stone (chert, jasper, etc.); CHL = California Historical Landmark; CRHR = California Register of Historical Resources; CSULB = California State University, Long Beach; ETU = exploratory test unit; FAR = fire-affected rock; LAN = Los Angeles County; MBA = Michael Brandman Associates; NRHP = National Register of Historic Places; ORA = Orange County; PAA = project area of analysis; PCAS = Pacific Coast Archaeological Society; POHI = Point of Historical Interest; Rd = Road; SCCIC = South Central Coastal Information Center; SHRC = State Historical Resources Commission; St = street | | | | | |

## Appendix CR-1 Table 5
## Archaeological Sites on Alamitos Mesa

| Site Number/Name | Site Components | Date Recorded/Updated | NRHP/CRHR Eligibility | Contributing Element to PCSC |
|---|---|---|---|---|
| CA-LAN-102 | Midden, shell, debitage, pestle, mano, and projectile point | 1966/ destroyed in 1973 by construction | | No |
| CA-LAN-231 | Midden, shell | 1961 | | Yes |
| CA-LAN-232 | Midden, shell | 1961 | | Yes |
| CA-LAN-233 | Midden, shell | 1961 | | Yes |
| CA-LAN-234 | Shell, lithic debitage, human remains | 1960/1964/1972 | NRHP listed | Yes |
| CA-LAN-235 | Human remains, shell, lithic debitage | 1960/1972 | NRHP listed | Yes |
| CA-LAN-271 | Midden, shell, hammerstone, debitage, | 1959 | | Yes |
| CA-LAN-273 | Midden, shell, bowl rim, chopper, lithic debitage | 1961 | | Yes |
| CA-LAN-274 | Shell fragments | 1961 | | Yes |
| CA-LAN-275 | Shell fragments | 1961 | | Yes |
| CA-LAN-306 | Midden, shell, manos, pestles, metate fragment, steatite bowls, bifaces, projectile points, debitage, shell pendants, asphaltum, stone disc bead, shell beads | 1964/1972/1997 | NRHP listed | Yes |
| CA-LAN-702 | Midden, shell, mano fragments, debitage, fish bones | 1974 | | Yes |

| Site Number/Name | Site Components | Date Recorded/Updated | NRHP/CRHR Eligibility | Contributing Element to PCSC |
|---|---|---|---|---|
| CA-LAN-703/The Park Estates Site | Shell fragments, midden, lithic debitage, projectile point, clam shell | 1974/1994 | | Yes |
| CA-LAN-705/The CSULB Isabel Patterson Child Development Center Site | Shell fragments, lithic debitage, shell beads, pestle, steatite bowl fragment, utilized shell, bone tool fragments, and faunal remain of terrestrial, marine and invertebrate species | 1974/1998 update identified additional artifacts and radiocarbon dated site from A.D. 1250 to late sixteenth century | | Yes |
| CA-LAN-1000 | Midden, shell fragments | 1979/1998 update expanded site, radiocarbon date to early eighteenth century | | Yes |
| CA-LAN-1001 | Midden, shell fragments | 1979/1996 update suggests site no longer extant | | No |
| CA-LAN-1002 | Midden, shell fragments | 1970 | | Yes |
| CA-LAN-1003 | Midden, shell fragments, debitage | 1977/1994 update suggests site no longer extant | | No |
| CA-LAN-1004 | Midden, shell fragments | 1971/1994 update suggests site no longer extant | | No |
| CA-LAN-1005 | Midden, shell | 1979 | | Yes |
| CA-LAN-1006 | Midden, shell | 1979 | | Yes |
| CA-LAN-1007 | Midden, shell, bone fragments (possibly human) | 1979/site destroyed ca. 1979 | | No |
| CA-LAN-270 | Human remains (burials and cremations) , projectile points, knives, mortars, pestles, steatite bowls, charmstones, pigments, bone tools and ornaments, shell ornaments and beads, ceramics | 1960/salvage excavation sometime prior to 1972 | | No |
| CA-LAN-1821 | Midden, shell | 1990 | | Yes |

| Site Number/Name | Site Components | Date Recorded/Updated | NRHP/CRHR Eligibility | Contributing Element to PCSC |
|---|---|---|---|---|
| CA-LAN-2616/The CSULB Vivian Engineering Quadrangle Site/P-19-120041/Trace D | Midden, shell, mano and metate fragments, projectile points, chert and obsidian debitage, shell beads, spokeshaves, invertebrate and faunal remains, | 1977/1998 update identified additional artifacts and expanded site to include Midden Trace D | | Yes |
| P-19-002629/Trace F second location/The CSULB Los Cerritos Hall Site | Midden, chlorite schist bead, projectile point, scrapers, spokeshave, lithic debitage, mano fragment, fire affected rock, shell and faunal remains | 1977/1994 update identified additional artifacts and radiocarbon dated the site to between A.D. 100 and A.D. 300 | | Yes |
| P-19-002630/The CSULB Parking Structure Site/P-19-120052/Trace G second location/P-19-120044/Trace G | Midden, shell beads, ceramics, bone awls, projectile points, lithic debitage, steatite, obsidian, and shell and faunal remains | 1977/1994 update expanded site to include both Trace G locations and identified additional artifacts | | Yes |
| P-19-120038/Trace A | Traces of midden and shell | 1977 | | Yes |
| P-19-120039/Trace B | Traces of midden and shell | 1977 | | Yes |
| P-19-120040/Trace C | Traces of midden and shell | 1977 | | Yes |
| P-19-120042/ race E | Traces of midden and shell | 1977 | | Yes |
| P-19-120043/ race F | Traces of midden and shell | 1977 | | Yes |
| P-19-120045/Trace H | Traces of midden and shell | 1977 | | Yes |
| P-19-120046/Trace I | Traces of midden and shell | 1977 | | Yes |
| P-19-120047/Trace J | Traces of midden and shell | 1977 | | Yes |
| P-19-120048/Trace K | Traces of midden and shell | 1977 | | Yes |
| P-19-120049/Trace L | Traces of midden and shell | 1977 | | Yes |

| Site Number/Name | Site Components | Date Recorded/Updated | NRHP/CRHR Eligibility | Contributing Element to PCSC |
|---|---|---|---|---|
| P-19-120050/Trace B second location | Traces of midden and shell | 1977 | | Yes |
| P-19-120053/Trace J second location | Traces of midden and shell | 1977 | | Yes |
| Abbreviations: CA = California; CRHR = California Register of Historical Resources; CSULB = California State University, Long Beach; LAN = Los Angeles County; NRHP = National Register of Historic Places; PCSC = Puvunga Ceremonial Site Complex | | | | |

**Appendix CR-1 Table 6**
**Summary of Cumulative Projects—Archaeological Resources**

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| AES Battery Energy Storage System | Project site | Three 100-MW containment buildings. Each building to be 50 ft tall x 270 ft long x 165 ft wide (44,550 sf, or about 3 ac). Each to contain 2 battery storage levels, electrical controls, & HVAC units. | Information pending CEQA review | |
| Alamitos Barrier Improvement Project | Westminster Ave at Canoe Brook Dr, Seal Beach | Drill and construct injection and monitoring wells, and construct and operate shallow piezometers. Injection wells, 3 monitoring wells, and 2 piezometers would be constructed along western side of Los Alamitos Channel. One monitoring well and two piezometers constructed within Leisure World community. | As-yet-unidentified/ LTSWM | OCWD 2013:7 |
| Alamitos Bay Bridge Improvement Project | Long Beach | Project crosses the Los Cerritos Channel on the PCH in Long Beach. | Information pending NEPA/CEQA reviews | |
| PCH & 2nd | 6400 E. PCH, Long Beach | About 216,000 sf retail uses, ~ 29,000 sf restaurant uses, and surface and structured parking. Replaces Seaport Marina Hotel. Proposed 1- and 2-story buildings 20–35 ft tall. | None/LTSWM | PCR 2011:IV.D-18 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Colorado Lagoon Restoration Project | Long Beach | Habitat and recreation improvements to the Colorado Lagoon and adjacent areas, including Marina Vista Park & a small area at Marine Stadium, which make up a 48.61-ac project area/park site in Long Beach. The lagoon is an 11.7-ac tidal water body. | None/LTS | LSA 2008a:4.4-9 |
| Humboldt Bridge Preventative Maintenance Project | | Project to perform maintenance activities on the existing Humboldt Dr bridge to restore the integrity of its original design. | As-yet-unidentified/ LTSWM | Beckman 2015:60–61 |
| Belmont Pool Revitalization | 4000 East Olympic Plaza, Long Beach | Demolition of Belmont Pool and construction/operation of new pool complex. Seating for 3,500 through permanent and portable seating in indoor and outdoor areas. | None/LTS | LSA 2014:18–19 |
| Sunset Gap Monitoring Wells Project | Bolsa Chica Rd at Edinger Ave, Seal Beach and Huntington Beach | Construct/operate six monitoring wells, destroy monitoring well at NWSSB and two existing monitoring wells in Huntington Beach. | As-yet-unidentified/ LTSWM; under construction | ICFI 2014:3-35–3-40 |
| Safran Senior Housing Project | 3215 E. 3rd St and 304 Obispo Ave, Long Beach | Convert Immanuel Community Church into senior housing with 24 independent low or very low income units, one manager's unit, and associated amenities/common areas in 31,006-sf floor area. Demolish single-family home to construct surface parking lot. | None/LTS | CLB 2012:Appendix A |
| Los Alamitos Medical Center | 3751 Katella Ave, Los Alamitos | Replace and add new buildings to the Los Alamitos Medical Center, including construction of two four-story hospital buildings. | None/No impact | RBF 2010:28 |
| Barton Place | Northeast corner of Katella Ave & Enterprise Dr, Cypress. | Build a senior residential community & commercial/retail improvements on Katella Ave. The site covers 33 ac. | None/No impact | LSA 2015:40–42 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| CA Army National Guard & U.S. Army Reserve New HQ Facilities | 4250 Constitution Ave, Los Alamitos | Addition of four buildings and demolition of three buildings. | Unknown; complete | |
| Village at Los Alamitos | Los Alamitos Blvd, Los Alamitos | 133 residential units and 5 retail units. | No cultural resources information available | |
| 4201 E. Willow | 4201 E. Willow St, Long Beach | Mixed-use development with 9,121-sf retail building and 4,296-sf automated car wash. Demolish portions of existing dealership. | None/LTSWM | LSA 2011:42–44 |
| East Division Police Substation Project | 3800 E. Willow St, Long Beach | Transfer Schroeder Hall USARC property from the U.S. DOD to CLB. Relocate Long Beach Police Department East Division Substation and Juvenile Investigations Section to Schroeder Hall site. Various minor improvements to existing USARC facility. | None/LTS | RBF 2013a:4.5-7 |
| Rofael Marina and Caretaker Facility | 16926 Park Ave, Huntington Beach | Construct marina on a 6,179-sf property. | None/No impact | Nguyen 2015:28–29 |
| Ocean Blvd Project | 1628–1724 Ocean Blvd, Long Beach | Demolish structures, develop 51 condo units and remodel existing building to maintain 11 motel units. Residential development would be 4 stories above street level with two levels of subterranean parking. | None/No impact | CLB 2009b:8, 21–22 |
| Big box retail | 1745 PCH, Long Beach | Construct a 120,000-sf big box retail project on 9.88 acres. | No information | |
| Camp Fire Girls Building | 7070 Carson Ave, Long Beach | 6,742-sf camping lodge building. | No information | |
| Harmony Cove Marina Development | 3901 Warner Ave, Huntington Beach | Develop 23-boat slip marina, concession stand, and ancillary uses on 2.28 ac. | None/No impact | CHB 2012a:41–42 |
| Warner Ave Bridge Preventative Maintenance Project | PCH at Warner Ave, Huntington Beach | Bridge improvements of Warner Avenue Bridge. | As-yet-unidentified/ LTSWM | CHB 2012b:65–66 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Pacific Pointe East Development Project | Lakewood Blvd and Conant St, Long Beach | Three industrial buildings on undeveloped site with paved surface parking lot. Maximum height of about 41 ft and total floor area of 494,000 sf. | None/LTS | Rincon 2014a:16 |
| Airport Circle Residential Project | 16911 Airport Cir Huntington Beach | Develop 45 condominium subdivision & associated open space. The site layout consists of 8 detached three-story buildings with 4–8 attached dwelling units. Units are 1250–1940 sf. | None/LTS | Villaseñor 2014:35–36 |
| 925 East Pacific Coast Highway Lease Acquisition Project | 925–945 E. PCH, Long Beach | Demolish or rehabilitation the existing building for the purposes of blight removal. The project site totals 15,795 sf (0.36 ac). | None/LTS | Chalfant 2010:15–17 |
| New Medical Building | 300 Alamitos Ave, Long Beach | 14,325-sf mixed-use medical office building with senior housing in Downtown Plan area. | As-yet-unidentified/LTS-WM | AECOM 2010:4.3-14–4.3-15 |
| Mixed-Use Project | 125 Linden Ave, Long Beach | Five-story, 25-unit apartment building with 1,257 sf of retail space. | No information | |
| Polytechnic High School Auditorium AB 300 Project | Atlantic Ave at E. 15th St, Long Beach | Seismic retrofit and upgrades to existing Auditorium Building. | None/No impact | Chambers 2014:43–44 |
| Douglas Park - Medical Office | NW corner of Worsham Ave and Cover St, Long Beach | Three industrial buildings of 149,077, 192,373, and 160,626 sf; new parking. | As-yet-unidentified/LTS-WM | Matrix 2009:III-42 |
| The Ridge | Bolsa Chica St & Los Patos Ave, Huntington Beach | 5-acre development of 22-single family residences. | CA-ORA-86/LTWSM | CHB 2008:43–45 |
| Apartment Building | 207 E. Seaside Way, Long Beach | Project would consist of a 113-unit multi-family apartment complex on 0.67-ac. Project would include a single structure consisting of 8 levels (1 subterranean level & 7 aboveground levels). Bottom 3 levels would provide 144 on-site parking spaces. Apartment structure would be 85 ft above East Seaside Way. Amenities include a cafe, fitness center, retail space, & a lobby. | As-yet-unidentified/LTS-WM | RBF 2015a:47–49 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Urban Village on Long Beach | 1081 Long Beach Blvd, Long Beach | Five-story building containing 129 condominium units and 5-level parking garage. Building would stand approximately 58 ft above Long Beach Blvd. | None/LTS | DDS 2012:15–16 |
| 1235 Long Beach Blvd Mixed-Use Project | South of E. Anaheim St and north of E. 12th St, between Locust Ave and Long Beach Blvd, Long Beach | Demolish existing uses and construct 3 buildings containing 170 residential condominium units, 186 senior apartment units, and 42,000 sf of retail/restaurant area. | None/LTSWM | LSA 2008b:25, 27 |
| Pine Square Theater Conversion to Residential | 250–270 Pacific Ave, Long Beach | Convert the theater into 69 residential apartment units (112,079 sf) in two levels. The existing 142 residential dwelling units will remain, as well as the retail spaces on Pine Ave, 3rd St and Broadway. Build 538 sf of commercial retail space. | None/No impact | DDS 2011:16–17 |
| Parkside Estates | West side of Graham St, south of Warner Ave, Huntington Beach | Includes 111 single family residences; 23 ac of preserved, restored and enhanced open space; 1.6-ac neighborhood park, public trails, and a water quality treatment system. | CA-ORA-83/86, CA-ORA-1308, and CA-ORA-1309/Significant impact on CA-ORA-1308 and CA-ORA-1309 | EDAW/ AECOM 2009:3-41–3-43 |
| Oceanaire Apartment | 150 West Ocean Blvd, Long Beach | Project is a 216-unit multi-family/mixed-use apartment complex on 1.76 ac. It would include a single 7-level structure along West Ocean Blvd & 5 levels along West Seaside Way. The apartment structure would be 85 ft above West Ocean Blvd & 106.5 ft above West Seaside Way. Improvements at Victory Park & a dog and fitness park on the southwest corner of the site. | None/LTSWM | RBF 2015b:51–52 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Aquarium of the Pacific "Pacific Visions" Expansion | 100 Aquarium Way, Long Beach | Construct a 23,330-sf addition to the aquarium. The project consists of a new wing with a "media-based chamber," an expanded retail store, & a new front entrance. | As-yet-unidentified/LTS-WM | Kinsey 2010:12–13 |
| 442 W. Ocean Boulevard Project | 442 West Ocean Blvd, Long Beach | Build a 95-unit multi-family apartment complex on 0.5 ac. It would include a 9-level structure (1 subterranean & eight aboveground levels). Apartment would be 85 ft above West Seaside Way. Amenities include lobby space, fitness center, & roof deck. | As-yet-unidentified/LTS-WM | RBF 2015c:47–48 |
| Cypress Village Shopping Center | 9515–9575 Valley View St, Cypress | Remodel & upgrade the shopping center. Project consists of: 1) demo of 6,982 sf of retail area in Building 1 and 2,586 sf of retail area in Building 2; 2) exterior façade remodel; 3) improvements to parking lot. The site is 2.37 ac. | None/No impact | Cypress 2015:33 |
| Edinger Walmart | 6856 Edinger Ave Huntington Beach | Build store in an existing 100,865-sf vacant retail building within an existing commercial center. | See *Beach Blvd/ Edinger Corridors Specific Plan* below. | |
| Drake Park Soccer Field | Along lower Los Angeles River in Long Beach to link Cesar E. Chavez Park to Drake Park & Loma Vista Park, Long Beach. | Acquire 31 ac of industrial and abandoned railroad property & develop wetlands, habitat, & recreation areas. Create a 64-ac park from Cesar E. Chavez Park to Drake & Loma Vista parks. Add park space between Anaheim St & Broadway to link the Los Angeles River Bike Path. Two new soccer fields are part of the project. Demo & grading, installation of drainage system, basketball court, synthetic soccer field, constructing concrete infrastructure, installing asphalt paving, park furnishings, lighting & | Prehistoric shell midden, human remains/LTSWM | LSA 2013b:26–29 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| | | electrical, prefabricated restroom installation, underground water, sewer pipelines, electrical service, landscape & irrigation for 8-ac site. | | |
| Monogram Apartments (formerly Pedigo) | 7262 Edinger Ave Huntington Beach | Four-story apartment building with lofts consisting of 510 dwelling units, 25,815 sf public open space, 55,396 sf private open space, and 5,097-sf leasing office wrapped around a 6-level structure. | As-yet-unidentified/LTS-WM | Arabe 2013:50–51 |
| Huntington Beach Lofts | 7400 Center Ave, Huntington Beach | Project is on 3.8 ac with 385 luxury residential units in five residential stories, located above 10,000 sf of street level retail & commercial uses. | As-yet-unidentified/LTS-WM | PBS&J 2008a:4.4-1–4.4-10 |
| Mitsubishi Cement Facility Modification Project | 1150 Pier F Ave, Long Beach | Modify existing facility: install emission control system; build four 10,000-metric ton storage & truck loading silos; upgrade facilities & ship unloading equipment. The 4.21-ac site would be enlarged to 5.92 ac. | None/No impact | Watanabe 2011:21 |
| Pacific Crane Maintenance Company Chassis Support Facility Project | 1402 Pier B St, Long Beach | Build a facility for the distribution, storage, & maintenance of chassis used to move cargo containers on a 13.24-ac site. Facility components include ingress & egress gates, admin & staff trailers, on-site parking spaces & designated areas for chassis storage, chassis maintenance, parts/miscellaneous storage, & tire support. | None/No impact | Beherec 2015; PLB 2015:42–44 |
| The Boardwalk (Murdy Commons) | 7461 Edinger Ave Huntington Beach | 487 dwelling units and 14,500 sf of commercial area on 12.5 ac with 0.5-ac public park. | As-yet-unidentified/LTS | PBS&J 2010:4.4-1–4.4-5 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| The Village at Bella Terra | 7777 Edinger Ave Huntington Beach | Develop commercial big-box retail with gasoline service station & mixed-use retail and residential project. 154,113-sf Costco Wholesale store with tire center, gas station, and two new elevators on the public parking structure. The project includes 467 multi-family residential units within a 4-story building along with 13,500 sf of residential amenities, 17,500 sf of mixed-use retail and restaurant uses; an additional 12,000 sf of freestanding retail and restaurants, & a 1,920-sf pavilion building within a greenbelt area. | As-yet-unidentified/LTS | PBS&J 2008b:4.4-1–4.4-10 |
| Oregon Park | 4951 Oregon Ave, Long Beach | Develop a 3.3-ac neighborhood park: soccer field with lights, tot lot, group picnic area, walking path & restrooms. Add 42 parking spaces & landscape a portion of the public right of way & Los Angeles flood channel. | None/No impact | Planning Bureau 2010:9, 26 |
| Fresh & Easy Neighborhood Market | 3300 Atlantic Ave, Long Beach | Construct new single-story, 14,304-sf store plus parking. | None/LTS | DDS 2010:17–19 |
| Living Spaces | 6812 Edinger Ave, Huntington Beach | Furniture store to occupy about 100,000 sf & enclose 5,000-sf outdoor storage area. | Completed/No information | |
| Mackay Place Project | Walker St & Delong St, Cypress | Demolish buildings, parking lots, and landscaped areas. Build 47 detached single-family homes around a central street system with access to Walker St on 6.8 ac. Remaining 2.9 ac acquired by city of Cypress for future park. | None/No impact | RBF 2013b:22–23; RBF 2014:8-1, 8-2 |
| Weiland Brewery Restaurant | 4354 Atlantic Ave, Long Beach | 3,382-sf full service restaurant with fixed bar and patio dining area. | No information | |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Riverwalk Residential Development Project | 4747 Daisy Ave, Long Beach | Subdivide former Boy Scout Camp & develop a gated residential community with 131 detached single family homes on lots of at least 2,400 sf. | As-yet-unidentified/PSI | Rincon 2014b:13 |
| Ramona Park Senior Apartments | 3290 & 3232 Artesia Blvd, Long Beach | Three-story apartment building. | None/No impact | MBA 2009:11, 34 |
| North Village Center Redevelopment Project | Bounded by South St, Linden Ave, 59th St, and Lime Ave, Long Beach | Redevelop a 6.3-ac site into mixed-use "village center": up to 61 units of multi-family housing in a mix of row houses, courtyard units, & units built atop non-residential space; up to 36,000 sf of commercial retail space, including restaurant space; and a public library & community center totaling 30,000 sf. | As-yet-unidentified/ LTSWM | CLB, with Rincon 2009:4.3-16, 4.3-17 |
| Pier S Marine Terminal and Back Improvements | Bounded by Cerritos Channel and Pier A Marine Terminal; Back Channel, SCE property, & LBGP; Ocean Blvd and Pier T; & SR 47, Vopak Terminal Long Beach & city of Long Beach property, Long Beach | Excavation of shoreline to realign dike & widen the Channel to 808 ft between Pier A & future Pier S pier head lines. 600,000 cy of material would be dredged from Cerritos Channel. Portions of Back Channel would be dredged to extend its navigable width to 315 ft. | None/No impact | PLB 2007:24–25 |
| Jordan High School Major Renovation Project | Atlantic Ave & Artesia Blvd, Long Beach | Demolish 10 permanent buildings and 32 portable buildings, renovate about 213,000 sf of building space, & build 240,000 sf of new buildings within existing school. | None/LTSWM | AECOM 2013:4-3 |
| Fisherman's Pride Processors Project | 338 Cannery St, Los Angeles | Redevelop 91,500-sf industrial space into commercial seafood processing facility with 56,700 sf of vacant land into parking area & new 5,700-sf structure. Repair existing structures, update infrastructure, replace interior office & restrooms, build mechanical and storage | None/LTSWM | AECOM 2014:3-6, 4.5-3–4.5-5 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| | | spaces, and enhance exterior of buildings. | | |
| Rehabilitation of Western Regional Sewers, Project No. 3-64 | Cities of La Palma, Buena Park, Cypress, Anaheim, Los Alamitos, Seal Beach, & Rossmoor. Westside Pump Station is at 3112 Yellowtail Dr | OCSD proposes to rehabilitate or replace four regional pipelines. The project includes pipeline and manhole replacement or rehabilitation, rehabilitation/replacement of the Westside Pump Station force main, reconstruction of the Westside Pump Station wet well, & construction of a new vent line from the wet well to the downstream manhole or construction of an odor control scrubber. | None/LTSWM | Jacobs 2015:33–35 |
| Alamitos Bay Marina Rehabilitation Project | Adjacent to the mouth of the San Gabriel River, Long Beach. | Renovate marina facilities & enhance recreational boating facilities by (1) dredging the marina basins down to original design or basin depths; (2) replacing or upgrading 13 restrooms & their associated water & sewer laterals; (3) repairing the sea wall; (4) completing dock & piling replacement; and (5) replacing pavement in the marina's parking lots. The project includes two construction staging areas: one in a parking lot on Marina Dr near Basin 2, the other in a parking lot on Marina Dr near Basin 3, adjacent to the Marina Shipyard. | None/LTS | LSA 2009:4.4-1–4.4-9 |
| I-405 Improvement Project | I-405 between SR-73 and I-605, Los Angeles and Orange counties | Add 1 GP lane, 2 GP lanes, or 1 GP lane and a tolled express lane in each direction between SR-73 & I-605. Most improvements in Orange County for 16 mi between Bristol St and 1.4 mi north of I-605, & portions of SR-22, SR-73, & I-605. | CA-ORA-113, CA-ORA-162/LTSWM | Caltrans 2012a:4-8–4-9 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Wrigley Village Streetscape Enhancement Master Plan | Pacific Ave between PCH and Willow St, Long Beach | Phase I: median island landscaping on Pacific Ave from PCH to 20th St. Phase II: complete median island landscaping to Willow St. Add pedestrian street lighting on Pacific Ave from PCH to Hill St. | Completed/No information | |
| Magnolia Industrial District Street Enhancement Program | PCH, Anaheim St, Magnolia and San Francisco Ave, Long Beach | Remove concrete and asphalt surfaces and abandoned railway track & ties. Build curbs, gutters, sidewalks, & asphalt street pavement on Oregon and Daisy Ave between Anaheim St and PCH. New traffic signal at Anaheim/Oregon intersection. | Completed/No information | |
| I-710 Corridor Project | I-710 from Ocean Blvd, Long Beach to Commerce/Vernon | Widen to 5 mixed flow & 2 dedicated lanes (each direction) for clean technology trucks; interchange improvements. | As-yet-unidentified/ LTSWM | Caltrans 2012b:4-17, 4-18 |
| AGS Units 1–6 | Project Site | Demolish Units 1–6 after construction of the AEC. | Information pending CEQA review | |
| Los Cerritos Wetlands Conceptual Restoration Plan & Mitigation Bank | Between PCH, Los Cerritos Channel, Studebaker Rd, and 2nd St, Long Beach. | Establish a mitigation bank & wetland restoration area on the 152-ac Synergy Oil Field. The mitigation bank would cover 76 ac & restored wetlands would cover 72 ac of the oil field. Build public access improvements. Remove about 37 oil wells. Drill 70 oil wells on adjacent 5-ac property & at the nearby 7-ac “Pumpkin Patch” property. About 50 oil wells would be drilled on the Pumpkin Patch. Remove about 21 oil wells from CLB's adjacent 33 ac. | Six archaeological sites/Categorically exempt from CEQA | Moffatt and Nichol 2012:56 |
| Haynes Generating Station | 6801 2nd St, Long Beach | Add 6 LMS100 simple-cycle gas turbines & two emergency diesel-powered generators. | None/LTS | Environment-al Services 2009:3-8–3-9 |
| Ocean Place Seal Beach | First and Marina, Seal Beach | 28 single-family homes, four cottages, 6-ac park | No information | |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| Douglas Park Rezone Project | Bound by Carson St to north, Lakewood Blvd to east, Conant St to south & west, Long Beach | About 3.75 million sf of commercial/light industrial uses, up to 250,000 sf of retail uses, & a hotel with up to 400 rooms. Additional retail space could be developed in expansion areas of Subareas 1 and 2 of PD-32 North. | None/LTSWM | CLB 2009c:17–18 |
| Brightwater Specific Plan and Annexation | Warner Ave at Los Patos, Huntington Beach | 105.3-ac residential subdivision, including 349 single-family residences. | None/No impact | CHB 2006:9, 28–29 |
| New Civic Center Project | Downtown Long Beach on 15.87 ac. Consists of two discontiguous parcels generally bounded by 3rd St, Pacific Ave, Magnolia Ave, & Ocean Blvd. | Build a new City Hall, Port Building for Harbor Department administration, new & relocated Main Library, redeveloped Lincoln Park, residential development, & commercial mixed use development. Proposal includes 6 new buildings, three parking garages, related infrastructure & landscaping, and extensions of Chestnut & Cedar avenues through the project. City Hall & Port buildings would be 11 stories high. Demolish the former Long Beach Courthouse (studied in draft EIR (SCH# 2014051003) circulated Oct. & Nov. 2014). | As-yet-unidentified/LTS-WM | Carmack and Hunt 2015:56; CLB 2015a:21–23; Development Services 2015:4.3-8, 4.3-12 |
| Weber Metals Large Press Expansion | 16706 Garfield Ave, Long Beach and Paramount | Expand facility through installation of a new 60,000-ton forging press in a new 115,000-sf building. The building would require an 85-ft-deep excavation pit to house the press. | None/LTSWM | CLB 2015b:19–20 |
| Golden Shore Master Plan | Bounded by Ocean Blvd, Shoreline Dr, and parking lots associated with Arco Center, Long Beach | New residential, office, retail, and hotel uses with associated parking and open space. Residential Option would include 1,370 condos, about 340,000-sf office space, 28,000 sf retail, parking, open spaces, & other amenities. Hotel Option | As-yet-undiscovered/ LTSWM | CLB 2009d:IV.C-30–IV.C-32 |

| Project Title | Location | Project Description | Resources Affected/Level of Significance | References |
|---|---|---|---|---|
| | | includes 1,110 condos, 400-room hotel including 27,000-sf conference & banquet space, about 340,000 sf office, 27,000 sf retail, parking, open spaces, and other amenities. | | |
| Baker Cold Storage Facility Project | 1710 Pier B St, Long Beach | Construct and operate a 250,000-sf cold storage facility to receive, sort, store, and distribute perishable commodities. | None/No impact | PLB 2013:53, 54 |
| CSULB Foundation Retail Project | PCH and Cota Ave, Long Beach | Demolish buildings and carports & construct a 1-story retail building up to 122,500 sf with on-site parking. | Unknown/ LTSWM | LSA 2013a:15, 16 |
| Admiral Kidd Park Expansion Site | NW corner of Santa Fe Ave and Willard St, Long Beach | Acquisition and development of industrial property for a 120,000-sf park expansion. | None/No impact | Hungerford 2008:10, 26–27 |
| Beach Blvd/ Edinger Corridors Specific Plan | Beach Blvd, Huntington Beach | Enhance and maximize economic opportunities along Beach Blvd and Edinger Ave (includes Edinger Walmart project). | As-yet-unidentified/SU | PBS&J 2009:4.4-13, 4.4-14 |

Notes: ac = acre(s); AEC = Alamitos Energy Center; AGS = Alamitos Generating Station; Ave = avenue; Blvd = boulevard; CA = California; Caltrans = California Department of Transportation; CHB = city of Huntington Beach; CEQA = California Environmental Quality Act; Cir = Circle; CLB = city of Long Beach; CSULB = California State University, Long Beach; cy = cubic yards; DDS = Department of Development Services (city of Long Beach); DOD = Department of Defense; Dr = drive; ft = feet; GP = general purpose; HOV = high occupancy vehicle; HQ = headquarters; I = Interstate; ICFI = ICF International; LBGP = Long Beach Generating Plant; LSA = LSA Associates; LTS = less than significant; LTSWM = less than significant with mitigation; mi = miles; MBA = Michael Brandman Associates; MW = megawatt(s); NEPA = National Environmental Policy Act; NW = northwest; NWSSB = Seal Beach Naval Weapons Station; OCSD = Orange County Sanitation District; OCWD = Orange County Water District; ORA = Orange County; PCH = Pacific Coast Highway; PCR = PCR Services Corporation; PLB = Port of Long Beach; PSI = potentially significant impact; RBF = RBF Consulting; Rd = road; SCE = Southern California Edison; sf = square feet; SR = State Route; St = street; SU = impact; USARC = U.S. Army Reserve Center

## CULTURAL RESOURCES ABBREVIATION AND ACRONYM GLOSSARY

| | |
|---|---|
| ac | acre(s) |
| ACC | air-cooled condenser |
| AEC | Alamitos Energy Center |
| AGS | Alamitos Generating Station |
| APD | Advanced Planning Division, Development Services Department, City of Long Beach |
| Ave | avenue |
| bg | below grade |
| Blvd | boulevard |
| B.P. | Before Present (A.D. 1950) |
| Ca. | circa |
| CA | California |
| Calectric | California Electric Power Company |
| Caltrans | California Department of Transportation |
| CCS | cryptocrystalline silicate stone |
| CDC | California Department of Conservation |
| CEQA | California Environmental Quality Act |
| CHB | city of Huntington Beach |
| CHL | California Historical Landmark |
| CLB | city of Long Beach |
| CRHR | California Register of Historical Resources |
| CSULB | California State University, Long Beach |
| CTG | combustion turbine generators |
| cy | cubic yard(s) |

| | |
|---|---|
| DDS | Department of Development Services (city of Long Beach) |
| DOD | Department of Defense |
| DON | Department of the Navy |
| Dr | Drive |
| EDR | Environmental Data Resources, Inc. |
| ETU | exploratory test unit |
| ° F | degrees Fahrenheit |
| FAR | fire-affected rock |
| FSA | final staff assessment |
| ft | foot, feet |
| gal | gallon(s) |
| GP | general purpose [traffic lane] |
| GSU | generator step-up unit |
| HOV | high occupancy vehicle |
| HRG | Historic Resources Group |
| HRSG | heat recovery steam generator |
| I | Interstate |
| ICFI | ICF International |
| JRP | JRP Historical Consulting Services/JRP Historical Consulting |
| kV | kilovolt(s) |
| kW | kilowatt(s) |
| LA | Los Angeles [County] |
| LACCNAIC | Los Angeles City/County Native American Indian Commission |
| LADPW | Los Angeles Department of Public Works |
| LADWP | Los Angeles Department of Water and Power |

| | |
|---|---|
| LAn/LAN | Los Angeles County |
| LBGP | Long Beach Generating Plant |
| LGM | Last Glacial Maximum |
| LSA | LSA Associates |
| LTS | less than significant |
| LTSWM | less than significant with mitigation incorporated |
| MBA | Michael Brandman Associates |
| mi | mile(s) |
| MW | megawatt(s) |
| NEPA | National Environmental Policy Act |
| NRHP | National Register of Historic Places |
| NW | northwest |
| NWSSB | Naval Weapons Station Seal Beach |
| OAC | Online Archive of California |
| OCSD | Orange County Sanitation District |
| OCWD | Orange County Water District |
| OHTL | overhead transmission line |
| OR | Orange [County] |
| ORA | Orange County |
| PAA | project area of analysis |
| PCAS | Pacific Coast Archaeological Society |
| PCH | Pacific Coast Highway (State Route 1) |
| PCR | PCR Services Corporation |
| PCSC | Puvunga Ceremonial Site Complex |
| PLB | Port of Long Beach |

| | |
|---|---|
| POHI | Point of Historic Interest |
| PRGTL | Pacific to Rio Grande Trails Landscape |
| PSI | potentially significant impact |
| RBF | RBF Consulting |
| Rd | road |
| SAFC | supplemental application for certification |
| SB | Senate Bill |
| SCCIC | South Central Coastal Information Center |
| SCE | Southern California Edison Company |
| SDHC | San Diego History Center |
| SEMP | Suburban Emergency Management Project |
| sf | square foot, square feet |
| SHRC | State Historical Resources Commission |
| spp. | Species |
| SR | State Route |
| SRS | Scientific Resource Surveys |
| St | street |
| Staff | Energy Commission cultural resources technical staff |
| STG | steam turbine generator |
| SU | significant and unavoidable impact |
| USACE | U.S. Army Corps of Engineers |
| USARC | U.S. Army Reserve Center |
| WPLT | Western Pluvial Lakes Tradition |

## REFERENCES

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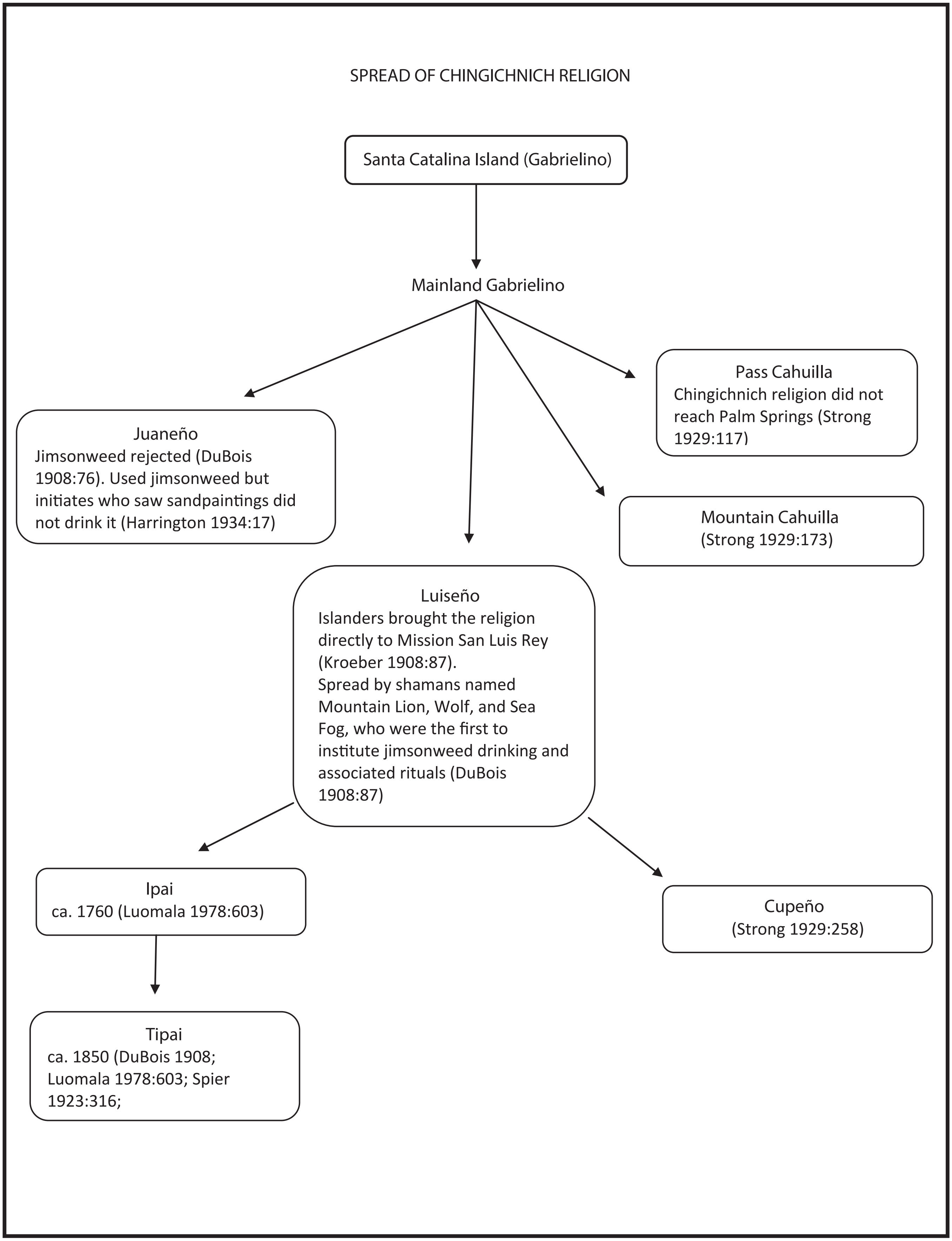
**CULTURAL RESOURCES - APPENDIX FIGURE 1**
Alamitos Energy Center - Spread of Chingichnich Religion




CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: CEC Staff

# HAZARDOUS MATERIALS MANAGEMENT

Testimony of Brett Fooks, PE and Geoff Lesh, PE

## SUMMARY OF CONCLUSIONS

Staff concludes that the proposed Alamitos Energy Center's (AEC) storage and use of hazardous materials at the site would not present a significant impact to the public. The proposed project would comply with all applicable laws, ordinances, regulations, and standards (LORS). In addition, staff's proposed conditions of certification would reduce the potential for impact on the public to less than significant. In response to California Health and Safety Code, section 25531 et seq., AES Southland Development, LLC (AES or applicant) would be required to develop a risk management plan. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Long Beach Environmental Health Bureau (LBEHB) and Energy Commission staff.

In addition, staff's proposed conditions of certification require staff review and approval of the risk management plan prior to delivery of any hazardous materials to the AEC project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia and site security.

## INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed AEC has a significant potential to cause impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work, provide them with special personal protective equipment and training, and to provide an injury illness prevention program to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this staff analysis describes applicable requirements for the protection of workers from these risks.

Aqueous ammonia (19 percent ammonia in aqueous solution) would be used to control oxides of nitrogen (NOx) emissions through selective catalytic reduction.  Aqueous ammonia provides important benefits to the operation of the facility and public because it reduces air pollution (see the **Air Quality** section for more information). Aqueous ammonia is the safest form of ammonia to use in the reduction of NOx air pollution because spills are easy to contain, reducing potential environmental and public health impacts.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, and welding gasses would be present at the proposed AEC project. No acutely toxic hazardous materials would be used on site during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Handling of hazardous materials during construction would follow best management practices (BMPs) to minimize environmental effects (AEC 2015g, Sections 5.5.3).

Although no natural gas is stored, the project would involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed AEC would connect to a new gas metering station built by Southern California Gas Company (SoCalGas) located on the northeastern side of the site.(AEC 2015g, Sections 2.1.1.1 and 4.0). The AEC project would also require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

**Hazardous Materials Management Table 1**
**Laws, Ordinances, Regulations, and Standards**

| Applicable LORS | Description |
|---|---|
| **Federal** | |
| The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.) | Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III). |
| The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended) | Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. |
| The CAA section on risk management plans (42 USC §112(r)) | Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq. |
| 49 CFR 172.800 | The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans. |
| 49 CFR Part 1572, Subparts A and B | Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks. |
| The Clean Water Act (CWA) (40 CFR 112) | Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters. |
| Title 49, Code of Federal Regulations, Part 190 | Outlines gas pipeline safety program procedures. |
| Title 49, Code of Federal Regulations, Part 191 | Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days. |

| Applicable LORS | Description |
|---|---|
| Title 49, Code of Federal Regulations, Part 192 | Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program. |
| Federal Register (6 CFR Part 27) interim final rule | A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented. |
| **State** | |
| Title 8, California Code of Regulations, section 5189 | Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process. |
| California Health and Safety Code, section 25531 to 25543.4 | The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified Unified Program Agency for approval. |
| California Health and Safety Code, section 41700 | Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.” |
| Title 19, California Code of Regulations, Division 2, Chapter 4.5, Articles 1-11 | Sets forth the list of regulated substances and thresholds, the requirements for owners and operators of stationary sources concerning the prevention of accidental releases, the accidental release prevention programs approved under Section 112 of the federal Clean Air Act (CAA) Amendments of 1990 and mandated under the CalARP Program, and how the CalARP Program relates to the state’s Unified Program. |
| Title 22, California Code of Regulations, Chapter 14, Article 10 | The design requirements set forth for new tank construction and secondary containment requirements for hazardous chemicals and waste. |
| California Safe Drinking Water and Toxic Enforcement Act (Proposition 65) | Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water. |
| California Public Utilities Commission General Order 112-E and 58-A | Contains standards for gas piping construction and service. |
| **Local (or locally enforced)** | |
| Long Beach Municipal Code Title 18, Chapter 18.48 - Fire Code | The city of Long Beach has adopted the latest California Fire Code with amendments found in Title 18, Chapter 18.48. |

The Long Beach Environmental Health Bureau (LBEHB) has responsibility for the Certified Unified Program Agency (CUPA) programs. The LBEHB is responsible for administering the Hazardous Materials Business Plans (HMBP), Risk Management Plan (RMP), and Spill Prevention Control and Countermeasure (SPCC) plan filed by businesses located within the city. In addition, the LBEHB has responsibility for ensuring that businesses store and use hazardous materials safely and in conformance with applicable regulatory codes. In this case because the Commission has the exclusive permitting jurisdiction over power plants like AEC, (Public Resources Code section 25500) commission staff, after consultation with LBEHB, will review and approve the various required plans. The LBEHB does engage the Long Beach Fire Department (LBFD), as a participating agency, to perform inspections at established facilities to verify that hazardous materials are properly stored and handled and that the types and quantities of materials reported in a firm's HMBP are accurate. Construction and design of the buildings and vessels storing hazardous materials would meet the appropriate seismic requirements of the latest adopted (2013 or later) California Building Code and the latest adopted (2013 or later) California Fire Code.

## SETTING

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

- local meteorology;
- terrain characteristics; and,
- location of population centers and sensitive receptors relative to the project.

## METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and directions are described in the **Air Quality** section (5.1) of the Application for Certification (AFC) (AEC 2015i). Staff agrees with the applicant's proposed meteorological input assumptions for modeling of potential accidental hazardous material releases that would use the U.S. Environmental Protection Agency's *RMP Offsite Consequence Analysis Guidance* document which assumes that environmental conditions of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and the maximum temperature recorded in the area in the last three years are appropriate for conducting the off-site consequence analysis (AEC 2015g, Appendix 5.5A).

## TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The existing AEC site is located on a gently sloping coastal plain, and the topography of the site ranges approximately from 8 to 15 feet above mean sea level. The AEC site is bounded to the north by Southern California Edison (SCE) switchyard and State Route 22 (East 7$^{th}$ Street); to the east by the San Gabriel River; to the south by the former Plains West Coast Terminals petroleum storage facility and undeveloped property; and to the west by the Los Cerritos channel, AGS cooling-water canals, and the residences west of the channel (AEC 2015i).

## LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. Sensitive receptors in the project vicinity are listed and shown in Appendix 5.9A (AEC 2015g). The nearest sensitive receptor would be Rosie the Riveter, a privately owned and operated school located adjacent to the entrance on the existing Alamitos Generating Station (AGS) site. The nearest school off site is the Kettering Elementary School, located 0.8 miles from the AGS entrance to the northwest of the site (AEC 2015i, Section 5.9.2). All sensitive receptors within six miles of the project site are depicted in Figure 5.9A-RECEPTOR MAP (AEC 2015i, Section 5.9A). The nearest residents would be approximately 0.22 miles west of the facility along E. Eliot Street, and additional residences would be approximately 0.39 miles east of the facility along El Dorado Drive (AEC 2015i, Section 5.9.2 and Figure 5.9-1a).

# ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. The chemicals listed in the AFC were evaluated (AEC 2015i, Table 5.5-1 & Table 5.5-2). Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. To accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, and the manner in which the applicant would use the chemicals. Staff also looked at the manner by which they would be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant’s proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems that can prevent the spill of a hazardous material from occurring. They can also limit the spill to a small amount or confine it to a small area. Examples of engineering controls can include storage tanks or automatic shut-off valves. Administrative controls are the rules and procedures that workers at the facility must follow that would help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant’s proposed use of hazardous materials as described by the applicant (AEC 2015i, Section 5.5). Staff’s assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Tables 5.5-1 through 5.5-4 of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves, different-sized transfer-hose couplings, and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff would propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

### Small Quantity Hazardous Materials

Staff determined in Steps 1 and 2 through its analysis that some hazardous materials pose a minimal potential for off-site impacts since they would be stored in a solid form or in smaller quantities. In addition, these hazardous materials would have low mobility or low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, the only hazardous materials proposed for use are paints, paint thinners, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, and welding gases. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuels all have very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, mineral insulating oil, and other various chemicals (see **Appendix B** for a list of all chemicals proposed to be used and stored at AEC) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity.

After removing from consideration those chemicals that pose no risk of an off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials, natural gas and aqueous ammonia. However, the project would be limited to using, storing, and transporting only those hazardous materials listed in **Appendix B** of the PSA as per staff's proposed condition of certification **HAZ-1**.

### Large Quantity Hazardous Materials

#### Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. Methane is colorless, odorless, tasteless, and lighter than air – odorant is added to the natural gas to make even small quantities easily detected. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5-14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. Natural gas' tendency to disperse rapidly (Lees 2012) means it is less likely to cause explosions than other fuel gases such as liquefied petroleum gas (propane). However, natural gas can explode under certain confined conditions as demonstrated by the natural gas explosion at the Kleen Energy power plant in Middletown, Connecticut in February 2010 (Chemical Safety Board (US CSB) 2010).

While natural gas would be used in significant quantities, it would not be stored on site. It would be delivered by SoCalGas via the existing on-site gas pipelines that serve the currently operating Alamitos Generating Station (AEC 2015i, Section 4.0). The pipelines and on-site metering station are, and would continue to be, owned and operated by SoCalGas. A new gas metering station would be constructed in the northeastern corner of the site to serve the new AEC.

The existing SoCalGas metering station would remain in service during AEC construction for continued operation of existing Alamitos Generating Station Units 1 through 6 until they are decommissioned. The existing metering station would then be demolished.

The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85 requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures would significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start up, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas, and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure. Additionally, the new gas metering station would be located entirely on-site, which greatly reduces the risks of impacts to the public from a rupture or failure.

On June 28, 2010, the United States Chemical Safety and Hazard Board (US CSB) issued Urgent Recommendations to the United States Occupational Safety and Health Administration (OSHA), the NFPA, the American Society of Mechanical Engineers (ASME), and major gas turbine manufacturers to make changes to their respective regulations, codes, and guidance to require the use of inherently safer alternatives to natural gas blows for the purposes of pipe cleaning (US Chemical Safety Board 2010). Recommendations were also made to the 50 states to enact legislation applicable to power plants that prohibits flammable gas blows for the purposes of pipe cleaning.

In accordance with those recommendations, staff proposes condition of certification **HAZ-9** which prohibits the use of flammable gas blows for pipe cleaning at the facility, including during construction and after the start of operations. Fuel gas pipe cleaning and purging shall adhere to the provisions of the latest edition of NFPA code 56, the Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems, with special emphasis on sections 4.4.1 (written procedures for pipe cleaning and purging) and 6.1.1.1 (prohibition on the use of flammable gas for cleaning or purging at any time).

**Aqueous Ammonia**

Aqueous ammonia would be used to control the emission of oxides of nitrogen ($NO_X$), a form of air pollution, from the combustion of natural gas at the AEC. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. AEC would have two 19-percent aqueous ammonia above ground horizontal storage tanks (AST) on site for the four simple-cycle generator turbines (SCGT) and two combined-cycle generator turbines (CCGT). A 30,000 gallon AST would be used for the AEC SCGT and a 40,000 gallon AST would be used for the AEC CCGT (AEC 2015i, Section 5.5.3.2, Table 5-5.1 & 5-5.2). The two ASTs are separated from each other and would not suffer from a common cause failure.

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose the risk of off-site impact. The use of aqueous ammonia can result in the formation and release of toxic gases (Lees 2012) in the event of a spill even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that would be used and stored on site. However, the use of aqueous ammonia poses far less risk than the use of the far more hazardous anhydrous ammonia.

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses four bench mark exposure levels of ammonia gas occurring off-site. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);

2. the immediately dangerous to life and health level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the Risk Management Plan (RMP) level 1 criterion used by US EPA and California; and,

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm (considered by staff to be a level of significance).

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff would assume that the potential release poses a risk of significant impact. However, staff would also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **Appendix A**.

Section 5.5.3.4 and Appendix 5.5A of the AFC (AEC 2015i) described the modeling parameters that would be used for the worst-case accidental releases of aqueous ammonia in the applicant's off-site consequence analysis (OCA). Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do not apply to sources that store or use aqueous ammonia solutions below 20 percent), the OCA would be performed for the worst-case release scenario, which would involve the failure and complete discharge of the storage tank. Ammonia emissions from the potential release scenario would be calculated following methods provided in the RMP off-site consequence analysis guidance (US EPA, April 1999). Potential off-site ammonia concentrations would be estimated indicating the distance from the source release point to the benchmarks of ammonia concentration.

Staff received applicant's offsite consequence analysis indicating that potential worst-case plume concentrations of more than 75 ppm would not move beyond the site boundaries. Applicant's modeling was performed using the SLAB dense-gas plume modeling program (AEC 2015h, Appendix 5.5A). The applicant modeled the worst case release of the 40,000 gallon AST on the site.

Staff verified applicant's results using a different EPA-approved plume modeling program, ALOHA in conjunction with MARPLOT, a mapping program that showed the distance of the plume from a specific reference point. Staff located ammonia storage tanks (the source point of the plume) based on the scaled plot layout provided in the AFC (AEC 2015i, Chapter 2.0, Figure 2.1-2). The applicant proposes that the secondary containment areas of both the 40,000 and 30,000 gallon tanks would be partially covered to effectively reduce the exposed surface area of spilled ammonia by 50 percent (AEC 2015g, Appendix 5.5A). Staff's modeling using ALOHA indicated that there was a very small potential of ammonia concentrations of 75 ppm to reach just off-site to the north, south, east and west. Staff therefore proposes that the secondary containment exposure area be limited to 50 square feet for both the 40,000 and 30,000 gallon tanks to ensure that the plume concentrations of 75 ppm would not migrate off site and would not pose a significant risk to any off-site members of the public.

However, the Rosie the Riveter school is located on the current AGS site but is located outside the current security fence, and would be outside the proposed AEC site. Staff's ALOHA modeling indicated that the ammonia plume would have a small probability of extending over to the Rosie the Riveter school in the case of a catastrophic ammonia release. Staff proposes Condition of Certification **HAZ-10** which would require accidental ammonia release notification and response procedures to be communicated to Rosie the Riveter school due to its close proximity to the AEC site. The notification requirement would include adding a procedural step to the AEC's Emergency Action Plan (EAP) requiring that plant personnel notify the school immediately of a catastrophic aqueous ammonia spill. The plant would also provide a safety procedure to the school indicating what best-practice actions to take during a catastrophic release to avoid exposure of personnel to a potential air-borne plume. These two items would help to ensure the safety of any sensitive receptors located at the school in the very unlikely event of an accidental ammonia release.

Staff's proposed Condition of Certification **HAZ-4** ensures that the aqueous ammonia secondary containment structure would include essential design elements to prevent a worst-case spill from producing significant off-site impacts.

Furthermore, the potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below.

### Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the AEC project include:

- construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in isolated containment areas with a non-combustible partition in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- installation of a fire protection system for hazardous materials storage areas;
- construction of bermed containment areas surrounding the aqueous ammonia storage tank capable of holding the entire tank volume plus the water associated with a 24-hour period of a 25-year storm;
- construction of a sloped ammonia unloading pad that drains into the storage tank's secondary containment structure; and
- process protective systems including continuous tank level monitors, automated leak detectors, temperature and pressure monitors, alarms, and emergency block valves.

### Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program would be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section for specific regulatory requirements):

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- procedures to ensure the proper use of personal protective equipment;
- safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;

- fire safety and prevention; and,
- emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner would be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official would oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant would be required to develop a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. Staff believes that an accidental release of aqueous ammonia during transfer from the delivery truck to the storage tank, although likely much smaller in spilled volume than a worst-case spill, would be the most probable accident scenario and therefore proposes Condition of Certification **HAZ-3** requiring the development of a safety management plan. A safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning and operations would further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors.

The applicant would also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan would also be prepared by the applicant that would incorporate California requirements for the handling of hazardous materials. Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and Condition of Certification **HAZ-4** would require that the final design drawings for the aqueous ammonia storage (and secondary containment) facility be submitted to the Compliance Project Manager (CPM) for review and approval.

### On-Site Spill Response

In order to address the issue of spill response, the facility would prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements. Emergency procedures would be established which include evacuation, spill cleanup, hazard prevention, and emergency response. The first responders to a hazardous materials incident at AEC would be from Station No. 22 of the LBFD. If needed, a full hazardous materials response would be provided by either LBFD Station No. 19 or Station No. 24. Staff finds that the LBFD response team would be capable of responding to a hazardous materials emergency call from the AEC.

## Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, would be transported to the facility by tanker truck. While many types of hazardous materials would be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation route for hazardous materials delivery. Trucks would travel on I-405 to SR 22 (7$^{th}$ Street), west along 7$^{th}$ Street, and then south on Studebaker Road to the AEC entrance (AEC 2012g, Section 5.5.3.3).

Aqueous ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend upon the location of the accident and the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent upon three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and,
- accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (I-405). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence.

To address the issue of tanker truck safety, aqueous ammonia would be delivered to the proposed facility in DOT-certified vehicles with design capacities of 7,000 gallons. These vehicles would be designed to meet or exceed the specifications MC307/DOT 407. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery would be made in a tanker that meets or exceeds the specifications prescribed by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Harwood studies (Harwood 1990 & Harwood 1993) to determine that the truck accident rate for the transportation of materials in the U.S. is between 0.64 and 13.92 per 1,000,000 miles traveled on well-designed roads and highways. The applicant estimated that routine operation of the proposed AEC would require six ammonia deliveries per month, each delivering about 7,000 gallons (AEC 2015g, Section 5.5.3.2). Each delivery would travel approximately 0.97 mile from I-405 to the facility.

This would result in a maximum of 5.85 miles of tanker truck travel in the project area per month during peak operation (with a full load) and an average of approximately 70 miles of tanker truck travel per year (assuming six deliveries per month). Staff believes that the risk over this distance is insignificant.

In addition, staff used a transportation risk assessment model (Harwood 1993, Brown 2000 & Guidelines for Chemical Transportation Risk Analysis 1995) in order to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility via Studebaker Road. Results show a risk of about one in 1,333,333 for one trip from I-405 and a total annual risk of about one in 18,000 for 72 deliveries over a year. This risk was calculated using accident rates on various types of roads (in this case, urban multilane undivided and multilane divided) with distances traveled on each type of road computed separately. Although it is an extremely conservative model in that it includes accident rates per million miles of highway trucking as a mode of transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

Staff therefore believes that the risk of public exposure to significant concentrations of ammonia during transportation to the facility is insignificant because the possibility of an accidental release of sufficient quantity would be very unlikely. The transportation of similar volumes of hazardous materials on the nation’s highways is neither unique nor infrequent. Staff’s analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT and studies) demonstrates that the risk of accident and exposure is less than significant.

In order to further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposes Condition of Certification **HAZ-6**, which would require the use of only the specified and California Highway Patrol-approved route to the site from I-405 to SR 22 (7$^{th}$ Street), west along 7$^{th}$ Street, and then south on Studebaker Road to the AEC entrance.

Based on the environmental mobility, toxicity, quantities at the site, and frequency of delivery, it is staff’s determination that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk over that of aqueous ammonia transportation.

## Seismic Issues

It is possible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Staff reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Staff has also reviewed the impacts of the recent earthquakes in Haiti (January 12, 2010; magnitude 7.0) and Chile (February 27, 2010; magnitude 8.8). The building standards in Haiti are not as stringent while those in Chile are similar to California building seismic codes.  Reports show a lack of impact on hazardous materials storage and pipelines infrastructure in both countries. For Haiti, this most likely reflects a lack of industrial storage tanks and gas pipelines; for Chile, this most likely reflects the use of strong safety codes. Staff also conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff notes that the proposed facility would be designed and constructed to the standards (including seismic) of the most recent (2013 or later) California Building Code (AEC2015g, Section 5.4.5 & Appendix 2C).

Therefore, on the basis of what occurred in Northridge (with older tanks) and the lack of failures during the Nisqually earthquake (with newer tanks) and in the 2010 Chilean earthquake (with rigorous seismic building codes), and given that the construction of AEC would comply with stringent California Building Codes, staff determines that tank failures during seismic events are not probable and do not represent a significant risk to the public.

## Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a) and the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002). The North American Electric Reliability Corporation (NERC) published an updated *Security Guideline for the Electricity Sector: Physical Security* (2011) and the U.S. Department of Energy (U.S.DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002).

The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain hazardous materials conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20 percent or greater and this proposed facility plans to utilize a 19 percent aqueous ammonia solution, staff still believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

The applicant has stated that a security plan would be prepared for the proposed facility and would include a description of perimeter security measures and procedures for evacuating, notifying authorities of a security breach, monitoring fire alarms, conducting site personnel background checks, site access, and a security plan and background checks for hazardous materials drivers. Perimeter security measures utilized for this facility may include security guards, security alarms, breach detectors, motion detectors, and video or camera systems (AEC 2015g, Section 5.5.5.2).

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for the AEC is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of the consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP would be used, in part, to determine the severity of consequences of a catastrophic event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Corporation's (NERC) 2011 guidelines, the U.S. DOE VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of medium vulnerability due to the urban setting and close proximity to sensitive receptors. Staff therefore proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, alarms, site access procedures for employees and vendors, personnel background checks, and law enforcement contacts in the event of a security breach. The perimeter fencing should include slats or other methods to reduce and restrict the visibility of the site from off-site locations. Site access for vendors shall be strictly controlled. The project owner would be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.800) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as per 49 CFR Part 1572, Subparts A and B). The compliance project manager (CPM) may authorize modifications to these measures or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

## CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes comingling to create a significant impact, are even more remote. Staff determines the risk to the public to be insignificant.

The applicant would develop and implement a hazardous materials handling program for AEC independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. It is unlikely that an accidental release that has very low probability of occurrence (about one in one-million per year) would independently occur at the AEC site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the AEC project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

## RESPONSE TO PSA COMMENTS

**Comment:** *The applicant suggested revising the secondary containment volume requirements in Condition of Certification* ***HAZ-4*** *from a 24-hour, 25 year storm event plus 100 percent of the capacity of the largest tank to a 24-hour, 25 year storm or 150 percent capacity of the largest tank. The applicant also suggested revising the verification from 30 to 60 days prior to the start of construction for* ***HAZ-4*** *(CH2 2016y).*

> **Staff Response:** Staff has not revised the secondary containment requirements in **HAZ-4**. The current language in **HAZ-4** more closely matches the code language found in the latest version of the California Fire Code (CFC). Staff determined that the code language is appropriate and should be retained. However, staff would revise **HAZ-4** for the Huntington Beach Energy Project (HBEP) to maintain consistency between the HBEP and AEC projects and make HBEP more closely tied to the code language found in the CFC. Staff has revised the verification from 30 days to 60 days prior to the start of construction.

**Comment:** *The applicant suggested revising condition of certification* ***HAZ-8*** *to change the verification from to receiving "any" hazardous materials on site to "initial" (CH2 2016y).*

> **Staff Response:** Staff agrees with the proposed change and has revised **HAZ-8** accordingly for clarity of intent.

## CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use would not pose a significant risk of impact to the public. Staff's analysis also shows that there would be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable LORS. In response to California Health and Safety Code, section 25531 et seq., the applicant would be required to develop a Risk Management Plan (RMP). To ensure the adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the LBEHB and by the CPM. In addition, staff's proposed Condition of Certification **HAZ-2** requires the review and approval of the RMP by the CPM prior to the delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia, in addition to site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project would be designed, constructed, and operated to comply with all applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation measures proposed by the applicant and staff are required and implemented, the use, storage, and transportation of hazardous materials would not present a significant risk to the public.

Staff proposes nine conditions of certification mentioned throughout the text (above), and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **Appendix B** of this staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **HAZ-2** requires that an RMP be submitted and approved prior to the delivery of aqueous ammonia.

Condition of Certification **HAZ-3** would require the development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. Condition of Certification **HAZ-4** requires that the aqueous ammonia storage tank be designed to appropriate standards. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-5** and **HAZ-6**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-7** and **HAZ-8.** Condition of Certification **HAZ-9** prohibits the use of natural gas for "gas blows" used for cleaning debris from newly installed piping.

## PROPOSED CONDITIONS OF CERTIFICATION

**HAZ-1** The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the compliance project manager (CPM).

**Verification:** The project owner shall provide to the CPM, in the Annual Compliance Report, the Hazardous Materials Business Plan's list of hazardous materials and quantities contained at the facility.

**HAZ-2** The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP), a Spill Prevention Control and Countermeasure Plan (SPCC), and a Risk Management Plan (RMP) to the Long Beach Environmental Health Bureau (LBEHB) and the CPM for review. After receiving comments from the LBEHB and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final HMBP, SPCC, and RMP shall then be provided to the LBEHB for information and to the CPM for approval.

**Verification:** At least 30 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final HMBP and SPCC to the CPM for approval.

At least 30 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the Certified Unified Program Agency (LBEHB) for information and to the CPM for approval.

**HAZ-3** The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials by tanker truck. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant. The Safety Management Plan shall be submitted to the CPM for review and approval.

**Verification:** At least 30 days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

**HAZ-4** The aqueous ammonia storage facilities shall be designed to the ASME code for Unfired Pressure Vessels, Section VIII, Division 1. The storage tanks shall be protected by a secondary containment vault capable of holding precipitation from a 24-hour, 25-year storm event plus 100 percent of the capacity of the largest tank within its boundary. The containment vaults shall incorporate a cover design that allows free flow of any aqueous ammonia release into the containment, yet limits the total vent area to not more than 25 square feet. The final design drawings and specifications for the ammonia storage tanks and secondary containment basins shall be submitted to the CPM for review and approval.

**Verification:** At least 60 days prior to start of construction of the aqueous ammonia storage and transfer facilities, the project owner shall submit final design drawings and specifications for the 30,000 and 40,000 ammonia storage tanks, ammonia pumps, ammonia detectors, and secondary containment basins to the CPM for review and approval.

**HAZ-5** The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles, which meet or exceed the specifications of MC-307/DOT-407.

**Verification:** At least 30 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

**HAZ-6** Prior to initial delivery, the project owner shall direct vendors delivering bulk quantities (>800 gallons per delivery) of hazardous material (e.g., aqueous ammonia, lubricating and insulating oils) to the site to use only the route approved by the CPM (from I-405 to SR 22 ($7^{th}$ Street), west along $7^{th}$ Street, and then south on Studebaker Road to the facility). The project owner shall obtain approval of the CPM if an alternate route is desired.

**Verification:** At least 60 days prior to initial receipt of bulk quantities (>800 gallons per delivery) of hazardous materials (e.g., aqueous ammonia, lubricating or insulating oils) and at least 10 days prior to a new vendor delivery of bulk quantities (>800 gallons per delivery), the project owner shall submit a copy of the letter containing the route restriction directions that were provided to the hazardous materials vendor to the CPM for review and approval.

**HAZ-7** Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. perimeter security consisting of fencing enclosing the construction area;
2. security guards;
3. site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;
5. protocol for contacting law enforcement and the CPM in the event of suspicious activity, incident or emergency; and,
6. evacuation procedures.

**Verification:** At least 30 days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

**HAZ-8** The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that would be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC Security Guideline for the Electricity Sector: Physical Security v1.9).

The Operation Security Plan shall include the following:

1. permanent full perimeter fence or wall, at least eight feet high and topped with barbed wire or the equivalent (and with slats or other methods to restrict visibility if a fence is selected);
2. main entrance security gate, either hand operated or motorized;
3. evacuation procedures;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

6. a statement (refer to sample, **ATTACHMENT A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

7. a statement(s) (refer to sample, Attachment B), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

8. site access controls for employees, contractors, vendors, and visitors;

9. a statement(s) (refer to sample, Attachment C), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

10. closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) with cameras that are able to pan, tilt, and zoom, have low-light capability, and are able to view 100 percent of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate; and,

11. additional measures to ensure adequate perimeter security consisting of either:

    A. security guard(s) present 24 hours per day, seven days per week; **<u>or</u>**

    B. power plant personnel on site 24 hours per day, seven days per week, and perimeter breach detectors **<u>or</u>** on-site motion detectors.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components— transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Corporation, after consultation with both appropriate law enforcement agencies and the project owner.

**Verification:** At least 30 days prior to receiving initial hazardous materials on site for commissioning or operations, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include signed statements similar to Attachments A and B that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a signed statement similar to Attachment C that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

**HAZ-9** The project owner shall not allow any fuel gas pipe cleaning activities on site, either before placing the pipe into service or at any time during the lifetime of the facility, that involve “flammable gas blows” where natural (or flammable) gas is used to blow out debris from piping and then vented to atmosphere. Instead, an inherently safer method involving a non-flammable gas (e.g. air, nitrogen, steam) or mechanical pigging shall be used as per the latest edition of NFPA 56, Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems. A written procedure shall be developed and implemented as per NFPA 56, section 4.4.1. The written procedure shall be provided to the CPM for review and approval.

**Verification:** At least 30 days before any fuel gas pipe cleaning activities begin, the project owner shall submit a copy of the Fuel Gas Pipe Cleaning Work Plan (as described in the 2014 NFPA 56, section 4.4.1) which shall indicate the method of cleaning to be used, what gas will be used, the source of pressurization, and whether a mechanical PIG will be used, to the CBO for information and to the CPM for review and approval.

**HAZ-10** The project owner shall include in their Emergency Action Plan (EAP) a procedure to provide an immediate notification to the Rosie the Riveter school in case of a catastrophic aqueous ammonia spill. The project owner shall also provide to the school a specific best practices response procedure that school personnel should follow after being notified of a catastrophic aqueous ammonia spill. The safety procedures shall be provided to the CPM for review and approval.

**Verification:** At least 30 days before delivery of aqueous ammonia to the site, the project owner shall provide a copy of the EAP highlighting the notification requirement to the school and a copy of the safety procedures being provided to the school to the CPM for review and approval.

# SAMPLE CERTIFICATION (Attachment A)

## Affidavit of Compliance for Project Owners

I,

______________________________________________________________________________

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

______________________________________________________________________________

(Company name)

for employment at

______________________________________________________________________________

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

__________________________________________________

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

# SAMPLE CERTIFICATION (Attachment B)

## Affidavit of Compliance for Contractors

I,

______________________________________________________________________

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

______________________________________________________________________

(Company name)

for contract work at

______________________________________________________________________

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

____________________________________________

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

## SAMPLE CERTIFICATION (Attachment C)

## Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

________________________________________________________

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

________________________________________________________

(Company name)

for hazardous materials delivery to

________________________________________________________

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

________________________________________

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 ________.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

## REFERENCES


**AEC 2015g**- Alamitos Suppl. AFC Appendices 5.1G to 5.10B (TN 206428-3). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

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**AEC 2015i**- Alamitos Energy Center Supplemental AFC (TN 206428-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

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**NRC (National Research Council)**. 1979. Ammonia. Subcommittee on Ammonia. Committee on Medical and Biologic Effects of Environmental Pollutants. Division of Medical Sciences, Assembly of Life Sciences, National Research Council (NRC), Baltimore, Maryland, University Park Press (NTIS No. PB 278-027).

**US Chemical Safety Board (US CSB)**. 2010. Final Report Kleen Energy Natural Gas Explosion: U.S. Chemical Safety and Hazard Investigation Board Urgent Recommendations. U.S. Chemical Safety Board, Washington D.C. June 28, 2010.

**U.S. Department of Energy (US DOE)**. 2002. Draft Vulnerability Assessment Methodology, Electric Power Infrastructure. Office of Energy Assurance, September 30, 2002.

**U.S. Department of Justice (US DOJ)**. 2002. Special Report: Chemical Facility Vulnerability Assessment Methodology. Office of Justice Programs, Washington, D.C. July 2002.

# HAZARDOUS MATERIALS
# APPENDIX A

## Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

## BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (PPM) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, not exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. The California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

## Hazardous Materials Appendix A Table-1
## Acute Ammonia Exposure Guidelines

| Guideline | Responsible Authority | Applicable Exposed Group | Allowable Exposure Level | Allowable* Duration of Exposures | Potential Toxicity at Guideline Level/Intended Purpose of Guideline |
|---|---|---|---|---|---|
| IDLH[2] | NIOSH | Workplace standard used to identify appropriate respiratory protection. | 300 ppm | 30 minutes | Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible Injury, or impairment of the ability to escape. |
| IDLH/10[1] | EPA, NIOSH | Work place standard adjusted for general population factor of ten for variation in sensitivity | 30 ppm | 30 minutes | Protects nearly all segments of general population from irreversible effects. |
| STEL[2] | NIOSH | Adult healthy male workers | 35 ppm | 15 minutes, 4 times per 8-hour day | No toxicity, including avoidance of irritation. |
| EEGL[3] | NRC | Adult healthy workers, military personnel | 100 ppm | Generally less than 60 minutes | Significant irritation, but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure. |
| STPEL[4] | NRC | Most members of general population | 50 ppm<br>75 ppm<br>100 ppm | 60 minutes<br>30 minutes<br>10 minutes | Significant irritation, but protects nearly all segments of general population from irreversible acute or late effects. One-time accidental exposure. |
| TWA[2] | NIOSH | Adult healthy male workers | 25 ppm | 8 hours | No toxicity or irritation on continuous exposure for repeated eight-hour work shifts. |
| ERPG-2[5] | AIHA | Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached) | 200 ppm | 60 minutes | Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin). |

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)
* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.
** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The WHO (1986) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

## REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1


**AIHA.** 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

**EPA.** 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

**NRC.** 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), Short-Term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) documents, NRC, Washington, D.C.

**NRC.** 1972. Guideline for Short-Term Exposure of the Public to Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

**NIOSH.** 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

**WHO.** 1986. World Health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland

## ABBREVIATIONS - HAZARDOUS MATERIALS APPENDIX A, TABLE 1

| | |
|---|---|
| **ACGIH** | American Conference of Governmental and Industrial Hygienists |
| **AIHA** | American Industrial Hygienists Association |
| **EEGL** | Emergency Exposure Guidance Level |
| **EPA** | Environmental Protection Agency |
| **ERPG** | Emergency Response Planning Guidelines |
| **IDLH** | Immediately Dangerous to Life and Health Level |
| **NIOSH** | National Institute of Occupational Safety and Health |
| **NRC** | National Research Council |
| **STEL** | Short Term Exposure Limit |
| **STPEL** | Short Term Public Emergency Limit |
| **TLV** | Threshold Limit Value |
| **WHO** | World Health Organization |

# HAZARDOUS MATERIALS
# APPENDIX B

## Hazardous Materials Proposed for Use at the AEC
## Hazardous Materials Appendix B

## Table 5.5-3 (from AFC)
## Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

**TABLE 5.5-3**
**Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities**

| Trade Name | Chemical Name | CAS Number | Maximum Quantity Onsite | CERCLA SARA RQ[a] | RQ of Material as Used Onsite[b] | EHS TPQ[c] | Regulated Substance TQ[d] | Prop 65 |
|---|---|---|---|---|---|---|---|---|
| Aqueous ammonia (19% $NH_3$ by weight) | Aqueous ammonia | 7664-41-7 | 70,000 gallons [g] | 100 pounds | 526 pounds | 500 pounds | 500 pounds | No |
| Anti-scalant (e.g., NALCO PermaTreat® PC-191T) | Antiscalant | Various | 400 gallons | [e] | [e] | [e] | [e] | No |
| Battery electrolyte | Sulfuric acid | 7664-93-9 | 400 gallons | 1,000 pounds | 2,632 pounds | 1,000 pounds | 1,000 pounds | Yes |
| Citric acid | Citric acid | 77-92-9 | 625 pounds | [e] | [e] | [e] | [e] | No |
| Cleaning chemicals/detergents | Various | None | 25 gallons | [e] | [e] | [e] | [e] | No |
| Cleaning chemicals/detergents for membrane-based water treatment systems (e.g., NALCO PermaClean® PC-77, NALCO PermaClean® PC-40, and NALCO PermaClean® PC-98) | Various | None | 55 gallons | [e] | [e] | [e] | [e] | No |
| Sanitizing chemicals for membrane-based (MF/RO/EDI) water treatment systems (e.g., NALCO PermaClean® PC-11) | Dibromoacetonitrile<br>2,2-dibromo-3-nitrilopropiona mide Polyethylene glycol | 3252-43-5<br>10222-01-2<br>25322-68-3 | 400 gallons | [e] | [e] | [e] | [e] | No<br>No<br>No |
| Diesel No. 2 | Diesel No. 2 | 68476-34-6 | 200 gallons | [e] | [e] | [e] | [e] | No |
| Hydraulic fluid | Phosphate ester | None | 50 gallons | 42 gallons[f] | 42 gallons[f] | [e] | [e] | No |
| Laboratory reagents | Various | Various | 10 gallons | [e] | [e] | [e] | [e] | No |
| Lubrication oil | Oil | None | 12,000 gallons | 42 gallons[f] | 42 gallons[f] | | | No |
| Mineral insulating oil | Oil | 8012-95-1 | 35,000 gallons | 42 gallons[f] | 42 gallons[f] | | | No |

**TABLE 5.5-3**
**Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities**

| Trade Name | Chemical Name | CAS Number | Maximum Quantity Onsite | CERCLA SARA RQ[a] | RQ of Material as Used Onsite[b] | EHS TPQ[c] | Regulated Substance TQ[d] | Prop 65 |
|---|---|---|---|---|---|---|---|---|
| Waste oil | Oil | None | 250 gallons | [e] | [e] | [e] | [e] | No |
| Amine solution | Amine | 2008-39-1 | 400 gallons | [e] | [e] | [e] | [e] | No |
| Sodium bisulfite ($NaHSO_3$) | Sodium bisulfite | 7631-90-5 | 500 gallons | 5,000 pounds | 5,000 pounds | [e] | [e] | No |
| Sulfuric acid (93%) | Sulfuric acid | 7664-93-9 | 600 gallons | 1,000 pounds | 1,075 pounds | 1,000 pounds | 1,000 pounds | Yes |
| Sodium hydroxide (NaOH) (20 to 50%) | Sodium hydroxide | 1310-73-2 | 400 gallons | 1,000 pounds | 2,000 pounds | [e] | [e] | No |
| Sodium hypochlorite (12.5%) | Sodium hypochlorite | 7681-52-9 | 200 gallons | 100 pounds | 800 pounds | [e] | [e] | No |
| Hydrochloric acid | Hydrochloric acid | 7647-01-0 | 25 gallons | 5,000 pounds | 5,000 pounds | [e] | 15,000 pounds | No |
| Sodium nitrite | Sodium nitrite | 7632-00-0 | 300 pounds | 100 pounds | 100 pounds | [e] | [e] | No |
| Proprietary corrosion/scale inhibitor (e.g., NALCO TRAC107) | Inorganic salt<br>Sodium hydroxide | Proprietary<br>1310-73-2 | 55 gallons | [e]<br>[e] | [e]<br>[e] | [e]<br>[e] | [e]<br>[e] | No<br>No |
| Proprietary nonoxidizing biocide (e.g., NALCO 7330) | 5-chloro-2-methyl-4-isothiazolin-3-one (1.1%)<br>2-methyl-4-isothiazolin-3-one (0.3%) | 26172-55-4<br>2682-20-4 | 400 gallons | [e] | [e] | [e] | [e] | No<br>No |
| Propylene glycol | Propylene glycol | 57-55-6 | 3,000 gallons | [e] | [e] | [e] | [e] | Yes |
| Trisodium phosphate ($Na_3PO_4$) or phosphate/sodium hydroxide blend (e.g., NALCO BT-3400 or NALCO BT-4000) | Trisodium phosphate | 7601-54-9 | 400 gallons | [e] | [e] | [e] | [e] | No |
| Sulfur hexafluoride | Sulfur hexafluoride | 2551-62-4 | 320 pounds | [e] | [e] | [e] | [e] | No |
| Acetylene | Acetylene | 47-86-2 | 500 cubic feet | [e] | [e] | [e] | [e] | No |
| Oxygen | Oxygen | 7782-44-7 | 500 cubic feet | [e] | [e] | [e] | [e] | No |
| Propane | Propane | 74-98-6 | 200 cubic feet | [e] | [e] | [e] | [e] | No |

| TABLE 5.5-3<br>Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Trade Name** | **Chemical Name** | **CAS Number** | **Maximum Quantity Onsite** | **CERCLA SARA RQ[a]** | **RQ of Material as Used Onsite[b]** | **EHS TPQ[c]** | **Regulated Substance TQ[d]** | **Prop 65** |
| EPA Protocol gases | Various | Various | 2,000 cubic feet | e | e | e | e | No |
| Cleaning chemicals | Various | Various | Varies (less than 25 gallons of liquids or 100 pounds solids for each chemical) | e | e | e | e | No |
| Paint | Various | Various | Varies (less than 25 gallons of liquids or 100 pounds solids for each type) | e | e | e | e | No |

[a] RQ for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) (Ref. 40 Code of Federal Regulations [CFR] Section 302, Table 302.4). Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
[b] RQ for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 pounds, the RQ for that material will be (100 pounds)/(10%) = 1,000 pounds.
[c] Extremely Hazardous Substance (EHS) TPQ (Ref. 40 CFR Part 355, Appendix A). If quantities of extremely hazardous materials equal to or greater than the TPQ are handled or stored, they must be registered with the local Administering Agency.
[d] TQ is from Title 19 of the California Code of Regulations (CCR) Section 2770.5 (state) or Title 40 of the CFR, Section 68.130 (federal).
[e] No reporting requirement. Chemical has no listed threshold under this requirement.
[f] State RQ for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)].
[g] The CCGT has a 40,000-gallon ammonia tank and the SCGT has a 30,000-gallon ammonia tank.

# LAND USE

Testimony of Negar Vahidi and Tatiana Inouye

## SUMMARY OF CONCLUSIONS

The proposed Alamitos Energy Center (AEC or project) would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to land use planning, and would not cause a significant impact under the California Environmental Quality Act (CEQA) guidelines.

The proposed project would not result in any impacts in **Noise and Vibration, Traffic and Transportation, Public Health, Air Quality, Hazardous Materials Management, and Soil and Water** and therefore would not create any land use incompatibilities in these areas. Furthermore, with the implementation of Condition of Certification **VIS-3** the proposed project would be compatible with surrounding land uses.

California Energy Commission staff has not identified any significant adverse direct or cumulative land use impacts resulting from the proposed project, including impacts to the environmental justice population identified in **Socioeconomics Figure 1**. Therefore, there are no land use environmental justice issues related to this project and no minority or low-income populations would be significantly or adversely impacted.

## INTRODUCTION

This land use analysis addresses project compatibility with existing or reasonably foreseeable[1] land uses; consistency with applicable city of Long Beach and state LORS; and potential project-related direct, indirect, and cumulative environmental effects.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

**Land Use Table 1** lists the state and local land use LORS applicable to the proposed project. The project site does not involve federally-managed lands; therefore, there are no identified applicable federal land use related LORS. The proposed project's consistency with adopted LORS is analyzed under the section “Assessment of Impacts and Discussion of Mitigation” and in **Land Use Table 2**. **Land Use Table 3** describes the proposed project's consistency with the city's proposed or draft LORS.

[1]Whether a project is reasonably foreseeable (i.e., a probable future project) for purposes of cumulative impact analysis depends on the nature of the resource in question, the location of the project, and the type of project (Title14, California Code of Regulations, section 15130(b)(2)).

**Land Use Table 1**
**Applicable Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **State** | |
| Warren-Alquist Act<br>Public Resources Code, section 25529 | Pursuant to Public Resources Code section 25529, the Energy Commission shall require public access to coastal resources as a condition of certification of a facility proposed in the coastal zone. |
| California Coastal Act of 1976, Public Resources Code, Chapter 3, section 30200 et seq. | The California Coastal Act establishes a comprehensive scheme to govern land use planning along the entire California coast. The act requires that new development not interfere with the public's right of access to the shoreline. It also encourages the use of existing coastal-dependent industrial sites within the coastal zone instead of using undeveloped areas of the coastal zone. |
| **Local** | |
| City of Long Beach General Plan Land Use Element<br>July 1, 1989<br>Revised April 1997 | The Long Beach General Plan Land Use Element includes goals and policies related to planning and development, and identifies specific land use districts that are defined by the land use types considered appropriate for that district. The city is currently updating its general plan and released a Draft Land Use Element in February 2016. The Draft Land Use Element has redefined its districts into PlaceTypes, which are designed to provide greater flexibility in development types and mixed uses. The draft element also identifies 9 areas of change intended to strengthen economic development and allow focused development opportunities, while supporting new mobility and sustainability objectives. |
| Southeast Area Development and Improvement Plan (SEADIP)<br>Amended January 3, 2006 | The SEADIP is intended to implement the policies within the city of Long Beach General Plan and Local Coastal Program by setting forth specific regulations regarding land use, development review processes, and design standards suitable for its planned development district (i.e., PD-1). The city released a Southeast Area Specific Plan Draft Environmental Impact Report in July 2016 (available for public review and comment through September 10, 2016). |
| City of Long Beach Local Coastal Program<br>Adopted February 12, 1980<br>Certified July 22, 1980<br>Amended January 1994 | The Local Coastal Program (LCP) identifies land uses and standards by which development will be evaluated within the coastal zone. The SEADIP is incorporated by reference into the LCP and defines the uses and standards specific to this coastal zone subarea. |
| Long Beach Municipal Code Supplement 12 Update 3;<br>Codified through Ordinance No. ORD-16-0001<br>Enacted January 19, 2016 | The Municipal Code designates the land use districts that divide the city into planning areas. The AEC would be subject to the zoning regulations for a planned development district that is designated General Industrial (IG). The IG district is intended to promote an *industrial sanctuary* where land is preserved for industry and manufacturing, and where existing industries are protected from non-industrial users that may object to the operating characteristics of industry. The IG district includes electric, gas, and sanitary services as conditionally permitted uses.<br><br>Municipal Code sections 21.33.060 through 21.33.230 address coverage, structure heights, development standards, and parking requirements.<br><br>Municipal Code sections 21.37.050 through 21.37.060 establish the development standard requirements for planned development (PD) districts. The AEC would be located within PD-1. |

## SETTING

## PROJECT SITE

The proposed AEC would be located within the existing Alamitos Generating Station (AGS) property in the city of Long Beach, Los Angeles County, California. The proposed project site is bounded on the north by State Route 22, on the east by the San Gabriel River, on the south by 2nd Street, and on the west by N. Studebaker Road.

## PROPOSED PROJECT

The AEC is a proposed natural gas-fired, fast starting, air-cooled, combined-cycle and simple-cycle generating facility with a gross generating capacity of 1,040 megawatts (MW). Administration and maintenance buildings would be constructed within the existing site footprint. The project would include the use of 21 acres within the larger 71.1-acre AGS site.

The AEC is proposed to use potable water provided by the city of Long Beach Water Department (LBWD) for construction, operational process, and sanitary uses. The AEC would include a new 1,000-linear-foot process/sanitary wastewater pipeline to the first point of interconnection with the existing LBWD sewer system.

The AGS site currently consists of three parcels totaling approximately 71.1 acres. The site comprises land identified by parcel numbers 7237-018-808 for the northern portion of the site, 7237-019-808 for the southern portion of the site and 7237-019-005 for the former aboveground storage tank farm. (AES 2015, p. 5.14-2)

The proposed AEC would be accessed from Studebaker Road along the west side of the project site, which is currently the main entrance to the existing AGS. Studebaker Road is a four-lane arterial that connects East 2nd Street to the south with the 405 Freeway to the north.

### Construction Laydown and Parking Areas

Construction of the proposed AEC would use onsite construction parking areas and onsite and offsite laydown areas. According to the Supplemental Application for Certification (SAFC), approximately 8 acres of the laydown and construction area would be located within the existing AGS property and 10 acres of construction laydown would be located offsite at a vacant parcel that is south of and adjacent to the AGS property and the Plains West Coast Terminals petroleum storage facility (AES 2015, Figure 2.1-1). The construction laydown areas would be used for storage of materials, equipment, and vehicles.

## Linear Facilities

The existing AGS has various ancillary facilities that would support the AEC, such as the Southern California Edison (SCE) 230-kilovolt (kV) switchyard adjacent to the northern side of the property. Natural gas would be supplied to the AEC via the existing offsite 30-inch-diameter, high-pressure pipeline owned and operated by Southern California Gas Company (SoCalGas), which currently serves the AGS. Any construction of natural gas compressors, water treatment facilities, emergency services, and administration and maintenance buildings would be constructed within the existing site footprint. The AEC would include a new 1,000-foot process/sanitary wastewater pipeline from the western edge of the facility connected to the bridge on Loynes Drive. The pipeline would cross Los Cerritos Channel to the first point of interconnection with the existing LBWD sewer system along Loynes Drive. The pipeline would eliminate the current practice of treatment and discharge of process/sanitary wastewater into the San Gabriel River.

## SURROUNDING AREA

Much of the city has been developed, with many of the remaining undeveloped parcels planned for development based on specific plans and development agreements, or preserved for open space.

Existing land uses immediately adjacent to and nearby the proposed AEC site within the city of Long Beach include:

- North: The area immediately adjacent to the project site includes the SCE 230-kV switchyard and paved open area. There is an existing mini-storage facility adjacent to SR-22 between Studebaker Road and the San Gabriel River. Further north of SR-22, land uses transition to residential neighborhoods.
- South: There is an oil tank farm directly adjacent to the site extending to 2nd Street. Beyond 2nd Street there is an open area with sporadic oil derricks that end at the San Gabriel River.
- East: The entire eastern portion of the project site is bordered by the San Gabriel River. Across the river to the northeast is a tank farm and to the southeast is the Haynes Power Generating Station owned by the Los Angeles Department of Water and Power (LADWP). Further east from the project site is an active adult community known as Leisure World located within Orange County.
- West: The western edge of the project site is bordered by Studebaker Road. Beyond the road, the northwest portion of the project area is bordered by the Los Cerritos Channel with a residential neighborhood further west. The project area is bordered by estuary land along the southwestern portion of the facility beyond the road, eventually ending at the El Cerritos Channel.

The following land uses are within one mile of the project site:

- El Cerrito Estuary
- Rosie the Riveter Charter High School
- Channel View Park

- College Park
- Edison Park
- Bixby Village Golf Course
- Bikram's Yoga College of India
- Redeemer Lutheran Church
- Faith Christian Assembly
- Assembly of God
- Cornerstone Church
- Charles F. Kettering Elementary
- Jack Nichol Park
- University Park Estates
- Leisure World

The project site and surrounding area do not contain land identified as Important Farmlands (CDOC 2016, 2015).

## GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

SAFC Figure 5.6-2 (General Plan Land Use Designations) and SAFC Figure 5.6-3 (Zoning in Project Vicinity) illustrate the current land use and zoning designations of the proposed project site as well as lands within the one-mile buffer of the proposed site (AES 2015). The land use and zoning designations of the areas surrounding the proposed project are presented to illustrate the city of Long Beach's existing and currently planned pattern of land use development in the project area.

## PROJECT SITE

### City of Long Beach General Plan

The Long Beach General Plan Land Use Element specifies 32 land use districts intended to provide guidance for the types of land uses considered appropriate to the city. The AEC site, laydown areas, and wastewater pipeline are located within a Mixed Use district (LUD NO. 7) that is used for "…blending of different types of land uses that serve to save time and energy in transportation and communications…" (LB 1997). The proposed project site is also located within a planned development (PD) district for which specific development standards apply. The PD district that contains the proposed project site is known as the Southeast Area Development Improvement Plan (SEADIP) or PD-1. The SEADIP neighborhood district comprises 1,470 acres.

The city is in the process of updating its general plan as well as its specific plan for the SEADIP (referred to as the Southeast Area Specific Plan). Until the draft specific plan is adopted, development within SEADIP will continue to be guided by the 2006 SEADIP.

Additional development guidelines apply to portions of the proposed project that are located within the coastal zone. This includes a portion of the proposed AEC site and the proposed wastewater pipeline alignment, as well as the 10-acre southern laydown area. As discussed under the subsection “Direct/Indirect Impacts and Mitigation,” the SEADIP Specific Plan was adopted by reference as an integral part of the city’s LCP. Consequently, specific development and use standards that apply to the portions of the proposed project site within the coastal zone are provided within the SEADIP Specific Plan.

### City of Long Beach Zoning Ordinance

The Long Beach Zoning Ordinance (Long Beach Municipal Code, tit. 21), in conformance with the General Plan, regulates land use development within the city of Long Beach. Within each zoning district, the zoning regulations specify the permitted and prohibited uses as well as the development standards including setbacks, height, parking, and design standards, among others. As the proposed AEC project is located within a PD district (i.e., SEADIP or PD-1), the approved development plans for that district serve as the applicable zoning regulations. If a PD zone does not contain any standards for a particular aspect of development, then the development standards for that aspect of a zoning district closest to the overall intent of the particular planned development district shall apply (Long Beach Municipal Code, ch. 21.37).

For each of the project components, zoning within the SEADIP (i.e., PD-1) would be as follows (LB 2012):

- PD-1, Subarea 19 (AEC site, offsite laydown area): Land uses are designated industrial. The specific design and development standards require that any project conform to the design and development standards of the city’s General Industrial (IG) zone.
- PD-1, Subarea 9 (wastewater pipeline): Land uses are designated residential, and the area is considered fully developed in accordance with a special permit (No. S-158-62) and two subdivision tracts (No. 24883 and 22087).
- PD-1, Subarea 22(b) (wastewater pipeline): Land uses are designated residential with accommodations for a golf course.
- PD-1, Subarea 24 South (wastewater pipeline): Land uses are to be developed as an overlook area and interpretive center for the bordering marsh.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff has reviewed the SAFC and applicable LORS documents to determine consistency of the proposed AEC with applicable land use LORS, and the proposed project’s potential to have any significant adverse land use impacts.

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on Appendix G of the CEQA Guidelines and performance standards or thresholds identified by staff, as well as applicable LORS utilized by other governmental regulatory agencies.

An impact may be considered significant if the proposed project results in:

- Conversion of Farmland or Forest Land.
  - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural use.[2]
  - Conflict with existing zoning for agricultural use, or a Williamson Act contract.
  - Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Pub. Resources Code, § 12220 (g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104(g)).
  - Loss of forest land or conversion of forest land to non-forest use.
  - Changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use[3] or conversion of forest land to non-forest use.
- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan, natural community conservation plan, or biological opinion.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating environmental effects. This includes, but is not limited to, a general plan, redevelopment plan, or zoning ordinance.
- Incremental impacts that, although individually limited, are cumulatively considerable4 when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if: they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or preclude, interfere with, or unduly restrict existing or future uses. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts and recommended mitigation and conditions of certification.

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[2] FMMP defines *land committed to non-agricultural use* as land that is permanently committed by local elected officials to non-agricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors.

[3] A non-agricultural use in this context refers to land where agriculture (the production of food and fiber) does not constitute a substantial commercial use.

[4] Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects and can result from individually minor, but collectively significant actions taking place over a period of time (CEQA Guidelines §15355).

## DIRECT/INDIRECT IMPACTS AND MITIGATION

This section discusses the potential project impacts and associated methods and thresholds of significance referenced above.

## AGRICULTURE AND FOREST

### Would the project convert Farmland to non-agricultural use?

The proposed AEC site does not contain, and would therefore not convert, any farmland with FMMP designations of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance to non-agricultural use (CDOC 2015). The proposed AEC would have no impact with respect to farmland conversion.

### Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?

The California Land Conservation Act, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. (Gov. Code, §§ 51200—51207) There are no existing agricultural uses present on the proposed project site (CDOC 2016). The proposed AEC is not located on land that is under a Williamson Act contract and as a result would not conflict with any Williamson Act contracts.

### Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Pub. Resources Code, § 12220(g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104(g))?

The proposed project site is not zoned for forest land, timberland, or for timberland production. In addition, there is no land zoned for such purposes within one mile of the project site. Therefore, there would be no conflict with, or cause for, rezoning of forest land or timberland and as a result there would be no impact to forest land or timberland.

## PHYSICAL DISRUPTION OR DIVISION OF AN ESTABLISHED COMMUNITY

The proposed AEC would be located within the boundaries of an existing power plant that has been in its current location since the late 1950s. The proposed AEC site is located on lands zoned PD-1 and designated as General Industrial (IG). Electrical generating facilities are a conditionally permitted use within IG districts (Long Beach Municipal Code, ch. 21.33, Table 33-2). The AEC would be located entirely on private property, on existing parcels that contain similar industrial uses and facilities related to the activities at the existing AGS. The proposed AEC would reduce the overall height of existing structures. Access to the proposed project would be through existing rights-of-way on Studebaker Road, and no existing roadways or pathways would be blocked or removed from service due to the proposed project. No residential communities are located immediately adjacent to the proposed AEC. The nearest residences are located in the University Park Estates community, approximately 0.2 mile west of the project, and Los Cerritos Channel serves as a natural barrier separating these residences from the proposed site. The Leisure World community, located approximately 0.2 mile east of the project site, is separated from the project by the San Gabriel River and the Haynes Power Generating Station.

Rosie the Riveter Charter High School is located within the northwest corner of the existing AGS property at 690 North Studebaker Road. Access to the school is from Studebaker Road, and construction of the proposed AEC would not prevent continued access or use of the school site. According to staff communications with the school's executive director of youth programs, the proposed project would not affect operations at the school (CEC 2016).

Construction and operation of the proposed AEC would not require relocation of community land uses (e.g., residences or schools). Therefore, the AEC would not physically divide or disrupt any community within the city of Long Beach.

## CONFLICT WITH ANY APPLICABLE HABITAT OR NATURAL COMMUNITY CONSERVATION PLAN

The AEC is not located within any Habitat Conservation Plan or Natural Community Conservation Plan (CDFW 2015; LB 1973). There would be no conflicts with a conservation plan as a result of the proposed project.

## CONFLICT WITH ANY APPLICABLE LAND USE PLAN, POLICY OR REGULATION

As required by Title 20, California Code of Regulations, section 1744, Energy Commission staff evaluates a project's consistency with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. The discussion of the proposed project's consistency with adopted LORS is presented below in **Land Use Table 2**, and project consistency with the city's proposed draft plans and policies is discussed in **Land Use Table 3**.

### California Coastal Act

The Coastal Act establishes a comprehensive approach to govern land use planning along the entire California coast. The Coastal Act also sets forth general policies (Pub. Resources Code, § 30200 et seq.) that govern the Coastal Commission's review of permit applications and local plans. In the case of energy facilities, section 30600 of the Coastal Act states: (a) Except as provided in subdivision (e), and in addition to obtaining any other permit required by law from any local government or from any state, regional, or local agency, any person, as defined in section 21066, wishing to perform or undertake any development in the coastal zone, other than a facility subject to section 25500, shall obtain a coastal development permit. Section 25500 specifically identifies the Energy Commission's exclusive power to certify sites for power generation facilities 50 MW or greater and related facilities anywhere in the state.

The southern-half of the existing AGS property is within the coastal zone. The city of Long Beach adopted its LCP on February 12, 1980. The Coastal Commission certified the LCP on July 22, 1980. As such, coastal development permit authority has been delegated to the city of Long Beach, while the Coastal Commission retains original permit jurisdiction over certain specified lands (e.g., tidelands, public trust lands). A discussion of the city of Long Beach LCP and applicable LORS is included under the subsection “City of Long Beach Local Coastal Program.”

## Warren-Alquist Act

The Warren-Alquist Act (Pub. Resources Code, § 25500 et seq.) discusses the Energy Commission’s statutory requirement for a public use area for facilities proposed in the coastal zone. Pursuant to section 25529 of the Warren-Alquist Act, the Energy Commission shall require the establishment of an area for public use as a condition of certification of a facility proposed in the coastal zone as follows:

"When a facility is proposed to be located in the Coastal Zone or any other area with recreational, scenic, or historic value, the [Energy] Commission shall require, as a condition of certification of any facility contained in the application, that an area be established for public use, as determined by the Commission. Lands within such area shall be acquired and maintained by the applicant and shall be available for public access and use, subject to restrictions required for security and public safety. The applicant may dedicate such public use zone to any local agency agreeing to operate or maintain it for the benefit of the public. If no local agency agrees to operate or maintain the public use zone for the benefit of the public, the applicant may dedicate such zone to the state. The [Energy] Commission shall also require that any facility to be located along the coast or shoreline of any major body of water be set back from the shoreline to permit reasonable public use and to protect scenic and aesthetic values."

The 21-acre proposed AEC would be located entirely within the 71.1-acre existing AGS property. Roughly the southern half of the existing AGS site is located within the coastal zone and the northern half of the site is located outside of the coastal zone. A portion of the proposed AEC Power Block 1 and the construction access road would be constructed within the coastal zone. Offsite of the AGS property, the proposed project would utilize a temporary 10-acre laydown area south of existing generating Units 5 and 6, as well as require construction of a wastewater pipeline. The laydown area is currently vacant and designated for industrial use, and would only be required temporarily to support construction activities at the AEC site. A portion of the proposed wastewater pipeline would be located within the coastal zone, as it travels south to the intersection with Loynes Drive, turns west and crosses Los Cerritos Channel (AES 2015, Figure 5.6-1). The project site is located approximately 2-miles inland from the seashore where there is ample existing public access to approximately one-mile of beach to the south in Seal Beach, approximately four-miles of beach to the southwest in Long Beach, and additional beach areas on the protected waters of the Alamitos Bay.

The AEC project site would be located entirely within an existing industrial area, only a portion of the site would be within the coastal zone, and none of the project components would restrict existing beach access or require additional access along a coastline or shoreline. Therefore, staff believes that in this case reasonable access for public use of the nearby coastal areas currently exists and no additional lands would need to be acquired by the applicant.

## City of Long Beach General Plan

California Law requires each local government to adopt a local general plan that reflects the goals and policies that guide the physical development of land within its jurisdiction (Gov. Code, § 65300 et seq.). A general plan must contain at least seven elements: Land Use, Transportation, Housing, Conservation, Noise, Open Space, and Safety. The elements for the city of Long Beach General Plan were adopted by the city council over a period extending from 1973 (Conservation Element) to 2002 (Open Space Element). **Land Use Table 2** provides a summary of the proposed project's consistency with the city's approved LORS. Based on the LORS consistency analysis conducted by staff, the proposed project is consistent with existing land use LORS (see **Land Use Table 2**). 2030 Plan. To date, the city adopted a Mobility Element in October 2013 and the 2013—2021 Housing Element in January 2014. The Draft Land Use Element was published in February 2016 but has not yet been adopted by the city council (LB 2016a). However, the Draft Land Use Element's proposed implementation strategies and policies that are applicable to the proposed project are included in **Land Use Table 3** to determine project consistency with the city's future planning goals. Based on the draft LORS consistency analysis conducted by staff, the proposed project would be consistent with the city's Draft General Plan (see **Land Use Table 3**).

## City of Long Beach Local Coastal Program (LCP)

As defined in Coastal Act section 30108.6, an LCP consists of a local government's land use plans, zoning ordinances and maps, and other implementing actions, which taken together, meet the requirements of and implement the provisions and policies of the Coastal Act at the local level. The city of Long Beach coastal zone encompasses approximately 3,100 acres of land (or 4.84 square miles) in south Long Beach.

The LCP was adopted by the Long Beach City Council on February 12, 1980, and certified by the California Coastal Commission on July 22, 1980. The LCP area is split into seven subareas, which includes the SEADIP. One of the steps for preparation of the city's LCP was incorporation of the SEADIP Specific Plan, which is adopted by reference as an integral part of the Long Beach LCP.

Prior to approving a local coastal development permit for any project, the city must make the following findings: (1) the proposed development conforms to the certified local coastal program including but not limited to all requirements for replacement of low and moderate-income housing; and (2) the proposed development conforms to the public access and recreation policies of Chapter 3 of the Coastal Act (applies only to development located seaward of the nearest public highway to the shoreline) (Long Beach Municipal Code, ch. 21.25.904). **Land Use Table 2** provides a summary of the proposed project's consistency with the key policies of the LCP. Based on the LORS consistency analysis conducted by staff, the proposed project is consistent with the city's adopted LCP (see **Land Use Table 2**).

As part of the city's long-term planning efforts, the city has begun the process for updating the SEADIP, with its release of a Draft EIR for the Southeast Area Specific Plan (SEASP) in July 2016 (LB 2016b). The proposed SEASP includes a proposed amendment to the LCP. **Land Use Table 3** discusses the proposed SEASP land use designations to determine whether the proposed project would be consistent with the revised specific plan. Based on the draft LORS consistency analysis conducted by staff, the proposed project would be consistent with the proposed SEASP (see **Land Use Table 3**).

**Land Use Table 2**
**Project Compliance with Adopted Federal, State, and Local Land Use LORS**

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| **Federal** | **None** | | |
| **State** | | | |
| California Coastal Act Public Resources Code, Chapter 3, section 30200 et seq. | **Section 30211** requires that new development not interfere with the public's right of access to the shoreline, where the access has been previously acquired by a federal, state, or local government authorization.<br>**Section 30212** requires new development to provide public access from the nearest public roadway to the shoreline and along the coast except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources; (2) adequate access exists nearby; or (3) agriculture would be adversely affected.<br>**Section 30240** requires development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas to be sited and designed to prevent impacts which would significantly degrade those areas, and be compatible with the continuance of those habitat and recreation areas.<br>**Section 30250** requires new residential, commercial, or industrial development, except as otherwise provided in this division, to be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. | YES | **Section 30211:** The AEC would be developed on the same property as an existing electrical generating facility and would not interfere with the public's right of access to the shoreline.<br><br>**Section 30212:** The project site is approximately two-miles from the shoreline where adequate public access exists nearby in Seal Beach and Long Beach.<br><br>**Section 30240:** The 21-acre proposed AEC would be located entirely within the 71.1-acre existing AGS property and would not be directly adjacent to environmentally sensitive habitat areas and parks and recreation areas.<br><br>**Section 30250:** By constructing the proposed AEC within the existing AGS property, the project would comply with this section. The project would be located within an existing developed industrial area with adequate resources to accommodate it. The 10-acre laydown area outside of the AGS property would be compatible with the existing zoning of that parcel (IG), and its use would be temporary. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| Warren-Alquist Act<br>Public Resources Code, section 25529 | **Section 25529:** The Energy Commission shall require the establishment of an area for public use as a condition of certification of a facility proposed in the coastal zone as follows:<br>*When a facility is proposed to be located in the Coastal Zone or any other area with recreational, scenic, or historic value, the [Energy] Commission shall require, as a condition of certification of any facility contained in the application, that an area be established for public use, as determined by the Commission. Lands within such area shall be acquired and maintained by the applicant and shall be available for public access and use, subject to restrictions required for security and public safety. The applicant may dedicate such public use zone to any local agency agreeing to operate or maintain it for the benefit of the public. If no local agency agrees to operate or maintain the public use zone for the benefit of the public, the applicant may dedicate such zone to the state. The [Energy] Commission shall also require that any facility to be located along the coast or shoreline of any major body of water be set back from the shoreline to permit reasonable public use and to protect scenic and aesthetic values.* | YES | The AEC project site would be located entirely within an existing industrial area, only a portion of the site would be within the coastal zone, and none of the project components would restrict existing beach access or require additional access along a coastline or shoreline. Therefore, staff believes that in this case reasonable access for public use of the nearby coastal areas currently exists and no additional lands would need to be acquired by the applicant. |
| **Local** | | | |
| City of Long Beach<br>General Plan<br>Land Use Element<br>July 1, 1989<br>Revised April 1997 | **Land Use District No. 7** provides a blending of different types of land uses that serve to save time and energy in transportation and communications, simplify and shorten transactions of goods and services, vitalize a site, and give it more importance in the urban structure of the city. | YES | The 1989 Land Use Element established neighborhoods (now called PD districts) that facilitate special design policies and standards suitable for that district. The AEC would be located within the SEADIP neighborhood (PD-1). |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | | | For each designated neighborhood, the Element identifies land use districts to provide general guidance as to the types of land uses considered appropriate to the city, and to provide the policy base for future zoning regulations. The AEC would be located within LUD No. 7 (Mixed Uses).<br>The proposed AEC would be developed on the property where an existing electrical generating facility currently operates and would not create incompatibilities with the required provisions of the LUD No. 7 designation. |
| City of Long Beach Local Coastal Program<br>Adopted February 12, 1980<br>Certified by California Coastal Commission on July 22, 1980<br>Amended January 1994 | **SEADIP Recommendation #8:** Environmental considerations of special significance include seismic safety, water protections, problems of uncontrolled landfill, methane gas generated in landfill, wildlife protections, the impact of traffic, preserving unique natural habitats, and the requirement of landfill for many vacant areas. | YES | The SEADIP Specific Plan and Ordinance are adopted in this LCP by reference, and specific LCP development and use standards are provided within the SEADIP Specific Plan.<br>The LCP designates planning sub-areas within the city's coastal zone, and the proposed AEC would be located within LCP Subarea 8, which is the SEADIP. The LCP designates the proposed project site as Mixed Use.<br>Construction of the proposed AEC at the existing AGS property would be consistent with the city's General Plan and LCP designation of the site as Mixed Use, and with the SEADIP's zoning of the site as IG (General Industrial).<br>The proposed AEC would be constructed within the existing AGS property and would not impact coastal resources or the implementation of the LCP. Offsite components would either be adjacent to the existing AGS property on a vacant parcel designated for IG use, or along rights-of-way in areas that would not affect coastal zone uses. As such, the project would meet the findings required for approval of a local coastal development permit, which are summarized in "City of Long Beach Local Coastal Program (LCP)" subsection above. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | | | The project has also been designed to provide adequate protection to surrounding uses from the impacts of noise, light, visibility of activity, vehicular traffic, and other potential nuisance impacts, as discussed in the **Noise, Visual Resources, Traffic and Transportation, Air Quality, Hazardous Materials Management**, and **Public Health** sections. |
| Southeast Area Development and Improvement Plan (SEADIP)<br>Amended January 3, 2006 | Development and Use Standards that are specific to the PD-1 subareas applicable to the proposed project include the following:<br><br>**Subarea 9:** Land uses are designated residential, and the area is considered fully developed in accordance with a special permit (No. S-158-62) and two subdivision tracts (No. 24883 and 22087).<br><br>**Subarea 19:** Land uses are designated industrial, and the area is considered fully developed in accordance with the provisions of the MG zone (now defined as IG-General Industrial zone). Commercial storage/self-storage shall be allowed by Conditional Use Permit.<br><br>**Subarea 22(b):** Land uses are designated residential with accommodations for a golf course. No additional street access to Seventh Street shall be permitted. | YES | The SEADIP identifies 33 subareas within its plan area and establishes goals and policies that are specific to each subarea. The AEC site and offsite laydown area would be located within SEADIP Subarea 19. The wastewater pipeline would be located within SEADIP Subareas 9, 22(b), and 24 South.<br>**Subarea 9:** The wastewater pipeline would be subsurface (with the exception of a portion that crosses over Los Cerritos Channel), and no changes to the land use or zoning along the pipeline are proposed. Further, the proposed AEC would not change the use of the existing sewer system in adjacent residential areas.<br>**Subarea 19:** Project design plans in the Supplemental Application for Certification (SAFC) demonstrate compliance with the General Development Standards that apply to the IG zone district. Electric services are a conditionally permitted use within the IG zone (Long Beach Municipal Code, ch. 21.33, Table 33-2).<br>**Subarea 22(b):** The wastewater pipeline would be subsurface (with the exception of a portion that crosses over Los Cerritos Channel), and no changes to the land use or zoning along the pipeline are proposed. Further, the proposed AEC would not change the use of the existing sewer system in adjacent residential areas. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | **Subarea 24 South:** Land uses are to be developed as an overlook area and interpretive center for the bordering marsh.<br><br>The following SEADIP provisions apply to all subareas:<br>1. Prior to issuance of a building permit, all infrastructure, including street improvements, fire hydrants, water lines, storm drains, and sanitary sewers shall be constructed on a block basis in accordance with the approved plans. Such improvements, including engineering plans, shall be financed by subdivider(s) or by an assessment district or both.<br>2. A minimum of 30 percent of the site shall be developed and maintained as usable open space (building footprint, streets, parking areas and sidewalks adjacent to streets shall not be considered usable open space. Bicycle and pedestrian trails not included within the public right-of-way may be considered usable open space). All buildings shall be set back a minimum of twenty feet from all public streets and a wider setback may be required by individual subarea. Within this minimum 20-foot setback area, a strip having a minimum width of 10 feet and abutting the street shall be attractively landscaped.<br>5. The maximum height of buildings shall be 30 feet for residential and 35 feet for non-residential uses, unless otherwise provided herein.<br>6. Minimum parking for commercial and industrial uses shall be provided in accordance with parking standards as specified in the zoning regulations.<br>9. All development shall be designed and constructed to be in harmony with the character and quality of surrounding development so as to create community unity within the entire area. | | **Subarea 24 South:** The wastewater pipeline within this subarea would be subsurface, and no changes to the land use or zoning in Subarea 24 is proposed.<br><br>SEADIP provisions that apply to all subareas:<br>**Provision 1:** The existing AGS has various ancillary facilities that would support the AEC; see the "Proposed Project" subsection above. Any construction of natural gas compressors, water treatment facilities, and emergency services would be constructed within the existing site footprint. The AEC would include a new 1,000-foot process/sanitary wastewater pipeline from the western edge of the facility connected to the bridge on Loynes Drive. The pipeline would cross Los Cerritos Channel to the first point of interconnection with the existing LBWD sewer system along Loynes Drive. The pipeline would eliminate the current practice of treatment and discharge of process/sanitary wastewater into the San Gabriel River. Condition of Certification **SOIL&WATER-5** would require the project owner to pay the city of Long Beach all fees normally associated with industrial connections to the city's sanitary sewer and water supply system.<br>**Provision 2:** Condition of Certification **VIS-3** would require the project owner to provide landscaping that reduces the visibility of the power plant structures in accordance with local policies. In addition, the applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | 10. Developers shall construct public open space, trails, pathways and bicycle trails for each development in such a manner that they will be generally accessible to the public and that they will interconnect with similar facilities in adjacent developments so as to form an integrated system of open space and trails connecting major points of destination.<br>12. Public views to water areas and public open spaces shall be maintained and enhanced to the maximum extent possible, consistent with the wetlands restoration plan.<br>13. Adequate landscaping and required irrigation shall be provided to create a park-like setting for the entire area. A landscaped parkway area shall be provided along all developments fronting on Pacific Coast Highway, Westminster Avenue, Studebaker Road, Seventh Street and Loynes Drive.<br>14. No additional curb cuts shall be permitted on Pacific Coast Highway, Westminster Avenue, Studebaker Road, or Seventh Street, unless it can be shown that inadequate access exists from local streets or unless specifically permitted by Subarea regulations provided herein. This restriction shall not preclude the provision of emergency access from these streets as may be required by the city.<br>15. All utility lines shall be placed underground and utility easements shall be provided as required unless waived by the Commission on the advice of the Director of Public Works. | | **Provision 5:** The proposed AEC would comply with the General Development Standards that apply to the IG zone district. Stack heights at the existing AGS are over 200 feet. The proposed AEC design would result in significantly shorter stacks (140-foot and 80-foot stack heights), and new project features would appear more streamlined overall.<br>**Provision 6:** Project design plans in the SAFC demonstrate that adequate space would be available to comply with the General Development Standards that apply to the IG zone district, including parking standards.<br>**Provision 9:** The design of the proposed AEC would be compatible with the existing electrical uses at the project site and with the standards of the IG zone.<br>**Provision 10:** Project components outside of the AGS property would be located adjacent to existing industrial uses or within existing rights-of-way that are compatible with that component (i.e., wastewater pipeline). None of the project components would affect the access or use of public open space or trails.<br>**Provision 12:** The proposed AEC would be located on the property of an existing power generating facility and would utilize existing infrastructure. The project would include more streamlined equipment and facilities, such as new stacks with lower overall structure height than currently exist at the AGS property. The project would not introduce a new barrier to public views.<br>**Provision 13:** The AEC site boundary does not reach to Studebaker Road and implementation of the AEC would not affect landscaping that is already in place along Studebaker Road. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | | | It should be noted that the city submitted a comment letter requesting all perimeter and public-facing landscape areas of the AGS be cleared and replanted with a comprehensively-designed landscape plan for the entire site (LB 2016d). In addition, the applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance.<br>**Provision 14:** The proposed AEC would be accessed from Studebaker Road along the west side of the project site, which is currently the main entrance to the existing AGS. No additional curb cuts are proposed.<br>**Provision 15:** The proposed wastewater pipeline would be placed underground with the exception of a portion that would be affixed to the bridge as it crosses over Los Cerritos Channel. |
| City of Long Beach Municipal Code (LBMC) Supplement 12 Update 3; Codified through Ordinance No. ORD-16-0001<br>Enacted January 19, 2016 | Chapter 21.37 defines standards for PD districts as the following:<br>**21.37.050- Development Standards:** Development plans approved by the City Council shall serve as the applicable zoning regulations for a PD zone. Whenever a PD zone does not contain any standards for a particular aspect of development, then the development standards for that aspect of a zoning district which is closest to the overall intent of the particular planned development district shall apply.<br>**21.37.060- Site Plan Review:** Site plan review is required for all development proposals within PD districts. The Site Plan Review Committee shall refer to the Planning Commission all planned development project applications which vary from the general or specific use and development | YES | **21.37.050:** The proposed AEC site would be located within PD-1, which is a planned development district also known as SEADIP. Within the SEADIP, the proposed AEC would be located in Subarea 19, which has been designated for development consistent with the provisions of the IG zone. Project design plans demonstrate compliance with the General Development Standards that apply to the IG zone district.<br>**21.37.060:** The proposed AEC would be developed in accordance with the provisions of the IG zone, which are also consistent with PD-1 development and use standards for that site. Staff has determined that the proposed project would be consistent with the city's community development standards of the PD-1 district. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| | standards but which are consistent with the intent of the particular planned development district.<br>Chapter 21.33 defines the IG zone as the following:<br>**21.33.020(C)- General Industrial:** The IG district is considered the city's *industrial sanctuary* district where a wide range of industries that may not be desirable in other districts may locate. The emphasis is on traditionally heavy industrial and manufacturing uses. The IG district is intended to promote an *industrial sanctuary* where land is preserved for industry and manufacturing, and where existing industries are protected from non-industrial users that may object to the operating characteristics of industry. Performance standards still must be met, but the development standards are the minimum necessary to assure safe, functional, and environmentally-sound activities.<br>General Development Standards for IG District:<br>**Max. Lot Coverage-** 80 percent<br>**Max. Building Height-** 65 ft.<br>**Max. Non-Building Structure Height-** no restriction<br>**Max. Accessory Office Space-** 25 percent of gross floor area<br>**Parking Lot Setback for Yard Fronting on a Street-** 5 ft. | | **21.33.020(C):** Municipal Code chapter 21.33, Table 33-3, lists permitted uses within industrial zones. Within the IG zone district, electric, gas, and sanitary services are a conditionally permitted use. The proposed AEC would be developed in accordance with the provisions of the IG zone, which are also consistent with PD-1 development and use standards for that site. The proposed AEC would utilize an existing industrial site already developed for power generation and surrounded by other industrial facilities. The project would also utilize existing infrastructure such as the SCE switchyard and transmission facilities, connections to a natural gas pipeline system, water connections, process water supply lines, and certain administrative, maintenance, and warehouse buildings.<br>The proposed AEC would comply with the General Development Standards that apply to the IG zone district, which are also consistent with PD-1 development and use standards for that site. Proposed project features would include the following:<br>**Proposed Lot Coverage-** 25 percent<br>**Proposed Building Heights-** 25 ft.<br>**Proposed Office Space-** 5,000 sq. ft. of office space at the 21-acre site, which is 0.55 percent of the total project area.<br>**Parking Lot Setback-** no changes are proposed to the location of the parking lot relative to the street.<br>Staff has determined that the proposed project would be consistent with the city's community development standards of the PD-1 district. |

**Land Use Table 3**
**Project Compliance with Draft Land Use LORS**

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| City of Long Beach General Plan<br>Draft Land Use Element February 2016 (not adopted) | **Allowable Building Height at AEC site:** 65 feet (Map LU-7, p. 67).<br><br>**Allowable Non-Building Structure Height at AEC site:** No restriction<br><br>**Proposed Area of Change at AEC site:** Designation #3- Promote Regional-Serving Uses | YES | The Draft Land Use Element defines PlaceTypes that identify permitted land uses, development patterns, streetscapes, and urban form features for specific areas. The proposed AEC would be located within an Industrial PlaceType. As stated in the Draft Element, "where the Industrial PlaceType is applied, continued industrial activities are strongly encouraged. Industrially-developed lands should be preserved, particularly for the expansion of quality employment opportunities. Conversion of industrial lands to nonindustrial uses is generally discouraged in this plan."<br><br>The Draft Element also identifies 9 major areas of change within the city. The proposed AEC would be located within Proposed Area of Change #3 (Promote Regional-Serving Uses). This area would be intended to accommodate future development of facilities (e.g., AES Los Alamitos) in order to promote their continued success in generating exceptional employment opportunities.<br><br>The proposed AEC would be consistent with the Draft Land Use Element given that it would be located on the property of an existing power generating facility and would utilize existing infrastructure. The project would include more streamlined equipment and facilities, such as new stacks with lower overall structure height than currently exist at the AGS property. Project construction and operation would also provide opportunities for employment. |

| Applicable LORS | Description of Applicable LORS | Consistent? | Basis for Consistency |
|---|---|---|---|
| Southeast Area Specific Plan (SEASP)<br>Draft EIR<br>July 2016 | **Land Use Designation: Industrial Use-** Provides for general industrial uses including utilities and oil extraction operations. Industrial uses must comply with Long Beach Municipal Code Chapter 21.33, except that:<br>- No heavy industrial, commercial, distribution, warehousing or public storage uses are permitted.<br>- Oil and gas operations consistent with Title 12, Oil and Gas Production, of the LBMC and Section 30262, Oil and Gas Development, of the Coastal Act are permitted uses. | YES | The SEASP Draft EIR identifies the AEC project site as an Industrial Use.<br>The AEC project would be consistent with SEASP Draft EIR land use designations given that it would be constructed on the property of an existing power generating facility and would utilize existing infrastructure. |

## CUMULATIVE IMPACTS

Under the CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR [environmental impact report] together with other projects causing related impacts” (Cal. Code of Regs., tit. 14, § 15130(a)(1)). Cumulative impacts of the project must be discussed if the incremental effect of a project, combined with the effects of other projects is *cumulatively considerable* (Cal. Code of Regs., tit. 14, § 15130(a)). Such incremental effects are to be viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code of Regs., tit. 14, § 15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

## GEOGRAPHIC SCOPE OF ANALYSIS

The cumulative land use and planning analysis considers past, current and probable future projects that are relatively near the proposed project that would contribute to cumulative impacts by impacting agricultural or forest lands, disrupt or divide an established community, conflict with applicable land use plans, policy or regulation, or conflict with an applicable habitat conservation plan or natural community conservation plan. **Land Use Table 4** identifies the proposed and planned projects within the immediate vicinity of the proposed AEC that would be applicable to the land use cumulative analysis.

## Land Use Table 4
## Notable Cumulative Projects

| Label ID | Project Name | Project Description | Location | Distance from AEC (Miles) | Status |
|---|---|---|---|---|---|
| 1 | AGS Units 1 through 6 | The existing units are to remain operational during AEC construction. After construction of the AEC, demolition of the existing Units 1–6 would occur according to a memorandum of understanding (MOU) between AES and the city of Long Beach. | 690 N. Studebaker Road Long Beach, CA 90803 | 0.19 | Schedule of demolition of Units 1–6 is unknown, but not before 2020. |
| 2 | Los Cerritos Wetlands Conceptual Restoration Plan and Mitigation Bank | A mitigation bank (76 acres) and wetlands habitat restoration area (72 acres) is proposed on the 152-acre Synergy Oil Field. Project includes construction of public access improvements. Synergy would remove approximately 37 oil wells from the restoration area. It would conduct oil production activities on an adjacent 5-acre property at the northeast corner of Studebaker Rd. and 2nd St./Westminster Blvd (70 new oil wells), and at the 7-acre "Pumpkin Patch" property at the southeast corner of Pacific Coast Highway and Studebaker Rd. (50 new oil wells). Approximately. 21 oil wells would be removed from the city's adjacent 33-acre site. | Mitigation bank and wetlands restoration areas are located between Pacific Coast Highway, Los Cerritos Channel, Studebaker Rd. and 2nd St. in the city of Long Beach. | 0.22 | Entitlements would require Coastal Commission approval of a CDP. An Environmental Impact Report (EIR) would be prepared for the project. |
| 3 | AES Battery Energy Storage System (BESS) | The BESS project at the AGS would include three 100-MW containment buildings, constructed in sequential phases from east to west. Each building would be 50 ft. tall, 270 ft. long, 165 ft. wide (44,550 sq. ft.). Each building would contain: 2 battery storage levels, electrical controls, and HVAC units. Construction is proposed to start third quarter 2019, after major mechanical completion of the AEC Power Block 1, with completion of the first 100-MW building planned for late 2020. The second and third 100-MW buildings would be constructed & operational in 2021 and 2022. | On the north side of the AEC project site, in the 10-acre area proposed for AEC parking and construction laydown. | 0.25 | Conceptual site plan has been submitted to the city. Project is still in the entitlement process. |

| Label ID | Project Name | Project Description | Location | Distance from AEC (Miles) | Status |
|---|---|---|---|---|---|
| 4 | Alamitos Barrier Improvement Project | Project involves drilling, construction, development, and aquifer testing of 17 injection wells, installing 4 nested (multi-casing) monitoring wells, and installing 2 shallow piezometers. Wells are located in Seal Beach. The injection wells and 3 nested monitoring wells would be constructed on a narrow (17 ft. by 20 ft.) access roadway for Los Alamitos Channel. | Located on the western access roadway of the Orange County Flood Control District Los Alamitos Channel. | 0.40 | Final EIR has been published (SCH #2012031027). |
| 5 | Los Angeles Department of Water and Power Haynes Generating Station | Addition of six LMS100 simple-cycle gas turbines and two emergency diesel-powered generators. | 6801 2nd Street Long Beach, CA 90803 | 0.64 | Operational |
| 6 | Alamitos Bay Bridge Improvement Project | Project would improve seismic deficiencies on the Alamitos Bay Bridge. Proposal includes a No Build Alternative, Bridge Retrofit Alternative (constructing additional concrete piles next to the existing bridge piles), and Bridge Replacement Alternative (replacing the existing bridge with a new wider bridge). | Project crosses El Cerritos Channel on Pacific Coast Highway in Long Beach. | 0.90 | Scoping meeting held August 2015. Caltrans to prepare an Initial Study/ Environmental Assessment to be released Fall 2016. |
| 7 | PCH and 2nd | The proposed project involves demolition of the existing Seaport Marina Hotel and construction of a commercial center totaling approximately 250,000 sq. ft. of retail and restaurant space and a three-level enclosed parking structure. The proposed commercial structures would be one- and two-story buildings with a maximum height of 35 ft. The project is on a 10.93-acre site. | Southwest corner of Pacific Coast Highway and 2nd Street in Long Beach. | 0.94 | Initial Study was published March 2014. Comment period on NOP for a Draft EIR ended April 2014. |

| Label ID | Project Name | Project Description | Location | Distance from AEC (Miles) | Status |
|---|---|---|---|---|---|
| 8 | Rehabilitation of Western Regional Sewers, Project No. 3-64 | Orange County Sanitation District proposes to rehabilitate and/or replace entire lengths of the Orange Western Sub-Trunk, Los Alamitos Sub-trunk, Westside Relief Interceptor, and the Seal Beach Interceptor regional pipelines. In addition to pipeline and manhole replacement and/or rehabilitation, project includes rehabilitation/replacement of the Westside Pump Station force main, reconstruction of the Westside Pump Station wet well, and construction of a new vent line from the wet well to the downstream manhole or construction of an odor control scrubber. | Primarily follows public rights-of-way in the cities of La Palma, Buena Park, Cypress, Anaheim, Los Alamitos, Seal Beach, and the community of Rossmoor (Orange County). Westside Pump Station is at 3112 Yellowtail Drive. | 1.28 | Initial Study was published November 2015 (SCH #2015111077). Draft EIR is scheduled for publication at the end of March 2016. |
| 9 | Alamitos Bay Marina Rehabilitation Project | Project would renovate the existing Marina facilities and enhance existing recreational boating facilities in the Marina. The project would provide upgraded ADA-compliant facilities, upgraded restrooms, dredged basins to ensure safe navigation, and longer average slip lengths. The existing 1,967 slips in Basins 1 through 7 would be replaced by 1,646 slips, at a loss of approximately 321 slips. | Located adjacent to and northwest of the mouth of the San Gabriel River in the city of Long Beach. | 1.33 | Draft EIR was published October 2009 (SCH #2008041028). |

The following topics have been analyzed with regard to cumulative land use impacts. The AEC would not contribute to any cumulative land use effects.

## AGRICULTURE AND FOREST

The AEC as proposed would not have any impacts to agricultural or forest lands or conflict with any land that is zoned for agricultural purposes and therefore, would not contribute to cumulative impacts related to this land use topic.

## PHYSICAL DISRUPTION OR DIVISION OF AN ESTABLISHED COMMUNITY

The AEC would be located entirely within the boundaries of an existing power plant facility that has been in operation since the 1950s. The project is situated on land designated and zoned for industrial uses. The project would not physically disrupt or divide an established community and would not contribute to a cumulative impact in this land use topic.

## CONFLICT WITH ANY APPLICABLE HABITAT OR NATURAL COMMUNITY CONSERVATION PLAN

The AEC would not conflict with any habitat or natural community conservation plans and would not contribute to any cumulative impacts in this land use topic.

## CONFLICT WITH ANY APPLICABLE LAND USE PLAN, POLICY OR REGULATION

The project would not conflict with any other applicable land use plan, policy, or regulation and would not contribute to any cumulative impacts in this land use topic.

## LAND USE COMPATIBILITY

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements (see discussion in **Land Use Table 2**) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses. As noted in the discussions above under the subsection “Physical Disruption or Division of an Established Community” and in **Land Use Table 2** and **Land Use Table 3**, development of the proposed project and its associated features are compatible with the existing and proposed land uses surrounding the site because the proposed AEC is located within the property of the existing AGS.

Temporary use of an offsite laydown area would be at an adjacent property that is currently vacant and is designated for IG (General Industrial) use. While the proposed offsite wastewater pipeline crosses through an area designated as an overlook, and connects to an existing LBWD sanitary line within an area designated for residential use, the proposed pipeline would be subsurface (with the exception of a portion that crosses over Los Cerritos Channel) and no changes to the land use or zoning in these areas is proposed. The existing sanitary line currently extends through areas designated for residential and golf course uses, and the proposed AEC would not change the use of the utility line in these areas. No conflict with the land use or zoning would occur from the onsite or offsite project components.

The AGS property has been used since the 1950s for the purpose of electrical power generation. As such, the project represents continued use of a site committed to ensuring reliable generation is maintained at an electrical system location critical to Southern California. The proposed AEC is consistent with the city’s land use designations and zoning and would not constitute a change in the current development pattern of the city, as established by the city’s adopted General Plan. Furthermore, the project is compatible with the existing ancillary facilities of the AGS that would be upgraded to support the AEC, such as the SoCalGas natural gas pipeline serving the site, the existing onsite SCE 230-kV switchyard, and the existing connections to the city of Long Beach potable water system and sanitary sewer system.

The proposed AEC is consistent with applicable LORS, including the California Coastal Act, the Warren-Alquist Act, and city LORS such as General Plan Land Use and Zoning designations for the proposed project site and the immediately surrounding existing land uses. Therefore, the proposed project would not result in any physical land use incompatibilities with existing surrounding land uses.

## SENSITIVE RECEPTORS

Land Uses such as schools, day-care facilities, hospitals, nursing homes, and residential areas are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact.

The area immediately surrounding the proposed project includes uses associated with the existing AGS: a natural gas pipeline, an onsite SCE 230-kV switchyard, and existing connections to a potable water system and sanitary sewer system. Residential and recreational uses are located further (approximately 0.5 mile) from the proposed project site. However, the following sensitive receptors would be within close proximity (i.e., within 0.25 mile) of the proposed AEC:

- Rosie the Riveter Charter High School
- Charles F. Kettering Elementary School
- Long Beach Bikeway Route 10/ Channel View Park
- San Gabriel River Bike Trail
- University Park Estates community
- Leisure World

These uses may experience project-related nuisance impacts such as construction-generated noise, dust, and traffic and operation-related public health impacts. The **Air Quality, Hazardous Materials Management, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of the noise, dust, public health hazards or nuisance, and adverse traffic or visual impacts on surrounding sensitive receptors such as schools, residential uses, and recreation facilities. These technical areas have not identified any significant unmitigated impacts that would affect these land uses.

Because the proposed project would be located entirely within the site of the existing AGS, on a property that has been used since the 1950s for the purpose of electrical power generation, the project is not considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

Based on analyses cited in **Land Use Table 2**, **Land Use Table 3,** and within other sections of this document, as well as the zoning and land use designations for the proposed project site and its associated features/facilities and surrounding locations, the proposed project would not result in a significant project-related impact at any sensitive receptor location.

## NOTEWORTHY PUBLIC BENEFITS

There are no land use-related benefits associated with the AEC.

## RESPONSE TO COMMITTEE QUESTIONS

On September 19, 2016, the Energy Commission Committee assigned to the AEC proceeding filed the following questions regarding the Land Use section of the PSA. (TN# 213708)

**Question:** *Regarding the City of Long Beach's Southeast Area Development Improvement Plan [SEADIP], on PSA page 4.6-11, it states "A Draft Specific Plan and Environmental Impact Report is expected to be released for public review in mid-2016." What is the status of the updates to the planning LORS? Will the project be compliant with the revised LORS?*

> **Response:** See updated text in **Land Use Table 1** and the "City of Long Beach Local Coastal Program (LCP)" subsection above.

**Question:** *Land Use Table 2 (PSA page 4.6-12) indicates that a conditional use permit (CUP) is required for electrical services uses, such as the AEC, in the zoning district where the proposed plant will be located. What are the standards for granting such a CUP? Does the AEC meet them? Has the city of Long Beach expressed an opinion on the topic?*

> **Response:** See updated text in **Land Use Table 2**. The city of Long Beach did not file comments on the PSA applicable to Land Use.

**Question:** *Land Use Table 2 also contains references to two different building height limits: 35 feet (under the 2006 SEADIP) and 65 feet (under the 2015 amendments to the SEADIP zoning) (see PSA pages 4.6-16 and 4.6-18, respectively). How is this dichotomy reconciled? Even if not reconciled, the stacks for the AEC are 140 and 80 feet tall. Does the fact that the existing AGS stacks are over height obviate the need for a variance (Long Beach Municipal Code Chapter 21.25, Division III) or is it merely a factor to consider in deciding whether a variance should be approved. If a variance is required and cannot be approved, is an override justified? Why?*

> **Response:** Please see updated text in **Land Use Table 2**. The proposed AEC would comply with the General Development Standards that apply to the IG zone district and would not require a variance. The proposed height of buildings is 25 feet. There is no maximum non-building height restriction for structures such as the proposed stacks.

**Question:** *The section lists numerous assessor parcel numbers (APNs). How many legal parcels are there on site? Do any of the project facilities extend over those parcel lines? Should a lot merger or other action take place to ensure that the project is built on a single lot? Why or why not?*

> **Response:** See the "Proposed Project" subsection above. The project owner has site control of the existing 71.1 acre AGS site and the AEC would be on a 21 acre portion within that site. Therefore, at this time there is no necessity that the project owner obtain a lot merger or other action to ensure that the project is built on a single lot and there is no LORS requirement that they do so.

**Question:** *Proposed Condition of Certification LAND-1 (PSA page 4.6-30) requires, prior to the start of construction, a site plan consistent with city of Long Beach design standards for the General Industrial zone, including heights, parking, and setbacks. Will the Final Staff Assessment discuss whether those standards are satisfied, or is staff expecting that determination to be made during the post-certification review of the site plan?*

> **Response:** Condition of Certification **LAND-1** has been deleted. Staff has revised the text accordingly, and has included further discussion of project compliance with the applicable development standards of the Long Beach Municipal Code, ch. 21.33 (see **Land Use Table 2**).

**Question:** *The project calls for construction of a new wastewater pipeline that will be affixed to an existing bridge that crosses the Los Cerritos Channel. Will the existing bridge be able to accommodate the new pipeline? Will the pipeline's construction cause any impacts? Where or how will any impacts of the pipeline on the bridge be addressed in the PSA or FSA?*

**Response:** Cultural Resources staff concluded in the PSA that the Loynes Drive bridge is not a historical resource under CEQA, and therefore attaching a pipeline to the bridge would not have any impacts to historical resources from a Cultural Resources point of view. See page 4.4-48 of the published PSA **Cultural Resources** section for the full text of the conclusion. The applicant has advised staff that they will file additional information addressing the committee's engineering design question regarding the bridge, that information will be docketed and submitted into the hearing record.

**Question:** *The project lies within the coastal zone and appears to require a coastal development permit under Long Beach Municipal Code sections 21.25.901- 21.25-908. Where is the analysis of this? Is Coastal Commission review/approval required under the Long Beach Municipal Code? Has the Coastal Commission commented on the project?*

**Response:** See "City of Long Beach Local Coastal Program (LCP)" subsection above. **Land Use Table 2** provides a summary of the proposed project's consistency with the key policies of the LCP. Based on the LORS consistency analysis conducted by staff, the proposed project is consistent with the city's adopted LCP (see **Land Use Table 2**). On September 8, 2016, Coastal Commission staff stated that they are not planning to participate in the AEC proceeding (CEC 2016a).

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

Responses to comments provided on the Land Use section of the PSA are included below. Note that each set of comments applicable to Land Use has been organized by the individual or agency submitting the comment(s).

## APPLICANT'S INITIAL COMMENTS ON PRELIMINARY STAFF ASSESSMENT (TN# 212487)

**Comment:** *Page 4.6-2, Land Use Table 1, Local, City of Long Beach General Plan* **–** *The applicant suggests noting that, as of July 2016, the Draft Land Use Element has not been adopted.*

**Response:** It is noted that the city of Long Beach released a revised Draft Land Use Element in February 2016, which replaced the October 2015 draft element that was referenced in the PSA (LB 2016a). Staff has reviewed the February 2016 Draft Land Use Element and has revised the text in the land use section accordingly.

**Comment:** *Page 4.6-18, Land Use Table 2, City of Long Beach, Municipal Code – The applicant suggests referencing Table 33-2 instead of Table 33-3.*

**Response:** The information in both Table 33-2 and Table 33-3 of the Long Beach Municipal Code are applicable to the project (LB 2016c). Table 33-2 identifies electric services as a conditionally permitted use within an industrial district. Table 33-3 provides specific information on the development standards that apply to construction and development in industrial districts, which are summarized in **Land Use Table 2**. Staff believes that the summary provided in **Land Use Table 2** adequately identifies the applicable city development standards in addition to other applicable state and local LORS.

**Comment:** *Page 4.6-21, Land Use Table 3, City of Long Beach, General Plan – The applicant suggests updating the Draft Land Use Element from October 2015 to "February 2016 (not adopted)." In addition, the applicant suggests noting "Allowable Non-building Height at AEC site: No restrictions" and that AEC is designated as "I-industrial Placetype."*

**Response:** It is noted that the city of Long Beach released a revised Draft Land Use Element in February 2016 (LB 2016a), as well as a Draft Environmental Impact Report (EIR) for the Southeast Area Specific Plan in July 2016 (LB 2016b). Staff has reviewed the February 2016 Draft Land Use Element and the July 2016 Specific Plan Draft EIR, and has revised the text in the land use section accordingly.

Text has been added to **Land Use Table 3** to include the allowable non-building structure height information. With regard to the designation of the proposed AEC as an Industrial PlaceType, please refer to the discussion in **Land Use Table 3**.

**Comment:** *Page 4.6-25, Land Use Table 4, Label ID# 5 – The LADWP Haynes Generating Station's installation of six LMS100 simple cycle gas turbines has been completed and these units are operational. Please revise the project status from Under Construction to Operational.*

**Response:** It is noted that LADWP's gas turbine installation has been completed. Staff has revised the text in the land use section accordingly (see **Land Use Table 4**).

**Comment:** *Page 4.6-30, Condition LAND-1 – The Energy Commission's process preempts the local site approval process. Issues of local LORS compliance are within the jurisdiction of the Energy Commission and should be decided in this proceeding. The project has submitted a site plan, which should be reviewed in this proceeding. The Energy Commission should not defer to post-Certification the determination of whether the project complies with applicable LORS. As written, Condition LAND-1 could be read as delegating to the City the review and de facto approval of the project's compliance with applicable local LORS. Because the Energy Commission preempts local approvals, Condition LAND-1 should be deleted.*

**Response:** Condition of Certification **LAND-1** has been deleted. Staff has revised the text accordingly, and has included further discussion of project compliance with the applicable development standards of the Long Beach Municipal Code, ch. 21.33 (see **Land Use Table 2**).

## DAVE SHUKLA COMMENTS: FORWARD PROGRESS (TN# 212781)

**Comment:** *"I respectfully suggest that Staff retain the requirement stated in the PSA that the applicant and its proposal take direction from the current City of Long Beach process around SEADIP/SEASP. For those of us involved in that process, there has been a lack of knowledge around how changes at the AGS will impact our efforts to prepare Southeast L.B. for the next 30 years. I believe the project can meet its funding and construction timeline beginning in early 2017 by incorporating the input of the public where area planning and power plant conversion planning overlap. I respectfully suggest that CEC Staff contact City of Long Beach Planning Division staff to ascertain how best to proceed. Even if that means renewing the discussion on what kind of mix of battery storage vs. natural gas-based generation should be included in the project."*

**Response:** Staff has coordinated directly with the city of Long Beach to identify all applicable LORS at the project site, and has sought input and guidance on specific project development standards that may be recommended by the city (CEC 2014). Staff has also clarified the discussion presented in **Land Use Table 2** to demonstrate that the proposed AEC would be developed in accordance with the provisions of the IG zone, which are consistent with PD-1 development and use standards for that site. Staff has determined that the proposed project would be consistent with the city's community development standards of the PD-1 district.

## CONCLUSIONS AND RECOMMENDATIONS

The proposed AEC would be located entirely within the existing Alamitos Generating Station property, an operating power plant site, in the city of Long Beach.

Staff concludes the AEC:

- Would not convert any farmland (as classified by the Farmland Mapping and Monitoring Program) to non-agricultural use, conflict with existing agricultural zoning or Williamson Act contracts or convert forest land to non-forest use.
- Would not conflict with existing zoning for agricultural use or a Williamson Act contract.
- Would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.
- Would not result in the loss of forest land or conversion of forest land to non-forest use.
- Would not conflict with any applicable habitat conservation plan or natural community conservation plan.
- Would not directly or indirectly divide an established community or disrupt an existing or recently approved land use.
- Would be consistent with the maximum allowable height limit within the PD-1(19) zone district.
- Would be consistent with both the California Coastal Act and the Long Beach LCP.

- Would not result in any physical land use incompatibilities with the existing surrounding land uses and would be consistent with the city of Long Beach LORS, including the General Plan, Southeast Area Development and Improvement Plan, and the Municipal Code.
- Would not conflict with the city's future planning and development goals identified in the Draft Land Use Element (February 2016).
- Would not result in incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.
- Would not result in any land use-related environmental justice issues. No minority or low-income populations would be significantly or adversely impacted.

## PROPOSED CONDITIONS OF CERTIFICATION

No land use conditions of certification are required.

## REFERENCES


**AES 2015**—Alamitos Energy Center (tn: 206427-1), Supplemental Application for Certification Volume 1, dated October 2015, submitted to CEC/Docket Unit on October 26, 2015.

**CCC 2014**—California Coastal Commission, Staff Report: Permit Amendment, filed August 22, 2014, <http://documents.coastal.ca.gov/reports/2014/11/F12b-11-2014.pdf>, accessed on February 29, 2016.

**CCR 2007**—California Code of Regulations, Title 14, Chapter 3 (CEQA Guidelines), §§15000-15387, as amended July 27, 2007.

**CCR 2016**—California Code of Regulations, Health & Safety Code, §§42301.6-42301.9, <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=42001-43000&file=42300-42316>, accessed on March 1, 2016.

**CDFW 2015**—California Department of Fish and Wildlife, California Regional Conservation Plans, August 2015, <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=68626&inline>, accessed on March 1, 2016.

**CDOC 2015**— California Department of Conservation, Los Angeles County Important Farmland 2012, published January 2015, <http://www.conservation.ca.gov/dlrp/fmmp/Pages/LosAngeles.aspx>, accessed on March 17, 2016.

**CDOC 2016**—California Department of Conservation, Los Angeles County Williamson Act FY 2015/2016, published February 2016, <ftp://ftp.consrv.ca.gov/pub/dlrp/wa/LA_15_16_WA.pdf>, accessed on March 17, 2016.

**CEC 2014**—California Energy Commission (tn: 202619), CEC Letter to the City of Long Beach Development Services, submitted to the CEC/Docket Unit on June 26, 2014.

**CEC 2016**—California Energy Commission (tn: 210529), Record of Conversation on Rosie the Riveter Youth Program 02/17/16, submitted to the CEC/Docket Unit on February 24, 2016.

**CEC 2016a**—California Energy Commission (tn: 213634), Email Regarding Alamitos 30413 (d), dated September 8, 2016, between Keith Winstead, CEC and Tom Luster, submitted to the CEC/Docket Unit on September 13, 2016.

**LB 1973**—City of Long Beach, General Plan Conservation Element, April 30, 1973, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=4092>, accessed on March 2, 2016.

**LB 1980**—City of Long Beach, Long Beach Local Coastal Program, adopted February 12, 1980, certified July 22, 1980, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=3795>, accessed on March 2, 2016.

**LB 1997**—City of Long Beach, General Plan Land Use Element, revised April 1997, <http://www.lbds.info/planning/advance_planning/general_plan.asp>, accessed on February 29, 2016.

**LB 2012**—City of Long Beach, Zoning Maps 6, 7, and 13, revised April 2012, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=2538>, accessed on March 1, 2016.

**LB 2016a**—City of Long Beach, General Plan Draft Land Use Element, February, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=5484>, accessed on August 5, 2016.

**LB 2016b**—City of Long Beach, Southeast Area Specific Plan Draft Program Environmental Impact Report. SCH No. 2015101075, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=5962>, accessed on August 5, 2016.

**LB 2016c**—City of Long Beach, Long Beach Municipal Code, Title 21 Zoning Regulations, Codified through Ordinance No. ORD-16-0001, enacted January 19, 2016, <https://www.municode.com/library/ca/long_beach/codes/municipal_code>, accessed on February 29, 2016.

**LB 2016d**—City of Long Beach Comments on the Supplemental Application for Certification (TN# 211372). May 5, 2016.

**PlaceWorks 2015**—Initial Study: Southeast Area Specific Plan, City of Long Beach, October 2015, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=5524>, accessed on March 17, 2016.

# NOISE AND VIBRATION

Testimony of Joseph Hughes and Shahab Khoshmashrab

## SUMMARY OF CONCLUSIONS

If built and operated in conformance with the proposed Noise and Vibration conditions of certification, the Alamitos Energy Center (AEC) would comply with all applicable noise and vibration laws, ordinances, regulations, and standards (LORS) and would produce no significant direct or cumulative adverse noise impacts on people within the project area, including the environmental justice population.

Staff retains the responsibility to monitor the enforcement of the conditions of certification listed above. Staff would work under the authority of the Energy Commission's compliance project manager (CPM) to monitor and review the reporting of project performance during construction, demolition, and the full term of operation, including facility closure.

## INTRODUCTION

The construction, demolition, and operational activities associated with any power plant create noise, or unwanted sound. The character and loudness of the noise, the times of day or night that it is produced, the duration and frequency of the occurrence of the noise, and the proximity of the facility to sensitive receptors all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse noise impacts. In some cases, vibration may be produced as a result of power plant construction practices such as pile driving. The ground-borne energy of vibration may have the potential to cause nuisance and structural damage.

This analysis identifies and examines the noise and vibration impacts from the construction and operation of the AEC. Staff recommends procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable LORS and to lessen the impacts to less than significant.

For an explanation of technical terms used in this section please refer to **Noise Appendix A** at the end of this section.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**Noise Table 1** below identifies the noise and vibration LORS related to AEC.

## Noise Table 1
## Laws, Ordinances, Regulations and Standards

| Applicable LORS | Description |
|---|---|
| **Federal:**<br>Occupational Safety & Health Act (OSH Act), Title 29, Code of Federal Regulations, § 1910.95 | Protects workers from the effects of occupational noise exposure. |
| U.S. Environmental Protection Agency Guidelines | Assists state and local government entities in development of state and local LORS for noise. |
| Federal Transit Administration | Establishes thresholds for ground-borne vibration associated with construction of rail projects; also applied to other types of projects. |
| **State:**<br>California Government Code, § 65302(f) | Encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. |
| State of California, Office of Noise Control, Model Community Noise Control Ordinance | Provides guidance for acceptable noise levels in the absence of local noise standards. |
| California Occupational Safety & Health Act (Cal-OSH Act): Title 8, California Code of Regulations, §§ 5095-5099 (Article 105) | Protects workers from the effects of occupational noise exposure. |
| California Department of Transportation (Caltrans), Transportation and Construction Vibration Guidance Manual | Establishes guidelines for assessing the impacts of ground-borne vibration associated with pile driving. |
| **Local:**<br>City of Long Beach Municipal Code – Noise Ordinance, Title 8: Health and Safety, Chapter 8.80: | The following noise standards for the various land use districts apply to all such property within a designated district: |
| § 8.80.150 Exterior noise limits – Sound levels by receiving land use district | A. The noise standards for the various land use districts identified by the noise control office as presented in Table A in Section 8.80.160 shall, unless otherwise specifically indicated, apply to all such property within a designated district.<br>B. No person shall operate or cause to be operated any source of sound at any location within the incorporated limits of the city or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured from any other property, either incorporated or unincorporated, to exceed:<br>1.The noise standard for that land use district as specified in Table A in Section 8.80.160 for a cumulative period of more than thirty (30) minutes in any hour; or |

| Applicable LORS | Description |
|---|---|
| | 2. The noise standard plus five (5) decibels for a cumulative period of more than fifteen (15) minutes in any hour; or<br>3. The noise standard plus ten (10) decibels for a cumulative period of more than five (5) minutes in any hour; or<br>4. The noise standard plus fifteen (15) decibels for a cumulative period of more than one (1) minute in any hour; or<br>5. The noise standard plus twenty (20) decibels or the maximum measured ambient, for any period of time.<br><br>C. If the measured ambient level exceeds that permissible within any of the first four (4) noise limit categories in Subsection B of this Section, the allowable noise exposure standard shall be increased in five (5) decibels increments in each category as appropriate to encompass or reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category in Subsection B of this Section, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.<br><br>D. If the measurement location is on a boundary between two (2) different districts, the noise level limit applicable shall be the arithmetic mean of the two (2) districts.<br><br>E. If possible, the ambient noise shall be measured at the same location along the property line utilized in Subsection B of this Section, with the alleged offending noise source inoperative. If for any reason the alleged offending noise source cannot be shut down, then the ambient noise must be estimated by performing a measurement in the same general area of the source but at a sufficient distance such that the offending noise from the source is inaudible. If the difference between the noise levels with noise source operating and not operating is six (6) decibels or greater, then the noise measurement of the alleged source can be considered valid with a small correction applied to account for the contribution of the ambient noise. The correction is to be applied in accordance with data shown in Table B in Section 8.80.160. |
| § 8.80.160 Exterior noise limits – Correction factor for character of sound | In the event that alleged offensive noise contains a steady audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting or contains music or speech conveying informational content, the standard limits set forth in Table A shall be reduced by five (5) decibels. |

Table A

**Exterior Noise Limits (dBA)**

| Receiving Land Use District | Noise Level (dBA) | Time Period |
|---|---|---|
| District One[a] | 45<br>50 | 10 p.m. – 7 a.m.<br>7 a.m. – 10 p.m. |
| District Two[b] | 55<br>60 | 10 p.m. – 7 a.m.<br>7 a.m. – 10 p.m. |
| District Three[c] | 65 | Any time |
| District Four[d] | 70 | Any time |
| District Five[e] | Regulated by other agencies and laws | |

Notes:

a. District One: Predominantly residential with other land use types also present.
b. District Two: Predominantly commercial with other land use types also present.
c. District Three and Four: Predominantly industrial with other land use types also present. Limits are intended primarily for use at boundaries rather than for noise control within these districts.
d. District Five: Airport, freeways and waterways regulated by other agencies.

| Applicable LORS | Description |
|---|---|
| § 8.80.202 Construction activity – Noise regulations | Prohibits construction between 7 p.m. and 7 a.m. on Mondays through Fridays, and federal holidays; prohibits construction before 9 a.m. and after 6 p.m. on Saturdays; and prohibits construction on Sundays. |

## FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSH Act), the Department of Labor, Occupational Safety and Health Administration (OSHA) adopted regulations Title 29, § 1910.95, designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Noise Table A4** at the end of this section). The regulations further specify a hearing protection program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of architectural damage for conventional sensitive structures is a peak particle velocity of about 0.2 inches per second (in/sec).

## STATE

California Government Code, § 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA). This is consistent with the definition in **Noise Appendix A**, **Noise Table A1**, last row, in this analysis.

The California Occupational Safety and Health Administration (Cal-OSHA) has adopted occupational noise exposure regulations (California Code of Regulations, Title 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A**, **Noise Table A4**).

In September 2013, California Department of Transportation (Caltrans) released the Transportation and Construction Vibration Guidance Manual, available at http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. This manual includes the FTA method and findings. For pile driving impacts, the manual uses a method based on the force of the pile driver as well as soil considerations in the calculation of vibration levels. Thus, it is a bit more robust analysis than the FTAs and so, staff uses the vibration criteria in this manual for pile driving associated with power plants. The Caltrans manual states that for construction activities that generate vibration, e.g., pile driving, the threshold of human response begins at a peak particle velocity of 0.16 in/sec. This is characterized by Caltrans as a “distinctly perceptible” event with an incident range of transient to continuous (Caltrans. “Transportation and Instruction Vibration Guidance Manual”, September 2013. Report No. CT-HWANP-RT-13069.25.3, Table 20).

## LOCAL

### City of Long Beach LORS

The project is located within the city limits of Long Beach, an incorporated city within Los Angeles County. The City of Long Beach Title 8, Chapter 8.80 Noise Regulation applies to this project. These municipal code references are listed above in **Noise Table 1**.

The criteria for operating conditions are defined in the following sections of the city’s noise regulation:

§ 8.80.160 provides noise limits for exterior locations. The AEC site is located in District 4 (predominantly industrial with other land use types present). § 8.80.160 limits exterior noise levels in District 4, to 70 dBA $L_{50}$. Residences are located outside District 4 boundary in District 1 (predominantly residential with other land use types present). § 8.80.160 limits exterior noise levels in District 1 to a nighttime noise level of 45 dBA $L_{50}$ and a daytime level of 50 dBA $L_{50}$.

For construction activities, the noise regulation specifies the following:

> § 8.80.202 prohibits construction between 7 p.m. and 7 a.m. on Mondays through Fridays and federal holidays, prohibits construction before 9 a.m. and after 6 p.m. on Saturdays, and prohibits construction on Sundays.

## SETTING

The AEC site and the surrounding vicinity has numerous existing industrial operations such as the existing Alamitos Generating Station, other power generation facilities, oil storage tank farms, in addition to several major air and ground transportation corridors. The closest residence to the noise-producing equipment (combustion turbine) at the proposed AEC would be located approximately 1,500 feet to the west on East Eliot Street. Rosie the Riveter Charter High School is a tenant on the existing Alamitos Generating Station site.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

### California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XII of Appendix G of CEQA's guidelines (California Code of Regulations, Title 14, Appendix G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to, or generation of, excessive ground borne vibration or ground borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Staff, in applying Item 3 above to the analysis of this and other power plant projects, concludes that an increase in background noise levels up to and including 5 dBA is less than significant[1], and an increase of above 5 dBA could be either significant or less than significant depending upon the circumstances of a particular case. For example, a significant impact may exist where the noise of the project plus the background exceeds the nighttime background level by more than 5 dBA at residential communities. Factors staff considers in determining if the noise is significant or not, are:

1. the resulting noise level;[2]

[1] Noise Appendix A, Subjective Response to Noise, explains that a change in background noise levels of at least five dB is required before any noticeable change in community response would be expected.

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions.

2. the character of the noise;
3. the time the noise is produced (day or night);
4. the duration and frequency of occurrence of the noise; and
5. the land use designation of the affected receptor site and the type of receptor (residential, commercial, etc.).

Noise due to construction activities is usually considered to be less than significant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities is limited to daytime hours.

For purposes of evaluating impacts on residential uses, the project noise is compared with measured nighttime ambient noise levels, when residents are asleep. Staff uses the above methods and thresholds to evaluate the project's noise impacts on the project area's populations, including its environmental justice population.

## Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey, a long-term survey taken between August 23-31, 2011 (AEC 2015f, AFC Section 5.7.3.2, Table 5.7-4, and AEC 2015d, Appendix 5.7A, Table 5.7A-1 for M1, Table 5.7A-2 for M2, and Table 5.7A-3 for M3). This noise survey monitored existing noise levels at three locations, labeled M1, M2, and M3, shown below in **Noise Figure 1**.

These surveys were performed using industry accepted equipment and techniques. During these surveys, the existing Alamitos Generation Station operated for a substantial period of time at various power ratings. Based on staff's examination of these surveys, the Alamitos Generation Station did not appear to substantially elevate the average ambient baseline levels at the project's sensitive noise receptors during the critical times, the quietest nighttime hours. Staff derived the average $L_{eq}$ values for use as the reference metric for daytime and nighttime baseline noise when evaluating construction impacts, average $L_{50}$ values for daytime and nighttime baseline noise when evaluating operational compliance with LORS, and the average $L_{90}$ as monitored from 10:00 p.m. to 7:00 a.m. for use as nighttime baseline noise when evaluating operational compliance with CEQA. The derived values are outlined in **Noise Table 2**.

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In this case, if the project creates an increase in ambient noise no greater than 10 dBA, the project noise level may not be significant if the resulting noise level does not exceed 40 dBA.

[3] Noise that draws project-related complaints. For definition of "project-related complaints", see the footnote in Condition of Certification **NOISE-2**.

**Noise Table 2**
**Noise Monitoring Results**

| | | Daytime | | Nighttime | | |
|---|---|---|---|---|---|---|
| **Receptor** | **Description** | **$L_{eq}$ Daytime Average dBA** | **$L_{50}$ Daytime Average dBA** | **$L_{eq}$ Nighttime Average dBA** | **$L_{50}$ Nighttime Average dBA** | **$L_{90}$ Nighttime Avgerage dBA** |
| **M1** | Residence at 6333 Eliot Street, Long Beach | 55 | 53 | 52 | 51 | 50 |
| **M2** | Residence at 6810 East Septimo Street, Long Beach | 59 | 57 | 53 | 52 | 48 |
| **M3** | Residence at the intersection of El Dorado Drive and Nassau Drive, Seal Beach | 57 | 51 | 49 | 48 | 47 |

Sources: AEC 2015f, AFC Section 5.7.3.2, Table 5.7-4, and AEC 2015d, Appendix 5.7A.

## DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by construction activities and normal operation of the project.

### Construction and Demolition Impacts and Mitigation

Construction noise is usually a temporary phenomenon where construction extends one to two years. Demolition activities use equipment similar to that used for construction activities so the noise impacts are expected to be similar between construction and demolition. The combined demolition of existing unit 7 and construction of the AEC project is expected to be typical of similar projects in terms of equipment used and types of activities and would last approximately 56 months (**AEC 2015f**, AFC § 5.7.4.2). Over the course of this period, various discrete activities would occur concurrently, creating a cumulative noise effect.

The project would commence with the demolition of the remaining components from the retired Alamitos Generating Station (AGS) Unit 7 and other ancillary structures to make room for the construction of AEC Blocks 1 and 2 on the AGS site. The demolition of AGS Unit 7 would commence in the first quarter of 2017. The construction of the AEC combined-cycle gas turbine (CCGT) is scheduled to commence in the second quarter of 2017, and construction of AEC simple-cycle gas turbine (SCGT) is scheduled to commence in the second quarter of 2020. The demolition of all other existing units is not required to construct AEC and is not part of the AEC project. The potential demolition of existing AGS Units may occur once AEC is operating. The impacts, including noise, would be evaluated and addressed by the City of Long Beach and is discussed in more detail under the Cumulative Impacts and Mitigation section below. **Noise Table 3** provides the project activities schedule.

**Noise Table 3**
**Alamitos Energy Center Project Activities Table**

| Year | 2017 | | | | 2018 | | | | 2019 | | | | 2020 | | | | 2021 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarter | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Unit 7 Existing | | | | | | | | | | | | | | | | | | | | |
| CCGT Power Block | | | | | | | | | | | | | | | | | | | | |
| SCGT Power Block | | | | | | | | | | | | | | | | | | | | |
| | Demolition | | | | Construction | | | | Operation | | | | | | | | | | | |

Source: Staff derived from AEC 2015f, Section 2.0, Table 2.2-1.

The construction, demolition, and operational activities provided in **Noise Table 3** would be limited to the approximate center of the project site (location of existing AGS Unit 7). **Noise Figure 1** provides a visual representation of the noise monitoring locations and the location where demolition and construction activities would occur. **Noise Table 4** provides the distances from each sensitive receptor to construction and demolition activities that would occur on the project site.

**Noise Table 4**
**Monitoring Receptor Distances to Construction/Demolition Activities**

| Monitoring Receptor | Approximate Distance from Construction/Demolition Activities (feet) |
|---|---|
| M1[a] | 1,500 |
| M2[b] | 2,500 |
| M3[c] | 2,100 |

Source: Staff derived from Google Earth.
Notes:
a. Residence at 6333 Eliot Street, Long Beach.
b. Residence at 6810 East Septimo Street, Long Beach.
c. Residence at the intersection of El Dorado Drive and Nassau Drive, Seal Beach.

## Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under standard noise ordinances that apply to plant operations. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under CEQA Impacts).

Where circumstances require construction activity to proceed outside the allowable hours, City of Long Beach noise regulation § 8.80.340 Variance – Exemption from regulations, gives the Noise Control Officer authority to issue a variance for construction outside the approved hours, where conditions warrant. Because the Energy Commission has permitting jurisdiction over this project, it must take the responsibility of fulfilling the applicable rule in ensuring that such an activity is managed in a manner to ensure any significant noise impacts at the surrounding communities are mitigated to below a significance level, in compliance with CEQA. This has been done in this analysis; please see the following discussion under CEQA Impacts.

The applicant commits to performing noisy construction work during the times specified in the City of Long Beach noise regulation; that is: 7 a.m. to 7 p.m. on Mondays through Fridays and 9 a.m. to 6 p.m. on Saturdays. To ensure this requirement is met, staff proposes Condition of Certification **NOISE-6**, Construction Noise Restrictions, which restricts construction to those times. Therefore, the noise impacts of the AEC project construction activities would comply with the noise LORS.

### CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by and compared with the $L_{eq}$ metric.

Staff has calculated the worst-case construction noise levels at the nearest residential receptors. **Noise Table 5** provides the predicted daytime construction worst case noise levels. The average $L_{eq}$ values for M1, M2, and M3 were derived from the noise measurements taken in August, 2011 and based on values of $L_{eq}$ for the periods of 7 a.m. to 10 p.m.

**Noise Table 5**
**Predicted Daytime Construction Worst Case Noise Levels**

| Activity | Receptor | Daytime Ambient Noise $L_{eq}$ (dBA) | Receptor Distance to Construction/ Demolition Activity (feet) | Daytime Construtction/ Demolition Noise[a] (dBA) | Daytime Cumulative Noise[b] (dBA) | Daytime Change[c] (dBA) |
|---|---|---|---|---|---|---|
| Demo Unit 7, Const Block 1 & 2 | M1 | 55 | 1,500 | 59 | 61 | 6 |
| | M2 | 59 | 2,500 | 55 | 61 | 2 |
| | M3 | 57 | 2,100 | 56 | 60 | 3 |

Source: AEC 2015f, Table 5.7-6, and Staff derived.
Notes:
a. Daytime construction and demolition noise are estimated to be 71 dBA at 375 feet. Daytime construction and demolition noise at nearby receptors are calculated using the noise distance logarithm.
b. Daytime cumulative noise is calculated by adding the noise generated from construction and demolition to the daytime ambient noise using the noise addition logarithm.
c. The daytime change is the difference between the daytime cumulative noise and the daytime ambient noise.

As discussed under the Thresholds for Determining Significance for CEQA, staff has concluded that a potential for a significant noise impact exists where the long-term noise of the project plus the background exceeds the background by more than 5 dBA at the nearest residential receptors in the late night and early morning hours when people are asleep. **Noise Table 5** shows that the noise impacts associated with construction/demolition could result in a potentially significant impact for the M1 receptor location. Therefore, staff proposes Condition of Certification **NOISE-6** (Construction Noise Restrictions), which restricts construction (except concrete pour) to daytime and would require construction equipment and trucks to avoid generating excessive and unnecessary noise.

### Nighttime Concrete Pouring Activities

For AEC, it is inevitable that an extended or continuous concrete pour would carry over to nighttime (10 p.m. – 7 a.m.). For example, a monolithic pour of equipment foundations at the power block may require a full 24 hour cycle to complete. Ambient temperatures at night improve the curing and improve strength. When the noise generated by these kinds of activities technically exceed: 1) LORS limits specified in the Long Beach noise ordinance or the measured ambient limit already measured to exceed the stipulated ordinance limit and 2) CEQA limit of significance of 5 dBA, mitigation measures must be implemented.

For nighttime conditions at AEC, an exception must be requested by the project owner to the CPM to handle a monolithic concrete pour at the power block that would require continuous 24-hour operation. As shown in **Noise Table 6** below, ambient $L_{eq}$ measurements are used to evaluate the impact of nighttime construction activities, instead of ambient $L_{90}$ measurements used for steady-state operational noise, because the $L_{eq}$ metric correlates to the variable nature of construction-related noise.

**Noise Table 6**
**Predicted Nighttime Concrete Pour Noise Levels**

| Activity | Receptor | Nightime $L_{eq}$ Average (dBA) | Receptor Distance to Concrete Pour (feet) | Nightime Concrete Pour Noise[a] (dBA) | Nightime Cumulative Noise[b] (dBA) | Nightime Change[c] (dBA) |
|---|---|---|---|---|---|---|
| Concrete Pour Power Block 1 & 2 | M1 | 52 | 1,500 | 48 | 54 | 2 |
| | M2 | 53 | 2,500 | 44 | 54 | 1 |
| | M3 | 49 | 2,100 | 45 | 51 | 2 |

Source: AEC 2015f, Table 5.7-6 and Staff derived.
Notes:
a. Concrete pours are estimated to be 60 dBA at 375 feet. Nighttime noise from concrete pours at nearby receptors is calculated using the noise distance logarithm.
b. Cumulative noise is calculated by adding the noise created from concrete pours to the $L_{eq}$ nighttime average ambient noise using the noise addition logarithm.
c. The nighttime change is the difference between nighttime cumulative noise and $L_{eq}$ nighttime average.

As seen in **Noise Table 6** above, concrete pouring would result in increases of 1-2 dBA in nighttime ambient levels at M1, M2, and M3. Because, staff regards an increase of up to 5 dBA as a less-than-significant impact, this nighttime activity would be less than significant. Also, concrete pour would be required for only some of the major equipment (mainly, the gas turbines, HRSGs, and steam turbines), and the entire pour would be expected to last no more than two weeks at each power block. Nevertheless, the sensitivity to nighttime construction activities in the surrounding residential areas should not be undermined. Therefore, the applicant should be prepared to take mitigation measures quickly. So, the potentially excessive noise levels caused by nighttime concrete pour need to be mitigated by anticipating and controlling noise. To ensure nighttime noise from concrete pour would be effectively managed to reduce the impacts to less than significant, staff proposes Condition of Certification **NOISE-6**, which would require sound attenuation of equipment and other means, such as barriers, if needed, prior approval of the work by the CPM, and public notification of the work.

A host of appropriate mitigation measures are available to limit noise during concrete pours. Examples include:

- Portable partitions that can be placed so that noise receptors are protected
- Encasing the transfer (concrete) pump boom arm to reduce effect of pump pulsing
- Repair of defective mufflers and tightening of rattling components
- Arranging work sites to avoid or minimize concrete truck reversing movements (the use of backup alarms), ensuring vehicles enter and exit work sites in a forward direction when possible, and installation of non-tonal and automatically adjusting reversing alarms
- Reorienting noisy equipment to minimize impact to residential receptors
- Using silenced powered equipment and silencing unsilenced powered equipment
- Assuring that vibration is sufficiently isolated

**NOISE-6** requires the project owner submit a request for CPM approval of the following:

- the need for such activities;
- the days, dates, and times during which these activities will occur;
- the approximate distance of activities to residential and other sensitive receptors;
- the expected sound levels at these receptors;
- and a statement that the activities will be performed in a manner to ensure excessive noise is prohibited as much as practicable.

**NOISE-6** also requires that at the same time, the project owner notifies the residents and property owners within one-half mile of the project site of the above request. In this notification, the project owner shall state that it will perform this activity in a manner to ensure excessive noise is prohibited as much as practicable.

Initiating measurements to address complaints, mitigation steps, and resolution would be performed using procedures specified in **NOISE-2** (Noise Complaint Process).

In light of the requirements contained in Conditions of Certification **NOISE-2** and **NOISE-6**, nighttime construction would create a less-than significant impact and satisfy the requirements of the local LORS (Long Beach Municipal Code, § 8.80.340).

### Linear Facilities

The AEC would require a new 1,000-foot-long, 6 inch-diameter pipeline that would connect the AEC to the existing Long Beach Water Department (LBWD) sewer system. The new, offsite pipeline would commence at the west side of the site near the intersection of Studebaker Road and the northern cooling water canal. The pipeline would cross under Studebaker Road then turn south to the intersection with Loynes Drive. The pipeline would then turn west and cross over the Los Cerritos Channel (affixed to the bridge). After crossing the channel, the pipeline would turn north on East Vista Street to connect into the existing system in the residential subdivision.

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6** (Construction Noise Restrictions).

### Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant anticipates that pile driving would be required for construction of the AEC (AEC 2015f, Section 5.7.4.2, and Table 5.7-7). The Caltrans measure of the threshold of distinct perception begins at 92 vibrational decibels, which correlates to a peak particle velocity of about 0.16 in/sec (inches per second). Condition of Certification **NOISE-8** (Pile Driving Management) would require public notification of the work and ensure that pile driving is conducted in a manner to reduce the potential for any noise and vibration complaints.

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control estimate that pile driving activities could reach 104 dBA at a distance of 50 feet (86 dBA at a distance of 375 feet). **Noise Table 7** provides the estimated noise impacts on nearby receptors due to pile driving activities.

**Noise Table 7**
**Predicted Pile Driving Noise Levels**

| Daytime ($L_{eq}$) | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Daytime Ambient Noise $L_{eq}$ (dBA)** | **Receptor Distance to Power Block (feet)** | **Pile Driving Noise Unsilenced[a] (dBA)** | **Daytime Cumulative Noise[b] (dBA)** | **Daytime Change[c] (dBA)** |
| **M1** | 55 | 1,500 | 74 | 74 | 19 |
| **M2** | 59 | 2,500 | 70 | 70 | 11 |
| **M3** | 57 | 2,100 | 71 | 71 | 14 |

Source: Staff derived.
Notes:
a. Pile driving is estimated to be 86 dBA at 375 feet (AEC 2015f, Table 5.7-7). Pile driving noise at nearby receptors is calculated using the noise distance logarithm.
b. Cumulative noise is calculated by adding the noise created by pile driving to the daytime ambient noise using the noise addition logarithm.
c. The daytime change is the difference between daytime cumulative noise and daytime ambient noise.

As seen in **Noise Table 7**, the increases in the existing ambient levels at these locations would range 11-19 dBA. These increases confirm that unsilenced pile drivers can cause a significant noise impact at the nearest noise-sensitive receptors. However, several methods are available for reducing noise generated by pile driving. These methods are: (1) the use of pads or impact cushions of plywood; (2) dampened driving, which involves some form of blanket or enclosure around the hammer; and (3) the use of vibratory drivers. These methods can be effective in reducing the noise by 8-15 dBA compared to unsilenced impact drivers.

To ensure that pile driving would be performed in a manner to reduce the potential for any noise complaints, staff proposes Condition of Certification **NOISE-8** (Pile Driving Management). **NOISE-8** also requires the project owner to submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring locations M1, M2, and M3. Also to ensure that pile driving would be limited to daytime hours staff proposes Condition of Certification **NOISE-6** (Construction Noise Restrictions).

### Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (AEC 2015f, Section 5.7.4.2, 5.7.4.3, 5.7.7). To ensure construction workers are, in fact, adequately protected, staff proposes Condition of Certification **NOISE-3** (Employee Noise Control Program).

### Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprise the steam path have accumulated dirt, rust, scale, and construction debris such as slag, weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this from happening, and before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the HRSG or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a "high pressure steam blow", is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

If a traditional, high-pressure steam blow process is used, the applicant has proposed to equip the piping with a temporary silencer that would quite the noise of steam blows to 89 dBA or less, measured at a distance of 50 feet. High pressure steam or air blows, if unsilenced, can typically produce noise levels well above 89 dBA (AEC 2015f, Section 5.7.6.3).

Steam blows could be very disturbing at the nearest noise-sensitive receptors, depending on the frequency, duration, and noise intensity of venting. As shown in **Noise Table 8** below, this silenced steam blow would amount to a range of 56-61 dBA at M1 through M3 with a 2-6 dBA increase over the existing ambient levels at these locations; less than significant.

**Noise Table 8**
**Predicted Steam Blows Noise Levels**

| Daytime ($L_{eq}$) | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Daytime Ambient Noise $L_{eq}$ (dBA)** | **Receptor Distance to Power Block (feet)** | **Daytime Steam Blows Noise[a] (dBA)** | **Daytime Cumulative Noise[b] (dBA)** | **Daytime Change[c] (dBA)** |
| **M1** | 55 | 1,500 | 60 | 61 | 6 |
| **M2** | 59 | 2,500 | 55 | 61 | 2 |
| **M3** | 57 | 2,100 | 57 | 60 | 3 |

Source: Staff derived.
Notes:
a. Steam Blows would be limited to 89 dBA at 50 feet. The noise produced by steam blows at nearby receptors is calculated using the noise distance logarithm.
b. Cumulative noise is calculated by adding the noise created by steam blows at nearby receptors to the daytime ambient noise using the noise addition logarithm.
c. The daytime change is the difference between daytime cumulative noise and daytime ambient noise.

Staff proposes Condition of Certification **NOISE-7** (**Steam Blow Restrictions**) in order to limit steam blow noise to 89 dBA at 50 feet, and to limit this activity to daytime hours.

**Traffic Noise during Construction**

The number of vehicles required for material delivery and worker commute would increase the traffic on the roadway network around the project. Truck trips transporting demolition waste and construction equipment and material deliveries are expected to peak in month 42 when 28 trucks per day (for a total of 56 truck trips per day) would transport construction equipment and materials. Although the truck trips are expected to peak in month 42, the peak traffic generation (workforce and truck trips combined) is expected to occur during month 44, coinciding with peak construction workforce (AEC 2015f, AFC § 5.12.2.1)

The increased traffic is summarized in Table 5.12-8 of the AFC (AEC 2015f, Section 5.12). It was assumed that during the peak traffic month, the estimated number of workers daily round trips would be 1,024 (512 workers x 2 trips per worker = 1,024 total trips) plus 42 truck trips (21 trucks x 2 trips per truck = 42 total trips).

The expected increase in traffic due to construction and demolition activities along the Pacific Coast Highway (PCH) and California State Route 22, which are the main routes that would be utilized for access to the project site, would be no more than 1 percent, which would not measurably increase the existing ambient noise levels in the neighboring communities. Therefore, this noise impact would not be significant.

As discussed in the **Traffic and Transportation** section of this document, the project would include a traffic control plan (TCP) as required by Condition of Certification **TRANS-2**. The TCP would address the movement of workers, vehicles and materials, including arrival and departure schedules and designated workforce and delivery routes. Specifically, it would require any delivery truck(s) or workers that arrive at the site prior to allowable construction start time (7 a.m. on weekdays and 9 a.m. on Saturdays) to be parked on the AEC project site. The TCP would require a parking/staging plan for all phases of project construction and operation to require all project-related parking to be on the AEC project site with the exception of offsite parking related to construction of the wastewater linear (workers and construction equipment).

California Air Resources Board prohibits idling diesel-fueled large trucks (similar to those used to deliver construction materials to the project site) for more than 5 minutes.[4] The longer a noise source is heard, the more adverse impact it would potentially have. A 5-minute limit, as opposed to a longer time limit, or no time limit at all, which may potentially cause a significant effect, is one effective measure to sufficiently reduce the noise impact, while allowing timely delivery of construction material.

In addition, **NOISE-6** would require haul trucks and other engine-powered equipment to be equipped with adequate mufflers and other state-required noise attenuation devices; haul trucks to be operated in accordance with posted speed limits; and truck engine exhaust brake use (jake braking) to be limited to emergencies.

Therefore, with staff’s proposed conditions of certification, project’s traffic-related noise impacts would be less than significant.

[4] http://www.arb.ca.gov/msprog/truck-idling/factsheet.pdf

## Operation Impacts and Mitigation

The primary noise sources of the AEC project, when operational, would include combustion turbine generators, heat recovery steam generators (HRSGs), exhaust stacks, combustion air inlets, air cooled condensers, steam turbine generators, electric transformers, and various pumps and fans. Staff compares the projected project noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

As the first step, the applicant has outlined design measures to control and mitigate noise generated by operational elements of the project. Using a computer-generated noise model,[5] the applicant has modeled operating conditions that include mitigation measures designed to control plant noise (AE 2015f, Section 5.7.4.3). They include:

- Large noise barriers
- Enclosures around major equipment or equipment skids
- Additional or increased silencing
- Lagging or enclosing of the ACC ductwork
- Lagging of high-noise piping
- Steam vent silencers
- Low noise valves
- Low noise fans

### Compliance with LORS

The applicant performed the noise modeling to determine the project's noise impacts on sensitive receptors M1, M2, and M3 (AEC 2015f, Section 5.7.4.3) and to determine whether the project would comply with the applicable LORS limits. The LORS maximum exterior level in District 4 is 70 dBA at the boundary of the district for all times of the day. The LORS maximum exterior level in District 1(predominantly residential with other land use types), which represents M1 and M2, is 50 dBA for daytime (7 a.m. – 10 p.m.) and 45 dBA for nighttime (10 p.m. – 7 a.m.).

If the measured ambient level exceeds what is permissible within any of the first four noise limit categories in Subsection B of Section 8.80.150 of the City of Long Beach Municipal Code, the allowable noise exposure standard shall be increased in five dBA increments in each category as appropriate to encompass or reflect the ambient noise level. The applicable noise limits are provided in **Noise Table 9** below.

[5] CADNA/A noise model, DataKustik GmbH, Munich 1996. Sound propagation factors adopted under ISO standard 9613-2 "Acoustics-Sound Attenuation during Propagation Outdoors"

**Noise Table 9**
**LORS Limits**

| | Daytime | | | Nighttime | | |
|---|---|---|---|---|---|---|
| **Receptor** | **$L_{50}$ Daytime Average dBA** | **LORS Limit Daytime (dBA)** | **Applicable Daytime Noise Limit (dBA)** | **$L_{50}$ Nighttime Average dBA** | **LORS Limit Nighttime (dBA)** | **Applicable Nighttime Noise Limit (dBA)** |
| **M1** | 53 | 50[a] | 55[c] | 51 | 45[a] | 55[c] |
| **M2** | 57 | 50[a] | 60[c] | 52 | 45[a] | 55[c] |
| **M3** | 51 | 70[b] | 70 | 48 | 70[b] | 70 |

Source: AEC 2015f, Appendix 5.7A, and Long Beach Municipal Code § 8.80.160
Notes:
a. Receptors M1 and M2 are located in Long Beach, District 1 and are subject to the limits within that district.
b. Receptor M3 is located in Seal Beach. Therefore, the AEC is subject to the District 4 limits at the District 4 boundary.
c. Because the ambient noise levels already exceed the permissible noise limits, 5 decibel increments are added to encompass or reflect the ambient noise level.

The noise impact results and determination of compliance with applicable LORS are provided in **Noise Table 10** below.

**Noise Table 10**
**Predicted Operational Noise Levels at Sensitive Residential Receptors**

| | Daytime | | | Nighttime | | |
|---|---|---|---|---|---|---|
| **Receptor** | **Plant Noise $L_{50}$ (dBA)** | **Applicable Daytime Noise Limit (dBA)** | **Compliant With Daytime LORS (YES/NO)** | **Plant Noise $L_{50}$ (dBA)** | **Applicable Nighttime Noise Limit (dBA)** | **Compliant With Nighttime LORS (YES/NO)** |
| **M1** | 55 | 55 | YES | 55 | 55 | YES |
| **M2** | 51 | 60 | YES | 51 | 55 | YES |
| **M3** | 53 | 70 | YES | 53 | 70 | YES |

Source: AEC 2015f, Section 5.7, Table 5.7-10.

As shown in **Noise Table 10**, the modeled plant operating noise levels would comply with the respective LORS noise limits at all receptors.

To ensure that the project would comply with the above noise level limits, staff proposes Condition of Certification **NOISE-4** (Operational Noise Restrictions). This condition of certification requires an operational noise survey to ensure project compliance. Similar to construction compliance and in addition to **NOISE-4**, staff proposes Condition of Certification **NOISE-2** (Noise Complaint Process), which would establish a noise complaint process requiring the applicant to resolve any problems that may be caused by operational noise.

With implementation of these conditions of certification, noise due to project operation would comply with the applicable LORS.

## CEQA Impacts

Power plant noise is unique. A power plant under base load may operate essentially, as a steady, continuous, broadband noise source. Under load following duty, the power plant noise may be intermittent and start-up at random times for a system designed as load follower. This would be more noticeable at nighttime when background noises are particularly low. Where power plant noise is audible, it tends to define the background noise level. For this reason, and because power plant operational noise is steady in nature (as opposed to the intermittent and variable nature of noise from construction), staff typically compares projected power plant noise to existing ambient background ($L_{90}$) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

In many cases, a power plant operates around the clock for much of the year. AEC is expected to operate as an intermediate load and peaking facility, and it could likely operate at night, which could affect nearby residences if the noise impacts are left unmitigated. For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when people are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels and differences in background noise levels of 5 to 10 dBA are common. Staff determined it is prudent to average the nighttime hourly background noise levels in terms of the $L_{90}$ metric, which exceeds measured noise 90 percent of the time, to arrive at a reasonable baseline for comparison with the project's predicted noise level. Using this comparison, adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors.

The applicant has predicted operational noise levels by modeling the plant operation, which is summarized in **Noise Table 11** for receptors M1, M2, and M3.

**Noise Table 11**
**Predicted Operational Noise Levels at Sensitive Residential Receptors**

| Receptor | Plant Noise $L_{50}$ (dBA) | Measured Ambient Nighttime Avg $L_{90}$ (dBA) | Cumulative Nighttime Noise Level (dBA) | Change in Nighttime Ambient (dB) |
|---|---|---|---|---|
| **M1** | 55 | 50 | 56 | 6 |
| **M2** | 51 | 48 | 53 | 5 |
| **M3** | 53 | 47 | 54 | 7 |

Source: AEC 2015f, Section 5.7, Table 5.7-10 and Appendix 5.7A, Tables 5.7A-1 through 5.7A-3.

As described in the Methods and Thresholds for Determining Significance section, an increase of above 5 dBA could be either significant or less than significant depending upon the circumstances of a particular case. As shown in **Noise Table 11** the change in nighttime ambient noise at receptors M1 and M3 would be 6 dBA and 7 dBA, respectively. However, staff does not expect AEC to cause a significant impact partly because it would replace an existing noise source, the existing AGS facility. In fact, AEC could create lower noise levels than AGS since it would consist of newer, more modern equipment that would replace the older AGS facility.

Furthermore, with the operation of the recently repowered Haynes Generating Station, which is located between AEC and receptor M3, the noise limits specified in **NOISE-4** of the PSA, which are slightly lower than the limits in **NOISE-4** of this FSA, could be difficult to meet due to the Haynes Generating Station's contribution to baseline levels.

Thus, staff considers the AEC's noise levels of 55 dBA at M1, 51 dBA at M2, and 53 dBA at M3 to create a less-than-significant impact although they are slightly higher than those required in the PSA.

Staff proposes Condition of Certification **NOISE-4** (Operational Noise Restrictions) to ensure that the changes in noise levels due to project operation would neither cause the cumulative effect of operational noise to exceed the LORS limits nor cause a significant impact at the nearest sensitive receptors. **NOISE-4** requires an operational noise survey to ensure this, when the plant achieves a minimum of 85 percent of its rated capacity (between 85 and 100 percent of the rated capacity, the change in the overall plant noise would not be measurable at the project's noise sensitive receptors).

### Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (AEC 2015f, Section 5.7.4.3.).

High pressure steam released directly into the atmosphere has the potential to cause annoying tonal noise. Releasing steam directly into the atmosphere while stepping down electric generation would not occur in the same fashion as the existing boiler systems operating at Alamitos Generating Station. In modern combined cycle power plants, such as the proposed AEC, flash tanks and direct condenser bypass are used to condense the excess steam to liquid condensate instead of direct steam release.

To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

### Linear Facilities

All water pipes and gas pipes would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

### Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of power plant consist of high-speed gas turbines and steam turbines, HRSGs, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Power plants operating under Energy Commission jurisdiction have not resulted in ground-borne or airborne vibration impacts. Staff agrees with the applicant that ground-borne vibration from the AEC project would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The AEC's chief source of airborne vibration would be the gas turbines' exhaust. In a modern power plant such as the proposed AEC, however, the exhaust must pass through the selective catalytic reduction (SCR) modules and the HRSG stack silencers before it reaches the atmosphere. The SCRs act as efficient mufflers. The combination of SCR units and stack silencers ensure that AEC would not cause perceptible airborne vibration effects.

### Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (AEC 2015f, Section 5.7.4.3). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, staff proposes Condition of Certification **NOISE-5**. For further discussion of proposed worker safety conditions of certification, please see **Worker Safety and Fire Protection** section of this document.

## CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code of Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts (from existing and/or reasonably foreseeable projects) that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but do not need to provide as much detail as the discussion of impacts solely attributable to the project.

Staff has compiled a list of 54 projects which are, by proximity (approximate nine-mile radius), size and possible construction schedule, candidates for consideration with AEC for cumulative effect. Because of the effect of noise propagation, and population and terrain in the project area, staff concludes that generated noise would only have a measureable impact within one mile of the project site. This reduces the perspective projects to five:

1. Demolition of existing AGS Units 1-6: The project would consist of demolishing existing AGS Units 1-6 once construction of the AEC has been completed and operation of the new facility has commenced. The existing units range in distance from 0.06 to 0.24 miles from the proposed AEC.

2. Los Cerritos Wetlands Conceptual Restoration Plan & Mitigation Bank: Synergy intends to establish a mitigation bank & wetlands habitat restoration area on the Synergy Oil Field. The project would include removing existing oil wells from the wetland habitat restoration area and drilling new wells on a 5-acre site that would be obtained from the Los Cerritos Wetlands Authority (LCWA). The project would be located approximately 0.22 miles from the proposed AEC site.

3. AES Recharge Battery Building: The proposed project would consist of three 44,550 square foot power storage facilities, located approximately 0.25 miles from the proposed AEC.

4. Alamitos Barrier Improvement Project: The proposed project involves the construction and operation of up to 20 injection wells, 4 monitoring wells and 4 piezometers along the Alamitos Barrier within the city of Seal Beach to help minimize saltwater intrusion into the Orange County Groundwater Basin. The project would be located approximately 0.40 miles from the proposed AEC.

5. Los Angeles Department of Water and Power Haynes Generating Station: The proposed project would consist of the addition of six General Electric LMS100 simple-cycle gas turbines and two emergency diesel-powered generators. The project would be located approximately 0.64 miles from the AEC site.

**Demolition of Existing AGS Units 1-6**

According to an MOU with the city, existing AGS Units 1-6 would be demolished once construction of the AEC has been completed and operation of the new facility has commenced. Although noise impacts on nearby residential receptors from the demolition of existing Units 1-6 may be higher than the noise impacts evaluated as part of construction of the AEC due to the fact that the existing units are located closer to residential receptors, the cumulative impacts are expected to be similar between the two phases evaluated. That is, the cumulative noise impacts from construction of the AEC with concurrent operation of the existing AGS, is expected to be similar to demolition of the existing AGS with concurrent operation of the AEC.

This is because construction and demolition activities are assumed to consist of similar types and quantities of noise generating equipment and therefore result in similar noise impacts. While construction/demolition of one facility would occur, it is assumed concurrent operation of the second would occur, and vice versa. Because all construction/demolition and concurrent operation would occur within the same project boundary, the cumulative impacts from both projects are expected to be similar, and therefore less than significant as determined by this staff assessment.

### Los Cerritos Wetlands Conceptual Restoration Plan & Mitigation Bank

Synergy and the LCWA wish to enter into a non-binding agreement that provides for the exchange of each party's respective properties. As part of the exchange, Synergy intends to establish a mitigation bank on the northerly approximately 76-acres of the 156-acre Synergy Oil Field. It intends to implement a wetlands habitat restoration plan on the southerly approximately 72-acres of the Synergy Oil Field. It also intends to construct public access improvements, such as trails and a parking lot on existing disturbed areas, and convert an existing building for use as a visitor's center, within approximately 4-acres of the Synergy Oil Field. The project would be located approximately 0.22 miles from the proposed AEC site.

As part of the restoration of the southerly approximately 76-acres, Synergy intends to remove, over time, approximately 58 oil wells from the Synergy Oil Field and would conduct its oil production activities at the 5-acre LCWA site that would be obtained in the exchange. Synergy would also conduct oil production activities from a second off-site location unaffiliated with LCWA.

Synergy has requested the preparation of an environmental impact report pursuant to CEQA by the City of Long Beach. Synergy and LCWA do not intend to be legally bound to consummate the property exchange until the agreement is executed by the parties following any required CEQA review, including any required public hearings.

Because the Los Cerritos Wetlands Conceptual Restoration Plan & Mitigation Bank has not yet entered the EIR phase, a potential construction schedule has not been provided. It is uncertain whether there would be an overlap in construction activities between the Los Cerritos Wetlands Conceptual Restoration Plan & Mitigation Bank and the AEC, and if so, what activities would occur. It is also unclear if there would be any potential for an overlap of operational noise impacts. As part of the CEQA review, the City of Long Beach would evaluate any potential noise and vibration impacts, including cumulative impacts, and require necessary mitigation to reduce the proposed project's impacts to a level of less than significant.

### AES Battery Energy Storage System (BESS)

The BESS project would include three 100-MW containment buildings, constructed in sequential phases from east to west. Each building would be 50-feet tall, 270-feet long, and 165-feet wide (44,550 square feet). Each energy storage building would contain two battery storage levels, electrical controls, & HVAC units. Construction of the proposed BESS is expected to start the third quarter of 2019, after major mechanical completion of the AEC CCGT power block. Completion of the first 100-MW building is planned for late 2020. The second and third energy storage buildings are expected to be constructed and operational in 2021 and 2022, respectively.

A conceptual site plan has been submitted to the City of Long Beach. However, the proposed project is still in the entitlement process. The city anticipates receiving revised open space, landscape, & parking plans. City staff expects to consider the AEC proposal together with the BESS to assess consistency with city development requirements.

Because the BESS has not yet entered the EIR phase, it is uncertain what construction activities, if any, would occur concurrently between the BESS and the AEC. It is also unclear if there would be any potential for an overlap of operational noise impacts. As part of the CEQA review, the City of Long Beach would evaluate any potential noise and vibration impacts, including cumulative impacts.

**Alamitos Barrier Improvement Project**

The Alamitos Barrier currently consists of 41 injection wells, 221 active monitoring wells, and four inactive extraction wells. The injection wells are on a continuous 24-hour operation to prevent seawater from migrating into deeper potable aquifers of the Central Basin in Los Angeles County and the Orange County Groundwater Basin. The proposed improvement project would add up to 20 injection wells, 4 monitoring wells and 4 piezometers along the Alamitos Barrier within the city of Seal Beach to help minimize saltwater intrusion. A Final Environmental Impact Report (EIR) has been completed for the Orange County Water District for the Alamitos Barrier Improvement Project that highlights expected noise impacts during construction and operation and the recommended mitigation for such impacts (OCWD 2013).

**Operation**

The proposed injection wells would operate continuously 24 hours a day, seven days per week. All of the injection and monitoring wells would be housed in underground vaults. The operation of the wells would not increase existing noise levels in the project area (OCWD 2013, Section 3, p. 135) and would therefore not have a significant cumulative impact with the AEC project.

**Construction**

Construction of the proposed project would occur just west of the Los Alamitos Channel north of 2nd Street. The injection wells and monitoring wells would require approximately 4 days each of continuous 24-hour drilling. Construction impacts for each group of similar well sites have been analyzed in the EIR. Where possible significant impacts are shown, mitigation is being proposed to reduce the impacts to a level of less than significant. Mitigation measures that would be required include: 1) utilizing temporary noise barriers to reduce noise impacts throughout the project site; 2) providing written notification to nearby residents about construction activities; and 3) utilizing construction equipment that contains noise reduction features.

The EIR has identified that even with the implementation of proposed mitigation measures, potential noise impacts above existing noise standards at some of the injection and monitoring wells could occur. Due to the need for 24-hour drilling, a majority of the impacts occur at nighttime when construction activities are not exempt from noise standards. **NOISE-6** would limit heavy equipment operation and noisy construction and demolition work at the AEC project site to daytime hours.

### Los Angeles Department of Water and Power Haynes Generating Station

Haynes Generating Station, which is located approximately 0.64 miles from the AEC site, is a natural gas and steam power plant located in the city of Long Beach that was built in the mid-1960s. In 2005, LADWP repowered Units 3 and 4 utilizing combined-cycle technology. (Repowering is a common term among electric utilities that refers to rebuilding power plants by taking an old generating unit out of commission, dismantling it, and building a new, modern one at the same site.) Units 5 and 6 were repowered in 2013. And Units 1 and 2 are expected to be repowered in 2023.

The repowering of the remaining units at the Haynes Generating Station may increase the future ambient noise levels in the area, but with its sufficient noise mitigation measures proposed below, **NOISE-1** through **NOISE-8**, the AEC's impacts would be sufficiently minimized..

## FACILITY CLOSURE

All operational noise from the project would cease when the AEC project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original demolition and construction, it could be similarly treated -- that is, noisy work could be performed during daytime hours with machinery and equipment that are properly insulated and/or equipped with mufflers. Any noise LORS in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply to facility closure, unless modified by a Petition to Amend.

## RESPONSE TO PSA COMMENTS

The following are the comments staff received on the PSA in the area of **Noise and Vibration** and the staff's responses to those comments.

## APPLICANT: AES ALAMITOS ENERGY, LLC (AES) (TN: 212487)

## Long Beach Noise Ordinance

**Comment:** *Page 4.7-3, Noise Table 1 – Staff's Noise Table 1 does not include the following additional detail (refer to SAFC Table 5.7-13):*

- *If the measured ambient noise level at a receptor exceeds the levels presented in Noise Table 1 or the levels with the time characteristic corrections, the allowable standard is increased in 5 decibel (dB) increments to encompass or reflect such ambient noise. (Long Beach Noise Ordinance 8.80.150(C))*
- *If the measurement location is on a boundary between two different districts, the noise level limit applicable shall be the arithmetic mean of the two districts. (Long Beach Noise Ordinance 8.80.150(D))*

- *In the event the noise contains a steady audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting or contains music or speech conveying informational content, the standards are reduced by 5 A weighted decibels (dBA). (Long Beach Noise Ordinance 8.80.160)*

**Response:** Staff agrees with this comment and has added the additional language to **Noise Table 1** and Operation Impacts and Mitigation, Compliance with LORS. Note that audible tone, or tonal noise, is defined in **Noise Table A1** (bottom row defining pure tone) below, and that this definition is consistent with Long Beach Ordinance 8.80.160

## Applicability of Seal Beach Noise Ordinance

**Comment:** *Page 4.7-4, Noise Table 1 – Staff's Noise Table 1 includes the City of Seal Beach under the heading "Applicable Law". The Applicant notes that, while staff may review or refer to adjacent jurisdictions' regulations, they are not "applicable" as no part of the project resides within the boundary of the city of Seal Beach. Additionally, if Staff are going to include reference to the City of Seal Beach Municipal Code, they should also include Section 7.15.015(C), which states that in the event the ambient noise levels exceed either of the first four noise limit categories [items 1 through 4 in Staff's Noise Table 1], the cumulative period applicable to such category shall be increased to reflect that ambient level. Furthermore, in the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under that category will be increased to reflect the maximum ambient noise level.*

**Response:** Staff agrees with this comment and has removed the Seal Beach Municipal Code from **Noise Table 1** and the Compliance with LORS assessment.

## Noise Limits by Receiving Land Use Districts

**Comment:** *Page 4.7-6, City of Long Beach LORS – Staff are correct that AEC is located within District 4 and the District 4 limit is 70 dBA. The Applicant notes that this limit applies at the boundary of District 4. With respect to the residences located in District 1, the District 1 limits are not applicable to AEC as AEC is not located in District 1. While not strictly applicable, the project will comply with the average of the District 4 and 1 limits (58 dBA during the night and 60 dBA during the day) at the residences (consistent with Long Beach Noise Ordinance, 8.80.150(D) referred to above). Staff's current analysis also does not incorporate Long Beach Noise Ordinance, 8.80.150(C).*

**Response:** Staff agrees that AEC would be located within District 4 and would therefore be subject to the 70 dBA limit at the District 4 boundary. However, staff does not agree that the District 1 limits are not also applicable to the project. Noise Ordinance, 8.80.150(B) – Exterior noise limits – Sound levels by receiving land use districts, states;

"*No person shall operate or cause to be operated any source of sound at any location within the incorporated limits of the City or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which cause the noise level when measured from any other property, either incorporated or unincorporated, to exceed the noise standard for that land use district as specified in Table A in Section 8.80.160…"*

This means that although AEC would be located within District 4, the facility could not cause the noise level when measured from within the District 1 boundary, to exceed the District 1 noise limits.

Furthermore, staff does not agree that the project would be subject to the average of the District 4 and 1 limit, unless the measurements were being taken on the boundary between these two districts. Noise Ordinance, 8.80.150(D), states;

> "If the measurement location is on a boundary between two (2) different districts, the noise level limit applicable shall be the arithmetic mean of the two (2) districts."

The monitoring locations presented in the AFC (e.g., M1 and M2) are located within District 1 (predominately residential with other land use types also present) and are not located on the boundary between District 1 and 4, so the District 1 noise limits would apply when project noise is measured within District 1.

On August 10, 2016, staff discussed the applicability of the City of Long Beach Municipal Code sections 8.80.150 (Exterior noise limits—Sound levels by receiving land use district) and 8.80.160 (Exterior noise limits—Correction for character of sound) to the AEC with the Noise Control Officer for the City of Long Beach (TN: 212790). The city agreed with staff, that the project would not be allowed to cause the noise level, when measured within District 1, to exceed the noise limits for land use District 1, and that the District 1 limits are applicable to AEC when its noise levels are measured within District 1.

Staff has added language in this FSA describing Noise Ordinance 8.80.150(C) and has applied the associated noise limits accordingly to the Compliance with LORS assessment under Operation Impacts and Mitigation.

## Seal Beach Noise Ordinance

**Comment:** *Page 4.7-6, City of Seal Beach LORS – Staff may choose to summarize the City of Seal Beach's regulations, but the Applicant notes that these are not the applicable regulations for AEC. In addition, the summary should reflect the complete ordinance, including Section 7.15.015(C).*

**Response:** Staff agrees with this comment and has removed the discussion of Seal Beach regulations in this FSA.

## CEQA Impact Analysis for Construction

**Comment:** *Page 4.7-13, CEQA Impacts – Staff's construction noise analysis implies that a cumulative 5 dBA increase is a firm fixed or absolute California Environmental Quality Act (CEQA) criteria. The Applicant is unaware of bright line threshold having been adopted and notes that Staff is correct that LORS do not limit sound levels from construction activities. In addition, Staff uses the average existing sound level as the Daytime Ambient Level in Noise Table 5 and does not consider that existing $L_{eq}$'s were as high as 76 dBA at M1, 65 dBA at M2, and 70 dBA at M3. In addition, while not applicable, but for context and comparison to the operational limits established for District 4 of 70 dBA, it is noted that the majority of construction/demolition activities are* *setback further than 375 feet from the boundary. That is, construction/demolition activities are likely in substantial compliance with the operational sound limit established for District 4 of 70 dBA. The Applicant recommends that Staff reconsider their assessment of a potentially significant impact at M1 and suggest that, at times Staff may wish to identify the potential increase as substantial, it is not significant nor adverse in a manner that requires mitigation.*

**Response:** The Methods and Thresholds for Determining Significance section explains that noise due to construction activities is usually considered to be less than significant in terms of CEQA compliance if the construction activity is temporary; and the use of heavy equipment and noisy activities is limited to daytime hours.

In this case, demolition/construction activities are expected to last approximately five years. Staff does not consider an increase in background noise levels for a period of five years to be temporary. So staff evaluated the construction noise impacts consistent with item 3 (substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project) of the Methods and Thresholds for Determining Significance section.

The comment is correct in that the 5 dBA threshold used by staff has not been adopted by the agency or incorporated into the CEQA guidelines. As noted in the discussion on thresholds of significance, increments of 5 dBA have been used by staff because a change in background noise levels of at least 5 dBA is required before any noticeable change in community response would be expected.

Staff, in applying Item 3 to the analysis of this and other power plant projects, concludes that an increase in background noise levels up to and including 5 dBA is less than significant, and an increase of above 5 dBA could be either significant or less than significant depending upon the circumstances of a particular case. One of the considerations is the duration and frequency of occurrence of the noise; the other is whether noise is created during the day or at night. Since the bulk of the construction noise would occur during the daytime, staff does not consider an increase of 5 dBA, due to construction, to be a significant impact. To ensure that noise impacts due to construction remain less-than-significant, staff has proposed Condition of Certification **Noise-6**.

## Nighttime Concrete Pouring Activities

**Comment:** *Page 4.7-15, Nighttime Concrete Pouring Activities – Staff's analysis of nighttime concrete pours does not identify a potentially significant impact yet Condition* ***NOISE-9*** *imposes a set of specific conditions and threshold for this activity. The Applicant notes that Conditions* ***NOISE-1*** *and* ***NOISE-2*** *provide effective means to address potential noise concerns during construction. It is unclear why Condition* ***NOISE-9*** *is required, particularly as this short-term construction activity is likely to comply with the operational sound limit established for District 4 of 70 dBA and existing nighttime levels exceed those identified for concrete pouring.*

**Response:** Based on comments staff has removed **NOISE-9** and agrees that **NOISE-1** and **NOISE-2** along with the addition of applicant's proposed language to **NOISE-6** will adequately address staff's findings that while a significant noise impact during nighttime concrete pouring is unlikely, it's imperative to ensure that any nighttime work does not disrupt the surrounding residential communities when they are asleep. The conditions of certification ensure this work is conducted in a manner to reduce the potential for complaints as much as possible. Therefore, the mitigation measures and procedural requirements outlined in the revised **NOISE-6**, in addition to **NOISE-1** and **NOISE-2** would ensure a less-than-significant impact during the short term nighttime concrete pouring activities.

## Vibration

**Comment:** *Page 4.7-16, Vibration – Staff do not identify that pile driving is likely to generate substantial levels of vibration at residences, yet impose a specific vibration threshold in Condition **NOISE-8**.*

**Response:** Staff does believe that pile driving activities are very unlikely to generate substantial levels of vibration due to their distances to noise-sensitive receptors and that, the mitigation measures and procedural requirements outlined in **NOISE-1**, **NOISE-2**, and **NOISE-8** would ensure less than significant impacts during the short term pile driving activities. Thus, staff has removed the specific peak particle velocity limit, as it is unnecessary.

## Long Beach Noise Ordinance, 8.80.150(C)

**Comment:** *Page 4.7-20, Compliance with LORS, last paragraph – This text should be revised to reflect Long Beach Noise Ordinance, 8.80.150(C), which states that "If the measured ambient noise level at a receptor exceeds the levels presented …. or the levels with the time characteristic corrections, the allowable standard is increased in 5 dB increments to encompass or reflect such ambient noise."*

*The adjusted limits result in the predicted levels at M1 and M2 of 55 and 51, respectively, complying with Long Beach's District 1 limits had they been applicable. Note that they are not applicable as the facility is located in District 4 and the District 4 limit of 70 dBA at the district boundary is the applicable LORS.*

**Response:** Staff agrees that if the measured ambient level exceeds that permissible within any of the first four noise limit categories in Long Beach Noise Ordinance Section 8.80.160, the allowable noise exposure standard shall be increased in five decibels increments in each category as appropriate to encompass or reflect the ambient noise level. Staff has applied Long Beach Noise Ordinance, 8.80.150(C) to its evaluation of operational compliance with LORS. However, staff disagrees that the District 1 limits are not also applicable to the project (see response to comment for Noise Limits by Receiving Land Use Districts above). The applicable noise limits are described in the Compliance with LORS section and discussed in more detail in **Noise Table 9**.

## CEQA Impact Analysis for Operation

**Comment:** *Page 4.7-22, CEQA Impacts – Staff's CEQA analysis is based on applying a firm threshold of 5 dBA, which is applied on a cumulative basis, thus really only allowing a 4 dBA differential; their baseline uses the average measured 4-hour $L_{90}$. While Staff's approach with respect to $L_{90}$ as the basis of CEQA may be debated, what is most challenging in this analysis is that it does not account for the variability in existing sound levels. When this variability is taken into consideration, the existing ambient measurements exceed Staff's CEQA threshold on at least one night and the "allowable" increase is substantially reduced on other nights. Thus the project is potentially non-compliant even before construction commences. For example, the minimum 4-hour $L_{90}$ at M2 was 51 dBA on August 23rd, which exceeds the average baseline selected by staff of 45 dBA by more than 5 dBA. Given this, it would appear appropriate to either adjust the baseline values to reflect the maximum of the 4-hour minimum $L_{90}$s and/or utilize the more typical and broader range of between 5 and 10 dBA being potentially less than significant. The table below summarizes the minimum 4-hour $L_{90}$s for reference.*

| ***Receptor*** | ***Description*** | ***Min 4-hour Average $L_{90}$*** | |
|---|---|---|---|
| | | ***Max*** | ***Avg*** |
| *M1* | *Residence at 6333 Eliot Street, Long Beach* | *51* | *49* |
| *M2* | *Residence at 6810 East Septimo Street, Long Beach* | *51* | *45* |
| *M3* | *Residence at the intersection of El Durado Drive and Nassau Drive, Seal Beach* | *47* | *46* |

*For additional context, it is also likely helpful to consider that the LADWP Haynes Generating Station is located between AEC and M3. The most recent Environmental Impact Report (EIR) for Haynes repower project identified 65 dBA as the appropriate threshold and the facility impact of over 60 dBA was noted to be less than significant in the draft and final EIR.*

**Response:** Staff agrees that the variability in existing ambient noise levels could make it difficult to comply with the limits in **NOISE-4** of the PSA. However, staff pointed out at the Preliminary Staff Assessment Workshop on August 9, 2016 that the maximum of the minimum 4-hour average $L_{90}$ value presented in the table above at receptor M2 was based on a miscalculation (the maximum is actually about 47 dBA). The applicant agreed and in its Summary of PSA Workshop and Supplemental Comments (TN: 212771), the applicant stated, "The calculations for 4-hour $L_{90}$ background levels presented in AES's PSA comments will be provided by August 17, 2016." However, staff never received this data.

Nonetheless, staff considered the variability in existing ambient noise levels in this FSA. Staff found that the maximum of the minimum 4-hour average $L_{90}$ measurements is about 2 dBA higher at each receptor than the minimum 4-hour average $L_{90}$ value calculated over the range of data. Due to this variability, staff found it appropriate to use the average of the nighttime $L_{90}$ values (10 p.m. to 7 a.m.), which result in baseline values of 50 dBA, 48 dBA, and 47 dBA at receptors M1, M2, and M3, respectively, instead of 49 dBA, 45 dBA, and 46 dBA at M1, M2, and M3, respectively, based on the minimum 4-hour average.

Furthermore, with the operation of the recently repowered Haynes Generating Station, which is located between AEC and receptor M3, the noise limits specified in **NOISE-4** of the PSA, which are slightly lower than the limits in **NOISE-4** of this FSA, could be difficult to meet due to the Haynes Generating Station's contribution to baseline levels.

Under the CEQA Impact analysis, staff considered the variability of existing noise levels, operation of the recently repowered Haynes Generating Station, and the fact the AEC would be replacing an existing noise source (the existing AGS), and based on these considerations staff determined that, AEC would not result in significant impacts.

## Noise-4

**Comment:** *Page 4.7-31, Condition **NOISE-4** – AES proposes revisions to Condition **NOISE-4**. This revision would increase the noise limits presented in **NOISE-4** to match the projects modeled noise impacts.*

**Response:** Staff agrees that with the proposed limits the facility would comply with all LORS and would result in less-than-significant impacts (as discussed in more detail in the Compliance with LORS section and CEQA Impacts section). Staff has made the proposed changes to Condition of Certification **NOISE-4**.

## Noise-6

**Comment:** *Page 4.7-33, Condition **NOISE-6** – AES proposes revisions to Condition **NOISE-6**.*

**Response:** Staff agrees with the proposed revisions to **Noise-6**. The revised language consolidates some of the mitigation and procedural requirements for construction activities. The revised language in **NOISE-6** also serves the same purpose intended by the staff's originally-proposed **NOISE-9**; that is, ensuring that any nighttime work is conducted in a manner to reduce the potential for complaints as much as possible.

## Noise-8

**Comment:** *Page 4.7-33, Condition **NOISE-8** – AES proposes revisions to Condition **NOISE-8**. This revision consists of removing the specific peak particle velocity limit and adding a requirement to report the projected peak particle velocity to the CPM prior to commencement of pile driving*

**Response:** Staff agrees with these proposed revisions and has revised **NOISE-8** accordingly. Pile driving activities are not likely to generate substantial levels of vibration and the mitigation measures and procedural requirements outlined in **NOISE-1**, **NOISE-2**, and the revised **NOISE-8** would ensure less than significant impacts during the short term, pile driving activities.

## Noise-9

**Comment:** *Page 4.7-34, Condition **NOISE-9** – AES recommends that Condition **NOISE-9** be removed in its entirety.*

**Response:** Staff agrees with the deletion of **NOISE-9,** as the addition of the applicant's language to **NOISE-6** serves the same purpose of avoiding the creation of excessive noise as intended by the staff's originally-proposed **NOISE-9**. The mitigation measures and procedural requirements outlined in **NOISE-1**, **NOISE-2**, and the revised **NOISE-6** would ensure less than significant impacts during the short term, nighttime concrete pouring activities.

# PUBLIC: IVAN ROSON (TN: 212722)

## Noise Monitoring Locations

**Comment:** *The Noise evaluation and impact has been limited to 3 addresses (north, east and west of the plant). I live in the Island Village community to the south of the plant and I propose another address in this neighboring community be added to this study, Windjammer Ct. and Seawind Dr. in Long Beach, CA.*

**Response:** The monitoring locations in the AFC (Application for Certification) represent the three closest communities to the proposed project site. As explained in this analysis, the M1 monitoring location (Residence at 6333 Eliot Street, Long Beach) is located approximately 1,500 feet from proposed construction and operational activities at the AEC. The M2 monitoring location (Residence at 6810 East Septimo Street, Long Beach) would be located approximately 2,500 feet and M3 (Residence at the intersection of El Dorado Drive and Nassau Drive, Seal Beach) would be located approximately 2,100 feet from any construction and operational noise activities at the AEC.

The Island Village community to the south of the AEC is located approximately 3,500 feet from the proposed construction and operational activities at the AEC, much further than the other three monitoring locations. It is expected that if the plant complies with the noise limits in Condition of Certification **NOISE-4** at the closer monitoring receptors, then the facility should not substantially increase the ambient noise in the Island Village community and should comply with the Long Beach Noise Ordinances within this community. Therefore, it is not necessary to also include a noise monitoring location south of the plant.

## PUBLIC: DAVE SHUKLA (TN: 212781)

### Ambient Noise Monitoring Data

**Comment:** *As one of the homes used for noise monitoring to determine a baseline back in 2011, I personally am in favor of increased noise monitoring to better establish the baselines of background noise - particularly in conjunction with other public works and infrastructure projects in the area active at night and at day.*

*I do not think the collected 2011 data adequately reflects current ambient and generated noise, nor concerns tri-level and multi-story home owners in the University Park Estates neighborhood and elsewhere have about operations noise, given how much louder sounds are for them generally on above-ground levels. As you may know, the OCTA expansion of the 405 south of Long Beach has impacted Studebaker Rd. significantly, including at night, in recent years.*

*As such, I have been in contact with AES staff regarding future noise monitoring from our backyard, for either longer durations or multiple periods than the one straight week recorded in August of 2011. For instance, multiple periods of 24hrs/day for 14 days straight, or even 28 days straight - to gather sufficient data, better establish a baseline, and provide greater insight into how newly proposed facilities perform comparatively.*

> **Response:** Staff's Noise and Vibration Data Request #150 asked the applicant to provide justification for using ambient noise monitoring data from August 2011 as representative for current conditions at each monitoring location. Additionally, in this data request staff asked the applicant to explain whether there have been any changes to the surrounding area since 2011 that could potentially affect the current ambient noise (TN: 207013).
>
> In its response, the applicant stated that the only change in the surrounding area since 2011 was the construction and operation of six General Electric LMS100 simple-cycle combustion turbines at the adjacent Haynes Generating Station. The introduction of new noise sources such as the combustion turbines at the Haynes Generating Station and the expansion of the 405, as noted in your comment above, are expected to increase the ambient noise levels which results in a conservative analysis. Based on the staff's current analysis and the use of the lower baseline (the 2011 survey) the project would be required to comply with noise limitations based on quieter ambient conditions. A new survey as requested by Mr. Shukla would account for the new noise sources in the area and thus would increase the project's permissible noise limits specified in **NOISE-4**; it would allow AEC to create more noise not less.

Additionally, staff does not require the applicant to perform additional noise monitoring data for purposes of gaining greater insight into how newly proposed facilities perform comparatively with existing facilities. Staff did not perform a comparative analysis, but rather analyzed the proposed project's impacts to determine whether the proposed project would comply with all laws, ordinances, regulations, and standards, and whether it would result in less-than-significant impacts under CEQA. The survey was performed for a sufficiently long period of time (continuously for a period of 7-9 days and nights); a longer period of time would not be necessary. Normally, a continuous 25-hour survey is sufficient to establish ambient baselines.

## Noise Monitoring Locations

**Comment:** *I support Ivan Roson's proposal to add a noise monitoring station to the south of the current AGS in the Island Village sub-division. I respectfully suggest that CEC Staff preparing the Final Staff Assessment of the Application for Certification on the Alamitos Energy Center incorporate new data and findings from an expanded and up-to-date measurement set.*

**Response:** Please see response to Ivan Rosen's comment regarding noise monitoring locations above.

## Construction Noise Impacts

**Comment:** *Noise is a real concern. Especially if an expedited construction schedule is set to begin in early 2017. Night construction activities, especially concrete pouring, will have a noticeable and demonstrable effect on nearby neighborhoods. I respectfully suggest that Staff re-evaluate how optimistic their assessment is of these impacts – most of which in the Preliminary Staff Assessment assumes the most modern equipment and techniques, and the most aggressive of noise abatement efforts. In an expedited [or] compressed construction timeline, these assumptions may not be obtained.*

**Response:** Although construction activities are exempt from noise limits as specified by the City of Long Beach Noise Ordinance 8.80.202, staff has proposed Conditions of Certification **NOISE-1**, **NOISE-2**, **NOISE-6**, and **NOISE-8** to ensure that the construction noise related impacts are less than significant. **NOISE-1** and **NOISE-2** would establish a public notification and complaint process. **NOISE-6** would require updating construction equipment and trucks, acoustic barriers, reorienting equipment, and relocating construction staging areas when possible to reduce the noise. Additionally, **NOISE-6** would require the project owner to submit a request to the CPM for review and approval for any heavy equipment operation or noisy construction activities that would occur outside the allowable daytime hours listed in section 8.80.202.

The request would specify the activities that need to occur outside of the restricted days and times set forth; the need for such activities; the days, dates, and times during which these activities would occur; the approximate distance of activities to residential and other sensitive receptors; the expected sound levels at these receptors; and a statement that the activities would be performed in a manner to ensure excessive noise is prohibited as much as practicable. The project owner would notify the residents and property owners within one-half mile of the project site of the request. In this notification, the project owner would state that it will perform this activity in a manner to ensure excessive noise is prohibited as much as practicable.

The procedures and mitigation measures described in these conditions of certification have been sufficiently effective in reducing or eliminating construction noise impacts for past power plant projects in similar urban and suburban settings as the AEC project area and staff believes they would be equally effective for this project.

## CONCLUSIONS

If built and operated in conformance with the proposed conditions of certification, it is staff's position that AEC would comply with all applicable noise and vibration LORS. Staff concludes that the project would produce no significant adverse noise impacts under CEQA guidelines on people within the project area, including the minority populations, directly, indirectly, or cumulatively.

Staff recommends conditions of certification addressing worker and employee protection (**NOISE-3**, Employee Noise Control Program, and **NOISE-5**, Occupational Noise Survey), measurement and verification that noise performance criteria are met at project's noise-sensitive residential receptors (**NOISE-4**, Operational Noise Restrictions), restrictions on construction activities (**NOISE- 6**, Construction Noise Restrictions, **NOISE-7**, Steam Blow Restrictions, and **NOISE-8**, Pile Drive Management). Finally, **NOISE-1** (Public Notification Process) and **NOISE-2** (Noise Complaint Process) describe the process of complaint investigation and resolution.

Regarding the staff's retention of responsibility to monitor the enforcement of these conditions of certification, staff works under the authority of the CPM to monitor and review the reporting of plant performance during construction and the full term of operation, including facility closure.

## PROPOSED CONDITIONS OF CERTIFICATION

## PUBLIC NOTIFICATION PROCESS

**NOISE-1** Prior to the start of ground disturbance, the project owner shall notify all residents within one mile of the project site and one-half mile of the linear facilities, by mail, or by other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction demolition, and operation of the project. If the telephone is not staffed 24 hours a day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This or a similarly effective telephone number shall be posted at the project site during construction where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

**Verification:** At least 15 days prior to ground disturbance, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

## NOISE COMPLAINT PROCESS

**NOISE-2** Throughout the construction, demolition, and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints[6]. The project owner or its authorized agent shall:

- use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to the noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant that states that the noise problem has been resolved to the complainant's satisfaction.

[6] A project-related noise complaint is a complaint about noise that is caused by the AEC project as opposed to another source and may constitute a violation by the project of any noise condition of certification, which is documented by an individual or entity affected by such noise.

**Verification:** Within five days of receiving a noise complaint, the project owner shall file with the CPM a Noise Complaint Resolution Form, shown below, that documents the resolution of the complaint. If mitigation is required to resolve the complaint, and the complaint is not resolved within a three business-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

## EMPLOYEE NOISE CONTROL PROGRAM

**NOISE-3** The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction and demolition in accordance with Title 8, California Code of Regulations, Sections 5095-5099, and Title 29, Code of Federal Regulations, Section 1910.95.

**Verification:** At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal-OSHA upon request.

## OPERATIONAL NOISE RESTRICTIONS

**NOISE-4** The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to normal steady-state plant operation alone, during the four quietest consecutive hours of the nighttime, to exceed an average of 55 dBA $L_{90}$ measured at or near monitoring location M1, 51 dBA $L_{90}$ measured at or near monitoring location M2, and 53 dBA $L_{90}$ measured at or near monitoring location M3.

No new pure-tone components (as defined in **Noise Table A1**, bottom row defining pure tone) shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws project-related noise complaints.

When the project first achieves a sustained output of 85 percent or greater of its rated capacity for each power block, the project owner shall conduct a 25-hour community noise survey at monitoring locations M1, M2, and M3, or at a closer location acceptable to the CPM. This survey shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceed the above values, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to reduce the pure tones to a level that complies with **Noise Table A1** (bottom row defining pure tone) below.

**<u>Verification:</u>** The above noise survey shall be conducted each time a power block becomes operational and shall take place within 90 days of the power block first achieving a sustained output of 85 percent or greater of its rated capacity. The second survey shall include the combined operation of both power blocks at 85 percent, or greater, of the overall plant rated capacity with all turbine generators operating. Within 15 days after completing this survey, the project owner shall submit a summary report to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. When these measures are implemented and in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

## OCCUPATIONAL NOISE SURVEY

**NOISE-5** Following the project's attainment of a sustained output of 85 percent or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas within the power plant.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, Sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, Section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures to be employed in order to comply with the above regulations.

**<u>Verification:</u>** Within 30 days after completing each survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request from OSHA and Cal-OSHA.

## CONSTRUCTION AND DEMOLITION NOISE RESTRICTIONS

**NOISE-6** Heavy equipment operation and noisy[7] construction and demolition work relating to any project features, including pile driving, shall be restricted to the times delineated below:

[7] "Noisy" means noise that has the potential to cause project-related noise complaints (for the definition of"project-related noise complaint", see the footnote in condition of certification NOISE-2)

| | |
|---|---|
| Mondays through Fridays and designated holidays: | 7:00 a.m. to 7:00 p.m. |
| Saturdays: | 9:00 a.m. to 6:00 p.m. |
| Sundays: | Construction not allowed |

Limited construction activities may be performed outside of the above hours, with CPM approval as set forth below.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers and other state-required noise attenuation devices. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use (jake braking) shall be limited to emergencies.

**Verification:** Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

In consultation with the CPM, construction equipment generating excessive[8] noise shall be updated or replaced if beneficial in reducing the noise and if feasible. In addition, temporary acoustic barriers shall be installed around stationary construction noise sources if beneficial in reducing the noise and if feasible. The project owner shall reorient construction equipment, and relocate construction staging areas, when possible, to minimize the noise impact at nearest noise-sensitive receptors.

At least 10 days prior to any heavy equipment operation or noisy construction activities that would occur outside of the above hours, the project owner shall submit a request to the CPM for review and approval. The request submitted to the CPM shall specify the activities that need to occur outside of the restricted days and times set forth above; the need for such activities; the days, dates, and times during which these activities will occur; the approximate distance of activities to residential and other sensitive receptors; the expected sound levels at these receptors; and a statement that the activities will be performed in a manner to ensure excessive noise is prohibited as much as practicable. At the same time, the project owner shall notify the residents and property owners within one-half mile of the project site of the request. In this notification, the project owner shall state that it will perform this activity in a manner to ensure excessive noise is avoided as much as practicable.

## STEAM BLOW RESTRICTIONS

**NOISE-7** When using a high-pressure steam blow process, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet. The steam blows shall be conducted between 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and between 9:00 a.m. and 6:00 p.m. on Saturdays. The project owner shall notify the residents and business owners in the vicinity of the project site prior to start of steam blow activities.

[8] "Excessive noise" means noise that has the potential to cause project-related noise complaints (for the definition of "project-related noise complaint", see the footnote in condition of certification **NOISE-2**)

**Verification:** At least 15 days prior to the first steam blow, the project owner shall notify all residents and business owners within one mile of the power block for which steam blow activities are scheduled. The notification may be in the form of letters, or other effective means as approved by the CPM. The notification shall include a description of the purpose and nature of the steam blows, the planned schedule, expected sound levels at monitoring locations M1, M2, and M3 and explanation that it is a one-time activity and not part of normal plant operation.

## PILE DRIVING MANAGEMENT

**NOISE-8** The project owner shall perform pile driving in a manner to reduce the potential for any project-related noise and vibration complaints. The project owner shall notify the residents and business owners in the vicinity of pile driving prior to start of these activities.

**Verification:** At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts and peak particle velocity at monitoring locations M1, M2, and M3.

At least 10 days prior to first production pile driving for each power block, the project owner shall notify the residents and business owners within one mile of the pile driving. The notification may be in the form of letters, or other effective means, as approved by the CPM. In this notification, the project owner shall state that it will perform this activity in a manner to reduce the potential for any project-related noise and vibration complaints. The project owner shall submit a copy of this notification to the CPM prior to the start of pile driving for each power block.

## EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Alamitos Energy Center
(13-AFC-01)

**NOISE COMPLAINT LOG NUMBER** ________________________

Complainant's name and address:

Phone number: ________________________

Date complaint received: ________________________
Time complaint received: ________________________

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: ________________________

Initial noise levels at 3 feet from noise source _________ dBA Date: _____________

Initial noise levels at complainant's property: __________ dBA Date: ____________

Final noise levels at 3 feet from noise source: ________ dBA Date: _____________

Final noise levels at complainant's property: __________ dBA Date: ____________

Description of corrective measures taken:

Complainant's signature: ________________________ Date: ____________

Approximate installed cost of corrective measures: $ ____________
Date installation completed: ____________
Date first letter sent to complainant: ____________ (copy attached)
Date final letter sent to complainant: ____________ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: ________________________

(Attach additional pages and supporting documentation, as required).

## REFERENCES


**AEC 2015d**- Alamitos Suppl. AFC Appendices 5.1G to 5.10B (TN 206427-3). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015f**- Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015s**- Alamitos Data Response Set 6 (TN 207013) dated December 14, 2015. Submitted to CEC/Docket on December 14, 2015.

**City of Long Beach 1975** – City of Long Beach General Plan, Noise Element.

**City of Long Beach 2016** – City of Long Beach Municipal Code, Noise Ordinance, Chapter 8.80.

**City of Seal Beach 2016** – City of Seal Beach Municipal Code, Noise Ordinance, Title 7: Public Peace, Morals, and Welfare, Chapter 7.15.

**OCWD 2013** - Final Environmental Impact Report, Orange County Water District, Alamitos Barrier Improvement Project, State Clearinghouse No. 2012031027. February 2013.

# NOISE APPENDIX A
# FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive areas, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period ($L_{eq}$), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA ($L_{dn}$). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical $L_{dn}$ values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

## Noise Table A1
## Definition of Some Technical Terms Related to Noise

| Terms | Definitions |
|---|---|
| Decibel, dB | A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter). |
| Frequency, Hz | The number of complete pressure fluctuations per second above and below atmospheric pressure. |
| A-Weighted Sound Level, dBA | The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted. |
| $L_{10}$, $L_{50}$, & $L_{90}$ | The A-weighted noise levels that are exceeded 10 percent, 50 percent, and 90 percent of the time, respectively, during the measurement period. L90 is generally taken as the background noise level. |
| Equivalent Noise Level, $L_{eq}$ | The energy average A-weighted noise level during the Noise Level measurement period. |
| Community Noise Equivalent Level, CNEL | The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m. |
| Day-Night Level, $L_{dn}$ or DNL | The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m. |
| Ambient Noise Level | The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study). |
| Intrusive Noise | That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. |
| Pure Tone | A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz. |

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

**Noise Table A2**
**Typical Environmental and Industry Sound Levels**

| Noise Source (at distance) | A-Weighted Sound Level in Decibels (dBA) | Noise Environment | Subjective Impression |
|---|---|---|---|
| Civil Defense Siren (100') | 140-130 | | Pain Threshold |
| Jet Takeoff (200') | 120 | | Very Loud |
| Very Loud Music | 110 | Rock Music Concert | |
| Pile Driver (50') | 100 | | |
| Ambulance Siren (100') | 90 | Boiler Room | |
| Freight Cars (50') | 85 | | |
| Pneumatic Drill (50') | 80 | Printing Press Kitchen with Garbage Disposal Running | Loud |
| Freeway (100') | 70 | | Moderately Loud |
| Vacuum Cleaner (100') | 60 | Data Processing Center Department Store/Office | |
| Light Traffic (100') | 50 | Private Business Office | |
| Large Transformer (200') | 40 | | Quiet |
| Soft Whisper (5') | 30 | Quiet Bedroom | |
| | 20 | Recording Studio | |
| | 10 | | Threshold of Hearing |
| Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980 | | | |

## Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, Academic Press, New York, 1970).

## Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

**Noise Table A3**
**Addition of Decibel Values**

| When two decibel values differ by: | Add the following amount to the larger value |
|---|---|
| 0 to 1 dB | 3 dB |
| 2 to 3 dB | 2 dB |
| 4 to 9 dB | 1 dB |
| 10 dB or more | 0 |
| Figures in this table are accurate to ± 1 dB. | |

Source: Architectural Acoustics, M. David Egan, 1988

## Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

## Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

**Noise Table A4**
**OSHA Worker Noise Exposure Standards**

| Duration of Noise (Hrs/day) | A-Weighted Noise Level (dBA) |
|---|---|
| 8.0 | 90 |
| 6.0 | 92 |
| 4.0 | 95 |
| 3.0 | 97 |
| 2.0 | 100 |
| 1.5 | 102 |
| 1.0 | 105 |
| 0.5 | 110 |
| 0.25 | 115 |

Source: 29 C.F.R. § 1910.

# SOCIOECONOMICS

Testimony of Ellen LeFevre

## SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) concludes that construction and operation of the Alamitos Energy Center (AEC) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the project area's housing, schools, law enforcement services, or parks. Staff also concludes the project would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing, parks, or law enforcement services. Staff's proposed Conditions of Certification **SOCIO-1** and **SOCIO-2** would ensure project compliance with applicable laws, ordinances, regulations, and standards (LORS).

Staff has not identified any significant socioeconomic impacts from the proposed AEC. Therefore, there are no significant impacts to any population, including the environmental justice population represented in **Socioeconomics Figure 1** and **Table 3.**

## INTRODUCTION

Staff's socioeconomics impact analysis evaluates the project's induced changes from construction and operation on the following:

- Existing population
- Employment patterns
- Local communities and their services and resources
- Law enforcement services
- Estimated beneficial economic effects

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**Socioeconomics Table 1** contains socioeconomics (LORS) applicable to the proposed project.

**Socioeconomic Table 1**
**Laws, Ordinances, Regulations, and Standards**

| Applicable LORS | Description |
|---|---|
| **State** | |
| California Education Code, Section 17620 | The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities. |
| California Government Code, Sections 65995-65998 | Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities. |

| Applicable LORS | Description |
|---|---|
| **Local** | |
| Long Beach Municipal Code Chapter 18.22 | A Police Facilities Impact Fee is imposed on residential and nonresidential development for the purpose of assuring that the impacts created by said development pay its fair share of the costs required to support needed police facilities and related costs necessary to accommodate such development. |

## SETTING

The proposed AEC is located in the city of Long Beach, Los Angeles County, within the boundaries of the existing Alamitos Generating Station (AGS) industrial site (690 North Studebaker Road).

The construction workforce typically resides within a two-hour commute of the project and the operations workforce resides within a one-hour commute; for the AEC the commute area encompasses the following:

- Los Angeles-Long Beach-Glendale Metropolitan Division (MD) (Los Angeles County);
- Anaheim- Santa Ana-Irvine Metropolitan Division (MD) (Orange County); and
- Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA) (Riverside and San Bernardino counties).

The study area for law enforcement and parks comprises the city of Long Beach; the population and housing would extend to the city of Long Beach and the nearby cities of; the indirect and induced economic impacts would extend to Los Angeles and Orange counties; impacts to environmental justice (EJ) populations would extend to a six-mile radius of the project.

## USING THE 2010 US CENSUS AND US CENSUS BUREAU'S AMERICAN COMMUNITY SURVEY IN STAFF ASSESSMENTS

After the 2000 Census, the detailed social, economic, and housing information previously collected on the decennial census long form was no longer part of the decennial census and instead was now collected on the American Community Survey (ACS) (US Census 2013a). The U.S. Census Bureau's ACS is a nationwide, continuous survey that will continue to collect long-form-type information throughout the decade. Decennial census data is a 100 percent count collected once every ten years and represents information from a single reference point (April 1st). The main function of the decennial census is to provide counts of people for the purpose of congressional apportionment and legislative redistricting.

ACS collects data from a sample of the population based on information compiled continually and aggregated into one and five-year estimates ("period estimates") released every year. The primary purpose of the ACS is to measure the changing social and economic characteristics of the U.S. population. As a result, the ACS does not provide official population counts in between censuses. Instead, the Census Bureau's Population Estimates Program continues to be the official source for annual population totals, by age, race, Hispanic origin, and sex.

ACS collects data at every geography level from the largest level (nation) to the smallest level available (block group (BG)).[1] Census Bureau staff recommends the use of data no smaller than the census tract level.[2,3] Data from the five-year estimates is used for our analysis as it provides the greatest detail at the smallest geographic level. A certain level of variability is associated with the estimates because they come from a sample population. This variability is expressed as a margin of error (MOE) which is used to calculate the coefficient of variation (CV). CVs are a standardized indicator of the reliability of an estimate. While not a set rule, the US Census Bureau considers the use of estimates with a CV more than 15 percent a cause for caution when interpreting patterns in the data (US Census 2009). When CVs for estimates are high, the reliability of an estimate improves by using estimates for a larger geographic area (e.g. city or community versus census tract) or combining estimates across geographic areas.

## PROJECT-SPECIFIC DEMOGRAPHIC SCREENING

Staff's demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy* Act (CEQ 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (US EPA 1998). The intention is to identify minority and below-poverty-level populations potentially affected by the proposed project.

Staff's demographic screening identifies the presence of minority and below-poverty-level populations within a six-mile radius of the proposed project site. The six-mile radius is based on air quality modeling, as described in the **Air Quality** section of this document. No other technical area has identified potential impacts that might exceed this distance. Therefore, staff uses a six-mile radius from the project to obtain data to gain a better understanding of the demographic makeup of the communities potentially impacted by the project. When an EJ population is identified, staff in 11 technical disciplines consider the project's effects on this population.[4]

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[1] Census Block Group - A statistical subdivision of a census tract. A BG consists of all tabulation blocks whose numbers begin with the same digit in a census tract; for example, for Census 2000, BG 3 within a census tract includes all blocks numbered between 3000 and 3999. The block group is the lowest-level geographic entity for which the Census Bureau tabulates sample data from the decennial census. **Source:** http://www.census.gov/dmd/www/glossary.html.

[2] Census Tract - A small, relatively permanent statistical subdivision of a county or statistically equivalent entity, delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. Census tracts are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time they are established. Census tracts generally contain between 1,000 and 8,000 people, with an optimum size of 4,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. **Source:** http://www.census.gov/dmd/www/glossary.html.

[3] Census Workshop: Using the American Community Survey (ACS) and The New American Factfinder (AFF) hosted by Sacramento Area Council of Governments on May 11 & 12, 2011. Workshop presented by Barbara Ferry, U.S. Census Partnership Data Services Specialist.

[4] The 11 technical disciplines are Air Quality, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, and Waste Management.

Due to the change of surveys generated by the U.S. Census Bureau, the screening process used by Energy Commission staff continues to rely on current (2010) decennial census data to determine the number of minority populations, and now relies on current (2010 – 2014) ACS data to evaluate the presence of individuals living below the federal poverty level.

While ACS provides more recently updated data than the 2010 decennial data, staff continues to use the current decennial data as it allows staff to accurately determine where minority populations reside in the smallest geographic area. Data at this small scale highlights where concentrations of minority populations reside so that the 11 technical staff can analyze whether any project impacts may be experienced by an EJ population. Updated minority data from the current ACS is presented for the smallest geographic area that yields reliable results so readers can see how demographics, specifically minority concentrations, have changed since the 2010 decennial data.

## Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups:

- American Indian or Alaskan Native
- Asian or Pacific Islander
- Black, not of Hispanic origin
- Hispanic

An EJ population is identified when one or more U.S. Census blocks in the six-mile radius have a minority population greater than or equal to 50 percent. **Socioeconomics Figure 1** (with a one-, three-, and six-mile radius) identifies the EJ population based on race and ethnicity as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act.*

In an effort to update population data since the 2010 decennial U.S. Census, staff has included **Socioeconomics Table 2** to provide the reader a comparison of decennial and ACS census data for minority populations.

**Socioeconomics Table 2**
**Minority Population Data Within the Project Area**

| CITIES IN THE SIX-MILE RADIUS | | Total Population | Not Hispanic or Latino: White alone | Minority | Percent Minority (%) |
|---|---|---|---|---|---|
| Cypress | **April 1, 2010 Census** [1] | 47,802 | 20,865 | 26,937 | **56.35** |
| | **2010-2014 Estimate** [2] | 48,748 | 20,863 | 27,885 | **57.20** |
| | | ±54 | ±972 | ±973 | ±2.00 |
| Hawaiian Gardens | **April 1, 2010 Census** | 14,254 | 1,044 | 13,210 | **92.68** |
| | **2010-2014 Estimate** | - | - | - | **-** |

| CITIES IN THE SIX-MILE RADIUS | | Total Population | Not Hispanic or Latino: White alone | Minority | Percent Minority (%) |
|---|---|---|---|---|---|
| Lakewood | **April 1, 2010 Census** | 80,048 | 32,774 | 47,274 | **59.06** |
| | **2010-2014 Estimate** | 80,926 | 30,835 | 50,091 | **61.90** |
| | | ±123 | ±993 | ±1001 | ±1.23 |
| Long Beach | **April 1, 2010 Census** | 462,257 | 135,698 | 326,559 | **70.64** |
| | **2010-2014 Estimate** | 468,594 | 131,481 | 337,113 | **71.94** |
| | | ±158 | ±2,222 | ±2228 | ±0.47 |
| Los Alamitos | **April 1, 2010 Census** | 11,449 | 6,721 | 4,728 | **41.30** |
| | **2010-2014 Estimate** | 11,598 | 6,404 | 5,194 | **44.78** |
| | | ±33 | ±411 | ±412 | ±3.55 |
| Seal Beach | **April 1, 2010 Census** | 24,168 | 18,580 | 5,588 | **23.12** |
| | **2010-2014 Estimate** | 24,477 | 18,020 | 6,457 | **26.38** |
| | | ±49 | ±590 | ±592 | ±2.42 |
| Signal Hill | **April 1, 2010 Census** | 11,016 | 3,340 | 7,676 | **69.68** |
| | **2010-2014 Estimate** | 11,245 | 3,089 | 8,156 | **72.53** |
| | | ±30 | ±387 | ±388 | ±2.89 |

**Notes:** Staff's analysis of the 2010 – 2014 estimates returned CV values less than 15, indicating the data is reliable. The 2010 – 2014 estimate data for Hawaiian Gardens is not reported because staff determined it to be unreliable (CV value greater than 15).**Sources:** [1] US Census 2010a and [2] US Census 2015a.

The data presented in **Socioeconomics Table 2** shows a large minority population in the six-mile radius of the project site and the highest percent minority population (using 2010 census data) in the city of Hawaiian Gardens, approximately 93 percent.[5] The percent minority population in the cities of Cypress and Long Beach has remained consistent and increased in the cities of Lakewood, Los Alamitos, Seal Beach, and Signal Hill.

[5] Staff's analysis of ACS 2010-2014 data for the city of Hawaiian Gardens in **Socioeconomics Table 2** returned CV values greater than 15, indicating that the data is unreliable and may not accurately reflect local characteristics. Thus the data for the city is not reported.

## Below-Poverty-Level-Populations

The official poverty thresholds do not vary by geography (e.g. state, county, etc.). The poverty thresholds are updated annually to allow for changes in the cost of living. The population for whom poverty status is determined does not include institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Staff identified the below-poverty-level population in the project area using place level data (city) from the 2010 - 2014 ACS Five-Year Estimates from the U.S. Census (US Census 2015c). The CEQ and U.S. EPA guidance documents do not provide a numerical threshold to use when identifying below-poverty-level populations. In the absence of a threshold, staff looks at the below-poverty-level populations in the cities within the six-mile radius and compares them to other appropriate reference geographies, such as the Census County Divisions (CCDs), county, or state to determine whether the below-poverty-level populations are less than, more than, or about the same to the populations in comparison geographies. U.S. EPA guidance notes that a demographic comparison to the next larger geographic area or political jurisdiction should be presented to place population characteristics in context (US EPA 1998, pg. 12). This is consistent with staff's approach to identify below-poverty-level populations that constitute an EJ population.

**Socioeconomics Table 3** shows poverty data for the cities in the project's six-mile radius and the reference geographies.

**Socioeconomics Table 3**
**Poverty Data within the Project Area**

| Area | Total Population | Persons with income in the past 12 months below-poverty-level | Percent of population below-poverty-level (%) |
|---|---|---|---|
| | Estimate* | Estimate | Estimate |
| **CITIES IN THE SIX MILE RADIUS** | | | |
| Cypress | 48,608 | 3,289 | **6.80** |
| | ±112 | ±632 | ±1.3 |
| Hawaiian Gardens | 14,373 | 4,134 | **28.80** |
| | ±58 | ±799 | ±5.5 |
| Lakewood | 80,717 | 6,688 | **8.30** |
| | ±184 | ±881 | ±1.1 |
| Long Beach | 462,140 | 95,719 | **20.70** |
| | ±544 | ±3,731 | ±0.8 |
| Seal Beach | 24,214 | 2,208 | **9.10** |
| | ±198 | ±390 | ±1.6 |
| **REFERENCE GEOGRAPHY** | | | |
| Long Beach-Lakewood CCD | 570,158 | 108,344 | **19.00** |
| | ±634 | ±4,118 | ±0.7 |
| North Coast CCD | 373,008 | 42,153 | **11.30** |
| | ±1,432 | ±2,396 | ±0.6 |
| Anaheim-Santa Ana-Garden Grove CCD | 1,657,735 | 257,082 | **15.5**0 |
| | +/2,854 | +/-5,859 | +/-0.3 |

**Notes:** * Population for whom poverty status is determined. Staff's analysis of the 2010 – 2014 estimates returned CV values less than 15, indicating the data is reliable. Data for the cities of Los Alamitos and Signal Hill is not reported (CV values greater than 15). **Source:** US Census 2015c.

**Socioeconomics Table 3** shows that cities of Hawaiian Gardens and Long Beach have a higher percentage of the population living below-poverty-level compared to the reference geographies.  The below-poverty-level for Hawaiian Gardens and Long Beach is approximately ten and two percent higher, respectively, than the reference geography with the highest below-poverty-level (Long Beach-Lakewood CCD). Thus, the below-poverty-level population in the cities Hawaiian Gardens and Long Beach constitutes an EJ population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act.*

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) requires a list of criteria to determine the significance of identified impacts. A significant impact is defined by CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (CEQA Guidelines Section 15382).

Thresholds serve as the benchmark for determining if a project will result in a significant adverse impact when evaluated against existing conditions (e.g., "baseline" conditions). State CEQA Guidelines Section 15064(e) specifies:

> *"[e]conomic and social changes resulting from the project shall not be treated as significant effects on the environment."*
>
> *"[w]here a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant."*

Staff has used Appendix G of the CEQA Guidelines for this analysis, which specifies that a project could have a significant effect on population, housing, and law enforcement services, schools and parks if it would:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for law enforcement, schools, and parks and recreation.

Staff's assessment of the significance of any impacts on population, housing, police protection, schools, and parks and recreation are based on professional judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers and one-hour commute range for operational workers.

# DIRECT/INDIRECT IMPACTS AND MITIGATION

## Induce Substantial Population Growth

Staff defines “induce substantial population growth” (for purposes of this analysis) as workers moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region.

The construction workforce typically resides within a two-hour commute of the project and the operations workforce resides within a one-hour commute. For the AES that distance includes the following areas:

- Los Angeles-Long Beach-Glendale Metropolitan Division (MD) (Los Angeles County);
- Anaheim- Santa Ana-Irvine Metropolitan Division (MD) (Orange County); and
- Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA) (Riverside and San Bernardino counties).

Workers with a greater commute would likely be non-local and would tend to seek lodging closer to the project site (temporarily during construction or permanently during operations).

**Socioeconomics Table 4** shows the historical and projected populations for the cities in the six-mile radius, plus Los Angeles and Orange counties for reference. Population projections between 2010 and 2035 show a growth of 12 percent in the cities within and around the six-mile radius. The cities of Long Beach, Signal Hill, and the county of Los Angeles have the highest projected growth with 16, 17, and 16 percent, respectively.

**Socioeconomics Table 5** shows the total labor by skill for the project study area. **Socioeconomics Table 6** shows the project labor needs for the construction compared with the total labor supply in the study area, which would be more than adequate to provide construction labor for the project.

## Socioeconomics Table 4
## Historical and Projected Populations

| | 2000[1] | 2010[2] | 2020[3] | 2035[3] | Projected Population Change 2010-2035 | |
|---|---|---|---|---|---|---|
| | | | | | **Number** | **Percent** |
| **Cities in the Project Study Area: (Total)** | 646,901 | 650,994 | 685,400 | 731,400 | 80,406 | 12.35 |
| Cypress | 46,229 | 47,802 | 50,300 | 51,400 | 3,598 | 7.53 |
| Hawaiian Gardens | 14,779 | 14,254 | 14,800 | 15,600 | 1,346 | 9.44 |
| Lakewood | 79,345 | 80,048 | 80,500 | 80,600 | 552 | 0.69 |
| Long Beach | 461,522 | 462,257 | 491,000 | 534,100 | 71,843 | 15.54 |
| Los Alamitos | 11,536 | 11,449 | 12,000 | 12,000 | 551 | 4.81 |
| Seal Beach | 24,157 | 24,168 | 25,000 | 24,800 | 632 | 2.62 |
| Signal Hill | 9,333 | 11,016 | 11,800 | 12,900 | 1,884 | 17.10 |
| **Counties** | | | | | | |
| Los Angeles County | 9,519,338 | 9,818,605 | 10,404,000[3]<br>10,435,991[4] | 11,353,000[3]<br>11,123,113[4] | 1,534,395* | 15.63 |
| Orange County | 2,846,289 | 3,010,232 | 3,266,000[3]<br>3,243,261[4] | 3,421,000[3]<br>3,410,509[4] | 410,768* | 13.65 |

**Notes:** *Calculated using the highest 2035 population projection. **Sources:** [1]US Census 2000, [2]US Census 2010a, [3]SCAG 2012, [4]CA DOF 2014.

## Socioeconomics Table 5
## Total Craft Labor by Skill in the Study Area MSAs/MD

| Craft | Los Angeles-Long Beach-Glendale Metropolitan Division (Los Angeles County) | | | | Santa Ana-Anaheim-Irvine MSA (Orange County) | | | | Riverside-San Bernardino-Ontario MSA (Riverside & San Bernardino counties) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Workforce (2012) | Total Projected Workforce (2022) | Growth from 2012 | | Total Workforce (2012) | Total Projected Workforce (2022) | Growth from 2012 | | Total Workforce (2012) | Total Projected Workforce (2022) | Growth from 2012 | |
| | | | Number | Percent | | | Number | Percent | | | Number | Percent |
| Boilermaker | - | - | - | - | - | - | - | - | - | - | - | - |
| Carpenter | 17,630 | 21,830 | 4,200 | 23.8 | 11,260 | 14,610 | 3,350 | 29.8 | 9,610 | 14,030 | 4,420 | 46.0 |
| Cement Finisher | 1,930 | 2,560 | 630 | 32.6 | 2,160 | 2,880 | 720 | 33.3 | 1,960 | 3,220 | 1,260 | 64.3 |
| Electrician | 11,100 | 13,390 | 2,290 | 20.6 | 5,500 | 6,950 | 1,450 | 26.4 | 3,920 | 5,590 | 1,670 | 42.6 |
| I&C Control Room | - | - | - | - | - | - | - | - | - | - | - | - |
| Insulation Worker | - | - | - | - | 300 | 480 | 180 | 60.0 | - | - | - | - |
| Ironworker | 940 | 1,170 | 230 | 24.5 | 460 | 590 | 130 | 28.3 | 630 | 880 | 250 | 39.7 |
| Laborer | 21,320 | 26,310 | 4,990 | 23.4 | 12,170 | 15,530 | 3,360 | 27.6 | 12,310 | 18,180 | 5,870 | 47.7 |
| Millwright | - | - | - | - | - | - | - | - | 140 | 200 | 60 | 42.9 |
| Oiler/ Mechanic[1] | 2,120 | 2,180 | 60 | 2.8 | 590 | 720 | 130 | 22.0 | 860 | 980 | 120 | 14.0 |
| Operating Engineer | 3,130 | 3,570 | 440 | 14.1 | 2,400 | 2,850 | 450 | 18.8 | 2,990 | 3,920 | 930 | 31.1 |
| Painters | 8,420 | 11,230 | 2,810 | 33.4 | 4,970 | 7,110 | 2,140 | 43.1 | 3,440 | 5,450 | 2,010 | 58.4 |
| Piling Crew | - | - | - | - | - | - | - | - | - | - | - | - |
| Pipefitter[2] | 8,200 | 10,060 | 1,860 | 22.7 | 3,590 | 4,560 | 970 | 27.0 | 2,520 | 3,620 | 1,100 | 43.7 |
| Plumber[2] | 8,200 | 10,060 | 1,860 | 22.7 | 3,590 | 4,560 | 970 | 27.0 | 2,520 | 3,620 | 1,100 | 43.7 |
| Roofers | 2,290 | 2,800 | 510 | 22.3 | 2,000 | 2,340 | 340 | 17.0 | 1,280 | 2,020 | 740 | 57.8 |
| Sheet Metal Worker | 2,270 | 2,650 | 380 | 16.7 | 1,560 | 1,870 | 310 | 19.9 | 1,160 | 1,540 | 380 | 32.8 |
| Sheetrockers[3] | 3,900 | 5,310 | 1,410 | 36.2 | 3,940 | 5,510 | 1,570 | 39.8 | 2,320 | 3,630 | 1,310 | 56.5 |
| Sprinkler Fitters[2] | 8,200 | 10,060 | 1,860 | 22.7 | 3,590 | 4,560 | 970 | 27.0 | 2,520 | 3,620 | 1,100 | 43.7 |
| Supervisors[4] | 10,760 | 12,240 | 1,480 | 13.8 | 5,420 | 6,430 | 1,010 | 18.6 | 4,040 | 5,380 | 1,340 | 33.2 |
| Teamster[5] | 15,920 | 17,320 | 1,400 | 8.8 | 2,160 | 3,150 | 990 | 45.8 | 7,460 | 8,750 | 1,290 | 17.3 |

**Notes**: - No data available; [1] Maintenance Workers, Machinery; [2] Plumbers, Pipefitters, and Steamfitters; [3] Drywall and Ceiling Tile Installers; [4] Construction Managers; [5] Industrial Truck and Tractor Operators. **Sources:** AEC 2015g Appendix 5.10B, Table 5.10B; CA EDD 2014.

## Socioeconomics Table 6
## Total Craft Labor by Skill in the Study Area MSAs/MD versus Project Labor Needs

| Study Area MSAs/MD | | | | | AEC Construction Workforce Needs- Peak Month by Phase | |
|---|---|---|---|---|---|---|
| | | | Growth from 2012 | | Phase | |
| | | | | | CCGT Power Block 1 | SCGT Power Bock 2 |
| | | | | | Construction Period | |
| **Craft** | **Total Workforce (2012)** | **Total Projected Workforce (2022)** | **Number** | **Percent** | June 2017-March 2020 34 mo. | May 2020-Aug. 2021 16 mo. |
| | | | | | **Workforce during Peak Month(s) / Peak Workforce by Trade by Phase** | |
| | | | | | July 2019 | Jan. 2021 |
| Boilermaker | - | - | - | - | 48 | 28 |
| Carpenter | 38,500 | 50,470 | 11,970 | 31.1 | 0 / (24) | 38 |
| Cement Finisher | 6,050 | 8,660 | 2,610 | 43.1 | 0 / (4) | |
| Electrician | 20,520 | 25,930 | 5,410 | 26.4 | 54 / (60) | 68 / (86) |
| I&C Control Room | - | - | - | - | 8 | 0 |
| Insulation Worker | 300 | 480 | 180 | 60.0 | 30 | 16 |
| Ironworker | 2,030 | 2,640 | 610 | 30.0 | 0 / (14) | 50 / (62) |
| Laborer | 45,800 | 60,020 | 14,220 | 31.0 | 16 | 62 |
| Millwright | 140 | 200 | 60 | 42.9 | 12 | 82 |
| Oiler/ Mechanic[1] | 3,570 | 3,880 | 310 | 8.7 | 2 | 0 |
| Operating Engineer | 8,520 | 10,340 | 1,820 | 21.4 | 14 | 18 / (26) |
| Painters | 16,830 | 23,790 | 6,960 | 41.4 | 6 / (8) | 18 |
| Piling Crew | - | - | - | - | 0 / (8) | 0 |
| Pipefitter[2] | 14,310 | 18,240 | 3,930 | 27.5 | 58 | 78 |
| Plumber[2] | 14,310 | 18,240 | 3,930 | 27.5 | 2 | 0 |
| Roofers | 5,570 | 7,160 | 1,590 | 28.5 | 2 | 0 |
| Sheet Metal Worker | 4,990 | 6,060 | 1,070 | 21.4 | 0 | 18 |
| Sheetrockers[3] | 10,160 | 14,450 | 4,290 | 42.2 | 4 | 0 |
| Sprinkler Fitters[2] | 14,310 | 18,240 | 3,930 | 27.5 | 4 | 0 |
| Supervisors[4] | 20,220 | 24,050 | 3,830 | 18.9 | 39* | 26 / (32)* |
| Teamster[5] | 25,540 | 29,220 | 3,680 | 14.4 | 7 | 10 / (22) |
| Total Workforce | | | | | 306 | 512 |

**Notes:** - No data available; () Number in parenthesis represents the peak workforce by trade during construction; [1] Maintenance Workers, Machinery; [2] Plumbers, Pipefitters, and Steamfitters; [3] Drywall and Ceiling Tile Installers; [4] Construction Managers; [5] Industrial Truck and Tractor Operators. * Includes engineering contractor's staff (accountants, engineers, field inspectors, management, etc.). **Sources:** AEC 2015g Appendix 5.10B, Table 5.10B; CA EDD 2014.

The applicant expects project construction and site preparation activities to last 56 months, from the first quarter of 2017 until the third quarter of 2021.The AEC site preparation would begin in January 2017 with the removal of the retired and decommissioned Unit 7's building and ancillary equipment, fuel tank storage, tank berms, small maintenance shops, and two wastewater retention basins to make room for the onsite construction and laydown area. The applicant expects the AEC combined-cycle gas turbine (CCGT) construction to begin in the second quarter of 2017 and be completed by the second quarter of 2020. The AEC CCGT would be operational before May 1, 2020. The AEC simple-cycle gas turbine (SCGT) construction would begin in the second quarter of 2020 and would be completed in the third quarter of 2021. The applicant expects to commence commercial operation in the third quarter of 2021. No construction overlap is expected between the AEC CCGT and the AEC SCGT power blocks (AEC 2015f pg. 5.10-2).

AGS Units 1 through 6 are currently in operation and would remain in operation through much of the AEC development and construction (AEC 2015f pg. 5.10-2). Units 1, 2, and 5 would be retired when the AEC CCGT commences operation.  Units 3, 4, 6 would remain in operation through at least December 31, 2020 (AEC 2015f pg. 2-2). The operation of Units 1 through 6 would not impede the construction of AEC.

The construction plan is based on a single shift composed of a 10-hour workday, Monday through Friday, and a single 8-hour shift on Saturday.  Construction would typically take place between the hours of 7:00 am and 7:00 pm Monday through Friday and 9:00 am and 6:00 pm on Saturday, consistent with the city of Long Beach ordinances.  Overtime and additional shift work may be used to maintain the construction schedule or to complete critical construction activities (such as pouring concrete at night during hot weather and working around time-critical shutdowns and constraints).  During the commissioning and startup phase of each of the power blocks, some activities may continue 24 hours per day, 7 days per week. (AEC 2015f pg. 2-20)

Construction of the AEC would require laydown areas (approximately eight acres onsite and approximately 10-acre offsite) for offloading, laydown and storage of materials, equipment, and vehicles.  The onsite laydown areas would include the parking lot north of existing Units 1 through 4 and the area between existing Units 1 and 2 and their intake canal. The offsite laydown area would be located adjacent to the AGS site south of the existing Units 5 and 6 (AEC 2015f pg.  2-20, 5.10-2).  The off-site laydown area may also be used by the proposed AES Huntington Beach Energy Project (12-AFC-02) (HBEP) for equipment storage.

The primary trades required for the project would include boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, and pipefitters. The project's site preparation activities would average 75 workers over the five-month period and peak with 91 workers in January through March 2017. The project's construction workforce would reach a peak workforce with 512 workers in month 44 (January 2021) and have an average workforce over the 51-month period of 191 workers. The peak construction workforce and duration of construction by phase is presented in **Socioeconomics Table 6**.

The applicant assumes that 90 percent of the construction workforce would reside in Los Angeles County (AEC 2015f, pg. 5.10-11). Workers would also be drawn from the neighboring counties of Orange, Ventura, Kern, and San Bernardino, and a portion from other nearby counties in southern California (AEC 2015f, pg. 5.10-10). Workers coming from Ventura, Kern, and San Bernardino counties would be considered non-local and likely seek lodging during the week closer to the project site and return to their primary residence on weekends.

Energy Commission staff contacted the local building and construction trades council for more information about the construction workforce in Los Angeles and Orange counties, as these counties are where the workforce for the AEC would be drawn (CEC 2014j).

Staff from the Los Angeles/Orange Counties Building and Construction Trades Council (BCTC) (Ron Miller and Jim Adams) explained that information from their local unions shows there is a more than sufficient supply of union members available within commuting distance of the AEC. BCTC staff also indicated the recession has caused huge unemployment in their trades with unemployment in the local unions from 15 to 40 percent. These unemployment figures are just starting to decrease. According to the BCTC staff, construction of energy facilities requires a certain ratio of apprentices to journeyman members for staffing the job site. With the robust five-year apprentice programs, apprentices at all levels would be available for energy facility staffing at the AEC.

Based on the large local area labor pool, Energy Commission staff concludes the majority of construction workers would commute daily to the project site and a small workforce, about ten percent, would come from outside of the local commute area. During the peak construction period, approximately 52 workers could come from outside of the local commute area, with an average of 20 workers during the 51-month construction period.

The 36 operational staff needed for the AEC would come from the existing 66-member AGS staff (AEC 2015f, pg. 5.10-12). Since no new workers would be hired, no new residents would be added.

Staff concludes the project's construction and operation workforces would not directly or indirectly induce a substantial population growth in the project area, and therefore, the project would create a less than significant impact under this criterion.

## Housing Supply

**Socioeconomics Table 7** presents housing supply data for the project area. As of April 1, 2010, there were 246,575 housing units within a six-mile radius of the project site with a vacancy of 15,899 units, representing a 6.4 percent vacancy rate. The California Department of Finance has updated changes to population and housing stock for 2015. Year 2015 housing estimates indicated 247,250 housing units within the six-mile radius, with a vacancy of 15,876 for a vacancy rate of 6.4 percent (CA DOF 2015). The updated data show almost no change in the housing stock and vacancy rate. A five percent vacancy is a largely industry-accepted minimum benchmark for a sufficient amount of housing available for occupancy (Virginia Tech 2006). The housing counts in the project area indicate a sufficient supply of available housing units within a six-mile radius of the project site.

**Socioeconomics Table 7**
**Housing Supply Estimates in the Project Area**

| Subject | Area | | | | | |
|---|---|---|---|---|---|---|
| | Cities in a Six Mile Radius of Project Site* | | Los Angeles County | | Orange County | |
| | Number | Percent | Number | Percent | Number | Percent |
| **OCCUPANCY STATUS** | | | | | | |
| Total housing units | 246,575 | 100 | 3,445,076 | 100 | 1,048,907 | 100 |
| --Occupied housing units | 230,676 | 93.6 | 3,241,204 | 94.1 | 992,781 | 94.6 |
| --Vacant housing units | 15,899 | 6.4 | 203,872 | 5.9 | 56,126 | 5.4 |
| **VACANCY STATUS** | | | | | | |
| Vacant housing units | 15,899 | 100 | 203,872 | 100 | 56,126 | 100 |
| --For rent | 8,471 | 53.28 | 104,960 | 51.5 | 25,254 | 45.0 |
| --For sale only | 1,964 | 12.35 | 26,808 | 13.1 | 8,434 | 15.0 |
| --For seasonal, recreational, or occasional use | 1,656 | 10.42 | 19,099 | 9.4 | 10,806 | 19.3 |
| --Other** | 3,808 | 23.95 | 53,005 | 26.0 | 11,632 | 20.72 |

**Notes:** *Cities include Long Beach, Signal Hill, Lakewood, Hawaiian Gardens, Cypress, Los Alamitos, and Seal Beach.** Other includes rented, not occupied; sold, not occupied; migratory workers, and other vacant.
**Source:** US Census 2010b

Los Angeles County has 997 hotel/motel properties with a total of 98,135 rooms and an occupancy rate of 79.7 percent for 2014 year to date (Jan 2016) (Discover LA 2016). Orange County has a large supply of lodging options with approximately 499 hotels and 56,711 rooms (Anaheim/OC VCB 2015). Long Beach has approximately 58 hotel/motel properties with approximately 5,712 rooms. There is one recreational vehicle park within six miles of the project site with 80 sites with full hook ups; however, the park is at full capacity during much of the year (Golden Shore 2014).

Given the large supply of lodging choices in Long Beach, Los Angeles and Orange counties, and the estimated number of non-local project construction workers (peak estimate 52 workers), staff expects no new housing would be required as a result of the project. There would be no new operations workers to impact housing supply.

Staff concludes the project's construction and operation workforce would not have a significant adverse impact on the housing supply in the project area, Long Beach, Los Angeles and Orange counties and therefore, the project would create a less than significant impact under this criterion.

## Displace Substantial Numbers of Existing Housing and People

The AEC is proposed on the site of the existing AGS as a replacement to the existing power plant, and therefore, would not directly displace existing housing or people. The project would not induce substantial population growth or create the need for replacement housing to be constructed elsewhere, as previously discussed.

Staff concludes the project would have no impact on area housing as the project would not displace any people or necessitate the construction of replacement housing elsewhere.

## Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the AEC would not cause significant impacts to service ratios, response times, or other performance objectives relating to law enforcement, schools, or parks.

### Law Enforcement

The AEC site is located within the jurisdiction of the city of Long Beach Police Department (LBPD) East Division. The East Division substation is located at 4800 Los Coyotes Diagonal, a distance of 3.4 miles from the project site (LBPD 2014a). LBPD's East Division staff includes 105 sworn police officers and 2 civilians. The estimated response time for Priority 1 (emergency) calls in the East Division is 4.5 minutes and the estimated response time for Priority 2 (non-emergency) calls is 16 minutes. While staffing levels fluctuate, the East Division service levels currently meet the needs of the area. According to Administrative Bureau Chief Braden Phillips, LBPD has existing mutual aid agreements with all regional law enforcement agencies, and any support requests are coordinated by the Los Angeles County Sheriff's Office (CEC 2014f).

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. The city of Long Beach includes a small segment of the Pacific Coast Highway (State Route 1). Both CHP and LBPD serve the portion of Pacific Coast Highway within the city of Long Beach. CHP services include law enforcement, traffic control, accident investigation and the management of hazardous material spill incidents (AEC 2015g pg. 5.10-6-5.10-7). The nearest CHP office is located in Westminster (CHP 2016). The **Hazardous Materials Management** section of this document discusses response times for hazardous material spill incidents.

Staff contacted LBPD to discuss the proposed project, ascertain their ability to provide law enforcement services to the project, and solicit comments or concerns they might have about the project. Staff included an example of two conditions of certification typically applied to projects like the AEC to address construction and operations site security and traffic management. Chief Phillips stated that based on the proposed traffic/workforce progression, additional traffic officers may be required in and around the project area because Studebaker Road is an already heavily used access route to the I-405 freeway (CEC 2014f). If repeated traffic jams occur on Studebaker Road, additional traffic officers may be required on an "as needed" basis to help unclog the thoroughfare. The LBPD could accommodate additional officers, if necessary, and would not need to increase staffing.

Chief Phillips noted that while it is possible that project-related traffic could slow some responses using Studebaker Road and/or Loynes Drive, the overall impact on average response times should be minimal. Traffic and Transportation staff has proposed Condition of Certification **TRANS-2**, which would require preparation and implementation of a traffic control plan to address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes. See the **Traffic and Transportation** section of this document for a full assessment of impacts related to traffic and transportation.

In the SAFC, the applicant has addressed security measures for operations by proposing site fencing and security gate; evacuation procedures; a protocol for contacting law enforcement in the event of conduct endangering the facility, its employees, its contractors, or the public; and a fire alarm monitoring system. Also proposed are measures to conduct site personnel background checks, including employee and routine onsite contractors; site access protocol for vendors; and a protocol for hazardous materials vendors for security plan preparation and personnel background security checks. The security plan may include one or more of the following: security guards; security alarm for critical structures; perimeter breach detectors and onsite motion detectors; and video or still camera monitoring system (AEC 2015f, pg. 5.5-25).

Hazardous Materials Management staff is proposing Conditions of Certification **HAZ-7** and **HAZ-8**, which would require the preparation of site security plans to provide for security during all phases of this project. If the project is approved by the Energy Commission, the construction site security plan would be implemented before new construction commences, and includes a protocol for contacting law enforcement and the Energy Commission compliance project manager (CPM) in the event of suspicious activity or emergency. See the **Hazardous Materials Management** section of this document for a full assessment of impacts related to hazardous materials

Based on the information from Chief Phillips, staff concludes the project would not result in law enforcement response times being affected so that they exceed adopted response time goals. The project would not necessitate alterations to police station or the construction of a new police station to maintain acceptable response times for law enforcement services; therefore, no associated physical impact would result. Staff concludes that for the above reasons, the project would create a less than significant impact on law enforcement.

## Education

The California Government Code sets forth the exclusive methods of considering and mitigating impacts on school facilities. Section 65995 expressly provides that “[t]he payment or satisfaction of a fee, charge, or other requirement levied or imposed pursuant to Section 17620 of the Education Code in the amount specified in Section 65995… are hereby deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving but not limited to, the planning, use, or development of real property, or any change in governmental organization… on the provision of adequate school facilities.” Please see the discussion of school impact fees in the “Compliance with LORS” subsection below.

## Parks

Long Beach has 162 parks with 26 community centers, two historic sites, two major tennis centers, a municipal golf system with five courses, the Long Beach Animal Care Services Bureau, a municipally operated marina system with 3,677 boat slips, and six miles of beaches. More than 3,100 acres within the city of Long Beach are developed for recreation (LBPRM 2015). Amenities offered at these parks include playgrounds and play equipment, skate parks, picnic areas/barbeque pits, sports courts (volleyball, basketball, tennis, roller hockey, handball/racquetball, and soccer), sports fields (baseball, softball, and football), weight room, nature trail, 18 and 9 hole golf courses, duck pond, swimming pools, peace garden, lawn bowling green, casting pond, dog park, gym, spray pool/water play features, community garden, fitness zones, archery range, and restrooms. Park facilities include community centers, teen centers, and senior centers. The closest park to the project site is the Edison Park in the city of Seal Beach. The closest park in the city of Long Beach to the project site is the Bixby Village Golf Course.

The city has a park standard of eight acres per 1,000 residents (LBPRM 2003). The 2010-2014 ACS Five-Year Estimates shows the estimated population in Long Beach as 468,594[6] (US Census 2015d). Based on this current estimate, approximately 3,749 acres of parks would be needed to meet the park standard. The city has approximately 3,100 acres of parks, equating to approximately 6.62 acres per 1,000 residents.

Staff’s analysis shows there would not be a large number of workers moving into the project area during project construction and no workers moving to the project area for project operations. Therefore, there would be little, if any increase in the usage of or demand for parks or other recreational facilities.

[6] The five-year ACS estimate for population in Long Beach is 468,594, with a margin of error of +/- 158, and a coefficient of variation of 0.01.

Staff concludes the project would not result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives with respect to parks. The project would not increase the use of neighborhood or regional parks or recreational facilities to the extent that substantial physical deterioration of the facility would occur, or accelerate. The project does not propose any park facilities or necessitate the construction of new parks in the area. For the above reasons, staff concludes the project would have a less than significant impact on neighborhood or regional parks and recreational facilities.

## CUMULATIVE IMPACTS AND MITIGATION

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [Cal. Code of Regs., tit 14, §15065(a)(3)].

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally, or when a project's demand for public services does not match a local jurisdiction's ability to provide such services. An influx of non-local workers and their dependents can strain housing, schools, parks and recreation, and law enforcement services.

Staff used Los Angeles and Orange counties and the cities in proximity to the project site as the geographic scope for cumulative impacts. Staff considered projects within these search parameters that would likely employ a similar workforce to the AEC and that could have construction schedules overlapping with the AEC. The applicant anticipates that if the AEC is approved, the project's 56-month site preparation and construction would begin in January 2017. Staff considers the following projects in **Socioeconomics Table 8** part of the cumulative setting for socioeconomic resources.

## Socioeconomics Table 8
## Cumulative Projects

| PROJECT NAME | PROJECT DESCRIPTION | LOCATION | DISTANCE TO PROJECT (Miles) | STATUS |
|---|---|---|---|---|
| Alamitos Energy Station Battery Energy Storage System (BESS) | BESS project at the AGS to include three 100 MW containment buildings, constructed in sequential phases from east to west. Each would contain two battery storage levels, electrical controls, and HVAC units. Construction proposed to start 3rd quarter 2019, after major mechanical completion of the AEC CCGT power block, with completion of the first 100-MW building planned for late 2020. The second and third 100 MW buildings to then be constructed and operational in 2021/2022. | North side of AEC project site, Long Beach | 0.3 | Planning Phase |
| Alamitos Bay Bridge Improvement Project | Improvements to the bridge are needed to enhance the safety of the structure and to maintain the level of service. Project could result in new bridge. | Project crosses the El Cerritos Channel on the Pacific Coast Highway, Long Beach | 0.9 | Environmental Review |
| CalTrans #12, San Diego Freeway I-405 Improvement Project | I-405 Improvement Project would add one general purpose lane in each direction on I-405 from Euclid Street to the I-605 interchange, plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. | I-405 between SR-73 and I-605, Costa Mesa, Seal Beach | 1.0 | Planning Phase |
| Los Alamitos Medical Center Specific Plan | Replacing and adding new buildings to the existing facility on an 18-acre site, including constructing two four-story hospital buildings. Planned in three phases with anticipated construction period of 25 years. | 3751 Katella Avenue, Los Alamitos | 3.2 | Under Construction |
| Humboldt Bridge Preventative Maintenance Project | Maintenance activities on the existing Humboldt Drive bridge to restore the integrity of its original design. | Humboldt Dr. bridge, west of the intersection of Humboldt Dr. and Wimbledon Lane, Huntington Beach | 3.8 | Planning Phase |
| Douglas Park Rezone Project | Based on 2009 project description from addendum to the final EIR: Revised project to include up to approximately 3.75 million sq ft of commercial/light industrial uses (research and development uses), 250,000 sq ft of retail uses, and a hotel with 400 rooms. 10 acres of open space planned. The site covers 261 acres. | Bound by Carson Street on the north, the Airport south and southwest, Lakewood Boulevard on the east, and Lakewood Country Club Golf Course on the west. | 5.0 | Under Construction |

| PROJECT NAME | PROJECT DESCRIPTION | LOCATION | DISTANCE TO PROJECT (Miles) | STATUS |
|---|---|---|---|---|
| 207 Seaside Way Project | Construction of 113-unit multi-family apartment complex on the 0.67-acre site. Project would include a single structure consisting of eight levels (one subterranean level and seven aboveground levels). Bottom three levels would provide 144 on-site parking spaces. Apartment structure would be 85 feet above the East Seaside Way grade.<br><br>Apartment units would include a mix of studios, and one- and two-bedroom configurations. Amenities include a cafe, fitness center, retail space, and a lobby. | 207 E Seaside Way Long Beach, CA 90802 | 5.2 | Environmental Review |
| Urban Village on Long Beach | Project would improve three abutting parcels with a five-story building containing 129 condominium units and 175 parking stalls located in an integrated five-level parking garage. | 1081 Long Beach Boulevard, Long Beach | 5.3 | Planning Phase |
| Oceanaire Apartment | Construction of a 216-unit multi-family/mixed-use apartment complex on the 1.76-acre site. | 150 West Ocean Boulevard Long Beach | 5.3 | Under Construction |
| New Civic Center Project | Construction of new City Hall, new Port Building for Harbor Department administration, new and relocated Main Library, redeveloped Lincoln Park, residential development, and commercial mixed use development. Includes demolition of the former Long Beach Courthouse. | Downtown Long Beach, CA | 5.5 | Under Construction |
| 442 W. Ocean Boulevard Project | Construction of a 95-unit multi-family apartment complex on the 24,000 sq ft site. | 442 West Ocean Boulevard Long Beach | 5.6 | Environmental Review |
| Golden Shore Master Plan | Project includes three development options, a Residential Option and two Hotel Options, and all would be entitled through the City of Long Beach. The option ultimately constructed would be selected based on market conditions prevailing at the time entitlement is complete. | 6-9 Golden Shore, Long Beach | 5.9 | Planning Phase |
| Monogram Apartments (formerly Pedigo) | Four-story with lofts apartment building consisting of 510 dwelling units, 25,815 sq. ft. public open space, 55,396 sq. ft. private open space, and approximately 5,097 sq. ft. leasing office wrapped around a six-level 862-space parking structure. (5 parcels located at the SW corner of Edinger Ave and Gothard St.) | 7262 Edinger Ave. Huntington Beach | 6.2 | Plan check |

| PROJECT NAME | PROJECT DESCRIPTION | LOCATION | DISTANCE TO PROJECT (Miles) | STATUS |
|---|---|---|---|---|
| Huntington Beach Lofts | 385 luxury residential units in five residential stories, located above approximately 10,000 square feet of street level retail and commercial uses. | 7400 Center Ave Huntington Beach | 6.3 | Under construction |
| Gerald Desmond Bridge Replacement Project | The Gerald Desmond Bridge Replacement Project will provide three lanes in each direction to improve traffic flow, emergency lanes on both sides to reduce traffic delays and safety hazards, and 205 feet of vertical clearance to accommodate the world's largest, "greener" vessels. | Gerald Desmond Bridge, Port of Long Beach | 7.0 | In construction |
| Huntington Beach Energy Project | The 2014 Energy Commission licensed project is a natural gas fired, combined cycle, air-cooled 939-MW electrical generating facility. Project would require demolition of existing power plant and construction of project. The 2015 Petition to Amend the 2014 licensed project is a natural gas fired, combined cycle and simple-cycle, air-cooled 844-MW electrical generating facility. | Huntington Beach Generating Station site, Huntington Beach | 10.9 | Under Construction |

AEC would employ an average of 75 workers per month during the five-month site preparation period and an average of 191 workers during the 51-month construction period. The construction workforce would peak during month 44 (January 2021) with 512 workers onsite. Approximately ten percent of the construction workforce would be non-local and would likely relocate closer to the project site. Once operational, the AEC would permanently employ 36 workers, drawn from the existing 66-member AGS staff. No additional staff would be required. **Socioeconomics Table 9** presents the total labor force for the crafts specifically needed for the construction of AEC. As shown in the table, the labor force within the Los Angeles-Long Beach-Glendale MD and the surrounding MD/MSAs are more than sufficient to accommodate the labor needs for construction of the AEC, including other future planned projects identified in **Socioeconomics Table 8** in the cumulative study area.

**Socioeconomics Table 9**
**Total Labor Supply for Selected MSAs/MD**

| Total Labor for Selected MSAs/MD (Construction Workforce)* | Total Workforce for 2012 | Total Projected Workforce for 2022 | Growth from 2012 | Percent Growth from 2012 |
|---|---|---|---|---|
| Los Angeles-Long Beach-Glendale Metropolitan Division | 109,930 | 132,620 | 22,690 | 20.6 |
| Santa Ana-Anaheim-Irvine MSA | 58,480 | 75,580 | 17,100 | 29.4 |
| Riverside-San Bernardino-Ontario MSA | 54,640 | 77,390 | 22,750 | 41.6 |
| **TOTALS** | 223,050 | 285,590 | 62,540 | 28.0 |

**Notes:** Total workforce includes only the crafts specifically needed for the AEC. *See **Socioeconomics Table 5** for a list of crafts included in the total construction workforce figures. **Source:** EDD 2014

The project would not have a significant adverse impact on area lodging or housing supply, but could have a temporary incremental impact when combined with the projects identified in **Socioeconomics Table 8**. However, as there is a large supply of lodging choices and sufficient housing supply in the city of Long Beach and in Los Angeles and Orange counties, the project's slight increase in area population during project construction would not create a significant reduction in lodging and housing supply. As no additional operational workers would be hired for the AEC, no new children would be added to the LBUSD and thus the project would not have an incremental impact on schools. The project would not have a significant adverse impact on neighborhood or regional parks or other recreational facilities. Construction workers who seek lodging closer to the project do not bring their families with them and generally return to their residences over the weekend. Because they are not likely to spend time at neighborhood parks and recreational facilities, the project would not have an incremental impact on neighborhood or regional parks or other recreational facilities. The project would not result in law enforcement response times being affected and would not increase the demand for law enforcement services. Thus, the project would not have an incremental impact on law enforcement services.

For the reasons discussed above, staff does not expect the construction or operation of the AEC to contribute to any significant adverse cumulative impacts on population, housing, schools, parks and recreation, or law enforcement.

## COMPLIANCE WITH LORS

### SCHOOL IMPACT FEES

School fees are applied to the new construction or reconstruction of existing building for industrial use (Cal. Education Code § 17620 (a) (2), Cal. Gov. Code § 65995 (d)). The fees are assessed on the area of covered and enclosed space and are calculated prior to the issuance of building permits during plan review. The AEC site is located within the Long Beach Unified School District (LBUSD). The LBUSD current rate for new or commercial or industrial development is $0.56 per square foot of covered and enclosed, non-residential space (CLB 2016). Based on the preliminary project design, approximately 5,000 square feet of the administration building, 5250 square feet of the water treatment building, and 6,000 square feet of the warehouse would be subject to assessment.  Based on this estimate, approximately $9,100 in school fees would be assessed for LBUSD. Staff is proposing Condition of Certification **SOCIO-1** to ensure the payment of fees to the school district. The project would comply with Section 17620 of the Education Code through the one-time payment of statutory school impact fees to the Long Beach Unified School District.

### POLICE FACILITY IMPACT FEES

Police facility impact fees are applied to all new residential or nonresidential development in the city of Long Beach. The fees are assessed on the area of enclosed spaces at the time of issuance of the applicable building permit. The current rate for new industrial development is $0.218 per square foot on enclosed industrial space (CLB 2016).  Based on the preliminary project design, approximately 5,000 square feet of the administration building, 5,250 square feet of the water treatment building, and 6,000 square feet of the warehouse would be subject to assessment.  Based on this estimate, the applicant would be assessed approximately $3,542.50 in police facility fees.  Staff is proposing **SOCIO-2** to ensure payment of fees to the city of Long Beach. The project would comply with Chapter 18.22 of the Long Beach Municipal Code through the one-time payment of statutory police facility impact fees to the city of Long Beach.

## NOTEWORTHY PUBLIC BENEFITS

Staff defines noteworthy public benefits (for purposes of this analysis) to include changes in local economic activity and local tax revenue that would result from project construction and operation. To assess the gross economic value of the proposed project the applicant developed an economic computer database and modeling system to create input output model, or an IMPLAN Input-Output model.

The assessment used Los Angeles County as the unit of analysis. However, the applicant acknowledged that most of the materials and supplies purchases during construction and operations would be from the greater southern California area. Thus, the economic benefits would also be realized in the neighboring counties.

Impact estimates reflect two scenarios; construction phase and the operations phase of the project. For both phases, the applicant estimated the total direct, indirect, and induced economic effects on employment and labor income.

Direct economic effects represent:

- employment,
- labor income, and
- spending associated with construction and operation of the project.

Indirect economic effects represent expenditures on intermediate goods made by suppliers who provide goods and services to the project.

Induced economic effects represent changes in household spending that occur due to the wages, salaries, and proprietor's income generated through direct and indirect economic activity.

IMPLAN Model Components

- Estimates do not represent a precise forecast, but rather an approximate estimate of the overall economic effect.
- A static model, meaning that it relies on inter-industry relationships and household consumption patterns, as they exist at the time of the analysis.
  - This is important because the start of construction activities would occur in the second quarter of 2017 and the AEC would not be completed until the third quarter of 2021.
- Assumes that prices remain fixed, regardless of changes in demand, and that industry purchaser-supplier relationships operate in fixed proportions.
- Does not account for substitution effects, supply constraints, economies of scale, demographic change, or structural adjustments.

**Socioeconomics Table 10** reports the applicant's estimates of the economic impacts/benefits that would accrue to Los Angeles County due to project construction and operation. The applicant assumes the following:

- 100 percent of the materials and equipment spending for construction would occur within Los Angeles County.
- 90 percent of the construction labor and associated payroll would come from within Los Angeles County.
- 100 percent of the operations payroll would occur within Los Angeles County (36 operations workers coming from existing 66-member AGS workforce).
- 100 percent of the annual operations and maintenance expenditures would be made within Los Angeles County.
  - Note: Some portion of the annual operations and maintenance budget may be spent in neighboring counties.

## Socioeconomics Table 10
## AEC Economic Benefits (2014 dollars)

| TOTAL FISCAL BENEFITS | |
|---|---|
| **Estimated annual property taxes** | **Increase in property taxes - $7.9 million to $9.8 million** |
| **State and local sales taxes:** | |
| Construction | $11.9 million total, $992,124 local |
| Operation | $748,080 total, $187,020 local |
| School Impact Fees | $9,100 |
| Police Facilities Impact Fee | $3,542.50 |
| Total Non-Fiscal Benefits | |
| Total capital costs | $940 million to $1.11 billion |
| Construction payroll (incl. benefits) | $315.55 million |
| Operations payroll (incl. benefits) | $4,469,090 |
| Construction materials and supplies | $132.29 million |
| Operations and maintenance supplies | $8,312,000 |
| **TOTAL DIRECT, INDIRECT, AND INDUCED BENEFITS** | |
| **Estimated Direct Benefits** | |
| Construction Jobs | 191 (average), 512 (peak) |
| Operation Jobs | 0 new jobs<br>(36 from existing 66-member AGS workforce) |
| **Estimated Indirect Benefits** | |
| Construction Jobs | 125 |
| Construction Income | $6,513,950 |
| Operation Jobs | 14 |
| Operation Income | $2,007,560 |
| **Estimated Induced Benefits** | |
| Construction Jobs | 464 |
| Construction Income | $20,168,770 |
| Operation Jobs | 13 |
| Operation Income | $669,190 |
| **SUMMARY OF LOCAL BENEFITS** (to LA County)[1] | |
| **Estimated Direct Benefits** | |
| Construction payroll (incl. benefits) (represents 90 percent to LA County) | $284 million |
| Operations payroll (incl. benefits) (represents 100 percent to LA County) | $4,469,090 |
| Construction materials & supplies (represents 100 percent to LA County) | $132.29 million |
| Operations & maintenance supplies (represents 100 percent to LA County) | $8,312,000 |

**Note:** [1] Based on applicant's estimates. **Source:** AEC 2015f, pg. 5.10-09 to 5.10-14.

## PROPERTY TAX

For a power plant producing 50 megawatts (MW) or greater, the Board of Equalization (BOE) has jurisdiction over the valuation of a power-generating facility for tax purposes. For a power-generating facility producing less than 50 MW, the county has jurisdiction over the valuation. The AEC would be a nominal 1,040-MW natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility, therefore, BOE is responsible for assessing property value. The property tax rate is set by the Los Angeles County Auditor-Controller's office. Property taxes are collected and distributed at the county level.

Assuming a capital cost of $940 million to $1.11 billion and a property tax rate consistent with the rate presented in the SAFC for the existing AGS site (1.122072 percent), the project would generate $10.5 million to $12.5 million in property taxes during the first operation year of the project (CEC 2016i). The property taxes assessed on the existing AGS for FY 2011-2012 were $2.63 million. An estimated increase of approximately $7.9 million to $9.8 million would be generated by the AEC. The revenue collected from property taxes would be distributed among school districts, special districts, redevelopment agencies, unincorporated areas, and incorporated areas (cities) by Los Angeles County. The remaining property tax generated above 1 percent (0.122072 percent) would be distributed in whole to the city.

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

The applicant was the only entity to provide comments on the Preliminary Staff Assessment (PSA) regarding socioeconomics.

**Comment:** *Page 4.9-26, School Impact Fees – The PSA states "The rate for the 2015-2016 fiscal year for new or commercial or industrial development for the LBUSD is $0.54 per square foot of covered and enclosed, non-residential space (CLB 2015). Based on the preliminary project design, approximately 5,000 square feet of the administration building, 5250 square feet of the water treatment building, and 6,000 square feet of the warehouse would be subject to assessment. Based on this estimate, approximately $8,775 in school fees would be assessed for LBUSD." In the SAFC, the Applicant states "Any industrial development within the Long Beach Unified School District is currently charged a one-time assessment fee of $0.47 per square foot of principal building area (Ahn, 2013, personal communication). Based on 16,250 square feet of occupied structures, AEC will pay $7,638 in school impact fees. These school impact fees are considered full mitigation for any potential impacts on these school districts." Please revise the PSA to reflect the 2013 rates presented by the applicant in the SAFC.*

> **Response:** Staff used the rate for school impact fees assessed on commercial/industrial development per the city of Long Beach Development Impact Fee Guide (last updated September 30, 2015). This fee guide has recently been updated and the current rates are effective as of April 20, 2016. For the FSA, staff has updated the estimate of school fees assessed on commercial/industrial development based on the current rate of $0.56 per square foot.

**Comment:** *Page 4.9-29, Property Tax – The PSA states "Assuming a capital cost of $940 million to $1.11 billion and a property tax rate consistent with the current rate for the existing AGS site (1.122072 percent), the project would generate $10.5 million to $12.5 million in property taxes during the first operation year of the project (CEC 2016i). The property taxes assessed on the existing AGS for FY 2011-2012 were $2.63 million. An estimated increase of approximately $7.9 million to $9.8 million would be generated by the AEC." In the SAFC, the applicant states, "The assumed capital cost is between $1.1 billion and $1.3 billion and the AEC will generate approximately $12.3 million to $14.6 million in property taxes annually. The property tax assessed on the existing AGS in FY 2011-12 was $2.63 million. Thus, the estimated increase in property tax revenues generated by the construction of the AEC will be approximately $9.71 million to $11.95 million." Please revise the PSA to reflect the updated capital cost range presented by the Applicant in the SAFC.*

> **Response:** Staff found inconsistent dollar amounts for the capital costs presented in the SAFC and contacted Fatuma Yusef, Senior Economist at CH2M Hill for clarification. This discussion was docketed in a record of conversation (TN 210847). Based on this conversation, staff used the revised capital cost ($940 million to $1.11 billion) in the discussion of property taxes.

## CONCLUSIONS

Staff concludes the AEC would not cause a significant adverse socioeconomic impact as a result of the construction or operation of the proposed project, or contribute to any significant cumulative socioeconomic impacts, for the following reasons:

1. The project's construction and operation workforce would not directly or indirectly induce a substantial population growth in the project area.

2. The project's construction and operation workforce would not have a significant impact on housing within the project area and would not displace any people or housing, or necessitate construction of replacement housing elsewhere.

3. The project would not result in significant physical impacts associated with the provision of new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives with respect to law enforcement service, education, or parks and recreation.

4. The project would have no significant adverse direct, indirect, and cumulative socioeconomic impacts. Therefore, the project would have a less than significant socioeconomic impact on any population, including the environmental justice population represented in **Socioeconomics Figure 1** and **Table 3**.

## PROPOSED CONDITIONS OF CERTIFICATION

**SOCIO-1** The project owner shall pay the one-time statutory school facility development fee to the Long Beach Unified School District required by Education Code Section 17620.

**Verification:** At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment to the Long Beach Unified School District of the statutory development fees.

**SOCIO-2** The project owner shall pay the one-time statutory police facilities impact fee to the city of Long Beach required by Long Beach Municipal Code Chapter 18.22.

**Verification:** At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment to the city of Long Beach of the statutory development fees.

## REFERENCES


**AEC 2015g** – Alamitos Suppl. AC Appendices 5.1G to 5.10B (TN 206428-3). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015f** – Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**Anaheim/OC VCB 2015** – Anaheim/Orange County Visitors and Convention Bureau, Travel Trade, Multilingual Info Sheets, http://travel-trade.anaheimoc.org/ , accessed January 6, 2016.

**CA DOF 2014** – California Department of Finance, *Report P-1 (County): State and County Total Population Projections, 2010-2060.* Sacramento, California, December 2014, http://www.dof.ca.gov/research/demographic/projections/#p-1 .

**CA DOF 2015** – California Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2015,* Sacramento, California, May 2015.

**CA EDD 2014** – Employment Development Department, State of California, Labor Market Information, *Projections of Employment by Industry and Occupation. 2012-2022 Occupational Employment Projections for Los Angeles-Long Beach-Glendale Metropolitan Division (Los Angeles County)*, *Santa Ana-Anaheim-Irvine MSA (Orange County)*, *and Riverside-San Bernardino-Ontario MSA (Riverside and San Bernardino Counties)*, published December 2014, http://www.labormarketinfo.edd.ca.gov/data/employment-projections.html#Proj .

**CDE 2015** – California Department of Education, Educational Demographics Unit, Data Quest, http://dq.cde.ca.gov/dataquest/ , data as of November 20, 2015.

**CEC 2014f** – California Energy Commission (TN 202269) ROC Clarifying LBPD Enforcement Needs Assessment Responses dated April 29, 2014. Submitted to CEC/Dockets Unit April 29, 2014.

**CEC 2014j** – California Energy Commission (TN202714) Record of Conversation between CEC staff and LA/OC Building and Construction Trades Council dated July 16, 2014. Submitted to CEC/Dockets Unit on July 16, 2014.

**CEC 2016i** – Report of Conversation with CEC Staff and Fatuma Yusuf, Senior Economist, CH2M Hill (TN 210847) dated March 24, 2016. Submitted to CEC/Docket on March 24, 2016.

**CEQ 1997** – Council on Environmental Quality, *Environmental Justice: Guidance Under the National Environmental Policy Act*, December 10, 1997, http://www3.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf .

**CLB 2016** – City of Long Beach, *Developer Fees*, as of April 20, 2016, <http://www.lbds.info/civica/filebank/blobdload.asp?BlobID=2506>.

**CHP 2016** – California Highway Patrol, https://www.chp.ca.gov/find-an-office , accessed on January 12, 2016.

**DWK 2011** – Dannis Woliver Kelley, *Recent CEQA Decision Chawanakee Unified School District v. County of Madera*, The Point- Education Law Bulletin, Volume 2011, Client Bulletin No. 13 - July 11, 2011.

**Discover LA 2016** – Discover Los Angeles, Research, *Los Angeles Submarkets Monthly & Year to Date Lodging Metrics and Supply Inventory*, http://www.discoverlosangeles.com/tourism/research .

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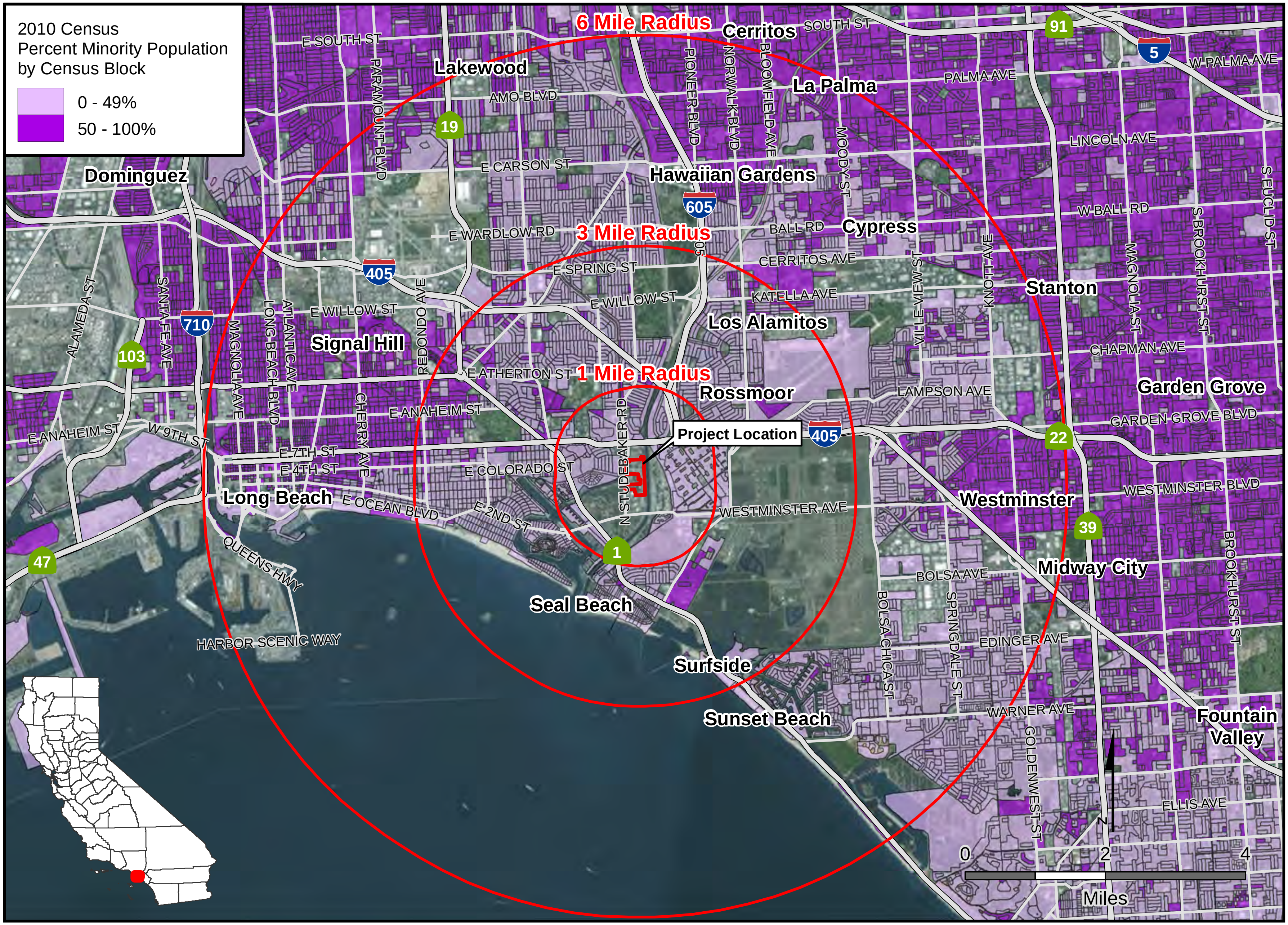
**SOCIOECONOMICS - FIGURE 1**

Alamitos Energy Center - Census 2010 Minority Population by Census Block




SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Census 2010 PL 94-171 Data

# SOIL AND WATER RESOURCES

Testimony of Abdel-Karim Abulaban, P.E.

## SUMMARY OF CONCLUSIONS

Based on the assessment of the proposed Alamitos Energy Center (AEC), California Energy Commission (Energy Commission) staff concludes that:

- The AEC would use potable water for construction lasting about 56 months. Use would not exceed an annual rate of about 22 acre-feet per year (AFY) (about 100 AF total) and 130 AFY for operation (process and sanitary uses). Once Alamitos Generating Station (AGS) ceases operation after completion of construction of the AEC, the reduction in potable water use would be about 272 AFY, which would result in additional supplies for other beneficial uses.
- Although the project would reduce potable water use relative to baseline conditions, staff conducted additional analysis to evaluate whether reclaimed water from nearby wastewater treatment plants or the city of Long Beach could be used as an alternative supply. Staff concluded that due to the small volume of water needed for operation, long distances to treatment plants and the nearest interconnection to the city's reclaimed water distribution system, it would be economically infeasible to use reclaimed water at this time.
- The proposed project would result in a reduction of 0.24 million gallons per day (mgd) in industrial wastewater discharge to the San Gabriel River and ultimately the Pacific Ocean and a similarly proportional decrease in pollutant loading associated with industrial wastewater, which would improve the water quality in the ocean and the Alamitos Bay.
- The proposed site has a long industrial history and would not require a lot of additional soil disturbance for the new facilities and, as such, would result in minimal losses to soil resources. Though some small losses in sediment are expected during construction and operation from wind and water erosion, onsite management of stormwater runoff and sediment erosion as proposed by staff in Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-4** would adequately minimize soil loss.
- Staff proposes Condition of Certification **SOIL&WATER-1,** which would require the proposed project to comply with the Clean Water Act and obtain discharge permits for construction through the State Water Resources Control Board. This condition would ensure that the impacts to waters of the United States (US) from construction would be less than significant.
- If the project owner chooses to discharge hydrostatic testing waters to waters of the United States (US), staff proposes Condition of Certification **SOIL&WATER-2**, which would require the proposed project to comply with the Los Angeles Regional Water Quality Control Board's (LARWQCB) Permit Order No. R4-2009-0068, NPDES No. CAG674001 which regulates discharges from hydrostatic testing water. This condition would ensure that the impacts to waters of the US from hydrostatic testing would be less than significant.

- Groundwater at the site is relatively shallow and potentially contaminated by petroleum by-products. Trench and foundation excavations would likely encounter shallow groundwater and dewatering would be required for stabilization. If dewatering is required for any construction activities, staff recommends that the applicant comply with Condition of Certification **SOIL&WATER-3**, which would require the applicant to apply for coverage under a Regional Water Quality Control Board permit that would allow for the discharge of petroleum-contaminated groundwater from dewatering activities.
- Staff proposes Condition of Certification **SOIL&WATER-4,** which would require the proposed project to comply with the Clean Water Act and obtain industrial discharge permits for project operation through the State Water Resources Control Board. This condition would ensure that the impacts to waters of the United States would be less than significant.
- Staff proposes Condition of Certification **SOIL&WATER-5**, requiring the proposed project to comply with the city of Long Beach code, title 15 chapters 4 through 28, which define regulations and permits required for discharge of wastewater to the city's wastewater system. Compliance with this condition would ensure that connections to the city's sewer system are completed appropriately and that annual fees are paid to the city.
- Long Beach Water Department (LBWD) has conducted a Water Supply Assessment and concluded that there is sufficient supply available for the project.
- The proposed project would use potable water supplied by LBWD for construction and operation. Water would be supplied through an existing connection used by the existing AGS. Staff proposes Condition of Certification **SOIL&WATER-6** to limit the amount of water used consistent with the scope of this analysis and the Water Supply Assessment. Staff also proposes Condition of Certification **SOIL&WATER-7**, which would require the applicant to install water meters on site for accurate reporting of water use.
- The proposed project is located in Zone X and is separated from the 100-year flood stage (flood with a 1 percent probability of occurrence in any year) by at least six feet.
- Recent Energy Commission studies show the project site and vicinity to be at increased risk of flooding due to relative sea level rise. However the proposed site would be sufficiently above sea level to ensure power plant reliability. Even with high-end estimates of relative sea-level rise of 61 centimeters (2.0 feet) by 2050 (relative to 2000) (Tebaldi et al. 2012, NAS, 2012), the site would still be about 4.0 feet above the current (2012) 100-year floodplain (FEMA, 2012).

- The proposed project would include use of air cooled condensers for cooling of the steam cycle. This technology significantly reduces the potential for use of other water supplies and is encouraged in accordance with the Energy Commission's water policy. Development of alternative water supplies for remaining industrial uses does not appear to be feasible. In addition, the project would use a number of systems to reuse wastewater and reduce wastewater volume. Staff concludes the project water use is consistent with Energy Commission water policy.
- The proposed project would comply with the State Water Resources Control Board's (SWRCB) Resolution No. 2010-0020, Policy for the Use of Coastal and Estuarine Waters for Power Plant Cooling, requiring all coastal power plants that utilize OTC to meet new (Best Technology Available [BTA]) performance requirements through a reduction in intake volume and velocity. The proposed project achieves these goals through the elimination of once through ocean cooling, the use of dry-cooling technology, and reduction of wastewater discharge.

## INTRODUCTION

The California Environmental Quality Act (CEQA) requires that the significant adverse environmental effects of a proposed project be identified and that an agency should not approve a project as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of the project. (Pub. Resources Code, § 21002). CEQA defines a "significant effect" on the environment as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including water" (Cal. Code Regulations., tit. 14, § 15382).

This section of the Final Staff Assessment (FSA) analyzes the potential effects on soil and water resources by the proposed AEC. This assessment incorporates information gathered by the Energy Commission staff and focuses on the potential for AEC to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood conditions in the vicinity of the project;
- adversely affect surface or groundwater supplies; or
- cause degradation of surface or groundwater quality.

Staff's analysis also ensures that construction and operation of the proposed project would be in compliance with all applicable laws, ordinances, regulations and standards (LORS) and state policies.

Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and, as appropriate, recommends conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS.

## LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local environmental LORS in **Soil and Water Resources Table 1** listed for the AEC and similar facilities require the best and most appropriate use and management of groundwater resources. Additionally, the requirements of these LORS are specifically intended to protect human health and the environment. Actual project compliance with these LORS is a major component of staff's determination regarding the significance and acceptability of the AEC with respect to the use and management groundwater resources.

**Soil and Water Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **Federal LORS** | |
| Clean Water Act (33 U.S.C. Section 1257 et seq.) | The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of stormwater and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act. |
| **State LORS** | |
| California Constitution, Article X, section 2 | The California Constitution requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited. |
| Water Code Sections 10910-10915 | Signed into law in 2001 amending Sections 10910-10915 of the California Water Code. Requires public water systems to prepare water supply assessments (WSA) for certain defined development projects subject to the California Environmental Quality Act. Lead agencies determine, based on the WSA, whether protected water supplies will be sufficient to meet project demands along with the region's reasonably foreseeable cumulative demand under average-normal-year, single-dry-year, and multiple-dry-year conditions. |
| The Porter-Cologne Water Quality Control Act of 1967, California Water Code Section 13000 et seq. | Requires the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue waste discharge requirements (WDRs) specifying conditions for protection of water quality as applicable. Section 13000 also states that the state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the state from degradation. Although Water Code 13000 et seq. is applicable in its entirety, the following specific sections are included as examples of applicable sections. |
| California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Los Angeles Region Basin (Basin Plan) | The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation measures and other controls designed to ensure compliance with statewide plans and policies, and provides comprehensive water quality planning. |
| California Water Code Section 13260 | This section requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269. |
| California Water Code Section 13550 | Requires the use of recycled water for industrial purposes when available and when the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources. |

| Applicable LORS | Description |
|---|---|
| Water Recycling Act of 1991 (Water Code 13575 et. seq.) | The Water Recycling Act states that retail water suppliers, recycled water producers, and wholesalers should promote the substitution of recycled water for potable and imported water in order to maximize the appropriate cost-effective use of recycled water in California. |
| Water Conservation Act of 2009 (Water Code 10608 et. seq) | This 2009 legislative package requires a statewide 20% reduction in urban per capita water use by 2020. It requires that urban water retail suppliers determine baseline water use and set reduction targets according to specified requirements, and requires agricultural water suppliers prepare plans and implement efficient water management practices. |
| California Code of Regulations (CCR), Title 17, Division 1, Chapter 5,Group 4, | Requires prevention measures for backflow prevention and cross connections of potable and non-potable water lines to protect a public water supply system. |
| California Code of Regulations, Title 20, Division 2, Chapter 3, Article 1 | The regulations under Quarterly Fuel and Energy Reports (QFER) require power plant owners to periodically submit specific data to the California Energy Commission, including water supply and water discharge information. |
| California Code of Regulations, Title 22 Division 4, Chapter 3 | This section of the CCR defines recycled water quality treatment standards and specifies permissible uses for each recycled water class, to protect the health and safety of the public. |
| SWRCB Order 2009-0009-DWQ | The SWRCB regulates stormwater discharges associated with construction affecting areas greater than or equal to one acre to protect state waters. Under Order 2009-0009-DWQ, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Stormwater Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent. |
| SWRCB Order 97-03-DWQ | The SWRCB regulates stormwater discharges associated with several types of facilities, including steam electric generating facilities. Under Order 97-03-DWQ, the SWRCB has issued a NPDES General Permit for stormwater discharges associated with industrial activity. Projects can qualify under this permit if specific criteria are met and an acceptable SWPPP is prepared and implemented after notifying the SWRCB with a Notice of Intent. |
| Los Angeles Regional Water Quality Control Board, Permit Order No. R4-2009-0068, NPDES NO. CAG674001 | The Los Angeles Regional Water Quality Control Board issued this order to regulate discharges to surface waters that pose a *de minimus* threat. |
| **Local LORS** | |
| City of Long Beach Code, Title 15 – Public Utilities. | Defines the process and permits required to connect to city's water supply and sewer systems. |
| **State Policies and Guidance** | |
| Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.) | In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission clearly outlined the state policy with regards to water use by power plants, stating that the Energy Commission would approve the use of fresh water for cooling purposes only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound." |

| Applicable LORS | Description |
|---|---|
| SWRCB Res. 2009-0011 (Recycled Water Policy) | This policy supports and promotes the use of recycled water as a means to achieve sustainable local water supplies and reduction of greenhouse gases. This policy encourages the beneficial use of recycled water over disposal of recycled water. |
| SWRCB Res. 75-58 | The principal policy of the SWRCB that addresses siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling, adopted by the Board on June 19, 1976, by Resolution 75-58. This policy states that use of fresh inland waters should only be used for cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. |
| SWRCB Res. 77-1 | SWRCB Resolution 77-1 encourages and promotes recycled water use for non-potable purposes and use of recycled water to supplement existing surface and groundwater supplies. |
| SWRCB Res. 2010-0020 | SWRCB's Resolution No. 2010-0020 and adoption of a Policy for the Use of Coastal and Estuarine Waters for Power Plant Cooling (OTC Plan), requires all coastal power plants that utilize OTC to meet new performance requirements (Best Technology Available [BTA]) through a reduction in intake volume and velocity. The proposed project complies with the OTC Plan through the conversion to dry-cooling and reduced discharge. |

# PROJECT DESCRIPTION

## Water Supply

The proposed project would utilize dry cooling technologies, which require substantially less water than wet cooling methods and the OTC technology currently used by AGS. The applicant proposes to use potable water provided by the LBWD for process and potable uses. The city's water supply source is part groundwater (60 percent) from the Central Groundwater Basin and part imported surface water. The applicant considered the use of reclaimed water for project operation but it was determined to be infeasible.

The annual water requirements (process and sanitary) for AEC would be approximately 130 AFY, assuming it would operate continuously for the proposed 4,600 hours (AEC 2015). The expected range in water use rates would be between 68 and 357 gallons per minute (gpm) based on weather conditions. The project would tie into the two existing separate pipeline interconnections. Water from service connections would be directed into an existing 600,000-gallon tank. In addition, a new, 340,000-gallon would be constructed to store demineralized water. Also, two 130,000-gallon tanks would be constructed, one for condensate storage, and another one for wastewater. Of the 600,000 gallons that would be stored in the existing tank, 228,000 gallons would be dedicated for fire protection. The total storage available on site would provide approximately 5 days of operational water for the project.

The proposed AEC would employ 36 full-time employees. The expected water use for sanitary purposes would be less than 1.0 gpm (AEC 2015), equivalent to about 1.6 AFY.

The applicant also proposes to use potable water for the limited demolition of some existing AGS structures including Unit 7 components and some other equipment and structures, and construction of the AEC. Construction uses include dust suppression.

Average water use during construction would be about 18,000 gallons per day (gpd) and around 24,000 gpd during hydrostatic testing and commissioning. Commissioning is expected to take about 60 days. Average annual water use during commissioning is not expected to exceed 22 AFY.

## Process Wastewater

The project would collect wash-down, general facility, and facility equipment drains in floor drains and sumps and route them to an oil/water separator system. Miscellaneous wastewaters, such as those from combustion turbine water washes and from some water treatment membrane-based system's cleaning operations would be collected in holding tanks or sumps and trucked offsite for disposal at an appropriate wastewater disposal facility. Wastewater streams that are unlikely to contain oil and grease, such as the cooler blowdown units and reverse osmosis reject, would bypass the oil/water separator. These process wastewaters would be collected in an onsite retention basin and discharged to the San Gabriel River through an existing AGS outfall. Discharge rates would range between 16 and 99 gpm, with average annual discharge equaling about 11 AFY (AEC 2015). Blowdown (condensate removed from the heat recovery steam generators (HRSG) would be discharged to an atmospheric flash tank where the condensate would be cooled and transferred to the service water storage tank for reuse. Similarly, blowdown from the combustion turbine evaporative coolers would be discharged to the plant process drain system and directed to the service water storage tank for reuse. Any unused portion would be discharged to the sewer.

## Sanitary Wastewater

Sanitary wastewater would be discharged to the facility's sanitary sewer collector system which discharges to the City of Long Beach's sanitary sewer line. The point of interconnection is located 1000 feet from the project property line. A discharge of approximately 0.91 gpm, equivalent to about 1.6 AFY, is expected from the proposed project during all operating conditions. The City of Long Beach provided the applicant with a will-serve letter indicating the availability of this service.

## Stormwater

The proposed project would use the existing site stormwater drainage system. Stormwater in contact with industrial equipment is routed through the oil/water separator system where it would comingle with process discharge water. Oil-free water from the oil/water separator would be discharged to the same onsite retention basin above along with non-contact stormwater before discharge to the San Gabriel River through an existing outfall.

## SETTING

### GROUNDWATER

The proposed project site is located within the Central Groundwater Basin which lies inland and is adjacent to the West Coast Basin of the Los Angeles Coastal Plain Groundwater Basin. The Central Basin has a total capacity of 13,800,000 acre-feet (Department of Water Resources [DWR] 2004). The majority of the West Coast Basin is underlain by the Silverado aquifer (AEC 2013a). With a yield of 80 to 90 percent of the groundwater extracted annually, the Silverado aquifer is the most productive aquifer in the West Coast Basin (DWR 2004).

There are currently two seawater barrier projects in operation to protect the freshwater aquifer: the West Coast Basin Barrier project, which runs from the Los Angeles Airport to the Palos Verde Hills, and the Dominguez Gap Barrier project, which covers the area of the West Coast Basin bordering the San Pedro Bay. Injection wells along these barriers create a groundwater ridge, which inhibits the intrusion of salt water into the subbasin to protect and maintain groundwater elevations (DWR 2004).

Based on a background review conducted by Ninyo & Moore, (2011), historical high groundwater levels at the AEC site have been mapped at a depth of approximately ten feet (California Department of Conservation, Division of Mines and Geology [CDMG] 1997). During subsurface exploration conducted on behalf of the applicant, groundwater was encountered at depths ranging from less than one foot to approximately 14 feet below the ground surface. The variability in the depth to groundwater encountered in the borings was primarily due to the difference in the ground surface elevations of the borings. Further, Dames & Moore reportedly recorded groundwater levels in 1952 ranging from approximately two feet above to one foot below mean sea level (MSL), and URS recorded similar groundwater levels in 2001 (Ninyo & Moore 2011). Based on the reported data by Dames & Moore and URS, and the groundwater levels encountered by Ninyo & Moore (Ninyo & Moore 2011), the groundwater at the project site has been documented at an elevation ranging from approximately two feet above to one foot below MSL. Thus, groundwater may be encountered during excavation activities in the lower areas of the site (Ninyo & Moore 2011).

### Surface Water

Surface watersheds in California are divided into management areas by the state’s Regional Water Boards based on political and physiographic boundaries. The AEC would be within the area regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB). Water quality objectives for San Gabriel River Estuary are contained in the Water Quality Control Plan for the Los Angeles Region (LARWQCB 1994). The project site is adjacent to the San Gabriel River which discharges to the Pacific Ocean near Alamitos Bay. There are five retention basins on the site that are used by AGS for onsite runoff from storm drains, boilers, and sumps. The five retention basins, located in the eastern side of the site, are lined. Any water that collects in these basins is pumped out and discharged to the San Gabriel River. The San Gabriel River Estuary, Alamitos Bay, and Los Cerritos Channel are considered impaired water bodies on the 2010 EPA-approved Total Maximum Daily Load (TMDL)[1] list. Pollutants for which the San Gabriel River Estuary, Alamitos Bay, and Los Cerritos Channel are listed as impaired are listed in Table 5.15-1 of the AFC (AEC 2013a).

## DIRECT/ INDIRECT IMPACTS AND MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and water resources that could be caused by construction, operation, and maintenance of the AEC. Staff's analysis consists of the following steps: establishing thresholds of "significance" used to determine if there is a potentially "significant" impact, gathering data related to construction and operation of the project, screening the data against the thresholds of significance, and then reaching a conclusion to determine whether or not the project presents a potentially "significant" impact. If staff determines that there is a significant impact then staff provides a summary of any mitigation proposed by the applicant and a discussion of the adequacy of the proposed mitigation. If the applicant did not propose any mitigation, or if staff determines that the applicant's proposed mitigation is inadequate, staff may recommend mitigation measures or a modification of the applicant's proposed mitigation.

## SOIL RESOURCES

Staff evaluated the potential impacts to soil resources including the effects of construction and operation activities that could result in erosion and downstream transportation of soils and the potential for contamination to soils and groundwater. There are extensive regulatory programs in effect that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an applicant's ability to identify and implement Best Management Practices (BMPs) to prevent erosion or contamination is sufficient to ensure that these impacts would be less than significant. The LORS and policies presented in **Soil and Water Resources Table 1** were used to determine the significance of AEC impacts.

## WATER RESOURCES

Staff evaluated the potential of AEC to cause a significant depletion or degradation of surface water and groundwater resources. Staff considered compliance with the LORS and policies presented in **Soil and Water Resources Table 1** and whether there would be a significant impact under the California Environmental Quality Act (CEQA).

To determine if significant impacts to soil or water resources would occur, the following questions were addressed consistent with Appendix G of the CEQA Guidelines. Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

- Would the project violate any water quality standards or waste discharge requirements?

[1] The TMDL calculates the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for that particular pollutant and allocates that load to point sources, (Wasteload Allocation), and nonpoint sources (Load Allocation), which include both anthropogenic and natural background sources of the pollutant.

- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?
- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?
- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?
- Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
- Would the project otherwise substantially degrade water quality?
- Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
- Would the project be inundated by seiche or tsunami?
- Would the project result in substantial soil erosion or the loss of topsoil?
- Does the project have impacts that are individually limited, but cumulatively considerable?

## WATER QUALITY

### Construction Stormwater Discharges

The project site comprises 21 acres of land that is part of the 71-acre AGS site. Approximately 8 acres of land within the 21-acre project site would be used for construction activities, including laydown, storage, and parking. AEC construction would use onsite laydown and construction parking areas as well as a 10-acre lot adjacent to the project site. A 1000-ft pipeline would be constructed to connect the project to the existing Long Beach City’s sanitary sewer system. Limited soil disturbance would be necessary to construct the new power blocks because the project would be constructed on an industrial site that has been completely disturbed and would utilize existing infrastructure as needed.

If not managed, operations or construction activities at the project site would have the potential to contaminate stormwater runoff, resulting in an adverse impact to local surface waters, specifically the Pacific Ocean. Ocean waters in the vicinity are protected from degradation by the Los Angeles Region Basin Plan (LARBP).

The discharge for the site would be subject to regulation based on Beneficial Uses identified in the LARBP. The site would likely also be subject to the Coastal Plain of Los Angeles Groundwater Basin Plan. The Coastal Plain of Los Angeles Groundwater Basin lies inland, and is adjacent to the West Coast Subbasin Plan. The site would be subject to regulations by the LARWQCB to protect the following beneficial uses:

- Industrial Service Supply (IND)
- Navigation (NAV)
- Water Contact Recreation (REC1)
- Non-Contact Water Recreation (REC1)
- Commercial and Sport fishing (COMM)
- Wildlife Habitat (WILD)
- Rare, Threatened, or Endangered Species (RARE)
- Spawning, Reproduction, and Development (SPWN)
- Marine Habitat (MAR)

During construction and operation, the stormwater collection system, comprising both existing and new elements, would be used to collect and process stormwater from the site. Stormwater that falls within process equipment containment areas would be collected and discharged to the existing AGS process drain system, which consists of oil/water separation sumps and two retention basins. Stormwater that falls within the plant-wide pavement areas and outside the process equipment containment areas would be routed to an onsite retention basin, which also collects briny blowdown water from the cooling system and the heat recovery steam generator (HRSG). A small portion of stormwater may fall outside of the process containment and pavement areas. This portion of stormwater would either percolate directly into the soil or drain over the surface into the retention basins to assist with the removal of suspended solids. The oil-free stormwater from the process areas and from the pavement areas would be collected in the retention basin to be discharged to the San Gabriel River via an existing outfall, which is ultimately discharged to the Pacific Ocean. Some of the discharge would likely flow into the Alamitos Bay because the San Gabriel River discharge point is adjacent to the entrance from the Pacific Ocean to the Alamitos Bay. The residual oil containing sludge would be collected via vacuum truck and disposed of as hazardous waste thus mitigating potential impacts to these water bodies. See the **Waste Management** section of this FSA for details about disposal locations and quantities.

The project owner would discharge stormwater to the same outfall currently utilized by the AGS under the requirements of the Order No. R4-2000-0082, NPDES No. CA0001139.Stormwater would be discharged to the San Gabriel River via an existing and permitted outfall. The applicant would be required to obtain a construction stormwater permit during construction and would be covered by project-specific Waste Discharge Requirements issued by the LARWQCB for industrial stormwater discharges that occur during operation.

The estimated amount of soil disturbance resulting from demolition of some existing AGS facilities and AEC construction activities requires that it be covered under the federal General Construction Permit (GCP), SWRCB Order No. 2009-0009-DWQ, requiring the applicant to prepare a Stormwater Pollution Prevention Plan (SWPPP) for submittal to the LARWQCB. To ensure compliance with the SWRCB Order and the city of Long Beach stormwater discharge requirements, the project should be required to comply with Condition of Certification **SOIL&WATER-1** which requires a construction SWPPP for the AEC site and laydown areas. The SWPPP would specify BMPs that would prevent all construction pollutants, including erosion products, from contacting stormwater, eliminate or reduce non-stormwater discharges to waters of the Pacific Ocean, and require inspection and monitoring of BMPs.

The project would use up to 600,000 gallons (approximately 1.85 acre-feet) of water for hydrostatic testing of pipes. Hydrostatic testing often involves the use of chemicals that have the potential to impact surface waters. The project would test hydrostatic testing water for harmful constituents. If found clean then it would be disposed of in the storm drain. However, if the hydrostatic testing water is found to contain harmful constituents and the project chooses to discharge it to the waters of the United States, an additional permit may be required by the LARWQCB. Permit Order No. R4-2009-0068, NPDES No. CAG674001 provides requirements for the discharge of water that contains substances that can be harmful to surface waters. If necessary, the applicant shall comply with Condition of Certification **SOIL&WATER-2**, which would require the applicant to obtain permit coverage for hydrostatic discharges under Permit Order No. R4-2009-0068, NPDES NO. CAG674001.

## Contaminated Groundwater

The Phase I Environmental Site Assessment (ESA) states that:

> "Groundwater underlying the site is known to be impacted by metals, volatile organic compounds (VOCs), and 1,4-dioxane. Groundwater is monitored as part of on-going subsurface investigations regarding former Southern California Edison operations at the site including former operation of waste-water retention basins (AEC 2013a, Appendix 5.14A, Phase I ESA, p. 3). These investigations are currently overseen by the Department of Toxic Substances Control. The presence of groundwater contamination represents a Recognized Environmental Condition in connection with the site."

Due to the site's long industrial history and results from the Phase 1 site assessment, it is reasonable to expect that any ground water pumped to dewater excavations will be contaminated. If not appropriately handled the contaminated groundwater could have significant impacts to the on- and off-site water resources.  Staff proposes Condition of Certification **SOIL&WATER-3**, which would require any discharge of dewatering water to comply with the Los Angeles Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board regulatory requirements and NPDES permits such as No.R4-2008-0032 and No. CAG994004. Coverage under Order No. R4-2008-0032, NPDES No. CAG994004 or other RWQCB permits may not be necessary if water quality tests reveal that local groundwater contamination does not exist. If tests show that groundwater is not contaminated then dewatering activities would be covered under the GCP (SWRCB Order No. 2009-0009-DWQ). If groundwater is contaminated the water would be disposed of or treated for discharge in accordance with the approved methods required in the applicable permit.

## Industrial Wastewater and Stormwater Discharge

As stated above, during operation, the existing stormwater collection system would be used to collect and process stormwater from the site. The oil-free stormwater from the process areas and from the pavement areas would be discharged to the San Gabriel River via an existing outfall, and ultimately to the Pacific Ocean. Since the outfall discharges to the San Gabriel River where it flows into the Pacific Ocean adjacent to the Alamitos Bay entrance, it is likely that some of the discharge would flow into Alamitos Bay. The residual oil containing sludge would be collected via vacuum truck and disposed of as hazardous waste (AEC 2013a) thus mitigating potential impacts to these water bodies. See the **Waste Management** section of this FSA for more details about waste streams.

The proposed AEC would discharge sanitary and industrial wastewater consisting of reject water from the reverse osmosis system and blowdown from the HRSG to the LBWD sanitary system, which would be ultimately conveyed to the LACSD facilities. Blowdown from the combustion turbine evaporative coolers would be discharged to the plant process drain system and directed to the service water storage tank for reuse. The unused portion would ultimately be discharged to the sewer. The discharge rate could range from 16 to 99 gpm. The average annual discharge is expected to be about 11 acre-feet per year, assuming 4,600 hours of annual operation. A will-serve letter was issued by the City of Long Beach for AEC indicating that there is sufficient capacity to receive sanitary and industrial wastewater from AEC.

Wastewater from combustion turbine water washes would be collected in combustion turbine drain tanks and then trucked offsite for disposal. Service water would be used for makeup to the combustion turbine evaporative coolers, equipment washdown, and other miscellaneous plant uses.

AGS currently collects non-contact stormwater and oil-free process wastewater in three retention basins along the east side of the project site for ultimate discharge to San Gabriel River. Grading plans show that AEC intends to collect the non-contact wastewater in the south retention basin.

AGS discharges 1,271 mgd of wastewater to the San Gabriel River through once-through cooling units. In addition, the existing project has been discharging up to 11.6 mgd of reverse osmosis (RO), metal cleaning, and preheating wash wastewater to the San Gabriel River. AGS is decommissioning and is expected to be demolished after construction of AEC is completed. Decommissioning of AGS would result in the elimination of the discharge of about 1,283 mgd of OTC and other miscellaneous wastewater to the San Gabriel River. This is a measureable reduction in pollutant loads sent to the ocean from the site. Furthermore, since the discharge point from San Gabriel River to the Pacific Ocean is adjacent to the entrance to the Alamitos Bay, it is likely that some of the discharged wastewater flows into Alamitos Bay. Elimination of this wastewater stream would result in improvement of water quality in the Bay.

The proposed project has been issued a new NPDES permit (SWRCB Order 97-03-DWQ) for operations discharge that would replace the existing Order No. R4-2000-0082, NPDES No. CA0001139. The new permit would require the implementation of Best Management Practices (BMPs) for both the project's industrial discharge and the project's operational stormwater discharges to the San Gabriel River. BMPs would likely include pollutant source control, pollutant containment, a monitoring and sampling protocol, and an iterative process for improving initially implemented BMPs based on monitoring and sampling results.

With implementation of BMPs and associated monitoring activities included in the LARWQCB issued WDRs, impacts to water quality from operation of the proposed AEC would be less than significant. Staff proposes Condition of Certification **SOIL&WATER-4** which would require the applicant to obtain an industrial permit for project operation from the LARWQCB, prior to beginning construction. Staff also recommends Condition of Certification **SOIL&WATER-5** to ensure proper disposal of the industrial wastewater to the sanitary sewer. This condition would require the applicant to comply with the requirements for discharge to City of Long Beach Municipal Code title 15, chapters 4 through 28 and pay their necessary fees for connection and discharge.

## Sanitary Wastewater

Sanitary wastewater would be discharged to the facility's sanitary sewer collector system which discharges to the City of Long Beach's sanitary sewer line that is 1000 feet away from the project site. A discharge of approximately 0.91 gpm is expected from the proposed project during all operating conditions. The City of Long Beach provided the applicant a will-serve letter dated September 3, 2013, indicating it has the capacity and intent to provide the site sewerage service. If the proposed AEC discharges sanitary waste as described above, the impact from its disposal should be less than significant. Staff proposes Condition of Certification **SOIL&WATER-5** which would require the applicant to pay sanitary sewer fees ordinarily assessed by the city, in accordance with the City of Long Beach Municipal Code title 15 chapters 4 through 28.

## Harbor Circulation and Trash Removal

AGS currently uses once through cooling (OTC), which induces flow of trash to the intake screens during pumping from Alamitos Bay for power plant cooling. This inadvertently removes significant volumes of trash thus keeping the harbor clean and clear of debris. Intake water is screened for trash and debris prior to entering the units; and an estimated 165,000 pounds per year of waste is collected and disposed of by the owners of the Alamitos Generating Station (Bodek 2014). Staff from the city of Long Beach has determined that the trash in Alamitos Bay is not generated from the AGS and the Los Angeles Department of Water and Power (LADWP) Haynes generating plants. They also note that the trash gathered at AGS is in the waters of Los Angeles (LA) County and therefore in the county's jurisdiction. LA County collects and disposes the trash from the AGS debris and trash boom.

Regardless of whether the AEC is licensed or not, the AGS OTC system is scheduled to be shut down due to requirements set forth in the State Water Resources Control Board's OTC policy and section 316b of the Clean Water Act. Because the termination of the OTC pumping is not a component or part of the AEC project before the Commission or a physical change related to the AEC project, the end of the garbage removal benefits associated with OTC, would not be a direct or indirect impact of the AEC project. Therefore, no additional analysis or mitigation is required.

Staff concludes that the proposed project is not contributing to waste in the harbor and that, as discussed in the **Waste Management** section of this FSA, all project construction and operation wastes would be managed and disposed of appropriately in accordance with proposed conditions of certification and LORS.

Independent of staff's environmental assessment of the AEC, the city of Long Beach commissioned a study to understand how the cooling water pumps could be re-purposed so that they continue to provide positive water quality benefits (Bodek 2014). Staff understands that the applicant is now working with the City of Long Beach on an agreement to manage flows in the harbor so trash can continue to be collected and disposed of appropriately.

# WATER SUPPLY

## Construction

The applicant proposes to use potable water for dust suppression. Average water use during construction would be about 18,000 gallons per day (gpd) and around 24,000 gpd during hydrostatic testing and commissioning. Commissioning is expected to take about 60 days. Average water use during construction would not be expected to exceed 22 AFY.

The volume of water required for construction would be offset by the operational water savings during the life of the project. Construction of the project would result in a net reduction in local water use. Therefore, the project would have a positive impact in terms of water consumption during the life time of the project.

In Section 6.6.3 of the AFC, the applicant indicated that it would be infeasible to use recycled water for project construction and operation due to the long distances from the project to the three treatment plants that produce recycled water in the area. The treatment plants are 8.0 to 13.0 miles away and would require construction of 8.0- to 13.0-mile pipelines through busy areas. In addition to the cost of constructing the pipeline, the construction activities have their own environmental impacts on the areas where they would be constructed.

## Operation

AEC proposes to use about 130 AFY of potable water (process and sanitary) provided by LBWD for process water. Process water would be used for the generator turbine wash, inlet air evaporative cooling blowdown makeup, water treatment, and other purposes. The AEC would employ a staff of 36 in three rotating shifts. As a result, a minimal amount of potable water would be used for sanitary use, drinking, eye wash, and safety showers, as well as fire protection water. Average use is expected to be less than 1.0 gpm, or approximately 1.6 AFY.

The project would access this water through an existing six-inch-diameter City of Long Beach potable water line serving the existing AGS. LBWD has provided a will-serve letter (AFC Appendix 2E) indicating there is sufficient supply of potable water to accommodate the AEC. The potable water that would be provided to the AEC for use as process water and domestic water is currently allocated for industrial use at the existing AGS (AEC 2013a).

Based on water volumes from 2008 through 2011, the existing AGS has historically used approximately 402 AFY while operating at only 8 percent of its annual maximum capacity. The existing AGS therefore uses more potable water than is proposed for the AEC. Compared to the existing use, the proposed project would result in a net reduction of potable water use equal to 272 AFY and a net beneficial impact on local water supplies, despite a large increase in potential capacity factor and potential energy production (megawatt-hours). In order to ensure that adequate water supplies would be available throughout the life of the project, staff requested a Water Supply Assessment (WSA) from LBWD, pursuant to Water Code sections 10910-10915. LBWD completed the requested WSA (LBWD 2016) based on project water use of 225 AFY rather than the proposed use of 130 AFY. The greater volume analyzed was due to LBWD's assumption that the project would use water at the peak rate for all hours of operation. Even using the greater volume LBWD found that potable water would be available in sufficient amounts during the project life.

In the LORS section below staff has analyzed the feasibility of using recycled water for all industrial applications. In summary, staff concludes that use of recycled water is infeasible.

To ensure that project water use is within the projected volumes analyzed herein, staff proposes Conditions of Certification **SOIL&WATER-6** and **-7**, which would limit potable water use for domestic and process use and require the applicant to meter and report facility water use in compliance reports. Condition of Certification **SOIL&WATER-6** would also require the applicant to pay all water supply connection fees assessed by LBWD in accordance with the LBWD connection and rate policies. If Conditions of Certification **SOIL&WATER-6** and **-7** are implemented as proposed, impacts to local water supplies would be less than significant.

## WATER SUPPLY ALTERNATIVES

The applicant provided detailed information in the Alternatives section of the AFC about the availability of both secondary and tertiary treated recycled water to the project. According to the applicant, there are three possible treatment plants that produce recycled water in the region: the Los Angeles County's Joint Water Pollution Control Plant (JWPCP) located in the city of Carson, more than 13 miles away; the Los Coyotes Water Reclamation Plant (LCWRP), approximately 8.2 miles away; and the city of Los Angeles Terminal Island Water Reclamation Plant (TIWRP) located more than 12 miles from the project site. The applicant cited the distance to the treatment plants as the main reason why it would be too costly to construct a pipeline from those treatment plants to deliver the recycled water to the project.

Energy Commission staff contacted LBWD to check if the city has recycled water available to the project. Staff was informed by the city that they have recycled water in sufficient quantity, but that the closest connection point is about 7,000 feet (1.33 miles) away from the project, which is closer than the treatment plants identified by the applicant. However, costs associated with construction of a 7000-ft pipeline for a single user like AEC are too high considering the project needs of only 130 AFY. Based on information provided by the applicant and information from LBWD, staff concludes that it would be economically infeasible for the project to use recycled water for operation unless more customers could be developed, or the build-out of the recycled water delivery system brings the infrastructure nearer the AEC facility.

## FLOODING

Staff reviewed the Federal Emergency Management Agency (FEMA) Long Beach Flood Insurance Rate Map (FIRM). The proposed project is not located within the 100-year flood zone as defined by FEMA. The site is located in Zone X, which is a zone of moderate flood potential (usually the area between 100-year and 500-year floods' boundaries). In addition, siting of the proposed project would not result in any structures that would impede or redirect flood flows and no impacts would occur. Therefore, flooding impacts due to the implementation of the project are expected to be less than significant.

Projected sea-level rise has the potential to reduce the effectiveness of local flood control measures by increasing the 100-year flood stage. The local protection from inundation is projected to be reduced up to 30 centimeters (1.0 foot) by 2030 and 61 centimeters (2.0 feet) by 2050 (relative to 2000 levels) (CEC 2009; NAS 2012). The site geotechnical report (Ninyo & Moore 2011) acknowledges future sea-level rise. An Energy Commission study (CEC 2009) also shows the project site may have reduced flood protection and inundation potential in the future. A significant rise in local sea water levels would also raise groundwater levels, and raise the fluvial base level, thereby potentially increasing the rate and extent of flooding.

The proposed project would have final grades at least 12 feet above sea level. FEMA flood maps show that the 100-year flood elevation for this area of Long Beach is about 6.0 feet; therefore, the project site would be separated from the flood level by at least 6.0 feet. Using the current projections of sea-level rise, separation between the site and the flood elevation is estimated to be reduced by up to 2.0 feet by the year 2050. However, if the minimum separation between the site and the surrounding floodplain is reduced from six feet to four feet there would still be a sufficient level of flood protection.

## STORM SURGE AND WAVE RUN-UP

Storm surge is usually defined by increased ocean water levels that occur during storms. Much like precipitation events and rainfall runoff events, storm surge events can be assigned recurrence intervals, e.g., 10-year, 100-year, etc. Storms may result in ocean water level increases that create increased threats of local flooding for shoreline property.

Coastal ecosystems, development, and public access are at greatest risk from short term storm events, including the confluence of large waves, storm surges, and high astronomical tides during a strong El Niño climatic event (OPC 2013).

Over the next few decades, episodes of heightened sea level associated with large winter storms and anomalous short period climate patterns will be of greater concern to infrastructure and development in coastal areas than the relatively slow increases that are projected in association with global sea-level rise alone (OPC 2013). The coast of California has experienced two very large El Niño events over the past 30 years, in 1982-83 and 1997-98 water years, when large storms resulted in hundreds of millions of dollars in storm damage to private property and public infrastructure. The damages occurred from a combination of elevated sea levels and large storm waves, especially when these factors coincided with high tides. During the 1983 El Niño event, sea levels were the highest ever recorded in San Diego, Los Angeles and San Francisco, 29.0 cm (11.4 in.), 32.3 cm (12.7 in), and 53.8 cm (21.2 in.), respectively, above predicted high tides. The water levels reached during these large, short term events have exceeded mean sea levels projected for 2030 and approach the values projected for 2050 (OPC 2013). Future sea level needs to be a starting point for project design considerations. Where feasible, consideration needs to be given to scenarios that combine extreme oceanographic conditions on top of the highest water levels projected to result from sea level rise over the expected life of the project.

Tebaldi et al. (2012) modeled the impacts of global sea level rise from climate change on storm surges and reported on the history and expected trends of storms at the Los Angeles Harbor (Gauge 9410660). The 100-year return level storms in this area result in about one meter (three feet) of local sea-level rise. Because both SLR and rise in total water level, including storm surge, in the area were observed to be linear with time, the magnitude of rise in water level attributable to the 100-year storm surge in 2050 is expected to be the same as current conditions, about one meter, or three feet.

Storm surge is taken into account when FEMA conducts coastal zone flood analyses. The Base Flood Elevations (BFEs) are the sum of storm surge, wave run-up, and tidal effects. The site is not currently classified as being within the 100-year floodplain. Based on estimates of rise in sea levels as stated above, the site classification could change by the year 2050. The site is vulnerable to flooding from extreme weather events and its protection may decrease in the future. However, even with high-end estimates of storm surge by 2050 (relative to 2000) (Tebaldi et al. 2012), the site would still be at least 5.5 feet above the current (2012) 100-year floodplain (FEMA 2012). This vertical separation should be sufficient to protect the project from flooding impacts.

### TSUNAMI AND SEICHE

The proposed site is within the zone identified by California Emergency Management Agency (CEMA) as a tsunami inundation zone and would be located adjacent to an enclosed bay or harbor that could be subject to seiche. An analysis of hazards posed by tsunami and seiche is included in the **Geology and Paleontology** section of this FSA.

## CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of reasonably foreseeable future projects (California Code of Regulations, tit. 14, §15130). The construction and operation activities of the various projects could potentially overlap and result in cumulative impacts to the same resource(s).

### POTABLE WATER SUPPLY

The project’s use of dry cooling and other water efficiency measures as described in the **Project Description** section and the adequacy of local water supplies as described in the WSA would ensure the project’s water use would not result in a significant adverse cumulative impact. In addition, because the existing AGS will eventually shut down, it can be expected that the cumulative local water consumption will be decreasing even with the addition of the AEC which will consume 272 AFY less than the AGS.

## WATER QUALITY

The project's use of dry cooling and other water efficiency measures as described in the **Project Description** section would ensure the project's waste water disposal would not result in a significant adverse cumulative impact to water quality by reducing waste water volume and pollutant loads. In addition, because the existing AGS will eventually shut down, it can be expected that the cumulative local waste water volume and pollutant loads will be decreasing even with the addition of the AEC.

## COMPLIANCE WITH LORS

The Energy Commission's power plant certification process requires staff to review each of the proposed project elements for compliance with LORS and state policies. Staff has reviewed the project elements and concludes that the proposed AEC project would comply with all applicable LORS addressing protection of water resources, stormwater management, and erosion control, as well as drinking water, use of freshwater, and wastewater discharge requirements, as long as staff's proposed conditions of certification are adopted and implemented. Summary discussions of project compliance with significant LORS and policies are provided below.

## STORMWATER

### Clean Water Act

Staff has determined that AEC would satisfy the requirements of the NPDES permit with the adoption of Conditions of Certification **SOIL&WATER-1** through **SOIL&WATER-4**. These conditions would ensure that there are no cumulative impacts from the project stormwater management.

## PORTER-COLOGNE WATER QUALITY CONTROL ACT

Staff has concluded that AEC would satisfy the applicable requirements of the Porter-Cologne Water Quality Control Act and adequately protect the beneficial uses of waters of the state through implementation of federal, state, and local requirements for management of stormwater discharges and pollution prevention and compliance with local grading and erosion control requirements, and compliance with local onsite wastewater system requirements.

### SWRCB Policy 75-58 and Energy Commission—Integrated Energy Policy Report (IEPR)-Power Plant Water Use and Wastewater Discharge Policy

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, (policy) and State Water Resources Control Board Resolution 75-58, will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. The IEPR policy also requires the use of zero-liquid discharge (ZLD) technologies unless such technologies are shown to be "environmentally undesirable" or "economically unsound."

Alternative sources were evaluated for their potential to supply the project's process water needs.

There are three possible treatment plants that produce recycled water in the region: the JWPCP located in the City of Carson, more than 13 miles away; the LCWOP, approximately 8.2 miles away; and the TIWRP located more than 12 miles from the project site. The applicant stated that it would not be economically feasible to use recycled water from those three treatment plants. The applicant cited distance to the treatment plants as the main reason why it would be too costly to obtain recycled water from them.

Energy Commission staff contacted the city of Long Beach to find out if the city has recycled water available to the project. Staff was informed by the city official in charge of water supplies that the city has recycled water in sufficient quantity, but that the closest connection point is 7,000 feet away from the project. Staff concludes that constructing a pipeline to deliver only 130 AFY for project operation would not be economically feasible.

Additionally, the applicant proposes to use air cooling technology to reduce the amount of water required for plant operation compared to consumption from water cooled technologies. The air-cooled condenser would significantly reduce the plant's water needs, by about 272 AFY compared to the baseline with the existing consumption from the AGS. Staff concurs with the applicant that the use of an air-cooled condenser is an economically sound practice that provides environmental benefits from significantly reduced water use. Staff also notes that although the project would include a limited amount of water use for inlet air cooling, it would also include use of dry low NOx combustors which would also conserve water use.

Furthermore, the Energy Commission's water policy also seeks to protect water resources from power plant wastewater discharges. To that end, the water policy specifies that the Energy Commission will require ZLD technologies (for management of power plant wastewaters) unless such technologies are shown to be 'environmentally undesirable' or 'economically unsound.' The AEC would not utilize ZLD technologies, because the project would allow for a substantial reduction in wastewater volume to the San Gabriel River. Staff notes that the applicant proposes a number of water reuse and wastewater reduction systems which would include the following:

- The reject water stream from the reverse osmosis system would be discharged to the City of Long Beach sanitary sewer system.
- Blowdown (condensate removed from the HRSGs to reduce water contaminants) would be discharged to an atmospheric flash tank, where the flash steam would be vented to the atmosphere and the condensate would be cooled prior to transfer to a holding tank for reuse.
- Blowdown from the combustion turbine evaporative coolers would be discharged to the plant process drain system and stored for reuse onsite; any unused portion would be discharged to the city's sewer system.
- Service water would be used for makeup to the closed-loop fluid coolers, equipment washdown, and other miscellaneous plant uses.

Therefore, staff finds that the wastewater management would be in compliance with the intent of the water policy because it eliminates the significant portion of process wastewater discharge from the facility.

## WATER SUPPLY ASSESSMENT

### California Water Code, Sections 10910-10915 (Senate Bill 610 of 2001)

Staff reviewed California Water Code, sections 10910-10915 to evaluate their applicability to the proposed project. The codes require public water systems to prepare WSA for certain defined development projects subject to the CEQA. Lead agencies determine, based on the WSA, whether projected water supplies will be sufficient to meet project demands along with the region's reasonably foreseeable cumulative demand under normal, single-dry, and multiple-dry year conditions. LBWD prepared a WSA for AEC in conformance with Sections 10910-10915 (LBWD 2016). It should be noted that instead of using the design maximum annual water consumption for the project, LBWD assumed that the project would operate at its peak demand throughout its hours of operation. This resulted in an annual demand of 225 AFY, which is much larger than the design maximum annual demand of 130 AFY. However, even assuming this much larger demand, the WSA concludes that sufficient potable water is available to supply AEC under the three water year scenarios: normal, single dry and multiple dry. The WSA was approved by the city of Long Beach Board of Water Commissioners on January 21, 2016. Staff proposes Condition of Certification **SOIL&WATER-6** to limit the amount of water used consistent with the scope of this analysis and the Water Supply Assessment.

## LOCAL LORS

Staff concludes that the implementation of Conditions of Certification **SOIL&WATER-5** AEC would satisfy the applicable requirements of all local LORS by paying necessary local connection fees to the City of Long Beach for potable water supply and sanitary sewer disposal services.

## NOTEWORTHY PUBLIC BENEFITS

- The proposed project would reduce the amount of potable water used relative to baseline conditions. The reduction in water use would be about 272 AFY.
- The proposed project would result in approximately 0.24 mgd reduction in discharge of industrial wastewater to the San Gabriel River and ultimately the Pacific Ocean, and a similarly proportional decrease in pollutant loading, which would result in an improvement of the water quality in the Pacific Ocean and the Alamitos Bay.
- The proposed project would utilize dry cooling which significantly reduces potential water consumption. The project would also reuse a portion of the blowdown water from the HRSGs and combustion turbines which would result in reduction of water consumption and wastewater discharges. This would, along with utilization of dry cooling, significantly reduce impacts to water resources compared to older technologies such as OTC.

## RESPONSES TO PSA COMMENTS

Staff received one common comment from a few members of the public related to the **Soil and Water Resources** section and some comments from the applicant and Plains West Coast Terminals LLC ("Plains"). Comments (in italics) and staff responses to the comments are listed below.

## APPLICANT'S COMMENTS:

The applicant's comments are regarding the wording of some of the conditions of certification.

**Applicant's Comment 1**: *Page 4.10-24, Condition* ***SOIL&WATER-2*** *– The hydrostatic testing will occur well after site mobilization and AES suggests the following change to the verification to better reflect when this documentation should be submitted.*

***Verification:*** *30 days prior to* ***<u>the first scheduled hydrostatic testing event</u>*** *~~site mobilization~~, the project owner shall submit to the CPM documentation that all necessary NPDES permits were obtained from the Los Angeles RWQCB or State Water Board.*

> **Response**: Staff agrees with the applicant's proposed modification. Condition language has been revised to reflect the change.

**Applicant's Comment 2:** *Page 4.10-25, Condition SOIL&WATER-3 – Please delete the following sentences or, in the alternative, move them to the Verification: "The project owner shall pay all necessary fees for filing and review of the RWD and all other related fees. Checks for such fees shall be submitted to the RWQCB and shall be payable to the State Water Resources Control Board." This will avoid the need to file an amendment if the State changes the payee or payee information.*

> **Response**: Staff agrees with moving the sentences to the Verification.

**Applicant's Comment 3:** *Page 4.10-25, Condition SOIL&WATER-3 – Please delete the following sentences or, in the alternative, move them to the Verification: "In furtherance of that objective, the Energy Commission hereby delegates the enforcement of the waiver or permit requirements, and associated monitoring, inspection, and annual fee collection authority, to the RWQCB. Accordingly, the Energy Commission and the RWQCB shall confer with each other and coordinate, as needed, in the enforcement of the requirements." The RWQCB may argue that this is a federal responsibility delegated to the Board. This legal question need not be resolved in Condition language for this project.*

> **Response**: Staff does not agree with the change. This is language that was agreed to with review and comment by the State Water Resources Control Board. In addition, the language of the condition specifically acknowledges the situation where the permit may be issued in accordance with federal NPDES requirements resulting in RWQCB having enforcement authority over the underlying NPDES permit and the Energy Commission having enforcement authority over the condition of certification.

**Applicant's Comment 4:** *Page 4.10-26, Condition SOIL&WATER-6 – The requirement for a maximum allowable quantity of sanitary water use is not necessary and should be eliminated. In order to document the sanitary water use, AES will need to install water meters on water supply pipelines to all buildings that include sanitary water uses. This represents an unneeded burden when the sanitary water use represents approximately 1 percent of the maximum allowable water use. Furthermore, AES will install sanitary facilities that comply with the California Building Code requirements for energy and water conservation, which will reduce sanitary water use consistent with state law. AES suggests the following revision to Condition SOIL&WATER-6:*

*Water supply for project construction and industrial uses during project construction and operation shall be potable water supplied by the City of Long Beach Water Department (LBWD). Water use for project operation shall not exceed 130 AFY~~, of which a maximum of 1.6 AFY shall be for sanitary purposes~~. Water use for construction shall not exceed 22 AFY during the 56-month construction period. A monthly summary of water use shall be submitted to the CPM.*

> **Response:** Staff does not agree with the proposed modification but proposes an alternate modification to the condition that will ensure adequate metering of water use for compliance consistent with the staff analysis of water use. Staff also notes that **SOIL&WATER-7** requires the applicant to meter the project water use such that domestic and process potable water use can be reported separately. The applicant did not comment on this requirement. Staff's experience indicates that it would be relatively simple to isolate and report domestic water use separately with appropriate design of the piping and metering system.

**Applicant's Comment 5:** *General request to keep the trash collection benefits from running the pumps at the AGS facility or to consider the impacts of turning the pumps off on the trash level in Alamitos Bay.*

> **Response**: As discussed above in the section titled, Harbor Circulation and Trash Removal, the pumping that is producing this benefit is part of the AGS facility, not the AEC. The proposed AEC facility is the project subject to this review and therefore, the impacts associated with the AGS pumps are outside the scope of this Final Staff Assessment.

## PLAINS' COMMENTS:

**Plains' Comment 1:** *Construction activity will affect Plains West Coast Terminals storm water quality draining to Outfall 3. Recommend that AES incorporate the eastern earthen lot (that they hope to lease from Plains for construction) between our tank farm and San Gabriel River into their Construction Storm Water Permit. Please provide us with the detail BMPs they will use to protect discharges through Outfall 3.*

**Response:** The project owner would implement Best Management Practices (BMPs) included in the SWPPP to ensure there would be no significant impacts to water quality from on- and off-site stormwater discharges. The SWPPP would be prepared prior to site mobilization per Condition of Certification **SOIL&WATER-1** and would include the construction and laydown areas. The Los Angeles Regional Water Quality Control Board (LARWQCB) is also responsible for regulating the stormwater discharges during project construction pursuant to the federal Clean Water Act. Once the applicant files the SWPPP with Energy Commission staff and LARWQCB in accordance with each agency's required schedule, the proposed BMPs specific to site and project design can be provided for Plains' review.

**Plains' Comment 2:** *There are currently two intake channels used to supply water to the AES facility. Plains understands, on completion of the project, AES will no longer utilize this water supply. Plains has pumping facilities within 100 feet of one channel and a pipeline that crosses the other channel. Request that both channels be refilled.*

**Response:** The intake channels are used to supply cooling water to the existing AGS facility. As discussed throughout the PSA, the AGS facility units 1-6 compliance with the Once-Through Cooling Policy, which could result in decommissioning and demolition of the units and related structures, is not part of the AEC project currently under Commission review. A decision whether the channels should be filled once AGS is decommissioned, and also a determination of the environmental impacts of such action, if any, are outside the scope of staff's analysis. Because the channels are not part of the AEC project and staff has not made a determination of environmental impacts associated with the channels, no mitigation can be recommended, including that the channels be filled.

## CONCLUSIONS

Based on the assessment of the proposed AEC, Energy Commission staff concludes that:

- The AEC would use potable water for construction lasting about 56 months. Use would not exceed an annual rate of about 22 acre-feet per year (AFY) (about 100 AF total). Operation water use (process and sanitary uses) would not exceed 130 AFY. Once Alamitos Generating Station (AGS) ceases operation after completion of construction of the AEC, this would reduce the amount of potable water used relative to baseline conditions, i.e. the AGS, which would cease operation after completion of construction of the AEC. The reduction in potable water use would be about 272 AFY, which would result in additional supplies for other beneficial uses.
- Although the project would reduce potable water use relative to baseline conditions, staff conducted additional analysis to evaluate whether reclaimed water from nearby wastewater treatment plants or the city of Long Beach could be used as an alternative supply. Staff concluded that due to the small volume of water needed for operation, long distances to treatment plants and the nearest interconnection to the city's reclaimed water distribution system, it would be economically infeasible to use reclaimed water at this time.

- The proposed project would result in a reduction of 0.24 million gallons per day (mgd) in industrial wastewater discharge to the San Gabriel River and ultimately the Pacific Ocean and a similarly proportional decrease in pollutant loading associated with industrial wastewater, which would improve the water quality in the ocean and the Alamitos Bay.
- The proposed site has a long industrial history and would not require a lot of additional soil disturbance for the new facilities and, as such, would result in minimal losses to soil resources. Though some small losses in sediment are expected during construction and operation from wind and water erosion, onsite management of stormwater runoff and sediment erosion as proposed by staff in Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-4** would adequately minimize soil loss.
- Staff proposes Condition of Certification **SOIL&WATER-1,** which would require the proposed project to comply with the Clean Water Act and obtain discharge permits for construction through the State Water Resources Control Board. This condition would ensure that the impacts to waters of the US from construction would be less than significant.
- Staff proposes Condition of Certification **SOIL&WATER-2**, which would require the proposed project to comply with Permit Order No. R4-2009-0068, NPDES NO. CAG674001, if hydrostatic testing waters are discharged to waters of the US. This condition would ensure that the impacts to waters of the US from hydrostatic testing would be less than significant.
- Groundwater at the site is relatively shallow and potentially contaminated by petroleum by-products. Trench and foundation excavations would likely encounter shallow groundwater and dewatering would be required for stabilization. If dewatering is required for any construction activities, staff recommends that the applicant comply with Condition of Certification **SOIL&WATER-3**, which would require the applicant to apply for coverage under a RWQCB permit that would allow for the discharge of petroleum-contaminated groundwater from dewatering activities.
- Staff proposes Condition of Certification **SOIL&WATER-4,** which would require the proposed project to comply with the Clean Water Act and obtain industrial discharge permits for project operation through the State Water Resources Control Board. This condition would ensure that the impacts to waters of the US would be less than significant.
- Staff proposes Condition of Certification **SOIL&WATER-5**, requiring the proposed project to comply with the city of Long Beach code, title 15 chapters 4 through 28, which define regulations and permits required for discharge of wastewater to the city’s wastewater system. Compliance with this condition would ensure that connections to the city’s sewer system are completed appropriately and that annual fees are paid to the city.
- LBWD has conducted a WSA and concluded that there is sufficient supply available for the project.

- The proposed project would use potable water supplied by LBWD for construction and operation. Water would be supplied through an existing connection used by the existing AGS. Staff proposes Condition of Certification **SOIL&WATER-6** to limit the amount of water used consistent with the scope of this analysis and the Water Supply Assessment. Staff also proposes Condition of Certification **SOIL&WATER-7**, which would require the applicant to install water meters on site for accurate reporting of water use.
- The proposed project is located in Zone X and is separated from the 100-year flood stage (flood with a 1 percent probability of occurrence in any year) by at least six feet.
- Recent Energy Commission studies show the project site and vicinity to be at increased risk of flooding due to relative sea level rise. However the proposed site would be sufficiently above sea level to ensure power plant reliability. Even with high-end estimates of relative sea-level rise of 61 centimeters (2.0 feet) by 2050 (relative to 2000) (Tebaldi et al. 2012, NAS 2012), the site would still be about 4 feet above the current (2012) 100-year floodplain (FEMA 2012).
- The proposed project would include use of air cooled condensers for cooling of the steam cycle. This technology significantly reduces the potential for use of other water supplies and is encouraged in accordance with the Energy Commission's water policy. Development of alternative water supplies for remaining industrial uses does not appear to be feasible. In addition, the project would use a number of systems to reuse wastewater and reduce wastewater volume. Staff believes the project water use is consistent with Energy Commission water policy.
- The proposed project would comply with SWRCB's Resolution No. 2010-0020, Policy for the Use of Coastal and Estuarine Waters for Power Plant Cooling, by the use of dry-cooling technology.

## PROPOSED CONDITIONS OF CERTIFICATION

## NPDES CONSTRUCTION PERMIT REQUIREMENTS

**SOIL&WATER-1:** The project owner shall manage stormwater pollution from construction activities by fulfilling the requirements contained in State Water Resources Control Board's (SWRCB) *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWG, NPDES No. CAS000002*) and all subsequent revisions and amendments. The project owner shall develop and implement a construction Stormwater Pollution Prevention Plan (SWPPP) for the construction of the project. The project owner shall submit the SWPPP to the CBO and CPM for review and SWRCB for review and approval.

**Verification:** 30 days prior to site mobilization, the project owner shall submit the construction SWPPP to the delegate chief building official (CBO) and compliance project manager (CPM) for review and the SWRCB for review and approval. A copy of the construction SWPPP shall be kept accessible onsite at all times. Within ten days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the Los Angeles RWQCB about the general NPDES permit for discharge of stormwater associated with construction and land disturbance activities. This information shall include a copy of the notice of intent and the notice of termination submitted by the project owner to the SWRCB.

## HYDROSTATIC WATER DISCHARGE PERMIT REQUIREMENTS

**SOIL&WATER-2:** Prior to initiation of hydrostatic testing water discharge to surface waters, the project owner shall obtain a National Pollutant Discharge Elimination System permit for discharge to the Pacific Ocean. The project owner shall comply with the requirements of the Permit Order No. R4-2009-0068, NPDES No. CAG674001 for hydrostatic testing water discharge. The project owner shall provide a copy of all permit documentation sent to the Los Angeles Regional Water Quality Control Board (RWQCB) or SWRCB to the CPM and notify the CPM in writing of any reported non-compliance.

**Verification:** 30 days prior to the first scheduled hydrostatic testing event, the project owner shall submit to the CPM documentation that all necessary NPDES permits were obtained from the Los Angeles RWQCB or State Water Board. 30 days prior to project operation, the project owner shall submit to the CPM a copy of the relevant plans and permits received. The project owner shall submit to the CPM all copies of any relevant correspondence between the project owner and the Water Board regarding NPDES permits in the annual compliance report.

## GROUNDWATER DISCHARGE PERMIT REQUIREMENTS

**SOIL&WATER-3**: Discharge of dewatering water shall comply with the Los Angeles Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board regulatory requirements. The project owner shall submit a Report of Waste Discharge (RWD) to the compliance project manager (CPM) and RWQCB for determination of which regulatory waiver or permit applies to the proposed discharges. The project owner shall ensure compliance with the provisions of the waiver or permit applicable to the discharge. Where the regulatory requirements are not applied pursuant to a National Pollutant Discharge Elimination System permit, the requirements of the applicable waiver or permit shall be enforceable by both the Commission and the RWQCB. In furtherance of that objective, the Energy Commission hereby delegates the enforcement of the waiver or permit requirements, and associated monitoring, inspection, and annual fee collection authority, to the RWQCB. Accordingly, the Energy Commission and the RWQCB shall confer with each other and coordinate, as needed, in the enforcement of the requirements.

**Verification:** Prior to any dewatering water discharge, the project owner shall submit a RWD to the RWQCB to obtain the appropriate waiver or permit. The appropriate waiver or permit must be obtained at least 30 days prior to the discharge. The project owner shall submit a copy of any correspondence between the project owner and the RWQCB regarding the waiver or permit and all related reports to the CPM within ten days of correspondence receipt or submittal. The project owner shall pay all necessary fees for filing and review of the RWD and all other related fees. Checks for such fees shall be submitted to the RWQCB and shall be payable to the State Water Resources Control Board.

## NPDES INDUSTRIAL PERMIT REQUIREMENTS

**SOIL&WATER-4:** Prior to site mobilization, the project owner shall obtain a National Pollutant Discharge Elimination System permit for industrial waste and stormwater discharge to the San Gabriel River. The project owner shall discharge to the same outfall currently utilized by the Alamitos Generating Station under the requirements of Order No. R4-2000-0082, NPDES No. CA0001139. The project owner shall provide a copy of all permit documentation sent to the Los Angeles or State Water Board to the CPM and notify the CPM in writing of any reported non-compliance.

**Verification:** Prior to site mobilization, the project owner shall submit to the CPM documentation that all necessary NPDES permits were obtained from the Los Angeles or State Water Board. 30 days prior to project operation, the project owner shall submit to the CPM a copy of the Industrial SWPPP. The project owner shall submit to the CPM all copies of any relevant correspondence between the project owner and the Board regarding NPDES permits in the annual compliance report.

## WATER AND SEWER CONNECTIONS

**SOIL&WATER-5:** The project owner shall pay the city of Long Beach all fees normally associated with industrial connections to the city's sanitary sewer and water supply system as defined in Title 15 of the city code.

**Verification:** 30 days prior to the scheduled connection to the city's sewer and water supply system, the project owner shall submit to the CPM a copy of the application to the city to connect to the sewer and water supply system and the check submitted to pay the fees described above. Fees paid to the city shall be reported in the Annual Compliance Report for the life of the project.

## WATER USE AND REPORTING

**SOIL&WATER-6:** Water supply for project construction, sanitary, and industrial uses during project construction and operation shall be potable water supplied by the city of Long Beach Water Department (LBWD). Water use for project operation, including 1.6 AFY for sanitary purposes, shall not exceed 130 AFY. Water use for construction shall not exceed 22 AFY during the 56-month demolition and construction period. A monthly summary of water use shall be submitted to the CPM.

**Verification:** No later than 60 days prior to construction, the project owner shall submit to the CPM two copies of the executed agreement for the supply and onsite use of potable water from LBWD.

The project owner shall submit a water use summary report to the CPM monthly during construction and annually during operations for the life of the project. The annual report shall include calculated monthly range, monthly average, daily maximum within each month and annual use by the project in both gallons per minute and acre-feet. After the first year and for subsequent years, this information shall also include the yearly range and yearly average potable water used by the project.

## WATER METERING

**SOIL&WATER-7:** Prior to the use of potable water, the project owner shall install and maintain metering devices as part of the water supply and distribution system. The project shall monitor and record in gallons per day the total volume of potable water from LBWD. Those metering devices shall be operational for the life of the project and must be able to record the volume of construction, domestic, and process water use separately.

**Verification**: At least 30 days prior to use of water for project construction and operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

## REFERENCES

**AEC 2013a** – Alamitos Energy Center (TN 201620-1 to -72) Application for Certification Volume 1 & 2, dated December 27, 2013. Submitted to CEC/Docket Unit on December 27, 2013

**Bodek 2014** – Email from Amy Bodek, City of Long Beach, Director of Developmental Services to Ellie Townsend-Hough. October 10, 2014.

**CEC 2009**. The Impacts of Sea-Level Rise on the California Coast, Final Paper. California Energy Commission, Docket CEC-500-2009-024-F.

**DWR 2004**. California's Groundwater Bulletin 118 – Coastal Plain of Orange County Groundwater Basin. Updated February 27, 2004.

**DWR 2003.** Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001. California Department of Water Resources. October 8, 2003.

**FEMA 2012**. Flood Insurance Rate Map 6059C0263J, December 3, 2009. Accessed at https://msc.fema.gov, on January 3, 2013.

**LBWD 2016** – Long Beach Water Department. Water Supply Assessment for Alamitos Energy Center, Long Beach, CA. January 21, 2016. Docket TN # 211015.

**NAS 2012.** Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. National Academy of Sciences, Committee on Sea Level Rise in California, Oregon, and Washington. ISBN: 978-0-309-25594-3

**Ninyo & Moore 2011.** Preliminary Geotechnical Evaluation, Redondo Beach Generating Station. Prepared by Ninyo & Moore, October 31, 2011.

**OWP 2012** - California State University, Sacramento. Office of Water Programs, Division of Environmental Analysis Water Quality Planning Tool.

**Tebaldi, C., Strauss, B.H., and Zervas, C.E. 2012.** -- Modeling sea level rise impacts on storm surges along US coasts. Environ. Res. Lett. 7 (2012) 014032 (11pp).

# TRAFFIC AND TRANSPORTATION

Testimony of Lisa Worrall

## SUMMARY OF CONCLUSIONS

Energy Commission staff has analyzed the information provided in the Supplemental Application for Certification (SAFC) and acquired from other sources to determine the potential for the Alamitos Energy Center (AEC, the project) to have significant adverse traffic and transportation-related impacts. Staff assessed the potential for mitigation proposed by the applicant and conditions of certification developed by staff to reduce any potential impacts to a less-than-significant level, as well as the feasibility and enforceability of those proposed mitigations and recommended conditions.

Staff proposes Conditions of Certification **TRANS-1** through **TRANS-7** to reduce potential impacts to a less than significant level and to ensure that the project would comply with all applicable laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation. Staff proposes Condition of Certification **TRANS-8** to promote aviation safety.

Implementation of Conditions of Certification **TRANS-1** through **TRANS-5** would reduce the potential AEC impacts to less than significant for the population within the six-mile radius of the AEC, including the environmental justice (EJ) population represented in **Socioeconomics Figure 1** and **Table 3**.

## INTRODUCTION

In compliance with the California Environmental Quality Act (CEQA) and Energy Commission requirements, this analysis identifies the AEC's potential impacts to the surrounding transportation systems and proposed mitigation measures (conditions of certification) that would avoid or lessen these impacts. It also addresses the project's consistency with applicable federal, state, and local transportation-related LORS.

## APPLICANT-PROPOSED IMPROVEMENTS AND TRAFFIC MITIGATION

The applicant has proposed a Construction and Demolition Transportation Management Plan (TMP) to ensure that construction and demolition activities of AEC would result in less than significant traffic impacts (AEC 2015f, pg. 5.12-18). The TMP would include:

- employee work schedule during the peak construction period to minimize arrivals during the morning peak hour when project impacts are anticipated. Specifically, the construction workforce will be scheduled to arrive at the site prior to 7:00 a.m. (Monday through Friday).

- timing of heavy equipment and building material deliveries, potential street or lane closures, signing, lighting, and traffic control device placement. Damage to any roadway caused by project construction traffic will be restored to or near its preexisting condition based on the procedures established by the TMP. The construction contractors will work with the local agencies to prepare a schedule and mitigation plan for the roadways along the construction routes in accordance with the procedures established by the TMP.

The applicant's proposed mitigation measures in the TMP are similar to staff's proposed Conditions of Certification **TRANS-1** through **TRANS-3** which are discussed in greater detail in the "Direct/Indirect Impacts and Mitigation" subsection below.

## SETTING

The proposed AEC would be constructed on the site of the existing AES Alamitos Generating Station (AGS). The AEC would occupy a 21-acre site within a larger 71 acre parcel in the city of Long Beach, Los Angeles County. The AEC site is located at the southeast corner of the intersection of SR-22 (Garden Grove Freeway/7th Street) and Studebaker Road. Access is provided via one primary security gated entrance on the western side of the site. The gated entrance is accessed via a signalized intersection on Studebaker Road approximately 300 feet south of the Studebaker Road/ SR 22 eastbound on-ramp.

The AGS parcel is bordered to the north by an existing Southern California Edison switchyard and SR-22, to the east by the San Gabriel River and beyond that to the Los Angeles Department of Water and Power Haynes Electrical Generating Station, to the south by the former Plains West Coast Terminals petroleum storage facility and undeveloped property, and to the west by the Los Cerritos Channel and beyond that to residences, AGS cooling-water canals, and Studebaker Road (AEC 2015f, pg. 2-4).

The AEC site is located in the southeastern most area of Long Beach within the Southeast Area Development and Improvement Plan (SEADIP) area. This portion of the SEADIP area is designated for industrial uses (AEC 2015f, pg. 5.6-15). Land uses around the project site are a mix of industrial, residential, recreational, open space areas, and sporadic commercial development (AEC 2015f, pg. 5.6-5). See the **LAND USE** section for a discussion of the surrounding general plan land use designations and land uses in the AEC project area.

The project would include the use of 8-acres of temporary construction laydown area spread throughout the AEC site plus a 10-acre temporary construction laydown area, south of the AEC site within the AGS parcel (AEC 2015f, pg. 1-3). Access to the laydown areas would be via the primary Studebaker Road entrance.

Construction of the AEC would require the delivery of large components by way of heavy/oversized trucks from the Port of Long Beach to the project site. The use of heavy/oversized trucks would be subject to the permitting requirements of the California Department of Transportation (Caltrans) and the local cities and counties listed in the LORS table in **Traffic and Transportation Table 1.** The roadways that would be affected by the proposed route are discussed below.

A new 1,000-foot long, 6-inch diameter sewer pipeline would be constructed from the AEC site and connect to an existing Long Beach Water District sewer pipeline in the residential subdivision west of the project site (AEC 2015f, pg. 2-5). The new pipeline would begin at the west side of the AEC site near the intersection of Studebaker Road and the northern cooling water canal, cross under Studebaker Road, turn south to the intersection with Lyons Drive, turn west to cross under Los Cerritos Channel where the pipeline would be affixed to the bridge, and then finally turn north on East Vista Street to connect to the existing sewer line in the residential subdivision.

Refer to the **Project Description** section for a detailed discussion of the existing power generating facilities on site, project description and a description of the construction schedule.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

**Traffic and Transportation Table 1** provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation that apply to this project.

**Traffic and Transportation Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| APPLICABLE LORS | DESCRIPTION |
|---|---|
| **FEDERAL** | |
| Title 14, Code of Federal Regulations, Section 77.13 (1) | This regulation requires notification of the Federal Aviation Administration (FAA) of construction or alteration at or above 200 feet above the ground level at its site. |
| Title 14, Code of Federal Regulations, Section 77.13 (2)(i) | This regulation requires notification of the Federal Aviation Administration (FAA) of any construction or alteration of greater height than an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length. |
| Title 49, Code of Federal Regulations, Parts 171-177 | Requires proper handling and storage of hazardous materials during transportation. |
| **STATE** | |
| California Department of Transportation CA Manual of Uniform Traffic Control Devices (MUTCD) Part 6 (Traffic Manual) | Provides traffic control guidance and standards for continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities when the normal function of a roadway is suspended. |
| California Health and Safety Code, Section 25160 | Addresses the safe transport of hazardous materials. |
| California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480 et seq., 1850-1852 | Requires encroachment permits for projects involving excavation in state and county highways and city streets. |

| APPLICABLE LORS | DESCRIPTION |
|---|---|
| California Vehicle Code | |
| Sections 13369, 15275, 15278 | Requires licensing of drivers and the classification of license for the operation of particular types of vehicles. A commercial driver's license is required to operate commercial vehicles. An endorsement issued by the Department of Motor Vehicles (DMV) is required to drive any commercial vehicle identified in Section 15278. |
| Sections 31303-31309 | Requires transportation of hazardous materials to be on the state or interstate highway that offers the shortest overall transit time possible. |
| Sections 32100-32109 | Requires shippers of inhalation hazards in bulk packaging to comply with rigorous equipment standards, inspection requirements, and route restrictions. |
| Sections 34000-34100 | Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in Section 25167.4 of the Health and Safety Code. |
| Sections 35550-35551 | Provides weight guidelines and restrictions vehicles traveling on freeways and highways. |
| Section 35780 | Requires a single-trip transportation permit to transport oversized or excessive loads over state highways. |
| **LOCAL** | |
| 2010 Los Angeles County Congestion Management Plan (CMP) | A required transportation planning document for urbanized areas with populations of 50,000. The Los Angeles County CMP goals are to support regional mobility and air quality objectives by reducing traffic congestion. |
| City of Long Beach General Plan, Mobility Element | The Mobility Element is a required chapter of the General Plan which evaluates the transportation needs of the city and provides a transportation plan to meet those needs. |
| City of Seal Beach General Plan, Circulation Element | The Circulation Element establishes LOS standards for local city streets and intersections. |
| City of Seal Beach Traffic Impact Study Guidelines | Identifies the minimum requirements for a Traffic Impact Study submitted to the city of Seal Beach. These guidelines specify increases in ICU that are considered significant and require mitigation. |
| City of Long Beach Municipal Code | |
| Title 10 Vehicles and Traffic, Chapter 10.18.10 Vehicles restricted from streets- Vehicles prohibited in central traffic district | Prohibits specific vehicles (freight vehicles) in the central traffic district between 7:00 a.m. and 6:00 p.m. |
| Title 10 Vehicles and Traffic, Chapter 10.41 Use of streets by Overweight Vehicles. 10.41.020 Special Permit Required | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. |

| APPLICABLE LORS | DESCRIPTION |
|---|---|
| Title 18 Buildings and Construction, Chapter 18.17 Transportation Improvement Fee | Transportation Improvement Fee is imposed on new development in the city of Long Beach. The fee assures the transportation level of service goals are met with respect to the additional demands placed on transportation system by traffic generated by new development. |
| City of Seal Beach, Municipal Code Title 8 Vehicles and Traffic, Section 8.10.135 Movement of Oversize Vehicles. | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. |
| Los Angeles County Municipal Code, Title 16- Highways, Division 1- Highway Permits, Chapter 16.22 Moving Permits, 16.22.030 Moving Permit issuance conditions for overweight loads. | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. |

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document for evaluating environmental impacts are based on the CEQA Guidelines, the CEQA Environmental Checklist for Transportation/Traffic, and applicable LORS used by other governmental agencies. Specifically, staff analyzed whether the proposed project would result in the following:

1. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);

2. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

3. Conflict with an applicable congestion management program, including, but not limited to, level of service standards (LOS) and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

5. Result in inadequate emergency access;

6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;

7. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risk;

8. Produce a thermal plume or generate glare in an area where flight paths are expected to occur[1]; or

9. Have individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

## CRITICAL ROADS AND FREEWAYS

The city of Long Beach Mobility Element classifies roadways in the city on a context-sensitivity classification system that addresses how a street interfaces with surrounding land uses and buildings, as well as how the street will serve to mobilize people, including pedestrians, bicyclists, transit riders, and drivers (LB GP, 2013). The six roadway classifications are Regional Corridor, Boulevard, Major Avenue, Minor Avenue, Neighborhood Connector, and Local Street.

The following describes the local and regional roadways that would be used for construction and operations traffic accessing the proposed project site and for the delivery of construction materials. The regional roadways are shown in **Traffic and Transportation Figure 1.** The local roadways within project vicinity are shown in **Traffic and Transportation Figure 2**

### Existing Regional and Local Transportation Facilities

**Interstate 405 (I-405):** I-405 is a north-south freeway that provides regional access to the project site. It is under the California Department of Transportation (Caltrans) jurisdiction and subject to state design standards. This heavily-traveled freeway used by commuters and freight haulers, extends north through Los Angeles County and south through Orange County, roughly following the southern Californian coastline.

**Interstate 605 (I-605):** I-605 is a north-south regional freeway connecting east Long Beach with the San Gabriel Valley to the north. I-605 is under the jurisdiction of Caltrans and subject to state design standards.

**Pacific Coast Highway (PCH, State Highway 1):** PCH is under the Caltrans jurisdiction and subject to state design standards. In the project vicinity, PCH is a four to six lane major north-south arterial connecting the city of Long Beach to Orange County coastal cities to the south. Left turn lanes are provided at major intersections. The posted speed limit in the project vicinity is generally 45 miles per hour (mph).

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[1] The FAA recommends that when able, pilots should steer clear of exhaust plumes by flying on the upwind side of smokestacks or cooling towers (FAA 2015a).

**State Route 22 (SR-22, Garden Grove Freeway)/ East 7th Street:** State Route 22 is a four to six-lane divided highway that turns into East 7th Street in the city of Long Beach. SR-22 is an east-west highway connecting the Costa Mesa Freeway (SR-55) to the east to the city of Long Beach. The posted speed limit is generally 40 mph.

**Studebaker Road:** Studebaker Road is a generally four-lane divided north-south roadway that connects 2nd Street to Los Coyotes Diagonal within the city of Long Beach. The posted speed limit is 45 mph. The roadway serves as a primary access to SR-22 for southeastern Long Beach and western Orange County coastal cities. North of SR-22, Studebaker Road connects residential communities to SR-22 and I-405. The AEC project site is directly accessed via a three-way signalized intersection on Studebaker Road. Studebaker Road is classified as a minor avenue from Los Coyotes Diagonal to Spring Street and Major Avenue to 2nd Street.

**2nd Street:** Second Street is an east-west oriented six-lane divided roadway that connects with Ocean to the west and changes name to Westminster Boulevard at the western city limits of Seal Beach. Second Street is in the city of Long Beach and classified as a boulevard.

**Westminster Boulevard:** Westminster Boulevard is a four-lane divided roadway that changes its name to 2nd Street in the city of Long Beach to the west and to I-405 and western Orange County to the east. Westminster Boulevard is in the city of Seal Beach and classified as a primary roadway facility.

**Seal Beach Boulevard**: Seal Beach Boulevard is a north-south oriented six-lane divided roadway that connects I-405/ SR-22 in the north, past PCH to Anaheim Bay at the coast. Near the intersection with Westminster Boulevard, the posted speed limit is 50 mph. Seal Beach Boulevard, provides access to notable areas such as Naval Weapons Station Seal Beach, Boeing, and the Leisure World residential development. Seal Beach Boulevard is in the city of Seal Beach and classified as a major roadway facility.

## HEAVY/OVERSIZED TRUCK ROUTES

The California Vehicle Code regulates the use of trucks on state roadways and local jurisdictions regulate the use of trucks on local roadways. Various large components of the AEC (e.g. CTGs, components of the HRSGs, transformers, and other oversize and heavy components) would arrive by ship or rail from the Port of Long Beach and be delivered to the AEC site. A map of the planned truck route is shown in **Traffic and Transportation Figure 3**. These deliveries would travel to the onsite laydown area over the anticipated heavy haul route with the necessary heavy/oversized permits from associated agencies for each road section (e.g. city of Long Beach, California Department of Transportation). The following roadways along the AEC heavy haul route are designated as truck routes under Section 10.40.030 of the city of Long Beach Municipal Code (LB MC, 2016):

- Anaheim Street (west Long Beach city limits to the Long Beach Freeway, I-710)
- Ninth Street (westerly terminus to Long Beach Freeway)
- PCH (west Long Beach city limits to the east City limits)

- Santa Fe Avenue (PCH to Ninth Street)

The following roadways along the AEC heavy haul route are within the overweight corridor/harbor district and are designated as overweight vehicle special permit routes (LB 2013):

- Anaheim Street (west Long Beach city limits to Daisy Avenue)
- Ninth Street (Pico Avenue to ”I” Street)
- Pico Avenue (Harbor Plaza to Tenth Street)
- Santa Fe Avenue (Ninth Street to PCH)
- Tenth Street (Pico Avenue to Ninth Street)

These roads are discussed below in the “Direct/Indirect Impacts and Mitigation” subsection. The remaining roadways that are part of the AEC heavy haul route are not designated as truck routes.

## Level of Service (LOS)

To quantify the existing baseline traffic conditions, state highways, roadways, and intersections in the study area were analyzed in the SAFC to determine their operating conditions. Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the volume/capacity (v/c) ratios and levels of service (LOS) have been determined for each intersection.

LOS is a qualitative measure describing operational conditions within a traffic stream. It is used to describe and quantify the congestion level on a particular roadway or intersection and generally describes these conditions in terms of such factors as speed or vehicle movement. **Traffic and Transportation Table 2** summarizes roadway LOS for associated V/C ratios.

**Traffic and Transportation Table 2**
**Level of Service Criteria for Roadways and Intersections**

| LEVEL OF SERVICE | VOLUME/CAPACITY (V/C) | DESCRIPTION |
|---|---|---|
| A | 0.000 - 0.600 | Free flow; insignificant delays |
| B | 0.601 - 0.700 | Stable operation; minimal delays |
| C | 0.701 - 0.800 | Stable operation; acceptable delays |
| D | 0.801 – 0900 | Approaching unstable flow; queues develop rapidly but no excessive delays |
| E | 0.901-1.000 | Unstable operation; significant delays |
| F | >1.000 | Forced flow; jammed conditions |

## ROADWAY SEGMENT AND INTERSECTION LOS STANDARDS

The level of service methodology used to identify the operating condition at roadways and intersections was from the 2010 Highway Capacity Manual. The study roadway segments were evaluated based on the v/c ratio for average daily conditions (AEC 2015f, pg. 5.12-4). Study intersections were evaluated using the Intersection Capacity Utilization (ICU) methodology, which estimates the v/c relationship based on individual v/c ratios for conflicting traffic movements. ICU represents the percent of green light signal time; equating to capacity. The use of ICU is consistent with requirements for the city of Long Beach and the Los Angeles County Congestion Management Program. LOS standards for state highways are subject to Caltrans standards. Staff used these LOS standards to evaluate potential AEC-generated traffic impacts. The following is a list of the applicable LOS standards:

- <u>California Department of Transportation (Caltrans)</u>

  Pacific Coast Highway (PCH) and State Route 22 (SR 22) are subject to Caltrans levels of service criteria. Caltrans establishes a target LOS between LOS C and D for state highways (Caltrans 2002, pg.1). If an existing State highway facility is operating at less than the appropriate target LOS, the existing measure of effectiveness (MOE) should be maintained.

- <u>Los Angeles County Congestion Management Program (CMP)</u>

  The Los Angeles County CMP, under the jurisdiction of Metro, establishes LOS E as the lowest acceptable performance standard for CMP intersections except where the base year LOS is worse than E (LA Co MTA 2010, pg. 15). In these cases, the base year LOS is the standard. The project study roadways that are CMP roadways include PCH, State Route 22, and Seventh Street between Alamitos Avenue and PCH (LA CO MTA 2010, pg. 14). There are five project study intersections with CMP roadways.

- <u>City of Long Beach Mobility Element</u>

  The Mobility Element is a required chapter of the city of Long Beach General Plan which evaluates the long-term transportation needs of the city and provides a plan to accommodate those needs. The Mobility Element establishes a maximum allowable peak hour LOS D for regional corridor, boulevard, and major avenues and LOS C for minor avenue and neighborhood connectors (LB GP 2013, pg. 75). Impacts are considered significant if an unacceptable LOS at any of the key intersections is projected and if the current LOS is unacceptable, the project increases traffic demand at the study intersection by 2 percent of capacity (ICU increase ≥ 0.020), causing or worsening LOS E or F (ICU ≥ 0.901) (AEC 2015f, pg. 5.12-5).

- <u>City of Seal Beach Circulation Element</u>

  The Circulation Element is a required chapter of the city General Plan which evaluates the long-term transportation needs of the city and provides a plan to accommodate those needs. The circulation element establishes the minimum LOS standard of D for city roadway segments and intersections during peak hours (SB GP 2003, pg. C-50).

- Seal Beach Traffic Impact Study Guidelines

  The city of Seal Beach deems specific increases in ICU as significant impacts and requires mitigation (SB Guidelines 2010, pg. 9). Intersections with lower v/c ratios for conflicting traffic movements (e.g. 0.0 to 0.69) would need to receive a larger volume of project traffic to result in a significant impact (e.g. 0.06). Conversely, intersections with high v/c ratios for conflicting traffic movements (e.g. 0.90+), would be significantly impacted with a lower volume of project traffic (e.g. 0.01).

## OTHER MODES OF TRANSPORTATION

### Freight and Passenger Rail

The closest freight lines to the AEC project site are approximately six miles away. One line originates from the Port of Long Beach, west of the AEC project site, and the second line is east of the project site extending its connection with a north-south route following I-5 in Anaheim, extending roughly southwest through Westminster to Huntington Beach.

The freight line extending from the Port of Long Beach is owned by Pacific Harbor Line and several rail lines spur off the main port rail line. These other freight lines are the Alameda Corridor owned by Pacific Harbor Line (PHL) and operated by PHL, Burlington Northern Santa Fe (BNSF), and Union Pacific (UP) northwest of the project site (north of the Long Beach airport). UP owns and operates a freight line east of the project site. In Huntington Beach/Westminster a freight rail line is owned and operated by UP, PHL, and BNSF. The applicant indicated that heavy and oversized components of the electrical generator sets for AEC would be transported by ship or rail to the Port of Long Beach (AEC 2015f, pg. 5.12-3). Heavy haul deliveries are discussed on page 4.10-10 of this section, and below in the “Direct/Indirect Impacts and Mitigation” subsection.

Passenger rail service in Long Beach is operated by Los Angeles County Metropolitan Transportation Authority (Metro). The only passenger rail service to Long Beach is the Metro Blue Line, approximately 5 miles west of the project site. The Blue Line provides transit service from Downtown Long Beach north to Downtown Los Angeles. From the Blue Line, passengers can access local bus routes in Long Beach.

### Bus Service

The AEC project site is located in the easternmost corner of Los Angeles County along the border with Orange County. In this area, public transit services are provided by Long Beach Transit (LBT), Los Angeles County Metropolitan Transportation Authority (Metro), Transit Torrance, and the Orange County Transportation Authority (OCTA).

Long Beach Transit operates 34 local bus service routes throughout Long Beach including Passport, a free bus service that connects to various destinations in downtown Long Beach (LBT 2015). The AquaBus and AquaLink water taxis, operated by LBT from late Spring to early Fall, ferries passengers to the most popular tourist attractions along the Long Beach harbor waterfront. Door-to-door Dial-A-Lift shared transport service for people who cannot use the fixed route transit system (e.g. disabled persons) is also operated by LBT. No direct LBT routes are located in the direct vicinity of AEC; however, Routes 121 and 131 provide service along PCH and 2nd Street.

Metro provides regional public transportation via local and express stop bus services as well as passenger rail and transit way service within the greater Long Beach and Los Angeles Metropolitan areas. There are a limited number of local buses and an express bus in the city of Long Beach (LA Co MTA 2014). The express bus (line 577) connects Long Beach northeast to El Monte. There are two stops in Long Beach along 7th street, east of the PCH intersection. Route 232 connects the Los Angeles Airport (LAX) with Downtown Long Beach. Within Long Beach Route 232 travels along Anaheim Street and south on Long Beach Boulevard to Downtown Long Beach. Route 60 operates an owl route that extends the daytime Downtown Los Angeles to Compton route to connect with Long Beach via Long Beach Boulevard to Downtown Long Beach. Owl service in Long Beach starts soon after 10 p.m. and ends just after 4 a.m.

Transit Torrance operates bus route rapid 3, a limited stop service from Redondo Beach to Downtown Long Beach (Transit Torrance 2014). From Downtown Long Beach, riders can transfer to the LBT (route 121). LBT Route 121 provides service within one mile of the AEC project site. Pedestrian access along Loynes Drive and Studebaker Road is limited.

Orange County Transit Authority's routes 1, 50, and 60 connect Orange County to roadways in close proximity to the AEC project site (PCH, Studebaker Road, and 7th Street, respectively) (OCTA 2013). OCTA Route 1 has a bus stop on Studebaker Road at Lonyes Drive. Pedestrian access along Studebaker Road is limited.

## Bicycle and Pedestrian Facilities

The city of Long Beach has an extensive network of Class I bike paths (exclusive right-of-way, cross traffic minimized), Class II bike lanes (on-street, striped vehicle/bicycle separation), and Class III bike routes (non-exclusive lane, vehicles and bicycles share the road) throughout the city. Bicycle facilities on the affected roadways include a Class I path on Loynes Drive, a Class II lane on 7th Street, and Class II lane and III route on Studebaker Road, PCH, and 2nd Street (LB GP 2013, pg. 42). Along the west bank of the Los Cerritos Channel is a Class I bike path (Los Cerritos Channel Bike Path), Long Beach Bikeway Route 10.

Several of the affected roadways extend into the city of Seal Beach, specifically PCH and Westminster Avenue (extension from 2nd Street in Long Beach). Seal Beach Boulevard is another affected roadway in the city of Seal Beach. Seal Beach Boulevard has a Class II bike lane north of PCH and a Class I bike path south of PCH, Westminster has a Class II bike lane. There is a Class I bike path along the San Gabriel River Greenbelt (east bank of the San Gabriel River).

Pedestrian facilities in Long Beach include the Shoreline Pedestrian/Bike Path, a 3.1-mile bicycle and pedestrian path extending along the beach from Alamitos Avenue to 54$^{th}$ Place. Long Beach pedestrian facilities include pedestrian paths, trails, passageways, and walkways through parks, public spaces, and other properties found across Long Beach.

### Airports

The closest airport is the Los Alamitos Army Airfield, a military installation approximately 2.5 miles northeast of the AEC project site. Of the two runways, the longest runway at the Los Alamitos Army Airfield is 8,001 feet. The runways are oriented approximately southwest to northeast. The airport operates from sunrise to sunset. The left-hand traffic pattern altitude for helicopters and one or two engine aircraft using the airport is 1,000 feet above ground level (AGL). The traffic pattern is a couple hundred yards wide due to noise restrictions in the local area. Currently at Los Alamitos Airfield, there are seven to eight arrivals/departures per day as one military unit is deployed elsewhere. The arrivals and departures would double (at least) once the unit returns from deployment.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impacts of the proposed AEC on traffic and transportation system are discussed in this section and based on an analysis comparing pre-AEC and post-AEC conditions. Pre-AEC conditions consider the on-going operations at the existing AGS plant (units 1-6) (AEC 2015f, pg. 1-3). The AEC's impacts were analyzed for the peak construction month when construction activity and employment would be maximized (January 2021). The roadway segments and intersections below were selected for evaluation because they provide the most direct route to the project site and would most likely be affected by project traffic during project construction. Operation intersection and roadway segment conditions were not analyzed as the project would become operational during the same year as peak construction and would have much fewer workers (36 employees).

### Construction Traffic

Traffic volumes for the affected project intersections and roadway segments were projected based on a 1.2-percent-per-year growth rate estimated in the 2012-2035 Regional Transportation Plan prepared by the Southern California Association of Governments (SCAG) (AEC 2015f, pg. 5.12-10 and 5.12-11). The SCAG growth rate was applied to the existing traffic volumes through 2021. The existing traffic volumes for the study intersections were collected in 2009 and existing roadway segment volumes are from 2014. With the application of the SCAG growth rate to bring the volumes to 2021 volumes, the project's construction trips were then added to the affected project intersections and roadway segments and the LOS was calculated.

The project's peak construction traffic estimates were developed based on the projected size of the AEC construction and demolition workforce and the anticipated truck deliveries to the site (AEC 2015f, pg. 5-12-12). Construction and site preparation activities are anticipated to last 56 months, from the first quarter of 2017 until the third quarter of 2021 (AEC 2015f, pg. 5.12-2).

### Workforce Traffic

During peak construction month in January 2021 (month 44 during the construction of the simple-cycle power block), 512 workers are anticipated, generating an estimated 1,024 daily round trips (512 workers x 2 trips per worker= 1,024 total trips) (AEC 2015f, pg. 5.12-12). It was assumed that none of the workers would carpool. Construction would typically occur between 7:00 a.m. and 7:00 p.m. Monday through Friday and between 9:00 a.m. and 6:00 p.m. on Saturday.

### Truck Traffic

#### *Heavy/Oversized Deliveries*

Construction of the AEC would require the delivery of large components by heavy/oversized trucks. The large components would be delivered to the Port of Long Beach via ship or rail and then transported via truck to the project site. The potentially affected roadways based on the applicant’s proposed heavy haul route are presented in **Traffic and Transportation Table 3** and graphically represented in **Traffic and Transportation Figure 3**. **Bold** text indicates the road is a designated truck route or an overweight vehicle special permit route.

**Traffic and Transportation Table 3**
**Proposed AEC Heavy / Oversized Haul Route**

| ROADWAY | APPLICABLE JURISDICTION |
|---|---|
| **Harbor Plaza to Pico Avenue** | City of Long Beach/County of Los Angeles |
| **Pico Avenue to West 10th Street** | City of Long Beach/County of Los Angeles |
| **10th Street to 9th Street** | City of Long Beach/County of Los Angeles |
| **9th Street to Santa Fe Avenue** | City of Long Beach/County of Los Angeles |
| **Santa Fe Avenue to West Anaheim Street*** | City of Long Beach/County of Los Angeles |
| West Anaheim Street to Magnolia Avenue | City of Long Beach |
| Magnolia Avenue to East Ocean Boulevard | City of Long Beach |
| East Ocean Boulevard to Alamitos Avenue | City of Long Beach |
| Alamitos Avenue to East Anaheim Street | City of Long Beach |
| East Anaheim Street to **PCH** | City of Long Beach |
| **PCH** to East. 2nd Street | Caltrans |
| East 2nd Street to Studebaker Road | City of Long Beach |
| **Notes**: **Bold** text indicates the road is a designated truck route or an overweight vehicle special permit route.*West Anaheim Street is an overweight vehicle special permit route from the western city limits of Long Beach to Daisy Avenue and does not extend to Magnolia Avenue. | |

The proposed AEC heavy/oversized haul route includes several segments that are not designated as truck routes or overweight vehicle special permit routes. Chapter 10.40 of the city of Long Beach Municipal Code allows trucks to use non-truck routes if they are entering or exiting a property for business purposes or storage by the most direct route, this is echoed in the Long Beach General Plan (LB GP 2013, pg. 106). The segments of the proposed AEC heavy haul route that are not truck routes or overweight vehicle special permit routes are not the most direct route to the project site.

Staff contacted the city of Long Beach Public Works Department to discuss the applicant's proposed heavy haul route. A Traffic Engineering Associate with the Engineering Bureau at the city of Long Beach Public Works Department responded to staff's inquiry. The associate said that to be in compliance with city streets designation as truck routes, the AEC would use the 710 freeway from the port, then exit on PCH, continuing to 2$^{nd}$ street (CEC 2016f). By using this route, the only street not designated as a truck route is 2$^{nd}$ Street, but it is the shortest route to the delivery destination, as specified in the Long Beach Municipal Code. Energy Commission staff also inquired about the roads identified in the Mobility Element of the Long Beach General Plan as appropriate paths of travel for local deliveries (LB GP2013, pg. 109). Specifically, staff wondered whether these roads could accommodate heavy/oversized trucks, as several of these roads are proposed for the AEC heavy haul route. The associate responded that the streets designated in the mobility element for trucks to use are connected to streets designated as a truck routes, and are to be used for local deliveries and not for overweight loads.

Energy Commission staff discussed the city's response on their review of the AEC heavy haul plan with the applicant and requested clarification from the applicant on the route selected for transporting the AEC heavy haul components. The applicant explained that AES worked with a local heavy haul firm to identify two possible routes from the Port of Long Beach to the AEC project site (CEC 2016g). The route that became the proposed AEC heavy haul route accommodates loads 15 feet tall or more as it avoids the overhead obstructions along the second route. The second route accommodates loads less than 15 feet tall. The second route more closely follows the route recommended by city staff, with the exception of the route from the port to PCH. The second route is described below:

- Harbor Plaza to Pico Avenue
- Pico Avenue to West 10th Street (10th Street changes to 9th Street)
- West 10th Street to Santa Fe Avenue
- Santa Fe Avenue to Pacific Coast Highway
- Pacific Coast Highway to East 2nd Street
- East 2nd Street to Studebaker Road
- Studebaker Road to AEC

Staff has identified the Long Beach Public Works recommended route in **Traffic and Transportation Figure 3** as well as the applicant's proposed route.

Based on other power plant projects near Caltrans freeways, Energy Commission staff has found that the overpasses cannot accommodate the weight of the types of heavy/oversized loads typically associated with projects like the AEC. If an overpass were to receive such a load and became inoperable as a result of damage from the load, the traffic on the freeway would have to be re-routed around the damaged overpass until it could be repaired. Both of the routes identified by the heavy haul firm and discussed above avoid Interstate 710.

When the heavy/oversized permits are requested from the applicable jurisdictions, the final route would be determined and the permit(s) issued. The city of Long Beach would issue special permits for oversized loads on roadway segments in their jurisdiction for the final route. Special permits for oversized loads on Pacific Coast Highway would be issued by Los Angeles County. Heavy/oversized loads are typically permitted for late-night delivery. Staff proposes Condition of Certification **TRANS-1** requiring the applicant to obtain all necessary permits from affected jurisdictions for the transportation of heavy/oversized equipment associated with the AEC project. The applicant anticipates a maximum of two heavy/oversized deliveries per month (AEC 2015f, pg. 5.12-3). The applicant has not included a traffic analysis for these added trips as the two trips per month would be late at night when background traffic would low enough for these heavy/oversized deliveries. Staff agrees with the applicant's reasoning.

Staff proposes Condition of Certification **TRANS-2** requiring the project owner to prepare a Traffic Control Plan (TCP). The TCP includes a heavy haul plan. **TRANS-3** requires the project owner to restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities.

### *Truck Deliveries*

Truck deliveries of construction materials and equipment would generally occur on weekdays between 6 a.m. and 6 p.m. (AEC 2015f, pg. 5.12-12). As the AGS is an operating power plant, it is likely that plant personnel would be at the main gate off Studebaker Road to let trucks and workers on to the project site as they arrive for deliveries and the start of work.

The peak truck deliveries would occur during month 42 when 28 trucks per day (for a total of 56 truck trips/day) would transport construction equipment and materials. Although the truck trips would peak in month 42, the peak traffic generation (workforce and truck trips combined) would occur during month 44, coinciding with the peak construction workforce. The applicant assumes that two truck deliveries would occur per peak hour (four trips). A 1.5 passenger car equivalent (PCE) factor per truck trip factor was applied to the equipment deliveries and construction truck trips, consistent with the 2010 Highway Capacity Manual.

## Total Construction Traffic

Workforce trips were added to the passenger car equivalent delivery truck trips to estimate the total construction trips generated by the project. Project trip estimates in **Traffic and Transportation Table 4** include the estimated average daily trips (ADT) and trips during the a.m. and p.m. peak hour.

**Traffic and Transportation Table 4**
**One-Way Trips Generated During Construction Period**

| Vehicle Type | Average Daily Trips (ADT) | AM Peak Hour[3] Trips | | | PM Peak Hour[4] Trips | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Delivery/ Haul Trucks in PCE (1.5)[1] | 63 | 3 | 3 | 6 | 3 | 3 | 6 |
| Workers[2] | 1,024 | 512 | 0 | 512 | 0 | 512 | 512 |
| Total Construction Traffic In PCE | 1,087 | 515 | 3 | 518 | 3 | 515 | 518 |

**Notes:** [1] Passenger Car Equivalent (PCE) is a ratio of 1.5 passenger cars for each truck. [2] Worker traffic during the peak construction period. These figures assume the worst case traffic scenario of one worker per car. [3] The a.m. peak hour is 7:00 a.m.-9:00 a.m. [4] The p.m. peak hour is 4:00 p.m.-6:00 p.m. **Source:** AEC 2015f, pg. 5.12-12.

The estimated project trips were distributed onto the affected intersections based on where the workforce and trucks would come from, as described in the following assumed trip distribution (AEC 2015f, pg. 5.12-13):

- One-third of the trips would come from Long Beach, Signal Hill, and communities located west of the AEC site.
- One-third of the trips would come from Lakewood, Los Alamitos, Cyprus, Cerritos, and communities located to the north of the AEC site.
- One-third of the trips would come from Garden Grove, Westminster, Fountain Valley, and communities located east and south of the AEC site.

The trips were then distributed on the local roadways based on the routes the workforce and trucks would take. The following are a general description of assumptions of routes that would be taken to the project site (AEC 2015f, Figure 5.12-5):

- 8 percent of the trips would travel from the south on PCH to the site,
- 4 percent of the trips would travel from the northwest on PCH to the site,
- 25 percent of the trips would travel from the east on SR-22 to the site, and
- 63 percent of the trips would travel from the northeast on I-405 to the site.

Intersection and roadway traffic data corresponds with the peak construction period estimated in 2021 (January). Peak hour (a.m. and p.m.) data is presented in **Traffic and Transportation Table 5** with and without the project traffic trips.

The intersection of Pacific Coast Highway and Seal Beach Boulevard would be significantly impacted with the project traffic added during the a.m. peak hour. To avoid a worsening of the LOS at this intersection, the TCP (identified as part of staff's recommended Condition of Certification **TRANS-2**), requires the applicant to monitor this intersection and provide alternate routes, and if necessary, stagger employee shifts or limit employee use of the intersection in the a.m. peak hour to ensure minimal impacts to local roadways during project construction. The LOS standards discussed previously under the subsection "Roadway Segment and Intersection LOS Standards" are applicable to the study intersections in **Traffic and Transportation Table 5**. If several LOS standards apply, the most stringent is applied.

**Traffic and Transportation Table 5**
**Study Intersections: AM and PM Peak Hour Trips and LOS - Existing and Peak Construction**

| Intersection | Existing (2009) | | 2021 | | 2021 + Project | | Change in V/C | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| | ICU* | LOS | ICU | LOS | ICU | LOS | | |
| **AM PEAK HOUR** | | | | | | | | |
| PCH at 7th Street | 1.090 | **F** | 1.235 | **F** | 1.235 | **F** | 0.000 | No |
| Studebaker Road at SR-22 W/B Ramp | 0.600 | A | 0.669 | B | 0.827 | D | 0.158 | No |
| Studebaker Road at SR-22 E/B Ramp | 0.492 | A | 0.544 | A | 0.669 | B | 0.125 | No |
| PCH at Loynes Drive | 0.907 | **E** | 1.023 | **F** | 1.036 | **F** | 0.013 | No |
| Studebaker Road at Loynes Drive | 0.736 | C | 0.826 | D | 0.846 | D | 0.020 | No |
| Studebaker Road at 2nd Street | 1.047 | **F** | 1.185 | **F** | 1.200 | **F** | 0.015 | No |
| PCH at 2nd Street | 0.943 | **E** | 1.060 | **F** | 1.069 | **F** | 0.009 | No |
| Seal Beach Boulevard at PCH | 0.865 | D | 0.983 | **E** | 0.995 | **E** | **0.012** | **Yes** |
| **PM PEAK HOUR** | | | | | | | | |
| PCH at 7th Street | 1.012 | **F** | 1.145 | **F** | 1.149 | **F** | 0.004 | No |
| Studebaker Road at SR-22 W/B Ramp | 0.831 | D | 0.936 | **E** | 0.937 | **E** | 0.001 | No |
| Studebaker Road at SR-22 E/B Ramp | 0.674 | B | 0.754 | C | 0.754 | C | 0.000 | No |
| PCH at Loynes Drive | 0.796 | C | 0.896 | D | 0.896 | D | 0.000 | No |
| Studebaker Road at Loynes Drive | 0.692 | B | 0.784 | C | 0.794 | C | 0.010 | No |
| Studebaker Road at 2nd Street | 1.122 | **F** | 1.271 | **F** | 1.284 | **F** | 0.013 | No |
| PCH at 2nd Street | 0.906 | **E** | 1.018 | **F** | 1.032 | **F** | 0.014 | No |
| Seal Beach Boulevard at PCH | 0.742 | C | 0.841 | D | 0.853 | D | 0.012 | No |

**Notes** * ICU- Intersection capacity utilization. A method for calculating traffic congestion. **Bold** text indicates unacceptable LOS.
**Sources:** CEC 2016b, AEC 2015f, pgs. 5.12-6, 5.12-7, and 5.12-15, Linscott, et. al. 2010, pgs. 9,15-17.

**Traffic and Transportation Table 6** presents the LOS on the affected roadway segments for existing conditions (2014). The state highways were the only affected project roadway segments selected for analysis as no current daily traffic volumes were available for the other affected project roadways. The city of Long Beach does not identify roadway capacities for their streets so the roadway capacities for the adjacent city of Seal Beach were used due to the similarities in roadway characteristics within the two cities.

**Traffic and Transportation Table 6**
**Study Roadway Segments - Existing Conditions**

| Roadway | Segment | | Daily Vehicle Capacity | Existing (2014) | | |
|---|---|---|---|---|---|---|
| | From | To | | ADT* | V/C | LOS |
| PCH | Outer traffic circle/East Atherton Street | East Anaheim Street | 37,500 | 32,250 | 0.86 | D |
| | East Anaheim Street | SR-22 | 37,500 | 34,000 | 0.907 | **E** |
| | SR-22 | Bellflower Boulevard | 56,300 | 26,000 | 0.462 | A |
| | Bellflower Boulevard | Orange County Line | 56,300 | 41,000 | 0.728 | C |
| | Orange County Line | Seal Beach Boulevard | 37,500 | 43,875 | 1.17 | **F** |
| SR-22 | PCH | Bellflower Boulevard | 56,300 | 58,000 | 1.03 | **F** |
| | Bellflower Boulevard | East Campus Road | 56,300 | 61,000 | 1.083 | **F** |
| | East Campus Road | Studebaker Road | 56,300 | 68,000 | 1.208 | **F** |
| | Studebaker Road | Orange County Line | 79,400 | 96,000 | 1.209 | **F** |

**Notes:** * ADT- Average Daily Traffic (volume). **Bold** text indicates unacceptable LOS. **Sources:** AEC 2015f, pg.5.12-6; Caltrans 2014; CEC 2016b.

**Traffic and Transportation Table 7** presents the LOS on the affected roadway segments with and without the project trips during peak construction (2021).

## Traffic and Transportation Table 7
## Study Roadway Segments - Peak Construction

| Roadway | Segment | | Daily Vehicle Capacity | 2021 | | | Project Added Trips | 2021 Plus Project | | | Change in V/C | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | | ADT* | V/C | LOS | | ADT | V/C | LOS | | |
| PCH | Outer traffic circle/ East Atherton Street | East Anaheim Street | 37,500 | 35,058 | 0.935 | D | 41 | 35,099 | 0.936 | D | 0.001 | No |
| | East Anaheim Street | SR-22 | 37,500 | 36,961 | 0.986 | **F** | 41 | 37,002 | 0.987 | **F** | 0.001 | No |
| | SR-22 | Bellflower Boulevard | 56,300 | 28,264 | 0.502 | A | 41 | 28,305 | 0.503 | A | 0.001 | No |
| | Bellflower Boulevard | Orange County Line | 56,300 | 44,570 | 0.792 | C | 82 | 44,652 | 0.793 | C | 0.001 | No |
| | Orange County Line | Seal Beach Boulevard | 37,500 | 47,696 | 1.272 | **F** | 82 | 47,778 | 1.274 | **F** | 0.002 | No |
| SR-22 | PCH | Bellflower Boulevard | 56,300 | 63,051 | 1.120 | **F** | 0 | 63,051 | 1.120 | **F** | 0.000 | No |
| | Bellflower Boulevard | East Campus Road | 56,300 | 66,312 | 1.178 | **F** | 0 | 66,312 | 1.178 | **F** | 0.000 | No |
| | East Campus Road | Studebaker Road | 56,300 | 73,922 | 1.313 | **F** | 0 | 73,922 | 1.313 | **F** | 0.000 | No |
| | Studebaker Road | Orange County Line | 79,400 | 104,360 | 1.314 | **F** | 901 | 105,261 | 1.326 | **F** | 0.011 | No |

**Notes:** * ADT- Average Daily Traffic (volume). **Bold** text indicates unacceptable LOS. **Sources:** AEC 2015f, pg. 5.12-14; CEC 2016b.

## Transportation of Hazardous Materials and Waste

During construction and operations, generation of hazardous materials at the project site, such as oil, oily rags, lead batteries, asbestos waste, solvents, and paint, would be stored at the project site for less than 90 days then transported for disposal to an offsite treatment, storage, and disposal facility by a permitted hazardous waste transporter. Transportation of hazardous materials and waste would need to be carried out in accordance with Caltrans, U.S. Environmental Protection Agency, California Department of Toxic Substances Control, California Highway Patrol, and California State Fire Marshal regulations.

While the applicant has identified 42 truck trips for truck deliveries, the applicant has not specified the number of hazardous materials and waste trips estimated during construction. The applicant anticipates the likely route for these deliveries would be via I-405, to SR-22 (7th Street), west along 7th Street, and then south on Studebaker Road to the AEC entrance. Removal of hazardous wastes would occur along the same routes in the reverse direction. With the exception of Studebaker Road, this route is a designated truck route by Caltrans and the city of Long Beach. The Mobility Element in the city of Long Beach General Plan identifies Studebaker Road as an appropriate path of travel for local deliveries (LB GP 2013, pg. 109).

Hazardous materials management staff confirmed that no acutely hazardous materials would be used or stored on the AEC site during construction. Please refer to the **HAZARDOUS MATERIALS MANAGEMENT** and **WASTE MANAGEMENT** sections for a detailed description of hazardous materials and waste associated with the project and proposed conditions of certification for the AEC. Transportation of these materials would pose a less than significant hazard to the public.

Staff proposes Condition of Certification **TRANS-4** requiring the proper permits and/or licenses from affected jurisdictions, e.g. Caltrans, Los Angeles County, and the city of Long Beach are obtained for transportation of hazardous substances.

## Linear Facilities

A new 1,000-foot process/ sanitary wastewater pipeline would be installed connecting the project to the first point of interconnection with the existing Long Beach Water Department (LBWD) (AEC 2015s, pg. 3). No other offsite linear facilities are proposed. **Traffic and Transportation Figure 2** shows the proposed alignment of the new wastewater pipeline. Encroachment permits would need to be obtained for the wastewater pipeline. Staff proposes Condition of Certification **TRANS-5** to ensure necessary encroachment permits are obtained. Also, the TCP required by Condition of Certification **TRANS-2** would help minimize any possible traffic impacts due to offsite linear construction.

## Parking and Laydown Area

The applicant has proposed an approximately 8-acre onsite parking and laydown area to accommodate the construction workers (512 estimated during the peak period), the laydown and storage of equipment, and an approximately 10-acre offsite laydown area. Additional parking is available throughout the project site. The onsite parking and laydown area is in the northern portion of the project site and the offsite laydown area is adjacent to the southern project boundary and the San Gabriel River. The proposed onsite and offsite parking and laydown areas are shown in **Traffic and Transportation Figure 2**. No on-street parking is anticipated, with the exception of workers and construction equipment needed for the offsite wastewater pipeline. The applicant anticipates limited construction equipment and workers parking along East Vista Street (AEC 2015f, pg. 5.12-17). Staff estimates construction of the wastewater pipeline would take no longer than a month to complete. Parking needs for the AEC should be easily met with the proposed onsite and offsite parking.

### Potential HBEP Use of AEC Laydown Area

The recently licensed Huntington Beach Energy Project (HBEP, 12-AFC-01) (November 2014) and amended project, now under consideration by the Commission, would store heavy and oversized components that have been transported by ship or rail to the Port of Long Beach on an undeveloped 16-acre portion of AGS (HBEP 2014, pg. 6.2-6). According to the AEC project applicant, approximately 24 deliveries, out of the 112 total HBEP deliveries (port and rail) would arrive via the Port of Long Beach (CH2 2014f, pg.5). Once the HBEP is ready to receive the heavy/oversized deliveries, these deliveries would continue to the HBEP site. The AEC applicant notes that the first preference for the HBEP heavy/oversized deliveries would be to time the arrival of HBEP deliveries at the Port of Long Beach so they are moved only once- from the Port of Long Beach directly to the HBEP site. The Petition to Amend the license proposes more construction laydown area than previously licensed (HBEP 2015a, pg. 2-14). With the additional storage, the amendment includes the use of the AGS property as a contingency plan. The heavy haul route identified for HBEP deliveries from the Port of Long Beach to the AEC site is the same route proposed for AEC. The HBEP project owner would need to obtain permits from the appropriate jurisdictions along the proposed for heavy/oversized truck route. The potential need of laydown area to accommodate HBEP deliveries added to the laydown and parking needs of the AEC should be more than adequate to accommodate needs of both projects. As previously noted, Condition of Certification **TRANS-2** requires the project owner to prepare a TCP to ensure all construction worker parking is in appropriate areas. With implementation of the plan, construction workforce parking impacts would be less than significant.

## Emergency Vehicle Access

Emergency vehicles would be able to access the project site through the main entrance off Studebaker Road. There is a secondary emergency access road off Studebaker Road with a locked gate and concrete aprons (AEC 2015s, pg. 27). See **Traffic and Transportation Figure 1** for the location of the existing secondary emergency access road. This access road would be widened and upgraded for AEC. See the **Worker Safety and Fire Protection** section for more discussion about emergency vehicle access.

## Airports

Title 14, Part 77.9 of the Code of Federal Regulations requires FAA notification for any construction or alteration within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with at least one runway more than 3,200 feet.

Because the longest runway at the Los Alamitos Army Airfield is 8,001 feet, FAA would require notification if a construction feature penetrates the navigable airspace of this airport. As noted earlier, the Los Alamitos Army Airfield is approximately 2.5 miles from the AEC; therefore, the navigable airspace above the AEC begins at 132 feet AGL. There are two exhaust stacks at 140 feet AGL that would penetrate the Los Alamitos Army Airfield navigable airspace. All other structures are below 132 feet AGL. The other two exhaust stacks at 80 feet AGL and the air cooled condenser (ACC) at 104 feet AGL would not penetrate this airspace. If any construction equipment used at AEC is 132 feet or taller, Form 7460-1 (Notice of Proposed Construction or Alteration) would need to be filed with the FAA. Staff proposes Condition of Certification **TRANS-6** requiring this FAA notification.

The applicant submitted Form 7460-1 (Notice of Proposed Construction or Alteration) to the FAA for the exhaust stacks and air cooled condenser and received a Determination of No Hazard to Air Navigation (Determination), provided FAA Form 7460-2 (Notice of Actual Construction or Alteration) is e-filed any time the project is abandoned or within five days after the construction reaches its greatest height (7460-2, Part 2) (AEC 2015s, Attachment DR159-1). The Determination also stated that lighting and marking are not necessary for aviation safety.

Part 77.9 requires Federal Aviation Administration (FAA) notification for any proposed structure that is 200 feet AGL or taller, regardless of the distance from an airport. Activities occurring during construction could require the use of tall equipment, such as cranes and derricks, on the project site. The applicant does not know at this time whether any construction equipment used for construction of AEC would be 200 feet AGL or taller. The applicant explained that the Engineering Procurement Construction contractor (EPC) would determine the particular crane needed. If the height of any piece of construction equipment used for the AEC exceeds FAA notification criteria (200 feet AGL or taller), the EPC contractor would file FAA Form 7460-1 (Notice of Construction or Alteration). Staff proposed Condition of Certification **TRANS-6** requires FAA notification for any construction equipment 132 feet AGL or taller.

Also, in accordance with FAA Advisory Circular, 70/7460-1 L, Chapter 2.1, any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200 feet AGL or exceeds any obstruction standard contained in 14 CFR Part 77, should be marked and/or lighted. Therefore, staff proposes Condition of Certification **TRANS-7** requiring marking and/or lighting in accordance with 70/7460-1 L Chapter 2.1, for any construction equipment used for AEC that is 200 feet AGL or taller.

Staff reviewed the approach and departure procedures for the Los Alamitos Army Airfield and concluded they do not pass over the AEC project site (AirNav 2015). Staff confirmed with an Air Traffic Control Specialist with the Los Alamitos Army Airfield that the flights would turn left before reaching the AEC (CEC 2016h).

## AEC Construction Impacts Conclusion

With implementation of the proposed conditions of certification discussed in this analysis, construction of the AEC would result in less than significant impacts to the traffic and transportation system in the vicinity of the project.

## Operational Traffic

The peak construction period (January 2021) is estimated in the same year the project is fully operational. Operations of the AEC would employ 36 operations staff, a decrease from the 66 staff members currently employed at the AGS (AEC 2015f, pg. 5.10-12). During project operations, it is estimated that the project would generate 44 daily trips and 24 peak hour trips, which is significantly fewer than the project-related construction trips (AEC 2015f, pg. 5.12-13). The applicant has not modeled operational traffic. Because peak construction traffic is much higher than operations traffic and is estimated to occur in the same year, staff does not need calculations of intersection and roadway segment LOS impacts to conclude that operations traffic would have a less than significant impact.

## Truck Traffic

Two deliveries per day are estimated for project operations. According to the applicant, this is the same number of trips or less than currently required by the existing AGS. (AEC 2015f, pg. 5.12-18). Approximately 32 deliveries per month of hazardous materials associated with plant operation are anticipated (AEC 2015f, pg. 5.12-16). The "Transportation of Hazardous Materials and Waste" discussion below provides more detail about these deliveries. The routes used for truck and hazardous materials transportation for project operations are the same as described for project construction.

## Transportation of Hazardous Materials and Waste

Similar to current operations at the AGS, the AEC would require deliveries of aqueous ammonia (AEC 2015f, pg. 5.12-15). Deliveries of this substance are subject to Section 32100.5 of the California Vehicle Code (CVC), regulating the transportation of hazardous materials that pose an inhalation hazard. Also, various cleaning chemicals, diesel fuel, lubricants, sulfuric acid, and other hazardous materials associated with plant operation would be delivered via truck. Approximately 32 truck deliveries would be made per month along a route selected by the supplier, consistent with the requirements of federal and state law (AEC 2015f, pg. 5.12-16). See the "Transportation of Hazardous Materials and Waste" discussion earlier in this section for a list of the various CVC sections that are applicable during both construction and project operation. These regulations ensure the transportation of hazardous materials and waste are carried out in accordance with state law. As described previously for construction, the routes used would be via I-405 to SR-22 ($7^{th}$ Street) to $7^{th}$ Street then to Studebaker Road and the AEC site. This route is consistent with the city of Long Beach truck routes and the most direct route to the site from the highway.

Delivery of aqueous ammonia may be hazardous to the public if a spill were to occur. Condition of Certification **TRANS-4** would ensure the project owner contracts with licensed hazardous materials and waste hauler companies that comply with all applicable regulations. For more information on the risks associated with the management and transportation of hazardous materials during project operation and staff's proposed conditions of certification to minimize these risks, see the **HAZARDOUS MATERIALS MANAGEMENT** section of this document.

For the reasons discussed above, the transportation of hazardous materials during project operation of the AEC would pose a less than significant hazard to the public with the incorporation of Condition of Certification **TRANS-4**.

## Parking

Operations of the AEC would employ 36 operations staff, a decrease from the 66 staff members currently employed at the AGS (AEC 2015f, pg. 5.10-12). No impacts from operational workforce parking are anticipated as, according to Land Use staff, existing parking at the AGS exceeds the minimum required parking. See the **LAND USE** section of this document for additional information regarding parking and site plan configurations.

## Emergency Vehicle Access

Energy Commission staff does not anticipate emergency access issues to the project site. The site is directly accessed via a signalized intersection on Studebaker Road which would not present any obstructions or design challenges for emergency vehicles to access the site. A secondary emergency access road off Studebaker Road, shown on **Traffic and Transportation Figure 2**, would be widened and upgraded for the AEC. Condition of Certification **TRANS-2** requires a TCP demonstrating and ensuring sufficient access. Onsite circulation of emergency vehicles would be subject to a site plan review by the city of Long Beach Fire Department per conditions of certification in the **WORKER SAFETY AND FIRE PROTECTION** section of this document.

## Thermal Plumes

The AEC gas turbines (exhaust stacks), ACC, and proposed auxiliary boiler have the potential to generate thermal plumes during worst case conditions. These conditions would occur during full operation of the AEC during periods of calm winds and/or cool temperatures. Thermal plume velocities would be greatest at the discharge point, with plume velocities decreasing with increasing altitude. High velocity thermal plumes have the potential to affect aviation safety and the FAA has amended the Aeronautical Information Manual to establish thermal plumes as flight hazards (FAA 2015a). Aircraft flying through thermal plumes may experience significant air disturbances, such as turbulence and vertical shear. When able, a pilot should fly upwind of possible thermal plumes. Since there is one airport within 2.5 miles of the AEC, there is a potential for low flying aircraft to be affected by the thermal plumes.

Energy Commission staff uses a 4.3 meters per second (m/s) average vertical velocity for determining whether a plume may pose a hazard to aircraft. This velocity generally defines the point at which aircraft begin to experience moderate to severe turbulence. Exhaust plumes with high vertical velocities may damage aircraft airframes and/or experience engine damage/failure (FAA 2015a).

Energy Commission Air Quality staff modeled plume velocity for the project structures that could generate plumes in excess of an average of 4.3 m/s. Staff found that the most severe thermal plume would be generated by the air cooled condenser exceeding an average of 4.3 m/s up to an altitude of 2,180 feet AGL. At altitudes higher than approximately 2,180 feet AGL, thermal plume-average velocity was below 4.3 m/s. Refer to **APPENDIX TT-1** for a complete thermal plume analysis documenting the method used to estimate worst-case vertical plume velocities.

Under the FAA's amended Aeronautical Information Manual, pilots are advised to fly upwind of sources of exhaust plumes, such as smokestacks or cooling towers. Staff proposes Condition of Certification **TRANS-8** to alert pilots to the location of the AEC and to help them to avoid flying directly over the facility. The applicant would request the FAA to file notices advising pilots of the potential overflight hazard associated with thermal plumes generated by the AEC. Notices filed with the FAA may include issuance of a Notice to Airmen (NOTAM), revision to the Los Angeles Sectional Chart, and addition of a new remark to the Automatic Terminal Information Service (ATIS) for the Los Alamitos Army Airport.

The Alamitos Generating Station and nearby Haynes Generating Station power plants have been in operation for many years and have likely been generating thermal plumes. Pilots would be aware of the presence of these power plants and may have even encountered thermal plumes. The AEC would not be introducing an unusual land use to this area. As discussed previously, Alamitos Army Airfield operates sunrise to sunset. Considering these factors, there is not a need to light and mark the exhaust stacks and ACC to identify the thermal plume sources at night.

Impacts to aviation safety are less than significant. Staff has proposed **TRANS-8** to assist pilot's ability to identify the power plant site and avoid direct overflight consistent with the Aeronautical Information Manual.

### AEC Operation Impacts Conclusion

Project traffic, emergency access, parking, hazardous materials and waste transportation, and truck deliveries for operation of the AEC would have a less than significant impact with the implementation of the traffic and transportation conditions of certification proposed by staff. Impacts to aviation safety, including impacts from thermal plumes, would be less than significant.

## CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [Cal. Code Regs., tit.14, § 15065 (a)(3)].

In a traffic and transportation analysis, cumulative impacts could occur when projects generate traffic that contributes to increased traffic volumes on the AEC study intersections and roadways. Projects with overlapping construction activities with the AEC could pose a cumulative impact through additional construction traffic and project-related road closures or rerouting of traffic. Projects generating a large number of trips during operation can contribute to higher traffic volumes along AEC study roadway segments and at study intersections.

Staff reviewed the AEC Master Cumulative Project List for projects that would contribute traffic on the AEC study intersections and roadways or create impacts from traffic detours onto AEC study intersections and roadways. Staff considers the following projects in **Traffic and Transportation Table 11** as part of the cumulative setting for Traffic and Transportation.

**Traffic and Transportation Table 11**
**Development Considered in the Cumulative Condition**

| Project Number | Project | Project Description | Distance from Project Site (miles) | Status of Project | Estimated Construction Start Date and Duration |
|---|---|---|---|---|---|
| 1 | AGS Units 1 through 6 | Existing units to remain operational during AEC construction. After construction of the AEC, demolition of the existing Units 1–6 to occur according to the memorandum of understanding (MOU) between AES and the city of Long Beach. | 0.2 | Schedule of demolition of Units 1–6 is unknown. | Unknown, but not before 2020. |
| 3 | AES Battery Energy Storage System (BESS) | BESS project at the AGS to include three 100-MW containment buildings, constructed in sequential phases from east to west. Each building to be 50 ft tall x 270 ft long x 165 ft wide (44,550 sq ft, or a little over 3 acres). Each to contain: two battery storage levels, electrical controls, and HVAC units. Construction proposed to start 3rd quarter 2019, after major mechanical completion of the AEC CCGT power block, with completion of the first 100-MW building planned for late 2020. The second and third 100-MW buildings to then be constructed and operational in 2021 and 2022. | 0.3 | Conceptual site plan submitted to City. Project is still in entitlement process. City anticipates receiving revised open space, landscape, and parking plans. City staff expects to consider the AEC proposal together with the battery storage project to assess consistency with City development requirements. | 3rd quarter 2019 through 2022. |
| 4 | Alamitos Barrier Improvement Project | Project involves construction and operation of up to 20 injection wells, four monitoring wells, and four piezometers along the existing alignment of the Alamitos Barrier. Wells located in Seal Beach. The injection wells and three nested monitoring wells will be constructed on the narrow (17 ft–20 ft wide) western access roadway of the Orange County Flood Control District Los Alamitos Channel. Existing and required structures and equipment will present work area constraints. | 0.4 | Under construction | Multiple phase project spanning from 2013 to 2019 |

| Project Number | Project | Project Description | Distance from Project Site (miles) | Status of Project | Estimated Construction Start Date and Duration |
|---|---|---|---|---|---|
| 6 | SR 1 Alamitos Bay Bridge Improvement Project | Improvements to the bridge are needed to enhance the safety of the structure and to maintain the level of service. Four alternatives being considered include: (1) No Build Alternative –no changes to existing bridge; (2) Bridge Retrofit Alternative –existing bridge repaired and strengthened to meet current seismic standards; (3) Bridge Replacement Alternative - existing bridge replaced with a new, wider bridge that meets current American Association of State Highway and Transportation Officials standards and California Department of Transportation seismic standards; and (4) Bridge Replacement Alternative with Limited Width Design- new bridge would be approximately 103 ft. wide. | 0.9 | Scoping meeting held 8/5/2015. California Department of Transportation to prepare CEQA/National Environmental Policy Act document (Initial Study (IS)/Environmental Assessment) fall 2016. Mitigated Negative Declaration/Finding of No Significant Impact to be published spring 2017. | Unknown |
| 7 | PCH & 2nd | The proposed project involves demolition of the existing Seaport Marina Hotel and construction of a commercial center totaling approximately 250,000 sq. ft. of retail and restaurant space and a three-level enclosed parking structure. | 0.9 | IS published March 2014. Potentially significant impacts identified for most environmental topic areas. Comment period on Notice of Preparation of a draft Environmental Impact Report (EIR) ended 4/17/14. | Unknown |
| 8 | CalTrans #12, San Diego Freeway I-405 Improvement Project | I-405 Improvement Project would add one general purpose lane in each direction on I-405 from Euclid Street to the I-605 interchange, plus add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East.<br>I-405 between SR-73 & I-605, Costa Mesa, Seal Beach | 1.0 | Approved. Notice of Determination June 17, 2015 | Design and build 2017-2022 |

| Project Number | Project | Project Description | Distance from Project Site (miles) | Status of Project | Estimated Construction Start Date and Duration |
|---|---|---|---|---|---|
| 9 | Rehabilitation of Western Regional Sewers, Project No. 3-64 | Orange County Sanitation District proposes to rehabilitate and/or replace entire lengths of the Orange Western Sub-Trunk, Los Alamitos Sub-trunk, Westside Relief Interceptor, and the Seal Beach Interceptor regional pipelines. In addition to pipeline and manhole replacement and/or rehabilitation, project includes rehabilitation/replacement of the Westside Pump Station force main, reconstruction of the Westside Pump Station wet well, and construction of a new vent line from the wet well to the downstream manhole or construction of an odor control scrubber.<br>The project primarily follows public rights-of-way (streets and easements). Public rights-pf-way affected near AEC include in the cities of Los Alamitos (Katella Avenue and Los Alamitos/Seal Beach Boulevard) and Seal Beach (Seal Beach Boulevard and Beverly Manor Road), and Rossmoor (unincorporated Orange County). | 1.3 | Draft EIR scheduled for publication at the end of March 2016. | 3-year construction period planned from the 4th quarter 2018 through 2021. |
| 10 | Alamitos Bay Marina Rehabilitation Project | Project would renovate the existing Marina facilities & enhance existing recreational boating facilities in the Marina. The project encourages boating use by providing upgraded ADA-compliant facilities, upgraded restrooms, & dredged basins to ensure safe navigation. Project would provide longer average slip lengths. The existing 1,967 slips in Basins 1 through 7 would be replaced by 1,646 slips in these Basins, at a loss of approximately 321 slips. Improvements associated with the project include: (1) dredging the Marina basins down to original design depths and/or original basin depths; (2) replacing and/or upgrading 13 restrooms & their associated water & sewer laterals; (3) repairing the sea wall where necessary to reestablish the rock revetment along the slope to the basin floor; (4) completing dock & piling replacement; & (5) replacing the pavement in the Marina's parking lots. The project includes two construction staging areas: one located in a parking lot on Marina Drive near Basin 2; & the other in a parking lot on Marina Drive near Basin 3, adjacent to the Marina Shipyard. | 1.3 | Construction of basin 2 is almost complete. | Basin 3 construction over next two years (2016-2017) |

| Project Number | Project | Project Description | Distance from Project Site (miles) | Status of Project | Estimated Construction Start Date and Duration |
|---|---|---|---|---|---|
| 15 | Belmont Pool Revitalization | The project proposes the demolition of the existing Belmont Pool complex (the indoor and outdoor features) & construction & operation of a replacement indoor/outdoor pool complex. Spectator seating for approximately 3,500 people through a combination of permanent & portable seating. | 2.7 | Preparing Draft EIR | Construction estimated to take 1–2 years. New Belmont Pool expected to open by 2017. |
| 56 | Huntington Beach Energy Project | The 2014 Energy Commission licensed project is a natural gas fired, combined cycle, air-cooled 939-MW electrical generating facility. Project would require demolition of existing power plant and construction of project.<br>The 2015 Petition to Amend (PTA) the 2014 licensed project is a natural gas fired, combined cycle and simple-cycle, air-cooled 844-MW electrical generating facility. Project would require demolition of existing power plant and construction of project. | 10.9 | Licensed 2014. Demo start estimated in the first quarter of 2015 with project completion 7.5 years later in the third quarter of 2022.<br>PTA license submitted to Energy Commission is currently under review. Demo started in the first quarter of 2016 with project completion estimated 10 years later in the fourth quarter of 2025. | Unknown whether the PTA is approved. Between the licensed project and the PTA, demolition/construction would occur in 2016 and extend at least 7.5 years. |

AEC construction would typically occur between 7:00 a.m. and 7:00 p.m. Monday through Friday and between 9:00 a.m. and 6:00 p.m. on Saturday. Peak AEC traffic generation would occur during January 2021. The intersection of Pacific Coast Highway and Seal Beach Boulevard would be significantly impacted by the project construction traffic during the a.m. peak hour. The AEC construction traffic would contribute to the failing LOS at the following six study intersections and six study roadway segments:

- PCH at 7th Street in a.m. and p.m. peak hours
- Studebaker Road at SR-22 W/B Ramp in p.m. peak hour
- PCH at Loynes Drive in a.m. peak hour
- Studebaker Road at 2nd Street in a.m. and p.m. peak hours
- PCH at 2nd Street in a.m. and p.m. peak hours
- Seal Beach Boulevard at PCH in a.m. peak hour
- Pacific Coast Highway
    - East Anaheim Street to SR-22
    - Orange County line to Seal Beach Boulevard
- SR-22
    - Pacific Coast Highway to Bellflower Boulevard
    - Bellflower Boulevard to East Campus Road
    - East Campus Road to Studebaker Road
    - Studebaker Road to Orange County line

Trips generated by the cumulative projects listed above occur within the transportation network used by AEC and may combine with AEC trips to result in cumulative impacts to the level-of-service (LOS) of nearby highways, roadways, and intersections. Staff considered the potential for cumulatively considerable impacts during peak construction period (January 2021) for the AEC. Any incremental increase in traffic at these intersections and roadway segments, listed above, could result in unacceptable LOS standards and significant impacts. Proposed Condition of Certification **TRANS-2** requires the applicant to prepare and implement a Traffic Control Plan, which would help with the movement of AEC workers, vehicles, and materials, including arrival and departure schedules related to the AEC. With this condition of certification the incremental cumulative construction impacts of the AEC would be reduced to a less than cumulatively considerable level.

## COMPLIANCE WITH LORS

**Traffic and Transportation Table 12** provides an assessment of the AEC's compliance with applicable laws, ordinances, and regulations (LORS) pertaining to traffic and transportation.

**Traffic and Transportation Table 12**
**Project Compliance with Adopted Traffic and Transportation LORS**

| APPLICABLE LORS | DESCRIPTION | AEC Consistency |
|---|---|---|
| **FEDERAL** | | |
| Title 14, Code of Federal Regulations, Section 77.13 (1) | This regulation requires notification of the Federal Aviation Administration (FAA) of construction or alteration of more than 200 feet above the ground level at its site. | **Consistent. TRANS-6** requires the project owner or contractor(s) to notify FAA for any construction equipment for AEC 200 feet above ground level or taller. |
| Title 14, Code of Federal Regulations, Section 77.13 (2)(i) | This regulation requires notification of the Federal Aviation Administration (FAA) of any construction or alteration of greater height than an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length. | **Consistent.** The applicant submitted FAA Form 7460-1 for the two 140-ft and two 80-ft. exhaust stacks and the 104-ft. air cooled condenser proposed for AEC. The applicant received a Determination of No Hazard to Aviation. The applicant may file another 7460-1 form if the construction crane is 132 feet above ground level or taller. |
| Title 49, Code of Federal Regulations, Parts 171-177 | Requires proper handling and storage of hazardous materials during transportation. | **Consistent. TRANS-4** requires the project owner to contract with licensed hazardous material and waste hauler companies. |
| **STATE** | | |
| California Department of Transportation CA Manual of Uniform Traffic Control Devices (MUTCD) Part 6 (Traffic Manual) | Provides traffic control guidance and standards for continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities when the normal function of a roadway is suspended. | **Consistent. TRANS-2** requires the project owner to prepare and implement a Traffic Control Plan. |
| California Health and Safety Code, Section 25160 | Addresses the safe transport of hazardous materials. | **Consistent. TRANS-4** requires the project owner to secure the proper permits and/or licenses from the California Highway Patrol, Caltrans and all other relevant jurisdictions for the transport of hazardous materials. |
| California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480 et seq., 1850-1852 | Requires encroachment permits for projects involving excavation in state and county highways and city streets. | **Consistent. TRANS-5** requires the project owner to coordinate with all relevant jurisdictions, obtain all required encroachment permits, and comply with all applicable regulations. |

| APPLICABLE LORS | DESCRIPTION | AEC Consistency |
|---|---|---|
| California Vehicle Code | | |
| Sections 13369, 15275, 15278 | Requires licensing of drivers and the classification of license for the operation of particular types of vehicles. A commercial driver's license is required to operate commercial vehicles. An endorsement issued by the Department of Motor Vehicles (DMV) is required to drive any commercial vehicle identified in Section 15278. | **Consistent.** **TRANS-1** requires the project owner to comply with driver licensing limitations. |
| Sections 31303-31309 | Requires transportation of hazardous materials to be on the state or interstate highway that offers the shortest overall transit time possible. | **Consistent.** **TRANS-4** requires the project owner to secure the proper permits and/or licenses from the California Highway Patrol, Caltrans and all other relevant jurisdictions for the transport of hazardous materials. As part of the permitting process, the proposed route would be reviewed for the shortest overall transit time. |
| Sections 32100-32109 | Requires shippers of inhalation hazards in bulk packaging to comply with rigorous equipment standards, inspection requirements, and route restrictions. | **Consistent.** **TRANS-4** requires the project owner to secure the proper permits and/or licenses from the California Highway Patrol, Caltrans and all other relevant jurisdictions for the transport of hazardous materials. As part of the permitting process, route restrictions could be imposed. |
| Sections 34000-34100 | Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in Section 25167.4 of the Health and Safety Code. | **Consistent.** **TRANS-4** requires the project owner to secure the proper permits and/or licenses from the California Highway Patrol, Caltrans and all other relevant jurisdictions for the transport of hazardous materials. The permits and/or licenses would incorporate the necessary special requirements. |
| Section 35550-35551 | Provides weight guidelines and restrictions vehicles traveling on freeways and highways. | **Consistent.** **TRANS-1** requires the project owner to comply with limitations on vehicle sizes and weights, driver licensing, and truck routes. |

| APPLICABLE LORS | DESCRIPTION | AEC Consistency |
|---|---|---|
| Section 35780 | Requires a single-trip transportation permit to transport oversized or excessive loads over state highways. | **Consistent. TRANS-1** requires the project owner to comply with limitations on vehicle sizes and weights, driver licensing, and truck routes. |
| **LOCAL** | | |
| 2010 Los Angeles County Congestion Management Program (CMP) | LOS E is the lowest acceptable performance standard for CMP intersections except where the base year LOS is worse than E. In these cases, the base year LOS is the standard. | **Consistent.** The AEC would not cause a project study intersection with a CMP roadway to become worse than the lowest acceptable performance standard. |
| City of Long Beach General Plan, Mobility Element | The Mobility Element is a required chapter of the General Plan which evaluates the transportation needs of the city and provides a transportation plan to meet those needs. | **Consistent.** The addition of AEC project trips to the traffic volumes estimated on the study roadways and intersections in the city of Long Beach during the AEC peak construction period (January 2021) does not create a significant impact. The AEC is consistent with LOS standards for the city of Long Beach. |
| City of Seal Beach General Plan, Circulation Element | The Circulation Element establishes LOS standards for local city streets and intersections. | **Consistent with compliance with TRANS-2.** The addition of AEC project trips to the traffic volumes estimated on the study roadways and intersections in the city of Seal Beach during the AEC peak construction period (January 2021) creates a significant impact for one intersection (PCH and Seal Beach Boulevard) during the a.m. peak period. While the AEC is not consistent with LOS standards for the city of Seal Beach, the impact would be temporary and **TRANS-2** requires the project owner to stagger the arrival time of the workforce during the a.m. peak period, so that impacts are reduced the a less than significant level. |
| City of Seal Beach Traffic Impact Study Guidelines | Identifies the minimum requirements for a Traffic Impact Study submitted to the city of Seal Beach. These guidelines specify increases in ICU that are considered significant and require mitigation. | **Consistent with compliance with TRANS-2.** See the previous explanation. |

| APPLICABLE LORS | DESCRIPTION | AEC Consistency |
|---|---|---|
| City of Long Beach Municipal Code | | |
| Title 10 Vehicles and Traffic, Chapter 10.18.10 Vehicles restricted from streets- Vehicles prohibited in central traffic district | Prohibits specific vehicles (freight vehicles) in the central traffic district between 7:00 a.m. and 6:00 p.m. | **Consistent.** While the applicant's proposed heavy haul route includes the use of the section of Ocean Boulevard in the central traffic district, heavy haul trips are typically permitted for late night and would be outside of the restricted hours for this district. |
| Title 10 Vehicles and Traffic, Chapter 10.41 Use of streets by Overweight Vehicles. 10.41.020 Special Permit Required | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. | **Consistent. TRANS-1** requires the project owner to obtain necessary transportation permits from all relevant jurisdictions. |
| Title 18 Buildings and Construction, Chapter 18.17 Transportation Improvement Fee | Transportation Improvement Fee is imposed on new development in the city of Long Beach. The fee assures the transportation level of service goals are met with respect to the additional demands placed on transportation system by traffic generated by new development. | **Consistent.** The Transportation Improvement Fee would be collected at the time an encroachment permit is obtained. **TRANS-5** requires consultation with the city of Long Beach to obtain an encroachment permit. |
| City of Seal Beach, Municipal Code Title 8 Vehicles and Traffic, Section 8.10.135 Movement of Oversize Vehicles. | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. | **Consistent. TRANS-1** requires the project owner to obtain necessary transportation permits from all relevant jurisdictions. |
| Los Angeles County Municipal Code, Title 16- Highways, Division 1- Highway Permits, Chapter 16.22 Moving Permits, 16.22.030 Moving Permit issuance conditions for overweight loads. | Requires an oversize vehicle permit for vehicles, mobile equipment or loads which exceed the requirements of the Vehicle Code. | **Consistent.** See the previous explanation. |

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received the following comments from the public and the applicant in the area of Traffic and Transportation for the AEC (summarized below). Staff's responses to the comments are provided below and where noted, changes were made in the text of the analysis to address the comment.

## APPLICANT'S INITIAL COMMENTS ON PRELIMINARY STAFF ASSESSMENT, JULY 27, 2106 (TN 212487)

**Comment:** *Installation of six LMS 100 simple-cycle gas turbines at the Haynes Generating Station has been completed (no longer under construction as stated in staff's **Traffic and Transportation Table 11**).*

**Staff Response:** Staff appreciates the updated information and has removed the LADWP Haynes Generating Station project from the cumulative project list for traffic and transportation, as the main potential contributor to traffic impacts was the construction workforce and delivery traffic. Now that the project is operational, few additional trips would be added to the roadways and therefore this project would no longer need to be considered as part of the cumulative project setting.

**Comment:** *Construction employee commute traffic is not likely to damage public roads, easements and rights-of-way referenced in staff's proposed* ***TRANS-3*** *Condition of Certification. The applicant proposed the following changes to this condition of certification:*

***TRANS-3 Restoration of All Public Roads, Easements, and Rights-of-Way***

*The project owner shall restore all public roads, easements, rights-of-way, and any other transportation infrastructure damaged due to project-related construction* ***deliveries***~~*activities*~~*. Restoration shall be completed in a timely manner to the infrastructure's original condition. Restoration of significant damage which could cause hazards (such as potholes, deterioration of pavement edges, or damaged signage) shall take place immediately after the damage has occurred.*

*Prior to the start of site mobilization, the project owner shall notify the relevant agencies, including the city of Long Beach, Los Angeles County, and Caltrans, of the proposed schedule for project construction. The purpose of this notification is to request that these agencies consider postponement of any planned public right-of-way repairs or improvement activities in areas affected by project construction until construction is completed, and to coordinate any concurrent construction-related activities that cannot be postponed.*

***Verification:*** *Prior to the start of site mobilization, the project owner shall videotape all* ***non-highway/freeway*** *public roads, easements, right-of-way segment(s), and intersections along the route construction* ***equipment and material delivery*** *vehicles would take in the vicinity of the project site. The project owner shall provide the videotapes to the CPM.*

**Staff Response:** Staff discussed the applicant's proposed edits during the Preliminary Staff Assessment (PSA) Workshop held on August 9, 2016. Staff and applicant agreed to the applicant's proposed changes, with the exception of the reference to "non-highway/freeway" facilities. The applicant agreed that this addition to the condition of certification can be removed. Staff has revised **TRANS-3** based on these discussions. See **TRANS-3** under the "Proposed Conditions of Certification" subsection below for the revised text.

**Comment:** *The applicant does not object to the provisions in **TRANS-8**, requiring notification of various entities of the location of the AEC, rather, the applicant objects to being required to advise against overflight of the AEC below 2,180 AGL. The applicant equates this requirement to the applicant advising the agencies that the power plant poses a threat to air navigation flying over the plant below 2,180 AGL. The applicant states that determining whether there is a hazard to air navigation is within the exclusive jurisdiction of the FAA and the Energy Commission has neither the legal authority nor the expertise to determine at what altitude planes should fly.*

*The applicant notes that the FAA has not made a determination that the AEC poses a hazard to air navigation nor is the existing Alamitos Generating Station or the neighboring LADWP Haynes Generating Station designated as a Notice to Airmen (NOTAM). The applicant comments that the recommended elevation limits described in the PSA assume that plume velocities of 4.3 meters per second (m/s) pose a threat to aviation. The applicant states there is no scientific basis for this assumption, and the FAA has not adopted this standard. The applicant says that 4.3 m/s (or 14.1 feet per second) is classified as light turbulence, which poses no risk to aircraft.*

*The applicant states that if the Energy Commission is going to attempt to usurp the exclusive role of the FAA, it should do so in an open and transparent manner though a noticed rulemaking: a. where the staff's analysis and assumptions are tested by independent, qualified third parties with actual aviation expertise; b. where all stakeholders can participate; and, c. where the Energy Commission findings, at the end of the process, will apply to all power plants under its jurisdiction.*

*The applicant recommends striking all specific references to elevations in Condition of Certification **TRANS-8**.*

**Staff Response:** The applicant's comment was discussed during the AEC PSA Workshop on August 9, 2016. The applicant reiterated their objections to specific requirements in **TRANS-8**.

Staff is cognizant that FAA has the authority to determine when there is a hazard to air navigation. It was not staff's intent to imply otherwise, and staff does not propose to usurp FAA authority by prohibiting overflight of the AEC. Staff was only recommending in **TRANS-8** that pilots avoid overflight below 2,180 AGL.

The Energy Commission has licensing authority for thermal power plants generating 50 megawatts and greater. Licensing a project that can produce thermal plumes necessitates awareness of how new plume sources could affect air navigation and safety. The Energy Commission has a long history in this area and staff has alerted FAA to pilot reports and reactions after encountering thermal plumes. FAA first amended the Aeronautical Information Manual (AIM) in 2010, recognizing that flight hazards may exist around exhaust plumes. FAA advises pilots to fly upwind of thermal plumes, when able. FAA has also recently provided tools for agencies to use to evaluate potential hazards from thermal plumes, even though FAA does not perform these evaluations or regulate plumes. In an FAA Memorandum dated September 24, 2015, the FAA states that land use planning and permitting agencies around airports are encouraged to evaluate and take into account potential flight impacts from existing or planned development that produces plumes (FAA 2015b). Use of the Spillane Approach is based on best available information for modeling plumes from large-scale power plants. Refer to the attached **Plume Analysis** in **Appendix TT-1** for a discussion of the methodology used and the plume modeling results.

Staff uses a vertical plume velocity of 4.3 m/s as the threshold of concern to aircraft. This is based on review of a 2004 advisory circular (AC 139-05(0)) prepared by the Australian Government Civil Aviation Safety Authority (CASA) that noted "aviation authorities have established that an exhaust plume with a vertical velocity in excess of 4.3 meters per second (m/s) may cause damage to an aircraft airframe or upset an aircraft when flying at low levels". Since 2004, CASA has provided an updated advisory circular (AC 139-5(1)) stating that "there is a need to assess the potential hazard to aviation posed by vertical exhaust plumes in excess of 4.3 meters per second (m/s) velocity" (CASA 2012). It also states that severe turbulence commences at a vertical velocity in excess of 10.6 m/s, which may cause a momentary loss of control. While staff's use of 4.3 m/s might seem conservative, it is important to note that it is an average velocity including velocities at the edge of the plume and in the center. The peak plume velocity is predicted to be twice the average velocity, and these peak velocities approach the start of severe turbulence. To account for this, staff uses the average vertical velocity of 4.3 m/s as a conservative threshold.

Staff proposed that Condition of Certification **TRANS-8** notify pilots of the calculated highest altitude at which the ACC's thermal plume would have an average velocity of 4.3 m/s or greater. It was staff's goal to include this clarifying information to increase pilots' awareness of a new source of thermal plumes in the airspace and not an attempt to determine where planes should fly. However, staff has removed all references to altitude in **TRANS-8**. Considering pilots do not have to fly over the power plant, FAA's 2015 AIM cautions pilots about overflight of thermal plumes, and the measures required by **TRANS-8** to notify pilots of the plume, staff is satisfied that removing all references to altitude in **TRANS-8** would not compromise the condition and goal of staff to alert pilots to the presence of new sources of thermal plumes.

See **TRANS-8** under the "Proposed Conditions of Certification" subsection below for the revised text.

## PLAINS WEST COAST TERMINALS, AUGUST 12, 2016 (TN212754)

**Comment:** *Plains West Coast Terminals (Plains) commented that unhindered site access to their facility for Plains personnel and emergency responders is necessary during AEC construction.*

**Staff Response:** AEC is not proposing to change public access to any properties. The applicant would be required to include a means of access to residential and/or commercial property located near construction work and truck traffic routes as part of the traffic control plan required by **TRANS-2**. Should there be any changes to internal access to Plains property; the laydown area agreement (discussed below) with AES could address them.

**Comment:** *Plains requires a laydown area agreement with AES.*

**Staff Response:** A laydown agreement is not related to the environmental analysis of this project. If Plains and AES enter into an agreement, it would be a third party agreement and not within the scope of the Commission's licensing proceeding.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed AEC's impacts to the nearby traffic and transportation system. The AEC would comply with all applicable LORS related to traffic and transportation. The AEC would result in less than significant impacts to the traffic and transportation system.

Implementation of Conditions of Certification **TRANS-1** through **TRANS-5** would reduce the potential AEC impacts to less than significant, which also reduces the impacts for the population in the six-mile radius of the AEC, including the environmental justice population represented in **Socioeconomics Figure 1** and **Table 3**.

1. Implementation of Condition of Certification **TRANS-1** would require the applicant to comply with applicable jurisdictions' requirements of vehicle size and weights, vehicle licensing, truck routes and other applicable limitations. The applicant would also be required to obtain all necessary transportation permits for roadway use.

2. Implementation of Condition of Certification **TRANS-2** would require the applicant to prepare and implement a traffic control plan (TCP) that would ensure sufficient parking during project construction and operation. The TCP would require that the applicant obtain all necessary permits for the transport of construction-related materials during site mobilization and maintain adequate emergency access for the duration of project construction and operation.

3. Implementation of Condition of Certification **TRANS-3** would require the project applicant to restore any road, easement or right-of-way damaged by project construction.

4. Implementation of Condition of Certification **TRANS-4** would require the applicant to obtain the necessary permits for the transport of all hazardous waste associated with the project.

5. Implementation of Condition of Certification **TRANS-5** would require the applicant to obtain the necessary encroachment permits from applicable jurisdictions.

6. Implementation of Condition of Certification **TRANS-6** would require the applicant to file FAA Form 7460-1 for any construction equipment 132 feet above ground level or taller.

7. Implementation of Condition of Certification **TRANS-7** would require the applicant to mark and light any construction equipment 200 feet above ground level or taller in accordance with FAA Advisory Circular, 70/7460-1 L, Chapter 2.1 or as updated.

8. Implementation of Condition of Certification **TRANS-8** would require the applicant to request the FAA and airport manager to advise pilots of the location of the power plant and the potential aviation hazards associated with thermal plumes and to avoid direct overflight of the facility, consistent with the Aeronautical Information Manual.

## PROPOSED CONDITIONS OF CERTIFICATION

### TRANS-1 Roadway Use Permits and Regulations

The project owner shall comply with limitations imposed by the Department of Transportation (Caltrans) and other relevant jurisdictions, including the city of Long Beach and Los Angeles County, on vehicle sizes and weights, driver licensing, and truck routes. In addition, the project owner or its contractor(s) shall obtain necessary transportation permits for roadway use from all relevant jurisdictions.

**Verification:** In the Monthly Compliance Reports (MCRs), the project owner shall report permits received during that reporting period. In addition, the project owner shall retain copies of permits and supporting documentation on-site for Compliance Project Manager (CPM) inspection if requested.

### TRANS-2 Traffic Control Plan, Heavy Hauling Plan, and Parking/Staging Plan

Prior to the start of construction, the project owner shall prepare and implement a Traffic Control Plan (TCP) for the project's construction and operations traffic. The TCP shall address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

The project owner shall consult with the Department of Transportation (Caltrans) District 7 office, the city of Long Beach and other applicable local jurisdictions in the preparation and implementation of the TCP. The project owner shall submit the proposed TCP to these agencies in sufficient time for review and comment, and to the Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan.

The TCP shall include:

1. Routes used for construction-related trips for workers, deliveries, and heavy-haul trucks.

2. Timing of construction-related trips for workers, deliveries, and heavy-haul trucks, with trips scheduled for off-peak hours if possible, and staggered when possible.

3. Stagger the arrival time of vehicles (workforce and delivery) to times outside of the a.m. peak period, particularly to avoid a worsening of LOS for the intersection of PCH and Seal Beach Boulevard during the a.m. peak.

4. Allow access to the AEC site for any delivery trucks or workers that arrive at the site prior to allowable construction start time (7 a.m. on weekdays and 9:00 a.m. on Saturdays) to be parked on the AEC project site.

5. Parking/Staging Plan (PSP) for all phases of project construction and operation to require all project-related parking to be on the AEC project site with the exception of offsite parking related to construction of the wastewater linear (workers and construction equipment). The PSP must comply with the city of Long Beach's parking regulations by providing sufficient onsite parking.

6. Provisions for redirection of construction traffic with a flag person as necessary to ensure traffic safety and minimize interruptions to non-construction related traffic flow.

7. Placement of necessary signage, lighting, and traffic control devices at the project construction site and laydown areas;

8. A heavy-haul plan addressing the transport and delivery of heavy and oversized loads requiring permits from the California Department of Transportation (Caltrans), other state or federal agencies, and/or the affected local jurisdictions including Los Angeles County and the city of Long Beach;

9. Details regarding temporary closure of travel lanes or disruptions to street segments and intersections during construction activities.

10. Traffic diversion plans (in coordination with Caltrans and any applicable local agencies) to ensure access during temporary lane/road closures.

11. Means of access to residential and/or commercial property located near construction work and truck traffic routes.

12. Means of access for emergency vehicles to the project site.

13. Advance notification to residents, businesses, emergency providers, and hospitals that would be affected when roads may be partially or completely closed.

14. Identify safety procedures for exiting and entering the site access gate;

**Verification:** At least 60 calendar days prior to the start of construction, the project owner shall submit the TCP to the applicable agencies for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the agencies requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the agencies, along with any changes to the proposed development plan, to the CPM for review and approval.

The project owner shall report in the Monthly Compliance Reports (MCRs) the arrival time of construction workers and construction delivery trucks, ensuring arrival at the AEC site is outside of the am peak hour (7 a.m. – 9 a.m.). Documentation of worker and truck delivery arrival time may include worker timesheets and security sign in sheets, or other documentation method approved by the CPM.

### TRANS-3 Restoration of All Public Roads, Easements, and Rights-of-Way

The project owner shall restore all public roads, easements, rights-of-way, and any other transportation infrastructure damaged due to project-related construction deliveries. Restoration shall be completed in a timely manner to the infrastructure's original condition. Restoration of significant damage which could cause hazards (such as potholes, deterioration of pavement edges, or damaged signage) shall take place immediately after the damage has occurred.

Prior to the start of site mobilization, the project owner shall notify the relevant agencies, including the city of Long Beach, Los Angeles County, and Caltrans, of the proposed schedule for project construction. The purpose of this notification is to request that these agencies consider postponement of any planned public right-of-way repairs or improvement activities in areas affected by project construction until construction is completed, and to coordinate any concurrent construction-related activities that cannot be postponed.

**Verification:** Prior to the start of site mobilization, the project owner shall videotape all public roads, easements, right-of-way segment(s), and intersections along the route construction equipment and material delivery vehicles would take in the vicinity of the project site. The project owner shall provide the videotapes to the CPM.

If damage to any public road, easement, or right-of-way occurs during construction, the project owner shall notify the CPM and the affected agency/agencies to identify the sections to be repaired. At that time, the project owner and CPM shall establish a schedule for completion and approval of the repairs. Following completion of any repairs, the project owner shall provide the CPM with letters signed by the affected agency/agencies stating their satisfaction with the repairs.

### TRANS-4 Hazardous Materials

The project owner shall contract with licensed hazardous materials delivery and waste hauler companies in order to obtain the necessary permits and/or licenses from the California Highway Patrol, Caltrans, and any relevant local jurisdictions for the transportation of hazardous materials. The project owner shall ensure compliance with all applicable regulations and implementation of the proper procedures.

**Verification:** In the Monthly Compliance Reports (MCRs) during construction and the Annual Reports during operation, the owner shall provide copies of all permits/licenses obtained for the transportation of hazardous materials.

At least 30 days prior to the start of construction, the project owner shall provide copies of any comment letters received from the relevant agencies, along with any resulting changes in plans for transportation of hazardous materials.

### TRANS-5 Encroachment into Public Rights-of-Way

Prior to any ground disturbance, improvements, or obstruction of traffic within any public road, easement, or right-of-way, the project owner shall coordinate with all applicable jurisdictions, including the city of Long Beach, Los Angeles County, and Caltrans, to obtain necessary encroachment permits and comply with all applicable regulations, including applicable road standards.

**Verification:** At least 10 days prior to ground disturbance, improvements, or interruption of traffic in or along any public road, easement, or right-of-way, the project owner shall provide copies of all permit(s), relevant to the affected location(s), received from Caltrans or any other affected jurisdiction/s to the CPM. In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

### TRANS-6 Notification of FAA for Construction Equipment at or Exceeding 132 feet AGL

The project owner or its contractor(s) shall file Form 7460-1 (construction or alteration of airspace) with the FAA for any construction equipment at the project site 132 feet above ground level (AGL) or taller.

**Verification:** At least 60 days prior to the presence of any construction equipment onsite 132 feet AGL or taller, the project owner shall submit to the CPM for review, supporting documentation that Form 7460-1 is filed with the FAA. Once FAA issues a hazard determination, the project owner shall provide a copy to the CPM for review.

### TRANS-7 Obstruction Marking and Lighting for Construction Equipment

The project owner shall install blinking obstruction marking and lighting on any construction equipment 200 feet AGL or taller, in accordance with FAA requirements, as expressed in FAA Advisory Circular 70/7460-1L or as updated.

Lighting shall be operational 24 hours a day, 7 days a week for the duration of project construction. Upgrades to the required lighting configurations, types, location, or duration shall be implemented consistent with any changes to FAA obstruction marking and lighting requirements.

**Verification:** At least 60 days prior to the presence of any construction equipment onsite which is or exceeds 200 feet in height, the project owner shall submit to the Compliance Project Manager for approval of final design plans for construction equipment depicting the required air traffic obstruction marking and lighting.

**TRANS-8 Pilot Notification and Awareness**

The project owner shall initiate the following actions to ensure pilots are aware of the project location and potential hazards to aviation:

1. Submit a letter to the Federal Aviation Administration (FAA) requesting a Notice to Airmen (NOTAM) be issued advising pilots of the location of the power plant and recommending avoidance of overflight of the project site. The letter should also request that the NOTAM be maintained in active status until status until all navigational charts and Airport Facility Directories (AFDs) have been updated.

2. Submit a letter to the FAA requesting a power plant depiction symbol be placed at the power plant site location on the Los Angeles Sectional Chart with a notice to “avoid direct overflight”.

3. Submit a request to the FAA and the Los Alamitos Army Airfield Manager to add a new remark to the Automatic Terminal Information Service (ATIS) identifying the location of the power plant and advising pilots to avoid direct overflight as they approach or depart the airport.

4. Submit aerodrome remarks describing the location of the power plant and advising against direct overflight to the:

    a. FAA Airport/Facility Directory – Southwest U.S.

    b. Jeppesen (Airway Manual Services - Western U.S. Airport Directory)

    c. Pilots Guide to California Airports

**Verification:** Within 60 days prior to start of construction, the project owner shall submit draft language for the letters of request to the FAA and Los Alamitos Army Airfield to the Compliance Project Manager (CPM) for review and approval. The letters should request a response within 30 days that includes a timeline for implementing the required actions.

Within 60 days after CPM approval of draft language, the project owner shall submit the required the letters of request to the FAA, Los Alamitos Army Airfield, and the identified publications. The project owner shall submit copies of these requests to the CPM. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt. If the FAA, Los Alamitos Army Airfield, or the listed publications do not respond within 30 days, the project owner shall contact the CPM.

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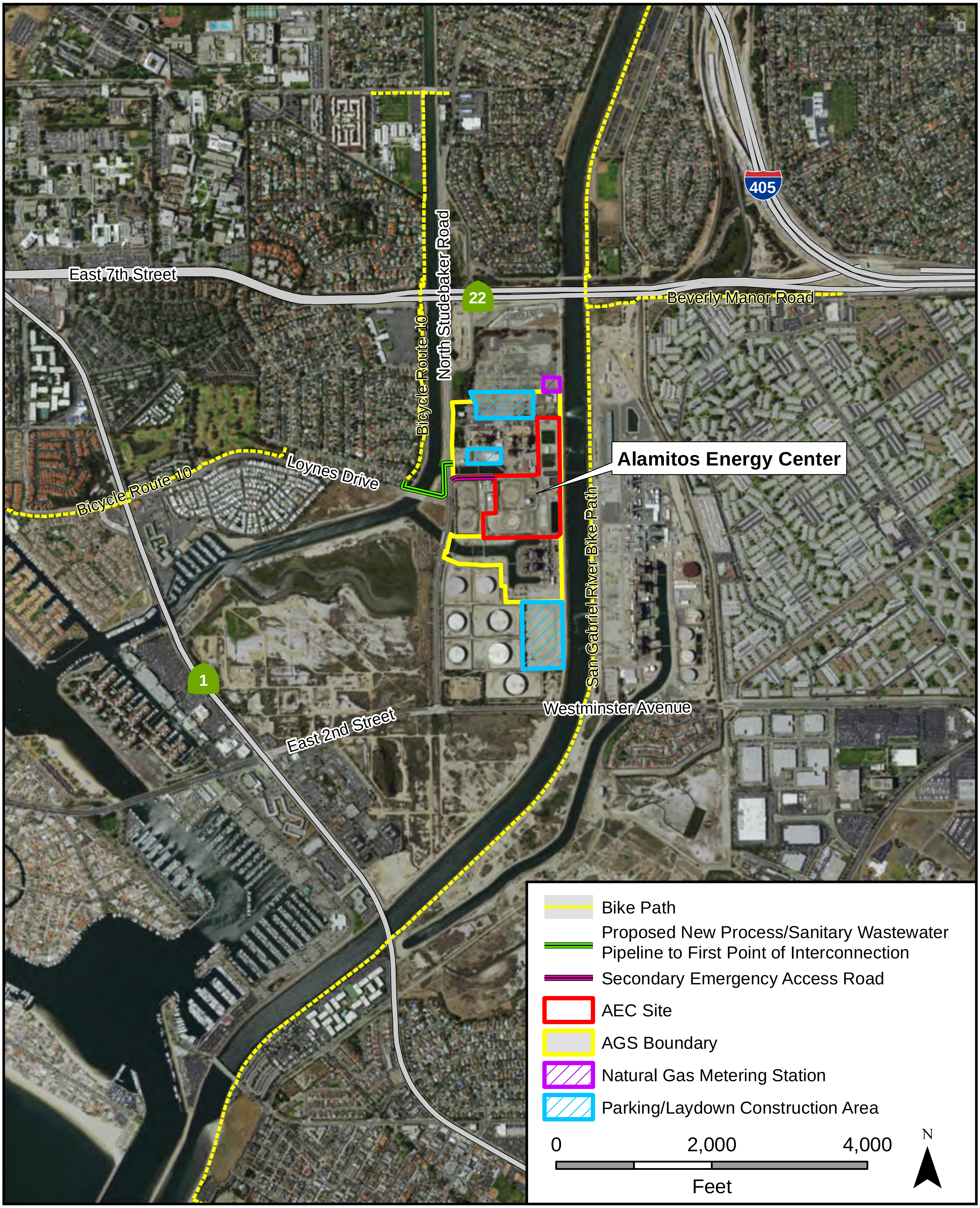
**TRAFFIC & TRANSPORTATION - FIGURE 1**
Alamitos Energy Center - Regional Transportation Network


**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION**
SOURCE: 13-AFC-01 Figure 1.1-3, AEC Data Response Set #6 Figure DR168-1, OSM, Los Angeles County, ESRI Imagery

**TRAFFIC & TRANSPORTATION - FIGURE 2**

Alamitos Energy Center - Local Transportation Network




**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION**

SOURCE: 13-AFC-01 Figure 1.1-3, AEC Data Response Set #6 Figure DR168-1, OSM, ESRI Imagery

**TRAFFIC & TRANSPORTATION - FIGURE 3**
Alamitos Energy Center - Heavy Haul Routes




CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: 13-AFC-01 Figure 1.1-3, AEC Data Response Set #6 Figure DR168-1, OSM, Los Angeles County, ESRI Imagery

# APPENDIX TT-1: PLUME VELOCITY ANALYSIS

Testimony of Nancy Fletcher and Wenjun Qian, Ph.D., P.E.

## INTRODUCTION

The following analysis assesses exhaust stack plume vertical velocities of the proposed Alamitos Energy Center (AEC) combustion turbines, auxiliary boiler, air cooled condenser (ACC) and fin fan coolers. Staff completed calculations to determine the worst-case vertical plume velocities at different heights above the ground based on the project owner's proposed facility design, with staff corrections to some of the operational data. The purpose of this appendix is to provide documentation of the method used to estimate worst-case vertical plume velocity estimates to assist evaluation of the project's impacts on aviation safety in the vicinity of the AEC.

## PROJECT DESCRIPTION

The AEC is a proposed natural-gas-fired, combined-cycle and simple-cycle, air-cooled electrical generating facility located on the site of the Alamitos Generating Station (AGS) in Long Beach, California. AGS consists of six operating natural gas fired boilers and one retired unit. The AGS totals 1,950 megawatts (MW), permitted through the South Coast Air Quality Management District and is not licensed through the Energy Commission. The proposed AEC would consist of two power blocks. Power Block 1 includes two General Electric (GE) Frame 7FA.05 combustions turbine generators (CTGs), two heat recovery steam generators (HRSGs), one steam turbine generator (STG), an air-cooled condenser (ACC), an auxiliary boiler, and related ancillary facilities. Power Block 2 includes four simple cycle GE LMS-100PB CTGs with fin-fan coolers/air-cooled heat exchangers and ancillary facilities.

## PLUME VELOCITY CALCULATION METHOD

## SPILLANE APPROFACH

Staff uses a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for vertical turbulence from plumes such as the AEC stacks and cooling system. The calculation approach, known as the "Spillane approach", is based on calm wind conditions to assess average plume vertical velocity as a function of height. Calm wind conditions are considered the worst-case wind conditions for worst case plume rise and velocities. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead calm wind (i.e., wind speed = 0) conditions:

(1) $(V*a)^3 = (V*a)_o^3 + 0.12*F_o*[(z-z_v)^2-(6.25D-z_v)^2]$

(2) $(V*a)_o = V_{exit}*D/2*(T_a/T_s)^{0.5}$

(3) $F_o = g*V_{exit}*D^2*(1-T_a/T_s)/4$

(4) $Z_v = 6.25D*[1-(T_a/T_s)^{0.5}]$

Where: $V$ = vertical velocity (meters per second [m/s]), plume-average velocity

$a$ = plume top-hat radius (m, increases at a linear rate of $a = 0.16*(z - z_v)$

$F_o$= initial stack buoyancy flux $m^4/s^3$

$z$ = height above stack exit (m)

$z_v$= virtual source height (m)

$V_{exit}$= initial stack velocity (m/s)

$D$ = stack diameter (m)

$T_a$= ambient temperature (K)

$T_s$= stack temperature (K)

$g$ = acceleration of gravity (9.8 $m/s^2$)

Individual plumes can be broken into three stages. The first stage describes plume conditions close to the stack exit where the plume momentum remains relatively unaffected by ambient and plume buoyancy conditions. This momentum rise stage describes the plume as it travels to a height of 6.25D. In the second stage, the plume responds to differences between ambient and plume buoyancy conditions. Cooler and less turbulent ambient air interacts with the plume and impacts the plume's vertical velocity. The dilution of the stack exhaust is sensitive to ambient wind speed. Therefore the calm wind conditions are considered to be conservative and yield worst case conditions. In the third stage, the plume rise is largely impacted by the buoyancy of the plume and continues until turbulence within and outside the plume equalizes. This generally takes place at large heights and distances from the stack where the plume vertical velocity is close to zero.

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where $z > 6.25D$) and at the end of the plume merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity would be two times higher than the plume-average velocity predicted by this equation. The stack buoyancy flux (Equation 3) is a prominent part of Equation (1). The calm condition calculation basis represents the worst-case conditions, and the vertical velocities will decrease substantially as wind speeds increase.

For multiple stack plumes, where the stacks are equivalent as is the case for AEC, the multiple stack plume velocity during calm winds is calculated by staff in a simplified fashion, presented in the Best Paper as follows:

(5) $V_m = V_{sp}*N^{0.25}$

Where: $V_m$ = multiple stack combined plume vertical velocity (m/s)
$V_{sp}$ = single plume vertical velocity (m/s), calculated using Equation (1)
$N$ = number of stacks

This simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology for multiple plumes as given in data results presented in the Best paper (Best 2003). However, for a long linear set of plumes, such as the ACC grid designed for the AEC project, it is very unlikely that all plumes can merge fully to allow this velocity given the stack separation and the height/atmospheric conditions needed for them to fully merge. Therefore the use of this approach will likely over predict the combined plume velocities in this case.

## MITRE EXHAUST PLUME ANALYZER

On September 24, 2015, the Federal Aviation Administration (FAA) released a guidance memorandum (FAA 2015) recommending that thermal plumes be evaluated for air traffic safety. FAA determined that the overall risk associated with thermal plumes in causing a disruption of flight is low. However, it determined that such plumes in the vicinity of airports may pose a unique hazard to aircraft in critical phases of flight (such as take-off and landing). In this memorandum a new computer model, different than the analysis technique used by staff and identified above as the Spillane approach, is used to evaluate vertical plumes for hazards to light aircraft. It was prepared under FAA funding and available for use in evaluating exhaust plume impacts.

This new model, the MITRE Corporation's Exhaust Plume Analyzer (MITRE 2012), was identified by the FAA as a potentially effective tool to assess the impact that exhaust plumes may impose on flight operations in the vicinity of airports (FAA 2015). The Exhaust Plume Analyzer was developed to evaluate aviation risks from large thermal stacks, such as turbine exhaust stacks. The model provides output in the form of graphical risk probability isopleths ranging from $10^{-2}$ to $10^{-7}$ risk probabilities for both severe turbulence and upset conditions for four different aircraft sizes. However, at this time the Exhaust Plume Analyzer model cannot be used to provide reasonable risk predictions on variable exhaust temperature thermal plume sources, such as cooling towers and air cooled condensers.

The FAA has not provided guidance on how to evaluate the risk probability isopleth output of the Exhaust Plume Analyzer model, but states in their memorandum that they intend to update their guidance on near-airport land use, including evaluation of thermal exhaust plumes, in fiscal year 2016. However, MITRE Corporation is suggesting that a probability of severe turbulence at an occurrence level of greater than $1 \times 10^{-7}$ (they call this a Target Safety Level) should be considered potentially significant. This is equivalent to one occurrence of severe aircraft turbulence in 10 million flights. For the past 50 years, the MITRE Corporation has provided air traffic safety guidance to FAA, and their recommended Target Safety Level is based on this experience (MITRE 2016).

Additionally, the MITRE model has a probability of occurrence plot limitation. While it provides output for predict plumes up to a maximum height of 3,500 feet above ground, the meteorological data that is used by the model is currently limited to a maximum height of 3,000 feet. Outputs corresponding to the higher altitudes simply reuse the 3,000 foot meteorological data. The model was developed with the assumption that a plume would not rise higher than 3,000-3,500 feet above ground level, and therefore the modeling output was terminated at that height. There is uncertainty if there will be any effort to expand the data set and model to work properly at altitudes above 3,000 feet above ground level at this point. The results obtained by staff using the Spillane approach suggest that this limitation would not apply to the AEC.

At this time staff does not believe the MITRE model should be used for final work products until the significance threshold is verified by the FAA and the model capabilities are enhanced to include other thermal plume sources such as cooling towers and air-cooled condensers.

## STAFF ANALYSIS

This appendix uses the Spillane approach method to be consistent with staff assessments done for other projects and because the Spillane approach is described in the FAA materials as providing similar risk assessments for light aircraft. As stated above, staff will consider using the new MITRE method to the extent that it is applicable after conducting further review of the FAA methodology and once FAA develops guidance on how to evaluate the output of the Exhaust Plume Analyzer.

## EQUIPMENT DESIGN AND OPERATING PARAMETERS

## GE 7FA.05 COMBUSTION GAS TURBINE DESIGN AND OPERATING PARAMETERS

The design and operating parameter data for the GE 7FA.05 CTGs were used to calculate the plume rise and velocity. Four operating scenarios detailed in the performance data and operational data sheets in Supplemental Application for Certification (AFC) Appendix 5.1B and Appendix 5.1C (AEC 2015h) were selected for analysis. The four scenarios evaluate three separate ambient temperatures across the range of operation for the CTGs. Operating parameters used to compute worst-case vertical plume velocities include ambient temperatures of 28, 65.3, and 107 degree Fahrenheit (ºF) at maximum turbine loads without inlet air cooling. In addition, inlet air cooling was analyzed at the 107 ºF ambient temperature scenario. The exhaust operating parameters used for analysis are provided in **Plume Velocity Table 1**.

**Plume Velocity Table 1**
**GE 7FA.05 CTG Exhaust Parameters**

| Parameter | GE 7FA.05 | | | |
|---|---|---|---|---|
| Stack Height | 140 ft. (42.70 meters) | | | |
| Stack Diameter | 20 ft. (6.10 meters) | | | |
| CTG Load (%) | 100 | | | |
| Operating Scenario # | 1 | 5 | 8 | 9 |
| Ambient Temperature (°F) | 28 | 65.3 | 107 | |
| With Inlet Air Cooling | No | No | Yes | No |
| Exhaust Temperature (°F) | 216 | 215 | 221 | 223 |
| Exhaust Velocity (ft/s) | 67.0 | 66.2 | 66.3 | 59.9 |
| Exhaust Flow Rate (1000 lb/hr) | 4,368 | 4,298 | 4,266 | 3,858 |

Source: AEC 2015h

## GE LMS-100PB COMBUSTION GAS TURBINE DESIGN AND OPERATING PARAMETERS

The design and operating parameter data for the GE LMS-100PB CTGs were used to calculate the plume rise and velocity. Several operating scenarios detailed in the performance data and operational data sheets in Supplemental AFC Appendix 5.1B and Appendix 5.1C (AEC 2015h) were evaluated. The three worst case operating scenarios at low mid and high ambient temperatures were selected for analysis. Operating parameters used to compute worst-case vertical plume velocities include ambient temperatures of 28 ºF, 65.3 ºF, and 107ºF at maximum turbine loads. Inlet air cooling was analyzed at 65.3 ºF and 107 ºF. The exhaust operating parameters used for analysis are provided in **Plume Velocity Table 2**.

**Plume Velocity Table 2**
**GE LMS-100PB CTG Exhaust Parameters**

| Parameter | GE LMS-100PB | | |
|---|---|---|---|
| Stack Height | 80 ft. (24.38 meters) | | |
| Stack Diameter | 13.5 ft. (4.11 meters) | | |
| CTG Load (%) | 100 | | |
| Operating Scenario # | 1 | 4 | 8 |
| Ambient Temperature (°F) | 28 | 65.3 | 107 |
| With Inlet Air Cooling | No | Yes | Yes |
| Exhaust Temperature (°F) | 789 | 797 | 837 |
| Exhaust Velocity (ft/s) | 109 | 109 | 99.2 |
| Exhaust Flow Rate (1000 lb/hr) | 1,755 | 1,726 | 1,525 |

Source: AEC 2015h

## AUXILIARY BOILER DESIGN AND OPERATING PARAMETERS

The 70.8 million British thermal units per hour (MMBtu/hr) auxiliary boiler proposed for AEC is not large enough to expect a significant thermal plume however for completeness the auxiliary boiler is included in the analysis. **Plume Velocity Table 3** shows the design and operating parameter data for the auxiliary boiler stack, which were provided by the project owner in the Supplemental AFC (AEC 2015h). Staff chose the operating parameters (shown in **Plume Velocity Table 3**) which correspond to the maximum heat input case to compute worst-case vertical plume velocities.

**Plume Velocity Table 3**
**Auxiliary Boiler Exhaust Parameters**

| Parameter | Auxiliary Boiler | |
|---|---|---|
| Stack Height | 80 ft. (24.38 meters) | |
| Stack Diameter | 3 ft. (0.91 meters) | |
| Exhaust Temperature (°F) | 256 | 318 |
| Exhaust Velocity (ft/s) | 16.2 | 69.5 |
| Exhaust Flow Rate (Actual Cubic Feet per Minute [ACFM]) | 6,860 | 29,473 |

Source: AEC 2015h and staff calculations

## AIR-COOLED CONDENSER DESIGN AND OPERATING PARAMETERS

The design and operating parameter data for the air-cooled condenser (ACC) for the combined-cycle power block are included in **Plume Velocity Table 4**. The project owner provided design and operating parameters for the ACCs in Data Responses Set 7 (CH2 2016e). The data provided for the outlet air flow rates, outlet air exit velocities, and cell dimensions of the ACC are internally inconsistent with each other. Revised information was provided (CH2 2016v). Staff calculated the outlet air exit velocities using the project owner-provided heat rejection and fan diameter. Staff-calculated outlet air exit velocities included in **Plume Velocity Table 4** are denoted with an asterisk symbol (*).

**Plume Velocity Table 4**
**Air Cooled Condenser Parameters**

| Parameter | Combined-Cycle Air-Cooled Condenser | | | |
|---|---|---|---|---|
| Number of Cells | 35 | | | |
| Cell Height (ft) | 53.1 | | | |
| Cell Diameter (ft) | 43.9 (L) x 43.1 (W) | | | |
| Fan Diameter (ft) | 36 | | | |
| Distance Between Cells (ft) | 0 ft (adjoining cells share a single column) | | | |
| Ambient Temperature (°F) | 28 | 65.3 | 107 | |
| Evaporative Cooling | No | No | No | Yes |
| Ambient Relative Humidity (%) | 76 | 87 | 11 | 11 |
| Number of Cells in Operation | 13 | 35 | 33 | 33 |
| Heat Rejection (MW) | 369.6 | 378.8 | 369.7 | 388.9 |
| Outlet Air Temperature (°F) | 89.2 | 88.6 | 135.8 | 137.1 |
| Outlet Air Exit Velocity (ft/s) [a] | 24.99* | 24.96* | 22.71* | 22.90* |

Source: CH2 2016v and independent staff analysis
Note: [a] Staff calculated the outlet air exit velocities based on the project owner provided heat rejection and fan diameter.

## FIN FAN COOLER DESIGN AND OPERATING PARAMETERS

**Plume Velocity Table 5** shows the design and operating parameter data for each of the fin fan coolers for the simple-cycle power block. The project owner originally provided the data for the fin fan coolers in Data Responses Set 7 (CH2 2016e). However, staff noticed that the project owner-provided data are internally inconsistent with each other. Staff requested the project owner to provide performance data sheets from the vendor and clarify the inconsistencies. The project owner provided follow-up vendor data sheets and explanations (CH2 2016v, CH2 2016w) for the fin fan coolers. The project owner provided the exit velocities based on the size of the tube bundle openings, not the fan diameter. Staff recalculated the outlet air exit velocities for each fan based on the project owner provided outlet air flow and the fan diameter. The staff-calculated values are shown in **Plume Velocity Table 5** with an asterisk symbol (*).

**Plume Velocity Table 5**
**Fin Fan Cooler Exhaust Parameters**

| Parameter | Simple-Cycle Fin Fan Cooler | | |
|---|---|---|---|
| Number of Cells (Fans) | 60 total | | |
| Cell Height (ft) | 32 | | |
| Cell Diameter (ft) | 12 | | |
| Ambient Temperature (ºF) | 28 | 65.3 | 107 |
| Ambient Relative Humidity | 76% | 87% | 11% |
| Number in Operation | 24 fans | 60 fans | 60 fans |
| Heat Rejection (MW) | 65.3 | 65.3 | 65.7 |
| Outlet Air Temperature (ºF) | 75.11 | 84.06 | 125.56 |
| Outlet Air Exit Velocity/fan (ft/s) [a] | 27.20* | 27.21* | 29.77* |
| Outlet Air Flow (lb/hr) | 19,674,564 | 49,186,410 | 49,186,410 |

Source: CH2 2016v, CH2 2016w, and independent staff analysis
Note:
[a] Staff calculated the exit velocities of each fan based on the project owner provided outlet air flow and the fan diameter.

## PLUME VELOCITY CALCULATION RESULTS

Using the Spillane approach, the plume average vertical velocities at different heights above ground were determined by staff for calm conditions for the proposed gas turbines, auxiliary boiler, air-cooled condenser (ACC) and fin fan coolers. Staff evaluated the potential for plume merging using the following stack-to-stack distances: (1) the distance between the two GE 7FA.05 combined-cycle turbine stacks would be about 44.1 meters (m [144.7 ft]), (2) the distance between a set of two GE LMS-100PB simple-cycle turbine stacks would be about 15.3 m (50.2 ft) and the distance between the two pairs would be about 112 m (367.5 ft). Plumes begin merging when the radius of each of the two plumes added together equals the distance between the stacks. As a rule of thumb they are considered fully merged when the sum of the plume radii adds to equal twice the distance between stacks.

As explained in the **Transportation and Traffic** section, a plume average vertical velocity of 4.3 m/s has been determined by staff to be the critical velocity of concern to light aircraft. This is based on the Australian Civil Aviation Safety Authority (CASA) advisory circular (CASA 2003). Vertical velocities below this level are not of concern to light aircraft.

The combined-cycle power block would have two GE 7FA.05 combined-cycle turbine stacks, with a spacing of about 44.1 m or 144.7 ft from each other. When the spacing between the stacks is not large enough to prevent plume merging, the exhaust plumes may spread enough to significantly merge prior to the velocity lowering to vertical velocities below levels of concern. Staff evaluated the potential for plume merging using a stack-to-stack distance for the CTGs/HRSGs of 44.1 m or 144.7 ft. Staff calculated plume average vertical velocities for all four operating cases shown in **Plume Velocity Table 1** for the GE 7FA.05 turbines and determined that the worst-case predicted plume velocities would occur at full load operation without inlet air cooling at the 28°F ambient temperature condition. Staff's calculated worst-case plume average velocity values are provided in **Plume Velocity Table 6**. Height above ground is determined by adding the physical stack height to z, the height above stack exit.

The GE 7FA.05 gas turbine plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 810 feet above ground for the single turbine plume (N=1). The plume diameter at this height would be around 63.5 meters, which would be larger than the distance between the two GE7FA.05 gas turbine stacks (44.1 meters). Therefore the merging of the adjacent turbine plumes should be considered. In the case of two plumes fully merging (N=2), the average velocity is calculated to drop below 4.3 m/s at the height of 1,230 feet above ground.

**Plume Velocity Table 6**
**GE 7FA.05 Turbine Plume Size (m) and Vertical Plume Velocities (m/s)**

| Height Above Ground Level (Feet) | Plume Diameter (m) [a] | Number of Merged Stacks | Plume Velocity (m/s) |
|---|---|---|---|
| 300 | 13.76 | 1.00 | 8.47 |
| 400 | 23.52 | 1.00 | 6.36 |
| 500 | 33.27 | 1.00 | 5.47 |
| 600 | 43.02 | 1.11 | 5.08 |
| 700 | 52.78 | 1.33 | 4.93 |
| 800 | 62.53 | 1.56 | 4.82 |
| 900 | 72.29 | 1.78 | 4.73 |
| 1,000 | 82.04 | 2.00 | 4.66 |
| 1,100 | 91.79 | 2.00 | 4.49 |
| 1,200 | 101.55 | 2.00 | 4.34 |
| 1,300 | 111.30 | 2.00 | 4.20 |
| 1,400 | 121.05 | 2.00 | 4.08 |
| 1,500 | 130.81 | 2.00 | 3.98 |
| 1,600 | 140.56 | 2.00 | 3.88 |
| 1,700 | 150.32 | 2.00 | 3.79 |
| 1,800 | 160.07 | 2.00 | 3.72 |
| 1,900 | 169.82 | 2.00 | 3.64 |
| 2,000 | 179.58 | 2.00 | 3.57 |
| 2,100 | 189.33 | 2.00 | 3.51 |

Notes:
a – The separation between the two stacks would be about 44.1 meters and the plumes will begin to merge when the plume diameter is the same as the separation and is assumed to be fully merged when the plume diameter is twice the stack separation.

The simple-cycle power block would have four GE LMS-100PB simple-cycle turbine stacks. The four stacks would be in two pairs. The distance between one set of two GE LMS-100PB simple-cycle turbine stacks would be about 15.3 m (50.2 ft) and the distance between the two sets would be about 112 m (367.5 ft). Staff calculated plume average vertical velocities for all three operating cases shown in **Plume Velocity Table 2** for the GE LMS-100PB turbines and determined that the worst-case predicted plume velocities would occur at 100 percent load operation without inlet air cooling at the 28°F ambient temperature condition. Staff's calculated worst-case plume average velocity values are provided in **Plume Velocity Table 7**.

The GE LMS-100PB gas turbine plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 1,140 feet above ground for the single turbine plume (N=1). The plume diameter at this height would be around 100.3 meters, which would be larger than the distance of 15.3 m between one set of two GE LMS-100PB gas turbine stacks, but would be less than the distance of 112 m between the two sets. Therefore the merging of the two adjacent turbine plumes should be considered but staff believes that it is unlikely that the two sets of plumes, with a distance of 112 m, would be merged. Staff assumes the worst case merging scenario would be two plumes fully merged (N=2). With two plumes fully merged, the average velocity is calculated to drop below 4.3 m/s at the height of 1,825 feet above ground.

**Plume Velocity Table 7**
**GE LMS-100PB Turbine Plume Size (m) and Vertical Plume Velocities (m/s)**

| Height Above Ground Level (Feet) | Plume Diameter (m) [a] | Number of Merged Stacks | Plume Velocity (m/s) |
|---|---|---|---|
| 300 | 18.37 | 1.47 | 8.72 |
| 400 | 28.12 | 2.00 | 7.95 |
| 500 | 37.87 | 2.00 | 7.13 |
| 600 | 47.63 | 2.00 | 6.58 |
| 700 | 57.38 | 2.00 | 6.17 |
| 800 | 67.14 | 2.00 | 5.85 |
| 900 | 76.89 | 2.00 | 5.58 |
| 1,000 | 86.64 | 2.00 | 5.36 |
| 1,100 | 96.40 | 2.00 | 5.17 |
| 1,200 | 106.15 | 2.00 | 5.01 |
| 1,300 | 115.90 | 2.00 | 4.86 |
| 1,400 | 125.66 | 2.00 | 4.73 |
| 1,500 | 135.41 | 2.00 | 4.61 |
| 1,600 | 145.16 | 2.00 | 4.51 |
| 1,700 | 154.92 | 2.00 | 4.41 |
| 1,800 | 164.67 | 2.00 | 4.32 |
| 1,900 | 174.43 | 2.00 | 4.24 |
| 2,000 | 184.18 | 2.00 | 4.16 |
| 2,100 | 193.93 | 2.00 | 4.09 |

Notes:
a – The separation between two adjacent stacks would be about 15.3 meters and the plumes will begin to merge when the plume diameter is the same as the separation and is assumed to be fully merged when the plume diameter is twice the stack separation.

Staff also calculated plume average vertical velocities for the auxiliary boiler using the operating parameters shown in **Plume Velocity Table 3**. **Plume Velocity Table 8** shows the worst-case plume average velocity values for the auxiliary boiler. The auxiliary boiler plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 128 feet above ground.

**Plume Velocity Table 8**
**Auxiliary Boiler Plume Size (m) and Vertical Plume Velocities (m/s)**

| Height Above Ground Level (Feet) | Plume Diameter (m) | Plume Velocity (m/s) |
|---|---|---|
| 100 | 1.57 | 9.82 |
| 110 | 2.55 | 6.37 |
| 120 | 3.52 | 4.91 |
| 121 | 3.62 | 4.81 |
| 122 | 3.72 | 4.72 |
| 123 | 3.81 | 4.63 |
| 124 | 3.91 | 4.54 |
| 125 | 4.01 | 4.46 |
| 126 | 4.11 | 4.39 |
| 127 | 4.20 | 4.32 |
| 128 | 4.30 | 4.25 |
| 129 | 4.40 | 4.18 |
| 130 | 4.50 | 4.12 |

Staff calculated plume average vertical velocities for all four operating cases shown in **Plume Velocity Table 4** for the combined-cycle's air-cooled condenser and determined that the worst-case height at which the plume velocities would drop below 4.3 m/s would occur at 28°F ambient temperature condition. Staff assumed that the plumes from all cells in operation would be fully merged. Staff's calculated worst-case plume average velocity values are provided in **Plume Velocity Table 9**. The combined-cycle air-cooled condenser plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 2,180 feet above ground.

**Plume Velocity Table 9**
**Combined-Cycle Air-Cooled Condenser Vertical Plume Velocities (m/s)**

| Height Above Ground Level (Feet) | Plume Velocity (m/s) |
|---|---|
| 400 | 7.45 |
| 500 | 7.11 |
| 600 | 6.73 |
| 700 | 6.39 |
| 800 | 6.11 |
| 900 | 5.86 |
| 1,000 | 5.65 |
| 1,100 | 5.46 |
| 1,200 | 5.30 |
| 1,300 | 5.15 |
| 1,400 | 5.02 |
| 1,500 | 4.90 |
| 1,600 | 4.79 |
| 1,700 | 4.69 |
| 1,800 | 4.59 |
| 1,900 | 4.51 |
| 2,000 | 4.43 |
| 2,100 | 4.35 |
| 2,200 | 4.28 |
| 2,300 | 4.22 |
| 2,400 | 4.16 |
| 2,500 | 4.10 |

Finally, staff calculated plume average vertical velocities for all three operating cases shown in **Plume Velocity Table 5** for the simple-cycle fin fan coolers determined that the worst-case height at which the plume velocities would drop below 4.3 m/s would occur at 28°F ambient temperature condition. Staff assumed that the plumes from all cells in operation would be fully merged. Staff's calculated worst-case plume average velocity values are provided in **Plume Velocity Table 10**. The combined-cycle air-cooled condenser plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 370 feet above ground.

**Plume Velocity Table 10**
**Simple-Cycle Fin Fan Cooler Vertical Plume Velocities (m/s)**

| Height Above Ground Level (Feet) | Plume Velocity (m/s) |
|---|---|
| 100 | 9.88 |
| 200 | 5.71 |
| 300 | 4.68 |
| 310 | 4.62 |
| 320 | 4.55 |
| 330 | 4.50 |
| 340 | 4.44 |
| 350 | 4.39 |
| 360 | 4.34 |
| 370 | 4.29 |
| 380 | 4.24 |
| 390 | 4.20 |
| 400 | 4.15 |

The velocity values listed above in **Plume Velocity Table 6** through **Plume Velocity Table 10** are plume average velocities across the area of the plume. The maximum plume velocity, based on a normal Gaussian distribution, is two times the plume average velocities shown in the tables.

It should be noted that additional thermal plume merging between the gas turbine stacks, the air-cooled condenser, the auxiliary boiler, and the fin fan coolers could occur and increase the plume heights where vertical velocities of 4.3 m/s are exceeded under worst case conditions. The model used for this analysis is not able to add different kinds of thermal plumes together. However, the approach is still conservative given the conservatism built in the model.

## WIND SPEED STATISTICS

The **Air Quality** section of this document uses meteorological data from North Long Beach station, which is located 6.4 miles northwest of the project site. The wind roses and wind frequency distribution data collected from the North Long Beach station were considered to be representative for the project site location. The project owner provides the calm wind speed statistics for North Long Beach station from ground-level meteorological data collected for 2006 to 2009 and 2011 (AEC 2015h). Calm winds for the purposes of the reported monitoring station statistics are those hours with average wind speeds below 0.5 m/s. Calm or very low wind speeds can also occur for shorter periods of time within each of the monitored average hourly conditions. However, the shortest time resolution for the available meteorological data is one hour. The threshold wind speed used by the South Coast Air Quality Management District for air quality modeling was 0.5 m/s. Therefore, the wind roses provided by the project owner show 0 percent of calm wind conditions. However, there are about 3 percent of hours with wind speeds at 0.5 m/s.

## CONCLUSIONS

The worst case calm wind condition vertical plume average velocities from the proposed GE 7FA.05 combined-cycle turbine stacks are predicted to drop below 4.3 m/s at the height of 1,230 feet assuming two plumes fully merged. The worst case calm wind condition vertical plume average velocities from the proposed GE LMS-100PB turbine stacks are predicted to drop below 4.3 m/s at the height of 1,825 feet assuming two plumes fully merged. The worst case auxiliary boiler plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 128 feet. The worst case air-cooled condenser plume average velocity is calculated to drop below 4.3 m/s at a height of approximately 2,180 feet. The worst case plume average velocity for the fin fan coolers is calculated to drop below 4.3 m/s at a height of approximately 370 feet. Thus, the thermal plume from the proposed air-cooled condenser would cause greatest risk to light aircraft.

Also, there is the potential for additional thermal plume merging between the gas turbine stacks and the air-cooled condenser or fin fan coolers that could increase the plume heights where vertical velocities of 4.3 m/s are exceeded under worst case conditions. Calm/low wind speed conditions (wind speeds less than or equal to 0.5 m/s) conducive to the formation of worst-case thermal plume velocities would occur on average approximately 3 percent of the time.

## REFERENCES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# TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Huei-An (Ann) Chu, Ph.D.

## SUMMARY OF CONCLUSIONS

The applicant, AES Alamitos Energy, LLC (AES), proposes to build two new single-circuit or double-circuit 230-kilovolt (kV) lines to connect the proposed Alamitos Energy Center (AEC) to the existing California Independent System Operator (CAISO)-operated and Southern California Edison (SCE)-owned 230-kV substation located within the site of the existing Alamitos Generating Station (AGS). The proposed lines would lie entirely within the boundaries of the AGS site and no offsite lines would be necessary. Since the proposed 230-kV lines would be operated within the SCE service area, they would be designed, constructed, operated, routed, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards. The proposed lines would lie within the boundaries of an existing, operating power plant that would cease operations once AEC construction is complete. Since this is an existing power plant site and the connecting transmission lines would be short in length with no nearby residences, there would be no potential for the residential electric and magnetic field exposures which have been of some health concern. With the three proposed conditions of certification, any safety and nuisance impacts from construction and operation of the proposed line would be less than significant.

## INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to assess the transmission line design and operational plan for the proposed AEC project to determine whether its related field and non-field impacts would constitute a significant environmental hazard in the area around the proposed route. All related health and safety laws, ordinances, regulations, and standards (LORS) are intended to minimize such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

The federal, state, and local laws and policies in this section apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

## METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The LORS and practices listed in **TLSN Table 1** have been established to maintain impacts below levels of potential environmental significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following table summarizes the LORS applicable to this facility. These LORS are fully evaluated in the remainder of this section.

**Transmission Line Safety and Nuisance (TLSN) Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **Aviation Safety** | |
| **Federal** | |
| Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space" | Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards. |
| FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space" | Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard. |
| FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting" | Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR. |
| **Interference with Radio Frequency Communication** | |
| **Federal** | |
| Title 47, CFR, section 15.2524, Federal Communications Commission (FCC) | Prohibits operation of devices that can interfere with radio-frequency communication. |
| **State** | |
| California Public Utilities Commission (CPUC) General Order 52 (GO-52 ) | Governs the construction and operation of power and communications lines to prevent or mitigate interference. |
| **Audible Noise** | |
| **Local** | |
| City of Long Beach General Plan. | Identifies and appraises noise problems within the community and assists the city in making land use decisions. |
| City of Long Beach Municipal Code. | Establishes performance standards that noise sources should achieve at existing or planned residential or other noise-sensitive land uses. |
| **Hazardous and Nuisance Shocks** | |
| **State** | |
| CPUC GO-95, "Rules for Overhead Electric Line Construction" | Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements. |
| Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders" | Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment. |
| National Electrical Safety Code (NESC) | Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances. |

| Applicable LORS | Description |
|---|---|
| **Industry Standards** | |
| Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations" | Specifies the guidelines for grounding-related practices within the right-of-way and substations. |
| **Electric and Magnetic Fields** | |
| **State** | |
| GO-131-D, CPUC "Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California" | Specifies application and noticing requirements for new line construction including EMF reduction. |
| CPUC Decision D.93-11-013 | Specifies CPUC requirements for reducing power frequency electric and magnetic fields. |
| CPUC Decision D.06-01-042 | Re-affirms CPUC EMF Policy in D.93-11-013. |
| **Industry Standards** | |
| American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines | Specifies standard procedures for measuring electric and magnetic fields from an operating electric line. |
| **Fire Hazards** | |
| **State** | |
| 14 CCR sections 1250-1258, "Fire Prevention Standards for Electric Utilities" | Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply. |

## SETTING AND EXISTING CONDITIONS

The proposed project would be located in Long Beach, Los Angeles County, California. The AEC would connect to the regional electrical grid using the existing SCE/CAISO-controlled, 230-kilovolt (kV) switchyard located on a parcel of land owned by SCE within the existing AGS site. No new offsite transmission lines would be needed for the AEC. AEC combined-cycle gas turbine (CCGT) and simple-cycle gas turbine (SCGT) power blocks would connect into the existing SCE/CASIO-controlled switchyard via two new single-circuit (or double-circuit) 230-kV lines (AEC 2015i, Section 3.1).

No changes are planned for the SCE transmission line circuits connecting the SCE switchyard to the area's CAISO-controlled transmission system. The new onsite 230-kV generation tie lines from the AEC power blocks to the SCE/CAISO-controlled switchyard would be designed as single-circuit or double-circuit, self-supporting steel or concrete structures, which would be installed on concrete pier foundations (AEC 2015i, Section 3.1.1).

The new generation tie lines that connect the AEC power blocks to the existing SCE 230-kV switchyard would be located within the existing Alamitos Generating Station site and would not affect the public because the site is industrial land that does not extend off the AGC/SCE site. Furthermore, no changes are proposed for the transmission lines connecting the SCE switchyard to the CAISO transmission system (AEC 2015i, Section 3.3.2.1). Since the proposed project's transmission lines would be located within the site of an existing power plant without nearby residents, residential exposure to the generated fields would not occur. Such residential exposure has been responsible for past health concerns.

## PROJECT DESCRIPTION

The existing AGS's Units 1 through 6 interconnect to the SCE 230-kV switchyard with six separate 230-kV generation tie lines; these six lines would be replaced with two new 230-kV generation tie lines. No modifications would be necessary on the existing 230-kV transmission lines connecting the SCE switchyard at the AEC to the CAISO transmission system (AEC 2015i, Section 3.3.2.2). The only new lines that would be built are the two 230-kV generation tie lines that would connect AEC generator's power blocks 1 and 2 to the SCE 230-kV Alamitos Switching Station (AEC 2015i, Section 3.1). The 230-kV switchgear would receive the power from each generator unit and set-up transformer, then combine and meter the power for delivery to the SCE substation located onsite (AEC 2015i, Section 3.1.2). Details of the interconnection scheme for these two proposed generator tie-lines were provided by the applicant (AEC 2015i, Section 3.1.3).

- Each of the two new AEC power blocks would interconnect to the SCE transmission system at the existing, onsite SCE switchyard.
- The AEC generation tie lines would use 230-kV isolation switches and gas-insulated circuit breakers for each block and an individual generator step-up transformer for each of the generating units within each power block.
- All generation tie lines from the AEC to the SCE switchyard would be constructed as overhead lines. No underground generation tie lines are proposed (AEC 2015i, Section 3.1.3). These overhead lines are within the controlled AEC site and not accessible by the general public (AEC 2015i, Section 3.3).
- The generation tie lines to the SCE switchyard and all equipment would be designed to ensure compliance with applicable National Electrical Code (NEC) and National Electrical Safety Code (NESC) rules following CAISO requirements.
- Standby power for the AEC when not generating would be back-fed through the generator step-up transformer and auxiliary transformer.

The applicant provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency (AEC 2015i, Figure 3.1-2).

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## DIRECT IMPACTS AND MITIGATION

### Aviation Safety

For AEC, any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The requirements in the LORS listed in **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable airspace. The requirements also establish the criteria for determining when to notify the FAA about such hazards. For example, FAA notification is required in cases of structures over 200 feet above ground level, or if the structure were to be less than 200 feet in height but located within the restricted airspace in the approaches to public or military airports and heliports. Moreover, for airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as area space that extends 20,000 feet

(3.3 nautical miles) from the runway. For airports with runways of 3,200 feet or less, the restricted airspace is defined as a space that extends 10,000 feet from the runway. For heliports, the restricted space is area space that extends 5,000 feet (0.8 nautical miles) from the landing site.

There are neither public airports with runways within 3.3 miles of the AEC, nor heliports within 0.8 miles of the AEC. The nearest military airport is the Los Alamitos Army Airfield approximately 2.7 miles northeast of the proposed AEC site (AEC 2015i, Section 3.3.3). None of these airports and heliports is close enough for any line-related collision hazards. Therefore, staff does not expect any potential hazard for aviation safety and does not recommend a condition of certification regarding aviation safety.

## Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation. It is produced by the physical interactions of line electric fields. More specifically, such interference is due to radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. Corona from a transmission line may result in radio and television reception interference, audible noise, light, and production of ozone. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication.

Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts therefore would be minimized by reducing the line electric fields and by locating the line away from inhabited areas.

The AEC transmission lines would be built and maintained according to standard practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not for 230-kV lines such as the proposed lines. Since the proposed AEC's generation tie lines are rated at less than 345 kV and would be located within an existing power plant with no nearby residents (AEC 2015i, Section 3.3.2.3), staff does not expect any corona-related radio-frequency interference or complaints. Thus staff does not recommend any related condition of certification.

## Audible Noise

Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line's electric field, the potential for perception would be assessed from estimating the field strengths during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345 kV as proposed for AEC. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing that the fair-weather audible noise from modern transmission lines is generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. The proposed line right-of-way (ROW) would fall entirely within the boundaries of an existing power plant with similar connecting lines. The new generation tie lines will be located within the AEC site and would be designed and constructed to reduce project-related audible noise interference (AEC 2015i, Section 3.3.2.2 and Section 3.3.2.3).

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. Instead, such audible noise is limited through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Since these designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed project and related facilities, please refer to staff's analysis in the **NOISE AND VIBRATION** section.

## Fire Hazards

The fire hazards addressed in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between a line and nearby trees and other combustible objects.

The requirements of the existing SCE fire prevention and suppression program would be implemented for the proposed project line. The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. GO-95 establishes clearances from other manmade and natural structures, and tree-trimming requirements to mitigate fire hazards (AEC 2015i, Section 3.3.4). Although the new lines would be located within the AEC site, Conditions of Certification **TLSN-1** and **TLSN-2** are recommended to ensure compliance with these program requirements.

## Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death. The hazard shocks remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry by compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

Potentially hazardous shocks could result from electrical faults from the new AEC equipment or the SCE high-voltage transmission system. The existing SCE/CAISO-controlled 230-kV switchyard is located within the secured area of the existing AGS. The SCE switchyard is fenced to keep individuals within the AEC site from entering the switchyard where they could be exposed to associated hazardous shocks. The new AEC 230-kV generation tie lines would be designed in accordance with applicable LORS (AEC 2015i, Section 3.4.3). Implementing the GO-95-related measures against direct contact with the energized line (AEC 2015i, pp.3-2 through 3-6) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** and **TLSN-3** would be adequate to ensure implementation of the necessary mitigation measures.

## Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the project owner would be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (AEC 2015i, Section 3.3.2.4). For the proposed project line, the applicant would be responsible in all cases for ensuring compliance with these ground-related practices within the right-of-way. Staff recommends Condition of Certification **TLSN-3** to ensure such grounding for AEC.

## Electric and Magnetic Field (EMF) Exposure

Both electric and magnetic fields are created whenever electricity flows, and exposure to them together is generally referred to as *EMF exposure*. There is general public concern regarding the possibility of health effects from EMF exposure.

### Electric Fields

Electric fields around transmission lines are produced by differences in voltage (i.e., electrical charges on the energized conductor). The electric field strength is measured in volts per meter (V/m). Electric Fields are easily shielded/weakened by conducting objects such as trees and buildings. Increased voltage produces a stronger electric field, but increased distance from the sources decreases its strength.

### Magnetic Fields

Magnetic fields around transmission lines are produced when electric current (measured in amperes) flows. Magnetic fields are measured in gauss (G) or tesla (T). Unlike electric fields, magnetic fields are not easily shielded/weakened by most materials. Magnetic field strength is directly proportional to the current; that is, increased amperes produce a stronger magnetic field. Like electric fields, increased distance from the sources decreases its strength.

The strengths of both the electric field and magnetic field are inversely proportional to the distance from the conductors. Thus, the EMF strength declines as the distance from the conductor increases (AEC 2015i, Section 3.3.2.1).

### Human Health Risk Assessment Findings

Human health risk assessments for EMF are conducted to determine if there are biological and other hazards from EMF exposure and what the potential health impacts might be.

Although there are several studies on the health effects of EMF, there are no consistent conclusions from human studies (epidemiological and clinical) and animal studies. In 1996, the World Health Organization (WHO) launched a large, multidisciplinary research effort (i.e. the International EMF Project) to bring together current knowledge and available resources including 25,000 articles which had been published over the past 30 years. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields[1]. The conclusions from WHO and other sources are summarized as follows:

- **Effects on general health:** Scientific evidence does not support a link between the reported symptoms (including headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido) and exposure to electromagnetic fields.

[1] EMF can be broadly divided into *static* and *low-frequency* electric and magnetic fields, where the common sources include power lines, household electrical appliances and computers, and *high-frequency* or radiofrequency fields, for which the main sources are radar, radio and television broadcast facilities, mobile telephones and their base stations, induction heaters and anti-theft devices (WHO 2002).

- **Effects on pregnancy outcome:** The overall weight of evidence shows that exposure to fields at typical environmental levels does not increase the risk of any adverse outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. There have been occasional reports of associations between health problems and presumed exposure to electromagnetic fields, such as reports of prematurity and low birth weight in children of workers in the electronics industry, but these have not been regarded by the scientific community as being necessarily caused by the field exposures.
- **Cataracts:** General eye irritation and cataracts have sometimes been reported in workers exposed to high levels of radiofrequency and microwave radiation, but animal studies do not support the idea that such forms of eye damage can be produced at levels that are not thermally hazardous[2]. There is no evidence that these effects occur at levels experienced by the general public.
- **Cancers:** Despite many studies, the evidence for any effect remains highly controversial. However, it is clear that if electromagnetic fields do have an effect on cancer, then any increase in risk will be extremely small. The results to date contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults. The U. S. National Institute of Environmental Health Sciences (NIEHS) also concluded that "a link has not been established between residential EMF exposure and adult cancers, including leukemia, brain cancer, and breast cancer. There have been no proven instances of cancer clusters[3] linked with EMF exposure, either (NIEHS 2002).
- **Childhood leukemia and cancers:** There have been studies showing a weak association between measured fields and childhood leukemia, but it is not clear whether this represents a cause-and-effect relationship. A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-and-effect relationship between exposure to the fields and disease. Moreover, animal and laboratory studies have failed to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer. After reviewing all the data, NIEHS also concluded in 1999 that the evidence was weak, but that it was still sufficient to warrant limited concern. Other than leukemia, the present available series of studies indicates no association between EMF exposure and childhood cancers (NIEHS 2002).

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[2] The definition of "thermally hazardous" is "any system above 130°F which exposes persons to potential thermal burns" (Source: http://apps.leg.wa.gov/wac/default.aspx?cite=296-59-080). Therefore, EMF is not at the level that is thermally hazardous.

[3] An unusually large number of cancers, miscarriages, or other adverse health effects that occur in one area or over one period of time is called a "cluster."

- **Electromagnetic hypersensitivity and depression:** Some individuals report hypersensitivity (examples: aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures) to electric or magnetic fields. There is little scientific evidence to support the association between electromagnetic hypersensitivity and electromagnetic field exposure. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of electromagnetic field exposure. Nor is there any accepted biological mechanism to explain hypersensitivity.

Based on the available evidence as evaluated by WHO and NIEHS, staff has determined that there is not sufficient evidence that such fields pose a significant health hazard to exposed humans.

### EMF Exposure Guidelines and Policies

There are no health-based federal regulations or industry codes specifying environmental limits or maximum acceptable levels of EMF from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the California Public Utilities Commission (CPUC), to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff therefore considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small;
- The most biologically significant types of exposures have not been established;
- Most health concerns are about the magnetic field; and
- There are measures that could be employed for field reduction, but they are not recommended because they would affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

#### *State's Approach to Regulating EMF Exposures*

In the absence of conclusive or evocative evidence, some states, including California, have chosen not to specify maximum acceptable levels of EMF exposure. Instead, these states, including California, mandate a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities that are regulated by the CPUC to use cost-effective techniques to reduce the levels of EMF (AEC 2015i, Section 3.3.2.1). The municipal and other publicly owned utilities that are not under the direct jurisdiction of the CPUC voluntarily comply with this CPUC policy.

In 1993, the CPUC[4] issued Decision D. 93-11-013, establishing EMF policy for California's investor-owned electric utilities. The Decision acknowledged that scientific research had not demonstrated that exposures to EMF cause health hazards and that it was inappropriate to set numeric standards that would limit exposure. In recognizing the scientific uncertainty, the CPUC addressed public concern over EMF by establishing a no-cost and low-cost EMF reduction policy that utilities would follow for proposed electrical facilities.

In 2006, the CPUC revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings specified in Decision D.06-01-042 did not point to a need for significant changes to existing field management policies. Instead, D.06-01-042 re-affirmed D.93-11-013 in that health hazards from exposures to EMF have not been established and that state and federal public health regulatory agencies have determined that setting numeric exposure limits is not appropriate at this time. The CPUC also re-affirmed its past conclusions and required the existing no-cost and low-cost precaution-based EMF policy to be continued. The CPUC requirement is that such field reductions are to be made only in connection with new or modified lines in any of the utilities' service areas. Each utility complies by establishing its own EMF-reducing measures and incorporating such measures into the designs for all new or upgraded power lines and related facilities. The CPUC further established specific limits on the resources to be used in each case for field reduction.

Since there are no residences in the immediate vicinity of the proposed project's transmission lines, there would not be the long-term residential EMF exposures mostly responsible for the health concerns noted above. The only project-related EMF exposures of potential significance would be the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the safety and EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures would impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on transmission line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values could be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths could be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic

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[4] CPUC regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities

field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors, and, in the case of magnetic fields, amount of current in the line.

Since the CPUC currently requires that most new lines in California be designed according to safety and EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

***Industry's and Applicant's Approach to Reducing EMF Exposures***

The present focus is on the magnetic field. This is because unlike electric fields, magnetic fields would penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of health concerns. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case.

As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields than those produced by high-voltage lines while using some common household appliances (National Institute of Environmental Health Sciences 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short term duration, while the exposures from power lines are lower level, but long term duration. Scientists have not established which of these exposure types would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the proposed line design to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures that could be applied include the following:

1. increasing the distance between the conductors and the ground to an optimal level;

2. reducing the spacing between the conductors to an optimal level;

3. minimizing the current in the line; and

4. arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since as previously noted, the route of the proposed project's transmission lines would be close to no nearby residences, the long-term residential field exposures at the root of health concerns would not be a significant concern. The field strengths of most significance in this regard would be those encountered within the boundaries of the existing Alamitos Generating Station. These field intensities would depend on the effectiveness of the applied field-reducing measures. The applicant calculated the maximum electric and magnetic field intensities expected when the two proposed line circuits are energized. The maximum electric field strength was calculated as 0.73 kV/m directly underneath the AEC generation tie lines and 0.45 kV/m at the edge of the AEC boundary. The maximum operational magnetic field strength was calculated as 63.44 mG underneath the lines and 38.88 mG at the edge of the AEC site boundary. All the measurements are well below regulatory levels established by states that do have limits (AEC 2015i, Section 3.3.2.1). These field strength values are similar to those of similar SCE lines (as required under current CPUC regulations) but, in the case of the magnetic field, the estimate is much less than the 150- 250 mG currently specified by the few states with regulatory limits.

## CUMULATIVE IMPACTS

Operating any given project may lead to significant adverse cumulative impacts when its effects are considered cumulatively considerable. "Cumulatively considerable" means in this context that the incremental field and non-field effects of an individual project would be significant when considered together with the effects of past, existing, and future projects (California Code Regulation, Title 14, section 15130). When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. For the proposed project's transmission lines, this interaction would occur between the AEC-related fields and the fields from nearby SCE lines. Since the proposed project's transmission lines would be designed, built, and operated according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity and not considered environmentally significant in the present health risk-based regulatory scheme.

## COMPLIANCE WITH LORS

As previously noted, current health risk driven CPUC policy on EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in the case of AEC is SCE. Since the proposed project's 230-kV lines would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis.

## NOTEWORTHY PUBLIC BENEFITS

Since the proposed tie-in lines would pose specific, although insignificant, risks of the field and nonfield effects of concern in this analysis, their building and operation would not yield any public benefits regarding the effort to minimize any human risks from these impacts.

## FACILITY CLOSURE

If the proposed AEC were to be closed and decommissioned, and all related structures are removed as described in the **PROJECT DESCRIPTION** section, the minimal electric shocks and fire hazards from the physical presence of this tie-in line would be eliminated. Decommissioning and removal would also eliminate the transmission lines' field and non-field impacts assessed in this analysis in terms of nuisance shocks, radio-frequency impacts, audible noise, electric and magnetic field exposure, and aviation safety. Since the lines would be designed and operated according existing SCE guidelines, these impacts would be as expected for SCE lines of the same voltage and current-carrying capacity and therefore, at levels reflecting compliance with existing health and safety LORS.

## RESPONSE TO PRELIMINARY STAFF ASSESSMENT (PSA) COMMENTS

### APPLICANT

**Comment:** The purpose of Condition **TLSN-2** in the PSA is to determine the maximum electric and magnetic field strengths of the AEC gen-tie lines at the edges of the right-of-way (ROW) to protect public health. However, considering that the AEC gen-tie lines and the ROWs are wholly located within the fenced 71-acre Alamitos Generating Station, measuring electric and magnetic field strengths would appear unwarranted as the public is precluded from approaching the AEC gen-tie by the existing power plant security fence. The Applicant suggests deleting Condition **TLSN-2** in its entirety.

> **Response:** Staff agrees to remove the original Condition of Certification **TLSN-2** of the PSA from the FSA.

### PUBLIC

Staff received no comments from the public in the area of TLSN.

### INTERVENORS

Staff received no comments from the intervenors in the area of TLSN

### AGENCIES

Staff received no comments from the agencies in the area of TLSN.

## CONCLUSIONS

AEC construction and operation, including the two new generation tie lines replacing the existing six tie lines to SCE's existing switchyard and transmission system, is not expected to result in significant changes in EMF levels, corona, audible noise, or radio and television interference.

Since staff does not expect the proposed 230-kV transmission tie-in lines to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend specific location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed AEC and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential, magnetic exposure would be insignificant for the proposed lines given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project's lines would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be routed within an area with no nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. With implementation of the four recommended conditions of certification, any such impacts would be less than significant.

## PROPOSED CONDITIONS OF CERTIFICATION

**TLSN-1** The project owner shall construct the proposed 230-kV transmission lines according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and Southern California Edison's EMF reduction guidelines.

**Verification:** At least 30 days prior to start of construction of the transmission lines or related structures and facilities, the project owner shall submit to the compliance project manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

**TLSN-2** The project owner shall ensure that the route of the proposed transmission line is kept free of combustible material, as required under the provisions of GO-95 and section 1250 of Title 14 of the California Code of Regulations.

**Verification:** During the first five (5) years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the proposed route and provide such summaries in the Annual Compliance Report on transmission line safety and nuisance-related requirements.

**TLSN-3** The project owner shall ensure that all permanent metallic objects within the proposed route are grounded according to industry standards.

**Verification:** At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

## REFERENCES


**EPRI** – Electric Power Research Institute 1982. Transmission Line Reference Book: 345 kV and Above.

**AEC 2012a** – AES Southland Development, LLC / Stephen O'Kane (TN 66003). A*pplication for Certification (AFC), Volume I & II, dated, June 27, 2012*. Submitted to CEC/ Dockets on 06/27/2012.

**AEC 2015i** – Alamitos Energy Center Supplemental AFC (TN 206428-1) – Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**National Institute of Environmental Health Sciences (NIEHS) 1998** – *An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, Working Group Report*. http://www.niehs.nih.gov/health/assets/docs_a_e/emf1.pdf

**National Institute of Environmental Health Sciences (NIEHS) 2002** – *Electric and Magnetic Fields Associated with the Use of Electric Power*. http://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf#search=Electric%20and%20Magnetic%20Fields%20Associated%20with%20the%20Use%20of%20Electric%20Power

**World Health Organization (WHO) 2002** – *Establishing a Dialogue on Risks from Electromagnetic Fields*. < http://www.who.int/peh-emf/publications/EMF_Risk_ALL.pdf >

**World Health Organization (WHO)** – *Electromagnetic fields (EMF)*, http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html

# VISUAL RESOURCES

Testimony of John Hope

## SUMMARY OF CONCLUSIONS

The proposed Alamitos Energy Center (AEC) project would be constructed at the site of the existing Alamitos Generating Station (AGS). Critical off-site viewpoints, referred to as key observation points (KOPs), were selected to represent primary viewer groups and sensitive viewing locations in a defined area surrounding the project site where visual impacts could occur. California Energy Commission staff did not identify significant visual resources impacts at three of the four KOPs used in the analysis for the AEC and visual impacts at these KOPs are considered less than significant. Impacts at KOP 3 are considered less than significant with mitigation incorporated (Condition of Certification **VIS-2**).

Staff evaluated the potential effects of the long-term schedule for the proposed construction of the AEC. Staff concludes that construction and commissioning activities would not substantially degrade the existing visual character and quality of the site and its surroundings. In addition, staff analyzed the potential for lighting of the project site and structures during construction, commissioning, and operation to create new sources of substantial light or glare. Staff proposes Conditions of Certification **VIS-1, VIS-2**, and **VIS-4** to reduce potential effects of lighting and glare on nighttime and daytime views to less than significant.

A portion of the project site is in the state's Coastal Zone. Section 30251 of the California Coastal Act requires that the scenic and visual qualities of coastal areas be considered and protected as resources of public importance. Permitted development must be sited and designed to restore and enhance visual quality in visually degraded areas where feasible. The applicant has indicated that a landscape design plan would be prepared for the AEC prior to commencement of construction. The plan would provide details as to how the project owner intends to enhance visual quality at the project site. Staff proposes Condition of Certification **VIS-3** to require preparation of landscaping plans prior to project implementation to satisfy the requirements of the city of Long Beach's South East Area Development and Improvement Plan (SEADIP) Specific Plan, the certified local coastal program for this area of the state.

## INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. Visual resources also include "sensitive viewing areas," which are areas consisting of uses such as residential, recreational, travel routes, and tourist destinations, and the people within those use areas, or "sensitive viewers." This analysis focuses on whether the AEC would cause significant adverse visual impacts and whether the project would be in compliance with applicable laws, ordinances, regulations and standards (LORS). The California Environmental Quality Act (CEQA) requires the California Energy Commission to determine the potential for significant impacts to visual resources resulting from the proposed project.

**Visual Resources Appendix-1** (VR Appendix-1), Visual Resources Terms, Definitions, and Analysis Method, describes the visual resources methodology employed for the CEQA analysis (Energy Commission staff's methodology), and the "Method and Threshold for Determining Significance" subsection below describes the thresholds for determining environmental consequences. In accordance with staff's procedure, conditions of certification are proposed as needed to reduce potentially significant impacts (under CEQA) to less than significant levels or to the extent possible, and to ensure LORS conformance, if feasible.

This section describes existing visual resources conditions in the vicinity of the proposed AEC and assesses changes to those conditions that would occur from construction and operation of the proposed project.

Staff visited the project site in October 2013 and surveyed existing visual resources in the project area. The descriptions of visual resources in this analysis are based on staff's direct observations, proposed project materials and data prepared by the applicant and submitted to the Energy Commission in October 2015, and other information and planning documents addressing visual resource conditions and issues in the project area.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LORS pertaining to aesthetics and protection of sensitive visual resources are summarized below. Further details on applicable LORS and analyses of the proposed project's consistency with specific policies and ordinances are discussed below under "Compliance with Laws, Ordinances, Regulations, and Standards." No federal LORS pertaining to visual resources are applicable to the proposed AEC.

### STATE

### California Coastal Act of 1976

The California Coastal Commission (Coastal Commission) was established by voter initiative in 1972 and later made permanent by the California State Legislature through adoption of the California Coastal Act of 1976 (Coastal Act) (Pub. Resources Code § 30000 et seq.). The Coastal Act includes policies addressing many environmental and land use management issues and defines the Coastal Zone boundary where those policies apply. Section 30001.5 of the Coastal Act includes a declaration to "protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources." Section 30251 of the Coastal Act requires that the scenic and visual qualities of coastal areas be considered and protected as resources of public importance.

Implementation of Coastal Act policies is accomplished primarily through preparation of local coastal programs (LCPs) by local municipalities that are located wholly or partly in the Coastal Zone. The city of Long Beach is a shoreline community, a portion of which is in the state's Coastal Zone. Coastal Act policies are the standards by which the Coastal Commission evaluates the adequacy of an LCP. An LCP includes a land use plan (LUP), which may be the relevant portion of the local general plan, including any maps necessary to administer the plan; and zoning ordinances, zoning district maps, and other legal instruments necessary to implement the LUP (Coastal Commission 2016).

The city of Long Beach's LCP was prepared to implement the Coastal Act, to "supplement and enhance" the Coastal Act, and to protect and enhance the city's Coastal Zone and its resources (City of Long Beach 1980, I-2 – I-3). The LCP was certified by the Coastal Commission in 1980 (City of Long Beach 2016a).

## LOCAL

### City of Long Beach General Plan

Applicable goals, objectives, and policies in the Long Beach General Plan include those pertaining to visual and aesthetic resources in general, development in areas designated as Mixed Use, and development in the Coastal Zone. The city prepared the Local Coastal Program of its General Plan to guide development for its portion of the Coastal Zone. The General Plan Open Space and Recreation Element, Air Quality Element, Land Use Element, and Conservation Element also contain goals, objectives, and policies that are potentially applicable to the proposed project.

### South East Area Development and Improvement Plan (SEADIP)

The SEADIP includes provisions pertaining to visual and character quality of development from public views and surrounding development, along with landscaping requirements.

### City of Long Beach Municipal Code Zoning Ordinance

The purpose of the city's zoning ordinance is to regulate land use development within the city of Long Beach in conformance with the general plan. Chapter 21.37 (Planned Development Districts) includes the SEADIP Specific Plan (PD-1), which implements the policies of the city's certified LCP. In addition, Chapter 21.42 contains development and design standards that are applicable to landscaped areas.

# SETTING

## PROJECT AREA CHARACTERISTICS

The project area is characterized by flat, sea-level topography built with urban mixed uses (e.g., industrial, commercial, residential) and pockets of maritime land uses including the San Gabriel River, Los Cerritos Channel, marina, open spaces, wetlands, and marina-oriented commercial businesses.

The existing AGS is situated on a flat coastal plain with a site elevation of approximately 10 to 20 feet above mean sea level (msl). The project site is located between the San Gabriel River and Los Cerritos Channel. The ridgeline of the hills beyond San Pedro to the northwest and the Santa Ana Mountains to the southeast are visible in background views from the project area. Roughly the southern half of the existing AGS site is located within the coastal zone and the northern half of the site is located outside of the Coastal Zone. A portion of the proposed AEC Power Block 1 and the construction access road would be constructed within the Coastal Zone.

The AEC would be located in an area of existing energy facilities that is surrounded by residential neighborhoods, open spaces, commercial developments, transportation corridors, and a marina and harbor area. The area on the north side of the AEC site includes the Southern California Edison (SCE) 230-kilovolt (kV) switchyard. The Plains West Coast Terminals Tank Farm encompasses the area on the south side of the AEC site.

The San Gabriel River Bike Trail parallels both banks of the San Gabriel River and is adjacent to the AEC site. The Los Angeles Department of Water and Power (LADWP) Haynes Generating Station occupies a large site on the east side of the San Gabriel River and east of the AEC site. Immediately beyond the LADWP generating facility is the senior residential community known as Leisure World.

## PROJECT SITE CHARACTERISTICS

The existing AGS site would be used for construction and operation of the proposed AEC. The six AGS exhaust stacks, over 200 feet tall, and the generating units behind the stacks, are approximately 750 feet from the nearest residential neighborhood (University Park Estates located west across the Los Cerritos Channel). Compared to other development in the surrounding area, including the relatively low-profile tank farm, the AGS, SCE switchyard transmission structures, and LADWP generating facility are the most visually prominent, built features in the project area.

The northwest corner of the existing AGS site, adjacent to the main entrance, is landscaped with trees and shrubs. The main entrance to the AGS is from North Studebaker Road. Views toward the AEC site from the north, west, and south are partially limited because of tree and shrub landscaping along adjacent roadways (i.e., Studebaker Road, Westminster Avenue, Highway 22).

The applicant describes existing lighting of the AGS structures as being equipped with red flashing aviation safety lights on the top of the existing exhaust stacks and exposed stairways and scaffolding are illuminated with bright, unshielded bulbs (AES 2015, 5.13-14).

The existing AGS generates steam to produce electricity, and the technology and operational characteristics produce visually prominent water vapor plumes from the exhaust stacks. Based on staff's review of photographs of the power plant, a visible plume emanates from the exhaust stack in varying weather conditions. Water vapor plumes form more frequently and are most visible during daytime hours in the winter when the sky is relatively clear. Highly visible water vapor plumes from the existing power plant slightly increase the industrial character and appearance of the site.

# ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

CEQA provides a series of broad policy statements addressing environmental protection, including the requirement to: “Take all action necessary to provide the people of this state with clean air and water, enjoyment of *aesthetic, natural, scenic*, [emphasis added] and historic environmental qualities...” (Pub. Resources Code § 21001 [b]).

Staff uses the environmental checklist in the “Aesthetics” section of Appendix G of the CEQA Guidelines and professional practices for visual resource assessments to evaluate the potential effects of a project on visual resources. From the State CEQA Guidelines, an impact on visual resources is considered significant if the project would:

1. Have a substantial adverse effect on a scenic vista;

2. Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;

3. Substantially degrade the existing visual character or quality of the site and its surroundings, or;

4. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

The CEQA Guidelines define a significant effect on the environment to mean a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance” (Cal. Code Regs., tit.14, § 15382). The section, “Direct and Indirect Impacts and Mitigation Measures,” (below) includes a complete analysis of impacts from the proposed project.

*Vista* can be defined as a distant view through or along an avenue or opening. For this visual resources analysis, the definition of a scenic vista is expanded to include views that include remarkable or memorable scenery or views of a natural or cultural feature that is indigenous to the area. The proposed AEC would be constructed in a mostly developed area of Southern California. Views in the vicinity of the existing AGS primarily include built elements typical of urban development in similar urbanized areas. No particular view in the project vicinity has a level of scenic appeal that could distinguish it as a scenic vista. Because the AEC would have no impact on a scenic vista, no further analysis of the project relating to this criterion is necessary.

There are no scenic resources on the AEC site that could be damaged by the proposed project. The Pacific Coast Highway (PCH) (State Route 1) extends approximately ½-mile to the southwest of the AEC site and is part of a much longer segment of the highway extending north and south of the site. Segments of the PCH in Ventura, Los Angeles, and Orange counties are on the list of eligible state scenic highways, as shown on the California Scenic Highway Program website (California Department of Transportation 2016); however, the PCH is not an officially designated state scenic highway in the region. No further analysis of the project relating to this criterion is necessary.

The analysis below is focused on Appendix G questions 3 and 4.

## Analysis Method

The method for this assessment of impacts on visual resources is primarily adapted from guidelines used by the U.S. Forest Service, U.S. Bureau of Land Management, and U.S. Department of Transportation. These guidelines are useful and meaningful for assessing the potential impacts of projects in various environmental settings, including the setting for the proposed AEC.

The process to evaluate potential impacts on visual resources from construction and operation of the AEC involved these general steps:

- Define the visual environment, or visual sphere of influence (VSOI), within which visual impacts could occur. As stated in the Application for Certification (AFC), the VSOI may be refined based on computer viewshed analysis and mapping.
- Describe sensitive viewpoints and the process to select key observation points, or critical viewpoints, within the VSOI for the project.
- Evaluate the potential effects of the project on visual resources based on the estimated visual sensitivity of the viewing public, the probability that the project site and area would demonstrate a noticeable visual impact with project implementation, and the estimated magnitude of the visual change that would occur with project construction and operation.
- Evaluate whether the proposed project would comply with applicable LORS for protection of visual and aesthetic resources.

**Visual Resources Appendix-1 (Appendix VR-1)** of this staff assessment, **Visual Resources Terms, Definitions, and Analysis Method**, provides further detail on the approach and process used in this visual resources analysis.

## Visual Sphere of Influence

The VSOI for the proposed AEC takes into account the estimated visibility of its most visible structures on the project site, existing development in the area, and other variables potentially affecting visibility of the site. The highest level of visibility exists when the viewer is stationary and has direct and close-up views of the site (e.g., nearby residents). A lower level of visibility exists, for example, when the viewer is farther from the site (e.g., residents that are approximately a mile or more from the site) and/or are traveling on local roadways not immediately adjacent to the site.

The limits of the VSOI for the project generally extend to encompass the furthest distance at which potentially significant visual impacts could occur. For views of the AEC, this distance was determined by staff to be approximately 1½ miles. At greater distances, the mass of project structures in the views would be much less dominant compared to views at closer distances.

## Process to Select Key Observation Points

### Sensitive Viewing Areas and Identification of Key Observation Points

The visual analysis for the proposed AEC involved identifying key observation points (KOPs), or critical viewpoints that would most clearly show the visual effects of the proposed project. Results of the VSOI analysis and photographic survey for the AEC resulted in selection of four critical viewpoints to represent views from areas with relatively high levels of visual sensitivity. KOPs were selected to represent viewing conditions from nearby residential neighborhoods and recreation areas. Visual Resources (VR) Figure 1 shows the results of the viewshed analysis and the KOPs for the proposed project. **VR Figure 2** shows further detail for the project area. The four KOPs selected for this analysis are:

KOP 1 – View from Channel View Park / Long Beach Bikeway Route 10

KOP 2 – View from University Park Estates

KOP 3 – View from Marine Stadium Park

KOP 4 – View from Loynes Drive

## Major AEC Components

The proposed project components would be located entirely on the existing AGS 63-acre site; no off-site linear elements are proposed. The project would include a new, single-circuit, on-site 230-kV transmission line to interconnect the proposed power blocks to the existing SCE 230-kV switchyard adjacent to the north. VR Table 1 summarizes the dimensions and quantities of the project components on the AEC site that would likely be visible to the public from offsite locations.

**Visual Resources Table 1**
**Visually Prominent Proposed AEC Structures**

| Project Feature | Length (feet) | Width (feet) | Height (feet) | Diameter (feet) | Color | Materials | Finish |
|---|---|---|---|---|---|---|---|
| **Combined-Cycle Power Block 1** | | | | | | | |
| Administration Building | 100 | 50 | 25 | --- | Tan | | Flat / Untextured |
| Water Treatment Building | 75 | 70 | 20 | --- | Tan | Ribbed Sheet Steel | Flat / Untextured |
| Warehouse Building | 100 | 60 | 25 | --- | Tan | Ribbed Sheet Steel | Flat / Untextured |
| Gas Compressor Building | 100 | 62 | 25 | --- | Tan | Ribbed Sheet Steel | Flat / Untextured |
| Air Cooled Condenser | 299 | 211 | 104 | --- | Gray | A-36 Steel Shapes | Flat / Untextured |
| Demin Water Storage Tank | --- | --- | 25 | 28 | Gray | A-36 Steel | Flat / Untextured |
| Steam Turbine and Generator (STG) | 90 | 33 | 62 | --- | Gray | A-36 Steel Plate | Flat / Untextured |
| STG Step-Up Transformer | 28 | 16 | 25 | --- | Gray | Mid Steel Plate | Flat / Untextured |
| Combustion Turbine | 56 | 25 | 29 | --- | Gray | Steel | Flat / Untextured |
| Combustion Turbine Generator (CTG) | 37 | 18 | 28 | --- | Gray | Steel | Flat / Untextured |
| Air Inlet Filter | 45 | 25 | 40 | --- | Gray | Custom Steel Shape | Flat / Untextured |
| Fuel Gas Filter/Separator | 11 | 11 | 22 | 18 | Gray | Custom Steel Shape | Flat / Untextured |
| Generator Breaker | 19 | 15 | 28 | --- | Gray | Mid Steel Plate | Flat / Untextured |
| CTG Step-Up Transformer | 30 | 23 | 25 | --- | Gray | Custom Steel Shape | Flat / Untextured |
| Heat recovery steam generator (HRSG) | 139 | 57 | 95 | 38 | Gray | A-36 Steel Plate | Flat / Untextured |
| Stack | --- | --- | 140 | 20 | Gray | A-36 Steel Plate | Flat / Untextured |
| Blowdown Tank | --- | --- | 20 | 9 | Gray | A-36 Steel | Flat / Untextured |
| Auxiliary Boiler and Associated Equipment | 40 | 41 | 38 | --- | Gray | Ribbed Sheet Steel | Flat / Untextured |

| Project Feature | Length (feet) | Width (feet) | Height (feet) | Diameter (feet) | Color | Materials | Finish |
|---|---|---|---|---|---|---|---|
| Air Cooled Heat Exchanger | 81 | 56 | 35 | --- | Gray | Mild Steel Plate | Flat / Untextured |
| Waste Water Tank | --- | --- | 25 | 28 | Gray | A-36 Steel | Flat / Untextured |
| Condensate Tank | --- | --- | 25 | 28 | Gray | A-36 Steel | Flat / Untextured |
| Transformer Wall | 50 | 40 | 28 | --- | Untinted | Concrete | Flat / Untextured |
| Acoustical Barrier | 262 | 182 | 35 | --- | Untinted | Concrete | Flat / Untextured |
| **Single-Cycle Power Block 2** | | | | | | | |
| Fin Fan Cooler | 151 | 130 | 32 | --- | Gray | A-36 Steel Shapes | Flat / Untextured |
| Site Fence | --- | --- | 7 | --- | Gray | Steel | Flat / Untextured |
| Combustion Turbine | 60 | 20 | 15 | --- | Gray | Steel | Flat / Untextured |
| Combustion Turbine Generator | 28 | 22 | 28 | --- | Gray | Steel | Flat / Untextured |
| Air Inlet Filter | 48 | 35 | 14 | --- | Gray | Custom Steel Shape | Flat / Untextured |
| Fuel Gas Compressors | 42 | 27 | 18 | --- | Gray | Ribbed Sheet Steel | Flat / Untextured |
| Intercooler Skid | 50 | 31 | 14 | --- | Gray | Structural Steel Shape | Flat / Untextured |
| Stack | --- | --- | 80 | 13.5 | Gray | A-36 Steel Plate | Flat / Untextured |
| Selective Catalytic Reduction (SCR) Unit | 37 | 23 | 38 | --- | Gray | Mid Steel Plate | Flat / Untextured |
| Combustion Turbine VBV Silencer Stack | --- | --- | 48 | 11 | Gray | A-36 Steel Plate | Flat / Untextured |

Source: AES 2015, pp. 5.13-10 - 5.13-11

## Steps in the KOP Analysis

The evaluation of the visual sensitivity for each representative KOP includes consideration of five factors: visual quality, viewer concern, visibility, number of viewers, and duration of view (see Diagram 1 in APPENDIX VR-1). Overall viewer exposure for each KOP is generally based on an average of the values for site visibility, number of viewers, and duration of view. Overall visual sensitivity is generally based on an average of the values for visual quality, viewer concern, and overall viewer exposure. APPENDIX VR-1 includes definitions for the key terms used in this analysis.

The assessment of visual impacts by staff is based on the change that would occur from the introduction of new built elements in the VSOI. The *overall visual change* is typically based on an average of the values for *contrast, dominance,* and *view blockage* for each KOP. The rating scale to assess visual sensitivity and visual change ranges from low to high for each factor. **Visual Resources Appendix-2 (VR Appendix-2), Key Observation Point Evaluation Matrix and Visual Impact Determination Conclusions,** describes the rating scale and summarizes the evaluations for each KOP's existing and proposed condition and the visual impact determination conclusion of the proposed project at each KOP. The ratings for *overall visual sensitivity* and *overall visual change* are combined to determine the visual impact significance for each KOP using **VR Appendix-1, Table 5 – KOP Visual Impact Significance Determination**).

## Visual Sensitivity for the KOPs

The discussion above under, "Steps in the KOP Analysis," summarizes the process to determine impact significance. APPENDIX VR-1 describes key terms and the method used by staff to evaluate effects of a project on visual resources.

### KOP 1 – View from Channel View Park / Long Beach Bikeway Route 10 (Existing Condition)

Channel View Park extends along the Los Cerritos Channel adjacent to the University Estates residential neighborhood. The park encompasses 5.28 acres of land and incorporates a portion of the Long Beach bikeway between Loynes Drive and 7th Street. Kettering Elementary School is located adjacent to the northern extent of the park. KOP 1 is located within the park at the end of 5th Street across the Los Cerritos Channel.

**Visual Resources Figure 3a** shows the existing view from KOP 1 looking southeast toward the project site. Channelized water in the Los Cerritos Channel along with its rock bed and scrub brush along the top of the banks are visible in the foreground. Trees adjacent to Studebaker Road and on the western edge of the AGS site, along with utility lines, create the middle ground and screen the lower levels of the AGS structures and screen distant views beyond the site. The six existing AGS stacks and scaffolding-covered boiler are skylined above the treetops. Traffic traveling along Studebaker Road is also in the view.

The existing AGS power plant is composed of immense, complex, mechanical structures in an area where the built environment is generally characterized by low buildings (e.g., residences, commercial businesses) and relatively open views of the nearby residential and recreational uses. There is little or no visual coherence or harmony in the southeastward view from KOP 1 and from other nearby viewpoints from Channel View Park. The AGS power plant is a visually discordant built element in the view and visual quality for KOP 1 is characterized as low.

Viewers at KOP 1 include recreationists engaged in passive and active recreational activities in Channel View Park and/or Long Beach Bikeway. Viewers near KOP 1 include persons walking, bicycling, and jogging on the bikeway that parallels the Los Cerritos Channel along with people picnicking in the park. Other viewer groups near KOP 1 include students at Kettering Elementary School located at the northern extent of Channel View Park. Viewer concern for visitors to Channel View Park and Long Beach Bikeway and other viewpoints near KOP 1 is considered high.

Under existing conditions, the lower portions of the AGS power plant structures are screened, but given their height and bulk, views of the AGS from KOP 1 are mostly unimpeded. As a result, the AGS power plant structures block the views of the proposed AEC site. Therefore, visibility of the AEC project site at this location is low.

The city of Long Beach classifies Channel View Park as a greenway park which is a largely undeveloped green space, often a remnant or odd shaped piece of land left over from development, which can be used for casual recreation uses. The city does not provide an estimate as to the number of users of a greenway park; therefore, staff presumes that the number of recreational users per day averages over 200 and that the number of viewers for KOP 1 is high (see Table 2 in **Appendix VR-1**). The duration of view for KOP 1 varies depending on the visitor's type of activity and whether a recreational activity is active (e.g., bicycling, jogging) or passive (e.g., walking, picnicking). Duration of view for KOP 1 is considered high or moderate to high.

Based on the ratings for visibility, number of viewers, and duration of view, overall viewer exposure for KOP 1 is considered moderate.

Due to the dominance of the AGS in views from KOP 1, visual quality is characterized as low. Viewer concern is characterized as high. Based on the ratings for visual quality, viewer concern, and overall viewer exposure, overall visual sensitivity for KOP 1 is considered *moderate*.

### KOP 2 – View from University Park Estates (Existing Condition)

University Park Estates, located to the west across the Los Cerritos Channel, is the closest residential neighborhood to the AEC site. The neighborhood is located between 7$^{th}$ Street and Loynes Drive and is adjacent to Channel View Park and Long Beach Bikeway Route 10. KOP 2 is located within the neighborhood at the intersection of Silvera Street and Eliot Street.

**Visual Resources Figure 4a** shows the existing view from KOP 2 looking east toward the AEC site. Hardscape of the street and front yard landscaping dominate the foreground view. Trees and utility lines located at the end of Eliot Street and in Channel View Park create the middle ground and screen the lower levels of the AGS and screen distant views beyond the AEC site. Six existing AGS stacks and a scaffolding-covered boiler are skylined above the treetops. Multiple vapor plumes may occasionally be seen by residents from the multiple stacks during weather conditions conducive to plume formation, further emphasizing the industrial character of development within close proximity to the residential subdivision.

The existing AGS encompasses immense, complex, mechanical structures in an area where the built environment is generally characterized by low buildings (e.g., residences, commercial businesses) and relatively open views of the nearby residential and recreational uses. There is little or no visual coherence or harmony in the eastward view from KOP 2 and from other nearby viewpoints from University Park Estates. The AGS is a visually discordant built element in the view and visual quality for KOP 2 is characterized as low.

Viewers at KOP 2 include motorists and residents engaged in active and passive recreational activities. Viewers near KOP 2 include people driving a vehicle or bicycling on the street and people walking or jogging on sidewalks. Other viewer groups near KOP 2 include people relaxing in their front or backyard. Viewer concern for residents in University Park Estates and other viewpoints near KOP 2 is considered high.

Under existing conditions, the lower portions of the AGS structures are screened by trees in Channel View Park, but given the height and bulk of the power plant structures, views of the AGS from KOP 2 are mostly unimpeded. As a result, the AGS power plant structures block the views of the proposed AEC site. Therefore, visibility of the project site at this location is low.

Staff presumes that the number of users per day averages over 200 and that the number of viewers for KOP 2 is high (see Table 2 in **Appendix VR-1**). The duration of view for KOP 2 varies depending on the visitor's type of activity and whether a recreational activity is active (e.g., driving, jogging) or passive (e.g., walking, sitting). Duration of view for KOP 2 is considered high or moderate to high.

Based on the ratings for visibility, number of viewers, and duration of view, overall viewer exposure for KOP 2 is considered moderate to high.

Due to the dominance of the AGS in views from KOP 2, visual quality is characterized as low. Viewer concern is characterized as high. Based on the ratings for visual quality, viewer concern, and overall viewer exposure, overall visual sensitivity for KOP 2 is considered *moderate*.

### KOP 3 – View from Marine Stadium Park (Existing Condition)

Marine Stadium Park is located at the confluence of the Los Cerritos Channel and Alamitos Bay (Marine Stadium portion). Marine Stadium is popular location for rowing, water skiing, and speedboats. KOP 3 is located within the park at the intersection of Appian Way and Bay Shore Avenue adjacent to Marine Stadium (**VR Figure 5a**, existing view).

**Visual Resources Figure 5a** shows the existing view from KOP 3 looking northeast toward the AEC site. Channelized water in the Alamitos Bay, along with buoys, dominates the foreground. Docked boats, trees, and various developments (e.g., residential, recreation, commercial) adjacent to the waterline create the middle ground. The AGS is viewable in distant background down the Los Cerritos Channel. Six stacks of the existing AGS are skylined above the waterline.

The existing AGS power plant is composed of immense, complex, mechanical structures in an area where the built environment is generally characterized by low buildings (e.g., residences, commercial businesses) and relatively open views of the nearby residential and recreational uses. The physical boundaries of the Los Cerritos Channel create a visual coherence and harmony in the northeastward view from KOP 3 and from other nearby viewpoints from Marine Stadium. The AGS power plant is not a visually discordant built element in the view because of the distance between the observation point and the site. Visual quality for KOP 3 is characterized as moderate.

Viewers at KOP 3 include recreationists engaged in passive and active recreational activities in Alamitos Bay and/or Stadium Park. Viewers near KOP 3 include people recreating on the water in Alamitos Bay and Los Cerritos Channel. Other viewer groups near KOP 3 include residents along the waterfront. Viewer concern for visitors to Marine Stadium and other viewpoints near KOP 3 is considered high.

Under existing conditions, the AGS power plant structures are not screened from KOP 3. Although the height and bulk of the power plant structures are substantial and views of the AGS from KOP 3 are mostly unimpeded, the viewing distance to the power plant reduces the scale of the power plant structures to blend with development in the middle ground along the waterfront. Therefore, visibility of the project site at this location is considered low.

The city of Long Beach classifies Marine Stadium Park as a special use park which provides unique cultural heritage and/or educational features which attract a broad audience from near and far. The city does not provide an estimate as to the number of users of a special use park; however, Marine Stadium Park is public boat launch and the city identifies it as one of the world's premier water skiing facilities. Staff presumes that the number of recreational users per day averages over 200 and that the number of viewers for KOP 3 is high (see Table 2 in **Appendix VR-1**). The duration of view for KOP 3 varies depending on the visitor's type of water activity (e.g., paddling, water skiing). Duration of view for KOP 3 is considered moderate.

Based on the ratings for visibility, number of viewers, and duration of view, overall viewer exposure for KOP 3 is considered moderate.

Due to the AGS not being a dominant visual element from KOP 3, visual quality is characterized as moderate. Viewer concern is characterized as high. Based on the ratings for visual quality, viewer concern, and overall viewer exposure, overall visual sensitivity for KOP 3 is considered *moderate to high*.

### KOP 4 – View from Loynes Drive (Existing Condition)

Loynes Drive traverses in an east-west direction to the west of the project site. Loynes Drive deadends at Studebaker Road, which extends adjacent to the western boundary of the project site. Motorists traveling east along Loynes Drive have a direct, unobstructed view of the project site. KOP 4 is located on the bridge crossing over the Los Cerritos Channel within ¼ mile of the western edge of the project site.

**Visual Resources Figure 6a** shows the existing view from KOP 4 looking east toward the AEC site. The roadway surface and bridge components are visible in the foreground. Structures of the existing AGS and a storage tank dominate the middle ground view. Structures at the LADWP Haynes Generating Station can be seen in the background and blend in with the existing industrial structures at the AGS. Overall, the middle ground and background views are dominated by the prominence of the existing AGS and LADWP power plant structures.

The existing AGS power plant is composed of immense, complex, mechanical structures including whitewashed stacks and boilers with exposed scaffolding which add distinct elements to the viewpoint. The combination of vertical and horizontal forms creates little or no visual coherence or harmony in the eastward view from KOP 4. The human-made electrical generation facilities are visually discordant built elements in the view and visual quality for KOP 4 is characterized as low.

Viewers at KOP 4 primarily include motorists with the occasional pedestrian and bicyclist. Viewers near KOP 4 include primarily persons driving but also include those walking and bicycling. Viewer concern for viewers at KOP 4 is considered low.

Under existing conditions, the AGS power plant structures are not screened and fully portray their height and bulk. Overall, views of the AGS power plant from KOP 4 are unimpeded. Visibility of the project site at this location is very high.

Staff presumes that the number of recreational users per day averages less than 200 and that the number of viewers for KOP 4 is low (see Table 2 in **Appendix VR-1**). The duration of view for KOP 4 varies depending on the visitor's type of activity and whether a recreational activity is active (e.g., bicycling, jogging) or passive (e.g., walking, picnicking). Visitors to KOP 4 would primarily involve an active activity because there are no passive recreational facilities available at KOP 4. Duration of view for KOP 4 is considered low.

Based on the ratings for visibility, number of viewers, and duration of view, overall viewer exposure for KOP 4 is considered low to moderate.

Due to the dominance of the AGS in views from KOP 4, visual quality is characterized as low. Viewer concern is characterized as low. Based on the ratings for visual quality, viewer concern, and overall viewer exposure, overall visual sensitivity for KOP 1 is considered *low*.

## DIRECT AND INDIRECT IMPACTS AND MITIGATION MEASURES

This assessment of impacts on visual resources addresses impacts that would occur from construction and operation of the power plant components at the AEC site. Due to the multi-year construction periods for the proposed project, impacts on visual resources from construction activities are considered to be long term rather than temporary.

Section 5.13.4 of the AFC, "Mitigation Measures," states that the proposed project "…would result in an overall visual quality which would remain the same. Because there will be no significant adverse visual impacts, given the existing conditions and the design features discussed [in the AFC], no additional mitigation measures are required" (AES 2015, pp. 5.13-17). Section 5.13.2.5 of the AFC, "Impact Significance," states that with implementation of the proposed project"… there will be no change in the views from KOPs 1 and 3, there will be a very minor and clearly less than significant change to the view from KOP 2, and there will be a slight positive change to the visual quality of the view from KOP 4" (AES 2015, pp. 5.13-16).

Staff's analysis under, "Visual Change for the KOPs," evaluates the visual resources impacts on sensitive viewer groups. The proposed project's potential to comply with applicable LORS is discussed below under, "Compliance with Laws, Ordinances, Regulations, and Standards."

## Visual Change for the KOPs

The discussion above under, "Steps in the KOP Analysis," summarizes the process to determine impact significance. APPENDIX VR-2 shows the KOP evaluation matrix summarizing the process to determine the visual impact conclusions described below.

### KOP 1 – View from Channel View Park / Long Beach Bikeway Route 10 (Proposed Condition)

The visual simulation for KOP 1 shows the AEC as it would appear at the end of construction activities for a viewer at Channel View Park across the Los Cerritos Channel from the project site (**VR Figure 3b**, simulated view).

As shown in the simulated view, the collection of AGS structures, tanks, and stacks viewable beyond the tree line would remain. The new stacks as part of the AEC would be lower than the existing AGS stacks and the new heat recovery steam generator (HRSG) units would be smaller, sleeker units that would be hidden behind the tree line extending along the western perimeter of the project site. The scale and height of existing power plant structures would not change in the view. The proposed facility would be obstructed by the existing, intervening trees and infrastructure. The AEC would not be a dominant feature and would not disrupt any portion of the skyline at the tree line because the AEC stacks and HRSG units would not be visible features in the view from this location. With the implementation of the proposed AEC, the skyline would remain the same from this viewpoint.

The overall visual change is typically based on an average of the values for contrast, dominance, and view blockage. Although overall visual sensitivity for KOP 1 is considered moderate, the overall visual change as a result of the proposed AEC compared to existing conditions would be low (none). From this viewpoint, constructing new angular, metallic power plant structures would not change visual resource conditions to a notable or significant degree. Compared to existing conditions, implementation of the AEC would not change the existing visual character and quality of the site and its surroundings for views at or near KOP 1, and the impact is considered ***less than significant***.

### KOP 2 – View from University Park Estates (Proposed Condition)

The visual simulation for KOP 2 shows the AEC as it would appear at the end of construction activities for a viewer at the intersection of Silvera Street and Eliot Street within the University Park Estates residential neighborhood (**VR Figure 4b**, simulated view).

As shown in the simulated view, the tall AGS stacks and boiler viewable beyond the neighborhood would remain. The new air-cooled condensers, HRSG units, and stacks would be shorter than existing structures, and would be mostly hidden behind the houses and vegetation in the foreground of the view. The overall scale and height of power plant structures in the view would not change. The proposed facility would be obstructed by the existing, intervening trees and residences and thereby would not change the contrast in the view nor change the overall dominance of power plant structures in the view. To the extent that they are visible, the air-cooled condensers, HRSG units, and stacks would create a solid line of developed features that would appear through breaks in trees located in Channel View Park. However, views of these structures would not extend above the highest portion of the tree line.

The existing tall stacks and scaffold-covered structures, which are currently the most visually discordant elements in the backdrop of the view, would not be removed as part of the proposed project. However, it should be noted that the project owner intends to remove the existing AGS power plant structures under terms of a memorandum of understanding (MOU) with the city of Long Beach at a future date. The new AEC stacks and HRSG units would appear lower than the trees and in line with residential rooftops, creating the appearance of an intact skyline.

Although overall visual sensitivity for KOP 2 is considered moderate, the overall visual change as a result of the proposed AEC compared to existing conditions would be low. From this viewpoint, constructing new angular, metallic power plant structures would not change visual resource conditions to a notable or significant degree. Compared to existing conditions, implementation of the AEC would slightly change the existing visual character and quality of the site and its surroundings for views at or near KOP 2, and the impact is considered ***less than significant***.

### KOP 3 – View from Marine Stadium Park (Proposed Condition)

The visual simulation for KOP 3 shows the AEC as it would appear at the end of construction activities for a viewer at Marine Stadium Park across Alamitos Bay and down the Los Cerritos Channel from the project site (**VR Figure 5b**, simulated view).

As shown in the simulated view, the existing assemblage of structures and stacks would not be removed as part of the proposed project. However, the project owner intends to remove the existing AGS power plant structures under terms of an MOU with the city of Long Beach at a future date. The new elements as part of the AEC would appear similar in scale to the existing AGS features.

Features of the AEC would appear equal in dominance with the existing AGS power plant structures in the open view across Alamitos Bay and up the Los Cerritos Channel. Similarly, the AEC structures would not change the contrast in the view because features of the AEC structures would not appear strikingly different from the existing AGS. The combination of the human-made features creates a visual mosaic with

various types, scales, colors, and forms. The AEC structures and stacks would increase the visual intactness of manmade structures across the horizontal plane. Structures of the AGS would continue to be silhouetted against the sky and viewable in the distance from Marine Stadium Park and nearby residences fronting the water. Construction of the proposed project would intensify the view of manmade structures in a continual horizontal pattern across the center view.

From this viewpoint, constructing new power blocks with angular, metallic power plant structures would change visual resource conditions to a noticeable degree. The overall visual change as a result of the proposed AEC compared to existing conditions would be moderate. Within the context of moderate to high visual sensitivity at KOP 3, this level of visual change compared to existing conditions would be considered a potentially significant impact.  Implementation of staff's Condition of Certification **VIS-2** would minimize the potential for visual intrusion and reduce contrast by blending with the existing visual environment in the project area. ***Less than significant with mitigation incorporated***.

**KOP 4 – View from Loynes Drive (Proposed Condition)**

The visual simulation for KOP 4 shows the AEC as it would appear at the end of construction activities for a viewer on Loynes Drive at the bridge crossing over the Los Cerritos Channel (**VR Figure 6b**, simulated view).

As shown in the simulated view, the two stacks HRSG units, and the ACC associated with AEC Power Block 1, along with an assemblage of structures and stacks of the existing AGS, would be visible across the view. Two of the stacks in Power Block 2 are barely visible immediately to the left of the simulated Power Block 1 structures. The existing stacks and scaffolding at the LADWP Haynes Generating Station will remain partially visible in the view's background.

Features of the AEC would appear equal in dominance with the existing AGS power plant structures in the direct, unobstructed view from Loynes Drive. Similarly, the AEC structures would not change the contrast in the view because features of the AEC structures would not appear strikingly different from the existing AGS and Haynes power plants and the overall industrial nature of structures in the view. The combination of the human-made features creates a visual mosaic with various types, scales, colors, and forms. The AEC structures and stacks would increase the visual intactness of manmade structures across the horizontal plane. Structures of the AEC would be silhouetted against the sky similarly as the existing AGS structures. Construction of the AEC would intensify the view of manmade structures in the center view.

From this viewpoint, the new structures associated with the AEC would change visual resource conditions to a notable or considerable degree. Although the overall visual change would be moderate to high, within the context of the low visual sensitivity at KOP 4, the visual impacts of the AEC would be considered ***less than significant***.

## Project Construction Visual Impacts

### Construction Overview

The construction activities at the project site would occur on a single shift composed of a 10-hour workday, Monday through Friday, and a single 8-hour shift on Saturday. Construction would typically take place between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 9:00 a.m. and 6:00 p.m. on Saturday. Overtime and additional shift work may be used to maintain the construction schedule or to complete critical construction activities (e.g., continuous pour and/or pouring concrete at night during hot weather, working around time-critical shutdowns and constraints).

The proposed project would require several areas for construction worker parking, storage, and laydown during site construction activities. Parking for workers would include an 8-acre area on the eastern and southern portions of the project site and a 10-acre area adjacent to the south of the project site. The adjacent 10-acre area is located along the west side of a rip rapped and channelized segment of the San Gabriel River that is flanked by industrial uses including the Los Angeles Department of Water and Power’s Haynes Generating Station, decommissioned fuel oil tanks, high-voltage transmission lines, and the AGS. A segment of the San Gabriel River Bike Trail borders the east side of the river through this industrial area.

Existing vegetation and fencing would create a visual buffer and screening for views toward these open lots, which would presumably be full of vehicles during daylight hours and sometimes at night while construction progressed on the AEC.

### Construction-Related Effects

The intensity of the long-term construction impact on visual resources would be greatest for sensitive viewer groups, primarily residents and recreationists, at the closest viewing distances to the project site. Construction activities would increase the presence and movement of heavy construction equipment and vehicles, large-scale construction work, and generation of dust over an approximately 5-year construction time frame at the project site. The long-term construction time frame could impact the ground surface on or adjacent to the project site from movement of heavy equipment and temporary storage of construction materials. Existing landscaped areas and the ground surface of areas at or near the AEC site would not be permanently impacted by the AEC. The construction parking and laydown areas are located in an existing disturbed area for utility uses. These areas are not located adjacent to public use areas. In addition, the AEC is located at or below the elevation of adjacent neighborhoods that surround the site which limits direct, unobstructed views of the construction areas. Neighborhoods located at an elevation above the AEC are located at a distance that substantially limits the ability of viewers to distinguish between construction equipment parked onsite and existing utility facilities.

The AEC is in an area with existing and former utility uses, and use of the 10-acre open lot at the AEC site for construction laydown would be a relatively minor change in visual resources conditions at this location. Long-term construction impacts at the AECP site would not substantially alter the visual character or quality of the site or surrounding area, and no impact on visual resources would occur.

## Lighting and Glare Effects

### Project Construction Lighting

Section 5.13.2.3.5 of the AFC, "Lighting," summarizes lighting requirements for night construction and commissioning activities. Although most construction activities would occur during daytime hours, additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities (AES 2015, page 5.13-12). During some construction periods and the project commissioning/startup phase, work would continue 24 hours per day, 7 days per week. The frequency of nighttime work over the 5-year construction schedule is not known, and the applicant states that the project site could appear as a brightly lit area for limited times during project construction and commissioning. Although lighting of construction worker parking areas is not discussed in the AFC, staff assumes that security lighting of the construction parking areas would be necessary. The AFC states that nighttime construction and commissioning lighting would be shielded and directed toward the center of the construction activity. Task-specific lighting would be used to the extent practicable and in compliance with worker safety regulations. The AFC provides no further details (e.g., a process requiring the project owner to respond to a construction-related lighting complaint). In response to staff's data requests on construction lighting, the applicant states there is no expectation for placing lighting on tall structures (e.g., cranes) during construction activities unless required for safety (AES 2014).

Staff has incorporated the applicant's proposed measures into staff's recommended Condition of Certification **VIS-1**, which includes measures to minimize the potential impacts of long-term lighting for construction and commissioning work. Implementation of **VIS-1** would reduce lighting impacts during construction to ***less than significant***.

### Project Operation Lighting

The AEC site is located in an urbanized area with existing street and industrial lighting. The amount of lighting in the area would increase marginally with the AEC. The AFC states that exterior lights for project operation would be hooded and directed onsite to minimize glare and light spillage beyond the project site (AES 2015, page 5.13-14). Low-pressure sodium lamps and/or efficient LED lighting with non-glare fixtures would be used for the project, and "switched lighting circuits" would be provided for areas not requiring continuous illumination. In addition, the AFC states the HRSG and air-cooled condenser structures would be lower than the existing boiler structures and their sides would be completely enclosed, without external scaffolding and stairways, thereby, requiring little to no need for external lighting. External lighting would be primarily restricted to the platforms on the tops of the HRSG structures. The applicant states that lighting fixtures would conform to standards (Dark Skies) for minimizing offsite lighting effects. Staff has incorporated the applicant's proposed measures into staff-recommended Condition of Certification **VIS-4** to ensure that operational lighting results in ***less than significant effects***. After the existing AGS generating units are retired (expected by the end of 2020), the AGS lighting needed for worker safety would no longer be required and would be turned off. At that time, the amount of lighting on the site, even with the lighting required by the AEC, would be less than at present.

### Structure Surface Glare

The applicant has proposed no measures requiring surface treatments to minimize glare from project structure surfaces. The potential for glare from project structures to adversely affect daytime views in the project area is considered a potentially significant impact of the AEC. Condition of Certification **VIS-2** is proposed to require preparation and implementation of a Surface Treatment Plan to reduce the effects of glare from project surfaces to ***less than significant***.

## Visible Plumes

When a thermal power generation facility is operated at times when the ambient temperature is low and relative humidity is high, the warm moisture (water vapor) in the exhaust plume condenses as it mixes with the cooler ambient air, resulting in formation of a visible plume[1]. This is similar to when the moisture-laden air in a person's breath on a cold day is chilled to the point where the water vapor condenses into lots of tiny droplets of liquid water, forming a visible cloudy fog. Formation of visible plumes typically occurs on cool, humid days when the outdoor air is at or near saturation[2].

Power plants like the proposed AEC produce high velocity, high temperature exhausts that disperse quickly, thereby, minimizing the probability that visible plumes would form above the stacks. Using data provided by the applicant, Energy Commission Air Quality staff conducted a preliminary assessment of the proposed project's exhaust gas plumes. Based on the AEC's exhaust gas characteristics and ambient air conditions, staff concluded that conditions would be unlikely to cause formation of visible plumes above the project's exhaust stacks. The AEC would not include wet cooling towers with evaporative cooling. Instead, the AEC would use dry cooling (i.e., ACCs) for heat rejection with no possibility of forming water vapor plumes. ***No impact*** on visual resources would occur pertaining to visible plumes.

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[1] Relative humidity is the percentage of the amount of water vapor in the air. The colder the air, the less water vapor it can carry.
[2] Saturated air is air containing the maximum amount of water vapor possible at a given temperature.

## Cumulative Impacts

Section 15130 of the State CEQA Guidelines requires a discussion of cumulative impacts of a project when the project's incremental effect is cumulatively considerable. According to State CEQA Guidelines Section 15065(a)(3), "[c]umulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." Sections 15130 and 15355 of the State CEQA Guidelines both stress cumulative impacts in the context of closely related projects and from projects causing related impacts. The goal of such an analysis is twofold: first, to determine whether the overall long-term impacts of all such projects would be cumulatively significant; and second, to determine whether the AEC itself would cause a "cumulatively considerable", and thus significant, incremental contribution to any such cumulatively significant impacts.

For this analysis, the impacts of cumulative projects (i.e., related projects) on visual resources are limited to those that could combine with the proposed project's visual resources impacts. The geographic scope of the area that could be subject to a cumulative visual effect is limited to the area very near the proposed AEC. Staff reviewed current and probable future projects occurring in the AEC area. Upon review of projects, staff determined that the distance between the AEC site and other current and probable future projects is of such distance to prevent a cumulative visual effect. In other words, an observer at any given location would be unable to see the AEC in combination with any current or probable future project. For this reason, the AEC would not contribute considerably to a cumulatively significant effect for visual resources.

## Summary of Project Effects

As described above, criteria for determining the significance of impacts on visual resources are based on the environmental checklist form in Appendix G of the State CEQA Guidelines. This discussion summarizes the effects of the AEC on visual resources and the corresponding significance criteria for evaluating impacts on visual resources.

### Substantial Adverse Effect on a Scenic Vista

Views in the vicinity of the AEC site include built elements typical of development in urbanized areas near the coast. No particular view in the project vicinity has a level of scenic appeal that could distinguish it as a scenic vista; therefore, the proposed project would have ***no impact*** relative to this criterion.

### Substantially Damage Scenic Resources, Including But Not Limited to Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway

Because the PCH is not an officially designated state scenic highway in the region, no impact would occur relative to this criterion. Furthermore, the project site does not contain scenic resources, including trees, rock outcroppings, and historic buildings; therefore, the proposed project would have ***no impact*** relative to this criterion.

### Substantially Degrade the Existing Visual Character or Quality of the Site and its Surroundings

The visual character of the existing AGS site and adjacent areas are dominated by large-scale electric generation and transmission facilities that include the AGS, a large SCE substation and associated transmission lines, and the LADWP Haynes Generating Station and associated transmission lines. The visual character of views in the project vicinity would not substantially change overall because the AEC structures would add to an existing industrial visual environment which includes the AGS and LADWP power plant structures. From most KOPs, the proposed project would not substantially degrade the existing visual character of the project site and its surroundings and the proposed project would have a ***less than significant impact*** relative to this criterion. At KOP 3, visual impacts are considered ***less than significant with mitigation incorporated***.

### Create a New Source of Substantial Light or Glare That Would Adversely Affect Daytime or Nighttime Views in the Area

The applicant has proposed measures to ensure that project lighting during construction, commissioning, and operation does not create significant visual impacts. Staff has incorporated these measures into Conditions of Certification **VIS-1** and **VIS-4** and concludes that the AEC would not create a new source of substantial light or glare that could adversely affect nighttime views in the area. ***Less than significant with mitigation incorporated.***

Implementation of staff's Condition of Certification **VIS-2** would minimize the potential for glint or glare from project structures to adversely affect daytime views in the project area. ***Less than significant with mitigation incorporated***.

## COMPLIANCE WITH LORS

**VR Table 2** summarizes LORS pertaining to protection of visual and aesthetic resources. The summary of applicable LORS in **VR Table 2** includes several that address minimizing the visual impacts of utilities by requiring landscape and architectural buffers and screens. The city's SEADIP Specific Plan includes Provision A2 which requires a minimum of thirty percent of the site shall be developed and maintained as usable open space. See applicable goals, objectives, and policies under, "South East Area Development and Improvement Plan (SEADIP) Specific Plan," in the table below.

Visual Resources Table 2
Proposed Project Consistency with Applicable Visual Resources LORS

| Applicable LORS | Consistency Determination | Basis for Consistency |
|---|---|---|
| California Coastal Act of 1976 | | |
| Section 30251 Scenic and visual qualities. The scenic and visual qualities of coastal areas shall be considered and protected. Permitted development shall be visually compatible with the character of the area and, where feasible, to restore and enhance visual quality in visually degraded areas. | Refer to the analyses (below) under Provision A2 for the SEADIP Specific Plan. | |
| City of Long Beach General Plan | | |
| **Open Space and Recreation Element** | | |
| **Policy 1.2** Protect and improve the community's natural resources, amenities and scenic values including nature centers, beaches, bluffs, wetlands and water bodies. | Consistency with Policy 1.2 to protect community natural resources, amenities, and scenic values is achieved with the project's proposed design. | The proposed arrangement of the AEC would locate components further away from surrounding areas (e.g., Los Cerritos Channel). The proposed lighting design (e.g., hooded lighting, lighting directed onsite) would minimize the potential for glare and light spillage into nearby recreation and open space areas. |
| **Land Use Element** | | |
| **Urban Design Analysis - Conclusions and Policy Directions** Certain city entrances at arterial and freeways should be beautified to enhance the city's image. Of particular importance are the entrances at Seventh Street and Studebaker Road, and all the entrances from the Long Beach Freeway. | Consistency with Urban Design Analysis to beautify entrances along Studebaker Road is achieved with the project's proposed design. | The existing AEC has landscaping in place that complies with the requirements for setbacks, screening, and vegetation. The AEC site boundary does not reach to Studebaker Road and implementation of the AEC would not affect landscaping that is already in place along Studebaker Road.<br><br>It should be noted that the city submitted a comment letter requesting all perimeter and public-facing landscape areas of the AGS be cleared and replanted with a comprehensively-designed landscape plan for the entire site (Long Beach 2016b).<br><br>In addition, the applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance. |

| Applicable LORS | Consistency Determination | Basis for Consistency |
|---|---|---|
| **Conservation Element** | | |
| **Goals for the City No. 2** To create and maintain a productive harmony between man and his environment through conservation of natural resources and protection of significant areas having environment and aesthetic value. | Consistency with Goals for the city to protect significant areas with aesthetic value is achieved with the project's proposed design. | The proposed design for AEC would comply with all setback and buffer requirements. The applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance. |
| **Local Coastal Program** | | |
| The LCP adopted the SEADIP Specific Plan by reference. Specific development and land use standards are provided within the SEADIP Specific Plan. | Refer to the analyses (below) under Provision A2 for the SEADIP Specific Plan. | |
| **South East Area Development and Improvement Plan (SEADIP) Specific Plan** | | |
| **Provision A2** A minimum of thirty percent of the site shall be developed and maintained as usable open space (building footprint, streets, parking areas and sidewalks adjacent to streets shall not be considered usable open space. Bicycle and pedestrian trails not included within the public right-of-way may be considered usable open space). All buildings shall be set back a minimum of twenty feet from all public streets and a wider setback may be required by individual subarea.<br>Within this minimum twenty-foot setback area, a strip having a minimum width of ten feet and abutting the street shall be attractively landscaped. | Consistency with Provision A2 to identify open space areas on the AECP site would be achieved with implementation of **VIS-3**. | Condition of Certification **VIS-3** requires the project owner to provide landscaping that reduces the visibility of the power plant structures in accordance with local policies.<br><br>In addition, the applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance. |
| **Provision A9** All development shall be designed and constructed to be in harmony with the character and quality of surrounding development so as to create community unity within the entire area. | Consistency with Provision A9 to construct and design in harmony with the character and quality of surrounding development is achieved with the project's proposed design. | AEC would be designed to be in harmony with the industrial zone in which it is located. Condition of Certification **VIS-3** would ensure the AEC would comply with applicable development policies set forth in the General Plan and SEADIP. |
| **Provision A12** Public views to water areas and public open spaces shall be maintained and enhanced to the maximum extent possible, consistent with the wetlands restoration plan. | Consistency with Provision A12 to maintain and enhance public views to water areas and public open spaces is achieved with the project's proposed design. | The AEC would not block views of water areas and public open spaces. |

| Applicable LORS | Consistency Determination | Basis for Consistency |
|---|---|---|
| **City of Long Beach Municipal Code Zoning Ordinance** | | |
| **21.42.010 Landscaping Standards** ***Landscaping Purpose*** - Landscapes are intended to improve the physical appearance of the city by providing visual, ecological, and psychological relief in the urban environment. Successfully designed and maintained landscape areas provide an attractive living, working, and recreating environment in addition to their role in reducing water and energy consumption. ***General Requirement C*** - Plans Required. When applicable, a Landscape Document Package shall be approved prior to the issuance of any planning or building permit. For projects proposing landscape area coverage with a minimum of ninety percent (90%) very low to low water use plantings, ETWU and MAWA calculations are not required in the Landscape Document Package submittal. Applicable landscaping, irrigation, planter drainage, water reuse, retention and filtration improvements shall be implemented before any final building and planning inspection is approved. | Consistency with Municipal Code Section 21.42.010 to provide a Landscape Document Package would be achieved with implementation of **VIS-3**. | Condition of Certification **VIS-3** requires the project owner to provide a landscaping plan whose proper implementation would satisfy the Municipal Code requirements. |
| **21.42.040 Landscaping standards for R-3, R-4 and Nonresidential Districts.** ***Landscape Area Requirements.*** A. Applicability. All portions of a lot not paved or occupied by a structure shall be attractively landscaped. All required set back areas shall be landscaped unless used for a permitted use. B. Landscape Area Requirements On-Site Street Frontage - Within the required setback area along all street frontages, except at driveways, a minimum five-foot (5') wide landscaping strip (inside dimension to planter) shall be provided. This area shall be landscaped with one (1) tree for each fifteen (15) linear feet of street frontage and three (3) shrubs for each tree. Fences and retaining walls. All required fences and retaining walls shall be landscaped with vines planted no more than ten feet (10') on center on all accessible sides of a wall or alternative plant materials approved by the Director of Development Services. | Consistency with Municipal Code Section 21.42.040 to provide landscaped area along street frontages is achieved with the project's proposed design. | The AEC site boundary does not reach to Studebaker Road and implementation of the AEC would not affect landscaping that is already in place along Studebaker Road.<br><br>It should be noted that the city submitted a comment letter requesting all perimeter and public-facing landscape areas of the AGS be cleared and replanted with a comprehensively-designed landscape plan for the entire site (Long Beach 2016b).<br><br>In addition, the applicant identified a commitment to work cooperatively with the city in submitting landscape plans for review and approval (AECP 2015, pg. 5.13-21). Implementation of Condition of Certification **VIS-3** would ensure conformance. |

## RESPONSE TO COMMENTS ON THE PRELIMINARY STAFF ASSESSMENT

The applicant was the only entity to provide comments on the Preliminary Staff Assessment (PSA) related to visual resources (TN# 212487). No comments were received from the public, intervenors, or other agencies.

**COMMENT:**

*The applicant identified inconsistencies in the text of the analysis.*

Staff appreciates the applicant's identification of the inconsistencies and staff revised the text to make statements regarding KOP 3 and KOP 4 consistent.

**COMMENT:**

*The applicant disagrees with staff's conclusions regarding the significance of visual impacts at KOP 3.*

**Response:** Staff's conclusions on the significance of visual changes to the environment are primarily based on the visual sensitivity at each KOP. As indicated in the conclusion for KOP 3, the visual sensitivity is considered moderate to high. As indicated in the conclusion for KOP 4, the visual sensitivity is considered low. Even though the overall visual change is greater at KOP 4 as compared to KOP 3, the sensitivity of views from KOP 4 is considered lower as compared to KOP 3. Therefore, staff believes the conclusions made in the analysis regarding the significance of visual changes in the environment are supported by the evidence presented in the analysis. Specifically constructing new power blocks with angular, metallic power plant structures would change visual resource conditions from KOP 3 to a noticeable degree. The overall visual change as a result of the proposed AEC compared to existing conditions would be moderate. Staff does not agree with the Applicant's comment that the overall effect will be that the visual quality of the views from KOP 3 will remain the same.

Staff is aware of the Federal Highway Administration visual impact assessment methodology cited in the comment. Visual resource management guidelines and methods established by federal agencies, such as the visual management system of the U.S. Forest Service and the descriptions for distance zones used by the Federal Highway Administration, are adapted and used by staff to evaluate the impacts of a project on visual resources. Because the impacts to KOP 3 can be mitigated, staff reached the same conclusions as the applicant regarding the overall impacts to visual resources.

**COMMENT:**

*The applicant requested revisions to Conditions of Certification **VIS-1**, **VIS-2**, **VIS-3**, and **VIS-4**.*

**Response:** Staff revised Conditions of Certification **VIS-1**, **VIS-2**, **VIS-3**, and **VIS-4** in response to the applicant's comments. The applicant's requested revisions involved identifying what would be included as part of the Lighting Management Plan and Surface Treatment Plan, along with clarifying the timeframe in which planting must occur. The applicant's requested revisions also included grammatical fixes.

Lastly, the applicant requested removal of the language "of colorful, interesting, and distinctive character" from **VIS-3**. Staff agrees with this revision because this language is subjective even though this language was specifically requested to be included by the city of Long Beach (TN# 211372).

## CONCLUSIONS AND RECOMMENDATIONS

Impacts on visual resources were assessed based on the magnitude of the anticipated incremental changes to the visual environment, considering the appropriate baseline conditions (i.e., existing conditions), and the estimated effects of those changes on sensitive viewer groups.

Lighting of the project site and structures during construction, commissioning, and operation could create new sources of substantial light or glare that could adversely affect daytime and nighttime views in the area. Staff proposes implementation of Conditions of Certification **VIS-1** and **VIS-4** to reduce the effects of lighting on visual resources. Condition of Certification **VIS-2** is proposed to require preparation and implementation of a Surface Treatment Plan to reduce the effects of daytime glare from project surfaces to less than significant. Lastly, staff proposes implementation of Condition of Certification **VIS-3** to require preparation of landscaping plans to satisfy the requirements of local policies.

With implementation of staff's proposed conditions of certification, the proposed project would not cause significant visual impacts and would comply with all applicable visual resources-related laws, ordinances, regulations, and standards.

## PROPOSED CONDITIONS OF CERTIFICATION

**VIS-1** **Lighting – Project Construction.** Consistent with applicable worker safety regulations, the project owner shall ensure that lighting of on-site construction areas and construction worker parking lots minimizes potential night lighting impacts by implementing the following measures:

- The Lighting Management Plan shall include three printed sets of full-size plans (24" x 36", minimum), three sets of 11" x 17" reductions, and a digital copy in PDF format, and contain the following information:
- All fixed-position lighting shall be hooded and shielded to direct light downward and toward the construction area to be illuminated to

prevent illumination of the night sky and minimize light trespass (i.e., direct light extending beyond the boundaries of the parking lots and construction sites, including any security-related boundaries).

- Lighting of any tall construction equipment (e.g., scaffolding, derrick cranes) shall be directed toward areas requiring illumination and shielded to the maximum extent practicable.
- Task-specific lighting shall be used to the maximum extent practicable.
- Wherever and whenever feasible, lighting shall be kept off when not in use and motion sensors shall be used to the maximum extent practicable.
- The Compliance Project Manager (CPM) shall be notified of any construction-related lighting complaints. Complaints shall be documented using a form in the format shown in Attachment 1, and completed forms shall record resolution of each complaint. A copy of each completed complaint form shall be provided to the CPM. Records of lighting complaints shall also be kept in the compliance file at the project site.

**Verification:** Within 7 calendar days after the first use of fixed-position parking area and construction lighting for major construction milestones, the project owner shall notify the CPM that the lighting is ready for inspection. Verification is to be repeated for these construction milestones:

- construction of Power Block 1
- construction of Power Block 2

If the CPM determines that modifications to the lighting are needed for any construction milestone, within 14 calendar days of receiving that notification, the project owner shall correct the lighting and notify the CPM that modifications have been completed.

Within 48 hours of receiving a lighting complaint for any construction activity, the project owner shall provide to the CPM a copy of the complaint report and resolution form, including a schedule for implementing corrective measures to resolve the complaint.

The project owner shall report any lighting complaints and document their resolution in the Monthly Compliance Report for the project, accompanied by copies of completed complaint report and resolution forms for that month.

**VIS-2** **Surface Treatment of Project Structures and Buildings.** Prior to commercial operation of the Power Block 1, the project owner shall prepare and implement a Surface Treatment Plan addressing treatment of the surfaces of all project structures and buildings visible to the public such that proposed colors and finishes (1) minimize visual intrusion and reduce contrast by blending with the existing visual environment, (2) avoid creating new sources of substantial glint and glare, and (3) are consistent with all applicable laws, ordinances, regulations, and standards.

The Surface Treatment Plan shall include, at a minimum, the following elements:

- Description of the overall rationale for the proposed surface treatments, including selection of the proposed colors and finishes;
- Discussion of proposed opportunities and options for using color to enhance design quality;
- Schedule for completing the surface treatments;
- Procedure to ensure proper surface treatment maintenance for the life of the project;
- Three printed sets (11” x 17”), and a digital copy in PDF format of elevation drawings depicting ~~at life-size scale~~ the major project structures and buildings, keyed to a spreadsheet that for each structure and building specifies: (1) the proposed color and finish; and (2) the height, length, and width or diameter;
- Two sets of color brochures, color chips, and or physical samples showing each proposed color and finish. Digital files showing proposed colors may not be submitted in place of original samples. Colors must be identified by vendor, name, and number, or according to a universal designation system; and
- Three printed sets (11’ x 17”) and a digital copy in PDF format of color of a visual simulation at scale showing the surface treatment proposed for the project structures. The visual simulations for KOP 4 shall be used to prepare an image showing the proposed surface treatment plan.

The Surface Treatment Plan shall be submitted to the Compliance Project Manager (CPM) for review and approval. The project owner shall not submit instructions for colors and finishes to manufacturers or vendors of project structures, or perform final field treatment on any structures, until written approval of the final plan is received from the CPM. Modifications to the Surface Treatment Plan are prohibited without the CPM’s approval.

**<u>Verification:</u>** At least 90 calendar days before submitting instructions for colors and other surface treatments to manufacturers or vendors of project structures, and/or ordering prefabricated project structures, the project owner shall submit the Surface Treatment Plan to the CPM for review and comment.

If the CPM determines that the plan requires revision, the project owner shall provide a plan with the specified revision(s) for review and approval by the CPM. No work to implement the Surface Treatment Plan shall begin until final plan approval is received from the CPM.

Prior to the start of commercial operation of Power Block 1, the project owner shall notify the CPM that surface treatments of all publicly visible structures and buildings identified in the Surface Treatment Plan have been completed and that the facilities are ready for inspection. The project owner shall obtain written confirmation from the CPM that the project complies with the Surface Treatment Plan.

**VIS-3** **Perimeter Landscape Screening.** The project owner shall provide landscaping that provides minimum open space areas on the project site in accordance with local policies. The objective shall be to create landscape of a semi-permanent manner with California-native, drought-tolerant groundcover and tree species.

The project owner shall submit to the Compliance Project Manager (CPM) for review and approval and simultaneously to the city of Long Beach for review and comment a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

a) A detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule.

b) A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

c) Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project; and

d) A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project.

The plan shall not be implemented until the project owner receives final approval from the CPM.

<u>**Verification:**</u> The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to the city of Long Beach for review and comment at least 90 days prior to installation.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to the city of Long Beach a revised plan for review and approval by the CPM.

Planting must be completed or bonded by the start of commercial operation. Planting must occur during the optimal planting season, but not later than 12 months after the start of commercial operation. The project owner shall simultaneously notify the CPM and the city of Long Beach within seven days after completing installation of the landscaping that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

### Lighting Management Plan – Project Operation

**VIS-4** The project owner shall prepare and implement a comprehensive Lighting Management Plan for project operations. The project owner shall not purchase or order any permanent lighting fixtures or apparatus until written approval of the final plan is received from the CPM. Modifications to the Lighting Management Plan are prohibited without the CPM's approval. Consistent with applicable worker safety regulations, the project owner shall design, install, and maintain all permanent exterior lighting such that light sources are not directly visible from areas beyond the project site, glare is avoided, and night lighting impacts are minimized or avoided to the maximum extent feasible. All lighting fixtures shall be selected to achieve high energy efficiency for the facility. The project owner shall meet these requirements for permanent project lighting:

1. The Lighting Management Plan shall include three printed sets of full-size plans (24" x 36", minimum), three sets of 11" x 17" reductions, a digital copy in PDF format.

2. The Lighting Management Plan shall be prepared with the direct involvement of a certified lighting professional trained to integrate efficient technologies and designs into lighting systems.

3. Exterior lights shall be hooded and shielded and directed downward or toward the area to be illuminated to prevent obtrusive spill light (i.e., light trespass) beyond the project site.

4. Exterior lighting shall be designed to minimize backscatter to the night sky to the maximum extent feasible.

5. Energy efficient lighting products and systems shall be used for all permanent new lighting installations. Smart bi-level exterior lighting using high efficiency directional LED fixtures shall be used as appropriate for exterior installations. The lighting system shall work in conjunction with occupancy sensors, photo sensors, wireless controls, and/or other scheduling or controls technologies to provide adequate light for security and maximize energy savings.

6. Lighting fixtures shall be kept in good working order and continuously maintained according to the original design standards.

7. The Lighting Management Plan shall be consistent with all applicable laws, ordinances, regulations, and standards.

The Compliance Project Manager (CPM) shall be notified of any complaints about permanent lighting at the project site. Complaints shall be documented using a form in the format shown in Attachment 1, and completed forms shall record resolution of each complaint. A copy of each completed complaint form shall be provided to the CPM. Records of lighting complaints shall also be kept in the compliance file at the project site.

**Verification:** At least 90 calendar days before installation of any permanent lighting equipment for the project, the project owner shall submit the comprehensive Lighting Management Plan to the CPM for review and approval.

If the CPM determines that the plan requires revision, the project owner shall provide a plan with the specified revision(s) for review and approval by the CPM. No work to implement the plan (e.g., installation of fixtures) shall begin until final plan approval is received from the CPM.

Prior to the start of commercial operation of the project, the project owner shall notify the CPM that installation of permanent lighting for the project has been completed and that the lighting is ready for inspection. If the CPM notifies the project owner that modifications to the lighting system are required, within 30 days of receiving that notification, the project owner shall implement all specified changes and notify the CPM that the modified lighting system(s) is ready for inspection.

## REFERENCES

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**City of Long Beach 1980** – *City of Long Beach South East Area Development and Improvement Plan (SEADIP)*.

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**California Department of Transportation 2016** – *California Scenic Highway Program, Scenic Highway Routes*. Available:

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**City of Long Beach 2002** – *Open Space and Recreation Element of the General Plan*. Prepared by Department of Planning and Building and Department of Parks, Recreation and Marine. October 2002.

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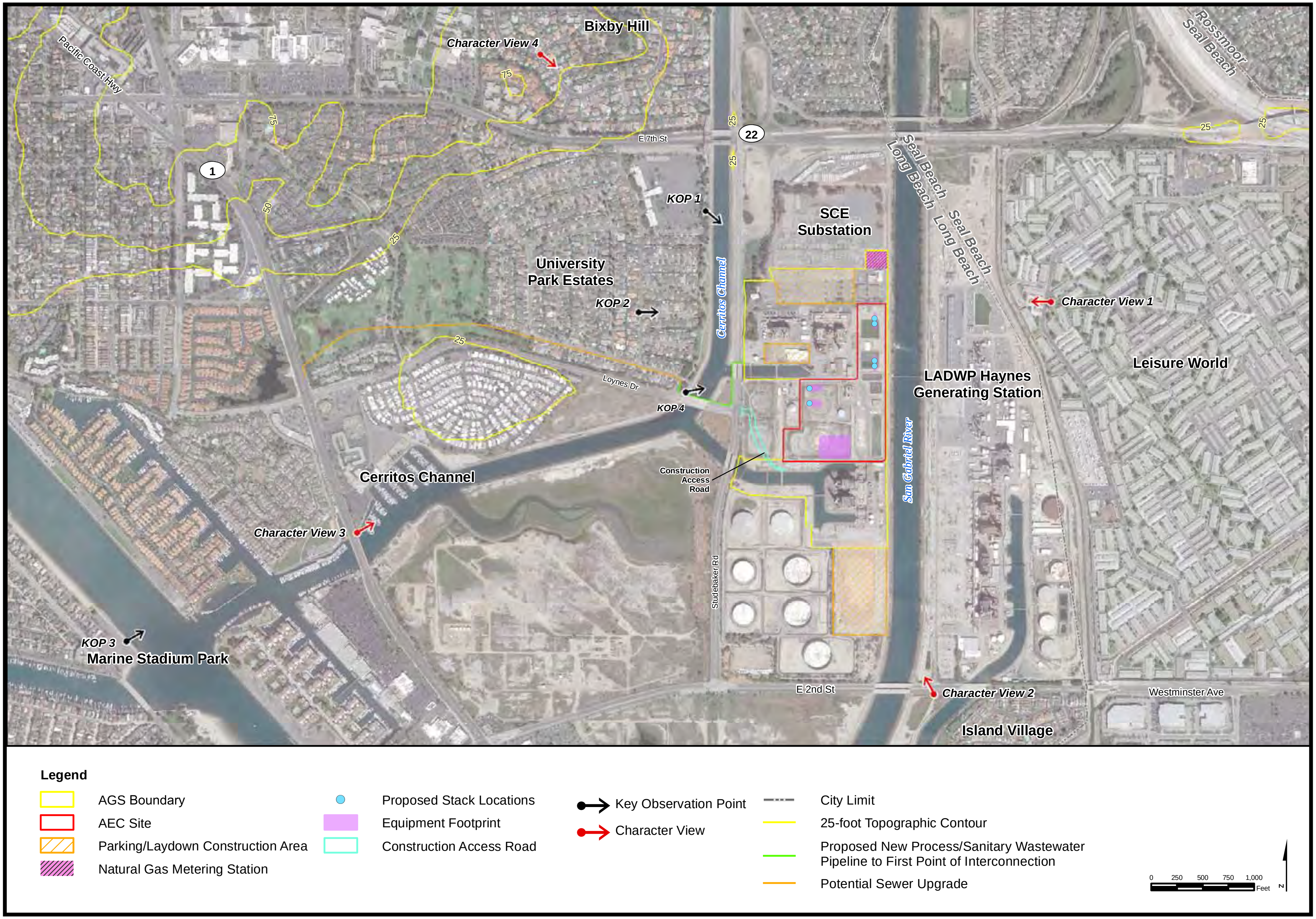
**City of Long Beach 1973** – *Conservation Element, City of Long Beach General Plan Program*. April 30, 1973.

**City of Long Beach 2016b** – City of Long Beach Comments on the Supplemental Application for Certification (TN# 211372). May 5, 2016.

**AES Southland Development, LLC 2014** – *Informal Staff Query 2 – Visual Resources*. (TN# 202416). June 3, 2014. Technical assistance provided by CH2M Hill.

## VISUAL RESOURCES - FIGURE 1

Alamitos Energy Center - Project Components, Key Observation Points and Character Views

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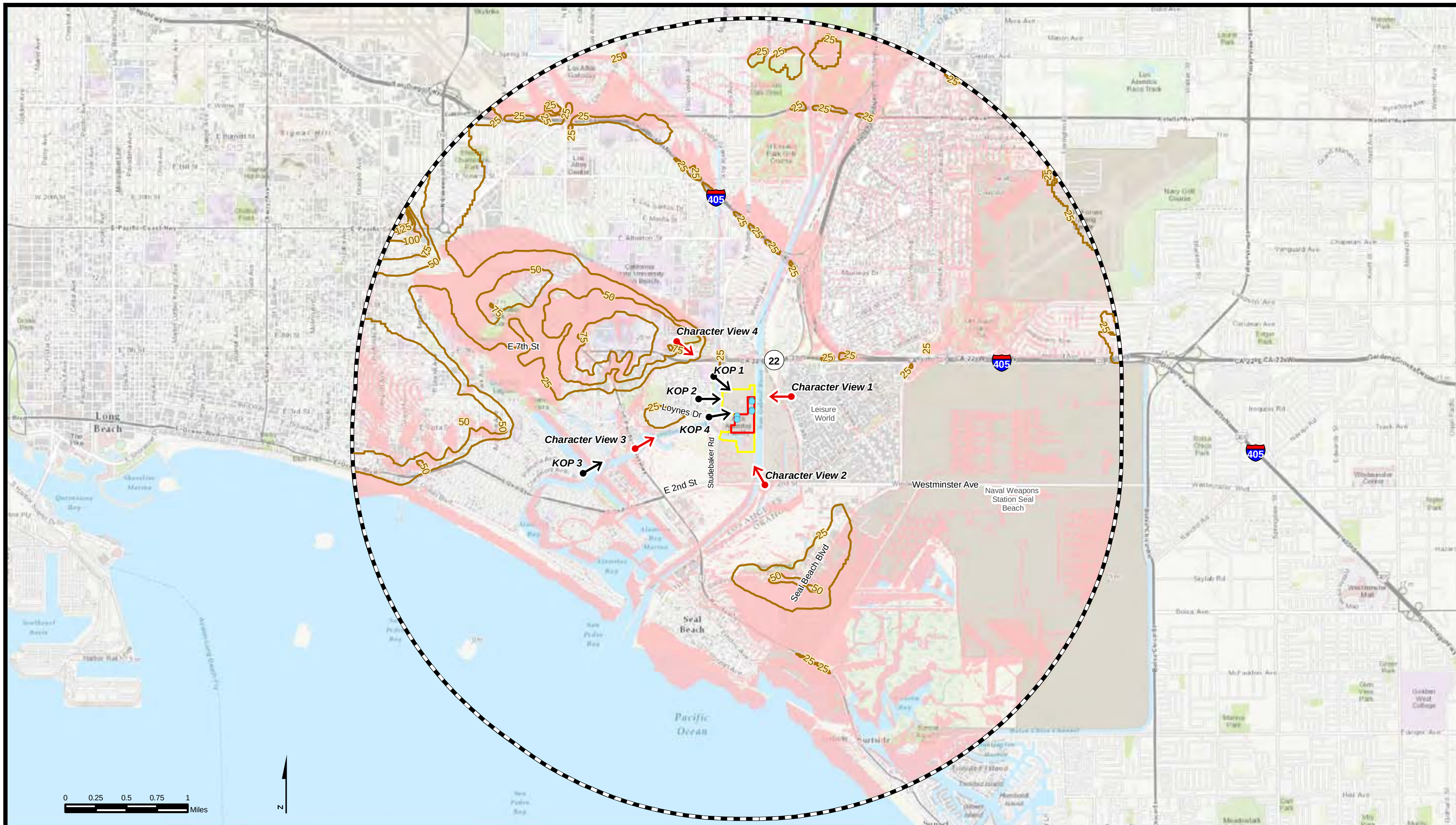
SOURCE: Supplemental AFC

**VISUAL RESOURCES - FIGURE 2**

Alamitos Energy Center - Project Viewshed, Key Observation Points and Character View Locations within 3 Miles of Project Site




**Legend**

- AGS Boundary
- AEC Site
- 25-foot Topographic Contour
- Potential Stack Locations
- Key Observation Point
- Character View
- 3- Mile Radius from Project Boundary

**Potential Stack Visibility**

- Areas within 3-mile radius from which the project will have the potential to be visible
- Areas within 3-mile radius from which the project will not be visible because the line of sight will be blocked by terrain

**Notes:**
Viewshed based on stack heights of 140 feet.
Elevation data from USGS 10 Meter DEM.

**Service Layer Credits:**
Esri World Topo Map

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SOURCE: Supplemental AFC

**VISUAL RESOURCES - FIGURE 3a and b**

Alamitos Energy Center - KOP-1 View from Channel View Park/Long Beach Bikeway Route 10

3a

KOP-1. Existing view toward the project site from Channel View Park and Long Beach Bikeway Route 10.

3b

KOP-1. Simulated view toward the project site after the addition of new AEC structures. New facilities will not be visible in this view.

# VISUAL RESOURCES - FIGURE 4a and b

Alamitos Energy Center - KOP-2 View from University Park Estates

4a

KOP-2. Existing view toward the project site from a street in University Park Estates, the residential area closest to the project site. A boiler and stacks that are part of the ALamitos Generating Station that surround the project are visible extending above the trees in the background of the view.

4b

KOP-2. Simulated view toward the project site after the addition of new AEC structures. After the addition of AEC structures, two stacks will be partially visible in the right portion of the view.

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SOURCE: Supplemental AFC

**VISUAL RESOURCES - FIGURE 5a and b**

Alamitos Energy Center - KOP-3 View from Marine Stadium Park

5a

KOP-3. Existing view toward the project site from Marine Stadium Park. The Alamitos Generating Station that surrounds the project site is visible in the left half of the view as the two power units with the large, scaffold-covered boilers as well as the tops of two white appearing stacks in the center-right of the view which are partially obscured behind commercial development. The stacks and generating units that extend along the horizon in the right half of the view are all part of the LADWP Haynes Generating Station.

5b

KOP-3. Simulated view toward the project site after the addition of new AEC structures. The AEC structures will be visible in the distance at the far end of the channel in the center of the view.

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SOURCE: Supplemental AFC

**VISUAL RESOURCES - FIGURE 6a and b**
Alamitos Energy Center - KOP-4 View from Loynes Drive

6a
KOP-4. Existing view toward the project site from Loynes Drive

6b
KOP-4. Simulated view toward the project site after the addition of new AEC structures.

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SOURCE: Supplemental AFC

# WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

## SUMMARY OF CONCLUSIONS

The Alamitos Energy Center (AEC) would be located on 21-acres within the existing AES Alamitos Generating Station (AGS) project site. The AGS site is a highly disturbed brownfield site that requires remediation. The applicant, current owner, or previous owner Southern California Edison (SCE), would ensure that impacted or contaminated areas on the AEC site are remediated where necessary. The applicant would also implement a Soil Management Plan to provide guidance for proper identification, handling, disposal and containment of contaminated soil during demolition, construction and ground-disturbing activities. The AEC project's proposed waste management methods and mitigation measures, along with the proposed conditions of certification and demolition waste recycling and diversion requirements would ensure that wastes generated by the proposed project would not result in a significant impact to local waste management and disposal facilities.

## INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with wastes generated from the proposed demolition of some existing structures and related components, and construction and operation of the AEC. It evaluates the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and non-hazardous wastes. The technical scope of this analysis encompasses solid wastes existing on site and those to be generated during demolition, facility construction, and operation. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may also be covered in the **Worker Safety and Fire Protection** and **Hazardous Materials Management** sections of this document.

The Energy Commission staff's (staff) objectives in conducting this waste management analysis are to ensure that:

- the management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- the disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities, or result in other waste-related significant adverse effects on the environment.
- upon project completion, the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the AEC with respect to management of waste.

**Waste Management Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
| --- | --- |
| **Federal** | |
| Title 42, United States Code, §§ 6901, et seq.<br>Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.) | The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation, and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions.<br>RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing:<br>• generator record keeping practices that identify quantities of hazardous wastes generated and their disposition;<br>• waste labeling practices and use of appropriate containers;<br>• use of a manifest when transporting wastes;<br>• submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and<br>• corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities.<br>RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills.<br>RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii. |
| Title 42, United States Code, §§ 9601, et seq.<br>Comprehensive Environmental Response, Compensation and Liability Act | The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses:<br>• reporting requirements for releases of hazardous substances;<br>• requirements for remedial action at closed or abandoned hazardous waste sites and brownfields;<br>• liability of persons responsible for releases of hazardous substances or waste; and<br>• requirements for property owners/potential buyers to conduct "all appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA "all appropriate inquiries" requirements. |

| Applicable LORS | Description |
|---|---|
| Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes | These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes.<br>• Part 246 addresses source separation for materials recovery guidelines.<br>• Part 257 addresses the criteria for classification of solid waste disposal facilities and practices.<br>• Part 258 addresses the criteria for municipal solid waste landfills.<br>• Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps).<br>U.S. EPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA. |
| Title 49, CFR, Parts 172 and 173<br>Hazardous Materials Regulations | U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20. |
| **State** | |
| California Health and Safety Code, Chapter 6.5, §§ 25100, et seq.<br>Hazardous Waste Control Act of 1972, as amended | This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements.<br>The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level. |
| Title 22, California Code of Regulations (CCR), Division 4.5<br>Environmental Health Standards for the Management of Hazardous Waste | These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters.<br>The standards addressed by Title 22, CFR include:<br>• Identification and Listing of Hazardous Waste (Chapter 11, §§ 66261.1, et seq.)<br>• Standards Applicable to Generators of Hazardous Waste (Chapter 12, §§ 66262.10, et seq.) |

<table>
<tr><th>Applicable LORS</th><th>Description</th></tr>
<tr><td></td><td><ul><li>Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§ 66263.10, et seq.)</li><li>Standards for Universal Waste Management (Chapter 23, §§ 66273.1, et seq.)</li><li>Standards for the Management of Used Oil (Chapter 29, §§ 66279.1, et seq.)</li><li>Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§ 67450.1, et seq.)</li></ul>The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.</td></tr>
<tr><td>California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9<br><br>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)</td><td>The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below:<ul><li>Aboveground Storage Tank Program</li><li>Business Plan Program</li><li>California Accidental Release Prevention (CalARP) Program</li><li>Hazardous Material Management Plan / Hazardous Material Inventory Statement Program</li><li>Hazardous Waste Generator / Tiered Permitting Program</li><li>Underground Storage Tank Program</li></ul>The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). Los Angeles County Department of Environmental Health is the area CUPA.<br><br>Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program. Other elements of the Unified Program may be addressed in the HAZARDOUS MATERIALS MANAGEMENT and/or WORKER HEALTH AND SAFETY analysis sections.</td></tr>
<tr><td>Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq.<br><br>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program</td><td>While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses.<ul><li>Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410).</li><li>Article 10 – Business Reporting to CUPAs (§§ 15600–15620).</li></ul></td></tr>
<tr><td>Public Resources Code, Division 30, §§ 40000, et seq.<br><br>California Integrated Waste Management Act of 1989.</td><td>The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements.</td></tr>
</table>

| Applicable LORS | Description |
|---|---|
| | The act was amended in 2011 (AB 341) to include a legislative declaration of a state policy goal that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020. The 2011 amendments expand recycling to businesses and apartment buildings; require the state to develop programs to recycle three-quarters of generated waste; and require commercial and public entities that generate more than four cubic yards of commercial solid waste per week, and multifamily residential dwellings of five units or more, to arrange for recycling services beginning July 1, 2012. |
| Title 14, CCR, Division 7, § 17200, et seq.<br>California Integrated Waste Management Board | These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions.<br>• Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal.<br>• Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste.<br>• Chapter 7 – Special Waste Standards.<br>• Chapter 8 – Used Oil Recycling Program.<br>• Chapter 8.2 – Electronic Waste Recovery and Recycling. |
| California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq.<br>Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14). | This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4-year cycle, with a summary progress report due to DTSC every 4th year. |
| Title 22, CCR, § 67100.1 et seq.<br>Hazardous Waste Source Reduction and Management Review. | These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act. |
| California Health and Safety Code Section 101480 101490 | These regulations authorize a local officer, such as the director of the Los Angeles County Department of Environmental Health to enter into voluntary agreements for the oversight of remedial action at sites contaminated by wastes. |
| Title 22, CCR, Chapter 32, §67383.1 – 67383.5 | This chapter establishes minimum standards for the management of all underground and aboveground tank systems that held hazardous waste or hazardous materials, and are to be disposed, reclaimed or closed in place. |
| Title 8, CCR §1529 and §5208 | These regulations require the proper removal of asbestos containing materials in all construction work and are enforced by California Occupational Safety and Health Administration (Cal-OSHA). |

| Applicable LORS | Description |
|---|---|
| Title 14, Chapter 9 Division 7 –(AB 939) | AB 939 established the organization, structure, and mission of California Integrated Waste Management Board (CIWMB) in 1989. AB 939 not only mandated local jurisdictions to meet numerical diversion goals of 25% by 1995 and 50% by 2000, but also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. Other elements included encouraging resource conservation and considering the effects of waste management operations. The diversion goals and program requirements are implemented through a disposal based reporting system by local jurisdictions under CIWMB regulatory oversight. Facility compliance requirements are implemented under a different approach primarily through local government enforcement agencies.<br><br>Cal Recycle, formerly known as the CIWMB, is the state's leading authority on recycling, waste reduction, and product reuse officially known as the Department of Resources Recycling and Recovery. |
| Cal OSHA's Lead in Construction Standard is contained in Title 8, Section 1532.1 of the California Code of Regulations | The regulations address all of the following areas: permissible exposure limits (PELs); exposure assessment; compliance methods; respiratory protection; protective clothing and equipment; housekeeping; medical surveillance; medical removal protection (MRP); employee information, training, and certification; signage; record keeping; monitoring; and agency notification. |
| Title 17, CCR, Division 1, Chapter 8, Section 35001 | Requirements for lead hazard evaluation and abatement activities, accreditation of training providers, and certification of individuals engaged in lead-based paint activities. |
| **Local** | |
| South Coast Air Quality Management District (SCAQMD) Rule 1403 | This rule establishes survey requirements, notification and work practice requirements to prevent asbestos emissions from emanating during renovation and demolition activities. SCAQMD Rule 1403 incorporates the requirements of the federal asbestos requirements found in National Emissions Standard for Hazardous Air Pollutants (NESHAP) in code of Federal Regulations (CFR) Title 40, Part 61, Subpart M. |
| City of Long Beach Integrated Waste Management Plan | The plan provides guidance for local management of solid waste and household hazardous waste (incorporates the county's Source Reduction and Recycling Elements, which detail means of reducing commercial and industrial sources of solid waste). |
| City of Long Beach Department of Health and Human Services, Environmental Health Bureau Hazardous Materials Programs | Long Beach Environmental Health Bureau and the City of Long Beach Fire Department are the Certified Unified Program Agency (CUPA) for Los Angeles County that regulates and conducts inspections of businesses that handle hazardous materials, hazardous wastes, and/or have underground storage tanks. Hazardous Material Division programs include assistance with oversight on property re-development (i.e., brownfields) and voluntary or private oversight cleanup assistance. |
| City of Long Beach Municipal Code Chapter 18.47 | The incorporation by reference in full in this chapter the 2013 Edition of the California Green Building Standards Code. The California Green Building Standards code is Part II of the California Code of Regulations, Title 24, also referred to as the California Building Standards Code. |
| City of Long Beach Municipal Code Chapter 18.97, Ordinance Number ORD-07-002 | City's rules for construction and demolition recycling program and waste management plan. Sixty percent of all material generated must be diverted and a Waste Management Plan submitted. |

| Applicable LORS | Description |
|---|---|
| South Coast Air Quality Management District Rule 1166 – Volatile Organic Compound (VOC) Emissions from Decontamination of Soil | This rule sets requirements to control the emission of VOCs from excavating, grading, handling, and treating VOC-contaminated soil as a result of leakage from storage or transfer operations, accidental spillage, or other deposition. |

# SETTING

## PROPOSED PROJECT

The AEC project site would be located within the 71-acre AGS footprint at 690 North Studebaker Road, in the City of Long Beach, Los Angeles County, California. The parcel includes the AGS electric generating station and a former aboveground storage tank farm. AGS is an existing operating electrical generating station formerly owned by the Southern California Edison Company (SCE). The project laydown area would include eight acres located throughout the AGS site and 10 acres located south of AGS Units 5 and 6 (AEC 2015f Page 5.14-2).

AGS is a highly disturbed industrial brownfield site. The site is located in an area surrounded by mixed commercial/industrial and residential use. The site is bordered to the north by the SCE switchyard, beyond which are State Highway 22 and Long Beach city residences; to the east by the San Gabriel River and the Los Angeles Department of Water and Power Haynes Generating Station; and to the south by a combination of undeveloped property and the Plains West Coast Terminals petroleum storage facility. Studebaker Road, a major north-south thoroughfare in the city of Long Beach bounds the site towards the west (AEC 2015f, page 5.6-3).

The AGS site consists of six generating units, underground fuel–oil pipelines, a portion of an aboveground storage tank farm, and wastewater retention basins. The generating units were commissioned in pairs starting with Units 1 and 2 constructed in 1956 and 1957. Units 3 and 4 were constructed in 1961 and 1962, and Units 5 and 6 were commissioned in 1964 and 1965. Unit 7 was a peaker unit located on the AGS property; the unit was decommissioned and partially demolished. The unit utilized fuel oil and natural gas for production of electricity until the late 1980s. AGS is currently operating the units using natural gas. AES has operated AGS since 1998 (AEC 2015f Page 5.14-2). Refer to **Waste Management Figure 1** for the layout of the AGS plant.

The AEC project would consist of two generation blocks, one combined-cycle power block and one simple-cycle power block. Refer to AEC **Project Description** for a complete overview of the project. Units 1 through 6 would continue to operate through the construction of AEC. The balance of Unit 7 remains on the AGS site would be removed. The remaining Unit 7 components and other on-site equipment that would be demolished include:

- certain buildings;

- foundations;
- underground water, fuel, and other lines;
- fuel tank;
- two existing retention basins; and
- a small maintenance shop (AEC page 1-3).

The demolition and construction of the AEC project would produce a variety of mixed wastes, such as soil, wood, metal, and concrete, etc. The demolition and the construction of the AEC would take approximately 56 months (AEC 2015f page 5.14-2). Hazardous waste generated would include asbestos debris, heavy metal dust, used oils, universal wastes, solvents, and empty hazardous waste material containers. Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper, and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

Operation and maintenance of the plant and associated facilities would generate a variety of wastes, including a small quantity of hazardous wastes. To control air emissions, the project's turbine units would use selective catalytic reduction and oxidation catalyst equipment and chemicals, which generate both solid and hazardous waste. Nonhazardous and hazardous waste would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill or Class I landfill.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This waste management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction and operation.

A. For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways where workers, the public, sensitive species, or the environment could be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment staff reviews the project's Phase I ESA and coordinates with other agencies as necessary to determine if additional site characterization work is needed. Information from the Phase I ESA and any additional site work is used to develop mitigation as required to ensure the protection of human health and the environment by preventing releases of hazardous substances and requiring adequate management of contaminated areas.

B. Regarding the management of project-related wastes generated during construction and operation of the proposed project, staff reviewed the applicant's proposed solid and hazardous waste management methods and determined if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

Staff then reviewed the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept. Staff used a waste volume threshold equal to 10 percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

### Existing Site Contamination

An environmental site assessment is a report prepared for a real estate holding that identifies potential or existing environmental contaminants or liabilities. Staff uses this report to identify whether there are any site conditions which may pose a hazard to the environment, construction workers or to the general public, and evaluate whether any mitigation should be required to ensure no significant impacts to any of these receptors. Three Phase I ESAs were completed, in 2012, 2013, and 2015, in support of the power development plans at the facility.

The July 2015 Phase I ESA for AEC was prepared for the 71-acre AGS project site (AEC 2015c, Appendix 5.14A). The ESA was completed in accordance with the American Society for Testing and Materials Standard Practice E 1527-13 for ESAs. Recognized Environmental Condition (REC) is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The RECs and Historical RECs for AGS are listed in **Waste Management Table 2**.

**Waste Management Table 2**
**Recognized Environmental Conditions**

| AREAS OF CONCERN | TYPE OF CONTAMINATION | REGULATING AGENCY |
|---|---|---|
| **North and Central Retention Ponds** | Nickel, Vanadium, Arsenic, PCBs | DTSC – by stipulated order (Envirostor 80001647) |
| **North fuel oil storage tank** | Fuel oil | Long Beach Fire Department or Los Angeles County Public Works Department |
| **Well AW-33** | Elevated levels of Nickel | Long Beach Fire Department |
| **Large AST** Peaker Unit 7 | Residual jet fuel | Long Beach Fire Department, Los Angeles County Public Works Department |
| **Aboveground & underground pipelines** | Fuel oil, PCB | Long Beach Fire Department |
| **Groundwater** | Metals, VOCs, 1,4-dioxane, PCE, TCE, and TCA | DTSC – thru corrective action |
| **Several spills** | Petroleum | DTSC – thru corrective action |

| AREAS OF CONCERN | TYPE OF CONTAMINATION | REGULATING AGENCY |
|---|---|---|
| **Concrete degreasing pits** | | DTSC – thru corrective action |
| **Near retention basin** | TCE, PCE | DTSC – thru corrective action |
| **Machine shop area** | Various chemicals | DTSC – thru corrective action |
| **Transformers** | PCB | DTSC |
| **Number of USTs** | Various | Long Beach Fire Department, Los Angeles County Public Works Department |
| **Contaminated Groundwater (adjacent to the property)** | Various | DTSC |
| **Site buildings were constructed prior to 1980.** | Asbestos | South Coast Air Quality Management District |
| **Site buildings were constructed prior to 1980.** | Lead | Cal OSHA |
| **Trash Dump around South Retention Basin** | Asbestos | DTSC, SCAQMD |
| **Area around Units 3 & 4** | Agricultural chemicals | DTSC |

Source: AEC 2015f pages 5.14-2 and 5.14-3

The demolition and construction activities on the project would come in contact with many of the RECs listed in **Waste Management Table 2**. Construction of AEC would require eight acres of lay down throughout the AGS parcel and 10 acres of laydown area adjacent to AGS Units 5 and 6. A portion of the AEC facility would occupy a portion of land where the decommissioned AGS Unit 7 was located (AECs 2015s Data Response 85). The AEC simple cycle Block 2 would be located on the northern portion of the AEC site next to the San Gabriel River (AEC 2015f page 2-3). Stormwater runoff from the power block areas would be directed to new oil/water separators and sumps and directed to the existing south retention basin and discharged to the Los Cerritos Channel via existing stormwater outfalls (AEC 2015f pages 2-5). Refer to **Waste Management Figure 2**.

Stormwater would be collected in the existing South retention basin. There are three wastewater retention basins (North, South, and Central) and a boiler chemical cleaning basin located along the eastern edge of AEC immediately adjacent to the San Gabriel River. Wastewater generated at the various station facilities is conveyed to these basins through a series of pipelines. The North and Central retention basins were installed in the 1960s. The South Basin was constructed in the mid-1960s. The Boiler Chemical Cleaning Basin (BCCB) was constructed in 1978. SCE implemented a Water Quality Monitoring Program in response to a Final Judgement pursuant to a Stipulation, handed down by the Superior Court of California, Los Angeles County, Number BC 121219 in February 1995. The stipulation alleged that SCE had stored hazardous wastes in non-permitted wastewater retention basins at their electrical generating stations in southern California. SCE agreed to close these basins according to Chapter 15 of Title 22, California Code of Regulations. The Alamitos Generating Station is one of the facilities cited in the agreement. The North, Central, South and Boiler Chemical Cleaning Basins are all covered by the stipulation.

The North Basin would require minor cleanup, the Central Basin would require cleanup, the Boiler Chemical Cleaning Basins do not appear to have any issues, and the South Basin would require additional cleanup. SCE believes that the southern third of the South Basin may be the site of a 1940/1950 dump (Johnsen 2016c). SCE is currently working with the Department of Toxic Substances Control on the closure of the AGS retention basins (Envirostor 80001647) (Randy 2014). The retention basins currently collect and store non-hazardous wastewater from the facility. SCE implemented a Water Quality Monitoring Program in response to a Final Judgment pursuant to a Stipulation. Most of the soil removal/cleanup procedures for the retention basin were approved by the Department of Toxic Substance Control.

The Long Beach Fire Department Bureau of Fire Prevention and the Long Beach Department of Health and Human Services form a Certified Unified Program Agency (CUPA). Among the responsibilities of the Long Beach CUPA is the regulatory oversight of the underground and aboveground storage tank programs. Information related to the removal, upgrade, repair, and monitoring of underground and aboveground storage tanks would be submitted to the CUPA for review. Prior to transportation of tanks off-site, an Industrial Hygienist or Marine Chemist would certify the tanks are inert and safe for travel. Additionally, when the tanks or piping are removed, ground soil samples shall be collected, the chain of custody documented witnessed and tested by the Industrial Hygienist or Marine Chemist with a report provided to the Long Beach Fire and Health Department.

Condition of Certification **WASTE-1**, would ensure the applicant provides relevant information to the CUPA, and where necessary, require completion of Phase II investigations to evaluate the extent of contamination and identify the necessary remedial actions. If a site is considered contaminated, a Phase II environmental site assessment may be conducted (ASTM test E1903), with a more detailed investigation involving chemical analysis for hazardous substances and/or petroleum hydrocarbons performed. The applicant would also be required to coordinate with the appropriate regulatory authority that would otherwise regulate the activity if not for the in-lieu authority of the Energy Commission. The condition would then require monitoring and reporting on the progress of remediation of the various areas of contamination located on the AEC site.

Condition of Certification **WASTE-1** would ensure the applicant adequately characterizes the site and completes remediation in accordance with applicable LORS. Condition of Certification **WASTE-1** also requires that any additional work must be conducted under the oversight of the Energy Commission compliance project manager (CPM), in consultation with the DTSC, and the Long Beach Fire Department.

Based on historic use of the AEC, property there is potential for subsurface impacts. The applicant would use the Soil Management Plan (SMP) to provide guidance for proper identification, handling, onsite management, and disposal of impacted soil that may be encountered during construction and ground-disturbing activities. The objective of the SMP is to describe the procedures that would be followed during the soil disturbances so workers can be protected from adverse reactions to any adverse soil conditions that may be encountered. Staff proposes Condition of Certification **WASTE-2** to ensure the applicant has procedures in place to properly handle and dispose of contaminated soil. The scope of the SMP would be limited to activities involving the excavation, characterization, management, reuse and/or disposal of soils at this site.

The SMP would include engineering controls, Health and Safety Plans, earthwork schedules and list of responsible staff. Staff is recommending Condition of Certification **WASTE-2** to provide protective measures as needed. These measures include soil removal, dust suppression techniques, workers wearing personal protective equipment for short durations, and a combination of all three measures. Specific methods for refined or enhanced airborne dust mitigation measures are also currently proposed in the **AIR QUALITY** section of this document so as to better control emissions of fugitive dust containing hazardous wastes (such as increased watering frequency, use of a chemical “fiber locking surfactant” or “wetting agent”, continuously covering stockpiled soils). The implementation of refined and enhanced dust suppression measures and using personal protective equipment can be implemented immediately upon the start of demolition.

Asbestos would be generated from the demolition of tanks, vessels and piping. Flaking or peeling lead-based paint could also be present in facilities to be demolished. The petitioner would comply with Title 17, CCR, Division 1, Chapter 8, Section 35001, to maintain a safe environment for workers. Additional analysis and requirements for LORS compliance related to lead abatement may be found in the **Worker Safety and Fire Protection** section of this FSA.

The site buildings were constructed prior to 1980; therefore, asbestos-containing building materials and lead based paint may be present on-site. Condition of Certification **WASTE-3** requires that the project owner submit the SCAQMD’s Asbestos Notification Form for review prior to removal and disposal of asbestos. One hundred and fifty tons of asbestos is expected to be generated from the demolition of AGS Unit 7 (page 5.14-17) All friable asbestos (Class I) collected during demolition activities would be disposed of as hazardous waste. Flaking or peeling lead-based paint could also be present in facilities to be demolished. The petitioner would comply with Title 17, CCR, Division 1, Chapter 8, Section 35001, to maintain a safe environment for workers. Additional analysis and requirements for LORS compliance related to lead abatement may be found in the **Worker Safety** section of this FSA.

Furthermore, staff proposes Conditions of Certification **WASTE-4** and **WASTE-5** be adopted to address any soil contamination contingency that may be encountered during project construction. **WASTE-4** would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil not previously identified is encountered. If contaminated soil is identified, **WASTE-5** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the CPM with findings and recommended actions. **WASTE-5** also addresses identification and investigation of any previously unidentified soil or groundwater contamination that may be encountered.

## Demolition and Construction Impacts and Mitigation

Site preparation, demolition, and construction of the proposed power plant and associated facilities would last approximately 56 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (AEC 2015f, § 5.14.1.2). Before demolition and construction can begin, the project owner would be required to develop and implement a Demolition and Construction Waste Management Plan, per proposed Condition of Certification **WASTE-6**.

### Nonhazardous Wastes

Nonhazardous waste would be generated from the demolition of AGS Unit 7 and the construction of AEC. Demolition and construction waste would consist of wood, glass, plastic, paper, scrap metals, concrete, and asphalt. All non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, section 17200 et seq. During construction, paper, wood, glass, plastics, and metal would be generated and recycled where practical. Quantities of nonhazardous waste are listed in **Waste Management Table 3**.

The California Department of Resources Recycling and Recovery (now CalRecycle, formerly California Integrated Waste Management Board (CIWMB)) is responsible for recycling, waste reduction, and product reuse programs in California. CalRecycle also promotes innovation in technology to encourage economic and environmental sustainability. The 2008 California Green Building Standards Code Requires all construction projects to develop a recycling plan to divert and/or recycle at least 50 percent of waste generated during construction, (CalGreen Building Standards Code Section 708 construction Waste Reduction, Disposal and Recycling).

The City of Long Beach has a Construction & Demolition Debris Recycling (C&D) Program, Long Beach Ordinance, ORD-07-0025, Chapter 18.97. The program is designed to encourage permit applicants to recycle all C&D materials by offering a refundable performance deposit. A waste management plan, a Performance Security Deposit, and an administrative review fee would accompany the building permit application. Applicants must demonstrate 60 percent demolition and construction project waste diversion. A final report detailing the amount of reuse, recycling, and disposal actually generated from the project would be required for the applicant to receive a Performance Security Deposit refund[2].

**Waste Management Table 3**
**Demolition & Construction Nonhazardous Waste**

| Waste Generated | Demolition | CCGT[1] Construction | SCGT[2] construction | Disposal Method |
|---|---|---|---|---|
| **Scrap wood, glass, plastic, paper, calcium silicate insulation, and mineral wool insulation** | 16,000 pounds per week | 10,000 pounds per month | 50 tons | Recycle and/or disposal in a Class II or III landfill |
| **Scrap Metals** | 2,500 tons | 1,500 pounds per month | 12 tons | Recycle and/or disposal in a Class II or III landfill |
| **Concrete** | 188 tons | 880 tons during construction | 34 tons | Recycle and/or disposal in a Class II or III landfill |
| **Asphalt** | 8 tons | | | Recycle and/or disposal in a Class II or III landfill |
| **Spent welding and cutting materials** | 100 pounds per month | 150 pounds per month | 2 tons | Recycle with vendors or dispose at a Class I landfill if hazardous |
| **Waste oil filters** | 200 pounds per month | 50 pounds per month | 60 pounds per month | Recycle at a permitted TSDF[3] |
| **Empty liquid material containers** | | 100 containers | 4 cubic yards | Containers <5 gallons would be disposed as normal refuse. Containers >5 gallons would be returned to vendors for recycling or reconditioning. |

Sources: AEC AFC Section 5.14.1.2, Tables 5.14-1, 5.14-2A and 5.14-2B.
[1]CCGT – combined cycle gas turbine.
[2]SCGT – simple cycle gas turbine
[3]TSDF – treatment, storage, and disposal facility

[2] http://www.lbds.info/planning/advance_planning/green_building/#cd

Adoption of Condition of Certification **WASTE-6** would facilitate proper management of project demolition and construction wastes since the City of Long Beach maintains a (C&D) program. Staff proposes Condition of Certification **WASTE-6** requiring the project owner to develop and implement a Construction Waste Management Plan and submit copies of C&D paperwork to the CPM. These conditions would require the applicant to identify type, volume, and waste disposal and recycling methods to be used during construction of the facility. Staff believes that compliance with proposed Conditions of Certification **WASTE-6** would assist the applicant's compliance with the CalGreen Building Code requirements.

Nonhazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression and stormwater drainage, and equipment wash and test water. Sanitary wastes would be collected in portable, self-contained chemical toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash and/or test water would be contained at designated areas, tested to determine if hazardous, and either discharged to the storm water retention basin (if nonhazardous) or transported to an appropriate treatment/disposal facility. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

### Hazardous Wastes

The AEC would produce hazardous waste during demolition and construction. It is anticipated that 150 tons of asbestos would be generated during demolition. The generation of hazardous wastes anticipated during construction includes empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and cleaning wastes. The amount of waste generated would be minor if handled in the manner identified in the **Waste Management Table 4** (AEC 2015f, § 5.14.1.2).

Wastes would be accumulated on site for less than 90 days and then properly manifested, transported, and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC section 5.14.1.2.2 and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-7** to notify the CPM whenever the owner becomes aware of any such action.

In the event that construction excavation, grading, or trenching activities for the proposed project encounter potentially contaminated soils and/or specific handling, disposal, and other precautions that may be necessary pursuant to hazardous waste management LORS, staff finds that proposed Conditions of Certification **WASTE-4** and **WASTE-5** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with LORS. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

**Waste Management Table 4**
**Demolition & Construction Hazardous Waste**

| Waste Generated | Demolition | CCGT Construction | SCGT construction | Disposal Method |
|---|---|---|---|---|
| **Used and waste lube oil** | 45 drums | 100 drums | 10,000 gallons | Recycle at a permitted TSDF |
| **Oily rags, oil sorbent excluding lube oil flushes** | 100 pounds per month | 50 pounds per month | 800 pounds per month | Recycle or dispose at a permitted TSDF |
| **Residual fuel oil from decommissioned storage tanks and piping** | 150 gallons | | | Recycle at a permitted TSDF |
| **Spent lead batteries** | 5 batteries per year | 5 batteries per year | 4 batteries per year | Store no more than 10 batteries (up to one year) then recycle offsite |
| **Spent alkaline batteries** | 10 batteries per month | 100 batteries per month | 60 batteries per month | Recycle or dispose offsite at an Universal Waste Destination Facility |
| **Asbestos waste** | Minimum 25 tons | | | Recycle with vendors or dispose at a Class I landfill if hazardous |
| **Waste oil** | 40 gallons per month | 50 gallons per month | 60 gallons per month | Dispose at a permitted TSDF |
| **Solvents, paints, adhesives** | | 125 pounds per month | 16 gallons per month | Recycle or dispose at a permitted TSDF |
| **Universal waste solids Fluorescent and mercury vapor lamps (Metals and PCBs)** | 100 pounds per year | 30 pounds per year | 70 pounds per year | Recycle or dispose offsite at an Universal Waste Destination Facility |

Source: AEC AFC Section 5.14.1.2, Tables 5.14-1, 5.14-2A and 2B.

## Operation Impacts and Mitigation

The proposed AEC would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-3A and 5.14-3B of the supplemental AFC provides a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed. Before operations can begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-8**.

### Non-Hazardous Solid Wastes

The generation of 35 tons per year of non-hazardous solid wastes is expected during project operation. Wastes would include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media), as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous wastes would be recycled to the extent possible, and non-recyclable wastes would be regularly transported off site to a local solid waste disposal facility (AEC 2015f, § 5.14.1.2.).

### Non-Hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation and are discussed in the **SOIL AND WATER RESOURCES** section of this document.

### Hazardous Wastes

The generation of hazardous wastes expected during routine project operation includes used hydraulic fluids, oils, greases, oily filters and rags, spent selective catalytic reduction catalysts, cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-9** requiring the project owner/operator to report, clean up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of the FSA.

The amount of hazardous wastes generated during the operation of AEC would be minor, with source reduction and recycling of wastes implemented whenever possible. Lubricating oil filters, and lubricating oil would be recycled with a certified recycler. Selective catalytic reduction catalyst units and carbon monoxide catalyst units would be recycled with the manufacturer (AEC 2015f, Table 5.14-3A and B). The hazardous wastes would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §§ 66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM whenever the owner becomes aware of any such action.

## Impact on Existing Waste Disposal Facilities

### Non-Hazardous Wastes

The AEC facility would generate nonhazardous solid waste that would add to the total waste generated in Los Angeles County, California. The proposed project would generate approximately 3,000 tons (4,290 cubic yards) of solid waste during demolition, and construction. Approximately 35 tons (50 cubic yards) per year of nonhazardous waste would be produced during operation (AEC 2015f, page 5.14-11). Nonhazardous waste that is not recycled would be disposed in a California Class III landfill.

CalRecycle is the state agency responsible for implementing the California Integrated Waste Management Act and is the state's leading authority on recycling, waste reduction, and product reuse. The county is required to submit an Integrated Waste Management Plan (IWMP) in accordance with state waste diversion mandates for jurisdictions (Chapter 764, Statutes of 1999). The Source Reduction and Recycling Element (SRRE), a Household Hazardous Waste Element (HHWE) and a Non-Disposal Facility Element (NDFE) are all elements that comprise the IWMP. For enforcement purposes, jurisdictions are evaluated on the effectiveness of their SRRE.

Once a California jurisdiction adopts an SRRE, it must implement the SRRE to the best of its ability. The jurisdiction can update the SRRE through CalRecycle’s electronic annual reporting system at any time as diversion programs need to be modified (e.g., a new program to address commercial waste and the expansion of educational programs.)

To help CalRecycle determine whether a jurisdiction is taking the appropriate steps to implement its SRRE, the jurisdiction submits an annual report to CalRecycle. The annual report includes the jurisdiction’s program information and per capita disposal information (Note: The per capita disposal data is derived from the statewide disposal reporting system). CalRecycle requires the county to report to the disposal reporting system all waste disposed in the county pursuant to Title 14, CCR, Sections 18800-18814.11. The disposal data is compiled for each jurisdiction to measure, whether the jurisdiction has met its 50 percent equivalent diversion requirement.

CalRecycle reviews each jurisdiction’s annual report information and conducts site visits to verify program implementation. Depending on the particular review cycle of the jurisdiction, CalRecycle staff review the jurisdiction's progress toward implementation of its SRRE, as well as its overall achievement of the 50 percent diversion requirement.

Los Angeles County is required to submit an annual report that is reviewed by CalRecycle at a minimum every four years to determine if it is meeting the 50 percent diversion requirement and implementing its programs. However, in response to State-mandated waste reduction goals and as part of the City's commitment to sustainable development, the City of Long Beach adopted an ordinance that requires certain demolition and/or construction projects to divert at least 60 percent of waste either through recycling, salvage or deconstruction. Condition of Certification **WASTE-6** would require the project owner to submit a construction waste management plan for approval by the CPM and for review by the city of Long Beach that demonstrates that they met the construction waste diversion requirements of 60 percent pursuant to the CalGreen Building Codes. Pursuant to recommended Condition of Certification **WASTE-8,** the applicant would also be required to submit to the CPM for approval an Operation Waste Management Plan (OWMP), discussing how the project would divert to the maximum extent feasible the recyclable materials that would be generated during construction and operation of the facility. The CPM and county would determine if the plan is diverting recyclables to the maximum extent feasible. If the OWMP is approved, as a condition prior to issuance of the project's building permit, the applicant would be required to divert all materials from the solid waste stream that could reasonably be diverted for alternate uses.

**Waste Management Table 5** presents details of two non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes that would be generated but could not be diverted by the AEC. Total solid waste disposal in Los Angeles County in 2015 was 5,036,552 tons[3]. The remaining capacity for the two Los Angeles County landfills listed in the AFC combined is approximately 45 million cubic yards. 50,000 tons or 104,000 cubic feet of metal would be recycled. The total amount of non-hazardous waste generated from project construction and operation after the material has been diverted to the maximum extent feasible would contribute less than one percent of the available landfill capacity. Staff concludes that disposal of the solid wastes generated by AEC could occur without significantly impacting the capacity or remaining life of any of these facilities.

### Hazardous Wastes

**Waste Management Table 5** displays information on Class III landfills in the vicinity of the project and Class I landfills available in California. The Kettleman Hills facility also accepts Class II and Class III wastes. Kettleman Hills and Buttonwillow landfills have a combined approximately 15 million cubic yards of remaining hazardous waste disposal capacity, with up to 31years of combined remaining operating lifetime (AEC 2015f, Section 5.14.2.3)

[3] http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/.

**Waste Management Table 5**
**Recycling/Disposal Facilities**

| Landfill | Location | Permitted Capacity | Remaining Capacity | Estimated Closure Date |
|---|---|---|---|---|
| | City | Cubic yards | Cubic yards | |
| **Class III -Nonhazardous** | | | | |
| Savage Canyon Landfill | Whittier, CA | 19.3* million | 9.5 million | 2055* |
| **Class I -Hazardous Waste** | | | | |
| Chemical Waste Management-Kettleman (Class I, II, III) | Kettleman, CA | 10.7 million | 6 million | 2044 |
| Clean Harbors Buttonwillow (Class I) | Kern, CA | 13.1 million | 9.2 million | 2040 |

Source: AEC 2015f Section 5.14.2.3

*http://www.calrecycle.ca.gov/SWFacilities/Directory/19-AA-0053/Detail/

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. Approximately 200 tons of hazardous waste would be generated from the AEC facility (AEC 2015f, page 5.14-16). The total amount of hazardous wastes generated by the AEC project would consume less than one percent of the 15 million cubic yards of remaining permitted capacity. Therefore, impacts from disposal of AEC generated hazardous wastes would have a less than significant impact on the remaining capacity at Class I landfills.

## CUMULATIVE IMPACTS AND MITIGATION

In general, cumulative impacts consist of impacts that are created as a result of the proposed project in combination with impacts from other closely related past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time (Cal. Code Regs., tit. 14, §15355.).

The **LAND USE** section **Cumulative Impacts Table** lists 55 projects that include transportation, energy, commercial and residential projects. The wastes generated by these projects and the proposed AEC would incrementally increase the volumes of waste requiring offsite management and disposal at local or regional landfills.

The projects vary in size and there is no data detailing the amount of waste that would be generated from the various projects, however, all residential, commercial and industrial projects would have to comply with Cal Recycle, Mandatory Commercial Recycling, Title 14, Division 7, Chapter 9.1.[4] and Title 24 (CALGreen). The implementation of these regulations would reduce solid waste disposal in the City of Long Beach and Los Angeles County. All of the projects listed would be required to recycle 60 percent of the waste generated from their project, thus minimizing the amount of waste generated from construction and demolition of new and current projects.

Staff has concluded that the AEC project's proposed waste management methods and mitigation measures (implementation of source reduction, waste minimization and recycling), along with staff's proposed conditions of certification , would ensure that wastes generated by the proposed project would not result in a significant cumulative impact to local waste management and disposal facilities. The implementation of these regulations would reduce solid waste disposal in Los Angeles County. In 2015, 4,885,628 tons of solid waste was landfilled in Los Angeles County. AEC's contribution would be significantly less than one percent of the county's waste generation.

## COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed AEC would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the AEC would be required to obtain a hazardous waste generator identification number from U.S. EPA. The AEC would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees in accordance with state and federal hazardous waste management requirements.

## RESPONSE TO PSA COMMENTS

**Applicant's comments:** *Page 4.13-19, Waste Management Table 5 –*

- *Waste Management Table 5 notes that the Savage Canyon Landfill has a permitted capacity of 15 million cubic yards. However, the SAFC notes that the permitted capacity is 19,337,450 million cubic yards, as of October 2015, based on CalRecycle Solid Waste Information System Database (CalRecycle, 2015). In addition, the estimated closure date listed in the PSA is 2048, while the SAFC notes a closure date of 2055. The remaining capacity is consistent. Please reconcile these discrepancies.*

[4] Regulatory requirements; Businesses and public entities that generate four or more cubic yards of solid waste per week, and multifamily residential dwellings that have five units or more, take action to reuse, recycle, compost or otherwise divert commercial solid waste from disposal.

- *The Puente Hills Landfill was not included in SAFC Table 5.14-4, Solid Waste Disposal Facilities in the Vicinity of the AEC. However, the Puente Hills Landfill is listed in Waste Management Table 5 as having available capacity. The Applicant did not include the Puente Hills Landfill in the SAFC because it is/was closing.[5] Please reconcile this discrepancy.*

**Staff response to Applicant:** The applicant has made comments on **Waste Management Table 5** concerning the statistics presented on the Savage Canyon Landfill and the Puente Hills Landfill. Staff updated the information on the Savage Canyon Landfill's permitted capacity and closure date, 19,337,450 million cubic yards, and 2055, respectively. The Puente Hills Landfill is closed and is deleted from **Waste Management Table 5**.

## CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1) After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that demolition, construction, and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and nonrecyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90,180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at, a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **9**. These conditions would require the project owner to do all of the following:

   - Once the AEC project owner identifies which areas of contamination would be remediated, staff proposes conditions that ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1**, **2**, **3**, **4** and **5**).

   - Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes would be managed, recycled, and/or disposed of after generation (**WASTE-6** and **8**).

[5] Website: http://www.calrecycle.ca.gov/SWFacilities/Directory/19-AA-0053/Detail/

- Report any waste management-related LORS enforcement actions and how violations would be corrected (**WASTE-7**).
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-9)**.

2) Existing conditions at the AEC project site do include areas where prior site uses and/or demolition activities may have resulted in releases of hazardous substances or soil contamination. To ensure that the project site is investigated and remediated as necessary and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-1**, **2**, **3**, **4**, **5**, **7** and **9**. These conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned-up, and remediated as necessary. Therefore, staff concludes that construction and operation of the proposed AEC project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

3) Regarding impacts of project wastes on existing waste disposal facilities, staff uses a waste volume threshold equal to ten (10) percent of a disposal facility's remaining capacity to determine if the impact from disposal of project wastes at a particular facility would be significant. The existing available capacity for the two Class III landfills that may be used to manage nonhazardous project wastes exceeds 44.5 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of AEC would contribute less than 0.1 percent of the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

   In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of AEC have a combined remaining capacity in excess of 15 million cubic yards. The total amount of hazardous wastes generated by the AEC project would contribute less than one percent of the remaining permitted capacity. Therefore, impacts from disposal of AEC generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff concludes that management of the waste generated during demolition, construction and operation of the AEC project would not result in any significant adverse impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the AEC project AFC and staff's proposed conditions of certification are implemented.

## PROPOSED CONDITIONS OF CERTIFICATION

**WASTE-1** The project owner shall ensure that the project site is properly characterized and remediated as necessary pursuant to the corrective action plans reviewed by Department of Toxic Substances Control (DTSC) and the Long Beach Fire Department (LBFD). In no event shall project construction commence in areas requiring characterization and remediation until the CPM determines, that all necessary remediation has been accomplished.

Prior to and during grading and construction, discovery of additional soil contamination not previously identified or already included in corrective action plans, work plans, or closure plans, must be reported to the CPM, DTSC, and the LBFD immediately.

**Verification:** At least 45 days prior to remediation the project owner shall submit to the CPM for approval copies of remediation documentation, such as, but not limited to, soil sample results, work plans, and agreements regarding the corrective action plan requirements and activities at the project site. Pertinent correspondence such as, but not limited to, soil sample results, work plans, agreements, and authorizations involving LBFD, and/or (if applicable) the DTSC, regarding the corrective action plan requirements and activities at the project site will be provided to the CPM within 10 days of receipt.

At least 15 days prior to the start of site mobilization, the project owner shall provide to the CPM written notice from the appropriate regulatory agency that the project site has been investigated and remediated as necessary in accordance with the corrective action plan.

If soil contamination not previously identified or already included in corrective action plans, work plans or closure plans is encountered prior to or during grading, the project owner shall notify the CPM and DTSC, revise the approved work plan and submit it for concurrent CPM, LBFD, and DTSC review within 30 days after contamination is identified. Comments received within 30 days from all parties will be incorporated and provided to the CPM for approval.

**WASTE-2** The project owner shall prepare and submit to the CPM a Soils Management Plan (SMP) prior to any earthwork. The SMP must be prepared by a California-Registered Geologist or a California-Registered Civil Engineer with sufficient experience in hazardous waste management. The SMP shall be updated as needed to reflect changes in laws, regulations or site conditions. An SMP summary report, which includes all analytical data and other findings, must be submitted once the earthwork has been completed. Topics covered by the SMP shall include, but not be limited to:

- Land use history, including description and locations of known contamination.
- The nature and extent of previous investigations and remediation at the site.

- The nature and extent of unremediated areas at the Alamitos Generating Station.
- A listing and description of institutional controls, such as the county's excavation ordinance and other local, state, and federal regulations and laws that would apply to Alamitos Power Plant.
- Names and positions of individuals involved with soils management and their specific role.
- An earthwork schedule.
- Requirements for site-specific Health and Safety Plans (HSPs) to be prepared by all contractors at Alamitos Power Plant. The HSP should be prepared by a Certified Industrial Hygienist and would protect onsite workers by including engineering controls, personal protective equipment, monitoring, and security to prevent unauthorized entry and to reduce construction related hazards. The HSP should address the possibility of encountering subsurface hazards including hazardous waste contamination and include procedures to protect workers and the public.
- Hazardous waste determination and disposal procedures for known and previously unidentified contamination.
- Requirements for site specific techniques at the site to minimize dust, manage stockpiles, run-on and run-off controls, waste disposal procedures, etc.
- Copies of relevant permits or closures from regulatory agencies.

**Verification:** At least 45 days prior to any earthwork, the project owner shall submit the SMP to the CPM for review and approval. All earthwork at the site shall be based on the SMP. A SMP summary shall be submitted to CPM within 25 days of completion of any earthwork.

**WASTE-3** Prior to demolition of existing structures the project owner shall complete and submit a SCAQMD Asbestos Demolition Notification Form to the CPM and the SCAQMD. Once submitted the project owner shall remove all asbestos-containing material (ACM) from the site prior to demolition.

**Verification:** No less than sixty (60) days prior to commencement of structure demolition, the project owner shall provide the Asbestos Demolition Notification Form and any update notifications to the CPM and to the SCAQMD. The project owner shall inform the CPM via the monthly compliance report, of the data when all ACM is removed from the site.

**WASTE-4** The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available for consultation during site characterization (if needed), demolition, excavation, and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

**Verification:** At least 30 days prior to the start of site mobilization, the project owner shall submit the resume of the professional engineer or professional geologist to the CPM for review and approval.

**WASTE-5** If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by instruments, or other signs, the professional engineer or professional geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of DTSC, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the professional engineer or professional geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the professional engineer or professional geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the DTSC and the LBFD for guidance and possible oversight.

**Verification:** The project owner shall submit any final reports filed by the professional engineer or professional geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

**WASTE-6** The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- a description of all construction waste streams, including projections of frequency, amounts generated, and hazard classifications;
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste-testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.
- a method for collecting weigh tickets or other methods for verifying the volume of transported and or location of waste disposal; and,
- a method for reporting to demonstrate project compliance with construction waste diversion requirements of 60 percent pursuant to the CalGreen Code and Construction and city of Long Beach Construction & Demolition Debris Program.

**Verification:** The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

The project owner shall also document in each monthly compliance report (MCR) the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Construction Waste Management Plan; and update the Construction Waste Management Plan, as necessary, to address current waste generation and management practices.

**WASTE-7** Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

**Verification:** The project owner shall notify the CPM in writing within 24 hours of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

**WASTE-8** The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- a detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping, and best management practices to be employed, treatment methods and companies providing treatment services, waste-testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- information and summary records of conversations with the local Certified Unified Program Agency and the DTSC regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;
- a detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- a detailed description of how facility wastes will be managed and disposed upon closure of the facility.

**Verification:** The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

**WASTE-9** The project owner shall ensure that all spills or releases of hazardous substances, materials, or waste are reported, cleaned up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

**Verification:** The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project property or related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

## REFERENCES


**Applicant**

**AEC 2013a**– Alamitos Energy Center (TN 201620-1 to -72) Application for Certification Volume 1 & 2, dated December 27, 2013. Submitted to CEC/Docket Unit on December 27, 2013.

**AEC 2014a** – Alamitos Energy Center (TN 201751) Data Adequacy Supplement dated February 17, 2014. Submitted to CEC/Docket Unit on February 17, 2014

**AEC 2014b** – Alamitos Energy Center (TN 202381) Data Response Set 1A dated May 27, 2014. Su1bmitted to CEC/Dockets Unit on May 27, 2014.

**AEC 2015c**- Alamitos Suppl. AFC Appendices 5.10 to 5.15A (TN 206427-4). Docket on October 26, 2015. CEC/Docket Unit on October 26, 2015.

**AEC 2015f**- Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015i**- Alamitos Energy Center Supplemental AFC (TN 206428-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**AEC 2015s**- Alamitos Data Response Set 6 (TN 207013) dated December 14, 2015. Submitted on CEC/Docket on December 14, 2015.

**CH2MHill**

**CH2 2014b** – CH2M Hill (TN 201751) Data Adequacy Supplement dated February 17, 2014. Submitted to CEC/Dockets Unit on February 18, 2014

**CH2 2014c** – CH2M Hill (TN 201940) Alamitos Energy Center Data Response dated March 31, 2014. Submitted to CEC/Dockets Unit on April 1, 2014

**CH2 2014f** – CH2MHill/Cindy Salazar (TN 202867). Data Responses Set 2 (Responses to Data Requests 64-68), dated August 1, 2014. Submitted to CEC/Docket Unit on August 1, 2014

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# WORKER SAFETY AND FIRE PROTECTION

Testimony of Brett Fooks, PE and Geoff Lesh, PE

## SUMMARY OF CONCLUSIONS

Staff concludes that with the implementation of conditions of certification **WORKER SAFETY- 1** through **8** there would be adequate levels of worker safety, fire protection, and compliance with the applicable laws, ordinances, regulations, and standards (LORS). Staff recommends the project owner provide a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program to set forth the procedures to ensure worker safety and fire protection at the Alamitos Energy Center (AEC).

Staff confirmed that the Long Beach Fire Department (LBFD) will have the continued ability to provide emergency response for fires, hazmat spills, rescue and routine code inspections with the construction and operation of the AEC.

## INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protective measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Final Staff Assessment (FSA) is to assess the worker safety and fire protection measures proposed by the AEC and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

## LAWS, ORDINANCES, REGULATION, AND STANDARDS

**Worker Safety and Fire Protection Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **Federal** | |
| Title 29 U.S. Code (USC) section 651 et seq (Occupational Safety and Health Act of 1970) | This act mandates safety requirements in the workplace with the purpose of “[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources” (29 USC § 651). |

| Applicable LORS | Description |
|---|---|
| Title 29 Code of Federal Regulation (CFR) sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations) | These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. |
| 29 CFR sections 1952.170 to 1952.175 | These sections provide federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 29 CFR sections 1910.1 to 1910.1500. |
| **State** | |
| Title 8, California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations) | These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling. |
| Title 24, Cal Code Regs., section 3, et seq. | This section incorporates the current edition of the International Building Code. |
| Health and Safety Code section 25500, et seq. | This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility. |
| Health and Safety Code sections 25500 to 25541 | These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility. |
| **Local (or locally enforced)** | |
| City of Long Beach Municipal Code Title 18, Chapter 18.48: Fire Code | The City of Long Beach Fire Department currently enforces the 2013 version of the California Fire Code. |
| National Fire Protection Association (NFPA) 850 | This industry standard of the National Fire Protection Association (NFPA) addresses fire protection at electrical generating stations. |
| NFPA 56 (adopted 2012) | NFPA 56 is the Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems. |

## SETTING

The proposed facility would be located in the City of Long Beach within an industrial area that is currently located within the service area of the Long Beach Fire Department (LBFD). There are a total of 23 fire stations within the City of Long Beach. The closest station to the AEC site is Station #22 of the LBFD located at 6340 Atherton Street, approximately 1.5 miles away. The total response time from the moment a call is made to the point of arrival at the site would be approximately 3-5 minutes. The next closest station is Station #14, located at 5200 Eliot Avenue, about 2 miles away, which would respond in approximately 5 minutes.

The first responders to a hazardous materials incident would be from Station #22 of the LBFD. If needed, a full hazardous material response would be provided by the LBFD Hazardous Materials Response Team (LBFD-HMRT) located at LBFD Station #19, located at 3559 Clark Avenue, approximately 5.0 miles away. The LBFD-HMRT is capable of handling any hazardous materials-related incident at the proposed facility and would have a response time of around 10 minutes. The LBFD could also call upon mutual aid agreements with the Los Angeles County Fire Department and the Orange County Fire Authority.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site in 2015 concluded that the areas beneath existing structures may have environmental conditions that would require remediation and that this should be assessed during the time these structures are removed (AEC 2015i, Section 5.14.1.1). To address the possibility that soil contamination would be encountered during construction of AEC, proposed Conditions of Certification **WASTE-3** and **WASTE-4** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. If any contaminated soil were identified, then the proper personal protective equipment (PPE) would be provided as needed. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in **WORKER SAFETY AND FIRE PROTECTION:**

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Availability of and potential impacts on fire prevention/protection, emergency medical response, and hazardous materials spill response services during demolition, construction, and operations of the facility.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS were followed, workers would be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA requirements.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on the local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

## Worker Safety

Industrial environments are potentially dangerous during demolition, construction, and operation of facilities. Workers at the proposed AEC would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, being struck by objects, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, electrical sparks and electrocution. It is important for the project owner to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

### Construction Safety and Health Program

Workers at the AEC would be exposed to hazards typical of demolition, construction, and operation of a natural gas-fired electric power generating facility. One set of worker safety policies and procedures would be followed during construction.

Construction Safety Orders are published at Title 8, California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 1509)
- Construction Fire Prevention Plan (Cal Code Regs., tit. 8, § 1920)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 1514 — 1522)
- Construction Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 to 544) would include:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Hazard Communication Program
- Heat and Cold Stress Monitoring and Control Program
- Pressure Vessel and Pipeline Safety Program
- Hazardous Waste Program
- Hot Work Safety Program
- Permit-Required Confined Space Entry Program
- Lockout/Tagout Energy Control Program

The Application for Certification (AFC) includes adequate outlines of the above programs (AEC 2015i, Section 5.16.3.3). Prior to the start of construction of AEC, detailed programs and plans would be provided to the California Energy Commission compliance project manager (CPM) and to the LBFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

**Operations and Maintenance Safety and Health Program**

Prior to the start of operations at AEC, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 3203)

- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221)
- Fire Protection System Impairment Program (2015 NFPA 850 Section 17.4.2 & Chapter 9 California Fire Code (CFC) Section 901.7, 901.7.1-901.7.6)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401 to 3411)
- Emergency Action Plan (Cal Code Regs., tit. 8, § 3220)

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 to 544) would be applicable to the project. The written safety programs developed by the project owner for AEC would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (AEC 2015i, Section 5.16.3.3). Prior to operation of AEC, all detailed programs and plans would be provided to the CPM and LBFD pursuant to Condition of Certification **WORKER SAFETY-2**.

### Safety and Health Program Elements

The applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would comprise seven more specific programs and would require major items detailed in the following paragraphs.

#### *Injury and Illness Prevention Program*

The Injury and Illness Prevention Program (IIPP) would include the following components:

- Identifies the person(s) with authority and responsibility for implementing the program;
- provides a system for ensuring that employees utilize safe and healthy work practices;
- provides a system for facilitating employer-employee communications regarding safety;
- provides procedures for identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- establishes methods for correcting unhealthy/unsafe conditions in a timely manner; and
- provides an employee training program.

### *Fire Prevention Plan*

California Code of Regulations requires an Operations Fire Prevention Plan (Cal Code Regs., tit. 8, § 3221). The plan would accomplish the following:

- determine general program requirements;
- determine fire hazard inventory, including ignition sources and mitigation;
- develop good housekeeping practices and proper materials storage;
- establish employee alarm and/or communication system(s);
- provide portable fire extinguishers at appropriate site locations;
- locate fixed fire-fighting equipment in suitable areas;
- specify fire control requirements and procedures;
- establish proper flammable and combustible liquid storage facilities;
- identify the location and use of flammable and combustible liquids;
- provide proper dispensing and determine disposal requirements for flammable liquids;
- establish and determine training and instruction requirements and programs; and
- identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the LBFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

### *Fire Protection System Impairment Program*

NFPA 850 and the California Fire Code lay out a prescriptive method that the project owner must follow when the facility's installed fire protection system is impaired. The plan would accomplish the following:

- supervise the safe shutdown of fire protection systems;
- provide notifications to the proper authorities and representatives;
- control potential fire hazards during the impairments through the use of fire watches and/or evacuation of the area effected;
- outline a repair strategy and timeline to get the fire protection system operational; and
- restore the fire protection system to service as soon as possible.

The Fire Protection System Impairment Program would ensure that the project owner follows the prescriptive measures laid out in NFPA 850 and the CFC. Therefore, staff proposes that the applicant submit a final Fire Protection System Impairment Program to the CPM for review and approval and to the LBFD for review and comment to satisfy the proposed Condition of Certification **WORKER SAFETY-2**.

### *Personal Protective Equipment Program*

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (Cal Code Regs., tit. 8, §§ 3380 to 3400). The AEC operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations; and
- when and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

### *Emergency Action Plan*

California regulations require an Emergency Action Plan (Cal Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (AEC 2015i, Section 5.16.3.3).

The outline lists the plans to accomplish the following:

- establish emergency escape procedures and emergency escape route for the facility;
- determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specify rescue and medical duties for assigned employees;
- identify fire and emergency reporting procedures to regulatory agencies;
- develop alarm and communication system for the facility;
- establish a list of personnel to contact for information on the plan contents;
- provide emergency response procedures for ammonia release; and
- determine and establish training and instruction requirements and programs.

Given the current planning scenarios that show the project site could be inundated by a tsunami (see the **GEOLOGY AND PALEONTOLOGY** section of this staff assessment for more details), staff is concerned there may be a threat of impact to worker safety from potential site inundation resulting from tsunamis. Staff concludes that the project owner should be required to prepare and implement a Tsunami Hazard Mitigation Plan (THMP) as set forth in Condition of Certification **GEO-2** (in the **Geology and Paleontology** section). Staff recommends that the THMP would be included in the site Emergency Action Plan.

#### ***Written Safety Program***

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "**Construction Safety and Health Program**" in this **Worker Safety and Fire Protection** section.

#### ***Safety Training Programs***

Employees would be trained in the safe work practices described in the above-referenced safety programs.

### Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by NIOSH:

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. This standard practice has reduced and/or eliminated hazards evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between, and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the project owner to designate and provide a site Construction Safety Supervisor.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;

- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hot work;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility, but too close to the perimeter fence; and
- lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Delegate Chief Building Official (DCBO) and CPM, will provide additional safety expertise and worksite awareness to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

## Fire Hazards

During construction and operation of the proposed AEC, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and applicant's response to staff's data requests to determine if LBFD's available fire protection services and equipment would be adequate to protect workers, and to determine the project's impact on fire protection services in the area. The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the LBFD (AEC 2015i, Sections 2.1.15 & 5.16.3.4).

### Construction

During construction, portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained, and safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Program (AEC 2015i, Section 5.16.3.3). In addition, the AEC proposed site is within the boundary of the existing Alamitos Generating Station, which has an existing hydrant system that could provide extra protection during construction.

### Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2013 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements. However, staff would like to clarify the enforceability of fire protection best practices document NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.

The applicant stated in the AFC that AEC would be built to the NFPA 850 standard and staff concurs with this assessment. For power plants permitted by the California Energy Commission, the Delegate Chief Building Official (DCBO) is instructed through the Energy Commission's Delegate Chief Building Official manual to apply NFPA 850 during the construction process of the project. This measure has ensured that past projects have been built to the NFPA standard. However, staff believes that because NFPA 850 is written as a set of "recommended" practices rather than "required" ones, the potential for confusion exists about whether conformance to NFPA 850 is indeed required. Staff therefore proposes Condition of Certification **WORKER SAFETY-7** which would require the project's compliance with NFPA 850, giving NFPA 850 the effectiveness and clear enforceability of a building code in its application to AEC. In any situations where both NFPA 850 and other state or local LORS have application, the more restrictive shall apply. This proposed condition of certification would clarify for all stakeholders the responsibilities of the project owner as they relate to NFPA 850.

Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire protection water system would comprise of the existing fire loop and the extension to cover the new AEC structures. Any new fire hydrants connected to the new loop would be installed per NFPA requirements. The fire water would be supplied from two sources. The primary source would be supplied from the existing Long Beach Water Department (LBWD) pipeline interconnection that enters the site along Studebaker Road. The secondary source would be supplied from a new 600,000 gallon onsite fire/service water tank. Two new electric pumps would be installed to serve the AEC (CEC 2016j). Each fire pump would be connected to an independent electrical supply, with one to be used as the main fire pump, and the other for backup purposes. There would be a transition period where the two existing fire pumps at AGS would serve extended fire loop until the new AEC pumps are installed, tested, and functional. (AEC2015i, Section 2.1.15).

Fixed water fire suppression systems would be installed in areas of risk including the combustion turbine areas and turbine lube-oil systems. A carbon dioxide or dry chemical fire protection system would be provided for the combustion turbine generators and accessory equipment compartments (AEC 2015i, Section 2.4.3.1).

The fire protection system would have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals (AEC 2015i, Section 2.4.3.1). These systems are standard requirements of NFPA and the California Fire Code, and staff has determined that they will ensure adequate fire protection.

The AFC failed to identify a secondary emergency access point to the facility. Staff consulted with LBFD who requested that a secondary emergency access be provided to allow for fire department vehicles and personnel to access the site should the main gate be blocked for any reason.

In response to staff's questions about the emergency access, the project owner showed staff the location of the existing emergency secondary access. The existing emergency secondary access does not currently meet local ordinances for an emergency access road. The project owner stated that the emergency road would be widened and upgraded during construction of the AEC to meet local fire code requirements (CEC 2016J). Therefore, in order to ensure the adequate emergency access to the site by the fire department, staff proposes Condition of Certification **WORKER SAFETY-6** that would require the project owner to identify, provide, and maintain for the lifetime of the project, a secondary access to the site that meets the requirements of the Long Beach Municipal Code for emergency response vehicles.

**Natural Gas Compressor Enclosure Fire Protection Systems**

The proposed natural gas compressors for the AEC CCGT and SCGT would be enclosed to mitigate for noise.  The two natural gas enclosures would be located at the east of the facility (AEC 2015i, Figure 2.1.2). There exists the potential for explosion if leakage of natural gas were to occur inside the enclosures. The accumulation of natural gas in the enclosure can create a flammable and, because of confinement in a building, potentially explosive mixture of fuel and air.

The potentially applicable codes with regard to appropriate fire protection measures for compressor enclosures within power plants can be found in NFPA 850. Instead of treating the enclosure as an occupied building with an occupancy class requiring a water deluge system – a method that is ineffective to prevent conditions that potentially can lead to a fire fueled by a gas that is leaking outside of the enclosure, i.e. flare type fire - NFPA 850 treats the enclosure as an industrial enclosure. Yet, NFPA 850 does not identify specific fire/explosion suppression requirements. Staff believes NFPA 850 provides the proper designation because a gas compressor industrial enclosure would be neither normally occupied nor near occupied buildings, but NFPA 850 does not adequately address fire and explosion protection measures. Staff has therefore proposed **WORKER SAFETY-8** to address this oversight if the enclosed-building design option were chosen by the project owner. This proposed Condition of Certification would treat the compressor enclosure as an industrial enclosure and would require compliance with 40 CFR 192 Sections 163 through 173 and sections 731 through 736 which describe fire protection measures. Although 40 CFR 192 is normally applied to compressor enclosures along a natural gas transmission pipeline as a part of U.S. Department of Transportation requirements, staff determines that this is also the most appropriate safety code provision for gas compressor buildings on power plant sites.

These requirements mandate a system of continuous measurement of natural gas levels in the enclosure with a mechanism for automatic ventilation if the concentrations of natural gas approach a small fraction of the combustible limit. 40 CFR 192 requirements also mandate the ability to shut off the supply of natural gas from the transmission pipeline through double block and bleed valves and vent internal gas piping to a safe outside location in the event of a release of fuel large enough to create a hazard. This requirement provides a means of controlling a release of fuel that exceeds the capability of the forced draft protections to control for combustible conditions. Staff believes that this approach provides the most effective fire and explosion mitigation and provides the most effective protection of both workers and the public if the enclosing building option were chosen instead of an open air enclosure.

### Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Staff proposes Condition of Certification **WORKER SAFETY-5,** which would require that this portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

## CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the AEC combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the LBFD and found that there was no significant potential for cumulative impacts to occur.

Based upon staff's experience with power plants around the state, staff concludes that while it is *possible* that during a major earthquake (or other major event) response to the power plant could impact on the LBFD, the *likelihood* of that happening is less than significant. Therefore, this project would not have a significant incremental or cumulative impact on the department's ability to respond to a fire or other emergency and no mitigation is required.

The LBFD has stated that its ability to respond to emergency calls will not be affected by the construction and operation of the AEC. Therefore, staff agrees with the applicant that mitigation is not required.

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of AEC would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

## RESPONSE TO PSA COMMENTS

**Comment:** *The applicant suggested eliminating* ***WORKER SAFETY-****8 because the 49 Code of Federal Regulations (CFR) Part 192, Sections 163 through 173, only apply to compressor enclosures along a natural gas pipeline (CH2 2016y)".*

> **Staff Response:** Staff agrees that 49 C.F.R. Part 192 typically applies to compressor enclosures along natural gas pipelines but in this case the compressor enclosures planned for the AEC are similar to those found along pipelines. As noted in the discussion above, NFPA 850 does not identify specific fire/explosion suppression requirements. To fill this gap and ensure adequate facility safety, staff has not eliminated **WORKER SAFETY-8** because this condition mandates the minimum requirements to mitigate the potential explosion hazard that could be created by a leak within the natural gas compressors enclosure. Staff believes that utilizing 49 C.F.R. Part 192 is a sound approach that provides the most effective fire and explosion mitigation for a compressor building and provides the most effective protection of both workers and the public. Staff also finds that utilizing an existing set of safety standards from federal law is preferred to developing new requirements.

**Comment:** *A public comment was received concerning the safety of the battery storage project currently being licensed through the City of Long Beach (Public 2016c).*

**Staff Response:** The battery storage project is not part of the proposed AEC and therefore the environmental and safety analysis of the battery storage project is not within the scope of this Final Staff Assessment. The City of Long Beach is the appropriate jurisdiction to perform any environmental and safety review under CEQA. Staff anticipates that the battery storage project would be designed and constructed to comply with all applicable LORS including those applying to public safety.

**Comment:** *The Plains West Coast Terminal listed out several items that the company requests AES to do before its property can be used for AEC construction purposes (Public 2016d). Such requests include: Cost responsibility of any pipeline relocations, access by Plains West Coast to pipelines for maintenance, facility security during construction, laydown area agreement and reimbursement agreement for engineering review.*

**Staff Response:** Under CEQA and the Commission's certified regulatory program, staff performs an environmental and LORS analysis of the proposed project. The comments and requests listed in Plains West Coast Terminal letter are not related to significant environmental issues but relate to the potential need for a third party contract between the applicant and Plains West Coast Terminal. Staff does not generally make any recommendations in its environmental analysis on the merits of private third party contracts related to project development or site management and such agreements are not included in any conditions of certification.

## CONCLUSIONS

Staff concludes that if the applicant for the proposed AEC provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfills the requirements of Condition of Certification **WORKER SAFETY-3** through **-8**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant would not present a significant impact on the local fire department.

## PROPOSED CONDITIONS OF CERTIFICATION

**WORKER SAFETY-1** The project owner shall submit to the compliance project manager (CPM) a copy of the Project Construction Health and Safety Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Long Beach Fire Department for review and comment prior to submittal to the CPM for approval.

**Verification:** At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction and Safety and Health Program. The project owner shall provide to the CPM a copy of a letter from the Long Beach Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan have been addressed.

**WORKER SAFETY-2** The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (Cal Code Regs., tit. 8, § 3221);
- Fire Protection System Impairment Program; and
- Personal Protective Equipment Program (Cal Code Regs, tit.8, §§ 3401—3411).

The Operation Injury and Illness Prevention Plan, Hazardous Materials Management Program, Emergency Action Plan, Fire Prevention Plan, Fire Protection System Impairment Program, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan, Fire Protection System Impairment Program, and the Emergency Action Plan shall also be submitted to the Long Beach Fire Department for review and comment.

**Verification:** At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy to the CPM of a letter from the Long Beach Fire Department stating the fire department's timely comments have been addressed on the Operations Fire Prevention Plan, Fire Protection System Impairment Program, and Emergency Action Plan.

**WORKER SAFETY-3** The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification **WORKER SAFETY-1** and **-2** are implemented.

**Verification:** At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction/Demolition Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The project owner shall ensure that the CSS submits in the Monthly Compliance Report a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health including near misses;
- report any visits from Cal/OSHA and/or any complaints from workers to Cal/OSHA; and
- report of accidents, near misses, and injuries that occurred during the month.

**WORKER SAFETY-4** The project owner shall make payments to the Delegate Chief Building Official (DCBO) for the services of a Safety Monitor, who shall be an independent third party, based upon a reasonable fee scheduled to be negotiated between the project owner and the DCBO. Those services shall be in addition to other work performed by the DCBO. The Safety Monitor shall be selected by the DCBO and approved by the CPM. The Safety Monitor will report directly to the DCBO and CPM and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

**<u>Verification:</u>** At least 60 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

**WORKER SAFETY-5** The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

**<u>Verification:</u>** At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM a copy of the AED training and maintenance program for review and approval. At the start of construction, the project owner shall submit a list of signatures of all the people who have been trained in the use of the portable AED to the CPM. In addition, the project owner shall proof that a portable AED is available on site.

**WORKER SAFETY-6** The project owner shall prepare and submit to the CPM for review and approval, an Emergency Access Plan that shows a secondary emergency access to the AEC site where the specifications of the roadway will comply with the Long Beach Municipal Code and the 2013 (or latest edition) California Fire Code. A secondary access must be maintained to the standards listed above for the life of the project.

**<u>Verification</u>:** At least 60 days prior to the start of construction, or within a time frame approved by the CPM, the project owner shall submit the Emergency Access Plan showing the secondary emergency access to the Long Beach Fire Department for review and timely comment, and to the CPM for review and approval.

**WORKER SAFETY-7** The project owner shall adhere to all applicable provisions of the latest version of NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations as the minimum level of fire protection. The project owner shall interpret and adhere to all applicable NFPA 850 recommended provisions and actions stating “should” as “shall.” In any situations where both NFPA 850 and the state or local LORS have application, the more restrictive shall apply. All fire protection system specifications and drawings shall be submitted to the CPM for review and approval.

**Verification:** The project owner shall ensure that the project adheres to all applicable provisions of NFPA 850. At least 60 days prior to the start of construction of the fire protection system, the project owner shall provide all fire protection system specifications and drawings to the Long Beach Fire Department for review and comment, to the CPM for review and approval, and to the DCBO for plan check and construction inspection.

**WORKER SAFETY-8** The project owner shall ensure that the natural gas compressor buildings at the Alamitos Energy Center shall comply with NFPA requirements for compressor enclosures and that it shall also comply with the requirements set forth in 40 CFR 192 Sections 163 through 173 and sections 731 through 736 regarding fire and explosion protection systems. All documentation of plans for the compressor enclosure shall be submitted to the CPM for review and approval.

**Verification:** At least 60 days prior to the start of construction of the natural gas compressor building the project owner shall submit to the LBFD for review and comment, and to the CPM for review and approval, documentation of plans for the compressor enclosure at the Alamitos Energy Center demonstrating compliance with the condition described above.

## REFERENCES


**AEC 2015i** - Alamitos Energy Center Supplemental AFC (TN 206428-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**CEC 2016j** - California Energy Commission. Report of Conversation: Alamitos Siting-related Visit for Hazardous Materials/Worker Safety (TN212030). Docketed on 06/30/2016.

**CH2 2016y**- Initial Comments on Preliminary Staff Assessment ( TN 212487) dated July 27, 2016. Submitted to CEC/Dockets on July 27, 2016

**Public 2016c** – Ivan Roson (TN 212722). Comment Re: Safety Assessment and Noise Study. Submitted to CEC/Docket Unit on August 8, 2016.

**Public 2016d** – PLAINS West Coast Terminals LLC, Ngiabi Gicuhi (TN 212754). Letter to Michael D. Lewis, CEC with Comments Re: AEC, dated August 12, 2016. Submitted to Michael D. Lewis, CEC/CEC/Docket Unit on August 12, 2016

# Engineering Assessment

# FACILITY DESIGN

Testimony of Shahab Khoshmashrab

## SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) concludes that the design, construction, and eventual closure of the project and its linear facilities would comply with applicable engineering laws, ordinances, regulations and standards (LORS). The proposed conditions of certification, below, would ensure compliance with these LORS.

## INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Alamitos Energy Center (AEC). The purpose of this analysis is to:

- Verify that the LORS that apply to the engineering design and construction of the project have been identified;
- Verify that the project's proposed design criteria and analysis methods have been identified and provide assurance that the project will be designed and constructed in accordance with all applicable engineering LORS;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in **Facility Design Appendix A** below. Key LORS are listed in **Facility Design Table 1** below:

**Facility Design Table 1**
**Key Engineering Laws, Ordinances, Regulations and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **Federal** | Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards |
| **State** | 2013 (or the latest edition in effect) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations) |
| **Local** | City of Long Beach building and engineering regulations and ordinances |
| **General** | American National Standards Institute (ANSI)<br>American Society of Mechanical Engineers (ASME)<br>American Welding Society (AWS)<br>American Society for Testing and Materials (ASTM) |

The Facility Design conditions of certification require the project to comply with the California Building Standards Code and city of Long Beach building and engineering regulations and ordinances to ensure that the project would be built to applicable engineering codes and ensure public health and safety.

For the project to be built in a manner that would ensure public health and safety and operational integrity of project equipment, the LORS listed above in **Facility Design Table 1** under the "**General**" heading, must also be met by the project. The LORS listed under this heading are only some of the key engineering LORS applicable to the project; for a complete list of engineering LORS, please see **Facility Design Appendix A** below. These LORS are consistent with those that are applicable to power plants.

## SETTING

AEC would be built on the existing site of the Alamitos Generating Station, an existing power plant in Long Beach. For more information on the site and its related project description, please see the **PROJECT DESCRIPTION** section of this document.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes, ensure public health and safety, and verify that applicable engineering LORS have been identified. This analysis also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring program that will verify compliance with these LORS.

## SITE PREPARATION AND DEVELOPMENT

The applicant proposes the use of accepted industry standards, design practices, and construction methods in preparing and developing the site. Staff concludes that this project would comply with all applicable site preparation LORS. To ensure compliance, staff proposes the conditions of certification listed below and in the **Geology and Paleontology** section of this document.

## MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS.

AEC will be designed and constructed to the 2013 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2013 CBSC takes effect, the 2013 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

Note that analysis and proposed conditions of certification for all transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the **Transmission System Engineering** section of this document.

## PROJECT QUALITY PROCEDURES

The applicant describes a quality program intended to ensure that the project's systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards, as described in the Supplemental Application for Certification, or SAFC (SAFC 2015a, §§ 2.1, 2.2, 2.3, 2.4, 2.5, 2.5.7.2, 2.6, Appendix 2C). Compliance with project design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that AEC is actually designed, procured, fabricated, and installed as described in this analysis.

## COMPLIANCE MONITORING

Under CBC, Division II, Section 104, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 103 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates may include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC or a fee schedule agreed upon by the applicant and the CBO, pays the cost of these reviews and inspections.

Engineering and compliance staff will invite a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure protection of public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (Conditions of Certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction subject to CBO review and approval be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

## FACILITY CLOSURE

Facility closure is defined in the **Compliance Conditions and Compliance Monitoring Plan** section of this document as a facility shutdown with no intent to restart operation.

In order to ensure that facility closure would be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the project owner must submit a closure plan to the Energy Commission for review and approval prior to the commencement of closing the facility, as required in Condition of Certification **COM-15** (Facility Closure Planning) in **Compliance Conditions and Compliance Monitoring Plan**.

Though future conditions that could affect facility closure are largely unknown at this time, the requirements in **Compliance Conditions and Compliance Monitoring Plan** are adequate protection, even in the unlikely event that the project is abandoned.

## RESPONSES TO PSA COMMENTS

Staff received no comments from the public, interveners, agencies, or the applicant in the area of Facility Design.

## CONCLUSIONS AND RECOMMENDATIONS

1. The engineering LORS identified in **FACILITY DESIGN APPENDIX A** apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the SAFC, and concludes that the design, construction, and eventual closure of the project will comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that AEC is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect facility closure are largely unknown at this time, it can reasonably be concluded that if the project owner submits a facility closure plan in accordance with **COM-15** as provided in the **Compliance Conditions and Compliance Monitoring Plan** portion of this document prior to facility closure, facility closure procedures will comply with all applicable engineering LORS.

Staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS.

2. The project be designed and built to the 2013 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for the CBO review).

3. The CBO review the final designs, checks plans, and performs field inspections during construction. Staff audit and monitor the CBO to ensure satisfactory performance.

## CONDITIONS OF CERTIFICATION

**GEN-1** The project owner shall design, construct, and inspect the project in accordance with the applicable edition of the California Building Standards Code (CBSC)[1], also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving (onsite), demolition, repair, or maintenance of the completed facility.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2013 CBSC is in effect, the 2013 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

**Verification:** Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

[1] The applicable edition of the CBCS is currently the 2013 edition, but if the successor edition of this code (i.e., the 2016) is in effect when initial project engineering designs are submitted for the CBO's review, the successor edition becomes the applicable edition.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

**GEN-2** Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawings and master specifications list. The master drawings and master specifications list shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures, systems, and equipment. Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. The schedule shall contain the date of each submittal to the CBO. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

**Verification:** At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, and the master drawings and master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures, systems, and equipment defined above in Condition of Certification **GEN-2**. Major structures and equipment shall be added to or deleted from the list only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

**GEN-3** The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the applicable edition of the CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

**Verification:** The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

**GEN-4** Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO’s approval of the new engineer.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO’s approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-5** Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California).

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the applicable edition of the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the applicable edition of the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

   1. Be directly responsible for the design of the proposed structures and equipment supports;

   2. Provide consultation to the RE during design and construction of the project;

   3. Monitor construction progress to ensure compliance with engineering LORS;

   4. Evaluate and recommend necessary changes in design; and

   5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

   1. Be responsible for the electrical design of the project; and

   2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-6** Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the applicable edition of the CBC.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

**Verification:** At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

**GEN-7** If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

**Verification:** The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

**GEN-8** The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

**Verification:** Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0 or newer version) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

**CIVIL-1** The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. A construction storm water pollution prevention plan (SWPPP);
4. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
5. Soils, geotechnical, or foundation investigations reports required by the applicable edition of the CBC.

**Verification:** At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

**CIVIL-2** The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

**Verification:** The project owner shall notify the CPM within 24 hours when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

**CIVIL-3** The project owner shall perform inspections in accordance with the applicable edition of the CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

**Verification:** Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

**CIVIL-4** After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

**Verification:** Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

**STRUC-1** Prior to the start of any increment of construction, the project owner shall submit plans, calculations and other supporting documentation to the CBO for design review and acceptance for all project structures and equipment identified in the CBO-approved master drawing and master specifications list. The design plans and calculations shall include the lateral force procedures and details as well as vertical calculations.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component. The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

**Verification:** At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

**STRUC-2** The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the applicable edition of the CBC.

**Verification:** If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**STRUC-3** The project owner shall submit to the CBO design changes to the final plans required by the applicable edition of the CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

**Verification:** On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

**STRUC-4** Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the applicable edition of the CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

**Verification:** At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

**MECH-1** The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in the CBO-approved master drawing and master specifications list. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- NACE R.P. 0169-83;
- NACE R.P. 0187-87;
- NFPA 56;
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- City of Long Beach codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

**<u>Verification:</u>** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**MECH-2** For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

**<u>Verification:</u>** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

**MECH-3** The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

**ELEC-1** Prior to the start of any increment of electrical construction for all electrical equipment and systems 110 Volts or higher (see a representative list, below) the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS.

A. Final plant design plans shall include:

1. one-line diagram for the 13.8 kV, 4.16 kV and 110/480 V systems;
2. system grounding drawings;
3. lightning protection system; and
4. hazard area classification plan.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 110/480 V systems;
6. system grounding requirements;

7. lighting energy calculations; and

8. 110 volt system design calculations and submittals showing feeder sizing, transformer and panel load confirmation, fixture schedules and layout plans.

C. The following activities shall be reported to the CPM in the monthly compliance report:

   1. Receipt or delay of major electrical equipment;

   2. Testing or energizing of major electrical equipment; and

   3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

## REFERENCES

**AEC 2015f** - Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

# FACILITY DESIGN APPENDIX A

## ENGINEERING LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

This appendix lists the LORS that would be used in the engineering design and construction of the Redondo Beach Energy Project (RBEP).

1. **Civil Engineering LORS:**

   American Association of State Highway and Transportation Officials (AASHTO) —Standards and Specifications

   American Concrete Institute (ACI) − Standards and Recommended Practices

   American Institute of Steel Construction (AISC) − Standards and Specifications

   American National Standards Institute (ANSI) − Standards

   American Society of Testing and Materials (ASTM) − Standards, Specifications, and Recommended Practices

   American Water Works Association (AWWA) − Standards and Specifications

   American Welding Society (AWS) − Codes and Standards

   Asphalt Institute (AI) − Asphalt Handbook

   State of California Department of Transportation (CALTRANS) Standard Specification

   California Energy Commission (CEC) − Recommended Seismic Design Criteria for Non-Nuclear Generating Facilities in California, 1989

   Concrete Reinforcing Steel Institute (CRSI) − Standards

   Factory Mutual (FM) − Standards

   National Fire Protection Association (NFPA) − Standards

   California Building Code (CBC)

   Steel Structures Painting Council (SSPC) − Standards and Specifications

   American Society of Civil Engineers (ASCE) – Standards and Recommended Practices

   United States Geological Survey (USGS)

2. **Structural Engineering LORS:**

American Concrete Institute (ACI)

American Society of Civil Engineers (ASCE)

American Society of Mechanical Engineers (ASME)

American Welding Society (AWS)

Code of Federal Regulations, Title 29—Labor, Chapter XVII, Occupational Safety and Health Administration (OSHA)

National Association of Architectural Metal Manufacturers (NAAMM)—Metal Bar Grating Manual

Hoist Manufacturers Institute (HMI), Standard Specifications for Electric Wire Rope Hoists (HMI 100)

IEEE 980 – Guide for Containment and Control of Oil Spills in Substations

National Electric Safety Code (NESC), C2-2007

National Fire Protection Association (NFPA Standards)

OSHA Williams-Steiger Occupational Safety and Health Act of 1970

Steel Deck Institute (SDI)—Design Manual for Floor Decks and Roof Decks

3. **Mechanical Engineering LORS:**

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code

ASME/ANSI B31.1 Power Piping Code

ASME Performance Test Codes

ASME Standard TDP-1

American National Standards Institute (ANSI) B16.5, B16.34, and B133.8

American Boiler Manufacturers Association (ABMA)

American Gear Manufacturers Association (AGMA)

Air Moving and Conditioning Association (AMCA)

American Society for Testing and Materials (ASTM)

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)

American Welding Society (AWS)

Cooling Tower Institute (CTI)

Heat Exchange Institute (HEI)

Manufacturing Standardization Society (MSS) of the Valve and Fitting Industry

National Fire Protection Association (NFPA)

Hydraulic Institute Standards (HIS)

Tubular Exchanger Manufacturer's Association (TEMA)

4. **Electrical Engineering LORS:**

American National Standards Institute (ANSI)

American Society for Testing and Materials (ASTM)

Anti-Friction Bearing Manufacturers Association (AFBMA)

California Building Standards Code

California Electrical Code

Insulated Cable Engineers Association (ICEA)

Institute of Electrical and Electronics Engineers (IEEE)

Illuminating Engineering Society (IES)

National Association of Corrosion Engineers (NACE)

National Electrical Code (NEC)

National Electrical Manufacturers Association (NEMA)

National Electrical Safety Code (NESC)

National Fire Protection Association (NFPA)

Underwriters Laboratories, Inc. (UL)

5. **Long Beach LORS:**

City of Long Beach building and engineering regulations and ordinances

# GEOLOGY AND PALEONTOLOGY

Testimony of Garry Maurath, PhD, PG, CHg

## SUMMARY OF CONCLUSIONS

The proposed Alamitos Energy Center (AEC) site is located in a geologically active area along the right bank of the San Gabriel River in coastal Southern California. The site could be subject to very strong levels of earthquake-related ground shaking and the effects of this shaking on structures must be mitigated. In addition to strong seismic shaking, the project may be subject to soil failure caused by liquefaction and/or dynamic compaction. A design-level geotechnical investigation is required for the project by the California Building Code 2013 (CBC 2013), and proposed Conditions of Certification **GEO-1** and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, would present standard engineering design requirements for mitigation of strong seismic shaking, liquefaction and potential excessive settlement due to dynamic compaction.

While not likely to occur during the project design life, the site is subject to inundation by tsunami. Sea level rise could exacerbate the potential for inundation. Staff recommends **GEO-1,** which would require the applicant to consider potential impacts from tsunami inundation on facility design. **GEO-2** would require the applicant to develop a tsunami hazard mitigation plan for preparedness and evacuation methods that would ensure public health and safety.

Petroleum is the only economic geologic resource in the project vicinity. The project site lies within the Seal Beach oil field (DOGGR, 1990). It is likely that oil reserves exist below the project site. With depths to main production zones in adjacent areas between 4600 feet and 5000 feet below ground surface (DOGGR 1990) these resources could be accessed by off-site directional drilling, and would not be impacted by the AEC.

Fossils have not been found in close proximity to the project site. Potential impacts to paleontological resources due to construction activities are not likely. However, if discovered during construction they would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed Conditions of Certification **PAL-1** through **PAL-8**.

Based on this information, Energy Commission staff concludes that the potential adverse cumulative impacts to project facilities from geologic hazards during its design life are less than significant. Similarly, staff concludes the potential adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, if any, are less than significant. It is staff’s opinion that the proposed AEC can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety.

## INTRODUCTION

This Final Staff Assessment (FSA) presents a discussion and analysis by California Energy Commission (Energy Commission) staff about potential impacts of geologic hazards on the proposed AEC facility as well as the AEC's potential impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to identify resources that could be significantly adversely affected, evaluate the potential of the project construction and operation to significantly impact the resources and provide mitigation measures, as necessary, to ensure there would be no significant adverse impacts to geological and paleontological resources during project construction, operation, and closure and to ensure that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed Conditions of Certification - *i.e.*, monitoring and mitigation measures that, if implemented, would reduce project impacts from geologic hazards and project impacts to geologic, mineralogic, and paleontologic resources, to insignificant levels.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS are listed in the Application for Certification (AFC) (AEC 2013). The following table briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

**Geology and Paleontology Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable LORS | Description |
|---|---|
| **Federal** | The site is not located on Federal Land and there are no federal regulations directly applicable to the geological or paleontological conditions at the project site |
| **State** | |
| California Building Code (2013) | The California Building Code (CBC 2013) includes a series of standards that are used in project investigation, design, and construction (including seismicity, grading and erosion control). The CBC has adopted provisions in the International Building Code (IBC 2012). |
| Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630 | Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. |
| Seismic Hazards Mapping Act, PRC section 2690–2699 | Maps identify areas (zones) that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches. Requires a geotechnical report be prepared that defines and delineates any seismic hazard prior to approval of a project located in a seismic hazard zone. |
| **Local** | |
| City of Long Beach Public Safety Element, 1975 | The City of Long Beach addresses public safety and welfare in the City through implementation of its General Plan. General Plan policies specific to geologic, soil, and seismic hazards are listed in the Public Safety Element. |
| City of Long Beach Public Seismic Safety Element, 1988 | Provides an in-depth analysis of seismic factors to assist with the reduction of loss of life, injuries, damage to property, and social and economic impacts resulting from future earthquakes. |

| Applicable LORS | Description |
|---|---|
| Long Beach Building Standards Code as a part of the Long Beach Municipal Code, ORD – 13 – 0024, 2013 | Establishes the minimum requirements to safeguard the public health, safety and general welfare, provides minimum provisions considered necessary for safety, efficiency, adequacy and the practical safeguarding of persons and of buildings, structures and their contents from hazards. |
| **Standards** | |
| Society for Vertebrate Paleontology (SVP), 2010 | The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources developed by the SVP, a national organization of professional scientists. The measures were adopted in October 1995, and revised in 2010 following adoption of the Paleontological Resources Preservation Act (PRPA) of 2009. |
| Bureau of Land Management (BLM) Instructional Memorandum 2008-2009 | Provides up-to-date methodologies for assessing paleontological sensitivity and management guidelines for paleontological resources on lands managed by the Bureau of Land Management. While not required on non-BLM lands, the methodologies are useful for all paleontological studies, regardless of land ownership. |

# SETTING

## REGIONAL SETTING

Formation of the western coast of North America began in late Triassic time during inception of the Mid-Atlantic rise (DeCourten 2008). This motion caused the continental North American crustal plate to migrate westward. As the North American plate migrated westward, the eastern edge of the Farallon plate was overridden and subducted beneath the advancing North American plate (Atwater 1998). This crustal subduction continued into the Miocene (Yerkes 1965). As the Farallon plate disappeared into the subduction zone, the East Pacific Rise reached the western edge of the continent and the northern end of the Peninsular Ranges became deformed (Yerkes, 1965). The project site is located in the northwestern portion of the Peninsular Ranges geomorphic province. (**Geology and Paleontology - Figure 1**) This deformation caused the Channel Islands-San Nicolas Island crustal block and the Santa Monica Mountains crustal block to move west from the Peninsular Ranges, leaving behind a rift that became the Los Angeles basin (Yerkes 1965). Subsequently, late Cenozoic age marine sediments filled the Los Angeles Basin. These sediments overlie diversely oriented Mesozoic basement rocks.

In early Miocene, plate motion slowly shifted from subduction along the western margin of the North American continent to translation along transform faults. As the area was subjected to right-lateral shear in late Miocene and early Pliocene time pre-existing faults in Mesozoic age basement rocks, which were formed during the earlier subduction period, propagated upward into Cenozoic age marine sediments creating the current transform fault systems. The orientation of these "new" transform fault systems was controlled by the orientation of the older faults. (Yerkes 1965).

Structurally, the Los Angeles Basin is a northwest-trending syncline composed of Cretaceous to Recent marine and non-marine deposits underlain by a basement complex of Jurassic through Cretaceous meta-sediments and granitic rocks (Yerkes 1965). The structural deformation of the Los Angeles Basin has allowed the accumulation of over 15,000 feet of stratified Miocene marine sediments (WCC 1988). During the late stages of sediment deposition in the LA Basin, additional deformation created four uplifted zones and synclinal depressions that are bound by faults. These regional faults break the LA Basin into four structural zones identified as the Northwestern, Northeastern, Central and Southern Blocks (Norris, 1990). The project site lies near the boundary of the Southwest Block and Central Block which is defined by the Newport-Inglewood fault zone.

Tectonic uplift during the past 300,000 years has created a raised linear dome structure within the marine sediments in the Long Beach area (Orange 2013a). Dissection of these uplifted marine sediments occurred during the lower sea level stand of the last glacial period when the ancestral Los Angeles and San Gabriel Rivers created deeply incised channels through the sedimentary sequence. The water gaps formed by the Los Angeles and San Gabriel rivers are respectively known as the Dominguez and the Alamitos Gaps (Orange 2013b).

The project site is located within the Alamitos Gap. The Alamitos Gap is an erosional feature located between the mesas of Bixby Ranch Hill and Landing Hill in the cities of Long Beach and Seal Beach, respectively (**Geology and Paleontology - Figure 2**). The erosion that created the Alamitos Gap began in the Late Pleistocene, approximately 60,000 years ago, and continued until the end of the last glacial period, approximately 11,000 years ago. The combination of a lowered sea level and accelerated stream erosion produced a river valley that grew hundreds of feet deep and thousands of feet wide. At the end of the glacial period, the sea level began to rise and the ancestral river began backfilling the valley eventually forming the existing coastal plain where the site is located. The coastal plain contains alluvial deposits (gravels, sands, and silts), aeolian deposits (well sorted fine grain windblown sand), estuarian deposits (organic silts and clays), and near shore marine deposits (predominantly well sorted medium grain sand) (Ninyo 2011).

According to State of California Division of Oil and Gas, and Geothermal Resources Publication TR 39, the project site and surrounding area are situated within the Seal Beach oil field (**Geology and Paleontology - Figure 3**). The Seal Beach oil field is between the Long Beach and the Huntington Beach oil fields, about one-half mile inland from the Pacific Ocean. The oil field lies within a series of oil fields associated with what is referred to as the Newport-Inglewood Structural Trend (Magorien 2002). A number of other significant oil fields are located along the Newport-Inglewood Structural Trend, all of which owe their existence to the Newport-Inglewood Fault.

## PROJECT SITE DESCRIPTION

The AEC site is located on a gently sloping coastal plain in the southeast part of the city of Long Beach. Topography of the site is relatively flat and elevation ranges from approximately 8 to 15 feet above mean sea level (Ninyo 2011). The site is bordered by the San Gabriel River channel to the east, North Studebaker Road and the Los Cerritos Channel to the west, Westminster Avenue to the south and East 7th Street to the north (**Geology and Paleontology - Figure 4**).

The project would be built on the site of the existing Alamitos Generating Station, an operating electrical generation facility. The site currently consists of six active power generating units and one retired combustion turbine unit, occupying approximately 21 acres of the 71-acre site. Each operating unit is comprised of a control room, boiler, turbine and other support facilities. The entire site is covered with asphalt or concrete pavement.

As part of the preliminary on-site geotechnical investigation, four small diameter exploratory borings were drilled and four Cone Penetration Tests (CPT) were driven in the northern and eastern portions of the site (Ninyo 2011). The borings were drilled to maximum depths of 51.5 feet below ground surface (bgs) and the CPTs were driven to final depths of approximately 63.5 feet bgs.

Groundwater was observed in exploratory borings at depths between 8 and 14 feet bgs. However, these observations were not considered to be representative of stabilized ground water conditions (Ninyo 2011). As presented in the Preliminary Geotechnical Report, groundwater has historically been as high as 10 feet bgs in the site vicinity.

Based on the preliminary geotechnical investigation, Ninyo and Moore concluded that the upper 6 to 9 feet of the subsurface consists of artificial fill composed of loose to medium dense sandy silt, sandy clay, and clayey sand and firm clayey silt. Native alluvial deposits beneath the fill consist of interbedded layers of loose to very dense sand, silty sand, sandy silt and clayey sand and very soft to stiff clayey silt, silty clay, and silt to a depth of approximately 63.5 feet bgs (Ninyo 2011).

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section assesses two types of impacts. The first is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area. The second is the potential geologic hazards, which could adversely affect the proper functioning of the proposed facility and create life/safety concerns.

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address when assessing impacts related to geologic and mineralogic resources, and effects of geologic hazards.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site, or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (XI) (a) and (b) concern the project's effects on mineral resources.

To assess potential impacts on unique geologic features and effects on mineral resources, staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area.

To assess potential impacts on paleontological resources, staff reviewed existing paleontologic information and reviewed the information obtained from the applicant's requested records searches from the Los Angeles County Natural History Museum for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's (UCMP) website, which gives generalized information for locality records of their collection, and site-specific information generated by the applicant for the proposed AEC was also reviewed (UCMP 2008). All research was conducted in accordance with accepted assessment protocol (BLM 2008 and SVP 2010) to determine whether known paleontologic resources exist in the general area. If present or likely to be present, Conditions of Certification that outline required procedures to mitigate adverse effects to potential resources are proposed as part of the project's approval.

The current California Building Code (CBC 2013) provide geotechnical and geological investigation and design guidelines that engineers must follow when designing a facility. As a result, the criterion used to assess the significance of a geologic hazard includes evaluating each hazard's potential impact on the design, construction, and operation of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

An assessment of the potential impacts to geologic, mineralogic, and paleontologic resources, and from geologic hazards is provided below. The assessment of impacts is followed by a summary of potential impacts that may occur during construction and operation of the project and provides recommended conditions of certification that would ensure potential impacts are mitigated to a level that is less than significant. The recommended conditions of certification would allow the Energy Commission's compliance project manager (CPM) and the applicant to implement a compliance monitoring scheme ensuring ongoing compliance with mitigation and LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

## GEOLOGIC AND MINERALOGIC RESOURCES

At the AEC site, the geologic units are buried with a layer of fill approximately 6 to 9 feet thick. The geologic units in the subsurface are widespread alluvial deposits that occur throughout the Long Beach/Seal Beach area (**Geology and Paleontology - Figure 5).** These geologic units are not unique in terms of recreational, commercial, or scientific value.

According to online maps of the California Division of Oil, Gas and Geothermal Resources (DOGGR 2012), oil and natural gas deposits are present in the wider project area. The city of Long Beach lies over several oil producing areas, comprising the Seal Beach, Long Beach and Wilmington oil fields. The Long Beach area has been the site of the extraction of oil and gas over many years. Large-scale oil and gas production has occurred since the late 1920s and continues today.

The project site overlies a portion of the Seal Beach oil field, which is situated between the Long Beach and Huntington Beach oil fields. The Seal Beach oil field lies on the northwesterly–southeasterly oriented Newport-Inglewood structural trend, and includes five separate structural areas: North Block, North Block-East Extension, South Block, Alamitos, and Marine (DOGGR 1990). The project site lies within the Alamitos structural area.

The Seal Beach oil field was first discovered in September 1924 by Shell Oil Company. Subsequent oil field development continued in the area through the mid-1950s. Production history for the area shows a rapid initial decline, followed by 35 years of gradual decline. Over 31 million barrels of oil have been produced from the area, with almost half of the production in the first 3 years of development. Today, the Alamitos area is in a mature production stage. Of the 140 known wells completed, only 19 are still producing.

California is the largest consumer of sand and gravel in the country, and the Los Angeles metropolitan area produces and consumes more construction aggregate than any other metropolitan area in the country (Los Angeles County 2014a). Both Los Angeles and Orange counties depend on the California Geological Survey to identify regionally-significant aggregate source material. The project site is located in Los Angeles County along the border with Orange County. Within Los Angeles County there are four areas designated as Mineral Resource Zones (MRZ), with cumulative reserves of over 680 million tons. However, the AEC site is located more than 16 miles from the closest MRZ (LA County 2016). In 1982, the California Division of Mines and Geology published a comprehensive mineral land classification for aggregate materials in the Orange County area. The Mineral and Energy Resources Element of the Orange County General Plan indicates that significant mineral deposits are not present in the project area (Orange 2011). Based on these data there are no known active areas of mining for mineral resources occur near the AEC site.

Based on the information above, it is staff’s opinion that the project would have no effect on oil and gas production or on other geologic resources of commercial value or on the availability of such resources and would not have any significant adverse direct, or indirect, impacts to potential geologic and mineralogic resources.

## PALEONTOLOGIC RESOURCES

The project site is mantled with approximately 6 to 9 feet of artificial fill material. Beneath the fill are native soils consisting of alluvial, estuarine and marine sediments. The upper 50 feet of the native soils consist of Holocene coastal marine sediments (AEC 2013). Underlying the Holocene deposits are older Quaternary sediments of the Pleistocene age Palos Verdes Formation. The Palos Verdes Formation consists of greenish-gray, fine- to medium-grained sand with traces of silt and clay. Within the Palos Verdes Formation is a unit referred to as the Palos Verdes Sand. The Palos Verdes Sand is a fossiliferous layer of marine gray sands and gravels and has produced a large number of fish fossils, as well as the remains of terrestrial and aquatic birds and mammals (BonTerra 2010).

Beneath the Palos Verdes Formation lies the San Pedro Sand (BonTerra 2010). The San Pedro Sand consists of gray to dark gray to reddish-yellow (rust)-stained siltstone and clayey siltstone with friable, interbedded fine to gravelly coarse grained sandstones.

In the San Pedro area, the San Pedro Sand has yielded late Pleistocene crustaceans, marine mollusks, bony fish and sharks, amphibians, birds, rodents, and mammals, including *Bison*, *Mammuthus* (mammoth), *Paramylodon* (sloth), *Equus* (horse), and *Capromeryx* (very small antelope). During the course of the field reconnaissance conducted for the nearby Banning Ranch project (BonTerra 2010), three shell bearing fossiliferous sites were found in deposits mapped as San Pedro Sand. The fossil sites represent the first recognized fossils from the San Pedro Sand in Orange County (BonTerra 2010).

Because the entire project area is highly developed, no paleontological resources survey was conducted by the applicant. As noted previously, a reconnaissance-level field review conducted by the applicant confirmed that no native sediment is present at the surface, and that the majority of the project site is covered by concrete or blacktop.

Even though the site is developed and paved and mantled with artificial fill, excavations are proposed for project construction. If the excavations extend through the fill, native soils will be encountered. There is a low potential for significant fossils to be encountered in the excavations. However, the possibility of encountering fossils remains. Therefore, staff considers monitoring of construction activities in accordance with the proposed Conditions of Certification is necessary. Proposed Conditions of Certification **PAL-1** to **PAL-8** are designed to mitigate any potential paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions would require a worker education program in conjunction with monitoring of proposed earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS).

Earthwork would be halted in the immediate area of the find at any time potential fossils are recognized by either the paleontological monitor or the worker. A PRS would be retained for the proposed project by the applicant to produce a monitoring and mitigation plan, conduct the worker training, and provide on-site monitoring. During monitoring, the PRS can petition the CPM for a change in the monitoring protocol. Most commonly, this would be a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

## GEOLOGICAL HAZARDS

The AFC provides documentation of potential geologic hazards at the proposed AEC plant site. Staff reviewed information presented in the AFC and conducted independent research regarding the site’s susceptibility to geologic hazards. Staff believes that the possibility of geologic hazards affecting plant operations, during its practical design life of 40 years, would be low. However, the potential and probability for the site to be affected by geologic hazards such as strong seismic shaking, liquefaction and dynamic compaction, would need to be addressed in a project geotechnical report per requirements of CBC 2013, or the most current version succeeding that code. All recommendations from the geotechnical report must be addressed in project design.

Staff’s independent research included the review of available geologic maps, reports, and related data of the proposed AEC plant site. Geological information from the California Geological Survey (CGS) and other governmental organizations was reviewed. Staff’s analysis of this information is provided below.

### Faulting and Seismicity

In southern California, tectonic deformation between the Pacific and North American plates is accommodated primarily by a zone of northwest trending strike-slip faults. However, within this complex zone of shear, areas of compression also occur.  Major active and potentially active faults in the region are shown on **Geology and Paleontology - Figure 6**.

Most tectonic deformation in southern California occurs along strike slip faults associated with the on-land portion of the San Andreas Fault system. In addition to the on-land faults, the tectonic shear is shared with faults in the offshore inner Continental Borderland region (Grant 2004).

In 2002, Grant and Rockwell postulated that an active 300-km-long Coastal Fault zone extends between the Los Angeles basin and coastal Baja California (Grant 2002). This Coastal Fault zone includes those faults contained within the inner Continental Borderland which become contiguous with the Agua Blanca fault in Baja California (Grant 2004). The Agua Blanca fault is considered to have a slip rate between 5 and 7 millimeters/year (Rockwell 2012). That slip is believed to be transferred to the offshore faults within the inner Continental Borderland (Rockwell 2012). The geometry and slip rate of faults in the inner Continental Borderland are poorly constrained relative to onshore faults, yet they may pose significant seismic risk because they are close to populated areas, and several offshore faults appear to displace seafloor sediments (Legg 1991).

Active faults in southern California associated with shear between the north American and Pacific plates include (from east to west), the San Andreas fault zone, the San Jacinto fault zone, the Elsinore fault zone, the Whittier fault zone, the Newport-Inglewood fault zone, the Palos Verdes fault zone, the San Diego Trough fault zone and the San Clemente fault zone. Faults specific to the inner Continental Borderland include the Newport-Inglewood fault zone, the Palos Verdes fault zone, the San Diego Trough fault zone and the San Clemente fault zone (Legg 2002).

In addition to transform strike slip faulting, tectonic compression in the southern California area has formed folds (anticlines and synclines), reverse faults and blind thrust faults (Blind thrusts). Blind thrusts underlie regions undergoing contraction in the Los Angeles Basin and if there is an associated surface expression it would typically be an active fold. The Compton-Los Alamitos fault and the San Joaquin Blind thrust are examples of this style of deformation. Seismic hazards posed by active thrusts are assessed in the Los Angeles Basin by a number of means, all of which are aimed at placing constraints on fault slip rates, earthquake recurrence and fault geometry and segmentation (Mueller 2005). Research into the relationship between fault slip, fault geometry and fold growth thus provides insight into the occurrence of earthquakes produced on these structures. Large earthquakes originating on blind thrusts within Southern California have occurred in the past century, illuminating their geometry and potential for seismic hazard and include the Mw5.9 1987 Whittier Narrows earthquake and the Mw6.8 1994 Northridge earthquake. It is likely that in 1769, a M7+ earthquake occurred on the San Joaquin Blind thrust which uplifted coastal Orange County approximately 10 feet (Grant 2004).

Early phases of active fault evaluation were conducted by CGS under the Alquist-Priolo Special Studies Zone Act of 1972 and under the subsequent Alquist-Priolo Earthquake Fault Zoning Act of 1994. These evaluations resulted in the delineation of Earthquake Fault Zones throughout California. Active faults with a potential to affect the AEC site are listed and described below and their locations presented on **Geology and Paleontology - Figure 6**:

### San Andreas Fault Zone

The San Andreas is the "master" fault of an intricate fault system that defines the boundary between the Pacific and North American crustal plates in California (Schulz 1992). The entire San Andreas fault system is more than 800 miles long and extends to depths of at least 10 miles within the Earth. In detail, the fault is a complex zone of crushed and broken rock from a few hundred feet to a mile wide. Many smaller faults branch from and join the San Andreas fault zone.

Over much of its length, a linear trough reveals the presence of the San Andreas fault; from the air, the linear arrangement of lakes, bays, and valleys in this trough is striking. However, viewed from the ground the features are more subtle. For example, many people driving near Crystal Springs Reservoir, near San Francisco, or along Tomales Bay, or through Cajon or Tejon Passes may not realize that they are within the San Andreas fault zone. On the ground, the fault can be recognized by carefully inspecting the landscape. The fault zone is marked by distinctive landforms that include long straight escarpments, narrow ridges, and small undrained ponds formed by the settling of small blocks within the zone. Many stream channels characteristically jog sharply to the right where they cross the fault.

At least 350 miles of offset has occurred along the San Andreas fault since it came into being about 15-20 million years ago (Schulz 1992). Surveying demonstrates displacement (strain) occurs along the fault at the rate of approximately 2 inches per year.

### San Jacinto Fault Zone

The San Jacinto fault zone is one of the major branches of the San Andreas fault system in southern California (Sharp 1965).

The San Jacinto fault zone is a complex zone of splaying and overlapping strike-slip fault segments, steps and bends, and associated zones of contractional and extensional deformation (Dorsey 2002). Offsets on basement piercing points and Pleistocene strata indicate that about 25 km of slip has accumulated on the San Jacinto fault during the past 1.5 to 2.0 million years. Based on GPS studies and offsets of dated Quaternary deposits, the rate of slip on the San Jacinto system is generally agreed to be about10-12 millimeters per year (mm/yr). This represents 20 to 25 percent of the present-day Pacific-North American relative plate motion (Dorsey 2002).

The straightness, continuity, and high seismicity of the San Jacinto fault zone suggest that it may be currently the most important member of the San Andreas fault system in southern California (Sharp 1965).

### Elsinore Fault Zone

The Elsinore fault zone parallels the San Jacinto and is part of the same right-lateral crustal plate strain system as the San Andreas and the San Jacinto (ECI 2000). The Elsinore branches into the Whittier fault near Santa Ana Canyon, where it borders the Puente Hills to the southwest and the Chino fault to the northeast. The most apparent displacements on the Whittier-Elsinore have been vertical, as evidenced by the steep scarp (an earthquake-built cliff) along the Santa Ana Mountains.

### Whittier Fault Zone

The Whittier fault zone is exposed for a distance of about 25 miles along the south slopes of the Puente Hills from the Whittier Narrows on the northwest to the Santa Ana River near its southwest end (Yerkes 1965). In the vicinity of the Santa Ana River, it joins with the northern end of the Elsinore Fault Zone. Recent deformation along the Whittier Fault Zone is indicated by steeply tilted and locally overturned strata of late Pleistocene age (Yerkes 1965). Trenching along the fault has uncovered evidence of recent offsets, including faulted Holocene alluvium dated at 1400 to 2200 years before present (Gath 1988).

### Compton-Los Alamitos Fault Zone

The Compton blind thrust fault is active and has generated at least six large-magnitude earthquakes (Mw 7.0–7.4) during the past 14,000 years (Leon 2009). Deformed Holocene strata record recent activity on the Compton thrust and are marked by discrete sequences that thicken repeatedly across a series of buried fold scarps. Minimum uplift in each of the scarp-forming events, which occurred at 0.7–1.75 thousand years ago (ka) (event 1), 0.7–3.4 ka or 1.9–3.4 ka (event 2), 5.6–7.2 ka (event 3), 5.4–8.4 ka (event 4), 10.3–12.5 ka (event 5), and 10.3–13.7 ka (event 6), ranged from approximately 2 to 6.2 feet, indicating minimum thrust displacements of ≥4.2 to 13.8 feet. Such large displacements are consistent with the occurrence of large-magnitude earthquakes (Mw ≥ 7). This large, concealed fault underlies the Los Angeles metropolitan area and thus poses one of the largest deterministic seismic risks in the United States (Leon 2009).

### Newport-Inglewood Fault Zone

The Newport-Inglewood fault zone (NIFZ) is approximately 0.9 to 1.6 miles wide, trends N45-60W, is mainly a right-lateral tectonic structure that extends from the Santa Monica Mountains on the north to offshore connection with the Rose Canyon fault near San Diego on the south (Shlemon 2008). Known active fault traces in the NIFZ zone of deformation have been mapped in Alquist-Priolo Special Studies Zones (CDMG 1994 and 2003).

The NIFZ was first identified as a significant threat to southern California residents in 1933 when it generated the M6.3 Long Beach earthquake, killing 115 people and providing motivation for passage of the first seismic safety legislation in the United States (Grant, 2004).

Ongoing studies indicate the NIFZ is capable of generating earthquakes with magnitudes up to 7.4 Mw (Toppozada 1989) or 7.5Mw (Petersen 2008). The higher magnitude indicated by Petersen uses a fault length of 208 km as described by Shlemon (2008).

A mapped trace of an inferred concealed fault is located approximately 500 feet southwest of the southwestern property corner. The surface expression of the fault, indicating its Holocene age, has been mapped approximately 3,500 feet west of the project site. (**Geology and Paleontology - Figure 7)**.

### San Joaquin Hills Blind Thrust

The uplift rate of the San Joaquin Hills during the late Quaternary period was approximately twice as high as uplift rates parallel to the Newport-Inglewood Fault Zone (NIFZ) along the coast to the south (Grant 2002). Several observations suggest that the San Joaquin Hills are underlain by a fault that is distinct from the NIFZ, although they may be linked kinematically. There are several Quaternary anticlines along the NIFZ north of the San Joaquin Hills (Grant 2002). However, the San Joaquin Hills anticline is longer and has the greatest topographic expression. Other topographically prominent anticlines, such as Signal Hill, are located within the structurally complex NIFZ and are associated with step-overs (Barrows 1974).

Geomorphic studies along the coastline in the vicinity of the San Joaquin Hills have discovered emergent shorelines along the open coast and an elevated marsh bench in Newport Back Bay. The surface of the marsh bench is approximately 5 feet above the current marsh elevation (Grant 2002). Radiocarbon dating and interpretation of the introduction of exotic pollens contained within the elevated marsh bench indicates that the marsh bench was uplifted between the years 1635 and 1797 (Grant 2002).

On July 28, 1769 a strong temblor was described by explorer Gaspar de Portola while he was in the central Los Angeles basin area (Townley 1939). The main shock was described as violent, and at least two dozen earthquakes followed it over the course of several days. It is likely that the 1769 San Joaquin Hills earthquake occurred on the San Joaquin Blind Thrust and was responsible for the uplift of the elevated marsh bench in Newport Bay and the emergent shorelines along the open coastline (Grant 2002). The San Joaquin earthquake may be the largest known earthquake that has originated within the greater Los Angeles region in the last few centuries (Grant 2002).

### Palos Verdes Fault Zone

The Palos Verdes Fault Zone extends southwestward from the northern part of Santa Monica Bay to the area southwest of Lasuen Knoll, offshore from Dana Point (Fisher 2004). The structure of the Palos Verdes Fault Zone changes markedly southeastward across the San Pedro Shelf and slope. Under the northern part of the shelf, this fault zone includes several strands, but the main strand dips west and is probably an oblique-slip fault (Fisher 2004). Under the slope, this fault zone consists of several fault strands having normal separation, most of which dip moderately east. To the southeast near Lasuen Knoll, the Palos Verdes Fault Zone locally is a low angle fault that dips east, but elsewhere near this knoll the fault appears to dip steeply. Fresh sea-floor scarps near Lasuen Knoll indicate recent fault movement (Fisher 2004).

Analysis of wave-cut terraces and offset stream courses indicates total fault-slip rate to be around 3 mm/yr. (Fisher 2004). The main style of movement along the Palos Verdes Fault Zone has been strike slip and multibeam bathymetric data show recent scarps along this fault near Lasuen Knoll indicating the fault’s recent activity.

### San Diego Trough Fault Zone

The San Diego Trough Fault Zone runs roughly from the Mexican border northward toward Catalina Island. The San Diego trough fault zone (SDTFZ) is part of a 56-mile-wide zone of faults within the inner Continental Borderland that accommodates motion between the Pacific and North American plates (Ryan 2012). New seismic reflection data shows that the fault zone steps across a 3.1-mile-wide stepover and continues for an additional 37 miles north of its previously mapped extent. At the latitude of Santa Catalina Island, the SDTFZ bends 20 degrees to the west and may be linked via a complex zone of folds with the Palos Verdes fault zone (PVFZ). If this is the case, this fault zone would be one of the longest in the California Borderland, and could produce some of the largest earthquakes in the region (Poppick 2013). The 1986 epicenter of the Oceanside earthquake (a magnitude 5.4 quake that caused nearly one million dollars in damage, 29 injuries, and one death) and the associated 1986 earthquake swarm is located within the SDTFZ (Poppick 2013). In a cooperative program between the U.S. Geological Survey (USGS) and the Monterey Bay Aquarium Research Institute (MBARI), the coseismic offset of a submarine channel that intersects the fault zone near the SDTFZ– PVFZ junction was measured and dated. This research indicated an estimated horizontal slip rate of about 1.5±0.3 mm/yr over the past 12,270 yr (Ryan 2012).

### San Clemente Fault Zone

The San Clemente fault zone is the westernmost of the group of right lateral faults traversing the California Inner Continental Borderland (Legg 1989). The main trace of the San Clemente fault cuts a straight path directly across the rugged topography of the region, displaying evidence of a steeply dipping (near vertical) fault surface. Modern tectonic activity along the San Clemente fault zone is demonstrated by numerous earthquakes with epicenters located along the fault's trend. The average strike of the San Clemente fault is parallel to the Pacific-North American relative plate motion vector at this location and is a part of the broad Pacific-North American transform plate boundary (Legg 1989).

### Fault Rupture

All of the faults discussed above have the potential to generate strong seismic shaking at the project site. However, none have the potential to cause fault offset of the ground surface at the project site.

The Alquist-Priolo Earthquake Fault Zoning Act of 1994 (formerly known as the Alquist-Priolo Special Studies Zone Act of 1972) stipulates that no structure for human occupancy may be built within an Earthquake Fault Zone until geologic investigations demonstrate that the site is free of fault traces that are likely to rupture with surface displacement. Earthquake Fault Zones are regulatory zones that include faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture (CGS 2008). An Earthquake Fault Zone has not been mapped on the project site.

Fault rupture almost always follows pre-existing faults, which are zones of weakness (CGS 2007). No active faults are shown on published maps as crossing the boundary of new construction on the proposed AEC power plant site or associated linear facilities. Therefore, it is highly unlikely that the site would experience surface fault rupture during the project's design life.

### Seismic Shaking

Preliminary estimates of ground motion based on probabilistic seismic hazard analyses have been calculated for the project site using the USGS Earthquake Hazards application called the U.S. Seismic "DesignMaps" Web Application (**Geology and Paleontology Table 2**). This application produces seismic hazard curves, uniform hazard response spectra, and seismic design values. The values provided by this application are based upon data from the 2008 USGS National Seismic Hazard Mapping Project. These design parameters are for use with the 2012 International Building Code, the 2010 ASCE-7 Standard, the 2009 NEHRP Provisions, and their respective predecessors.

**Geology and Paleontology Table 2**
**Planning Level 2013 CBC Seismic Design Parameters Maximum Considered Earthquake, ASCE 7 Standard**

| Parameter | Value |
|---|---|
| Assumed Site Class | E |
| Structure Risk Category | III - Substantial |
| SS – Mapped Spectral Acceleration, Short (0.2 Second) Period | 1.561 g |
| S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period | 0.582 g |
| Fa – Site Coefficient, Short (0.2 Second) Period | 0.900 |
| Fv – Site Coefficient, Long (1.0 Second) Period | 2.400 |
| SDS – Design Spectral Response Acceleration, Short (0.2 Second) Period | 0.937 g |
| SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period | 0.931 g |
| SMS – Spectral Response Acceleration, Short (0.2 Second) Period | 1.405 g |
| SM1 – Spectral Response Acceleration, Long (1.0 Second) Period | 1.396 g |

ASCE = American Society of Civil Engineers
Values from USGS 2010

These parameters are project-specific and, based on AEC's location, were calculated using latitude and longitude inputs of 33.767 degrees north and 118.100 degrees west, respectively. Other inputs for this application are the site "type", which is based on the underlying geologic materials, and the "Structure Risk Category". The assumed site class for AEC is "E", which is applicable to soft clay soil. These parameters can be updated as appropriate following the results presented in a project-specific geotechnical investigation report performed for the site. The assumed "Structure Risk Category" is "III", which is based on its inherent risk to people and the need for the structure to function following a damaging event. Risk categories range from I (non-essential) to IV (critical). Examples of risk category I include agriculture facilities, minor storage facilities, etc., while examples of category IV include fire stations, hospitals, nuclear power facilities, etc.

The ground acceleration values presented are typical for the area. Other developments in the adjacent area would also be designed to accommodate strong seismic shaking. The potential for and mitigation of the effects of strong seismic shaking during an earthquake must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Condition of Certification **GEO-1** and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Compliance with these conditions of certification would ensure the project is built to current seismic standards and potential impacts would be mitigated to insignificant levels in accordance with current standards of engineering practice.

### Liquefaction

Liquefaction is the phenomenon in which uniformly sized, loosely deposited, saturated, granular soils with low clay contents undergo rapid loss of shear strength through the development of excess pore pressure during strong earthquake induced ground shaking of sufficient duration to cause the soil to behave as a fluid for a short period of time. Liquefaction generally occurs in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. If the liquefying layer is near the surface, the effect for any structure supported on it is much like that of quicksand, resulting in sinking or tilting. If the layer is deeper in the subsurface, it can provide a sliding surface for materials above it, resulting in lateral motion (spreading or lurching) toward any nearby 'free face' (shore bluff, river embankment, excavation wall) (PBS&J 2009).

The proposed project site is mapped in a Liquefaction Investigation Zone on the State of California Seismic Hazard Zone Map for the Los Alamitos Quadrangle (CGS 1998). A Liquefaction Investigation Zone is an area "where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Codes Section 2693(c) [Seismic Hazards Mapping Act] would be required" (CGS 1998).

Groundwater was measured in geotechnical borings at depths between approximately 8 and 14 feet below ground surface (Ninyo 2011). Ninyo and Moore stated that the measured groundwater depth is likely not representative of stabilized conditions. The Seismic Hazard Zone Report for this area indicates that the historic shallowest depth to groundwater at the site occurs at a depth of approximately 10 feet below ground surface (CDMG 1998). These determinations indicate that groundwater is shallow at the site and surrounding vicinity. The presence of shallow groundwater raises concerns about liquefaction potential, settlement rates, and the possible need for construction dewatering.

Based on site observations and review of information presented in the preliminary geotechnical report (Ninyo 2011), subsurface conditions at the site are likely to be conducive to liquefaction. Groundwater levels must be confirmed and the liquefaction potential on the proposed AEC site must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Condition of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5,** and **CIVIL-1**.

## Lateral Spreading

Lateral spreading of the ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spreading generally takes place in the direction of a free-face (i.e., retaining wall, slope, or channel). An empirical model is typically used to predict the amount of horizontal ground displacement within a site (Ninyo 2011). For sites located in proximity to a free-face, the amount of lateral ground displacement is strongly correlated with the distance of the site from the free-face. Other factors such as earthquake magnitude, distance from the earthquake epicenter, thickness of the liquefiable layers, and the fines content and particle sizes of the liquefiable layers also affect the amount of lateral ground displacement.

The project site includes free-face slopes along the San Gabriel River on the east side of the site. However, based on analysis of the sampler blow counts and generally discontinuous nature of the underlying soil layers encountered during the preliminary geotechnical evaluation, the project site is not considered susceptible to significant seismically induced lateral spread (Ninyo 2011). However, the susceptibility of the underlying beds to lateral spread beneath the proposed AEC site must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Condition of Certification **GEO-1** and **FACILITY DESIGN** Conditions of Certification **GEN-1, GEN-5** and **CIVIL-1**.

## Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a denser state. The decrease in volume can result in settlement of overlying structural improvements.

In order to estimate the amount of post-earthquake settlement of site soils, Ninyo and Moore used seismically induced cyclic stress ratios and corrected blow counts (N-values) to calculate the potential volumetric strain of the soil (Ninyo 2011). Their analysis indicated that seismically induced settlement at the project site would be approximately 1.25 inches, or less.

The potential for and mitigation of the effects of dynamic compaction of proposed site soils during an earthquake must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Conditions of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Common mitigation methods would include deep foundations (driven piles; drilled shafts) for severe conditions, geogrid reinforced fill pads for moderately severe conditions and over-excavation and replacement for areas of minimal hazard.

## Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. As stated in the preliminary geotechnical report, “Due to the high groundwater levels encountered at the site and the reported historically high groundwater, it is our opinion that the site soils are not susceptible to hydro-collapse” (Ninyo 2011). The potential for and mitigation of the effects of hydrocompaction of site soils must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Conditions of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

## Compressible Soils

Compressible soils are generally those soils that undergo consolidation when exposed to new loading, such as fill placement or building construction. Buildings, structures and other improvements may be subject to excessive settlement-related distress when built above compressible soils. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils.

Based on the results of the preliminary geotechnical evaluation, the project site was determined to be underlain by fill soils and young native alluvial sediments.  The fill soils were considered potentially compressible (Ninyo 2011). In addition, native soils encountered in the borings contained interbeds of very soft silty clay alluvial/estuarine soil layers which were considered potentially compressible (Ninyo 2011). Due to the presence of potentially compressible soils at the site, the potential impacts of settlement could be significant without appropriate mitigation during detailed project design and construction.

The potential for and mitigation of the effects of consolidation of site soils must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Condition of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

## Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in-place with moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. Based on subsurface exploration conducted by Ninyo and Moore (2011), the near-surface soils at the project site predominantly consist of sandy silt and fine-grained sand with silt and clay, which typically have a low to moderate expansion potential. The potential for and mitigation of the effects of expansive soils on the proposed site must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Conditions of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation would normally be accomplished by over-excavation and replacement of the expansive soils. For deep-seated conditions, deep foundations are commonly used. Lime-treatment (chemical modification) is often used to mitigate expansive clays in pavement areas.

## Corrosive Soils

The project site is located in a geologic environment that could potentially contain soils that are corrosive to concrete and metals. Corrosive soils are defined as having earth materials with more than 500 ppm chlorides, a sulfate concentration of 0.20 percent (i.e., 2,000 ppm) or more, a pH of less than 5.5, or an electrical resistivity of less than 1,000 ohm-centimeters (Ninyo 2011).

As part of the preliminary geotechnical evaluation, the corrosion potential of on-site soil was evaluated for its effect on steel and concrete structural members (Ninyo 2011). Laboratory testing was performed on a representative soil sample to evaluate pH, minimum electrical resistivity, and chloride and soluble sulfate content. Based on the laboratory test results, Ninyo & Moore classified site soils as corrosive (Ninyo 2011).

Corrosive soil conditions may exacerbate the corrosion hazard to buried conduits, foundations, and other buried concrete or metal improvements. Corrosive soil could cause premature deterioration of underground structures or foundations. Constructing project improvements on corrosive soils could have a significant impact to the project.

The potential for and mitigation of the effects of corrosive soils on the proposed site must be addressed in a project-specific geotechnical report, per requirements of CBC 2013, or the most current version succeeding that code, and proposed Conditions of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation of corrosive soil conditions may involve the use of concrete resistant to sulfate exposure. Corrosion protection for metals may be needed for underground foundations or structures in areas where corrosive groundwater or soil could potentially cause deterioration. Typical mitigation techniques include epoxy and metallic protective coatings, the use of alternative (corrosion resistant) materials, and selection of the appropriate type of cement and water/cement ratio.

## Landslides

Landslides occur when masses of rock, earth, or debris move down a slope, including rock falls, deep failure of slopes, and shallow debris flows. Landslides are influenced by human activity (mining and construction of buildings, railroads, and highways) and natural factors (geology, precipitation, and topography). Frequently, they accompany other natural hazards. Although landslides sometimes occur during seismic events, earthquakes are rarely their primary cause.

The most common cause of a landslide is an increase in the down slope gravitational stress applied to slope materials (over steepening). This may be produced either by natural processes or human activities. Undercutting of a valley wall by stream erosion is a common way in which slopes may be naturally over steepened. Other ways include excessive rainfall or irrigation on a cliff or slope.

The site is relatively flat and located substantial distances from steep terrain. Therefore, the site is not subject to landslide hazards.

## Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, submarine landslides and/or volcanic activity. Seiches are waves generated within enclosed water bodies such as bays, lakes or reservoirs caused by seismic shaking, rapid tectonic uplift, basin bottom displacement and/or land sliding. A tsunami can be categorized as local, regional, or Pacific-wide. Those terms describe the potential destruction relative to the tsunami source area.

**Local** (near-source) tsunamis occur soon after the generating event and allow little time for warning and evacuations. Their impact may be large, but in a limited area. For example, in 1958, waves from a local tsunami in Lituya, Alaska ran up 1,591 feet, but destruction was focused on a small area.

**Regional** (intermediate) tsunamis are by far the most common. Destruction may be limited because the energy released was not sufficient to generate a destructive Pacific-wide tsunami, or because the source area limited the destructive potential of the tsunami. These events can occur within 15 minutes to two hours after the generating event. Areas affected by the tsunamis may not have felt the generating event.

**Pacific-wide** (distant source) tsunamis are much less frequent, but have a far greater destructive potential. The waves are not only larger initially, but they subject distant coastal areas to their destructive impact as they cross the Pacific basin. For example, the Chilean tsunami of May 22, 1960, spread death and destruction across the Pacific from Chile to Hawaii, Japan, and the Philippines. These events may have long lead times (up to six hours), but the breadth of the destruction is wide (OES 1998).

All of coastal California is at risk from tsunamis (CSSC 2005). Eighty-two possible or confirmed tsunamis have been observed or recorded in California during historic times. Most of these events were small and only detected by tide gauges. Eleven were large enough to cause damage and four events caused deaths (CSSC 2005). Two tsunami events caused major damage. Tsunamis that damaged California's coast have come from all around the Pacific basin including South America and Alaska. However, damaging tsunamis can also be caused by local offshore faults or coastal and submarine landslides. These local sources have the potential to cause locally greater wave heights and do pose a threat to the state. The largest historic local-source tsunami on the west coast was caused by the 1927 Point Arguello, California, earthquake that produced waves of about seven feet in the nearby coastal area (CSSC 2005).

### Inundation Potential

The California Geological Survey (CGS) has published tsunami inundation maps for the entire California coastline (CGS 2009). Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides. Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

As a disclaimer, the map states that it is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose (CGS 2009). However, the inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami run-up from a number of extreme, yet realistic, tsunami sources. The map indicates that the areas in the site vicinity that are situated at elevations less than seven feet above sea level could be inundated by a tsunami (**Geology and Paleontology - Figure 8**).

Studies indicate that the Catalina fault is the most likely source of local tsunami generation (Legg 2002). The Catalina fault is the northern continuation of the San Diego Trough fault zone discussed above (Ryan 2012). Near Catalina, the fault changes orientation to a more westerly trend forming a restraining bend. At this bend, crustal compression occurs and subsequent deformation creates up lift. Depending on the amount of underwater crustal uplift that takes place, a tsunami could be generated. Additionally, amplification of the wave form can occur due to ocean floor bathymetry causing wave refraction and constructive interference or wave amplification (Legg 2002). Areas considered susceptible to tsunami wave amplification include the coast from Los Angeles and Long Beach harbors to Newport Beach. Legg further states "*proximity to the coastal zone of urban Los Angeles and Orange Counties, orientation so as to direct tsunami energy towards the southern California coast and size of seafloor uplift (exceeding 1,300 square kilometers and almost 2,000 meters of seafloor relief) suggests that the Santa Catalina Island restraining bend represents the most serious local tsunami threat to coastal southern California*" (Legg 2002). Based on detailed earthquake modeling using variable earthquake scenarios, Legg determined the maximum runup of a tsunami in the project area caused by an earthquake on the Catalina Island restraining bend would have a height between 5 to 7.2 feet (Legg 2002).

In addition to tsunamis generated by earthquake rupture of the seafloor, the possibility that major tsunamis could be generated by massive submarine slumps was recognized a century ago (Synolakis 2002). In more recent years, a variety of studies have supported the scenario of the generation of a major tsunami by a large submarine mass failure, itself induced or triggered by a large earthquake in a coastal area. In addition to the classical documented cases of Grand Banks in 1929, Kalapana, Hawaii in 1975, and the ongoing speculation about the great 1946 Aleutian tsunami, careful analyses of run-up patterns along shorelines often reveal a peaked distribution, with very intense and localized maxima, generally attributed to a local submarine mass failure, against the background of a more regular wave amplitude reflecting the coseismic dislocation (Synolakis 2002). This would be the case, in particular, for localities in Prince William Sound during the great 1964 Alaska earthquake, at Riangkroko during the 1992 Flores, Indonesia event, and during the recent Izmit, Turkey earthquake (Yal¸ciner et al, 1999).

This scenario can also explain minor tsunamis during strike–slip earthquakes on nearby on-land faults, for example, following the 1989 Loma Prieta earthquake (Ma et al,1991). It is clear that the exact timing of failure in this framework is variable, but delays of a few minutes to a few tens of minutes could easily be attributed to the complex nucleation of a failure plane in metastable sediment, or to a mild secondary trigger (aftershock) tipping a precarious balance (Murty 1979).

Characteristics of tsunamis generated by the two kinds of sources can be compared in very general terms by considering the vertical deformation of the sea floor caused by either event. Catastrophic earthquakes can result in coherent surface rupture over long distances (Kanamori 1975) with vertical displacement usually reaching several meters (Plafker 1965). Tsunamis generated by seafloor displacement caused by earthquakes typically have long wavelengths and long periods and have a high potential for transoceanic travel and subsequent impact to distant shores. Conversely, the linear dimension of an underwater landslide rarely exceeds 62 miles (Piper 1987). However, the areal dimension of the sliding mass could easily reach thousands of square feet (Piper 1987). Tsunamis caused by submarine mass failures are more geographically contained, although they may give rise to higher amplitudes in the local field (Plafker 1969).

Bathymetric surveys show that the slopes of the southern California Borderland contain a large number of landslide deposits (Lee 2009). The submarine landslide most likely to affect the AEC site is the Palos Verdes debris avalanche. The Palos Verdes debris avalanche occurs on one of the steepest slopes in the Los Angeles offshore region (Lee 2009). Should it catastrophically reactivate, the Palos Verdes debris avalanche would likely cause a tsunami run-up of up to 10 feet over an 18-mile-long stretch of low-lying coastline extending eastward from the entrance of Los Angeles harbor (Lee 2009).

Based on modeling a dozen distant and local "worst case" sources, USGS determined that the high incoming wave elevation is 13.2 feet and maximum onshore runup elevation would be approximately 16.4 feet in the LA Harbor area (Wood 2013). Coupled with the tsunami occurring at Mean High Water (MHW) conditions (approximately 2 feet above MSL, NOAA 2013) the modeling shows inundation would extend to about 18 feet NAVD88 (CGS 2009) in portions of the project site. The source that could produce a tsunami with this maximum flood level is a magnitude 9.2 earthquake from the Alaska-Aleutians 3 scenario. Although MHW and wave runup from the most likely local source are not as great, they do represent a potential hazard. Based on a submarine landslide such as the Palos Verdes slide Number 2 scenario (Wood 2013) the high incoming wave elevation would be approximately 7.54 feet, which if it occurred during MHW conditions would result in inundation to about 9.54 feet NAVD88.

Based on a 1:24,000 scale topographic map of the site area prepared using the NAD83 datum and 2011 topographic overlay (USGS 2015) the entire site lies at an elevation that is less than 10 feet Above Mean Sea Level. Therefore, regardless of the source generating the tsunami the entire site would be inundated if a tsunami occurred during MHW conditions. The entire site would also be inundated should a "worst case" scenario seismically-induced tsunami happen with current sea level conditions. Existing data is not sufficiently detailed to determine the precise extent of site inundation as a result of a submarine-landslide generated tsunami, but based upon existing data it would appear that most, if not all of the AEC site would be impacted should a Palos Verdes Slide Number 2 scenario tsunami occur with current sea level conditions.

A seiche is a standing wave in an enclosed or partially enclosed body of water. The effect is caused by resonances in a body of water that has been disturbed by one or more of a number of factors, most often meteorological effects (wind and atmospheric pressure variations), seismic activity, or tsunami. Seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbors and seas. The key requirement for formation of a seiche is that the body of water be at least partially bounded, allowing the formation of the standing wave. Of most concern are seiches caused by tsunamis captured and reflected within the enclosed area of an inner harbor, such as Los Cerritos Channel, which is connected to Alamitos Bay. It is located immediately adjacent to the western side of the site. The channel and bay are both shallow and narrow, and while a seiche could possibly form within the bay or channel their diminutive size would suggest that the likelihood of a seiche is considered very low.

**Effects of Sea Level Rise**

The effects of sea-level rise could exacerbate potential flooding and tsunami inundation impact at the site. Analysis of potential of flooding impacts from storm water flows coupled with sea level rise is included in the Soil and Water Resources section of this SA.

The National Academy of Sciences (NRC 2012) provides tables of expected sea level rise referenced to the sea level measured in the year 2000. The document provides a range of “possible” sea level changes from a low estimate to a high estimate. Using the maximum rate in the tables for the Los Angeles area (closest data point to the project site), sea level could rise at a rate of 0.4 inches per year (in/yr) between the years 2000 to 2030, and 0.6 in/yr between the years 2030 and 2050. Using these maximum rates, between the years 2020 and 2055, which is the project’s design life, sea level could rise 1.5 feet at the site, and 2 feet above the year 2000 sea level. Based on the rate of sea level rise of 0.4 in/yr, mean sea level in 1992 was 3 inches lower than sea level in 2000.

The 2011 USGS topographic map of the site shows elevations relative to North American Vertical Datum of 1988 (NAVD88). The 1992 sea level elevation corresponds to the mean of the last sea level elevations published for the 1982-2001 epoch and is the current mean sea level used throughout North America. At the time the mean sea level elevation was established, the NAVD88 benchmark was 2.6 feet below that sea level elevation. In order to evaluate the flooding and inundation impacts coupled with the maximum estimated sea level rise, staff had to reconcile site elevations shown on the grading plan and the 1992 mean sea level. Using the NRC 2012 projections, coupled with back calculating the rate of sea level rise between 1992 and 2000, in the year 2055 sea level is predicted to rise to a level 2.5 feet higher than what sea level was in 1992. Using the NAVD88 datum (-2.6 MSL 1992) and the NRC projections (+2.5 feet 1992 MSL), sea level in 2055 is predicted to be at an elevation of 5.1 feet above NAVD88. Therefore, if sea level rises as projected (5.1 feet above NAVD88), and the maximum tsunami (16.4 feet) occurs during MHW (+ 2 feet MSL) at the end of the project’s design life, the leading edge of tsunami derived water inundation could approach an elevation of approximately 23.5 feet relative to NAVD88, effectively inundating the entire AES site.

It is possible tsunami events could be larger than those predicted or have higher levels of inundation than that predicted by the model. Estimates of sea level rise rates have also changed over recent time and it is likely that as more data becomes available sea level rise rates could be updated again. This in turn could affect future predicted tsunami flood level elevations during the life of the facility.

U.S. Building codes generally have not addressed the subject of designing structures in tsunami zones. The Federal Emergency Management Agency's (FEMA), Coastal Construction Manual (FEMA P- 55) (FEMA, 2013), developed to provide design and construction guidance for residential structures built in coastal areas, addresses seismic loads for coastal structures and provides information on tsunami and associated loads (CSSC 2005). FEMA P-55 cites ASCE Standard ASCE 7-10, Minimum Design Loads for Buildings and Other Structures as the reference to be consulted during design of structures. ASCE 7-10 is codified in CBC 2013.

**Tsunami Impact Mitigation**

The planning scenarios discussed above evidence that the project site could be inundated by a tsunami (CGS 2009), and thus present a threat of impact to public health and safety from site flooding. Since the science behind estimating sea level rise is evolving it is also possible rates could change during the life of the project and project design would not adequately incorporate mitigation for potential site inundation. Staff concludes that the project owner needs to be prepared to respond to a potential tsunami event and ensure that all workers and site visitors would be safe.

Los Angeles County issued their 2014 All Hazard Mitigation Plan, which addresses the County tsunami hazard and describes the warning and notification systems that have been put in place (Los Angeles County 2014a). The Los Angeles County Office of Emergency Services has identified primary tsunami evacuation routes (LACOA 2006) that are clearly marked with blue and white signage. However, these systems do not provide detailed, site specific information on how individuals and institutions should respond to a tsunami or differentiate between Disaster Routes and Evacuation Routes.

Staff recommends the project owner be required to prepare and implement a Tsunami Hazard Mitigation Plan (THMP) in accordance with Condition of Certification **GEO-2**. The THMP would include among other things a discussion of criteria for a response to ensure public safety for a tsunami event, show where on and offsite refuge can be accessed, and provide detailed evacuation routes. The THMP would also include a training program for visitors and workers. The purpose of training would be to inform workers and visitors on how to respond to tsunami hazards and where they may obtain refuge in the event it is determined it is necessary to evacuate the project site. Integral to this training program would be periodic testing of the plan to ensure everyone at the site could actually implement the plan.

The THMP would be updated at least bi-annually, or whenever a later version of the Los Angeles County All Hazard Mitigation Plan is updated to ensure the current assessment of the tsunami hazard and risk assessment is representative and that appropriate measures are taken to comply with current requirements. Whenever there is an update in hazard response plans the project owner shall submit for CPM approval an updated THMP showing how the project owner proposes to comply.

The potential for, and mitigation of, the effects of tsunami or seiche caused inundation on the proposed site should also be addressed in a project-specific geotechnical report, per CBC 2015 in accordance with proposed Conditions of Certification **GEO-1** and proposed Conditions of Certification Facility Design **GEN-1**, **GEN-5** and **CIVIL-1**. Mitigation of tsunami run-up hazards includes structural and civil engineering evaluation, strengthening of seafront structures and providing emergency warning systems. Structural reinforcement at the site can be included for tsunami protection, as deemed appropriate at the detailed design stage by the project structural engineer.

### Dam Failure Inundation

Based on review of the County of Los Angeles Safety Element and the City of Long Beach Seismic Safety Element, the project site is mapped in an area subject to flooding from a failure of the Whittier Narrows Dam or the Prado Dam (Ninyo and Moore 2011). Inundation from dam failure could cause damage to the project site. However, dams in California are monitored by various governmental agencies (such as the State of California Division of Safety of Dams and the U.S. Army Corps of Engineers) to guard against the threat of dam failure. Current design and construction practices, and ongoing programs of review, modification, seismic retrofitting, or total reconstruction of existing dams (including recent reconstruction of the Prado Dam) are intended to see that dams are capable of withstanding the maximum credible earthquake for the site. The Whittier Narrows Dam is approximately 20 miles from the project site, and the Prado Dam is approximately 30 miles from the site. Additionally, drainage channel systems for the San Gabriel River and Los Cerritos Channel are provided in the site vicinity to alleviate flooding conditions. Because of the regulatory monitoring of dams, nearby drainage channels, and the site distances from these dams, the potential for inundation due to dam failure is considered low (Ninyo and Moore 2011).

## OPERATION IMPACTS AND MITIGATION

Operation of the proposed plant facilities would not have any adverse impact on geologic, mineralogic, or paleontologic resources. Once the plant is constructed and operating, there would be no further disturbances that could affect these resources. Potential geologic hazards, including strong ground shaking, ground subsidence, liquefaction, settlement due to compressible soils, hydrocompaction, or dynamic compaction, corrosive soils and the possible presence of expansive clay soils can be effectively mitigated through facility design such that these potential hazards would not affect future operation of the facility. Compliance with Condition of Certification **GEO-1**, and Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** in the **Facility Design** section would ensure the project is constructed to current seismic building standards and potential impacts would be mitigated in accordance with current standards of engineering practice.

## CUMULATIVE IMPACTS AND MITIGATION

No geologic and mineralogic resources have been identified in the project area.  The site has not been identified as containing a significant mineral deposit requiring protection. Development of this project is not expected to lead to a significantly cumulative effect on geologic and mineralogic resources within the project area.

Paleontological resources have been documented in the general area of the proposed project but not in sediments that could be encountered beneath the site. If significant paleontological resources are uncovered during construction, they would be protected and preserved in accordance with Conditions of Certification **PAL-1** to **PAL-8**.  These conditions would also mitigate any potential cumulative impacts.

The proposed AEC would be situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by CBC 2013, or the most current version succeeding that code. The potential for lateral spreading and liquefaction must be addressed and mitigated through appropriate facility design. Corrosive soils and soils that may be subject to settlement due to liquefaction and dynamic compaction, must be addressed and mitigated in accordance with a design-level geotechnical investigation as required by CBC 2013, or the most current successor to that code, and proposed Conditions of Certification **GEO-1**, and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1.**

## FACILITY CLOSURE

Future facility closure activities would not be expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location. In addition, the decommissioning and closure of the proposed project would not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

No public or agency comments relating to geologic hazards, geologic resources, mineralogic resources, or paleontologic resources were received on the Preliminary Staff Assessment published July 2016 (CEC 2016). A consolidated list of applicant comments and staff responses are provided below:

**Comment:**  *Page 5.2-27, Condition GEO-2 – AES appreciates Staff's consideration for mitigating potential tsunami risks and is willing to incorporate applicable tsunami recommendations and procedures into the Emergency Action Plans specified in Conditions Worker Safety-1 (Project Construction Safety and Health Program) and Worker Safety-2 (Project Operations and Maintenance Safety and Health Program) similar to other known geologic hazards that exist. In fact, AES's existing site safety plan already includes tsunami response as part of the Emergency Action Plan. As there is no regulatory basis for development of a Tsunami Hazard Mitigation Plan at either the local, state, or federal level, AES requests Condition GEO-2 be deleted in its entirety.*

**Staff's response to Applicant:** Staff declines to delete condition **GEO-2**. Staff appreciates the owner's cognizance of the tsunami hazard and a willingness to address the impacts this hazard presents. Staff has concluded that the hazard to public health and safety from tsunami inundation is significant and requires mitigation. This is within the regulatory purview of the California Energy Commission as authorized consistent with the Warren-Alquist Act. Staff has referred to the Los Angeles County All Hazard Mitigation Plan and Long Beach Public Safety Element, which outline steps to ensure public health and safety from such hazards. Staff concludes **GEO-2** is also consistent with these LORS. The Energy Commission considers preparation and implementation of a Tsunami Hazard Mitigation Plan to be an essential element for ensuring public safety. Staff does agree that the THMP could be part of the Emergency Action Plan, which is part of the Project Construction Safety and Health Program and Project Operations and Maintenance Safety and Health Program required under certification conditions **WS-1** and **WS-2**, respectively. Staff has modified **GEO-2** to allow for incorporation of the tsunami hazard response into the plans for **WS-1** and **WS-2**.

**Comment:** *Page 5.2-29, Condition PAL-1 – AES suggests the following language be added to the verification of the Condition PAL-1, and any other conditions related to the Paleontological Resource Specialist and replacement of said specialist: The Project Owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. A proposed PRS previously approved by Commission Staff within the preceding five (5) years shall be deemed approved ten (10) days after project owner provides a resume and statement of availability of the proposed PRS. The CPM may disapprove a previously approved PRS within seven (7) days of Project Owner submission of the Proposed PRS' resume and statement of availability only if non-compliance or performance issues events were documented in the compliance record for the previous CEC project work conducted by the proposed Paleontological Resource Specialist previously approved within the last five (5) years by the Commission shall be automatically approved and the project owner shall provide a resume and statement of availability. The CPM may disapprove a previously approved PRS if non-compliance or performance issues were documented in the record during the previous project work by the PRS or the PRS's qualifications are not applicable to the specific paleontological resources identified in the project area.*

**Staff's response to Applicant:** Staff declines to revise **PAL-1** in the manner requested because prior performance as a Paleontological Resource Specialist (PRS) on other Energy Commission projects may have no bearing on an individual's qualifications to do so for the proposed AEC. Each proposed project is located in a unique environmental setting that requires an original evaluation of the professional qualifications requirements for a PRS. Therefore, a blanket approval process, based solely on prior acceptance within the last 5 years, is not appropriate for the AEC.

**Comment** *Page 5.2-29, Condition PAL-1 – 3. Prior to any planned change of the PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.*

**Staff's response to Applicant:** Staff will incorporate the proposed text to read "…to any planned change…"

## CONCLUSIONS

Because of its geologic setting, the site could be subject to very strong levels of earthquake-related ground shaking. The significant effects of strong ground shaking on the AEC structures must be mitigated through structural designs required by the most recent edition of the California Building Code (currently CBC 2013). CBC 2013 requires that structures be designed to resist seismic stresses from anticipated maximum ground acceleration.

In addition to strong seismic shaking, the project may be subject to soil failure caused by liquefaction and/or dynamic compaction. A design-level geotechnical investigation required for the project by CBC 2013, or the most current version succeeding that code, and proposed Conditions of Certification **GEO-1** and, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, would present standard engineering design requirements for mitigation of strong seismic shaking, liquefaction and potential excessive settlement due to dynamic compaction.

While not likely to occur during the project design life, the site is subject to inundation by tsunami. Sea level rise could exacerbate the potential for inundation. Staff recommends **GEO-1** which would require the applicant to consider potential impacts from tsunami inundation on facility design. **GEO-2** would require the applicant to develop a tsunami hazard mitigation plan for preparedness and evacuation methods that would ensure public health and safety.

Petroleum is the only economic geologic resource in the project vicinity. Other than petroleum, there are no known viable mineralogical or geologic resources at the proposed AEC site.

The near surface of the project site is highly disturbed and partially covered by artificial fill, blacktop and onsite structures. Native soils beneath the fill have a potential to contain fossils. The underlying San Pedro formation has yielded numerous fossils within the Los Angeles Basin as reported by the applicant's paleontologist during the paleontological archive and literature reviews.

While significant paleontological resources are not anticipated to be discovered during construction of the proposed project, potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed Conditions of Certification **PAL-1** through **PAL-8**.

Based on this information, Energy Commission staff concludes that the potential adverse cumulative impacts to project facilities from geologic hazards during its design life are less than significant. Similarly, staff concludes the potential adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, if any, are less than significant. It is staff's opinion that the proposed AEC can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety

## PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1, GEN-5**, and **CIVIL-1** in the **Facility Design** section and in **GEO-1** of this section. Staff proposes a condition of certification to ensure public health and safety in the event of inundation due to a tsunami in **GEO-2**. Proposed paleontological Conditions of Certification follow in **PAL-1** through **PAL-8**. It is staff's opinion that the likelihood of encountering paleontologic resources could be high in areas where native Pleistocene age deposits occur. Staff would consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative excavations that fully describe site stratigraphy.

**GEO-1** <u>The project owner shall provide to the Certified Building Official (CBO) a</u> Soils Engineering Report, as required by Section 1803 of the California Building Code (CBC) (2013) or the most current version succeeding that code in effect at the time construction of the project were to commence, shall specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of seismicity; liquefaction; dynamic compaction; compressible soils; corrosive soils; and tsunami. In accordance with CBC, the report must also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present.

**<u>Verification</u>:** At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the Soils Engineering Report to the CBO for design review and approval. Submittal of the report shall be coordinated with reports required in accordance with CIVIL-1. The submittal shall include a summary of how the results of the report were incorporated into the project foundation and grading plan design.

**GEO-2** The project owner shall ensure that all staff and visitors at the project site are informed of tsunami hazards in the region and have been shown how and where to evacuate the site if there is potential for a tsunami to affect public health and safety at the site. The project owner shall ensure that the information provided to staff and visitors complies with the recommendations and procedures provided in the 2006 Tsunami Annex to the Los Angeles County Emergency Response Plan (LACOA. 2006) and any of its successors. The project owner shall provide a Tsunami Hazard Mitigation Plan (THMP) to the Compliance Project Manager (CPM) for review and approval.

The THMP shall include:

A. A general discussion of tsunami hazards and the public safety risk they present at the site.

B. Identification of what tsunami hazards exist specific to the project site and how the project owner proposes to ensure compliance with applicable hazard response plans.

C. A discussion of the Tsunami Annex to the Los Angeles County Emergency Response Plan and how that plan applies to the project.

D. A discussion of criteria for a response to ensure public safety for a tsunami event and show where on and offsite refuge can be accessed, and evacuation routes.

E. Identification of any site modifications or signage that may be needed to show how and where refuge is accessible.

F. The THMP shall also include a training program for visitors and workers, which could be incorporated with other safety training programs such as those required in **WS-1** and **WS-2**. The purpose of training is to inform workers and visitors on how to respond to tsunami hazards and where they may obtain refuge in the event it is determined necessary to evacuate the project site. The training shall include:

   i. Information on who and how staff and visitors will be notified that there is a potential for a tsunami event to impact the site and how they should respond;

   ii. Graphics showing methods of seeking refuge and routes for evacuation of the site;

   iii. A certification of completion form signed by each worker/visitor indicating that he/she has received the training; and

   iv. Submittal of the training script and, if the project owner is planning to use a video for training, a copy of the training video, with the set of reporting procedures for workers to follow that will be used to present the training.

   v. Provision for conducting a tsunami evacuation drill for the entire site at least once every two years. A report summarizing the results of an evacuation drill, including a list of participants and any recommendations for modification of the THPM arising from issues identified during conduct of these drills shall be prepared.

The THMP would be updated at least bi-annually, or whenever a later version of the Los Angeles County All Hazard Mitigation Plan is updated to ensure the current assessment of the tsunami hazard and risk assessment is representative and that appropriate measures are taken to comply with current requirements. Whenever there is an update in hazard response plans the project owner shall submit for CPM approval an updated THMP showing how the project owner proposes to comply.

**Verification:** The project owner shall submit the THMP 60 days prior to ground disturbance for CPM review and approval. The project owner shall submit any subsequent updates to the THMP to the CPM within 90 days after an update to an applicable THMP. The project owner shall submit a summary report of an evacuation drill within 60 days of the drill's conclusion.

**PAL-1** The project owner shall provide the CPM with the resume and qualifications of its paleontological resource specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the paleontological resources report (PRR), the project owner shall obtain CPM approval of the replacement PRS.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a Qualified Professional Paleontologist as defined in the Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources by the Society of Vertebrate Paleontology (SVP 2010). The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or

- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

The project owner shall submit to the CPM for review and approval, and keep on file, all resumes of qualified PRMs employed on the project. If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM for review and approval, and kept on file.

**Verification:**

(1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work to the CPM, whose approval must be obtained prior to initiation of ground disturbing activities.

(2) At least 30 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated PRM's for the project. The letter shall state that the identified PRM's meet the minimum qualifications for paleontological resource monitoring as required by this condition of certification. If additional PRM's are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM for approval no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to any planned change of the PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

**PAL-2** The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay-down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings must show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, until ground disturbance is completed.

**Verification:**

(1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

(2) If there are planned changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

**PAL-3** The project owner shall ensure that the PRS prepares a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) and submits the PRMMP to the CPM for review and approval. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. The PRMMP shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall include all updates and reside with the PRS, each PRM, the project owner’s on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP. 2010) and shall include, but not be limited, to the following:

1. Procedures for and assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks required by the PRMMP and these conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why sampling is needed, a description of the sampling methodology, and how much sampling is expected to take place in which geologic units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling at these locations;

6. A discussion of procedures to be followed: (a)in the event of a significant fossil discovery, (b) stopping construction, (c) resuming construction, and (d) how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological resources conditions of certification.

**Verification:** At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

**PAL-4** Prior to ground disturbance the project owner and the PRS shall prepare a CPM-approved Worker Environmental Awareness Program (WEAP).

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources. The purpose of the WEAP is to train project workers to recognize paleontologic resources and identify procedures they must follow to ensure there are no impacts to sensitive paleontologic resources. The WEAP shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to stop or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to stop or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

8. The project owner shall also submit the training script and, if the project owner is planning to use a video for training, a copy of the training video with the set of reporting procedures for workers to follow that will be used to present the WEAP and qualify workers to conduct ground disturbing activities that could impact paleontologic resources.

**Verification:**

(1) At least 30 days prior to ground disturbance, the project owner shall submit to the CPM for review and comment the draft WEAP, including the brochure and sticker. The submittal shall also include a draft training script and, if the project owner is planning to use a video for training, a copy of the training video with the set of reporting procedures for workers to follow.

(2) At least 15 days prior to ground disturbance, the project owner shall submit to the CPM for approval the final WEAP and training script.

**PAL-5** No worker shall excavate or perform any ground disturbance activity prior to receiving CPM-approved WEAP training by the PRS, unless specifically approved by the CPM.

Prior to project ground disturbance the following workers shall be WEAP trained by the PRS in-person: project managers, construction supervisors, foremen, and all general workers involved with or who operate ground-disturbing equipment or tools. A CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. A WEAP certification of completion form shall be used to document who has received the required training.

**Verification:**

(1) In the Monthly Compliance Report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person and/or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

(2) If the project owner requests an alternate paleontological WEAP trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct WEAP training prior to CPM authorization.

**PAL-6** The project owner shall ensure that the PRS and PRM(s) monitor, consistent with the PRMMP, all construction-related grading, excavation, trenching, and auguring in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to stop or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities, and copies of these logs shall be submitted with the monthly compliance report. The PRS may discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event, when construction has been stopped because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities that will be included in each MCR. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. Negative findings, when no fossils are identified, will also be reported. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

**Verification:** The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 15 days in advance of any proposed changes in monitoring different from that identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

**PAL-7** The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and shall be submitted to the CPM for approval.

The report shall include, but not be limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; and the PRS' description of sensitivity and significance of those resources; and indicate if and how fossil material was curated in accordance with PAL-6.

**Verification:** Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

**PAL-8** The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed, including collection of fossil material, preparation of fossil material for analysis, analysis of fossils, identification and inventory of fossils, preparation of fossils for curation, and delivery for curation of all significant paleontological resource materials encountered and collected during project construction. The project owner shall pay all curation fees charged by the museum for fossil material collected and curated as a result of paleontological mitigation. The project owner shall also provide the curator with documentation showing the project owner irrevocably and unconditionally donates, gives, and assigns permanent, absolute, and unconditional ownership of the fossil material.

**Verification:** Within 60 days after the submittal of the PRR, the project owner shall submit documentation to the CPM identifying the entity that will be responsible for curating collected specimens. This documentation will also show that fees have been paid for curation and the owner relinquishes control and ownership of all fossil material.

# Certification of Completion
# Worker Environmental Awareness Program
# ALAMITOS ENERGY CENTER (13-AFC-01)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

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Cultural Trainer: ___________ Signature: __________________ Date: ___/___/____

Paleo Trainer: _____________ Signature: __________________ Date: ___/___/____

Biological Trainer: ___________ Signature: __________________ Date: ___/___/___

## REFERENCES


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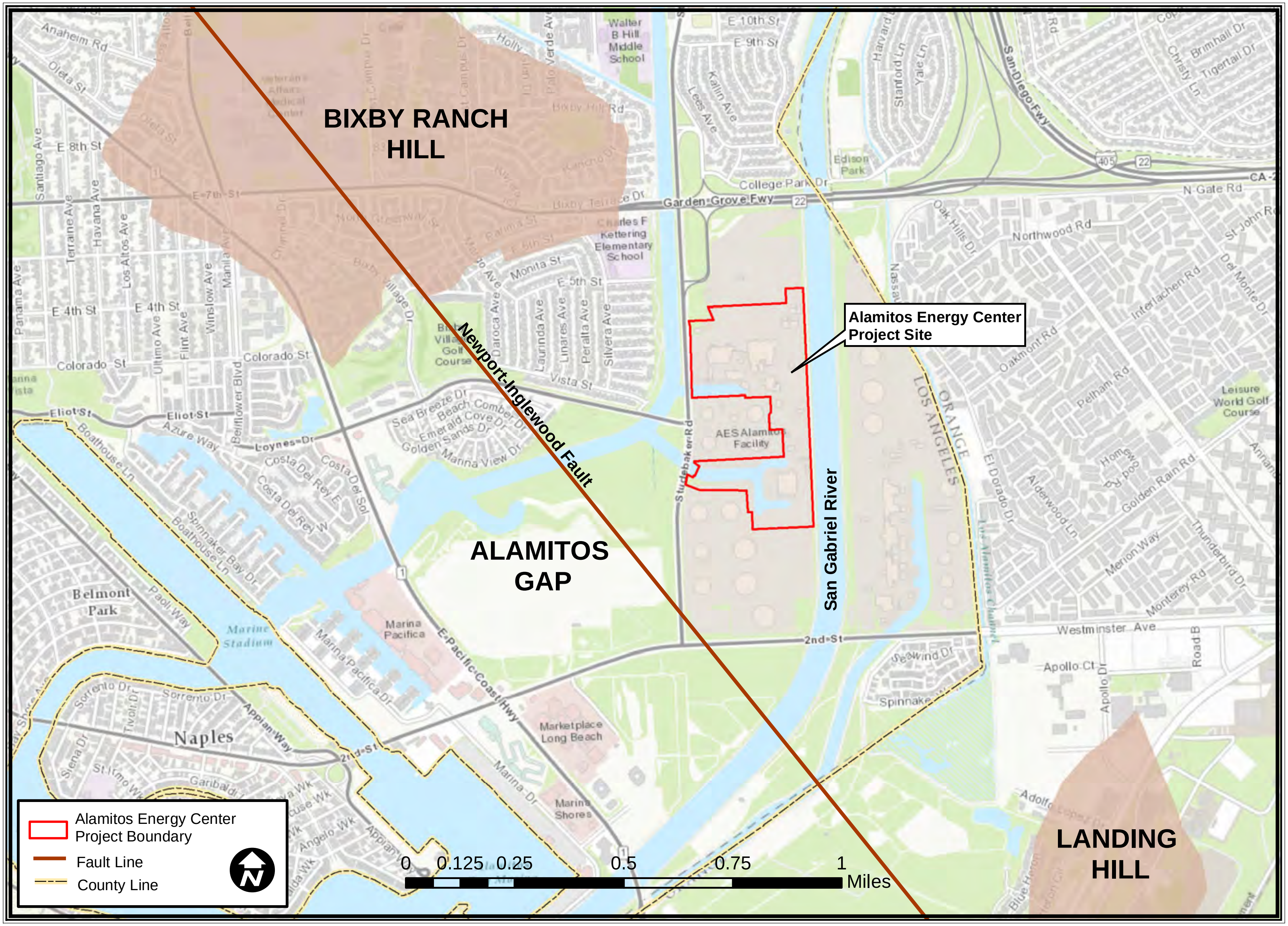
**GEOLOGY AND PALEONTOLOGY - FIGURE 1**
Alamitos Energy Center - Geomorphic Provinces


**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**
SOURCE: California Department of Conservation, California Geological Survey, 2002.

**GEOLOGY AND PALEONTOLOGY- FIGURE 2**

Alamitos Energy Center - Alamitos Gap



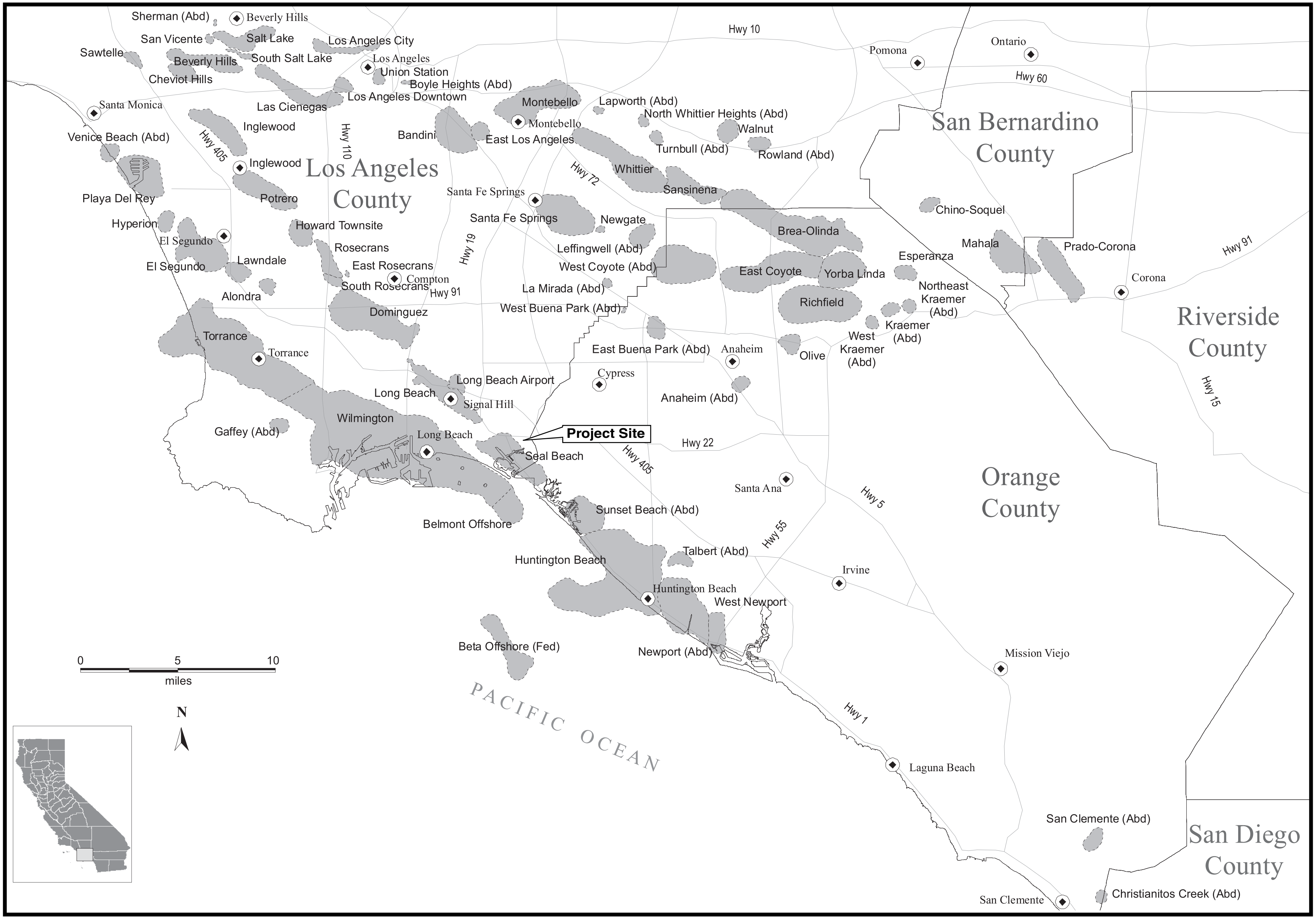



**CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**

SOURCE: Orange County Drought Response Workshop, November 6, 2012

GEOLOGY AND PALEONTOLOGY - FIGURE 3

Alamitos Energy Center - Los Angeles Basin area oil fields

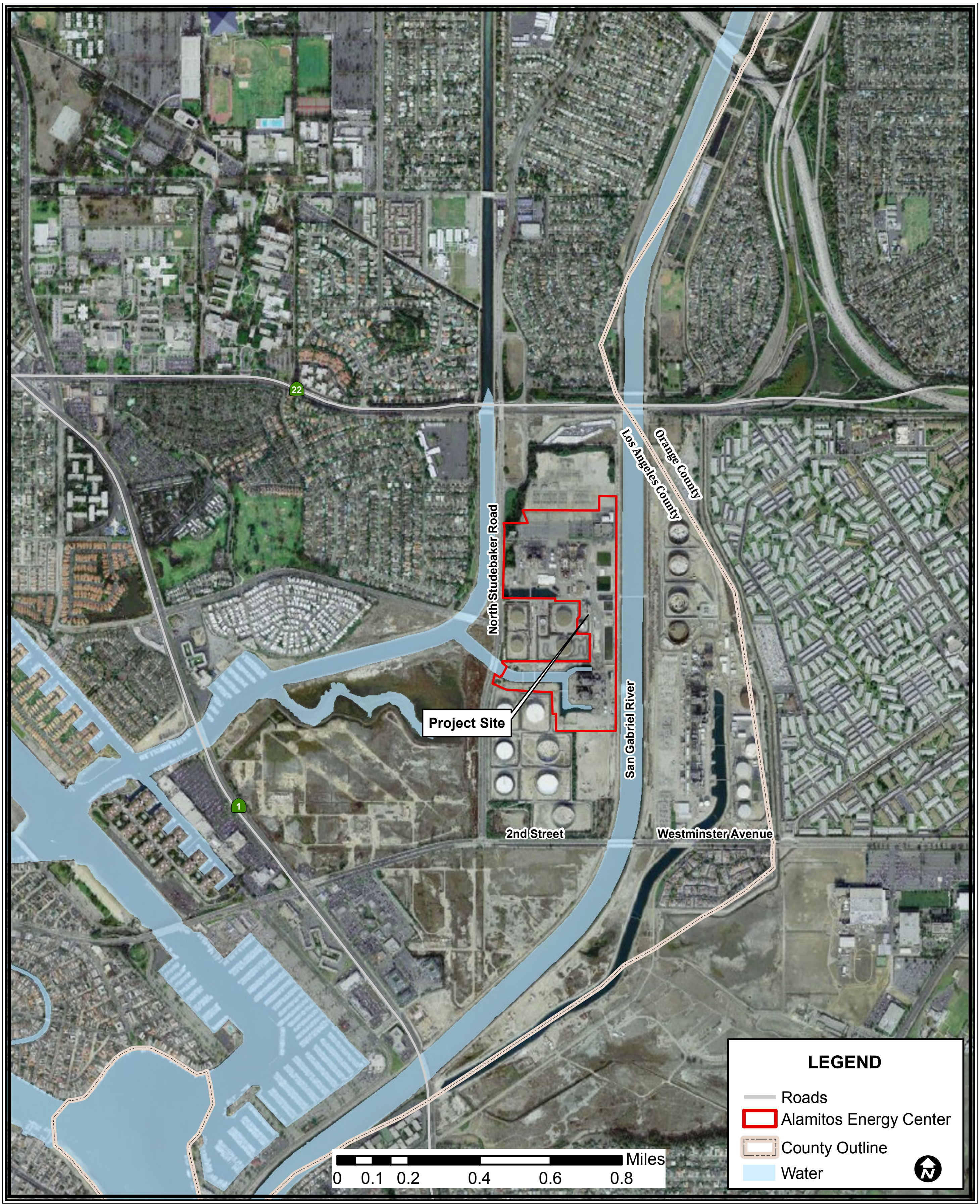



GEOLOGY AND PALEONTOLOGY

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

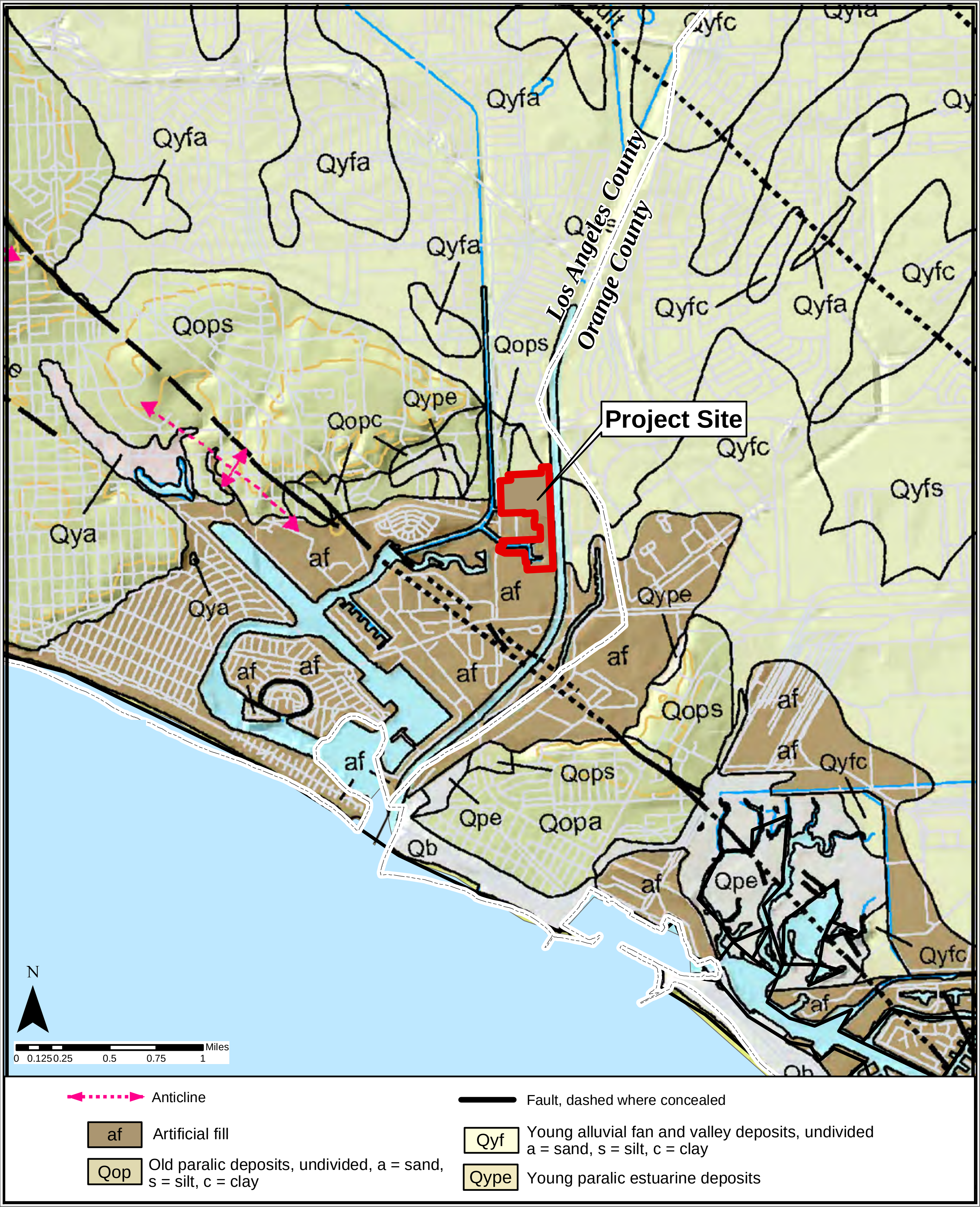
SOURCE: Urban Development of Oil Fields in the Los Angeles Basin Area, 1983 to 2001 (Gamache 2003)

**GEOLOGY AND PALEONTOLOGY - FIGURE 4**
Alamitos Energy Center - Site Map




**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**
Source: Bing Map Image - CEC Staff

**GEOLOGY AND PALEONTOLOGY - FIGURE 5**
Alamitos Energy Center - Geology




**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION**
Source: Dept. of Conservation 2003 preliminary geologic map of Long Beach 30'x60' quadrangle, Southern California with modifications based on site investigations - CEC Staff

# POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab and Jacquelyn Record

## SUMMARY OF CONCLUSIONS

Alamitos Energy Center (AEC) would generate 1,040 MW (net output1) of electricity. Power Block 1 would be in a combined-cycle configuration with a maximum thermal efficiency of 56 percent lower heating value (LHV)2 at maximum full load and average design conditions3. Power Block 2 would be a simple-cycle configuration with a maximum thermal efficiency of 41 percent LHV at maximum full load at average design conditions. While the project would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of providing fast-ramping capabilities and ancillary load-following services. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

## INTRODUCTION

In keeping with the California Environmental Quality Act (CEQA), California Energy Commission (Energy Commission) must make findings on whether the energy use by a power plant would create significant adverse impacts on the environment. If the Energy Commission finds that a power plant's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. Therefore, in this analysis, staff addresses the potential for inefficient and unnecessary consumption of energy at AEC and examines:

- whether the project would present any adverse impacts upon energy resources;
- whether these adverse impacts are significant; and if so,
- whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a less-than-significant level.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No Federal, State or local/county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

[1] Net output is the facility's gross electricity generation minus its parasitic electricity (load) requirements, or the amount of electricity that the facility delivers to the electricity grid.

[2] LHV is lower heating value, or a measurement of the energy content of a fuel correcting for post-combustion water vapor.

[3] At site average annual conditions of 65.3°F and relative humidity of 87 percent (AES 2015f, § 2.1.4)

## SETTING

The applicant proposes to install and operate two power blocks.  Power Block 1 would consist of two natural-gas-fired combustion turbine generators (CTGs) in a combined-cycle configuration, two heat recovery steam generators (HRSGs), one steam turbine generator (STG), an air-cooled condenser, an auxiliary boiler, and related ancillary equipment. Power Block 2 would consist of four simple-cycle CTGs with fin-fan coolers and ancillary equipment. (AEC 2015f § 2.0). AEC would provide peaking and load following power to the Western Los Angeles Basin sub-area (AEC 2015f, § 2.0). There are six existing natural gas-fired conventional steam turbine units on the project site referred to as Alamitos Generating Station (AGS) Units 1 through 6, which were constructed in the 1950s through the 1960s and have a combined generating capacity of 2,025 MW net. These units are to be retired, decommissioned, and removed and 1,040 MW of their total net capacity would be replaced by AEC.

Natural gas would be delivered to AEC via an existing 30-inch-diameter pipeline owned and operated by Southern California Gas Company (SoCalGas) natural gas pipeline (AEC 2015f §§ 2.0).

## ASSESSMENT OF IMPACTS

### METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (California Code of Regulations, title 14, §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (California Code of Regulations, title 14, §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

## PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any thermal power plant large enough to fall under Energy Commission siting jurisdiction (50 MW [net] or greater), by definition, consumes large amounts of energy. The project would burn natural gas at a maximum rate of approximately 8,137 million Btu[4] (mmBtu) per hour and consume up to 29,318,594 mmBtu annually (§ 5.1, Table 5.1-21). Additional fuel would be consumed to support an estimated 500 annual start-up and shutdown sequences. This is a substantial rate of energy consumption, but would not impact energy supplies (See **Adverse Effects on Energy Supplies and Resources Below For Further Discussion**). AEC would generate electricity at a full-load efficiency of approximately 56 percent for the combined-cycle block (Power Block 1) and 41 percent for the simple-cycle block (Power Block 2) (AEC 2015f, § 2.0). This efficiency level of 56 percent compares favorably with the average fuel efficiency of a typical combined-cycle power plant and the efficiency level of 41 percent compares favorably with the average fuel efficiency of a simple-cycle plant. Also, the project would improve the overall thermal efficiency of electricity production compared to the existing, aging AGS Units 1 through 6 due to the higher efficiency of the AEC's modern and new CTGs.

## ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (AEC 2015f, § 2.1.1.1). Natural gas for the project would be supplied from an existing SoCalGas natural gas transmission pipeline. The SoCalGas natural gas system has access to gas from the Rocky Mountains, Canada and the southwest. This represents a resource of considerable capacity and offers access to adequate annual supplies of natural gas. However, gas demand is both instantaneous and long-term (e.g., annual), and the current closure and potential long-term de-rate of the SoCalGas' Aliso Canyon natural gas storage facility, located north/northwest of the San Fernando Valley near Los Angeles, may impact instantaneous natural gas deliveries to the power plants it serves. This includes the existing AGS and it could potentially impact the proposed AEC.

The state's program to bring once-through cooling power plants into compliance with water quality standards is forcing the retirement of a substantial amount of dispatchable generation in coastal areas and their replacement with new electrical generation to preserve the reliability of the California electric grid system. In keeping with this program, the approximately 50-60 year-old retiring once-through cooling AGS would be replaced by the modern and more efficient proposed AEC, resulting in less natural gas consumption per megawatt (MW) of generation. Additionally, dispatch orders generally call for the most efficiently-generated energy first; especially when peaking capacity is required (the proposed AEC would include peaking units). Therefore, the older, less efficient plants are being displaced by modern and more efficient gas-fired power generation. The electric grid system's reliance on new generation in the region rather than on the existing aging plants would result in further decreases in natural gas consumption per MW of generation and would help alleviate the potential effect of the closure of Aliso Canyon. The expected first fire dates for the two power blocks are the

[4] British thermal units

3rd quarter of 2019 for the combined-cycle power block and the 3rd quarter of 2021 for the simple-cycle power block (CH2 2016y).

## ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas would be delivered to the project site via an existing natural gas pipeline that would be connected to an existing SoCalGas natural gas transmission pipeline (AEC 2015f, §§ 1.1, 2.7.4). Gas supplies would be acquired from gas providers in supply regions accessible through the SoCalGas' gas transmission system. As noted above, this transmission system represents a resource of considerable capacity. Thus, AEC would not require additional natural gas capacity.

## COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of AEC.

## ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The evaluation of alternatives to the proposed project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the proposed project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by both the configuration of the power producing system and the selection of equipment used to generate its power.

### Project Configuration

AEC would be configured into two power blocks.  Power Block 1 would use two General Electric (GE) 7FA.05 CTGs in a combined-cycle configuration.  Power Block 2 would use four GE LMS100PB CTG units in a simply-cycle configuration. Each block would utilize the GE's fast-start, flexible technology. These two configurations, with their short start-up time and fast ramping[5] capabilities, are well suited for providing peaking and load-following power.

### Efficiency of Alternatives to the Project

#### Alternative Generating Technologies

For purposes of this analysis, staff considered solar technology, other fossil fuels, nuclear, biomass, hydroelectric, wind, and geothermal technologies as alternative generating technologies for AEC. Due to regulatory prohibitions, nuclear technology was rejected. Biomass, hydroelectric, geothermal, wind, and solar technologies were ruled out due to the lack of adequate space on the project site and/or the unavailability of these energy resources in the project area. And, coal and oil are too highly polluting. Therefore, staff believes that the applicant's selection of a natural gas-burning technology is reasonable.

[5] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

**Natural Gas-Burning Technologies**

Fuel consumption is one of the most important economic factors in selecting a turbine generator; fuel typically accounts for over two-thirds of the total operating costs of a natural gas-fired power plant. Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines embody the most fuel-efficient electric generating technology currently available. The 7FA.05 heavy duty CTG and LMS100PB CTG proposed for the AEC project are nominally rated at 376 MW net with 60.3 percent efficiency and 109 MW net with 44.1 percent efficiency, respectively at ISO-conditions[6] (GTW 2016).

For Power Block 1, alternative machines that can meet the project's objectives of the generating capacity requirements of load following electricity would be the Mitsubishi M501G.  The M501G gas turbine is nominally rated at 398 MW[7] net and 58.4 percent efficiency at ISO conditions in a combined-cycle configuration (GTW 2016). For the AEC SCGT (Power Block 2), alternative machines that can meet the project's objectives of the generating capacity requirements of peaking/load following services would be the Mitsubishi H-100 gas turbine in a simple-cycle configuration which is nominally rated at 101 MW and 37.8 percent efficiency LHV at ISO conditions (GTW 2016).

For the AEC CCGT (Power Block 1) the 7FA.05 also offers a significantly higher ISO rated efficiency than the Mitsubishi M501G. Similarly, for the AEC SCGT (Power Block 2) the LMS100 PB CTG offers a significantly higher ISO rated efficiency than the Mitsubishi H-100.  However, actual performance may vary and is based on project site conditions, such as annual range of ambient temperature and humidity, and any differences in actual operating efficiency between these two machines may be insignificant. In order to meet the AEC generating capacity requirement of 1,040 MW net, the same amount of CTGs would be needed for each power block.

The efficiency of the combined cycle portion of the project would be 56 percent (AEC 2015f, § 2.1.3 and Figures 2.1-4a and 2.1-4b). The 7FA.05 is a modern CTG and its efficiency is comparable, if not superior, to the efficiency of other, currently-operating, modern combined cycle CTGs such as the Mitsubishi M501G. The efficiency of the simple-cycle portion of the project would be 41 percent (AEC 2015f, § 2.1.4 and Figures 2.1-3a and 2.1-3b).[8] The LMS100 PB is a modern CTG and its efficiency is comparable, if not superior, to the efficiency of other, currently-operating, modern simple cycle CTGs such as the Mitsubishi H-100.

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[6] ISO (International Organization for Standardization): In this case, ISO Standard 27.040 for measurement of gas turbine capacity. These standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure.

[7] ISO rated MW net values are used here because site-specific values are not available for the comparable systems. The MW net rating used here for the 7FA.05 and LMS100 PB machines, does not reflect the site-specific design conditions such as site elevation, air inlet and outlet pressures, and parasitic loads, which result in 667 MW net for the CCGT and 379 MW for the SCGT referenced elsewhere in this analysis.

[8] This efficiency is based on the average climatic conditions at the project site.

Staff concludes that in terms of thermal efficiency, the GE 7FA.05 and LMS100 PB are appropriate choices of machines for the project.

### Inlet Air Cooling

A gas turbine's power output decreases as ambient air temperatures rise. Cooling the air as it enters the turbine increases its power output and cycle efficiency. Therefore, alternative gas turbine inlet air cooling methods are usually evaluated as a part of the equipment selection process for a power plant. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater gross power output than the evaporative cooler on hot, humid days; however, it consumes electricity to operate its refrigeration process, slightly reducing the turbine's overall net power output and efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively minor.

The project site climate is mild, tempered by cool sea breezes. This usually mild climatological pattern can be interrupted by periods of extremely hot weather, winter storms, or Santa Ana winds (AEC 2015f § 5.1.3.2). Staff believes that the evaporative gas turbine inlet air cooling system proposed by the applicant (AEC 2015f Table 2.7-1) would have no significant adverse energy impacts.

In conclusion, the project configuration (combined cycle and simple-cycle) and generating equipment (7FA.05 and LMS100 PB) chosen represent a sufficiently efficient combination to satisfy the project objectives of efficient power production with operational flexibility as identified in the Supplemental AFC (AEC 2015f, § 2.1). There are no alternatives that could significantly reduce energy consumption.

## CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the project to create cumulative impacts on natural gas resources. Note that the SoCalGas natural gas supply system draws from extensive supplies originating in the Rocky Mountains, in the southwest, and in Canada. Staff concludes that the SoCalGas system is adequate to supply the project without creating a significant cumulative impact. For further discussion, see **Adverse Effects on Energy Supplies and Resources** above.

## RESPONSES TO PSA COMMENTS

Applicant's Comment: *Page 5.3-3, **Adverse Effects on Energy Supplies and Resources**, 2$^{nd}$ paragraph, last sentence – This sentence indicated AEC will start up the first quarter of 2017 to the third quarter of 2021. This is the construction period for the project. The expected first fire dates for the two power blocks are 3$^{rd}$ quarter 2019 for the combined-cycle power block and 3$^{rd}$ quarter 2021 for the simple-cycle power block.*

Response to Comment: Staff has incorporated the clarifying language regarding the expected first fire dates for the two power blocks into this Final Staff Assessment (see **Adverse Effects on Energy Supplies and Resources** above).

Staff received no other comments from the applicant and no comments from the public, interveners, or agencies in the area of **Power Plant Efficiency**.

## CONCLUSIONS

The project would generate 1,040 MW (net output); AEC CCGT would have a maximum thermal efficiency of 56 percent LHV at maximum full load and average design conditions. AEC SCGT would have a maximum thermal efficiency of 41 percent LHV at maximum full load and average design conditions. While it would consume substantial amounts of energy, it would do so in a sufficiently efficient manner to satisfy the project's objectives of producing peak-load electricity and base load services. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

## PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

## REFERENCES

**AEC 2015f** – Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**CH2 2016y** – Initial Comments on Preliminary Staff Assessment (TN 212487) dated July 27, 2016. Submitted to CEC/Dockets on July 27, 2016

**GTW 2016** – Gas Turbine World, January-February 2016, Turbine Specifications

# POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab and Jacquelyn Record

## SUMMARY OF CONCLUSIONS

Staff concludes that Alamitos Energy Center (AEC) would be built to operate in a manner consistent with industry norms for reliable operation and would be able to achieve the equivalent availability factor of approximately 98 percent predicted in the Application for Certification. (The equivalent availability factor of a power plant is the percentage of time it is available to generate power, accounting for both planned and unplanned outages.) No conditions of certification are proposed for power plant reliability.

## INTRODUCTION

This analysis evaluates AEC to determine if the power plant would be built in accordance with typical industry norms for reliable power generation. Staff uses these norms because they ensure that the resulting project would not degrade the overall reliability of the electric system it serves (see the "**Setting**" subsection, below). The scope of this power plant reliability analysis covers the following benchmarks:

- equipment availability;
- plant maintainability and maintenance program;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff uses the above benchmarks as appropriate industry norms to evaluate the project's reliability and determine if its availability factor is achievable.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to power plant reliability.

## SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), which purchase, dispatch, and sell electricity throughout the state. How the California ISO and other control area operators ensure system reliability is an evolving process; new protocols are being developed and put in place to ensure sufficient reliability with the integration of renewable power sources in the competitive market system.

Historically, one of the primary mechanisms used to ensure system reliability was the California ISO's "Reliability Must-Run" (RMR) power purchase agreement. In recent years, the means of ensuring system reliability have shifted from RMR agreements to the California Public Utilities Commission's (CPUC's) Resource Adequacy (RA) program. Nearly all RAs have "Participating Generator Agreement", or PGA, to ensure an adequate supply of reliable power. PGA allows the California ISO operators to invoke "command and control" authority on PGA resources and forces resources to conform to the California ISO Tariff.

The California ISO also requires that power plants selling ancillary services fulfill certain requirements, including:

- filing periodic reports on power plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the California ISO.

The above mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that each new power plant in California will exhibit reliability levels similar to those of other power plants currently serving the state's electric system. New power plants should operate in a manner to at least maintain the industry's current level of reliability.

## ASSESSMENT OF IMPACTS

## METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how a project is designed, sited, and operated in order to ensure its safe and reliable operation (Cal. Code Regs., tit. 20, § 1741[b][3]). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is the case if a project is at least as reliable as other power plants on that system.

The equivalent availability factor of a power plant is the percentage of time it is available to generate power, accounting for both planned and unplanned outages. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available, and upon starting failures and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these industry measures, making a reliable power plant one that is available when called upon to operate. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, power plant maintainability, fuel and water availability, and resistance to natural hazards. The following analysis evaluates these measures.

## EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adoption of appropriate quality assurance/ quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for adequate maintenance and repair of project equipment and systems.

### Quality Control Program

The applicant describes a QA/QC program (AEC 2015f, § 2.5.7) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. The QA/QC program would include performing receipt inspections, testing of components, and administering independent testing contracts. Implementation of this program would result in adequate reliability of operational equipment.

### Equipment Redundancy

A generating facility must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (AEC 2015f, § 2.5.2 and 2.5.3). For example, the combustion turbine generator's (CTG's) lube oil system would include redundant pumps, filters, and coolers, and redundant microprocessors and sensors would be provided in the turbine's control system. Also, technology advancements have led to extremely high reliability for the CTGs considered for this project. Staff concludes that the project's proposed equipment redundancy would be sufficient for its reliable operation.

## PLANT MAINTAINABILITY AND MAINTENANCE PROGRAM

Equipment manufacturers provide maintenance recommendations for their products, and power plant owners usually develop their plant's maintenance program based on those recommendations. Such a program encompasses both preventive and predictive maintenance techniques. AEC would develop its maintenance program the same way (AEC 2015f, § 2.5.7.2). Additionally, because AEC would be expected to operate only up to 50 percent of the time (AEC 2015f, § 2.6), there would be plenty of opportunity for planned maintenance to be done during the times the project is offline, thus not affecting its operation. Therefore, staff believes the project would be adequately maintained to ensure an acceptable level of reliability.

## FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening the power supply.

## Fuel Availability

AEC would use natural gas supplied by Southern California Gas Company (SoCalGas) and would connect to a new gas metering station, one for each AEC power block (AEC 2015f, § 2.1.1.1). Gas supplies would be acquired from gas providers in supply regions accessible through the SoCalGas' natural gas transmission system. This transmission system is connected to natural gas resources spanning the Rocky Mountains, Canada, and the southwest. This represents a resource of considerable capacity and offers access to adequate annual supplies of natural gas. However, gas demand is both instantaneous and long-term (e.g., annual), and the closure and potential long-term de-rate of the SoCalGas' Aliso Canyon natural gas storage facility, located north/northwest of the San Fernando Valley near Los Angeles, may impact instantaneous natural gas deliveries to the power plants it serves. This includes the existing AGS and it could potentially impact the proposed AEC.

The state's program to bring once-through cooling power plants into compliance with water quality requirements is forcing the retirement of a substantial amount of dispatchable generation in coastal areas and their replacement with new electrical generation to preserve the reliability of the California electric grid system. In keeping with this program, the approximately 50-60 year-old retiring once-through cooling AGS would be replaced by the modern and more efficient proposed AEC, resulting in less natural gas consumption per megawatt (MW) of generation. Additionally, dispatch orders generally call for the most efficiently-generated energy first; especially when peaking capacity is required (the proposed AEC would include peaking units). Therefore, the older, less efficient plants are being displaced by modern and more efficient gas-fired power generation. The electric grid system's reliance on new generation in the region rather than on the existing aging plants would result in further decreases in natural gas consumption per MW of generation and would help alleviate the potential effect of the closure of Aliso Canyon. The expected first fire dates for the two power blocks are the 3rd quarter of 2019 for the combined-cycle power block and the 3rd quarter of 2021 for the simple-cycle power block (CH2 2016y).

## Water Supply Reliability

AEC would be both a simple-cycle and a combined-cycle project. With the elimination of once through cooling and most of the steam cycle make-up, the consumptive demand for AEC is projected to be substantially less than the amount of water currently provided to AGS Units 1 through 6 (AEC 2015f, Tables 2.1-1 and 2.1-2). The project's process water and potable water source would be from the Long Beach Water District (LBWD); the point of connection would be to the existing onsite AGS Units 1 through 6 water supply pipeline that enters the site along Studebaker Road (AEC 2015f, §§ 2.1.1, 2.5.5, 5.15.1.4). LBWD has provided a will-serve letter (see Appendix 2D) confirming the adequacy of the regional water supply into the foreseeable future.

Therefore, staff concludes that this source of water supply is a reliable source of water for the project (see the **Soil and Water Resources** section of this document for a detailed discussion of water supply).

## POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes), flooding, and tsunamis (tidal waves) could present credible threats to the project's reliable operation.

### Seismic Shaking

The site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered significant during the design life of the proposed structures (AEC 2015f, §§ 2.4.2); see the "Faulting and Seismicity" portion of the **Geology And Paleontology** section of this document. The project would be designed and constructed to the latest applicable engineering LORS (AEC 2015f, § 2.4, Appendix 2C). Compliance with the latest seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because the project would be built to the latest seismic design LORS applicable at the time the project's final design would be underway, this project would perform at least as well as, and perhaps better than, existing plants in the electric power system.

Staff has proposed conditions of certification to ensure project compliance with these LORS; see **Geology And Paleontology** Condition of Certification **GEO-1 and GEO-2** and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**. These conditions include standard engineering design requirements for mitigation of strong seismic shaking, liquefaction, and potential excessive settlement due to dynamic compaction. Therefore, staff believes there are no special concerns with power plant functional reliability due to seismic shaking.

### Flooding

The AEC power blocks are at an elevation of approximately 12-15 feet above mean sea level (AEC 2015f, § 5.4.1.1). It is not in the Federal Emergency Management Agency (FEMA) 100-year flood zone (AEC 2015f, § 2.4.2). Nevertheless, project features would be designed and built to provide adequate levels of flood resistance by complying with Conditions of Certification **GEN-1**, **CIVIL-1**, **CIVIL-3**, and **CIVIL-4**. Therefore, staff believes there are no special concerns with power plant functional reliability due to flooding.

### Tsunami

In the vicinity of the project site, the potential tsunami inundation area is adjacent to the AEC site along the river channel and within 0.5 mile of an enclosed bay or harbor that could be subject to tsunamis (AEC 2015f, § 5.15.2.2). Because the site's existing elevation is approximately 12 to 15 feet above existing mean sea level, there would still be a buffer of at least 5.5 feet on the AEC site.

U.S. building codes generally have not addressed the subject of designing structures in tsunami zones (Reynolds 2013). The FEMA's Coastal Construction Manual (FEMA 2013), developed to provide design and construction guidance for structures built in coastal areas, addresses seismic loads for coastal structures and provides information on tsunami and associated loads. This manual cites ASCE Standard ASCE 7-10, Minimum Design Loads for Buildings and Other Structures as the reference to be consulted during design of structures. ASCE 7-10 is codified in the California Building Code. AEC would be designed and constructed in accordance with this code (as required by **GEN-1** and **GEO-1**). This, combined with an additional buffer of 5.5 feet on the site, would adequately protect the project from tsunami. (For further discussion, see the **Geology and Paleontology** section of this FSA).

## COMPARISON WITH EXISTING FACILITIES

Industry statistics for equivalent availability factors are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [http://www.nerc.com]. In its latest report, for the years 2009 through 2014, NERC reports an equivalent availability factor of 80 percent for CTGs (combustion turbine generators) with a capacity of 100-299 MW (NERC 2014). Since AEC, consisting of 1,040-MW CTGs, falls within this range, staff uses this 80 percent availability factor for comparison to AEC.

The project's CTG would be modern General Electric (GE) 7FA turbines combined with modern GE LMS100 turbines. The GE 7F model has been in commercial operation for many years and has exhibited high reliability; similarly the GE LMS100 has been in commercial operation now for many years. The AEC's CTGs could well be expected to outperform the fleet of various, mostly older CTGs that make up the NERC statistics. The anticipated maturation period of AEC's power blocks would range between 6 and 12 months following commercial operation. The applicant has committed to functional testing, performance testing, punch-list resolution, reliability runs, and warranty claims, as well as extensive QA/QC during the commissioning and start-up of the facility (AEC 2015f, § 2.5). These measures would accelerate the maturation process and ensure that the project would exhibit high reliability throughout its operating life.

Also, as explained above, the CTGs would be equipped with redundant features, and would be expected to operate only up to 50 percent of the time; there would be plenty of opportunity for planned maintenance to be done during the times the project is offline, thus not affecting its operation. Therefore, the applicant's expectation of an annual availability factor of 98 percent (beyond the 6- to 12- month maturation period) is reasonable when compared to the NERC's availability factor of 80 percent.

## RESPONSES TO PSA COMMENTS

**Applicant's Comment:** *Page 5.4-4, **Fuel Availability**, 1st full paragraph, last sentence – This sentence indicated AEC will start up the first quarter of 2017 to the third quarter of 2021. This is the construction period for the project. The expected first fire dates for the two power blocks are 3rd quarter 2019 for the combined-cycle power block and 3rd quarter of 2021 for the simple-cycle power block.*

> **Response to Comment:** Staff has incorporated the clarifying language regarding the expected first fire dates for the two power blocks into this Final Staff Assessment (see **Fuel Availability** above).

Staff received no other comments from the applicant and no comments from the public, interveners, or agencies in the area of Power Plant Reliability.

## CONCLUSIONS

The applicant predicts an equivalent availability factor of approximately 98 percent, which staff believes is achievable. Staff concludes that AEC would be built to operate in a manner consistent with industry norms for reliable operation.

## PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification are proposed.

## REFERENCES

**AEC 2015f** - Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**CH2 2016y**- Initial Comments on Preliminary Staff Assessment (TN 212487) dated July 27, 2016. Submitted to CEC/Dockets on July 27, 2016

**FEMA 2013** — Federal Emergency Management Agency, FEMA P-55, Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (4th edition), Nov 13, 2013.

**NERC** (North American Electric Reliability Council) **2014** – 2009–2014 Generating Availability Report.

**Reynolds 2013** — Reynolds, David, Engineers Design Tsunami-Resistant Port in California, ASCE Civil Engineering Magazine, January 15, 2013.

# TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

## SUMMARY OF CONCLUSIONS

The proposed project facilities from the generator to the interconnection with the Southern California Edison (SCE) Alamitos switchyard, including, the step-up transformer, the project switchyards, the 230 kV overhead transmission line, and the termination are acceptable, in accordance with good utility practices and would comply with applicable Laws, Ordinances, Regulations and Standards (LORS).

Staff expects the California Independent System Operator (California ISO) will find the Alamitos Energy Center (AEC) project to be substantially unchanged from the existing Alamitos Generating Station (AGS) plant and to have no significant impacts on the existing transmission system. The applicant has requested exemption from the California ISO generator interconnection study process in accordance with section 25.1 of the California ISO tariff which allows the California ISO to exempt a generator from the interconnection queue study process if the new generator is found to be substantially unchanged from the generator it replaces (CH2 2016q). Submittal of the California ISO 25.1.2 exemption report has been added to Condition of Certification TSE-3.

## INTRODUCTION

## STAFF ANALYSIS

This Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conform to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the California Environmental Quality Act (CEQA), the California Energy Commission (Energy Commission) must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified downstream transmission facilities (beyond the first point of the proposed interconnection) that are required for interconnection and represent the "whole of the action." Any downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant are used to identify the requirement for any additional CEQA analysis for potential indirect impacts.

Energy Commission staff relies on the interconnecting authority, in this case the California ISO, for the analysis of impacts on the transmission grid from the proposed interconnection as well as the identification and approval of new or modified facilities downstream that may be required as mitigation measures. The proposed AEC would connect to the SCE transmission network and requires analysis and approval by SCE and the California ISO.

## ROLE OF SCE

SCE is responsible for ensuring electric system reliability on its transmission system and the integration of the proposed generating plant into the grid. Normally SCE will provide analysis in their Phase 1 and Phase 2 Interconnection Studies, if required, and identify any proposed downstream changes required in its transmission system to interconnect the AEC.

## ROLE OF CALIFORNIA ISO

The California ISO is responsible for system operation on the California ISO grid, ensuring electric system reliability for all participating transmission owners and for developing the standards and procedures necessary to achieve system reliability. The California ISO is responsible for completing the interconnection studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will also determine the reliability and delivery impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO tariff, the California ISO will determine the need for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The proposed AEC project is expected to be exempted from these studies by the California ISO because the project replaces the existing AGS and would not impact the transmission grid much differently than the existing generator. The California ISO tariff Section 25.1 allows a proposed generator to be excused from the interconnection study process if the California ISO and the PTO find that the project is substantially unchanged from the existing project it replaces. If necessary, the California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code (NESC), 2007 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.

- The North American Electric Reliability Corporation (NERC) Reliability Standards define the plans, policies & procedures, methodologies & system models, coordination & responsibilities, and performance criteria for reliable planning, control and operation of the North American bulk electric system (BES) over a broad spectrum of system conditions and following a wide range of probable disturbances. The standards cover all aspects of an interconnected BES such as: Transmission system planning & operation, consistent data (steady-state and dynamic) for modeling and simulation, facility ratings methodology and connections, balancing real power, resources & load demand, procedures for voltage control & reactive power, system protection, control, communications & security, nuclear plant interface coordination, emergency operation planning, and system restoration plans. The transmission planning standards stipulate periodic system simulations and associated assessments over a planning horizon by the planning authority and transmission planner to ensure that reliable systems are planned with sufficient lead time to meet the system performance requirements and continue to be modified or upgraded as necessary for operating the network reliably to supply projected customer demands and firm transmission services under normal and forced or maintenance outage system conditions.

  For an interconnected bulk electric system, Table I in the NERC Transmission Planning Standards specifies the system performance requirements during normal system conditions with all facilities in service (pre-contingency) and normal operating procedures in effect under Category A, and during probable and rational contingencies of a single BES element under Category B and two or more (multiple) BES elements under Category C. The performance limits or impacts for the above Categories A-C are specified for a reliable system as to remain stable, and within applicable normal and emergency facility thermal ratings and system voltage limits as determined and applied by the transmission owner according to the NERC Facility Ratings Standards. Specified system performance limits may vary from no loss of load demand or curtailed generation/firm transfers for insignificant adverse impacts (for Categories A & B) to planned/controlled loss of load demand or curtailed generation/firm transfers (for Category C) without any cascading outages. However, during major extreme disturbances such as loss of multiple 500 kV lines on a common right-of-way with cascading outages or multiple generators with loss of a major load center as stated under Category D in the Table I, some of the interconnected systems may become unstable resulting in widespread black out in islanded areas. The standards require the planning authority to evaluate the risks and consequences for such catastrophic events, and be prepared according to the NERC Emergency Operation Planning Standard and/or to restore the system to normal according to the NERC standard for System Restoration Plans (NERC 2005-10).

- The Western Electric Coordinating Council (WECC) Regional System Performance Criteria is similar to the system performance limits as defined in NERC transmission planning standards. The WECC performance criteria incorporate Table I NERC transmission planning standards and include the WECC Disturbance-Performance Table W-1 which provides standards for transient voltage and frequency limits, and post-transient system voltage variation. Certain aspects of the WECC performance criteria are either more stringent or specific than the NERC standards, such as inclusion of contingency event frequencies and additional Category C & D contingencies. Adequate reactive power resources planning criteria for transfer path ratings and post-transient voltage stability are also included. For any past disturbance that actually resulted in cascading outages in the interconnected system, the WECC performance criteria require remedial action so that future occurrences of such events would not result in cascading outages(WECC 2008).
- California ISO planning standards also provide standards and guidelines to ensure the adequacy, security, and reliability in the planning of the California ISO grid transmission facilities. The standards incorporate the current NERC Reliability Planning Standards and WECC Regional System Performance Criteria. However, the California ISO standards are more stringent or specific than the NERC standards and WECC performance criteria. The standards include additional Category B disturbance elements and criteria for existing nuclear plant unit’s control. The standards also address new transmission versus involuntary load interruptions. The California ISO Standards apply to the electric systems of all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides rules, procedures and guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides an operational review of all facilities that are to be connected to the California ISO grid. The tariff specifies the required Generator Interconnection and Delivery Allocation Procedures (GIDAP) and Large Generator Interconnection Agreement (LGIA) to be followed for any large generator interconnection to the California ISO controlled grid (California ISO 2010a).

## EXISTING FACILITIES AND RELATED SYSTEMS

The applicant proposes to replace the existing AGS plant (1950's era steam turbine technology with ocean water once-through-cooling (OTC) system and related facilities) which is scheduled to be shut down by 2020 as part of the State Water Resources Control Board's OTC phase out. The proposed AEC project, includes air-cooled condensers and modern fast-starting combined-cycle (CC) technology. The AGS plant located at the coast line of the city of Long Beach, is now operating with six natural gas -fired steam turbine /Generator (Gen) Units with a total 1,950 MW net generating capacity. The AGS combustion turbine Unit 7 is non-operational. Each of the six operating units is interconnected individually at the existing SCE-owned Alamitos 230 kV switchyard located near the site of the AGS plant.

## EXISTING SCE ALAMITOS 230 KV SWITCHYARD

The existing SCE-owned Alamitos 230 kV switchyard situated just outside the north fence line of the Alamitos property, has a double bus, double breaker arrangement in two sections, section A (west bus) and section B (east bus). Section A and section B have a north and south bus. Thus the Alamitos switchyard has four busses, section A north, section A south, section B north and section B south.

The two section A (west) buses have eight 230 kV switching bays (SB) each with two 230 kV, 2,500/3,000-ampere circuit breakers (CB). The existing AGS generating units 1 through 4 connect to the section A buses at the SB no. 2, 4, 6 and 8 respectively. There are two 2,500-ampere, 230 kV breakers and two 2,500-ampere associated disconnect switches for each breaker. The four remaining SB bays at the section A buses each have two 3,000-ampere breakers and two associated 3,000-ampere disconnect switches for each breaker and connect to SCE's Lighthipe, Barre and Long Beach substations.

The two Section B (east) buses have four 230 kV SBs and the existing AGS Generating units 5 and 6 are connected to section B buses at SB no. 1 and 3 respectively, each with two 2,500-ampere breakers and two 2,500-ampere associated disconnect switches for each breaker. The remaining two bays at section B buses, each with two 3,000-ampere, 230 kV breakers and two associated disconnect switches for each breaker, connect to SCE's Barre and Center Line substations.

There is a bus-section 3,000-ampere breaker with two associated 3,000-ampere disconnect switches between section A (west) and section B (east) north 230 kV buses.

## PROJECT DESCRIPTION

The proposed AEC plant would reuse approximately 21 acres of the existing 71-acre AGS power plant site and the existing plant infrastructure, including the existing SCE-owned Alamitos 230 kV switchyard just on the north side of the property line and its transmission outlets.

In Power Block 1, the proposed AEC Plant would consist of a natural gas-fired 2-on-1 CC Generating Unit with a steam-turbine generator (STG) unit rated at 241.1MW (290 MVA),18 kV, 0.85 power factor (PF) and two CTG units each rated at 234.5 MW (272 MVA),18 kV, 0.85 PF. The maximum turbine output for the STG would be 241.1 MW, and each CTG 234.5 MW.

Power Block 2, would be divided into two sub-blocks, as shown in the physical layout diagram, each sub-block would consist of two natural gas-fired CTGs for a total of four CTG units in Power Block 2. Each of the CTGs in Power Block 2 would be rated at 103.3 MW (121.5 MVA), 13.8 kV, 0.85 PF (CH2 2016q, Revised Electrical System One-Line Diagram, and Figure DR173-1R).

The proposed AEC plant would have a total gross generating installed capacity of about 1,123.3 MW and a net generating capacity of 1,092.2 MW.

In Power Block 1, the Applicant expects that the STG unit would be connected through a 10,000-ampere, 18 kV circuit breaker (CB), a disconnect switch and an approximately 100-foot-long 10,000-ampere segregated bus duct to the low voltage terminal of a dedicated 171/228/285 MVA, ONAN/ONAF, 18/230 kV generator step-up (GSU) transformer. Each of the two CTG units in Power Block 1 are expected to be connected through a 10,000-ampere, 18 kV breaker, a disconnect switch and an approximately 100-foot long 10,000-ampere segregated bus duct to the low side voltage terminal of a dedicated 169/225/282 MVA ONAN/ONAF, 18/230 kV GSU. The high side of each the above three GSU transformers would be connected by a short overhead span of 1113 ACSR “Bluejay” conductor and a 230 kV 1,200-ampere CB with a 1,200-ampere disconnect switch to the switchyard 4 inch schedule 80, 6063 aluminum overhead 230 kV bus (CH2 2016t and Alamitos Energy Center Supplement to Data Response 8, 7/12/2016).

In Power Block 2, the Applicant expects that each of the four simple-cycle CTG units would be connected through a 7,000-ampere, 13.8 kV breaker, a disconnect switch and an approximately 100-foot long 7,000-ampere segregated bus duct to the low side voltage terminal of a dedicated 72/96/120 MVA ONAN/ONAF,13.8/230 kV GSU transformer. The high side of the GSU transformers for each of the two CTG units would be connected to a 230 kV, 2,000-ampere CB with a 2,000-ampere disconnect switch and then to a 230 kV 4-inch schedule-80, 6063 aluminum overhead 230 kV bus through an approximately 50-foot long overhead 1113 ACSR “Bluejay” conductor. Similarly the high side of the GSU transformers for the other two simple-cycle CTG units would be connected to a 230 kV CB with a 2,000-ampere disconnect switch and then to another 230 kV overhead bus of 4-inch schedule-80, 6063 aluminum through an approximately 50-foot long 1113 ACSR “Bluejay” overhead conductor. Each of the two 230 kV overhead buses would terminate to a 230 kV common overhead bus of 4 inch schedule-80, 6063 aluminum bus through a 2,000-amp disconnect switch (CH2 2016t and Alamitos Energy Center Supplement to Data Response 8, 7/12/2016).

The proposed gen tie line for the four CTG units would be connected to the 230 kV overhead common bus through a 230 kV 2,000-ampere breaker with a 2,000-ampere disconnect switch.

## INTERCONNECTION FACILITIES

The 230 kV bus in the Power Block 1 switchyard would be connected to a new overhead generator tie line through a 230 kV, 2,000-ampere breaker and two 2,000-ampere disconnect switches. The new 0.31-mile long overhead gen tie line would be built with 1113 kcmil bundled “Bluejay” Aluminum Conductor Steel-supported (ACSS) on 95-foot high dead end steel structures and 95-foot high steel poles. The line would terminate at the SCE Alamitos switching station on the section Bus B double buses, switching Bay No.1, with two 2,500-ampere breakers and two 2,500-ampere disconnect switches for each breaker. At the maximum output from the generators in Power Block 1 and a 0.85 power factor, the full load current in the overhead tie line would be 2,100 Amperes, and the line rating of the bundled tie line would be 4,200 Amperes at 200 degree Celsius. Since the line would be protected by a 230kV, 25 ohms (66.31 MH) current limiting reactor, and the line conductor size rating is more than twice of the full load current, it is expected that the conductor temperature would be limited within 130 degree Celsius as required by the SCE interconnection requirements(CH2 2016q).

For Power Block 2, the switchyard 230 kV bus would be connected to a new overhead generator tie line through a 230 kV, 2,000 Ampere breaker with an associated 2,000 Ampere disconnect switch. The overhead tie line would be built on 95-foot high dead-end steel structures and 95-foot high steel poles. The second, 0.16 mile long overhead generator tie line, would be built with 1431 kcmil “Bobolink” ACSS conductor on the proposed 95-foot high steel structures and 95-foot dead end steel poles. The generator tie line for Power Block 2 would terminate at the SCE Alamitos switching station at the section Bus B double buses, switch bay No.3, with two 2,500-ampere breakers and two 2, 500-ampere disconnect switches for each breaker. (AEC 2014a, Figures DR 173-1R, 2.1-2R, 3.1-2aR, & 3.1-2bR)

## SCE ALAMITOS 230 KV SWITCHYARD

The configurations of the existing SCE-owned Alamitos 230 kV switchyard buses, switching bays, breakers, and associated disconnect switches, terminations of the existing AGS generating Units 1 through 6 and transmission outlets to the SCE network have been described in the previous section of “Existing Facilities and Related System”.

With the decommissioning of the AGS Units 1 through 4, all the related SBs with 2,500-ampere breakers and the associated 2,500-ampere disconnect switches in the Alamitos 230 kV Switchyard Bus A section would be available. With the decommissioning and disconnection/demolition of existing AGS Units 5 & 6, SB 1 & 3 with associated 2,500-ampere breakers and 2,500-ampere disconnect switches, would be available for the interconnection of the proposed CC units from Power Block 1 and the CTG units from Power Block 2 respectively (AEC 2014a, Figures 3.1-1R and Dr173-1R).

The proposed interconnection facilities are acceptable, in accordance with good utility practices and would comply with applicable LORS.

## TRANSMISSION SYSTEM ANALYSIS AND IMPACTS

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility or participating transmission owner (PTO), SCE in this case, and the control area operator (California ISO) are responsible for ensuring grid reliability. *Normally these entities perform the Phase 1 and Phase 2 Interconnection cluster studies,* determine the transmission system impacts of the proposed project, and any mitigation measures needed to ensure system conformance with performance levels required by utility reliability criteria, NERC reliability standards, WECC system performance criteria, and California ISO planning standards. Staff relies on these studies and any review conducted by the responsible agencies to determine the project's effect on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards.

The proposed AEC project is expected to be exempted from these studies by the California ISO because the project replaces the existing AGS and would not impact the transmission grid significantly differently than the existing generator. The California ISO tariff Section 25.1 allows a proposed generator to be excused from the interconnection queue study process if the California ISO and the PTO find that the project is substantially unchanged from the existing project it replaces.

Staff expects the California ISO will find the repowered AEC project to be substantially unchanged from the existing AGS plant and to have no significant impacts on the existing transmission system. The applicant has requested exemption from the California ISO generator interconnection study process in accordance with section 25.1 of the California ISO Tariff which allows the California ISO to exempt a generator from the interconnection queue study process if the new generator is found to be substantially unchanged from the generator it replaces.

According to section 25.1.2.1 of the California ISO tariff pre-LGIA requirement, the applicant would need to submit switchyard/substation final design drawings to SCE along with final impedances of the new GSU transformers for their review and approval during final engineering of the SCE interconnection facilities at the SCE Alamitos 230 kV substation. The engineering would be followed by a final interconnection analysis by SCE and/or the California ISO, including a short circuit duty study during the California Energy Commission post-licensing period.

## DOWNSTREAM FACILITIES

Since the proposed AEC plant is replacing the existing AGS OTC plant, and its total generation output and electrical characteristics are substantially unchanged, there is no expectation of additional downstream impacts. Hence, the interconnection of the AEC project should not require any new downstream facilities or any downstream upgrades.

## CUMULATIVE IMPACTS

The proposed AEC generating project replaces the existing AGS plant with almost equal generating capability. Hence the new AEC project would not create any cumulative adverse impacts in the surrounding SCE transmission network.

## CONFORMANCE WITH LORS AND CEQA REVIEW

Staff expects the California ISO will find the proposed AEC project would be substantially unchanged from the existing AGS plant and would have no significant impacts on the existing transmission system. The applicant requested exemption from the California ISO generator interconnection study process in accordance with section 25.1 of the California ISO tariff, which allows the California ISO to exempt a generator from the study process if the new generator is found to be substantially unchanged from the generator it replaces.

According to section 25.1.2.1 of the California ISO tariff, the applicant has the obligation to submit switchyard/substation final design drawings along with final impedances of the new GSU transformers for review and approval by SCE during engineering of the SCE interconnection facilities at the Alamitos 230 kV switchyard followed by a final interconnection analysis during CEC post-licensing.

Staff's proposed conditions of certification **TSE-1** through **TSE-5** would help ensure that construction and operation of the transmission facilities for the proposed AEC would comply with applicable LORS:

1. Staff proposed Condition of Certification **TSE-1** to ensure that the preliminary equipment is in place for construction of the transmission facilities of the proposed project to comply with industry standards and utility practices with applicable LORS.

2. Staff proposed Condition of Certification **TSE-2** to ensure the final design of the proposed transmission facilities would comply with industry standards, utility practices, and applicable LORS.

3. Staff proposed Condition of Certification **TSE-3** to ensure that the proposed project would be properly interconnected to the transmission grid after receiving California ISO analysis for exemption of section 25.1 of their Tariff. **TSE-3** also ensures that the generator output would be properly delivered to the transmission system.

4. Staff proposed Condition of Certification **TSE-4** to ensure that the project would synchronize with the existing transmission system and the operation of the facilities would comply with applicable LORS.

5. Staff proposed Condition of Certification **TSE-5** to ensure that the proposed project would be built to required specifications and the operation of the facilities would comply with applicable LORS.

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

## RE: TRANSMISSION SYSTEM ENGINEERING PSA (REF: AEC 2016A)

**Applicant's Comment:** *Pages 5.5-10 and 5.5-11, Condition TSE-3 – The purpose of the condition is to ensure that the transmission facilities are designed, constructed, and operated in conformance with all applicable LORS. Because the documents requested and specific items necessary to implement this condition are detailed in the verification, the Applicant recommends that the condition be deleted. The Applicant does not have any proposed changes to the verification language.*

**Response to Applicant:** There is no need to change the format of our standard Condition TSE-3. Since the applicant does not have any proposed changes to the verification language, the Applicant's comment doesn't functionally change the condition of certification TSE-3. Staff, therefore, does not agree with the proposed change to Condition TSE-3.

**Applicant's Comment:** *Pages 5.5-10 and 5.5-11, Condition TSE-4 – While the Applicant will most certainly provide the California Independent System Operator (CAISO) with CAISO-required information, there is no need to have those CAISO obligations repeated in Conditions of Certification. Moreover, CAISO requirements are federal requirements, not State LORS, given that the CAISO is a Federal Energy Regulatory Commission (FERC)-regulated entity. Condition TSE-4 should be deleted.*

**Response to Applicant:** Condition TSE-4 was added many years ago due to a specific request from the California ISO. The condition serves as a reminder that the synchronization request must be made to the California ISO. Compliance with the request is not onerous as it only requires submittal of the synchronization letter and evidence of the phone notification. Typically these are single page documents. Because this condition was added at the request of the California ISO and compliance with the condition does not place a large burden on the project owner, staff, therefore, does not agree with the applicant's suggestion that the condition be removed.

It is not relevant that requirements are state LORS or federal requirements for purposes of a condition of certification that ensures compliance with a requirement and provides the means of showing such compliance.

No other Public Comment was received.

## CONCLUSIONS AND RECOMMENDATIONS

1. The proposed interconnection including facilities, including, the step-up transformer, the project switchyards, the 230 kV overhead transmission lines, and the termination at the SCE Alamitos switchyard are acceptable, in accordance with good utility practices and would comply with applicable LORS are acceptable and would comply with applicable LORS.

2. Staff expects the California ISO will find the AEC project would be substantially unchanged from the existing AGS plant and would have no significant impacts on the existing transmission system. Submittal of the California ISO 25.1 exemption letter has been added to proposed Condition Of Certification TSE-3.

## RECOMMENDATIONS

If the Energy Commission approves the project, staff recommends the following conditions of certification to ensure system reliability and conformance with industry standards, utility practices, and LORS.

## CONDITIONS OF CERTIFICATIONS FOR TSE

**TSE-1** The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

**Verification:** Prior to the start of transmission facilities construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

| **Table 1: Major Equipment List** |
|---|
| Breakers |
| Step-up Transformer |
| Switchyard |
| Busses |
| Surge Arrestors |
| Disconnects and Wave-traps |
| Take off facilities |
| Electrical Control Building |
| Switchyard Control Building |
| Transmission Pole/Tower |
| Insulators and Conductors |
| Grounding System |

**TSE-2** For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

A. receipt or delay of major electrical equipment;

B. testing or energization of major electrical equipment; and

C. the number of electrical drawings approved, submitted for approval, and still to be submitted.

**Verification:** Prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

**TSE-3** The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO.

Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.

b) All components, including breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

d) The project conductors and all components like buses, Breakers, and Transformers etc. shall be sized to accommodate the full output of the project.

e) Termination facilities shall comply with industry standards and applicable SCE interconnection standards.

f) The project owner shall provide the following for all seven AEC units to the CPM

   i) The Special Protection System (SPS) sequencing and timing if applicable,

   ii) The pre-LGIA California ISO final interconnection analysis report including *the California ISO exemption analysis* in accordance with the section 25.1.2 of their Tariff and any SCE analysis report including the short circuit study report.

   iii) The electrical one-line diagrams for two AEC switchyards with all updates for generator ratings, including final percentage impedances of the GSU transformers.

   iv) The electrical one-line diagram of the SCE Alamitos Switchyard West and East 230 kV buses, with all updates including configuration of buses and circuit breakers with associated disconnect switches, including their types and/or ampere ratings and leveled transmission outlets, considering decommissioning and disconnection of all the existing AGS generator units.

   v) The operational study report(s) based on in-service dates or current commercial operation dates (CODs) system conditions from the California ISO and/or SCE.

   vi) A copy of the executed LGIA (s) signed by the California ISO and the project owner, and approved by the Federal Energy Regulatory Commission.

**<u>Verification:</u>** Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

a) Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code of Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst-case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-3** a) through f);

d) The project owner shall provide the following for all four AEC generator units to the CBO for approval:

   i) The Special Protection System (SPS) sequencing and timing if applicable,

   ii) The pre-LGIA California ISO final interconnection analysis report including the California ISO exemption analysis in accordance with the section 25.1.2 of their Tariff and any SCE analysis report including the short circuit study report.

   iii) The electrical one-line diagrams for two AEC switchyards with all updates including final percentage impedances of the GSU transformers.

   iv) The electrical one-line diagram of the SCE Alamitos Switchyard West and East 230 kV buses, with all updates including configuration of buses and circuit breakers with associated disconnect switches including their types and/or ampere ratings and leveled transmission outlets, considering decommissioning and disconnection of all the existing AGS generator units.

   v) A copy of the executed LGIA(s) signed by the California ISO and the project owner, and approved by the Federal Energy Regulatory Commission.

   vi) The operational study report(s) based on in in-service dates or current commercial operation dates (CODs) system conditions from the California ISO and/or SCE.

   Prior to the construction of, or start of modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

**TSE-4** The project owner shall provide the following notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

**Verification:** The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

**TSE-5** The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

**Verification:** Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

A. “As built” engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

B. An “as built” engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. “As built” drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the “**Compliance Monitoring Plan**”.

C. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

## REFERENCES


**California ISO (California Independent System Operator) 1998a**. California ISO Tariff Scheduling Protocol posted 1998, Amendments 1,4,5,6, and 7 incorporated in 1998.

**California ISO (California Independent System Operator) 1998b**. California ISO Dispatch Protocol posted April 1998.

**California ISO (California Independent System Operator) 2002a**. California ISO Planning Standards, 2002.

**California ISO (California Independent System Operator) 2010a**. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, 2010.

**California ISO (California Independent System Operator) 2009a.** Large Generator AEC 2013a – Alamitos Energy Center (TN 201620 -1-72) Application for Certification Volume 1 & 2, dated December 27, 2013. Submitted to CEC/Docket Unit on December 27, 2013.

**AEC 2013a** – Alamitos Energy Center (TN 201620 -1-72) Application for Certification Volume 1 & 2, dated December 27, 2013. Submitted to CEC/Docket Unit on December 27, 2013. Volume 2, Appendix 3A: The California ISO letters dated May 24, June 6 and August 12, 2014 addressed to the applicant regarding application of section 25.1 of the California ISO tariff in order to forgo the interconnection queue process study.

**AEC 2014a** – Alamitos Energy Center (TN 201751) Data Adequacy Supplement dated February 17, 2014. Submitted to CEC/Docket Unit on February 17, 2014.

**AEC 2014b** – Alamitos Energy Center (TN 202381) Data Response Set 1A dated May 27, 2014. Submitted to CEC/Dockets Unit on May 27, 2014.

**AEC 2015f** – Alamitos Energy Center Supplemental AFC (TN 206427-1). Submitted on October 26, 2015. CEC/Docket on October 26, 2015.

**AEC 2015i** – Alamitos Energy Center Supplemental AFC (TN 206428-1). Submitted on October 26, 2015. CEC/ Docket on October 26, 2015.

**AEC 2016a** – AES Southland Development, LLC (TN 212771). Preliminary Staff Assessment Summary of PSA Workshop and Supplemental Comments, dated August 12, 2016. Submitted to CEC/Docket Unit on August 12, 2016.

**CEC 2015n** – Alamitos Energy Center Report 8 (TN 205359). Submitted on July 15, 2015. CEC/Docket Unit on July 15, 2015.

**CH2 2014b** – CH2M Hill (TN 201751) Data Adequacy Supplement dated February 17, 2014. Submitted to CEC/Dockets Unit on February 18, 2014.

**CH2 2016q** – AEC CAISO Section 25.1 Affidavit Application (TN 211006) dated April 12, 2016 Submitted to. CEC/Docket on April 12, 2016

**CH2 2016t** – Alamitos Energy Center Data Response Set 6-R2 (TN 211169) dated April 21, 2016 Submitted to. CEC/Docket on April 21, 2016

**CH2** – Supplement To Data Response 8 dated July 12, 2016 Submitted to CEC/Docket on July 12, 2016

**NERC (North American Electric Reliability Council) 2006 (ongoing).** Reliability Standards for the Bulk Electric Systems of North America, May 2 2006, http://www.nerc.com/docs/standards/rs/Reliability_Standards_Complete_Set.pdf

**WECC (Western Electricity Coordinating Council) 2008 (ongoing)** - The WECC Regional System Performance Criteria.

## DEFINITION OF TERMS

| | |
|---|---|
| **ACSR** | Aluminum cable steel reinforced. |
| **AAC** | All Aluminum conductor. |
| **ACSS** | Aluminum conductor steel-supported. |
| **Ampacity** | Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations. |
| **Ampere** | The unit of current flowing in a conductor. |
| **Kiloampere (kA)** | 1,000 Amperes |
| **Bundled** | Two wires, 18 inches apart. |
| **Bus** | Conductors that serve as a common connection for two or more circuits. |
| **Conductor** | The part of the transmission line (the wire) that carries the current. |
| **Congestion** | Congestion management is a scheduling protocol, which provides that |
| **Management** | dispatched generation and transmission loading (imports) would not violate criteria. |
| **Emergency** | See Single Contingency. This is also called an L-1. |
| **Overload** | |
| **Hertz** | The unit for System Frequency. |
| **Kcmil or KCM** | Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained. |
| **Kilovolt (kV)** | A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts. |
| **Loop** | An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac. |
| **MVAR or** | Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. |

| | |
|---|---|
| **Megavars** | Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. |
| **Megavolt Ampere (MVA)** | A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000. |
| **Megawatt (MW)** | A unit of power equivalent to 1,341 horsepower. |
| **Normal Operation/ Normal Overload** | When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating. |
| **N-1 Condition** | See Single Contingency. |
| **Outlet** | Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid. |
| **Power Flow Analysis** | A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels. |
| **Reactive Power** | Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system. |
| **Remedial Action Scheme (RAS)** | A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload. |
| **SSAC** | Steel Supported Aluminum Conductor. |
| **SF6** | Sulfur hexafluoride is an insulating medium. |
| **Single Contingency** | Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service. |
| **Solid Dielectric Cable** | Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket. |

| | |
|---|---|
| **SVC** | Static VAR Compensator: A piece of equipment made of capacitors and reactors with electronic controls for producing and controlling reactive power in the power system. |
| **Switchyard** | A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators. |
| **Thermal rating** | See ampacity. |
| **TSE** | Transmission System Engineering. |
| **TRV** | Transient recovery voltage |
| **Tap** | A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard. |
| **Undercrossing** | A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees. |
| **Underbuild** | A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors. |
| **VAR** | Voltage Ampere Reactive, a measure for Reactive power in the power system. |

# Alternatives

# ALTERNATIVES

Testimony of Steven Kerr, Matthew Layton, and David Vidaver

## INTRODUCTION AND SUMMARY OF CONCLUSIONS

As required by the California Environmental Quality Act (CEQA), this section evaluates a reasonable range of alternatives to the proposed Alamitos Energy Center (AEC or proposed project) that would feasibly attain most of the basic objectives of the project and would avoid or substantially lessen any of the significant effects of the project. CEQA establishes the framework and guiding principles for selection and evaluation of project alternatives, and the alternatives evaluation process applied by staff is consistent with the CEQA Guidelines (Cal. Code Regs., tit. 14, §15000 et seq.). The following subsections describe these guidelines in more detail.

Staff has reviewed the alternatives analysis provided by the project applicant in the AEC Supplemental Application for Certification (SAFC). The applicant acknowledges that the alternatives considered in the SAFC were either infeasible, unable to reduce or avoid any adverse environmental impacts, or would not attain most of the basic objectives of the project (AES 2015). Staff concurs with the applicant's assessment of their alternatives. And although the information provided in the SAFC served as a starting point for this alternatives evaluation, the alternatives evaluated within this section of the Final Staff Assessment (FSA) are those recommended and developed by staff.

The alternatives considered by staff include one off-site alternative and the no-project alternative. The No-Project Alternative presented here evaluated a no-build scenario at the project site. Subsequently, the off-site alternative was eliminated from further consideration, while the no-project alternative was carried forward for further evaluation. Staff has not identified a feasible alternative that would be environmentally superior to the proposed AEC.

## CEQA REQUIREMENTS

As the CEQA lead agency for the AEC, the Energy Commission is required to consider and discuss alternatives to the proposed project. The principles for the selection of alternatives for analysis are provided by the CEQA Guidelines (Cal. Code Regs., tit. 14, §15000 et seq.). According to section 15126.6 of the CEQA Guidelines, the alternatives analysis must:

- describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project;
- consider alternatives that would avoid or substantially lessen any significant environmental impacts of the project, including alternatives that would be more costly or would otherwise impede the project's objectives; and
- evaluate the comparative merits of the alternatives.

The lead agency is responsible for selecting a reasonable range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. CEQA does not require an agency to “consider every conceivable alternative to a project.” Rather, CEQA requires consideration of a “reasonable range of potentially feasible alternatives” (Cal. Code Regs., tit. 14, §15126.6, subd. (a)). The reasonable range of alternatives must be selected and discussed in a manner that fosters meaningful public participation and informed decision making (Cal. Code Regs., tit. 14, §15126.6, subd. (f)). That is, the range of alternatives presented in this analysis is limited to ones that will inform a reasoned choice by the Energy Commissioners. Under the “rule of reason,” an agency need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6, subd. (f)(3)).

The CEQA lead agency is also required to:

- evaluate a ‘’no-project’ alternative;
- identify alternatives that were initially considered but then rejected from further evaluation; and
- identify an environmentally superior alternative among the other alternatives if the environmentally superior alternative is the “no-project” alternative (Cal. Code Regs., tit. 14, §15126.6).

## ENERGY COMMISSION STAFF’S ALTERNATIVES SCREENING PROCESS

The CEQA Guidelines describe selection of a reasonable range of alternatives and the requirement to include those that could feasibly accomplish most of the basic project objectives while avoiding or substantially lessening one or more of the significant effects. The CEQA Guidelines require the alternatives analysis to briefly describe the rationale for selecting alternatives to be discussed. In addition, the analysis should identify any alternatives that were considered by the lead agency but were rejected as infeasible and briefly explain the reasons underlying the lead agency’s determination (Cal. Code Regs., tit. 14, § 15126.6, subd. (c)).

Alternatives may be eliminated from detailed consideration by the lead agency if they fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects (Cal. Code Regs., tit. 14, §15126.6, subd. (c)). According to the CEQA Guidelines, the factors that may be considered when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives (Cal. Code Regs., tit. 14, § 15126.6, subd. (f)(1)).

Pursuant to CEQA, the purpose of staff’s alternatives analysis is to focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any of significant effects of the project.

Staff used the following process in preparation for this alternatives analysis:

- identify the objectives of the project, as defined by the applicant;
- identify any potential significant environmental impacts of the project;
- identify and evaluate alternatives to the project that may reduce or avoid environmental impacts;
- Evaluate a "no-project" alternative to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.

## PROJECT OBJECTIVES

The applicant's SAFC identifies the project's primary objective to design a project that provides local area capacity at the existing Alamitos Generating Station (AGS) site (AES 2015).

In addition to the primary objective, these are the basic project objectives:

- Develop a project capable of providing energy, generating capacity, and ancillary electrical services (voltage support, spinning reserve, inertia) to satisfy Los Angeles Basin Local Reliability Area requirements and transmission grid support, particularly in the western subarea of the Los Angeles Basin.
- Provide fast starting and stopping, flexible, controllable generation with the ability to ramp up and down through a wide range of electrical output to allow the efficient integration of renewable energy sources into the electrical grid, and replace older, once-through cooled (OTC) and less efficient generation.
- Develop on a brownfield power plant site and use existing infrastructure, including the existing switchyard and related facilities, the Southern California Edison (SCE) switchyard and transmission facilities, the Southern California Gas Company (SoCalGas) natural gas pipeline system, the Long Beach Water Department (LBWD) water connections, process water supply lines, and existing fire suppression and emergency service facilities.
- Use qualifying technology under the South Coast Air Quality Management District's (SCAQMD) Rule 1304(a)(2) exemption that allows for the replacement of older, less-efficient electric utility steam boilers with specific new generation technologies on a megawatt-to-megawatt basis (that is, the replacement megawatts are equal or less than the megawatts from the electric utility steam boilers).

Staff's alternatives analysis broadly interprets the applicant's project objectives to foster a complete and robust discussion of potential alternatives to the applicant's proposed project.

The California Independent System Operator (CAISO) has identified the importance of new power generation facilities in their Los Angeles Basin Local Reliability Area to replace the OTC plants that are expected to retire as a result of the State Water Resources Control Board's (SWRCB) *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling* (referred to here as OTC Policy), which was adopted in 2010. The project objectives are consistent with OTC Policy. They are also consistent with the use of the offset exemption contained in SCAQMD Rule 1304(a)(2), which allows for the replacement of older, less efficient, electric utility steam boilers with specific new generation technologies on a megawatt-to-megawatt basis.

The applicant's first two objectives address providing generating capacity and controllable, fast-ramping generation to support integration of renewable energy sources into the electrical grid. As discussed below under "Preferred Resources," the California Public Utilities Commission (CPUC) issues decisions authorizing procurement by the state's investor-owned utilities (IOUs) based on the need for new resources. In the two most recent CPUC decisions in the Long-term Procurement Planning (LTPP) proceeding, levels of procurement are specified for preferred resources, energy storage, and gas-fired generation; these procurement authorizations are intended to ensure local reliability following the potential retirement of OTC generation facilities in the Southern California portion of the CAISO balancing authority area and permanent closure of the San Onofre Nuclear Generating Station (SONGS). (Future CPUC decisions will adjust the procurement levels according to changes in need and in response to the IOUs' progress developing preferred resources.)

Preferred resources cannot fully substitute for generating capacity in providing reliability services, the closest to an exception being event-triggered demand response. However, staff has not perfunctorily eliminated preferred resources from the alternatives analysis due to that limitation. Rather, staff fully discusses preferred resources and assesses the characteristics that determine and limit their ability to attain the basic project objectives. The preferred resources analysis is important to include given that the proposed project's generating capacity is not the only way to meet local capacity needs. The SCAQMD Rule 1304(a)(2) exemption allows for replacement of electric utility steam boilers with new gas-fired technologies and equipment and with renewable energy sources and equipment.

## CLUTCHES AND SYNCHRONOUS CONDENSERS

Recent Energy Commission project siting committees have asked whether and when clutches could be installed, and what that would mean for the project's impacts. Since clutches were not proposed in this application for certification and AEC would not have any significant environmental effects that would be reduced or avoided by the inclusion of clutches, staff did not consider clutches as an alternative for the purpose of complying with CEQA in this analysis. Therefore, staff is providing the following information on clutches for informational purposes only.

California has a large, geographically diverse, interconnected generation system. Ancillary services in support of the grid, such as voltage and frequency regulation, sometimes called volt-ampere reactive (var), can be provided incidentally when generators are online providing capacity and energy (megawatts and megawatt hours – MW and MWhr, respectively), or through dedicated equipment including synchronous condensers or capacitors. On November 23, 2015, the California Independent System Operator (CAISO) sent a letter to the California Public Utilities Commission (CPUC) with a copy provided to the Energy Commission (CAISO 2015b). The CAISO recommended that the clutch technology that allows fossil fuel-fired generation units to operate temporarily as synchronous condensers be considered as a “default option in procurement decisions” by the CPUC. On August 9, 2016, the California Independent System Operator (CAISO) sent a letter to Energy Commissioner J. Andrew McAllister recommending that “at a minimum, the HBEP [Huntington Beach Energy Project, a very similar location and configuration] should be designed such that it could easily accommodate a clutch installation in the future should the need arise.” (CAISO 2016a)

The clutch allows a generator to disconnect from its prime mover (e.g., combustion or steam turbine) and synch up to the electricity grid to provide voltage and frequency support. The clutches are commercially available, as are the controls to synch and control the generator as it operates as a synchronous condenser. The clutches and controls are feasible on a variety of turbines, and appear on a small number of California combustion turbines. However, they are not generally used by California utilities to provide the ancillary services they potentially offer. To date, only Los Angeles Department of Water and Power is using clutches it has recently installed to operate the associated generators as synchronous condensers. Two legacy steam turbine generators, Huntington Beach Generating Station Units 3 are 4, are now operating as synchronous condensers. The shafts to the steam turbine were permanently disconnected, avoiding the need for a clutch. New equipment was added to ramp up, sync, and control the synchronous condenser operations, and some form of a contract is in place to pay for the services provided.

Because vars do not travel well it may be most efficient, as described in other reports by the CAISO and as seen in activities in SCE and San Diego Gas and Electric, to install stand-alone voltage support components at a time and very specific location they are needed. This may be a moving target as the system integrates 33 percent and then to 50 percent renewable generation. The relative costs of achieving voltage support with clutches should be compared to other measures (ranging from developing stand-alone equipment, distributed generation, demand-side measures, batteries, storage, to electrifying the transportation sector). Further, as the system evolves, certain assets will become “stranded” to a degree that they can offer fewer services to the grid, or that portion of the grid needs fewer services. Adding features to a new turbine generating unit may appear efficient, but could result in a more expensive/multipurpose facility, including stranded assets.

## Potential Clutch Installation at the AEC

There would be seven turbine generators at the AEC – two CTGs and one STG in the combined-cycle Power Block 1 and four CTG peakers in Power Block 2. While there appears to be the potential to deploy this technology at AEC, the use, and any potential system or environmental benefits realized, of this technology at a given power plant occurs only when:

1. There is a need for location specific ancillary/grid support services;

2. The plant is not needed for (a) energy or (b) ancillary services other than voltage support, if provision of these services requires the plant to be operating and producing energy. When needed for energy or spinning reserve, the generator and engine are connected and the plant is producing energy and providing voltage support; the fact that it *can* provide the latter without generating energy is irrelevant at that point in time; and,

3. The synchronous condenser is needed for voltage support but the energy and capacity not provided by the plant are provided by a plant *that is more efficient/lower emitting than the local plant that it replaces.* Reliance on a synchronous condenser to provide the needed voltage support would require replacing the energy it would have provided; while the replacement energy might be cleaner (e.g., from a renewable generator), it might not, depending on load levels, time of day, etc.

For AEC Power Block 1 combined-cycle unit, it is unlikely that any of the three turbine generators would be candidates for clutches, for the following reasons:

- Combined cycles are more efficient than simple-cycle peakers, and therefore they may already be online and operating and providing incidental ancillary services along with the contracted real power (MW and MWhrs). In other words, if already operating, there would be no opportunity or need to operate as an independent synchronous condenser, as laid out in Number 2 above.
- Combined cycles are generally designed for optimum performance at expected or contracted operations obligations. Therefore, the project owner needs, or prefers, to have the combined cycle available to operate when required. If operating as a synchronous condenser prevents or limits the responsiveness to dispatch requests, the project owner may be penalized or miss revenue opportunities.
- In California, air regulations do not permit the turbine exhaust to bypass the oxidation and selective catalytic reduction catalysts located in the HRSGs, so either the HRSG has to be designed to operate “dry” or the cooling tower has to be sized large enough to take all the steam dumped from the HRSG if the steam turbine is taken off line via a clutch.

For the four simple-cycle CTGs in AEC Power Block 2, there would be the potential to install and use clutches because:

- The same GE LMS100 CTGs planned for AEC have been recently delivered and are operating in California with clutches; and,

- There appears to be adequate space (about 14 feet) to insert a clutch unit between the combustion turbine and the generator.

However, the technical feasibility does not answer:

- Whether there is a need for such ancillary services at this location;
- Whether there is a need for such ancillary services at this location once the proposed efficient, flexible, dispatchable combined cycle is constructed and operating;
- If the petitioner could negotiate satisfactory terms with the CTG vendor that would warranty the CTG with the clutch installed and in use; and,
- How a power purchase agreement would be crafted to allow the petitioner to install and operate the clutch and control equipment while recovering costs?

In other words, technical feasibility does not address the questions of need, function, or economics. The determination of the need for vars would be no different than the consideration of need for capacity or real power – determining whether or not vars are needed at a location would be outside the Energy Commission's siting purview.

## Potential Effects of Clutch Installation

There may be an opportunity well after the Energy Commission finalizes its decision on this application for the local utility and the project owner to agree on var procurement from the proposed simple-cycle CTGs in Power Block 2. This would occur before the four simple-cycle CTGs are purchased and installed. Staff does not believe it is workable to put in a place-holder-shaft in a gap left for the clutch. The place-holder, or extended shaft, would have to be supported, making it nearly as complicated and expensive as the clutch itself. Staff agrees that the decision about the clutch should be made when specifications are prepared for purchase of the CTG unit. Further, while staff believes an amendment to the Decision would be required, it would be a simple amendment and would likely not result in significant impacts. Staff does not recommend fully analyzing the clutch now as we believe it to be speculative (the project owner does not have a contract for peaker services, much less, for ancillary services that would be provided by a clutch and synchronous condenser controls).

The clutch and its housing for an LMS100 CTG are about 14-feet long but no taller or wider than the combustion turbine or generator housings it would be located between. It would require a foundation. The location of Power Block 2 within the AEC site has adequate space to extend one or more LMS100 units by about 14 feet if a clutch was added to the unit(s). Given the site is a brown field site, staff does not foresee any significant impacts (e.g., no additional noise, no new visual impacts, manageable biological or cultural effects, no additional water use or storm water impact, no change in unit availability or reliability, etc.) from the installation and operation of a clutch/synchronous condenser. Staff agrees that losses of output and efficiency would be negligible, but losses none the less, from having to spin up and overcome friction in the clutch and its bearings. This could result in additional fuel use and emissions, or a loss of output and efficiency, at AEC. Staff estimates the changes would be small.

There would also be some electricity demand from the grid to keep the generator synched to the grid. (How that electricity would be fed back from the grid, and paid for, would have to be laid out in a contract for the ancillary services). However, the amount of electricity is low, about 1 percent of the generator rating (or 1 MW for the LMS100 nominal 100 MW generator). The CAISO is the agency primarily responsible for determining the need for voltage support in the balancing authority area, as well as the impact and effectiveness of existing or proposed resources in its provision. In comments on the need for, and impact of installing synchronous condenser technology at the Amended Carlsbad Energy Center Project site, it stated:

> "*The [CPUC's] Alternate Proposed Decision includes language directing SDG&E to study the addition of synchronous condenser technology, commonly referred to as a "clutch," at the Carlsbad Energy Center facility. In response to the Alternate Proposed Decision, the CAISO analyzed both peak forecast and lower load level scenarios to test whether the addition of synchronous condenser technology could enable a reduction in the amount of gas-fired generation (and associated emissions) that the Carlsbad Energy Center would otherwise be expected to produce. In recent years, the CAISO has approved significant upgrades to the Southern California transmission system to address reactive power needs and will continue to update and evaluate the adequacy of these solutions in future planning studies. The CAISO targeted these upgrades at locations that were both highly electrically efficient and feasible at times of peak system loading with some locations having expansion capabilities for even more reactive support should it become necessary. Due to the specific circumstances of localized voltage stability, the thermal limitations in the area, and the development of better-situated synchronous condensers in the area, the CAISO has not been able to confirm that the synchronous condenser technology at Carlsbad would enable any material reduction in gas-fired generation output. Assuming that the transmission system upgrades and [CPUC]-authorized procurement are realized in a timely manner, synchronous condenser technology at the Carlsbad Energy Center may not provide material emission reduction benefits [emphasis added]. Therefore, based on a preliminary analysis, the CAISO has not been able to identify significant benefits to the installation of synchronous condenser technology at the Carlsbad Energy Center."* [1]

Avoided emissions (i.e., emissions savings that arise when the plant would not otherwise be operating) are complex given the interconnectedness of the modern grid. If AEC operates and thus also provides ancillary services, a unit elsewhere in the grid does not have to operate and its potential emissions may be avoided. However, if AEC operates as a synchronous condenser, it still uses some nominal amount of electricity, and the emissions associated with the generation of that small amount of electricity would occur. Further, the electricity that would have been provided by AEC now has to be generated elsewhere on the grid.

[1] Comments of the California Independent System Operator Corporation on Alternative Proposed Decision, filed in California Public Utilities proceeding A.14-07-009, April 27, 2015.

## PREFERRED RESOURCES

California is rapidly and fundamentally changing its electricity supply system. These changes are driven in large part by the state's programs addressing global climate change and the policy imperative of reducing greenhouse gas (GHG) emissions. California's transition to a low-carbon economy requires dramatically reducing GHG emissions from the electricity sector, in turn allowing other economic sectors (e.g., transportation, industry) to transition from fossil fuels to electricity as a primary fuel source. The state's Renewable Portfolio Standard (RPS) requires that providers of retail electricity procure a minimum share of energy (measured as a percentage of retail sales) from renewable sources. The RPS was established in 2002 under Senate Bill (SB) 1078 and accelerated in 2006 under SB 107. SB 2 (2011) expanded RPS to require all electricity retailers in the state to increase procurement from eligible renewable energy resources to 33 percent of total procurement by the end of 2020. SB 350 (2015) increased the RPS target to 50 percent by 2030. It is estimated that an amount equal to 25 percent of retail sales was procured by California load-serving entities from renewable sources in 2014.

State energy policies includes a *loading order* for electric generation that prefers and maximizes cost-effective, reliable, and feasible energy efficiency, demand response programs and measures, and renewable generation to supplant the need for new fossil fuel-fired generation. Consistent with state law, the CPUC has held that all utility procurement must be consistent with this loading order (Pub. Utilities Code, § 454.5, subd. (b)(9)(C)).

At the same time, state policies and other factors have dramatically increased the near-term need for new resources with which to reliably meet—or reduce—the state's demand for reliably delivered electricity. The state's policy objective to phase out OTC power plants is forcing the rapid retirement of a substantial amount of dispatchable generation in coastal areas and its replacement with new generation, transmission, and demand-side resources to preserve system reliability. In addition, concerns about nuclear safety led to the permanent closure of a large nuclear baseload facility in 2012 that was a critical source of Southern California electricity generation.

All of these factors are considered by the state's energy agencies when determining the need for new, natural gas-fired electric generation capacity (NGFG) over the 10-year horizon for which the state energy agencies undertake procurement planning. The Energy Commission considers them in developing its 10-year electricity demand forecast. The CAISO considers them as part of its efforts to maintain electric system reliability. In tandem with CAISO planning, the CPUC conducts its biennial LTPP proceeding, in which it determines how much new natural gas-fired generation is required and should be financed by the state's IOUs. In estimating the need for new "least-cost best-fit" generation capacity or specifically for new NGFG over the 10-year planning horizon, the CPUC first assumes the timely development of all cost-effective preferred resources.

## RELIABLE OPERATION OF THE ELECTRICITY SYSTEM

State law emphasizes the importance of maintaining the reliability of the electric grid, including sections of the Public Utilities Code addressing the importance of maintaining reliable electric services to the state's citizens and businesses (Pub. Utilities Code, §§ 330, subds. (g) and (h), 334, 345.5, subd. (b), and 362, subd. (a)).

In May 2010, the SWRCB adopted the statewide OTC Policy. The OTC Policy established compliance dates for existing power plant operators to implement measures to greatly reduce impingement mortality and entrainment of marine life. Compliance with the OTC Policy is expected to lead to the retirement of a large amount of OTC capacity in transmission-constrained areas of Southern California. As a result, the CPUC devoted a share of its 2012 LTPP proceeding (Rulemaking 12-03-014) to the potential need for new NGFG to meet local reliability requirements in the CAISO-defined Los Angeles Basin (LA Basin), San Diego, and Big Creek/Ventura areas. Such generation, if necessary, would be required to meet reliability standards imposed by the North American Electric Reliability Council and the Western Electricity Coordinating Council, which are based on load circumstances that are projected to occur once in 10 years and the assumption that two major component failures (generator, transmission line) occur in a transmission-constrained area nearly simultaneously.

In February 2013, as part of its 2012 LTPP proceeding, the CPUC issued a decision (D.13-02-015, referred to as the Track 1 decision) authorizing procurement to meet the local capacity requirement (LCR) in the West LA subarea of the LA Basin local reliability area (West LA Basin). The authorization for new capacity was done to maintain reliability after the expected retirement of generating units at Alamitos, Huntington Beach, and Redondo Beach, totaling 3,818 MWs of capacity. The SWRCB set December 31, 2020, as the compliance date for these three generators. SCE was authorized to procure between 1,400 and 1,800 MWs of electrical capacity to meet the West LA Basin LCR by 2021 (CPUC 2013a). At least 1,000 MWs and up to 1,200 MWs of total capacity must be procured from natural gas-fired resources.

In establishing a level of development for natural gas-fired generation, the CPUC found that such generation is needed to provide reliability services (regulation, spinning reserves, load following, frequency response, and voltage support). The remaining capacity was to come from preferred resources (energy efficiency, demand response, renewable generation, and energy storage).

In March 2014, the CPUC issued its Track 4 decision in the 2012 LTPP proceeding (D.14-03-004) authorizing SCE and San Diego Gas & Electric (SDG&E) to procure generating capacity from a combination of preferred resources and gas-fired resources to meet local capacity needs stemming from the permanent retirement of SONGS. In combining the Track 1 and Track 4 procurement, SCE is authorized to procure between 1,900 and 2,500 MWs in the West LA Basin (CPUC 2014a). The Track 4 decision increased SCE's maximum allowable NGFG from 1,200 to 1,500 MWs, providing SCE greater flexibility to meet reliability needs. Consistent with the loading order, SCE is required to procure at least 550 MWs from preferred resources. SCE is required to procure at least 50 MWs from energy storage. Subject to the overall cap of 2,500 MWs for SCE, any additional local capacity beyond these amounts may only be procured through preferred resources.

To satisfy authorized procurement under the Track 1 and Track 4 decisions, SCE issued a Request for Offers (RFO) seeking new LCR resources in the West LA Basin, including preferred resources, energy storage, and NGFG. SCE entered into contracts with AES to meet a share of the West LA Basin LCR, including a contract for new NGFG generation at the Alamitos site. On November 21, 2014, SCE submitted an application (A.14-11-012) to the CPUC seeking approval of all contracts entered into as a result of the LCR RFO for the West LA Basin, including cost recovery for those contracts. On November 24, 2015, the CPUC issued its decision approving most of the contracts, including two separate contracts with AES for new combined-cycle gas turbines at the Alamitos and Huntington Beach sites (D.15-11-041) (CPUC 2015).

## PREFERRED RESOURCES AS SUBSTITUTES FOR DISPATCHABLE NATURAL GAS-FIRED GENERATION

The state's loading order established by the energy agencies in 2003 calls for meeting new electricity needs first with efficiency and demand response (jointly, demand-side management), followed by renewable energy and distributed generation, and only then with efficient, utility-scale natural gas-fired generation. Section 454.5 (b)(9)(C) of the California Public Utilities Code addresses requirements for an electrical corporation's proposed procurement plan, including the requirement to "first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible." In recent years, energy storage has achieved preferred resource status due to its ability to a) absorb over-generation that may occur at high levels of solar penetration, and b) obviate the need for natural gas-fired generation and associated capacity to meet ramping needs during evening hours when solar resource output declines to zero.

Preferred resources can provide many of the services provided by dispatchable, natural gas-fired generation. However, where preferred resources cannot ensure reliability, because they lack necessary operating characteristics or are not available in sufficient quantities, the CPUC has found that the procurement of clean, efficient natural gas-fired generation is necessary and is consistent with the state's loading order.

The ability of individual resources (energy efficiency, demand response, utility-scale and distributed renewable generation, and storage) to provide specific services is discussed below.

## Energy Efficiency

Energy efficiency entails using less energy to provide the same service such as by improving the efficiency of air conditioners or the insulation characteristics of building shells, thereby using less energy to keep the temperature of a building at desired levels. Continued development and implementation of comprehensive, long-term energy efficiency strategies and programs remains the top priority to offset increased energy demand. The CPUC oversees the IOU energy efficiency programs, and many of the state's municipal utilities administer similar programs. These efforts are funded by ratepayers and include a wide variety of initiatives aiming to move energy-efficient equipment and effective energy management practices into the marketplace at increasing scale. The CPUC issues decisions approving the electric energy efficiency budgets for the state's IOUs. For 2013–2015, the approved electricity energy efficiency budgets for the state's three major IOUs total $2.388B (D.12-11-015 and D.14-10-046) (CPUC 2012, 2014b).

SB 350 (2015) reflects California's commitments to energy efficiency in its efforts to transition to a low-carbon economy. The bill requires the Energy Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings by January 1, 2030, and requires the CPUC (for the IOUs) and local publicly owned utilities to establish efficiency targets consistent with this goal.

Energy efficiency programs can serve as substitutes for dispatchable, natural gas-fired generation such as the AEC and partially meet the project objectives by: 1) reducing the amount of electricity that needs to be generated when targeted at consumption during high-demand hours and when flexible generation is needed most, and 2) reducing the need for natural gas-fired generation capacity, as well as the need for load-serving entities to procure such capacity to satisfy CAISO- and CPUC-imposed system-wide resource adequacy requirements. In targeting consumption in the West LA Basin, energy efficiency programs can reduce the need for conventional generation in the area and the need to procure such capacity to satisfy resource adequacy requirements for local, flexible resources. Energy efficiency programs are thus capable of reducing the need for energy and capacity-related reliability services that conventional natural gas-fired generation such as the AEC would provide. But energy efficiency cannot eliminate the need for all natural gas generation such as AEC because some level of reliable energy is necessary. Therefore, energy efficiency is not a viable alternative to the generation AEC would provide.

## Demand Response

Demand response (DR) programs provide an economic incentive for end users to modify energy use, whether through direct payments to reduce consumption when requested to do so (i.e., event-triggered DR programs) or rate structures that encourage reducing energy use during hours in which generation is expensive and/or system reliability is threatened. On September 25, 2013, the CPUC authorized a new rulemaking (R.13-09-011), in part, to facilitate the participation of aggregated loads in ancillary service markets, allowing them to directly compete with generation resources in providing reliability services and to satisfy resource adequacy requirements imposed on load-serving entities in exchange for a stream of revenue.

DR continues to play an important role in meeting California's capacity planning, including requirements for peak summer demand. These programs are operated by the state utilities; DR programs operated by the IOUs meet roughly 5 percent of total CAISO-system resource adequacy capacity requirements (CAISO 2015a). DR has attributes that can partially meet some of the AEC's project objectives by: 1) contributing to or reducing the need for capacity-related reliability services, including an array of ancillary services (regulation and spinning reserves), and 2) reducing the need for flexible generation if called upon during hours in which ramping needs are highest. When such programs reduce loads in the West LA Basin, they reduce local capacity requirements. DR programs can facilitate the integration of renewable resources by meeting incremental needs for regulation and reserves and reducing ramping needs. Unlike gas-fired generation, DR can absorb load during periods of renewable over-generation (a condition that occurs when total supply exceeds total demand in the CAISO balancing authority area). But demand response cannot eliminate the need for all natural gas generation such as AEC because some level of reliable energy is necessary. Therefore, demand response is not a viable alternative to the generation AEC would provide.

## Utility Scale and Distributed Renewable Generation

In 2010, Governor Brown's Clean Energy Jobs Plan established a target of 12,000 MWs of renewable distributed generation (DG) by 2020. As of October 31, 2015, 7,200 MW of renewable DG was operational, contracts with another 900 MWs had been approved, and 2,200 MWs of capacity was anticipated from various incentive programs (the Renewable Auction Mechanism, Renewable Feed-in Tariff, Bioenergy Feed-in Tariff, and utility photovoltaic programs) (Energy Commission 2015).

Utility-scale and distributed renewable generation can substitute for natural gas-fired generation as sources of energy. To the extent that they can be relied on to produce energy during periods of peak or high demand, they are also substitute sources of capacity, thereby reducing the need to build and operate gas-fired generation. When located in transmission-constrained areas such as the West LA Basin, they can provide local capacity, reducing the need to build and operate local natural gas-fired generation, such as the AEC. But renewable energy cannot eliminate the need for all natural gas generation such as AEC because some level of reliable energy is necessary to ensure adequate supply through a range of conditions. Therefore, renewable energy is not a viable alternative to the generation AEC would provide.

## Energy Storage

As California increasingly relies on wind and solar resources to meet its energy needs and environmental goals, other energy resources are increasingly called upon to "balance the system." Expected changes in wind and solar output over the course of a day and random swings due to changing weather conditions require construction and operation of more flexible, dispatchable natural gas-fired generation to compensate for the variations in wind and solar output[2].

[2] In some systems (in the Pacific Northwest, for example), there is sufficient dispatchable hydroelectric energy to balance a wind- and solar-intensive generation fleet. The scale of wind and solar development

Mature, utility-scale technologies include pumped hydroelectric and compressed air storage. Several pumped hydroelectric facilities have been operating in California for decades. The 1,212-MW Helms facility has been operated by the Pacific Gas and Electric Company since 1984.

California's energy agencies recognize the key role that storage will play in integrating wind and solar resources in a "high variable energy" system in setting an ambitious target for the procurement of energy storage capacity for 2020. On October 17, 2013, the CPUC established a target of 1,325 MWs for energy storage development, apportioning it to the transmission and distribution systems and the customer side of the meter (D.13-10-040).

Energy storage cannot replace generation as a source of energy because it requires injections of energy in excess of the amounts that are discharged when the stored energy is needed. However, energy storage can replace generation capacity by being charged during non-peak hours and discharged on peak, in lieu of dispatching natural gas-fired generation. If located in a transmission-constrained area, storage can replace generation capacity needed for local reliability. But energy storage cannot eliminate the need for all natural gas generation such as AEC because some level of reliable energy is necessary to ensure adequate supply through a range of conditions. Therefore, energy storage is not a viable alternative to the generation AEC would provide.

## CONCLUSIONS FOR PREFERRED RESOURCES

In D.13-02-015, the CPUC found that at least 1,000 MWs of dispatchable, natural-gas fired generation resources are needed in the West LA Basin for local reliability (CPUC 2013a):

> *The record shows that the most certain technology which can meet LCR needs (from the ISO's perspective) is gas-fired generation. In order to ensure a base level of procurement certain to ensure reliability under the most stringent criteria, we will require that at least 1000 MW in the LA basin local [reliability] area be from gas-fired generation.*

Selected preferred resources might meet the CAISO's criteria for contributing to local reliability. The CPUC found that this possibility should be considered by the CAISO and discussed in SCE's application to procure specific resources; the application was subsequently submitted to the CPUC in November 2014 (A.14-11-012). As stated in D.13-02-015 (CPUC 2013a):

in California, however, is such that energy storage is expected to absorb surplus generation during midday hours, as well as use energy generated during the day to reduce the need for energy and capacity from natural gas-fired generation resources during evening hours.

> *The ISO finds that gas-fired generation meets its criteria [for the provision of local reliability services], as well as any other resources (or combination of resources) which have the same performance criteria as gas-fired generation. Demand response resources and [combined heat and power, also referred to as cogeneration] may meet the ISO's criteria, but not at this time. It is possible that other resources will pass the ISO test as well in the future. Of course, acquisition of more energy efficiency and demand side resources would reduce the LCR need.*
>
> *We will require SCE to consult with the ISO regarding ISO performance characteristics (such as ramp-up time) for local reliability. In its application to procure specific resources to meet local reliability needs (discussed herein), SCE shall provide documentation of such efforts and how SCE meets ISO performance requirements.*

A substantial share of the testimony and subsequent discussion in the 2012 LTPP proceeding was devoted to determining the appropriate assumptions for development of preferred resources in the West LA Basin over the planning horizon, which, in turn, largely determined the need for NGFG in the area. SCE was directed to procure at least 1,000 MW, but no more than 1,500 MW of NGFG, a directive that would be satisfied with the development of AEC.

## ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION

As discussed, the alternatives analysis should identify any alternatives that were considered by the lead agency but were rejected as infeasible. In addition, CEQA requires a brief explanation of the reasons underlying the lead agency's determination to eliminate alternatives from detailed analysis.

## ALTERNATIVE SITES

### Relationship of the Proposed AEC to the Project Site

The Warren-Alquist Act addresses aspects of an applicant's site selection criteria for thermal power plants and the use of an existing industrial site for such use when the project has a strong relationship to the existing industrial site. When this is the case, it is "reasonable not to analyze alternative sites for the project" (Pub. Resources Code, § 25540.6, subd. (b)). This subsection of the alternatives analysis addresses the project's strong relationship to the project site from a regulatory and practical standpoint, which provides part of the context for staff's analysis of alternatives to the proposed AEC.

#### Use of the Existing Project Site for Electrical Power Generation

The long-term historical use of the project site for electrical power generation is applicable to the discussion of the project's strong relationship to the site. The proposed AEC would be constructed and operated at the existing Alamitos Generating Station (AGS) site, which began operating in 1956, when it was owned by SCE. During the late 1990s, the electric industry was restructured and SCE sold most of its generating facilities. In 1998, AES Southland purchased the Alamitos, Huntington Beach, and Redondo Beach generating facilities from SCE.

The proposed project would use the site's existing infrastructure, including the existing fresh water supply, stormwater drainage system, wastewater system, natural gas supply line, and access to the adjacent SCE switchyard for connection to the transmission grid. The proposed AEC would include a new 1,000-foot-long process/sanitary wastewater pipeline to the first point of interconnection to the existing Long Beach Water Department sewer system to eliminate the current practice of treatment and discharge of process/sanitary wastewater to the San Gabriel River.

### City of Long Beach Land Use and Zoning

As discussed in detail in the **LAND USE** section of this staff assessment, the city of Long Beach General Plan Land Use designation for the project site is LUD No. 7 and the zoning district is Planned Development-1 Subarea (19) (PD-1(19)). The PD-1 Planned Development District was adopted as part of the city's Local Coastal Plan (LCP) and is also referred to as the Southeast Area Development Improvement Plan (SEADIP). The SEADIP District includes numerous subareas subsequently adopted by the city to identify specific land uses and provide development standards that guide any future development within the SEADIP. Subarea 19 allows for industrial uses and the city has ensured that the Subarea 19 is fully developed in accordance with the provisions of the General Industrial (IG) zone. Land Use staff concluded that the project as proposed at the existing AGS site would be consistent with the development standards for the PD-1(19) zoning district, as well as other applicable provisions of the Municipal Code, and would be consistent with both the California Coastal Act and the Long Beach LCP. The project would have no adverse significant unmitigated impacts with the existing surrounding land uses in the following areas: Air Quality, Hazardous Materials Management, Noise and Vibration, Public Health, Transmission Line Safety and Nuisance, Soil and Water Resources, and Traffic and Transportation. Furthermore, with the implementation of Condition of Certification **VIS-3** the proposed project would not result in any physical land use incompatibilities to Visual Resources.

### Expansion of Existing Coastal Power Plants

The California Coastal Act of 1976 (Coastal Act) protects coastal resources from the major impacts of power plant siting. In 1978, the California Coastal Commission (Coastal Commission) adopted a report that satisfied a requirement of the Coastal Act to designate specific locations in the state's Coastal Zone where the location of an electric generating facility would prevent the achievement of the objectives of the Coastal Act (Pub. Resources Code § 30413, subd. (b)). The 1978 report was revised in 1984 and re-adopted in 1985 (Coastal Commission, 1985). In accordance with the Coastal Act, the report designates sensitive resource areas along the California coast as unsuitable for power plant construction and provides "that specific locations that are presently used for such facilities and reasonable expansion thereof shall not be so designated." This policy encourages expansion of existing power plant sites if new plants are necessary, thereby protecting undeveloped coastal areas (Coastal Commission, 1985).

In a related effort, the Energy Commission prepared a 1980 study that examined opportunities for the reasonable expansion of existing power plants in the state's Coastal Zone and reviewed the effects of the designated resource areas on expansion opportunities (Energy Commission, 1980). The 1980 study defines "reasonable" in this context to mean the provision or maintenance of land area adequate to satisfy a specific site's share of the state's need for increased electrical power generating capacity over the Energy Commission's planning intervals of 12 and 20 years (Energy Commission, 1980). According to the 1980 study, the expansion areas should be inside or adjacent to the existing site boundaries, or within a distance that would permit the cost effective use of the existing power plant support facilities, where necessary or advisable. The study acknowledged that other conventional siting factors (e.g., local land use plans) could affect expansion opportunities. The Energy Commission study is not intended to be used to endorse specific sites or types and sizes of power plants for expansion.

The 1980 study describes expansion opportunities for various combinations of plant types and sizes at 20 of the 25 evaluated sites. The Alamitos power plant is generally characterized as having reasonable on-site expansion opportunities; off-site expansion opportunities at the power plant are considered "seriously constrained" by the lack of available land due to the encroachment of urban land uses (Energy Commission, 1980). The proposed AEC would replace the AGS and be constructed on the brownfield site of the existing AGS. No off-site expansion of power plant facilities is proposed.

## POTENTIAL FOR THE PROPOSED AEC TO CONTRIBUTE TO LOCAL GRID CAPACITY REQUIREMENTS

The CAISO regularly evaluates grid reliability issues in its balancing authority area for the state. The CAISO develops and publishes its annual Transmission Plan, which includes a comprehensive evaluation of the CAISO transmission grid identifying the upgrades required to successfully meet California's energy policy goals, maintain grid reliability requirements, and provide economic benefits to ratepayers. The CAISO's transmission planning process involves collaboration with the CPUC, the Energy Commission, and other stakeholders. The most recent plan adopted by the CAISO Board of Governors, the 2015–2016 Transmission Plan, assesses challenges to grid reliability in Southern California due to the SONGS closure and the SWRBC's requirement to replace or retire OTC units. A total of approximately 9,290 MWs of generation in the region is affected (CAISO 2016).

AES power plants in the West LA Basin affected by the OTC Policy include the existing Alamitos Generating Station (approximately 2,000 MWs), the Huntington Beach Generating Station (approximately 450 MWs), and the Redondo Beach Generating Station (approximately 1,300 MWs). To comply with the OTC Policy, these generators must be retrofitted, repowered, or retired.

The CPUC's LTPP Track 1 decision (D.13-02-015) ordered SCE to procure 1,400 to 1,800 MWs of new local energy resources in the West LA Basin to meet long-term local capacity requirements by 2021. Of this total, at least 1,000 MWs but not more than 1,200 MWs must be from conventional gas-fired resources. The CPUC's LTPP Track 4 decision concerning the SCE service territory authorized procurement of additional resources and increased the upper limit for gas-fired generation to 1,500 MWs of local capacity (D.14-03-004) (CPUC 2014a). The proposed AEC would contribute to meeting local capacity requirements for NGFG, and in November 2015, the CPUC approved SCE's contract for 640 MWs of NGFG at the Alamitos site (D.15-11-041) (CPUC 2015).

## San Onofre Nuclear Generating Station (SONGS) Site

With the permanent closure and decommissioning of SONGS, the site was considered due to its potential to contribute to meeting LCR in the West LA Basin and its relatively remote location; the area in the vicinity of SONGS is less developed and has a lower population density compared to the more urbanized area near the AEC site. The existing infrastructure at the SONGS site, including its transmission lines, switchyard, substation, water and sewage lines, and a natural gas pipeline, could be used for an AEC equivalent project. As an existing power generation facility equipped with the appropriate infrastructure and connected to the transmission grid serving southern California, the SONGS site satisfies most of the proposed project objectives as an alternative site location.

SONGS was a nuclear-powered thermal power plant located between the CAISO-defined LA Basin and San Diego areas. The SONGS site is situated on two separate areas of land that are leased from the U.S. Marine Corps Base Camp Pendleton (Camp Pendleton). The two areas are located on either side of Interstate 5 (I-5). The main portion of the facility is situated on 84 acres of land along the Pacific Ocean, west of I-5 and south of San Onofre State Beach. In this area, SCE operated Units 1, 2, and 3 until Unit 1 was shut down in 1992 (Tetra Tech 2008). The dismantlement of Unit 1 is essentially complete, and Units 2 and 3, each rated at 1,127 MW, for a facility total of 2,254 MW, ceased operations in 2013 (U.S. Nuclear Regulatory Commission 2014). SCE submitted a Post-Shutdown Decommissioning Activities Report to the U.S. Nuclear Regulatory Commission in 2014, providing their current plans to decommission the plant within 35 years (U.S. Nuclear Regulatory Commission 2015). The remaining portion is on approximately 130 acres of land east of I-5 and opposite the main portion of the facility. This area, referred to as the Mesa Complex, houses various administrative, maintenance, and support services for the facility. No power-generating activities occur at the Mesa Complex (Tetra Tech 2008). SONGS is principally owned by SCE. Other owners of SONGS include SDG&E and the city of Riverside. The city of Anaheim is a former owner of the facility and will share responsibility for decommissioning (SCE 2014).

According to the San Diego County General Plan Land Use Element, the lands owned by Camp Pendleton are within unincorporated San Diego County but outside the land use jurisdiction of the county, and therefore, the Land Use Element does not contain goals or policies that guide future development of those lands (San Diego County General Plan 2011). The future development of Camp Pendleton falls under the jurisdiction of the U.S. Marine Corps and the U.S. Department of Defense. Current real estate grants authorize SONGS to maintain a presence on Camp Pendleton until approximately 2024 (U.S. Marine Corps 2007).

In a letter dated April 11, 2014, the U.S. Marine Corps informed SDG&E that it intends to return the SONGS Mesa Complex site to the Marine Corps as a training site for the "critically needed maneuver corridor and mission-supporting infrastructure…" that the Mesa site provides. SDG&E had been working with the Marine Corps to help site a new substation and voltage stabilizing equipment associated with the closure of SONGS. In the letter, the U.S. Marine Corps advises SDG&E to locate the proposed equipment components on the SONGS power plant easement west of I-5 (U.S. Marine Corps 2014).

After considering the SONGS site (both the power plant and Mesa Complex areas), staff determined that the site would not provide a feasible alternative site location. The power plant portion of SONGS would not be available for approximately 35 years due to the lengthy decommissioning process. This presents a notable feasibility issue for development of new NGFG capacity at the site due to the significant delay in the project schedule. The Mesa Complex, because it contains no power generation facilities but is in close proximity to the power facility's infrastructure, would be the more feasible of the two areas for development of an AEC equivalent project. But considering that the U.S. Marine Corps owns the land occupied by the SONGS facility and has complete land use jurisdiction over the site, and that it has demonstrated its intention to use the Mesa area for training purposes for the foreseeable future, the applicant would not be able to reasonably acquire site access. Because the SONGS site is not a feasible alternative site location for the AEC, this alternative was eliminated from further consideration.

## Alternative Site Summary

The proposed project has a strong relationship to the existing industrial site, which has a long history of generating electrical power; the infrastructure, including transmission lines, switchyard, natural gas pipeline, and fresh water lines, is in place, and a process/sanitary wastewater pipeline would be constructed to eliminate the discharge of wastewater to the San Gabriel River (which would be an improvement to the health of the river and the Pacific Ocean). In addition, the project site, which is owned by AES, is consistent with local land use policies, and development of the AEC would be in compliance with local plans and ordinances, including the city of Long Beach's general plan, local coastal program, the SEADIP Specific Plan, and standards for industrial development. Further, the applicant does not propose expanding the AEC outside the boundaries of the existing AGS brownfield site.

Beyond the SONGS site, the extent to which development of a different site could meet most of the project objectives is unknown, and it is questionable whether any alternative site location that is not currently provided with transmission lines and a switchyard would allow the project to contribute in a timely manner to satisfy the local capacity requirements identified by CAISO and supported by the CPUC. Development of the AEC at the project site would satisfy project objectives and help contribute to meeting local grid capacity requirements.

## NO-PROJECT ALTERNATIVE

This analysis evaluates the “no-project” alternative to the AEC to fulfill the requirements of section15126.6, subdivision (e)(1) of the CEQA Guidelines. As mentioned above, under “Energy Commission Screening Process,” the Energy Commission is required to consider a “no-project” alternative, the purpose of which is to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The “no-project” alternative is required to discuss the existing conditions at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved. In this case, because the proposed project is a development project on identifiable property, the “no-project” alternative is the circumstance under which the proposed project does not proceed (Cal. Code Regs., tit. 14, §15126.6, subd. (e)(2)).

SCE built the AGS between 1955 and 1969. Unit 1 began commercial operation in 1956, Unit 2 in 1957, Unit 3 in 1961, Unit 4 in 1962, Units 4 and 5 in 1966, and Unit 7 in 1969. Unit 7 was decommissioned and removed in 2003. The facility was designed to be dual-source, powered by either oil or natural gas, and had four large fuel tanks to hold oil. In the 1970s, all dual source-fueled plants were required to convert to natural gas only. By the 1980s, the AGS was converted to natural gas only, and the fuel oil tanks were removed in 2010. AES Alamitos Energy acquired the AGS plant from SCE in 1998. (AES 2015, p. 5.3-16)

AGS Units 1-6 are currently in operation and if the AEC is licensed, would continue to provide electrical service concurrent with the construction of the AEC Power Block 1. Units 3, 4, and 6 would likely operate until December 31, 2020, which is the final date for the AGS facility to comply with the OTC Policy. The city and project owner have entered into a Memorandum of Understanding (MOU) for the demolition of the existing units after the AEC is constructed and operating. Demolition of Units 1-6 would be conducted in accordance with the MOU once all necessary regulatory approvals to retire and decommission the existing units are received. (AES 2015, p.1-3)

The most reasonably expected “no project” alternative if the AEC is not licensed by the Energy Commission, would be for AGS Units 1-6 to continue operating until the end of 2020 and then cease operations. Units 1-6 would be decommissioned and left in place. There are no existing requirements to demolish Units 1-6.

Under the “no project” alternative, the construction and operational impacts from the proposed AEC would not occur. As determined by Energy Commission staff in this FSA, the construction and operation of the AEC is not likely to cause potentially significant adverse impacts with the incorporation of staff’s recommended conditions of certification. Additionally, the existing visual condition of the AGS site and viewshed would remain visually degraded as the opportunity to implement enforceable measures to restore and enhance the visual quality at the project site in compliance with section 30251 of the California Coastal Act as part of the AEC project would be missed.

The “no-project” alternative would likely result in the construction and operation of another new, natural gas-fired generation unit or units in the Western sub-area of the Los Angeles Basin to serve the predicted demand for the service area and electric system, and would not make use of the existing AGS infrastructure. It is assumed that under the “no-project” alternative, the AGS would continue to operate under existing conditions until the end of 2020 and then cease operations. It is possible that a project similar to the AEC could be permitted and constructed elsewhere in the LA Basin area, although no specific site or project is identified; therefore, the potential impacts of such a project are unknown.

AGS Units 1-6 are older power generation facilities that the state is looking to replace with fast-start and dispatch flexibility capabilities to provide grid stability to accommodate increased renewable energy and provide back-up for planned and unplanned grid outages in response to excessive demands. Thus, the “no-project” alternative would also fail to meet most of the basic project objectives.

## RESPONSE TO PSA COMMENTS

The Los Cerritos Wetlands Land Trust was the only entity to provide comments on the Preliminary Staff Assessment (PSA) regarding alternatives.

## LOS CERRITOS WETLANDS LAND TRUST (TN 212764-1)

**Comment:** *The PSA’s alternative analysis lacks the required reasonable range of alternatives. This error has resulted in the PSA analyzing an alternative that is not the environmentally superior alternative without an adequate discussion for that choice.*

> **Response:** The purpose of alternatives analysis is to identify feasible ways to substantially lessen or avoid the significant environmental effects of a project. (Cal. Code Regs., tit. 14, § 15126.6, subd. (b); see also Pub. Resources Code, § 21002.1, subds. (a), (b); Cal. Code Regs., tit. 14, §§ 15002, subd. (a)(3); 15021, subd. (b).) The CEQA Guidelines state that the range of alternatives is governed by a “‘rule of reason’” that requires an EIR to contain “only those alternatives necessary to permit a reasoned choice.” (Cal. Code Regs., tit. 14, § 15126.6, subd. (f)). In this case staff’s analysis found that the proposed AEC project did not have any significant environmental effects or significant effects that could not be mitigated. Therefore staff need not consider any alternatives. (Cal. Code Regs., tit. 14, §15126.6, subd. (b)) Nevertheless, staff considered an alternative site, alternative technologies, and the no project alternative. (See Alternatives “Conclusions” subsection)

Because the proposed project is on an existing industrial site, close to adequate transmission facilities, gas lines and sewer lines, and as staff's nearly one thousand page analysis shows the project would not have any significant impacts, the proposed project is the environmentally superior project. (See Alternatives "Conclusions" subsection)

It should also be noted that Public Resources Code section 25540.6(b) holds that when a proposed project has a strong relationship to an existing industrial site, it is reasonable not to analyze alternative sites for the project. The discussion detailing the strong relationship to the existing site can be found in the subsection titled "Alternative Sites".

**Comment:** *There were a number of comments related to the California Public Utilities Commission's (CPUC) approval of the contracts offered to Southern California Edison (SCE) to meet the Long Term Procurement Plan (LTPP). The comments suggested reliance on the CPUC approval process fails because the standard of review for the CPUC process is a reasonableness test of SCE's effort to meet reliability goals in the LTPP and that any CPUC approval cannot be construed as an effective finding that alternatives are not feasible. Also the CPUC only approved 640 MWs of gas-fired generation at AEC while the project is proposed to be 1040 MWs. Finally, the CPUC approved 100 MWs of battery storage but AES is now proposing 300 MWs of battery storage.*

**Response:** The Energy Commission's environmental review of an Application for Certification for a thermal power plant is a separate and distinct process from the CPUC's LTPP. The Commission staff does not consider whether the proposed facility is needed, whether it has a contract with a power purchaser, whether any proposed contract will be approved by the CPUC or whether the project is financially sound. Under Public Resources Code section 25009 staff assumes the proposed project is needed if an AFC was filed. Staff's task is to assess the impacts of the project and develop appropriate mitigation. While information on the LTPP process is included in the Alternatives analysis to provide context for the project objectives, the CPUC's actions on a particular contract are not material to the environmental analysis. The project before staff is a 1040 MW facility.

**Comment:** *It is clear that staff relied on the Applicant's project objectives, and not those of the lead agency. The lead agency must exercise its independent judgment on project objectives, and must not uncritically accept the applicant's objectives. (Public Resources Code section 21082.1(c)(1).*

**Response:** There is nothing impermissible in taking the applicant's project objectives. The primary concern is project objectives that are so narrow that only the proposed project can meet the objectives. (See County of Inyo v. City of Los Angeles (3d Dist. 1981) 124 Cal.App.3d 1, 5 ["impermissibly truncated" description distorted not only the project but its alternatives].) In this case staff specifically noted that staff's analysis broadly interprets the applicant's project objectives to foster a complete and robust discussion of potential alternatives to the applicant's proposed project. (See Alternatives "Project Objectives" subsection)

***Comment:*** *The PSA fails to provide alternatives consisting of a smaller gas plant configuration. This omission is especially glaring given that the CPUC only approved a 640 MW project at Alamitos to meet LA Basin reliability needs. An alternative that contemplates the 640 MW combined cycle plant approved by the CPUC, must be considered in the PSA.*

**Response:** The comment mischaracterizes what exactly the CPUC approved during its LTPP proceeding. Under Public Resources Code section 25500 the Energy Commission has exclusive jurisdiction to license and approve thermal power plants. The CPUC did not and cannot approve a power plant such as AEC. What the CPUC approves is the amount of power generation SCE can acquire using rate payer funds. The LTPP process does not exclude applicants from proposing projects of different sizes and the Energy Commission from approving those facilities. In the case of AEC, the project already reduced its power output from the original planned 1995 MWs down to 1040 MWs. (See Project Description at http://docketpublic.energy.ca.gov/PublicDocuments/13-AFC-01/TN201620-7_20140203T124541_AEC_AFC_20_Project_Description.pdf) Staff's analysis found that the proposed AEC project would not have any significant environmental effects or significant effects that could not be mitigated. Therefore, a smaller gas plant configuration alternative would not substantially lessen a significant environmental effect of the project and an analysis of such configuration was not carried forward in this case.

**Comment:** *The PSA has wrongly conflated the CPUC standard of review – "reasonableness" of the SCE's efforts – with the CEQA standard of review for "feasibility" of proposed alternatives. The conclusions highlight that the CPUC did not find the preferred resources are infeasible as asserted in the PSA.*

**Response:** Staff agrees that additional preferred resources may be available in the Western Los Angeles Basin sub-area, beyond those procured by SCE in its RFO.

While the CPUC proceeding considers reasonableness, the Energy Commission staff considers a reasonable range of alternatives and the requirement to include those that could feasibly accomplish most of the basic project objectives while avoiding or substantially lessening one or more of the significant effects. In AEC's case, these project objectives include the provision of energy, capacity and services to contribute to Los Angeles Basin and Western Los Angeles Basin reliability requirements, as established by the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC). A threshold amount of natural gas-fired generation capacity – as opposed to preferred resources: energy efficiency, demand response, renewable generation, and energy storage - was held by the CPUC and CAISO to be necessary to provide local reliability in the Los Angeles area. The total amount of new natural gas-fired generation capacity needed to satisfy these requirements was determined to be at least 1,000 MWs and up to 1,500 MWs; the AEC would contribute 1,040 MWs of such capacity.

While the CPUC considers a regional approach to developing the mix of resources generation, Energy Commission staff's individual project review includes review of specific project objectives and project impacts. While on a regional level additional preferred resources are feasible, on a project level the proposed project has certain characteristics (fast start capabilities, existing industrial location, voltage support, etc.), and no significant impacts, which make it the preferred alternative under CEQA.

***Comment:*** *The CPUC decision warns against misinterpreting its findings as CEQA equivalent…The CEC's CEQA review or other environmental review should be conducted independent of the fact that potential damages and risks may result because the CPUC has issued its approval of the underlying power purchase contract.*

**Response:** Staff concurs that it is obligated to perform an independent environmental review of the proposed project and to identify project impacts and develop appropriate mitigation or if warranted recommend the project not be approved. Staff does not consider the terms of power purchase contracts and often are unware of agreement terms. Because the proposed project does not have any significant impacts and is on an existing industrial site, the scope of the alternatives and the depth of the analysis need not be as detailed or extensive. There is no requirement that an agency select the most environmentally-protective alternative (Sierra Club v. County of Napa (2004) 121 Cal.App.4th 1490, 1507), nor that agencies choose an off-site alternative (Cal. Native Plant Society v. City of Santa Cruz (2009) 177 Cal.App.4th 957 980), nor that agencies analyze all alternatives to the same level of detail (Laurel Heights Improvement Assn. v. Regents of Univ. of Cal. (1988) 47 Cal.3d 376, 407 ("Laurel Heights")

***Comment:*** *Potential for continuing operation of the Alamitos Generation Station (AGS). If this is an alternative under consideration by the applicant or Energy Commission it must be evaluated.*

**Response:** Neither staff nor the applicant has proposed continued operation of the AGS passed 2020. For example, the no project alternative assumes AGS operates until the end of 2020 then ceases operations to comply with the final compliance date of December 31, 2020 for the AGS under the OTC Policy.

Section 15126.6 of the CEQA Guidelines addresses feasibility related to legal concerns: Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, and other plans or regulatory limitations. In this case the OTC policy is a barrier to continued operations of the facility as currently designed.

## CONCLUSIONS

Staff has not identified a feasible alternative that would be environmentally superior to the proposed AEC. Staff considered a reasonable range of alternatives to the proposed project, including an alternative site location, “no-project” alternative, and provided a discussion on preferred resources as substitutes for dispatchable natural gas-fired generation. Each of these alternatives have been eliminated from detailed consideration do to a failure to meet most of the basic project objectives, infeasibility, inability to avoid significant environmental impacts, or any combination thereof. As determined by Energy Commission staff in this FSA, the construction and operation of the AEC is not likely to cause potentially significant adverse impacts with the incorporation of staff’s recommended conditions of certification.

Staff concludes that:

- Energy efficiency, demand response, energy storage, and utility scale and distributed renewable generation are not viable or feasible alternatives to the AEC.
- Demand reduction, energy efficiency, and utility scale and distributed renewable generation are not capable of meeting project objectives, particularly the objectives that address providing grid stability to accommodate integration of renewable energy generation and removal of the existing once-through cooling process to comply with OTC Policy.
- The SONGS site, as an alternative site location, would meet most of the proposed project’s objectives, and could potentially reduce or avoid environmental impacts at the AEC project site. In addition, as proposed, the AEC would comply with OTC Policy if constructed at the SONGS site; however, this alternative was eliminated from further consideration because the project owner would not be able to reasonably acquire the SONGS site from the U.S. Marine Corps and the existing SONGS facility will take decades to decommission and remove.
- The facility owner has selected a mix of natural gas combined-cycle and natural gas simple-cycle components utilizing fast start and dispatch flexibility in order to support southern California grid load balancing and renewable energy integration (NRG 2013a, § 1.1). This configuration would provide an important element in the introduction of renewable energy sources by providing a bridge for power-loss intermittencies characteristic of wind turbines, solar photovoltaic, and solar thermal electric generation systems. Given the project objectives, location, and the commercial experience of the selected technologies, staff agrees with the facility owner that only natural gas-burning technologies are feasible for this project.
- AGS Units 1-6 are older power generation facilities that the state is looking to replace with fast-start and dispatch flexibility capabilities to provide grid stability to accommodate increased renewable energy and provide back-up for planned and unplanned grid outages in response to excessive demands. Thus, the “no-project” alternative (i.e., continued operation of Units 1-6 until the end of 2020) would fail to meet most of the basic project objectives.

- Coastal Commission policy encourages expansion of existing power plant sites if new plants are necessary, thereby protecting undeveloped coastal areas (Coastal Commission 1985).
- If all conditions of certification contained in the FSA are implemented, construction and operation of the AEC would not create any significant direct, indirect, or cumulative adverse environmental impacts.

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# Compliance Conditions
# and
# Compliance Monitoring
# Plan

# COMPLIANCE CONDITIONS
# AND
# COMPLIANCE MONITORING PLAN

Testimony of Joseph Douglas

## INTRODUCTION

The Alamitos Energy Center (AEC) Compliance Conditions of Certification, including a Compliance Monitoring Plan (Compliance Plan), are established as required by Public Resources Code section 25532. The Compliance Plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety and environmental law; all other applicable laws, ordinances, regulations, and standards (LORS); and the conditions adopted by the California Energy Commission (Energy Commission) and specified in the Energy Commission's written Decision on the project's Application for Certification (AFC).

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the compliance project manager (CPM), the project owner or operator (project owner), delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission-approved conditions of certification;
- establish contingency planning, facility non-operation protocols, and closure requirements; and
- establish a tracking method for the technical area conditions of certification that contain measures required to mitigate potentially adverse project impacts associated with construction, operation, and closure below a level of significance; each technical condition of certification also includes one or more verification provisions that describe the means of assuring that the condition has been satisfied.

## KEY PROJECT EVENT DEFINITIONS

The following terms and definitions help determine when various conditions of certification are implemented.

## PROJECT CERTIFICATION

Project certification occurs on the day the Energy Commission files its decision after adopting it at a publically noticed Business Meeting or hearing. At that time, all Energy Commission conditions of certification become binding on the project owner and the facility. Also at that time, the project enters the compliance phase. It retains the same docket number it had during its siting review, but the letter "C" is added at the end (for example, 02-AFC-1C) to differentiate the compliance phase activities from those of the certification proceeding.

## SITE ASSESSMENT AND PRE-CONSTRUCTION ACTIVITIES

The below-listed site assessment and pre-construction activities may be initiated or completed prior to the start of construction, subject to the CPM's approval of the specific site assessment or pre-construction activities. Site assessment and pre-construction activities include the following, but only to the extent the activities are minimally disruptive to soil and vegetation and will not affect listed or special-status species or other sensitive resources:

1. the installation of environmental monitoring equipment;
2. a minimally invasive soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility;
5. any minimally invasive work to provide safe access to the site for any of the purposes specified in 1 through 4, above; and
6. removal of small surface structures and equipment that is minimally invasive such as sheds, trailers and similar sized structures.

## SITE MOBILIZATION AND CONSTRUCTION

When a condition of certification requires the project owner to take an action or obtain CPM approval prior to the start of construction, or within a period of time relative to the start of construction, that action must be taken, or approval must be obtained, prior to any site mobilization or construction activities, as defined below.

Site mobilization and construction activities are those necessary to provide site access for construction mobilization and facility installation, including both temporary and permanent equipment and structures, as determined by the CPM.

Site mobilization and construction activities include, but are not limited to:

1. ground disturbance activities like grading, boring, trenching, leveling, mechanical clearing, grubbing, and scraping;

2. site preparation activities, such as access roads, temporary fencing, trailer and utility installation, construction equipment installation and storage, equipment and supply laydown areas, borrow and fill sites, temporary parking facilities, chemical spraying, controlled burns; and

3. permanent installation or removal activities for all facility and linear structures, including access roads, fencing, utilities, parking facilities, equipment storage, mitigation and landscaping activities, and other installations, as applicable.

### COMMISSIONING

Commissioning activities test the functionality of the installed components and systems to ensure the facility operates safely and reliably. Commissioning provides a multistage, integrated, and disciplined approach to testing, calibrating, and proving all of the project’s systems, software, and networks. For compliance monitoring purposes, examples of commissioning activities include interface connection and utility pre-testing, “cold” and “hot” electrical testing, system pressurization and optimization tests, grid synchronization, and combustion turbine “first fire” and tuning.

### START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” or “operation” begins once commissioning activities are complete, the final or temporary certificate of occupancy has been issued, and the power plant has reached reliable steady-state electrical production. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager. Operation activities can include a steady state of electrical production, or, for “peaker plants,” a seasonal or on-demand operational regime to meet peak load demands.

### NON-OPERATION AND CLOSURE

Non-operation is time-limited and can encompass part or all of a facility. Non-operation can be a planned event, usually for equipment maintenance or repair, or unplanned, usually the result of unanticipated events or emergencies.

Closure is a facility shutdown with either no intent to restart operation or may result from unsuccessful efforts to re-start over a lengthy period of non-operation. Facility closures can occur due to a variety of factors, including, but not limited to, irreparable damage and/or functional or economic obsolescence.

## ROLES AND RESPONSIBILITIES

Provided below is a generalized description of the compliance roles and responsibilities for Energy Commission staff (staff) and the project owner for the construction and operation of the AEC project.

## COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM's compliance monitoring and project oversight responsibilities include:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Decision;

2. resolving complaints;

3. processing post-certification project amendments for changes to the project description, conditions of certification, ownership or operational control, and requests for extension of the deadline for the start of construction (see **COM-10** for instructions on filing a Petition to Amend or to extend a construction start date);

4. documenting and tracking compliance filings; and

5. ensuring that the compliance files are maintained and accessible.

The CPM is the central contact person for the Energy Commission during project pre-construction, construction, operation, emergency response, and closure. The CPM will consult with the appropriate responsible parties when handling compliance issues, disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal requires CPM approval, the approval will involve all appropriate Energy Commission technical staff and management. All submittals must include searchable electronic versions (.pdf, MS Word, or equivalent files).

### Pre-Construction and Pre-Operation Compliance Meeting

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. These meetings are used to assist the Energy Commission and the project owner's technical staff in the status review of all required pre-construction or pre-operation conditions of certification, and facilitate staff taking proper action if outstanding conditions remain. In addition, these meetings shall ensure, to the extent possible, that the Energy Commission's conditions of certification do not delay the construction and operation of the plant due to last minute, unforeseen issues or a compliance oversight. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

### Energy Commission Record

The Energy Commission maintains the following documents and information as public record, in either the Compliance file or Dockets Unit files, for the life of the project (or other period as specified):

- all documents demonstrating compliance with any legal requirements relating to the construction, operation, and closure of the facility;

- all Monthly and Annual Compliance Reports (MCRs, ACRs) and other required periodic compliance reports (PCRs) filed by the project owner;
- all project-related requests for investigation of alleged noncompliance filed with the Energy Commission; and
- all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

### Chief Building Official Delegation and Agency Cooperation

Under the California Building Code standards, while monitoring project construction and operation, staff acts as, and has the authority of, the Chief Building Official (CBO). Staff may delegate some CBO responsibility to either an independent third-party contractor or a local building official. However, staff retains CBO authority when selecting a delegate CBO (DCBO), including the interpretation and enforcement of state and local codes, and the use of discretion, as necessary, in implementing the various codes and standards.

The DCBO will be responsible for facilitating compliance with all environmental conditions of certification, including cultural resources, and for the implementation of all appropriate codes, standards, and Energy Commission requirements. The DCBO will conduct on-site (including linear facilities) reviews and inspections at intervals necessary to fulfill these responsibilities. The project owner will pay all DCBO fees necessary to cover the costs of these reviews and inspections.

## PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that all conditions of certification and applicable LORS in its license are satisfied. The project owner will submit all compliance submittals to the CPM for processing unless the conditions specify another recipient. The Compliance Conditions regarding post-certification changes specify measures that the project owner must take when modifying the project's design, operation, or performance requirements, or to transfer ownership or operational control. Failure to comply with any of the conditions of certification or applicable LORS may result in a non-compliance report, an administrative fine, certification revocation, or any combination thereof, as appropriate. A summary of the Compliance Conditions of Certification are included as **Compliance Table 1** at the end of this Compliance Plan.

## COMPLIANCE ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision are specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke a project certification and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Decision. The Energy Commission's actions and fine assessments would take into account the specific circumstances of the incident(s).

## PERIODIC COMPLIANCE REPORTING

Many of the conditions of certification require submittals in the MCRs and ACRs. All compliance submittals assist the CPM in tracking project activities and monitoring compliance with the terms and conditions of the Energy Commission's Decision. During construction, the project owner or an authorized agent will submit compliance reports on a monthly basis. During operation, compliance reports are submitted annually; though reports regarding compliance with various technical area conditions of certification may be required more often (e.g. AIR QUALITY) and if the project is operating with a temporary permit to occupy. Further detail regarding the MCR/ACR content and the requirements for an accompanying compliance matrix are described below.

## INVESTIGATION REQUESTS AND COMPLAINT PROCEDURES

Any person may file a Request for Investigation alleging noncompliance with the conditions of certification, Energy Commission regulations or orders. Such a request shall be filed with, and reviewed by, the Executive Director. The provisions setting forth the Request for Investigation process can be found in Title 20, California Code of Regulations, sections 1230 through 1232.5. The Request for Investigation may result in the Executive Director bringing a complaint against the alleged violator under section 1233 and seeking administrative penalties.

While this formal process exists, it is anticipated that in many instances, issues can be resolved by working with the CPM using a more informal process of contacting the CPM and discussing potential noncompliance. This process is available for both the public to bring forth concerns and the project owner to bring up potential issues with the facility.[1]

### <u>Informal Resolution Process</u>

Issues related to the construction or operation of a licensed facility should be directed to the CPM who will act as the point person in working with the public and project owner to resolve these concerns. The CPM can initiate meetings with stakeholders, investigate the facts surrounding the issues, obtain information from the facility owner, work with staff to review documents and information, issue reports and facilitate solutions to issues related to the construction and operation of the facility.

Contacting the CPM seeking an informal resolution may precede the formal Request for Investigation procedure specified in Title 20, California Code of Regulations, section 1231, but is not intended to be a prerequisite or requirement to utilizing the Request for Investigation process. The informal resolution process encourages all parties to openly discuss the conflict and reach a mutually agreeable solution.

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[1] The California Office of Administrative Law provides on-line access to the California Code of Regulations at http://www.oal.ca.gov/.

### Request for Informal Investigation

Any person or agency may request that the CPM conduct an informal investigation of alleged noncompliance with the Energy Commission's conditions of certification. Upon receipt of an informal investigation request, the CPM will promptly provide both verbal and written notification to the project owner of the allegation(s), along with all known and relevant information of the alleged noncompliance. The CPM will evaluate the request and, if the CPM determines that further investigation is necessary, will ask the project owner to promptly conduct an inquiry into the matter and provide a written report of the investigation results within seven days, along with corrective measures proposed or undertaken. Depending on the urgency of the matter, the CPM may conduct a site visit and/or request that the project owner provide an initial verbal report within 48 hours.

## POST-CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project and/or the linear facilities, or to transfer ownership or operational control of the facility. It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769. The CPM will determine whether staff approval will be sufficient, or whether Energy Commission approval will be necessary.

A project owner is required to submit a $5,000 dollar fee for every Petition to Amend (PTA) a previously certified facility, pursuant to Public Resources Code section 25806(e). If the actual amendment processing costs exceed $5,000.00, the total PTA reimbursement fees owed by a project owner will not exceed the maximum filing fee for an AFC, which is adjusted annually. Current amounts for PTA fees are available at http://www.energy.ca.gov/siting/filing_fees.html. Implementation of a project modification without first securing Energy Commission approval may result in an enforcement action including civil penalties in accordance with Public Resources Code, section 25534.

Below is a summary of the criteria for determining the type of approval process required, reflecting the provisions of Title 20, California Code of Regulations, section 1769, at the time this compliance plan was drafted. If the Energy Commission modifies this regulation, the language in effect at the time of the requested change shall apply. Upon request, the CPM can provide sample formats of these submittals.

## AMENDMENT

The project owner shall submit a Petition to Amend the Energy Commission Decision, pursuant to Title 20, California Code of Regulations, section 1769 (a), when proposing modifications to the design, operation, or performance requirements of the project and/or the linear facilities. If a proposed modification results in an added, changed, or deleted condition of certification, or makes changes causing noncompliance with any applicable LORS, the petition will be processed as a formal amendment to the Decision, triggering public notification of the proposal, public review of the Energy Commission staff's analysis, and consideration of approval by the full Energy Commission.

## CHANGE OF OWNERSHIP AND/OR OPERATIONAL CONTROL

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Energy Commission, but does not require submittal of an amendment processing fee.

## STAFF-APPROVED PROJECT MODIFICATION

Modifications that do not result in additions, deletions, or changes to the conditions of certification, that are compliant with the applicable LORS, and that will not have significant environmental impacts, may be authorized by the CPM as a staff-approved project modification pursuant to section 1769 (a)(2). Once the CPM files a Notice of Determination of the proposed project modifications, any person may file an objection to the CPM's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If there is a valid objection to the CPM's determination, the petition must be processed as a formal amendment to the Decision and must be considered for approval by the full Energy Commission at a publically noticed Business Meeting or hearing. This process requires submittal of an amendment processing fee.

## VERIFICATION CHANGE

Pursuant to section 1770(d), a verification may be modified by the CPM, after giving notice to the project owner, if the change does not conflict with any condition of certification.

# EMERGENCY RESPONSE CONTINGENCY PLANNING AND INCIDENT REPORTING

To protect public health and safety and environmental quality, the conditions of certification include contingency planning and incident reporting requirements to ensure compliance with necessary health and safety practices. A well-drafted contingency plan avoids or limits potential hazards and impacts resulting from serious incidents involving personal injury, hazardous spills, flood, fire, explosions or other catastrophic events and ensures a comprehensive timely response. All such incidents must be reported immediately to the CPM and documented. These requirements are designed to build from "lessons learned," limit the hazards and impacts, anticipate and prevent recurrence, and provide for the safe and secure shutdown and re-start of the facility.

# FACILITY CLOSURE

The Energy Commission cannot reasonably foresee all potential circumstances in existence when a facility permanently closes. Therefore, the closure conditions provided herein strive for the flexibility to address circumstances that may exist at some future time. Most importantly, facility closure must be consistent with all applicable Energy Commission conditions of certification and the LORS in effect at that time.

Prior to submittal of the facility’s Final Closure Plan to the Energy Commission, the project owner and the CPM will hold a meeting to discuss the specific contents of the plan. In the event that significant issues are associated with the plan's approval, the CPM will hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

With the exception of measures to eliminate any immediate threats to public health and safety or to the environment, facility closure activities cannot be initiated until the Energy Commission approves the Final Closure Plan and Cost Estimate, and the project owner complies with any requirements the Energy Commission may incorporate as conditions of approval of the Final Closure Plan.

## RESPONSE TO COMMENTS

**Applicant Comment (TN# 212487)**: *Page 6-2, Site Assessment and Pre-Construction Activities Applicant advocates that demolition activities are exempt from CEQA and recommends a sixth category for CEQA-exempt activities.*

> **Staff Response:** Staff agrees that demolition is ordinarily considered ministerial and would not trigger CEQA. But an exception to the general rule is when the demolition is part of a larger overall project. (See *Orinda Association v. Board of Supervisors* (1st Dist. 1986) 182 Cal. App. 3d 1145, 1170-1172) In the case of AEC, site preparation and removal of some existing structures is part of the AEC project and has been assessed by staff. Because impacts from the entire project were considered and mitigation, including those related to demolition, was developed to address impacts, staff anticipates that demolition activities would be quickly approved by the CPM as part of the pre-construction activities. Including demolition as part of the activities approved by the CPM in the pre-construction phase has been the standard practice and staff is unaware of any issues related to such approval. To allow some pre-construction removal of small structures such as those similar to sheds and trailers, language was added to the Site Assessment and Pre-construction Activities provision to accommodate this type of site activity.

**Applicant Comment (TN# 212771):** *Page 6-6, Request for Informal Investigation - Applicant questions if they will be notified when staff initiates an informal investigation.*

> **Staff Response:** Energy Commission staff track a facility’s compliance with its conditions of certification and LORS, including applicable regulatory changes, or inquiries received from the public or sister agencies. Acting in this capacity staff may request compliance information from the applicant/project owner directly; however staff will not provide formal notification to the applicant when conducting their compliance duties.

**Applicant Comment (TN# 212771):** *Page 6-6, Emergencies Requiring Immediate Action - Applicant requests statutory or regulatory authority to shut down a facility during an emergency, clarification of agency notification during an emergency shutdown, and the availability of an appeals process.*

**Staff Response:** Staff has removed this provision as it is duplicative with sections set forth in the Public Resources Code.

**Applicant Comment (TN# 212771):** *Page 6-8, Verification Change - The reference should be to section 1770(d) of the Commission's regulations, not 1770(e). This section should also include language stating that if the project owner objects to the modification, the project owner is entitled to a public hearing on the matter.*

**Staff Response:** The error has been corrected. The additional language suggested by the Applicant is not necessary because the regulation, 1770(d,) already allows the licensee, or any other person, to object and receive a hearing on the matter.

**Applicant Comment (TN# 212771):** *Page 6-9, COM-3 Compliance Verification Submittals - Applicant identified a typographic error and suggests the term "certification process" as more appropriate than the "amendment process".*

**Staff Response:** Staff agrees with the applicant's revision and will incorporate the proposed edits into the FSA.

**Applicant Comments (TN# 212487 and TN# 212771):** *Page 6-14, COM-11, Reporting of Complaints, Notices, and Citations - Applicant requests a 6 business day compliant notification window and objects to language requiring public notice of facility closure.*

**Staff Response:** Staff will remove the term closure so notification will be prior to the start of construction.

For consistency with Appendix B (a)(1(E), staff revised **COM-11** to require notification to all parcels within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed power plant and related facilities, prior to construction activities.

Similar proposals to designate business day deadlines for complaint reporting have been previously rejected by staff. Complaints must be reported to the CPM within five calendar days. Under the applicant's proposal a complaint received on a weekend would potentially go unreported to the CPM for 9 days, this is an unacceptable delay that would hinder staff's ability to be responsive to, or subsequently investigate in a timely manner, a potentially dangerous situation reported by the public or other concerned entity. Staff is unclear as to the Applicant's concerns as a simple email with an attachment can be easily sent to the CPM to comply with the condition within the five days.

**Applicant Comment (TN# 212771):** *Page 6-15, COM-12, Emergency Response Site Contingency Plan – This condition requires the preparation of a plan that outlines the facility's coordinated "emergency response and recovery preparedness for a series of reasonably foreseeable emergency events." What is the scope of the term "unanticipated event" governing the number of agencies, persons, and responders to be identified?*

**Staff Response:** Staff has removed the term “unanticipated event” which caused ambiguity in the condition. Emergency preparedness guides (OSHA, FEMA, EPA) define the core elements of an emergency management system. As noted in **COM-12,** Bullet 8, many Emergency Response Contingency Plan elements are addressed during compliance with the **Public Health**, **Waste Management**, **Hazardous Materials Management** and **Worker Safety** conditions of certification. The **COM-12** Emergency Response Contingency Plan requires the applicant to delineate emergency procedures for a list of reasonably foreseeable hazards (or chain of events) including: fire; spills; severe weather events (flood, wind, freezing); earthquakes; outages and security issues; **and** site specific procedures based upon vulnerabilities specific to the facility’s location (i.e. close proximity to train tracks). It is the applicant’s responsibility to coalesce existing and site specific information into an Emergency Response Contingency Plan for CPM review, approval and revision as necessary. It is also the applicant’s responsibility to notify the relevant regulatory entities based upon what the emergency situation requires.

**Applicant’s Comments (TN# 212487):** *Page 6-15, COM-13, Incident Reporting Requirements – Applicant complains that the temporary outage reporting requirement could result in a tremendous volume of reports that would not always be indicative of an unsafe condition, a material loss of operations, or a potentially harmful environmental effect.*

**Staff Response:** The purpose of the condition is to ensure the CPM receives timely notice regarding incidents at the facility. In such case where ongoing power delivery is reduced without prior notification, CAISO requires notification so that it can take compensating actions to maintain or restore electrical grid stability.

In a case where the CAISO is *unsuccessful* at responding sufficiently, whether in magnitude or timeliness of response, unreliability of the grid may occur, possibly resulting in a regional surge, brown-out, or black-out. Should that occur, it would directly affect public health and safety. Furthermore, even in the opposite case where the CAISO’s response is *successful at* maintaining grid reliability, the incident has been a “near-miss” and is an important leading-indicator of potential reliability issues developing at the power plant.

In the first case above where the CAISO’s response is *unsuccessful,* it would be expected that requests for information on the incident would come almost immediately to the Energy Commission from other government agencies and from media outlets. In the second case above, where the CAISO’s response is *successful,* the information is useful to the Energy Commission in maintaining metrics on power plant reliability. In either case, the incident is one where the power plant has demonstrated itself *unreliable* in meeting a CAISO dispatch request, and is of concern to the Energy Commission.

**Applicant's Comments (TN# 212771):** *Page 6-17, COM-14, Non-Operation and Repair/Restoration Plans - The applicant requests clarification of "nearby property owners", "concerned agencies"; and the notification requirement during a temporary cessation of operations. The applicant objects to the potential unnecessary expenditure caused by preparation of a Repair/Restoration Plan. The applicant also requests clarification of the Executive Director's authority to "assign suspended status" and recommend commencement of permanent closure activities, as well as an appeals process for such a determination. Lastly the applicant proposes new COM-14 language for facility closure planning.*

**Staff Response:** To remove ambiguity in the condition staff has deleted the terms "nearby property owners" and "concerned agencies".

Staff has removed the language related to the Executive Director determination of suspension and replaced it with a Commission hearing. Staff will address the proposed facility closure planning language in the COM-15 comment response.

**Applicant Comment (TN# 212771):** *Page 6-18, COM-15, Facility Closure Plan - Applicant objects to providing a provisional closure plan and cost estimate in the first ACR, objects to updating the closure cost estimate in the final closure plan, and objects to providing an environmental review and proposed alternatives in the closure plan. Applicant advocates that demolition is exempt from CEQA and the applicant provided alternative language for COM-14 "Closure Planning" and COM-15 "Permanent Closure Plan".*

**Staff Response:** Staff has considered the Applicant's proposed language and has modified **COM-15** to provide greater clarity and practicality considering the need for a closure plan is not anticipated for many years. The requirement for a provisional closure plan has been removed. Staff agrees that an alternative analysis for a closure plan is not necessary as processes exist to address project modifications, in lieu of decommissioning, through an amendment under section 1769.

Staff retained the Final Closure Plan cost estimate to inform staff, sister agencies and the public of the potential costs associated with ongoing facility maintenance and/or monitoring after closure and/or the potential costs associated with the use of a third party contractor for closure services under an insolvency, abandonment, or divestiture scenario.

Staff agrees that demolition is ordinarily considered ministerial and would not trigger CEQA. But an exception to the general rule is when the demolition is part of a larger overall project. (See *Orinda Association v. Board of Supervisors* (1$^{st}$ Dist. 1986) 182 Cal. App. 3d 1145, 1170-1172) In this case the AEC project includes construction, operations and final decommissioning which may include demolition.

## COMPLIANCE CONDITIONS OF CERTIFICATION

For the AEC project, staff proposes the **Compliance** Conditions of Certification below.

**COM-1** **Unrestricted Access.** The project owner shall take all steps necessary to ensure that the CPM, responsible Energy Commission staff, and delegate agencies or consultants have unrestricted access to the facility site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting audits, surveys, inspections, or general or closure-related site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time, whether such visits are by the CPM in person or through representatives from Energy Commission staff, delegated agencies, or consultants.

**COM-2** **Compliance Record**. The project owner shall maintain electronic copies of all project files and submittals on-site, or at an alternative site approved by the CPM, for the operational life and closure of the project. The files shall also have at least one hard copy of:

1. the facility's Application for Certification;
2. all amendment petitions and Energy Commission orders;
3. all site-related environmental impact and survey documentation;
4. all appraisals, assessments, and studies for the project;
5. all finalized original and amended structural plans and "as-built" drawings for the entire project;
6. all citations, warnings, violations, or corrective actions applicable to the project, and
7. the most current versions of any plans, manuals, and training documentation required by the conditions of certification or applicable LORS.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

**COM-3** **Compliance Verification Submittals**. Verification lead times associated with the start of construction may require the project owner to file submittals during the amendment process, particularly if construction is planned to commence shortly after certification. The verification procedures, unlike the conditions, may be modified as necessary by the CPM after notice to the project owner.

A cover letter from the project owner or an authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. The cover letter subject line shall identify the project by AFC number, cite the appropriate condition of certification number(s), and give a brief description of the subject of the submittal. When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and the condition(s) of certification applicable.

All reports and plans required by the project's conditions of certification shall be submitted in a searchable electronic format (.pdf, MS Word or Excel, etc.) and include standard formatting elements such as a table of contents identifying by title and page number each section, table, graphic, exhibit, or addendum. All report and/or plan graphics and maps shall be adequately scaled and shall include a key with descriptive labels, directional headings, a bar scale, and the most recent revision date.

The project owner is responsible for the content and delivery of all verification submittals to the CPM, and that the actions required by the verification were satisfied by the project owner or an agent of the project owner. All submittals shall be accompanied by an electronic copy on an electronic storage medium, or by e-mail, as agreed upon by the CPM. If hard copy submittals are required, please address as follows:

Compliance Project Manager
ALAMITOS ENERGY CENTER (13-AFC-01C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

**COM-4** **Pre-Construction Matrix and Tasks Prior to Start of Construction.** Prior to commencing construction, the project owner shall submit to the CPM a compliance matrix including those conditions that must be fulfilled before the start of construction The matrix shall be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first, and shall be submitted in a format similar to the description below.

Site mobilization and construction activities shall not start until the following have occurred:

1. The project owner has submitted the pre-construction matrix and all compliance verifications pertaining to pre-construction conditions of certification; and

2. The CPM has issued an authorization-to-construct letter to the project owner.

The deadlines for submitting various compliance verifications to the CPM allow staff sufficient time to review and comment on, and, if necessary, also allow the project owner to revise the submittal in a timely manner. These procedures help ensure that project construction proceeds according to schedule. Failure to submit required compliance documents by the specified deadlines may result in delayed authorizations to commence various stages of the project.

If the project owner anticipates site mobilization immediately following project certification, it may be necessary for the project owner to file compliance submittals prior to project certification. In these instances, compliance verifications can be submitted in advance of the required deadlines and the anticipated authorizations to start construction. The project owner must understand that submitting compliance verifications prior to these authorizations is at the owner's own risk. Any approval by Energy Commission staff prior to project certification is subject to change based upon the Commission Decision, or amendment thereto, and early staff compliance approvals do not imply that the Energy Commission will certify the project for actual construction and operation.

**COM-5** **Compliance Matrix**. The project owner shall submit a compliance matrix to the CPM with each MCR and ACR which shall identify:

1. the technical area (e.g., biological resources, facility design, etc.);
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition (e.g., "not started," "in progress" or "completed" (include the date); and
8. if the condition was amended, the updated language and the date the amendment was proposed or approved.

The CPM can provide a template for the compliance matrix upon request.

**COM-6 Monthly Compliance Report**. The first MCR is due one month following the docketing of the project's Decision unless otherwise agreed to by the CPM. The first MCR shall include the AFC number and an initial list of dates for each of the events identified on the Key Events List. (The Key Events List form is found at the end of this Compliance Conditions and Compliance Monitoring Plan section.)

During pre-construction, construction, or closure, the project owner or authorized agent shall submit an electronic searchable version of the MCR to the CPM within ten (10) business days after the end of each reporting month. MCRs shall be submitted each month until construction is complete and the final certificate of occupancy is issued by the DCBO. MCRs shall be clearly identified for the month being reported. The MCR shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the MCR. Each of these items shall be identified in the transmittal letter, as well as the conditions they satisfy, and submitted as attachments to the MCR;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;

4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. a cumulative listing of any approved changes to conditions of certification;

7. a listing of any filings submitted to, and permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next (2) two months; the project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. a listing of the month's additions to the on-site compliance file; and

10. a listing of incidents, complaints, notices of violation, official warnings, or citations received during the month; a list of any incidents that occurred during the month, a description of the actions taken to date to resolve the issues; and the status of any unresolved actions noted in the previous MCRs.

**COM-7** **Periodic and Annual Compliance Reports**. After construction is complete, the project owner must submit searchable electronic ACRs to the CPM, as well as other periodic compliance reports (PCRs) required by the various technical disciplines. ACRs shall be completed for each year of commercial operation and are due each year on a date agreed to by the CPM. Other PCRs (e.g. quarterly reports or decommissioning reports to monitor closure compliance), may be specified by the CPM. The searchable electronic copies may be filed on an electronic storage medium or by e-mail, subject to CPM approval. Each ACR must include the AFC number, identify the reporting period, and contain the following:

1. an updated compliance matrix which shows the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. documents required by specific conditions to be submitted along with the ACR; each of these items shall be identified in the transmittal letter with the conditions it satisfies and submitted as an attachment to the ACR;

4. a cumulative list of all post-certification changes approved by the Energy Commission or the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a listing of the year’s additions to the on-site compliance file;

9. an evaluation of the Site Contingency Plan, including amendments and plan updates; and

10. a listing of complaints, incidents, notices of violation, official warnings, and citations received during the year, a description of how the issues were resolved, and the status of any unresolved complaints.

**COM-8** **Confidential Information.** Any information that the project owner considers confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality, pursuant to Title 20, California Code of Regulations, section 2505(a). Any information deemed confidential pursuant to the regulations will remain undisclosed, as provided in Title 20, California Code of Regulations, sections 2501-2507.

**COM-9** **Annual Energy Facility Compliance Fee**. Pursuant to the provisions of section 25806 (b) of the Public Resources Code, the project owner is required to pay an annually adjusted compliance fee. Current compliance fee information is available on the Energy Commission's website at http://www.energy.ca.gov/siting/filing_fees.html. The project owner may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission dockets its final Decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification.

**COM-10** **Amendments, Staff-Approved Project Modifications, Ownership Changes, and Verification Changes.** The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to modify the design, operation, or performance requirements of the project or linear facilities, or to transfer ownership or operational control of the facility. The CPM will determine whether staff approval will be sufficient, or whether Commission approval will be necessary. It is the project owner's responsibility to contact the CPM to determine if a proposed project change triggers the requirements of section 1769. Section 1769 details the required contents for a Petition to Amend an Energy Commission Decision. The only change that can be requested by means of a letter to the CPM is a request to change the verification method of a condition of certification.

A project owner is required to submit a five thousand ($5,000) dollar fee for every Petition to Amend a previously certified facility, pursuant to Public Resources Code section 25806(e). If the actual amendment processing costs exceed $5,000.00, the total Petition to Amend reimbursement fees owed by a project owner will not exceed seven hundred fifty thousand dollars ($750,000), adjusted annually. Current amendment fee information is available on the Energy Commission's website at http://www.energy.ca.gov/siting/filing_fees.html.

**COM-11** **Reporting of Complaints, Notices, and Citations**. Prior to the start of construction, the project owner shall send a letter to all parcels within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed power plant and related facilities notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it must include automatic answering with date and time stamp recording.

The project owner shall respond to all recorded complaints within 24 hours or the next business day. The project site shall post the telephone number on-site and make it easily visible to passersby during construction, operation, and closure. The project owner shall provide the contact information to the CPM and promptly report any disruption to the contact system or telephone number change to the CPM, who will provide it to any persons contacting him or her with a complaint.

Within five days of receipt, the project owner shall report and provide copies to the CPM of all complaints (including, but not limited to, noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations). Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the Noise and Vibration conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A) at the end of this section. Additionally, the project owner must include in the next subsequent MCR, ACR, or PCR, copies of all complaints, notices, warnings, citations and fines, a description of how the issues were resolved, and the status of any unresolved or ongoing matters.

**COM-12** **Emergency Response Site Contingency Plan.** No less than 60 days prior to the start of construction (or other CPM-approved date), the project owner shall submit for CPM review and approval, an Emergency Response Site Contingency Plan (Contingency Plan). Subsequently, no less than 60 days prior to the start of commercial operation, the project owner shall update (as necessary) and resubmit the Contingency Plan for CPM review and approval. The Contingency Plan shall evidence a facility's coordinated emergency response and recovery preparedness for a series of reasonably foreseeable emergency events. The CPM may require Contingency Plan updating over the life of the facility. Contingency Plan elements include, but are not limited to:

1. A site-specific list and direct contact information for persons, agencies, and responders to be notified in the event of an emergency;

2. A detailed and labeled facility map, including all fences and gates, the windsock location (if applicable), the on- and off-site assembly areas, and the main roads and highways near the site;

3. A detailed and labeled map of population centers, sensitive receptors, and the nearest emergency response facilities;

4. A description of the on-site, first response and backup emergency alert and communication systems, site-specific emergency response protocols, procedures for maintaining the facility's contingency response capabilities, including a detailed map of interior and exterior evacuation routes, and the planned location(s) of all permanent safety equipment;

5. An organizational chart including the name, contact information, and first aid/emergency response certification(s) and renewal date(s) for all personnel regularly on-site;

6. A brief description of reasonably foreseeable, site-specific incidents and accident sequences (on- and off-site), including response procedures and protocols and site security measures to maintain twenty-four-hour site security;

7. Procedures for maintaining contingency response capabilities; and

8. The procedures and implementation sequence for the safe and secure shutdown of all non-critical equipment and removal of hazardous materials and waste (see also specific conditions of certification for the technical areas of **Public Health**, **Waste Management**, **Hazardous Materials Management,** and **Worker Safety**).

**COM-13** **Incident-Reporting Requirements.** (a) The project owner shall notify the CPM within one hour after it is safe and feasible of any incident at the facility that results in any of the following:

1. an event of any kind occurs that causes an unplanned turn-down of ongoing power delivery to the electrical grid such that the turn-down is of sufficient magnitude that CAISO notification is required;

2. the activation of onsite emergency fire suppression equipment to combat a fire;

3. any chemical, gas or hazardous materials release that could result in potential health impacts to the surrounding population or create an off-site odor issue; and/or

4. notification to, or response by, any off-site emergency response, federal, state or local agency regarding a fire, hazardous materials release, on-site injury, or any physical or cyber security incident.

Notification shall describe the circumstances, status, and expected duration of the incident. If warranted, as soon as it is safe and feasible, the project owner shall implement the safe shutdown of any non-critical equipment and removal of any hazardous materials and waste that pose a threat to public health and safety and to environmental quality (also, see specific conditions of certification for the technical areas of **Hazardous Materials Management** and **Waste Management**).

Within one week of the incident, the project owner shall submit to the CPM a detailed incident report, which includes, as appropriate, the following information:

1. a brief description of the incident, including its date, time, and location;

2. a description of the cause of the incident, or likely causes if it is still under investigation;
3. the location of any off-site impacts;
4. description of any resultant impacts;
5. a description of emergency response actions associated with the incident;
6. identification of responding agencies;
7. identification of emergency notifications made to federal, state, and/or local agencies;
8. identification of any hazardous materials released and an estimate of the quantity released;
9. a description of any injuries, fatalities, or property damage that occurred as a result of the incident;
10. fines or violations assessed or being processed by other agencies;
11. name, phone number, and e-mail address of the appropriate facility contact person having knowledge of the event; and
12. corrective actions to prevent a recurrence of the incident.

The project owner shall maintain all incident report records for the life of the project, including closure. After the submittal of the initial report for any incident, the project owner shall submit to the CPM copies of incident reports within 24 hours of a request.

**COM-14** **Non-Operation and Repair/Restoration Plans.** (a) If the facility ceases operation temporarily (excluding planned maintenance), for longer than one (1) week (or other CPM-approved date), but less than three months (or other CPM-approved date), the project owner shall provide the CPM with a notice of planned non-operation; which shall be given at least two weeks prior to the scheduled date. Notice of unplanned non-operation shall be provided no later than one week after non-operation begins.

For any non-operation, a Repair/Restoration Plan for conducting the activities necessary to restore the facility to availability and reliable and/or improved performance shall be submitted to the CPM within one week after notice of non-operation is given. If non-operation is due to an unplanned incident, temporary repairs and/or corrective actions may be undertaken before the Repair/Restoration Plan is submitted. The Repair/Restoration Plan shall include:

1. identification of operational and non-operational components of the plant;

2. a detailed description of the repair and inspection or restoration activities;

3. a proposed schedule for completing the repair and inspection or restoration activities;

4. an assessment of whether or not the proposed activities would require changing, adding, and/or deleting any conditions of certification, and/or would cause noncompliance with any applicable LORS; and

5. Planned activities during non-operation, including any measures to ensure continued compliance with all conditions of certification and LORS.

(b) Written monthly updates (or other CPM-approved intervals) shall be provided to the CPM for non-operational periods, until operation resumes. Updates shall include:

1. Progress relative to the schedule;

2. Developments that delayed or advanced progress or that may delay or advance future progress;

3. Any public, agency, or media comments or complaints; and

4. Projected date for the resumption of operation.

(c) During non-operation, all applicable conditions of certification and reporting requirements remain in effect. If, after one year from the date of the project owner's last report of productive Repair/Restoration Plan work, the facility does not resume operation or does not provide a plan to resume operation, the Compliance Office Manager may request a Committee Hearing to recommend an order compelling commencement of permanent closure activities.

(d) If a temporary closure becomes permanent, the project owner shall submit a closure plan as set forth in **COM-15**.

**COM-15:** **Facility Closure Planning.** To ensure that a facility's eventual permanent closure and long-term maintenance do not pose a threat to public health and safety and/or to environmental quality, the project owner shall coordinate with the CPM to plan and prepare for eventual permanent closure.

Final Closure Plan and Cost Estimate

(a) No less than one year (or other CPM-approved date) prior to initiating a permanent facility closure, or upon an order compelling permanent closure, the project owner shall submit for Energy Commission review and approval, a Final Closure Plan and Cost Estimate, which includes any long-term, site maintenance and monitoring.

(b) Final Closure Plan and Cost Estimate contents include, but are not limited to:

1. a statement of specific Final Closure Plan objectives;
2. a statement of qualifications and resumes of the technical experts proposed to conduct the closure activities, with detailed descriptions of previous power plant closure experience;
3. identification of any facility related installations or maintenance agreements not part of the Energy Commission certification, designation of who is responsible for these, and an explanation of what will be done with them after closure;
4. a comprehensive scope of work and itemized budget for permanent plant closure and long-term site maintenance activities, with a description and explanation of methods to be used, broken down by phases, including, but not limited to:
   a. dismantling and demolition;
   b. recycling and site clean-up;
   c. impact mitigation and monitoring;
   d. site remediation and/or restoration, including ongoing testing or monitoring protocols,
   e. exterior maintenance, including paint, landscaping and fencing,
   f. site security and lighting, and
   g. any contingencies.
5. a Final Cost Estimate for all closure activities, by phases, including long-term site monitoring and maintenance costs, and long-term equipment replacement;
6. a schedule projecting all phases of closure activities for the power plant site and all appurtenances constructed as part of the Energy Commission-certified project;
7. an electronic submittal package of all relevant plans, drawings, risk assessments, and maintenance schedules and/or reports, including an above- and below-ground infrastructure inventory map and registered engineer's or DCBO's assessment of demolishing the facility; additionally, for any facility that permanently ceased operation prior to submitting a Final Closure Plan and Cost Estimate and for which only minimal or no maintenance has been done since, a comprehensive condition report focused on identifying potential hazards;

8. all information additionally required by the facility's conditions of certification applicable to plant closure;

9. an equipment disposition plan, including:
   a. recycling and disposal methods for equipment and materials; and
   b. identification and justification for any equipment and materials that will remain on-site after closure;

10. a site disposition plan, including but not limited to: proposed rehabilitation, restoration, and/or remediation procedures, as required by the conditions of certification and applicable LORS, and long-term site maintenance activities.

11. identification and assessment of all potential direct, indirect, and cumulative impacts and proposed mitigation measures to reduce significant adverse impacts to a less-than-significant level; potential impacts to be considered shall include, but not be limited to:
    a. traffic;
    b. noise and vibration;
    c. soil erosion;
    d. air quality degradation;
    e. solid waste;
    f. hazardous materials;
    g. waste water discharges, and
    h. contaminated soil.

12. identification of all current conditions of certification, LORS, federal, state, regional, and local planning efforts applicable to the facility, and proposed strategies for achieving and maintaining compliance during closure;

13. updated mailing list for all parcels within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed power plant and related facilities; and

14. description of and schedule for security measures and safe shutdown of all non-critical equipment and removal of hazardous materials and waste (see conditions of certification for **Public Health, Waste Management, Hazardous Materials Management**, and **Worker Safety**).

(c) If the CPM-approved Final Closure Plan and Cost Estimate are not initiated within one year of its approval date, it shall be updated and re-submitted to the CPM for supplementary review and approval.

(d) Failure to comply with the closure plan in a timely manner may subject the project owner to enforcement actions as set forth in Public Resources Code section 25534

# KEY EVENTS LIST

**PROJECT:** ______________________________

**DOCKET #:** ______________________________

**COMPLIANCE PROJECT MANAGER:** ______________________________

| EVENT DESCRIPTION | DATE |
|---|---|
| Certification Date | |
| Obtain Site Control | |
| On-line Date | |
| **POWER PLANT SITE ACTIVITIES** | |
| Start Site Assessment/Pre-construction | |
| Start Site Mobilization/Construction | |
| Begin Pouring Major Foundation Concrete | |
| Begin Installation of Major Equipment | |
| Completion of Installation of Major Equipment | |
| First Combustion of Turbine | |
| Obtain Building Occupation Permit | |
| Start Commercial Operation | |
| Complete All Construction | |
| **TRANSMISSION LINE ACTIVITIES** | |
| Start Transmission Line Construction | |
| Complete Transmission Line Construction | |
| Synchronization with Grid and Interconnection | |
| **FUEL SUPPLY LINE ACTIVITIES** | |
| Start Gas Pipeline Construction and Interconnection | |
| Complete Gas Pipeline Construction | |
| **WATER SUPPLY LINE ACTIVITIES** | |
| Start Water Supply Line Construction | |
| Complete Water Supply Line Construction | |
| Start Recycled Water Supply Line Construction | |
| Complete Recycled Water Supply Line Construction | |

**Compliance Table 1:**
**Summary of Compliance Conditions of Certification**

| Condition Number | Subject | Description |
|---|---|---|
| **COM-1** | Unrestricted Access | The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site. |
| **COM-2** | Compliance Record | The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files. |
| **COM-3** | Compliance Verification Submittals | The project owner is responsible for the delivery and content of all verification submittals to the CPM, regardless of whether the conditions were satisfied directly by the project owner or by an agent. |
| **COM-4** | Pre-construction Matrix and Tasks Prior to Start of Construction | Construction shall not commence until all of the following activities/submittals have been completed:<br>• Project owner has submitted a pre-construction matrix identifying conditions to be fulfilled before the start of construction;<br>• Project owner has completed all pre-construction conditions to the CPM's satisfaction; and<br>• CPM has issued a letter to the project owner authorizing construction. |
| **COM-5** | Compliance Matrix | The project owner shall submit a compliance matrix (in a spreadsheet format) with each Monthly and Annual Compliance Report, which includes the current status of all Compliance Conditions of Certification. |
| **COM-6** | Monthly Compliance Reports and Key Events List | During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due one (1) month following the docketing of the Energy Commission's Decision on the project and shall include an initial list of dates for each of the events identified on the Key Events List. |
| **COM-7** | Periodic and Annual Compliance Reports | After construction ends, and throughout the life of the project, the project owner shall submit Annual Compliance Reports (ACRs) instead of MCRs. |
| **COM-8** | Confidential Information | Any information the project owner designates as confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality. |
| **COM-9** | Annual Fees | Required payment of the Annual Energy Facility Compliance Fee. |
| **COM-10** | Amendments, Staff-Approved Project Modifications, Ownership Changes, and Verification Changes | The project owner shall petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements, and/or transfer ownership or operational control of the facility. Petitions to Amend require the payment of amendment processing fees. |
| **COM-11** | Reporting of Complaints, Notices, and Citations | Prior to the start of construction, the project owner shall provide all property owners within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed power plant and related facilities a letter notifying them of a telephone number to contact project representatives with questions, complaints or concerns. The project owner shall respond to all recorded complaints within 24 hours. Within five days of receipt, the project owner shall report to the CPM all notices, complaints, violations, and citations. |

## Compliance Table 1:
## Summary of Compliance Conditions of Certification

| Condition Number | Subject | Description |
|---|---|---|
| **COM-12** | Emergency Response Site Contingency Plan | No less than 60 days prior to the start of commercial operation, the project owner shall submit an on-site Contingency Plan to ensure protection of public health and safety and environmental quality during a response to an emergency. |
| **COM-13** | Incident-Reporting Requirements | The project owner shall notify the CPM within one hour of an incident and submit a detailed incident report within one week, maintain records of incident report, and submit public health and safety documents with employee training provisions. |
| **COM-14** | Non-Operation | No later than two weeks prior to a facility's planned non-operation, or no later than one week after the start of unplanned non-operation, the project owner shall notify the CPM, of this status. During non-operation, the project owner shall provide written updates to the CPM. |
| **COM-15** | Facility Closure Planning | No less than one (1) year prior to closing, or upon issuance of a closure order, the project owner shall submit a Final Closure Plan and Cost Estimate. |

**ATTACHMENT A**
**COMPLAINT REPORT AND RESOLUTION FORM**

COMPLAINT LOG NUMBER:________________________________ DOCKET NUMBER:____________

PROJECT NAME:________________________________________________________________________

### COMPLAINANT INFORMATION

NAME:____________________________________________ PHONE NUMBER:_____________________________

ADDRESS:__________________________________________________________________________________

### COMPLAINT

DATE COMPLAINT RECEIVED:________________________ TIME COMPLAINT RECEIVED:____________________

COMPLAINT RECEIVED BY: __________________________ ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_______________________

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:___________________________________________

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:___________________

__________________________________________________________________________________________

__________________________________________________________________________________________

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:__________________________________________________________________________

__________________________________________________________________________________________

### CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:___________________________________________

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):____________________________________

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED):____________________________________

OTHER RELEVANT INFORMATION:_______________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

*"This information is certified to be correct."*

PLANT MANAGER SIGNATURE:______________________________________ DATE:_______________

**ATTACHMENT A**
**COMPLAINT REPORT AND RESOLUTION FORM**

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING PHOTO/DOCUMENTATION, AS REQUIRED)

# Declarations

# &

# Resumes

# DECLARATION OF
**Abdel-Karim Abulaban**

I, **Abdel-Karim Abulaban**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as an **Associate Civil Engineer in the Water section.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Soil and Water**, for the **Alamitos Energy Center (13-AFC-1)**, based on my independent analysis of the Petition to Amend and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and, if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 17, 2016 Signed: ______________________

At: Sacramento, California

# *AbdelKarim Abulaban*

## *Education*

**Ph.D. Civil Engineering,** University of Minnesota (*Hydrology and Water Resources)*.
Thesis title: Modeling the transport of sorbing chemicals in heterogeneous porous media.
**M.S. Civil Engineering**, Yarmouk University, Irbid, Jordan *(Water Resources).*
Thesis Title: Developing Intensity-Duration-Frequency Curves for Irbid Region.
**B.S. Civil Engineering**, Yarmouk University, Irbid, Jordan *(water resources stream).*
Senior Project: Design of Water Supply and Sewer Systems for the Northwestern Part of Irbid City (*population 100,000)*.

## *Registration:*

**Registered Professional Engineer** (Civil) in the state of California (Lic. No. 76030)
**Registered as a Qualified SWPPP Developer and Practitioner** (QSD/QSP), California Stormwater Quality Association (CASQA) - Cert. # 1160.

## *Experience - Professional*

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| ***June 2010-Present:***<br>***Associate Civil Engineer***<br>CA Energy Commission, Sacramento, CA, USA. | ❖ Reviewing and evaluating the construction, operation, and maintenance of energy facilities and power plants for water supply, wastewater disposal, waste, water quality, and stormwater to assess the potential impacts to human health and the environment.<br>❖ Reviewing sensitive project sites that may have issues involoving flooding and stormwater management, discharges to impaired water bodies, depleted groundwater and surface water resources, and wastewater management and disposal methods.<br>❖ Responding to soils or water resources issues that may arise regarding power plant operations.<br>❖ Conducting investigations to determine if any violations of the program's regulations, the Energy Commission's conditions of certification, or the CA Environmental Quality Act (CEQA) have occurred.<br>❖ Analysis of one of the largest solar projects in the world for environmental impacts on soil and water resources. This project is designed to generate 500 megawatts using solar energy to generate steam that runs a turbine to generate electricity.<br>❖ Analysis of another solar project, also one of the largest projects in the world, that uses photovoltaic (PV) technology and is designed to generate 1000 megawatts.<br>❖ Currently analyzing a cutting-edge project that proposes to minimize the green house impact of the project by injecting the generated CO2 gas underground for long term sequestration. The CO2 would be injected to depths of 5000 ft. or more below ground surface. This project is the first of its kind in the USA and would set the stage for other projects to store CO2 in geologic formations to reduce green house gas emissions. |
| ***Dec. 2006-May 2010:***<br>**Water Resources Engineer**<br>CA Dept. Water Resources, | ❖ In charge of hydraulic modeling and sediment transport for the San Joaquin River restoration project.<br>❖ Performed 1- and 2-D hydraulic analysis to support restoration |

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| Fresno, CA, USA. | of the San Joaquin River for the purpose of improving spawning/rearing habitat, enhancing floodplain connectivity, and improving riparian corridor. |
| ***Dec. 2001-Dec. 2006:***<br>**Retained Hydrologist**<br>J.L. Nieber & Associates, Hydrologic Consultants, Lindstrom, Minnesota, USA. | ❖ Performed hydrologic analysis and assessment of environmental impact of comtamination incidents on ground water resources, as well as design of remediation plans.<br>❖ Contaminants analyzed included hydro-carbons, chlorinated solvents, as well as agrichemicals. |
| ***Dec. 90 – Dec. 93:***<br>**Retained Hydrologist**.<br>BAUMGARTNER ENVIRONICS, INC, Olivia, Minnesota, USA. | ❖ Performed assessment of the environmental impact of contamination incidents on groundwater resources, and design of action plans. |

## *Experience - Teaching*

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| ***Sep. 2003-Sep. 2005:***<br>Assistant Professor, Hashemite University, Zarqa, Jordan. | Taught the following courses:<br>❖ Water and Wastewater Treatment Mehods (Senior) – 1 semester<br>❖ Wastewater Engineering (Senior level) – 2 semesters<br>❖ Statics - 3 semesters<br>❖ Engineering Drawing - 4 semesters<br>❖ Visual Communication - 4 semesters |
| ***June – August, 96, 97, 98, 2000:***<br>Army High Performance Computing Research Center, Minneapolis, Minnesota. | ❖ The Summer Institute is a summer course offered to promising upper class students from member institutions. The summer course included a ground water flow and transport group that normally had about 4 students from different backgrounds.<br>❖ Taught and helped teach the Summer Insitute course in hydrology and transport in porous media.<br>❖ Was part of the team that trained the students to use a particle tracking solute transport code which I developed.<br>❖ Also trained the group to use the DoD's Ground Water Modeling System, GMS.<br>❖ In the summer of 2000 I was fully in charge of the whole group.<br>❖ More infromation about the projects can be on the Summer Institute web site at: http://www.arc.umn.edu/education/SummerInst/ |
| ***August, 1997:***<br>Short course for practitioners, University of Minnesota, Minneapolis, Minnesota, USA. | ❖ Taught a short course on the application of the Department of Defense's Ground Water Modeling System, GMS, offered by the American Society of Agricultural Engineers and attended by about 40 professionals and academicians from around the United States as well as several countries around the world. |
| ***Mar. 88 - Dec. 92:***<br>Teaching Assistant, Dept. of Civil Engineering, University of Minnesota, Minneapolis, Minnesota. | ❖ Teaching assistant for the senior courses of Hydrology and Hydrologic Design, and Water Resources Engineering. |

# DECLARATION OF
Matthew Braun

I, Matthew Braun, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Cultural Resources Analyst.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I am familiar with, and have reviewed the analysis and preparation of, staff testimony on **Cultural Resources** for the **Application for Certification for the Alamitos Energy Center**. Therefore, based on the independent analysis of the Petition to Amend and associated supplements; based on data from reliable documents and sources; and, based on my professional experience and knowledge: I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/22/16 Signed: Matt Braun

At: Sacramento, California

# MATTHEW BRAUN

**Cultural Resources Specialist**

## Academic Background

MA, Anthropology (Archaeology), Northern Illinois University
BS, Anthropology and Psychology, University of Pittsburgh

## Professional Experience

Mr. Braun is a Secretary of the Interior qualified prehistoric archaeologist and cultural anthropologist. He has over 9 years of experience conducting archaeological field work, consulting with Native American groups, researching, analyzing, and writing about Native American concerns, archaeology, ethnohistory, anthropology, cultural and ethnographic landscapes and paleontology. Mr. Braun has experience preparing cultural resources technical reports and environmental documents pursuant to applicable federal, state and local regulations in compliance with the National Environmental Policy Act (NEPA), Section 106 and 110 of the National Historic Preservation Act (NHPA), and the California Environmental Quality Act (CEQA).

**California Energy Commission……………………………………………………………………………………2014-present**

The California Energy Commission is the State Agency responsible for licensing energy facilities 50 megawatt and greater and environmental review is conducted under a CEQA-equivalent Certified Regulatory Program. As a Planner II, Mr. Braun provides independent analyses of prehistoric and ethnographic resources for proposed energy facilities throughout California by conducting fieldwork, report writing, and critical analysis of Applicant proposed impacts and mitigation measures. As a cultural resources analyst with the Energy Commission, Mr. Braun participated in the following projects:

- **Alamitos Generating Station.** Mr. Braun conducted analyses of impacts to ethnographic resources for this natural gas-fired power plant in Long Beach, California.
- **Carlsbad Energy Center Project.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this natural-gas fired power plant in Carlsbad, California.
- **Argus Cogeneration Project.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources from the decommissioning of this coal-fired powered plant in Trona, California.
- **Gateway Generating Station Power Project.** Mr. Braun oversaw portions of the compliance efforts of this natural gas-fired power plant in Antioch, California.
- **Puente Power Proejct.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this natural-gas fired power plant in Oxnard, California.
- **Mission Rock Energy Center.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this natural-gas fired power plant in Santa Paula, California.
- **Desert Renewable Energy Conservation Plan.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this planning document for renewable energy in the California Desert.
- **Palmdale Energy Project.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this natural-gas fired power plant in Palmdale, California.
- **Pomona Repower Project.** Mr. Braun conducted analyses of impacts to ethnographic and archaeological resources for this natural-gas fired power plant in Pomona, California.

**Aspen Environmental Group……………………………………………………………………………………2012-2014**

**California Energy Commission.** Under contract with the CEC as an employee of Aspen, Mr. Braun participated in the following projects:

- **Rio Mesa Solar Electric Generating Facility, Cultural Resources Staff Assessment (2012-2013).** Mr. Braun conducted analyses of impacts to archaeological resources, ethnographic resources and ethnographic landscapes through fieldwork, archival research and interviews with local Native American tribal representatives from the area near the 3,960 acre 500 MW solar concentrating thermal plant located on the Palo Verde Mesa near Blythe, California. Important resource issues included impacts to trail systems, prehistoric archaeological sites, plant and animal resources, and other elements that are part of a Native American tribe's ethnographic landscape. This was a large, complex project, coordinated with other solar projects and with Native American representatives from the Fort Mojave Tribe, the Chemehuevi Tribe, the Colorado River Indian Tribes, the Agua Caliente Band of Cahuilla Indians, and the Fort Yuma Quechan Tribe.

- **Hydrogen Energy California, Cultural Resources Staff Assessment (HECA) (2012-present).** Mr. Braun conducted analyses of impacts to ethnographic resources and ethnographic landscapes through consultation with local Native American Tribal representatives and archival research of the area near the 453 acre 400 MW Integrated Gasification Combined Cycle (IGCC) power plant and associated linear facilities. Important resources include known and unknown burials, traditional gathering and hunting areas, and other ethnographic resources. This project was coordinated with the Department of Energy and Native American representatives from the Tejon Indian Tribe and the Tubatalabals of Kern County.

- **Palen Solar Electric Generating Facility, Cultural Resources Staff Assessment (2013).** Mr. Braun is conducting analyses of impacts to ethnographic resources through fieldwork, archival research and interviews with Native American tribal representatives from the area near the 3,794 acre concentrating solar thermal plant located near Desert Center, California. He is the lead author of the ethnographic technical report, and co-author to the Staff Assessment issued by the CEC. Important resource issues include impacts to cultural landscapes, components of which include trail systems, archaeological sites, plant and animal resources, rock art and earth figures, among intangible spiritual and religious values. This is a large, complex project coordinated with other solar projects and with Native American representatives from the Chemehuevi Tribe, Colorado River Indian Tribes, Fort Mojave Tribe, Fort Yuma Quechan Tribe, Cocopah Indian Tribe, Morongo Band of Cahuilla Indians, San Manuel Band of Mission Indians, Agua Caliente Band of Cahuilla Indians, Cabazon Band of Mission Indians, and Soboba Band of Luiseño Indians.

- **Desert Renewable Energy Conservation Plan, southern CA desert (DRECP) (2013-present)**. The goal of this planning project is to generate an efficient and effective biological mitigation and conservation program providing renewable project developers with permit timing and cost certainty under the federal and California Endangered Species Acts while at the same time preserving, restoring and enhancing natural communities and related ecosystems. The DRECP Plan Area consists of approximately 22.5 million acres of federal and non-federal California desert land in Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego counties. Mr. Braun is an author of the Cultural Resources and Tribal Interest chapters of the associated EIR/EIS (BLM and CEC lead agencies).

- **Genesis Solar Energy Project, Cultural Resources Compliance (2010-2014).** Mr. Braun reviewed all of the licensees' submittals and actions related to compliance with cultural resources conditions of certification and providing recommendations to staff regarding acceptability. The GSEP is a large, complex project for which cultural resources compliance review has been coordinated with other solar projects, with BLM as the federal lead agency, and with local Native American tribal representatives. This effort included reviewing more than 3100 daily monitoring logs, 30 monthly compliance reports, and more than 950 DPR forms associated with the collection of more than 2700 artifacts.

**Western Power Administration, Desert Southwest Region.** Under contract with WAPA as an employee of Aspen, Mr. Braun participated in the following project:

- **Parker-Blythe Transmission Line 1 & 2, Cultural Resources Survey (2014).** Mr. Braun co-led an archaeological field crew in re-recording 56 archaeological sites, and providing recommendations concerning the NRHP eligibility of these resources. Important resources included trails, lithic scatters, petroglyphs, intaglios, ceramics, and cleared circles. The transmission line is located on land managed by the Colorado River Indian Tribes, several different BLM field offices, and the BOR, and this project required coordination for permits and fieldwork.

**Other California projects**

- **Renewable Energy General Plan Amendment, Opportunities and Constraints Study (2013-present).** Inyo County is proposing to amend their General Plan to designate some lands for renewable energy development. As part of this amendment, an Opportunities and Constraints Technical Study was conducted to identify areas of the County that would be less likely to impact cultural resources. Mr. Braun worked closely with GIS specialists to construct cultural resources sensitivity maps to identify those less sensitive areas.
- **California Valley Solar Ranch, Cultural and Paleontological Resources Compliance (2012-2013).** The CVSR project is a 250 MW solar photovoltaic power plant on the Carrizo Plain in rural San Luis Obispo County. The solar arrays for the project will cover nearly 2,000 acres. Mr. Braun served as an assistant technical reviewer for cultural resources and paleontology during the compliance process. Duties included the review of licensees' submittals and actions related to compliance with cultural resources and paleontological conditions of approval and providing recommendations to San Luis Obispo County regarding acceptability.
- **Renewable Energy General Plan Amendment, Opportunities and Constraints Study (2013-present).** San Luis Obispo County is proposing to amend their General Plan to designate some lands for renewable energy development. As part of this amendment, an Opportunities and Constraints Technical Study was conducted to identify areas of the County that would be less likely to impact cultural resources. Mr. Braun worked closely with GIS specialists to construct cultural resources sensitivity maps to identify those less sensitive areas.
- **Santa Margarita Quarry Expansion Project, Environmental Impact Report (2013-present).** The Santa Margarita Quarry is an aggregate quarry along the Salinas River in San Luis Obispo County, and is proposing to expand existing operations by approximately 50 acres and is applying for a Conditional Use Permit to expand. A Reclamation Plan is also being proposed, and Mr. Braun is authoring the corresponding cultural and paleontological resources EIR section and conducting Native American outreach with those groups interested in the project.
- **Donnell Basin Flood Control Project, Initial Study and Mitigated Negative Declaration (2013).** Mr. Braun conducted archaeological survey of the 65 acre Donnell Basin and co-authored the technical report. Donnell Basin is an area proposed by the San Bernardino Flood Control District to be used for overflow in the Twenty-nine Palms area. Important resource issues included a prehistoric quarry and built-environment resources.

- **Mission Channel and Zanja Creek Routine Maintenance Project, Technical Report and Mitigated Negative Declaration (2014-present).** Under contract with the Department of Public Works, Flood Control District Mr. Braun conducted a cultural resources record search, and is the co-author a technical report and IS/MND sections associated with vegetation management, channel shaping, slope repairs and sediment removal along approximately 8 miles of the Mission Channel/Zanja Creek in Redlands, CA. The Mission Channel/Zanja Creek was built in 1819 and is listed on the National Register of Historic Places.
- **Costa Photovoltaic Solar Energy Facility, Cultural Resources Reconnaissance Survey and Technical Report (2013).** Mr. Braun conducted a cultural resources reconnaissance survey and co-authored a technical report in support of a CEQA review and preparation of an Initial Study for a proposed 170 acres solar energy facility on private land in Kings County, California. Cultural resources identified and evaluated include segments of an historic irrigation canal.
- **Gales Photovoltaic Solar Energy Facility, Cultural Resources Reconnaissance Survey and Technical Report (2013).** Mr. Braun conducted a cultural resources reconnaissance survey and co-authored a technical report in support of a CEQA review and preparation of an Initial Study for a proposed 20 acre solar energy facility on private land in Kings County, California. Cultural resources identified and evaluated include segments of two historic irrigation canals.
- **Venable Photovoltaic Solar Energy Facility, Cultural Resources Reconnaissance Survey and Technical Report (2013).** Mr. Braun conducted a cultural resources reconnaissance survey and co-authored a technical report in support of a CEQA review and preparation of an Initial Study for a proposed 20 acre solar energy facility on private land in the City of Blythe, Riverside County, California.
- **Zuni Photovoltaic Solar Energy Facility, Cultural Resources Reconnaissance Survey and Technical Report (2013).** Mr. Braun conducted a cultural resources reconnaissance survey and co-authored a technical report in support of a CEQA review and preparation of an Initial Study for a proposed 20 acre solar energy facility on private land in the town of Apple Valley, San Bernardino County, California.
- **Desert Harvest Solar Project (CEQA-equivalent document) (2012).** Under contract with EDF Renewable Energy, Mr. Braun assisted senior cultural resources staff with writing the cultural resources, Native American concerns, and paleontology sections of the Desert Harvest EIS. The proposed project is a 1,280 acre 150 MW photovoltaic generating facility in the Chuckwalla Valley near Desert Center, California.

## Argonne National Laboratory (Environmental Sciences Division) .........................2010-present

The Environmental Sciences Division at Argonne conducts environmental analyses in compliance with NEPA and other applicable environmental regulations. The main Argonne Campus is located in Lemont, Illinois with satellite branches in Denver, Colorado and Washington, D.C.

- **Programmatic Environmental Impact Statement for Solar Energy Development in Six Western States (2010-2012).** Under contract with the BLM, Mr. Braun provided technical expertise by developing, synthesizing, and interpreting prehistoric and historic contexts, ethnohistoric contexts, paleontological contexts and Native American concerns in order to assess the impacts to these resources at the programmatic level and a more focused Solar Energy Zone level. The six western states that were analyzed in this study were California, Nevada, Arizona, Utah, New Mexico, and Colorado. This research involved archival studies, communication and coordination with cooperating partners in the BLM, National Park Service (NPS), State Historic Preservation Officers (SHPO), as well as Native American tribal governments, and responding to and addressing comments from cooperators and the public.

- **Oil Shale and Tar Sands Programmatic Environmental Impact Statement (2011-2012).** Mr. Braun assisted senior cultural resource staff in updating a Class I survey based on GIS data from SHPOs in Wyoming, Colorado and Utah for the BLM. Through the analysis of this data, a predictive model was developed in determining the probability of encountering significant archaeological sites in the affected areas proposed for oil shale and tar sands development.
- **Generic Environmental Impact Statements for License Renewals for the Nuclear Regulatory Commission (NRC) (2010-2012).** Under contract with the Nuclear Regulatory Commission, Mr. Braun conducted archival and site specific analyses for impacts related to the relicensing of NRC permitted facilities for the Diablo Canyon Nuclear Power Plant (California), the Davis Besse Nuclear Power Station (Ohio), and the Grand Gulf Nuclear Station (Mississippi).
- **2012-2012 Outer Continental Shelf Oil and Gas Programmatic Environmental Impact Statement (2012).** Mr. Braun conducted archival research related to whaling practices by indigenous groups on the North Slope, the Chukchi Sea and the St. Lawrence Island regions of Alaska. This information was then used to analyze potential impacts that off-shore oil and gas leases issued by the Bureau of Ocean Energy Management, Regulation and Enforcement would have on indigenous whaling practices.
- **Uranium Leasing Program Programmatic Environmental Impact Statement (2012).** Mr. Braun conducted research analyzing potential impacts to cultural resources in uranium mining lease tracts in Colorado. This research was conducted in conjunction with the Department of Energy which issues the leasing permits and the Colorado and Utah SHPOs.
- **Long-Term Monitoring Strategies for Cultural and Natural Resources Affected by Utility Scale Solar Energy Development on BLM lands (2011).** Mr. Braun collaborated in a multi-disciplinary group to develop strategies for the protection and monitoring of significant resources affected by large-scale solar energy projects on BLM land in California, Nevada, Arizona, Utah, New Mexico and Colorado.
- **National Register of Historic Places Evaluation of Five Test Grids and Buildings at Dugway Proving Ground, Dugway, Utah (2011).** Under contract with the Department of Defense, Mr. Braun conducted field work and evaluations of historic properties related to the chemical and biological weapons testing that occurred at Dugway Proving Ground in the post-World War (WW) II and Cold War Eras. Evaluations were conducted of large-scale grids which were laid out in a pattern to collect sampling information about the rate of dispersal and efficacy of the agent being tested from the air or the ground, as well as evaluations of a naval gun and a WW II Era tar-paper structure.
- **National Register of Historic Places Evaluation of the Intense Pulsed Neutron Source (IPNS) at Argonne National Laboratory, Argonne, Illinois (2012).** Under the direction of senior cultural resources staff, Mr. Braun conducted research related to the history of neutron studies at Argonne and other facilities to evaluate the significance of the IPNS located at Argonne. The IPNS was the first neutron accelerator of its kind constructed in the world, and this user-facility provided physicists extensive knowledge regarding the behavior of high-speed neutron activity.
- **Phase I Cultural Resources Survey for the Materials Design Laboratory at Argonne National Laboratory, Argonne, Illinois (2010).** Mr. Braun assisted senior cultural resources staff in planning, conducting and authoring a Phase I survey for cultural resources potentially affected by construction of the Materials Design Laboratory and ancillary facilities.

**American Resources Group…………………………………………………………………………………..(2012)**

American Resources Group is a cultural resources firm based out of Carbondale, Illinois.

- **Keystone XL Pipeline Phase I Cultural Resources Survey (2012).** Mr. Braun conducted a pedestrian survey in Eastern Nebraska for a re-alignment of the controversial Keystone XL Pipeline.

## Professional Affiliations and Training

- Section 106 Agreement Documents (National Preservation Institute, 2012)
- Consultation and Protection of Native American Sacred Lands (National Preservation Institute, 2012)
- NEPA and the National Historic Preservation Act (ICF, 2013)
- CEQA and Historic Resources (CPF, 2013)
- UXO Hazards Training

# DECLARATION OF
## HUEI-AN (ANN) CHU

I, Huei-An (Ann) Chu, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony **on Public Health**, **Transmission Line Safety and Nuisance** for the **Alamitos Energy Center** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and, if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/2016 Signed: Huei-An Chu

At: Sacramento, California

# Huei-An (Ann) Chu

**1516 Ninth Street, MS-46, Sacramento, CA 95815**
Phone: **(916) 651-0965** , Email: Ann.Chu@energy.ca.gov

## EDUCATION

**PhD**, Environmental Sciences and Engineering, 05/2006
School of Public Health, University of North Carolina at Chapel Hill
Area of Specialization: Environmental Risk Assessment, Environmental Management and Policy, Risk-Based Regulation, Biostatistics, Environmental Epidemiology

**MEM**, Environmental Management, 05/2000
School of Forestry and Environmental Studies, Yale University, New Haven, CT

**MS,** Environmental Engineering, 06/1998
National Taiwan University, Taipei, Taiwan

**BA**, Geography, with honors, 06/1996
National Taiwan University, Taipei, Taiwan

## SKILLS

Language: Fluent in Chinese and English.

Computer software and programming skills: HARP, SAS, Stata, Minitab, ArcGIS, ArcView, ArcInfo, Stella, Crystal Ball, ISC, ERMapper, Microsoft Excel, PowerPoint, Word.

## WORK EXPERIENCE

**Air Resources Engineer,** California Energy Commission, 1/12/2012 - Present
- Independently performs responsible, varied analyses assessing air quality and public health impacts of energy resource use and large electric power generation projects in California.
- Model air quality and public health impacts of stationary sources using HARP (Hot Spot Analysis and Reporting Program).
- Identify air quality and public health impacts of stationary sources and measures to mitigate these impacts following California Environmental Quality Act and regulations of US EPA (including the National Environmental Policy Act), ARB, and the Districts.
- Collect, analyze, and evaluate data on the effects of air pollutants and power plant emissions on human health, and the environment.
- Ensure conditions of certification are met and recommending enforcement actions for violations.

**Research Associate**, Taiwan Development Institute, 10/01/2010 – 12/31/2011
- Provided professional consultation for the environmental risk assessment of Taiwan's techno-industrial development initiatives
- Reviewed the environmental risk assessment reports of Taiwan's techno-industrial development initiatives
- Presented in various distinguished lecturer series about environmental risk assessment

**Consultant**, Chu Consulting, 08/2007 - 07/2010
- Conducted a cumulative risk assessment to evaluate the risk associated with the emissions of VOCs from a petrochemical plants in southern Taiwan
- Used EPA's ISC3 model (based on Gaussian dispersion model) to simulate the dispersion and deposition of VOCs from this petrochemical plant to the neighboring areas, then used ArcGIS to spatially combine the population data and VOC simulation data (and further calculated risks)

- Built a framework of risk-based decision making to set the emission levels of VOCs to reduce people's exposure and the risk of experiencing health problems
- Presented in conference: SRA 2007
- Awarded: CSU-Chico BBS Faculty Travel Funds (2007)

**Environmental Justice Intern**, Clean Water for North Carolina (CWFNC), Summer, 2005
- Reviewed and critiqued key state environmental policies and the federal EPA Public Participation Policy.
- Interviewed impacted communities, member organizations of the NC Environmental Justice Network, state policy officials about how those policies are actually implemented.
- Wrote a report about the survey and review of environmental justice needs for key state policies.
- Report Publication: "Achieving Environmental Justice in North Carolina Public Participation Policy" (Aug, 2005).

**Volunteer**, New Haven Recycles and Yale Recycling, 08/1998 – 05/2000
- Promoted recycling and conservation
- Checked trash cans (chosen randomly) and recycling bins at each entryway of residential college, then gave grades.

**Volunteer**, Urban Resource Initiative (URI), Summer, 1998
- Planted trees for local community of New Haven for a better and sustainable environment

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## RESEARCH EXPERIENCE

### Postdoctoral Research

Department of Public Health Sciences, University of California, Davis, 07/01/2010 - present
Research advisor: Dr. Deborah H. Bennett and Dr. Irva Hertz-Picciotto
- Work on two projects: NIEHS-funded ***Childhood Autism Risks from Genetics and Environment (CHARGE)*** and EPA-funded ***Study of Use of Products and Exposure Related Behavior* (*SUPERB)***.
- Perform statistical and quantitative analyses with SAS to analyze collected house dust data and children's urine concentrations of metabolites.
- Conduct exposure assessment to investigate if pesticides, flame retardants, and phthalates are risk factors for children autism.
- Conduct exposure assessment to explore the relationships between children's exposure to phthalate, benzophenone-3 (oxybenzone), triclosan, and parabens, and the use of personal care products.
- Produce scholarly peer-reviewed publications of methodology and findings, and write the final reports of both projects.

Carolina Environmental Program, University of North Carolina at Chapel Hill, 01/01/2006 – 12/31/2006
Research advisor: Dr. Douglas J. Crawford-Brown
- Applied a framework of risk-based decision-making to perchlorate in drinking water. (Awarded: SRA Annual Meeting Travel Award 2006)
- Conducted a material and energy flow analysis (MEFA) to quantify the overall environmental impact of Bank of America operations, and quantitatively analyze the strategies BOA might adopt to reduce these impacts and achieve sustainability. (Report Publication: "Environmental Footprint Assessment")

### Doctoral Research, 08/2000-12/2005

Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina at Chapel Hill
Research advisor: Dr. Douglas J. Crawford-Brown
- Dissertation topic: "**A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example**".
- Conducted risk assessment for arsenic in drinking water.
- Conducted theoretical analysis on the variability and uncertainty issues of risk assessment.

- Conducted a meta-analysis to improve dose-response assessment.
- Conducted analytical and numerical analysis to build a new framework of risk-based decision-making which can be applied coherently across the regulation decisions for different contaminants.
- Presented in conferences: APPAM (2004), SRA (2004, 2005 and 2006), DESE Seminar (2005), CEP Symposium on Safe Drinking Water (2006).
- Awarded: SRA Annual Meeting Student Travel Award (2004 & 2005), UNC-CH Graduate School Travel Grants (2004), UCIS Doctoral Research Travel Awards (2002).

### Master's Research

School of Forestry and Environmental Studies, Yale University, 08/1999 - 06/2000
Research advisor: Dr. Xuhui Lee

- Master's project: "**Forest Stand Dynamics and Carbon Cycle**".
- Research project: "Monitoring Forest $CO_2$ Uptaking"
- Used remote sensing (ERMapper) to investigate the role of forest in the uptake of $CO_2$.
- Awarded from Teresa Heinz Scholars for Environmental Research Program (2000) and Klemme Award (1999).

Graduate Institute of Environmental Engineering, National Taiwan University, 06/1996 - 06/1998
Research advisor: Dr. Shang-Lien Loh

- Master's thesis: "**The Loads of Air Pollutants from Urban Areas on a Neighboring Dam and its Water Quality**"
- Research Projects: "Research on Air Pollutant Deposition in Urban Areas" and "the Fate and Flow of Recyclable Materials"
- Used Gaussian's Dispersion model (ISC3) to investigate the loads of air pollutants on dam water.

## TEACHING EXPERIENCE

### Lecturer

Department of Environmental Studies, California State University at Sacramento

- Environmental Politics and Policy, Fall 2011

Department of Geological & Environmental Science, California State University at Chico

- Environmental Risk Assessment, Spring 2009 & 2010
- Applied Ecology, Spring 2008
- Pollution Ecology, Fall, 2007

Department of Geography & Planning, California State University at Chico

- Seminar in Applied Geography & Planning – Environmental Regulation and Policy, Fall, 2007

Department of Forestry and Environmental Resources, North Carolina State University

- Environmental Regulation, Fall, 2006

### Teaching Assistant

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Environmental Risk Assessment, Spring, 2002
- Introduction to Environmental Science, Fall, 2001
- Analysis and Solution of Environmental Problems, Fall, 2001

### Lab Instructor

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Biology for Environmental Science, Fall, 2000

Graduate Institute of Environmental Engineering, National Taiwan University

- Water Quality Analysis, Fall, 1997

## AWARDS and HONORS

- CSU-Chico BBS Faculty Travel Funds, 2007
- Member of Society of Risk Analysis (SRA), 2006-2008
- SRA Annual Meeting Student Travel Award, 2004-2006
- UNC-CH Graduate School Travel Grants, 2004
- Member of Association for Public Policy Analysis and Management (APPAM), 2004-2005
- UCIS Doctoral Research Travel Awards, 2002
- Graduate Student Teaching and Research Assistantships, 2000-2005
- Teresa Heinz Scholars for Environmental Research Program, 2000
- Yale Forestry & Environmental Studies, Klemme Award, 1999

## PUBLICATIONS (SELECTED LIST)

**Huei-An Chu***,* Deborah H. Bennett, Irva Hertz-Picciotto, "Phthalates in relation to autism and developmental delay: Exploratory analyses from the CHARGE Study". (In preparation)

**Huei-An Chu***,* Deborah H. Bennett, Irva Hertz-Picciotto, "Peronal Care Products: Possible Sources of Children Phthalate Exposure". (In preparation)

**Huei-An Chu** and Douglas J. Crawford-Brown, "A Probabilistic Risk Assessment Framework to Quantify the Protectiveness of Alternative MCLs for Arsenic in Drinking Water", *Journal of American Water Works Association*. (Being revised)

**Huei-An Chu** and Douglas J. Crawford-Brown, "Letter to the Editor: Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health*, 2007, 4(4), 340-341.

**Huei-An Chu** and Douglas J. Crawford-Brown, "Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health* 2006, 3(4), 316-322.

S.L. Lo and **H.A. Chu**, "Evaluation of Atmospheric Deposition of Nitrogen to the Feitsui Reservoir in Taipei", *Water Science & Technolog*y, 2006, 53(2), 337-344.

CSE Consulting and the UNC Carolina Environmental Program (CEP), "Environmental Footprint Assessment", Report for Bank of America, Aug, 2006.

**Huei-An Chu**, "Achieving Environmental Justice in North Carolina Public Participation Policy", Report for Clean Water for North Carolina (CWFNC), Aug, 2005.

**Huei-An Chu**, "Arsenic and its Health Implications", Report for University Center for International Studies Graduate Travel Awards, 2002.

## PRESENTATIONS (SELECTED LIST)

Guest Speaker, "Human Health Risk Assessment – Arsenic in Drinking Water as an Example". Tunghai University, Taichuang, Taiwan. (December 16th, 2010)

Guest Speaker, "Environmental Problems in Developing Countries", Course Title: Developing Countries, Department of Economics, CSU-Chico (October 31st, 2008)

"Cumulative Risk Assessment for Volatile Organic Compounds (VOCs) from Petrochemical Plants in Southern Taiwan". Oral Presentation in Society of Risk Analysis (SRA) 2007 Annual Meeting, San Antonio, TX. (December, 2007)

Guest Speaker, "Arsenic in Drinking Water", Course Title: Environmental Geology, CSU-Chico. (November 13th, 2007)

"Risk-Based Environmental Regulation for Arsenic in Drinking Water", Oral Presentation in Department of Environmental Health Seminar, East Tennessee State University (February 2nd, 2007)

"A Framework of Risk-based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Dinking Water as an Example", Oral Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore. MD. (December, 2006)

“A New Policy Tool to Choose Water Quality Goals under Uncertainty”, Poster Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore. MD. (December, 2006)

“A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example”, Oral Presentation for National Center for Environmental Assessment (NCEA), Environmental Protection Agency (EAP). (October 26th, 2006)

“Probabilistic Risk Assessment for Arsenic in Drinking Water”, Poster Presentation in Carolina Environmental Program (CEP) 2006 Symposium on Safe Drinking Water, Chapel Hill, NC. (March, 2006)

“Probabilistic Risk and Margins of Safety for Water Borne Arsenic”, Poster Platform Presentation in Society of Risk Analysis (SRA) 2005 Annual Meeting, Orlando, FL. (December, 2005)

“Using Meta-Analysis in Dose-Response Analysis – Risk Assessment of Arsenic in Drinking Water as an Example”, Poster Platform Presentation in Society of Risk Analysis (SRA) 2004 Annual Meeting, Palm Springs, CA. (December, 2004)

# DECLARATION OF
## Joseph Douglas

I, **Joseph Douglas**, declare as follows:

1. I am presently employed by the California Energy Commission in the Compliance Office of the Siting Transmission& Environmental Protection Division as a Planner III.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Compliance Conditions and Compliance Monitoring Plan for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/22/16 Signed: Joseph Douglas

At: Sacramento, California

# Joseph Douglas

## Experience

*11/01/08 – present* *State of California, California Energy Commission* *Sacramento, CA*

**Siting, Compliance, Transmission & Environmental Protection, Compliance Project Manager 916.653.4677**

- Coordinate and manage multi functional environmental and engineering team in reviewing and processing complex and controversial renewable energy facility CEQA and ARRA funded projects.
- Critically review, evaluate and process Compliance submittals to assure project compliance with environmental, design and downstream transmission requirements.
- Act as technical lead in processing project changes to ensure consistence of the compliance requirements.
- Conduct periodic on-site power plant visits and inspections during construction and operation.
- Review, edit, and evaluate regulatory/commission reports, testimony, briefs, and position papers.
- Publish project documents including Commission program reports, and Environmental Impact Reports and Initial Studies/Negative Declarations.
- Coordinate with Bureau of Land Management, U.S. Department of Energy, and U.S. Environmental Protection Agency to write and process Environmental Impact Statements for large renewable energy projects.
- Organize and conduct public workshops and meetings among energy staff, energy facility developers, regulatory agencies, government agencies, and the public to discuss siting concerns.
- Oversee the construction of licensed power plants.
- Plan and lead environmental and engineering team in the review of complex and controversial project amendments during construction.
- Represent staff at energy commission business meetings, make presentations, and answer questions from commissioners.

*03/01 2003 – 10/31/08* *State of California, Department of Transportation* *Oakland, CA*

**Office of Environmental Analysis, Environmental Project Manager**

- Oversight of large transportation projects with state and federal involvement
- As NEPA lead agency - Writing and processing of environmental documents with specific time deadlines requirements
- Coordination with multiple agencies including: Federal Highway Administration, U.S. Fish and Wildlife Service, Army Corps of Engineers, EPA, State Historic Officer, Homeland Security, California Highway Patrol
- Partnership with local governments to implement growth/environmental strategies
- Organized multi-functional teams to determine project cost, scope, risk, impacts, and benefits in order to meet funding and programming deadlines
- Participated in Value Analysis studies and made recommendations regarding least environmentally damaging alternative
- Establish purpose and need of project to justify benefits of future capital cost expenditures
- Quality assurance and quality control for state and federal compliance of environmental regulations
- Participated in field studies to determine project impacts

*05/01/00 – 02/28/03* *State of California, Department of Transportation* *Oakland, CA*

**Right of Way Office, Cost and Impact Estimation**

- Determination of community impacts of large transportation projects
- Estimated costs, and time needed for acquisition of parcels, and relocation assistance
- Coordination with multiple disciplines within the Department including: engineering, survey, legal, and environmental to forecast cost
- Investigation of Assessors Parcel Numbers, Right of Way data maps, and property databases
- Research of city and county zoning codes, general plan, and property records
- Identified utility conflicts and estimated time and cost of relocation
- Property management services

# DECLARATION OF
## Nancy Fletcher

I, **Nancy Fletcher**, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting Transmission& Environmental Protection Division as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Traffic and Transportation Appendix TT-1** for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9-22-2016 Signed: Nancy Fletcher

At: Sacramento, California

# NANCY L. FLETCHER

nancy.fletcher@energy.ca.gov


## PROFESSIONAL EXPERIENCE

### CALIFORNIA ENERGY COMMISSION

**Air Resources Engineer** (**02/12-Present):** Perform air quality review of new power plant applications and amendments for existing plants, analyze project impacts on air quality including the impacts of greenhouse gases with respect to climate change, perform thermal plume analysis, determine project conformance with applicable federal, state and local laws, ordinances, rules and standards, investigate and recommend appropriate mitigation measures, prepare staff assessments and technical testimony, develop and monitor air quality compliance plans, and develop, recommend and implement planning and policy initiatives for the Energy Commission and the State.

### YOLO-SOLANO AIR QUALITY MANAGEMENT DISTRICT

**Associate Air Quality Engineer (01/07-01/12):** Performed air quality analysis for Authority to Construct, Permit to Operate, Federal Operating Permit, and Emission Reduction Credit applications, reviewed analysis for consistency with local, state and federal regulations, developed and amended local rules and regulations, performed health risk assessments, managed public outreach, conducted public workshops, incorporated state and federal statues into policy, performed inspections for a full range of manufacturing, industrial, commercial and agricultural facilities, supported source testing, and chaired a working group with other local agencies designed to provide a forum for information sharing for consistent engineering analysis and rule development.

**Assistant Engineer (08/04-01/06):** Developed and amended local rules, drafted a model ordinance, attended local planning meetings to provide technical support, conducted public workshops, performed public outreach, developed standard procedures and policies, performed database QA/QC, reviewed permits and re-evaluated as necessary.

**Engineer Technician (02/01-01/02):** Prepared reports, updated records, researched and compiled information from files and databases, answered public inquiries and processed public information requests.

### BLOCK ENVIRONMENTAL SERVICES

**Environmental Engineer (03/00-02/01):** Developed Risk Management Programs, performed Phase I site assessments, produced Health and Safety Plans, coordinated multi-agency remediation projects, conducted indoor air quality analysis, completed property investigations, updated the website, and provided support for a local environmental organization.

### UNIVERSITY OF CALIFORNIA, BERKELEY

**Laboratory Assistant (05/99-03/00):** Researched alkali-silica reactions in concrete. Analysis included microscopy and x-ray diffraction.

**Engineering Aide (01/00-02/00*)*:** Evaluated the denitrification process in wetlands. Laboratory work included ion chromatography.

**Teacher's Assistant (08/99-12/99):** Prepared course materials, directed labs, led discussions, held office hours, lectured, and graded coursework.

## EDUCATION AND CERTIFICATES

### UNIVERSITY OF CALIFORNIA, BERKELEY

B.S. Environmental Engineering Science, Geology Minor, May 2000
Approved Cluster: Pollutant Transport and Exposure

Engineer-In-Training, 24 hr HAZWOPER, UC Extension Courses -Introduction to Greenhouse Gas Management, Careers in Public Health, and Aspiring Supervisor Skills, ARB and CAPCOA Trainings.

# DECLARATION OF BRETT FOOKS

I, Brett Fooks, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission, and Environmental Protection Division as a Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimonies on Hazardous Materials Management and on Worker Safety / Fire Protection for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 17, 2016 Signed: Brett Fooks

At: Sacramento, California

# BRETT FOOKS, P.E.

## MECHANICAL ENGINEER

### PROFESSIONAL EXPERIENCE

**California Energy Commission - STEP** **Sacramento, CA** **2/2014 - Present**
The Commission ensures that energy facilities (power plants) are permitted in an acceptable manner. The STEP division prepares environmental documentation for the Commission as required by the California Environmental Quality Act (CEQA).
**MECHANICAL ENGINEER**
*Provide independent engineering analysis for various technical areas with an emphasis on hazardous materials management, worker safety, & fire protection.*

- Review, analyze and prepare engineering analysis for hazardous materials management, fire protection, and worker safety for gas-fired power plants.
- Provide written and oral expert witness testimony at commission hearings.
- Conduct power plant inspections during construction and operational phases.
- Investigate accident, fire, and hazardous materials incidents at licensed power plants.

**Capital Engineering Consultants, Inc.** **Rancho Cordova, CA** **6/2004 – 2/2014**
A leader in mechanical engineering design in Northern California since 1947 specializing in areas including K-12 Education, Higher Education, Civic and Justice, and Healthcare.
**SENIOR ENGINEER, ASSOCIATE**
*Manage the design, project specification, calculations and cost estimations for new and renovated construction projects. Oversee and supervise the daily workload, mentoring, and quality control for an assigned junior engineer.*

- Plan and monitor the workload of projects, while preparing and taking responsibility for the concept of and preliminary engineering solutions for the detailed design phase.
- Implement the detailed design engineering of HVAC systems; code review, heating and cooling load calculations, air-flow requirements, ductwork sizing and layout, piping sizing and layout, equipment selection, and system controls with an emphasis on healthcare facilities.
- Prepare and deliver calculations for Title 24 building compliance.
- Prepare and deliver calculations and documents for project LEED certification.

**Select Accomplishments**

- Assisted in the implementation and teaching of new 3-D modeling software, CAD-MECH, to team members for the Sutter Health Eden Medical Center.
- Worked with co-workers to create and implement standards for plumbing calculations firm wide leading to an increased efficiency.

### EDUCATION

**STATE OF CALIFORNIA ~ LICENSED PROFESSIONAL ENGINEER**
**UC DAVIS EXTENSION – WORKPLACE HEALTH & SAFETY CERTIFICATE (2016)**

**BACHELOR OF SCIENCE ~ MECHANICAL ENGINEERING (2004)**
California Polytechnic State University, San Luis Obispo

**Computer Literacy:** Proficient in the use of various software applications including Microsoft Office (Word, Excel, PowerPoint, Outlook) AutoCAD 2012/2013, Revit 2013/2014, Visio, NavisWorks, and ProjectWise.

# DECLARATION OF
## AJOY GUHA

I, **Ajoy Guha,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Siting, Transmission and Environmental Protection Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Alamitos Energy Center Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 30, 2016 Signed: Ajoy K. Guha

At: Sacramento, California

**RESUME**


AJOY GUHA
*Associate Electrical Engineer*
*California Energy Commission*
*1516 Ninth Street, MS 46*
*Sacramento, CA 95814*


**EDUCATION:**
MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

**CERTIFICATIONS:**
REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLIINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

**SUMMARY OF PROFESSIONAL BACKGROUND:**

Ajoy Guha, P. E. has years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

**WORK EXPERIENCE:**

**CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.**
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.
Proficient in using GE PSLF Power system Program for various studies like System Impact studies for integrating new Generation by Load flow, Stability and short Circuit studies

**ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.**
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

**IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998**.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

**CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.**
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

**WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.**
Worked as Planning Engineer and was involved in transmission system planning.

**THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.**
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and

Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

# DECLARATION OF
# MARK HESTERS

I, Mark Hesters, declare as follows:

1. I am presently employed by the California Energy Commission in the Strategic Transmission Planning and Corridor Designation Office of the Siting, Transmission, and Environmental Protection Division as a Senior Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Transmission System Engineering for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/14/16 Signed: ______________________

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has fourteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

# DECLARATION OF
# JOHN HOPE

I, John Hope, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Visual Resources for the Alamitos Energy Center project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/16/16 Signed: [signature]

At: Sacramento, California

JOHN HOPE

1516 9th Street, MS 40
Sacramento, California 95814

(916) 654-7119
john.hope@energy.ca.gov

**Land Use and Environmental Planner**

John Hope has sixteen years' experience with current and long-range land use planning and environmental planning. He has served the public interest through evaluating economic, social, and environmental issues in communities. He is a skilled advocate effective in presenting professional planning knowledge to interest groups, the public, and political affiliations.

## PROFESSIONAL EXPERIENCE

**CALIFORNIA ENERGY COMMISSION**, Sacramento, California
**Environmental Planner II**, December 2011 to Current

As part of the Siting, Transmission and Environmental Protection (STEP) division - Environmental Office, I prepare environmental documentation for proposed energy facilities for the Commission as required by the California Environmental Quality Act (CEQA). Specifically, I write technical analyses for facility siting cases and planning studies in the areas of socioeconomics, environmental justice, land use, traffic and transportation, and visual resources, along with and formulate solutions and mitigation unique to each individual energy facility. I provide expert technical expertise and serve as a member of inter-disciplinary team that evaluates potential environmental and socioeconomic effects of proposed power plants, policies, and plans for energy development in order to satisfy the requirements of the Warren-Alquist Act and CEQA.

**AECOM**, Sacramento, California
**Noise Analyst**, February 2010 to July 2011

I served as assistant project manager, environmental planner, or air quality/noise analyst for various CEQA/NEPA documents. My work focused on preparing environmental setting and impact analysis sections, such as land use, traffic, public services, for projects related to infrastructure improvements, residential development, fairgrounds, industrial expansion, business parks, mixed-use developments, and economic appraisal. I used various modeling techniques along with SoundPLAN, a software-based noise prediction modeling program, to assess project-generated noise levels in an environment. Through the use of SoundPLAN, I graphically mapped and visually evaluated project-generated noise levels based on principles of acoustics. I also used SoundPLAN to model noise maps, design traffic noise mitigation, and predict combined noise levels. My experience in long-range planning also involved preparation of various elements for general plans and community plans.

**EDAW | AECOM**, Sacramento, California
**Associate Environmental Planner**, September 2004 to June 2009

I wrote technical sections and managed environmental documents that analyze and describe to the public the potential environmental impacts of implementing development projects, including needed on-site and offsite infrastructure. I supervised preparation of environmental documents utilizing information from the client (i.e., state, county, city) and other professionals (e.g., air quality consultant, traffic engineers) to conduct environmental impact analysis of development projects. I also wrote sections and conducted research for general plans and specific plans. I worked as part of a team in preparing these documents to meet the requirements of state and federal permit regulations. I diligently maintained budgets and worked within stringent schedules as part of managing preparation of environmental and community planning documents with local agencies, cities and counties, and environmental specialists. I prepared scopes of work and proposals for new work opportunities.

**STANTEC CONSULTING**, Sacramento, California
**Project Planner**, July 2002 to August 2004

I was responsible for providing land planning and environmental impact analysis in environmental engineering firms with various environmental remediation projects throughout northern California. I conducted hands-on oversight of remediation projects to assess the onsite environmental impacts and analyzed their successfulness. I provided my proficient writing skills through the preparation of site reports related to remediation projects. I was relied upon to provide my land planning, environmental impact analysis, and entitlement processing expertise.

I was also responsible for providing assistance to land developers through the entitlement process including preparing development applications, preparing due diligence reports, and representation of the project to the public-at-large. I assisted cities and counties with the preparation of environmental documents and the processing of proposed land development projects. I managed the implementation of land development projects including large residential subdivisions, commercial development, public facilities, and business parks by coordinating efforts being pursued by other associates including surveyors, engineers, environmental specialists, public agencies, and the developer themselves. I also wrote technical sections that analyzed the environmental impacts associated with large infrastructure improvement projects and prepared the environmental document articulating the team's findings. Co-workers relied upon me to provide land use and environmental planning expertise towards a team effort.

**PACIFIC MUNICIPAL CONSULTANTS**, Rancho Cordova, California
**Assistant Planner**, July 1999 to July 2002

As part of my work experience I evaluated proposed development projects, provided code enforcement, and assisted the public-at-large. I gained experience in long-range planning from diligent researching, and writing technical sections for General Plans and environmental documents.

As part of a team effort, I was responsible for the expedited review and management of proposed development applications through the entitlement process and conducting environmental review while working as a land use planner for the City of Elk Grove. I was responsible for processing and reviewing current planning projects applications such as subdivision maps, use permits, design review applications, staff level discretionary review, and other entitlements as assigned by the Community Development Director. As part of this process, I evaluated proposed projects with the requirements of the municipal code and General Plan, presented development projects, and portrayed issues surrounding the project to decision makers and the public through writing staff reports and articulating my professionalism to Planning Commissions and City Councils. As time went on, I worked my way up for the opportunity to process larger and more complicated development projects.

In addition, I worked on the City of Elk Grove's first General Plan by writing and analyzing all the quantitative and statistical data for the Housing element and administered public meetings and workshops. I wrote the draft Housing Element, started the State certification process with the Department of Housing and Community Development, and assisted with the preparation of other required elements of the General Plan. I also utilized GIS software for manipulating and visually presenting information related to the community.

I gained experience with the environmental impact review process which resulted from analyzing and comprehending technical studies and incorporating their information by writing technical sections for environmental documents and I coordinated the implementation of mitigation monitoring and reporting programs. As my experience with the environmental review process grew, my work ethic allowed me to increase my responsibilities as related to more environmentally controversial projects.

## EDUCATION

**California Polytechnic State University, San Luis Obispo**
Bachelor of Sciences, City and Regional Planning

This program provided a hands-on experience which allowed me to execute environmental impact assessments and site analysis, create site designs, research planning law and ordinances, present to several public and private groups, create graphic presentations, and conduct hands-on field research for specific projects located along the California central coast. I gained knowledge of various land use design concepts through hands-on draft work with computers and graphic tools.

# DECLARATION OF
Joseph Hughes

I, Joseph Hughes, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Noise and Vibration** for the **Alamitos Energy Center** based on my independent analysis of the Application for Certification, and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge: I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 08/17/2016 Signed:

At: Sacramento, California

# Joseph Hughes

## Education

California State University, Sacramento, 2003-2008
Sacramento, Ca
***Bachelor of Science, Mechanical Engineering Technology****, May 2008*

## Experience

**California Energy Commission**, March 2009-Present
Sacramento, Ca

**Air Resources Engineer**
Technical expert responsible for completing environmental analysis on thermal power plant project applications seeking a California Energy Commission license, or an amendment or project modification to an existing license, in addition to determining ongoing operational compliance for facilities operating under existing Energy Commission licenses. Specific responsibilities, by technical area, include the following:

<u>Air Quality</u>

- Reviewing project applications to verify engineering data, including worst case emissions during construction and various operating profiles.
- Completing air dispersion modeling to identify the worst case impacts associated with construction and the various operating profiles, and determining whether the project would result in any significant air quality related impacts.
- Determining whether the project would comply with all local, state, and federal, air quality laws, ordinances, regulations, and standards.
- Concluding whether the mitigation measures proposed for the project would reduce potential air quality impacts to a level of less than significant under California Environmental Quality Act requirements.
- Manages ongoing air quality compliance for operational power plant facilities.

<u>Greenhouse Gas</u>

- Reviewing project applications and quantifying potential greenhouse gas emissions associated with construction, commissioning, and operation of the proposed facilities.
- Determining whether the project would comply with all local, state, and federal, greenhouse gas laws, ordinances, regulations, and standards (including the Greenhouse Gas Emission Performance Standard).
- Analyzing the implications the proposed facility may have on California's electricity sector, and how it may affect greenhouse gas emissions in California and globally.

Visible Water Vapor Plume

- Assisting the technical experts authoring the Visual Resources section to identify potential visual impacts as a result of visible water vapor plumes.
- Reviewing operational design data from visible water vapor plume emitting sources and calculating visible plume frequencies and sizes.

Vertical Plume Velocity

- Assisting the technical experts authoring the Traffic and Transportation section to identify potential hazards to aircrafts as a result of vertical plume velocities.
- Reviewing operational design data from vertical plume emitting sources and calculating the vertical plume velocities at various heights above the source.
- Identifying at what height above the plume sources the vertical plume velocities drop below the threshold of concern set by the Federal Aviation Administration.

Noise and Vibration

- Reviewing project applications to verify worst case noise and vibration impacts during construction and operation, and determine whether the project would result in any significant impacts.
- Determining whether the project would comply with all local, state, and federal, noise and vibration laws, ordinances, regulations, and standards.
- Concludes whether the mitigation measures proposed for the project would reduce potential noise and vibration impacts to a level of less than significant under California Environmental Quality Act requirements.

Preparation of Staff Assessments for the following Applications for Certification (AFCs): Genesis Solar Energy Project; Palen Solar Power Project; Oakley Generating Station; Quail Brush Generation Project; Hydrogen Energy California; Alamitos Energy Center; Redondo Beach Energy Project.

Preparation of Staff Assessments for the following project amendments: Carlsbad Energy Center Project; Starwood Power-Midway; Sycamore Cogeneration Company; Palomar Energy Project; Orange Grove Energy Project; La Paloma Generating Plant; Lodi Energy Center; SMUD Cosumnes River; Genesis Solar Energy Project; Henrietta Peaker Power Project; Hanford Energy Park; Elk Hills Power Project; Avenal Energy Project; Pastoria Energy Facility; Kern River Cogeneration Project; Midway Sunset Cogeneration Company; Panoche Energy Center; Argus Cogeneration Project; GWF Tracy Combined Cycle Power Plant.

**Capital Engineering Consultants, Inc**, April 2008-2009
Sacramento, Ca

**Mechanical Engineer**

- Responsible for detailed and accurate take off calculations to ensure successful project completion.
- Completed engineering design for Heating Ventilation Air Conditioning and Plumbing by utilizing complex engineering calculations and software.
- Responsible for meeting code regulation and requirements to the degree acceptable by various organizations.
- Led productive weekly team meetings to discuss project scheduling, cost effectiveness, request for information, and change orders.

## Certifications

Engineer-In-Training (Certificate No. EIT 157529)

## Awards

2014 Superior Accomplishment Award – California Energy Commission

# DECLARATION OF
**Tatiana Inouye**

I**, Tatiana Inouye,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a consultant to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **Alamitos Energy Center Project Final Staff Assessment,** based on my independent analysis of the Application for Certification and supplement hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Tatiana Inouye Signed: September 22, 2016

At: Agoura Hills, California

## TATIANA W. INOUYE

**Associate Planner- Land Use and Public Policy**

## Academic Background

Master of Environmental Science and Management, University of California, Santa Barbara, 2004
B.S., Biology, Xavier University, 1999

## Professional Experience

Ms. Inouye is an environmental professional with an extensive multidisciplinary background in the biological and environmental sciences. Ms. Inouye has over 10 years of experience preparing Environmental Impact Reports (EIR) and Environmental Impact Statements (EIS) in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). She specializes in impact analysis for land use and planning, agriculture and forestry resources, public services, utilities and service systems, and recreation.

### Aspen Environmental Group..........................................................................2003-present

#### ENERGY PROJECTS

- **Hollister Oil and Gas EIS and Resource Management Plan Amendment, U.S. Department of the Interior, Bureau of Land Management.** Aspen is currently preparing an EIS to analyze well completion and stimulation practices, including hydraulic fracturing and the use of horizontal drilling, in the Hollister Field Office. Aspen conducted a Social and Economic Workshop and Ms. Inouye wrote the Workshop Summary Report, which summarized public input on effects to local economic and social goals. This report was used to guide the EIS Socioeconomic analysis. Ms. Inouye analyzed project impacts to Lands and Realty, Special Management Areas, Wild and Scenic Rivers, and Utility Corridors and Communication Sites.
- **Parker-Davis Transmission System Routine Operation and Maintenance Project and Proposed Integrated Vegetation Management Program, U.S. Department of Energy, Western Area Power Administration, Desert Southwest Region.** Aspen prepared the Environmental Assessment for a programmatic operations and maintenance process and an Integrated Vegetation Management program on the 1,534-mile Parker-Davis Transmission System. Ms. Inouye supported the project manager with document preparation, editorial review, production, and management of the Administrative Record.
- **Parker-Headgate Rock and Parker-Bouse Reroute Project, U.S. Department of Energy, Western Area Power Administration, Desert Southwest Region.** Under contract to Western, Aspen prepared an Environmental Assessment of proposed upgrades and reroute of the existing Parker Dam-Headgate Rock and Parker-Bouse transmission lines along the Colorado River in western Arizona and eastern California. Ms. Inouye oversaw the analyses prepared for Land Use, Recreation, and Wild Horses and Burros.
- **San Bernardino County Partnership for Renewable Energy and Conservation: Phase 2, San Bernardino County, CA.** Under contract to San Bernardino County, Aspen prepared a Renewable Energy Cost, Benefits, and Recovery Study to provide supportive technical information as a foundation for future County policy recommendations and directives on renewable energy development. Ms. Inouye created a Strategic Conservation Framework that identified planning and policy tools and examples of best practices to maximize economic gains and opportunities for conservation from renewable energy development. Ms. Inouye also interviewed community stakeholders to gather input on the community’s evaluation of costs and benefits associated with renewable technologies.

- **SCE Transmission Tower Replacement Project, Port of Long Beach, Los Angeles County, CA.** Aspen is preparing this EIR to evaluate the proposed removal and replacement of transmission and telecommunication lines across Cerritos Channel in order to increase the vertical conductor clearance for the passage of larger ships within Long Beach Harbor. Ms. Inouye is preparing the Effects Found Not Significant discussion for Aesthetics, Agricultural and Forestry Resources, Land Use, Planning and Recreation. She is also preparing the Application Summary Report, which includes an analysis of the project's consistency with the Port Master Plan and the California Coatal Act.
- **Coastal Consistency Determinations for Federal Oil and Gas Leases Offshore Santa Barbara, Ventura and San Luis Obispo Counties, Minerals Management Service.** Aspen assisted the U.S. Department of the Interior, Minerals Management Service in evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf located offshore Southern California. Ms. Inouye directly assisted the Project Manager with the analysis and preparation of 10 Coastal Consistency Determinations.
- **Aspiration Solar G Solar Generating Facility, Fresno County, CA.** This IS/MND was prepared for Fresno County to evaluate the effects of the proposed construction and operation of a 9 megawatt utility-scale solar generating facility. Ms. Inouye analyzed project impacts to Minerals, Recreation, Public Services, and Utilities.
- **Bogle Wind Turbine Project, Yolo County, CA.** Under contract to Yolo County, Aspen is preparing an EIR to evaluate the impacts from a proposed 1.85 MW wind turbine that would be used to power the Bogle winery production facility. Ms. Inouye prepared a summary analysis of the resource areas for which project effects would not be significant.
- **DG Solar Projects (Confidential Client).** Ms. Inouye served as an analyst for the CEQA clearance documents and permitting of three small-scale (2 MWs and smaller) solar PV projects located in San Bernardino. Aspen assisted with the preparation of CEQA clearance documents (e.g., MNDs), cultural analyses, and local agency permitting efforts. Ms. Inouye analyzed project impacts to Agricultural, Biological, and Mineral Resources, Hydrology and Water Quality, Land Use and Planning, and Recreation.
- **Sunset Substation and Transmission and Distribution Project, City of Banning, CA.** Ms. Inouye assisted with the research and preparation of an environmental strategy memorandum to advise the City on an appropriate environmental strategy for its energy transmission and distribution project. Ms. Inouye conducted the social science analyses and assisted the project manager with the coordination and preparation of the CEQA document.
- **California Public Utilities Commission (CPUC)**

  Ms. Inouye prepared environmental analysis sections for large-scale transmission and generation projects. She also assisted with public scoping and review periods and document production. Her project experience with the CPUC includes the following:

  - **Valley South Subtransmission Project, Riverside County, CA.** Aspen prepared this EIR to evaluate the environmental impacts from construction and operation of a proposed 12-mile, 115-kV subtransmission line, with an additional 3.4 miles of reconductoring activities. Ms. Inouye analyzed the project's impacts to Land Use.
  - **Coolwater-Lugo Transmission Project, San Bernardino County, CA.** This Draft PA and EIS/EIR was prepared by Aspen in coordination with the U.S. Bureau of Land Management and the CPUC to analyze the effects of proposed transmission lines and associated infrastructure required to interconnect renewable generation projects and improve system reliability in the High Desert

Region of San Bernardino County. Ms. Inouye defined the No Action/No Project alternative for the analysis. She also wrote a summary of existing Land Use conditions for a Master Environmental Assessment that Aspen prepared for the project study area.

- **West of Devers Upgrade Project, San Bernardino and Riverside Counties, CA.** This EIR/EIS was prepared by Aspen in coordination with the U.S. Bureau of Land Management and the CPUC to facilitate the full deliverability of electricity from new generation resources in eastern Riverside County into the Los Angeles area. Ms. Inouye analyzed the impacts from connected actions to Recreation, Agriculture, Air Quality, and Climate Change.
- **Devers–Palo Verde No. 2 Transmission Line Project, San Bernardino and Riverside Counties, CA, and La Paz and Maricopa Counties, AZ.** For this EIS/EIR that was jointly prepared by the U.S. Bureau of Land Management and the CPUC, Ms. Inouye conducted the analyses for the Land Use, Wilderness and Recreation, and Agricultural Resource sections. Ms. Inouye assisted with the research and analysis of cumulative projects and with the coordination of the public scoping and public review periods.
- **Antelope-Pardee 500-kV Transmission Project, Los Angeles County, CA.** For this EIS/EIR that was jointly prepared by the USDA Forest Service and the CPUC, Ms. Inouye prepared the Land Use and Recreation analyses. She also assisted with coordination of the public scoping and public review periods.
- **Nuclear Steam Generator Replacement Projects, San Diego and San Luis Obispo Counties, CA.** This project analyzed the replacement of existing radioactivity-contaminated steam generators at the San Onofre Nuclear Generating Station (SONGS) and Diablo Canyon Nuclear Power Plant (DCPP) in San Diego and San Luis Obispo Counties, respectively. Ms. Inouye prepared the Land Use and Recreation analysis (DCPP), Land Use, Recreation, and Military Operations analysis (SONGS), Cumulative project list (SONGS), and Mitigation Monitoring and Reporting documentation (SONGS). Ms. Inouye assisted with the Public Scoping and Public Involvement Meetings in San Clemente, California.

- **California Energy Commission (CEC)**

  As a component of a multi-year contract with the CEC, Aspen continues to provide support to the Energy Facility Planning and Licensing Programs. Under this contract, Ms. Inouye has participated in the following projects:

  - **Land Use Assessment for the Alamitos Energy Center.** Ms. Inouye prepared the key components of the Land Use Assessment to facilitate the Energy Commission's review of the proposed 1,040 MW energy project located within the City of Long Beach. Key issues addressed by Ms. Inouye include a determination of the project's consistency with the California Coastal Act and the Local Coastal Program.
  - **2005 Update to the California Environmental Performance Report (EPR).** Ms. Inouye conducted the analysis of a new portion of the Land Resources Chapter of the EPR, which addressed the siting and land use issues associated with renewable power. This analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants. Ms. Inouye also provided editorial and technical assistance with the update to the Socioeconomics chapter of the EPR.
  - **Out-of-State Power Generation and Imports: Water and Biological Resources.** Ms. Inouye contributed to the research and analysis for this white paper, which discussed the impacts to

water and biological resources from a variety of electricity sources that are generated for California consumption. This white paper was incorporated into the Electricity Environmental Performance Report.

### WATER RESOURCE PROJECTS

- **Littlerock Reservoir Sediment Removal Project, USDA Forest Service and Palmdale Water District, Los Angeles County, CA.** Aspen prepared a Draft EIS/EIR (May 2016) to evaluate the effects of restoring Littlerock Reservoir to its 1992 design capacity. The Aspen team is currently responding to public and agency comments that will be incorporated into the Final EIS/EIR. Ms. Inouye's technical role was to analyze the project impacts to Recreation and Land Use and Wildfire Prevention and Suppression. Ms. Inouye is also an assistant to the project manager in document preparation, editorial review, production, and managing the Administrative Record.
- **Redmont Pump Station and Tank Project, Los Angeles Department of Water and Power, Los Angeles County, CA.** Ms. Inouye assisted the Aspen Team with preparing this EIR to evaluate the replacement of Redmont Pump Station and Reservoir with a new pump station and steel tank. Ms. Inouye coordinated with technical staff and the client to integrate their analyses into the report. She also prepared the Summary and Comparison of Alternatives, Cumulative Scenario, and Other CEQA Consideration analyses.
- **Environmental Justice and Socioeonomics Baseline Conditions Technical Report, SGPWA Water Supply Facility Removal Project, Riverside County, CA.** Ms. Inouye served as an analyst for a technical report prepared for the San Gorgonio Pass Water Agency (SGPWA). The Project facilities currently supply consumptive water to the community of Banning Bench and the City of Banning. The pipeline proposed for removal is currently the only source of potable water supply for the community of Banning Bench. Therefore, removing the 1,100-foot section of pipe would curtail water deliveries to the community.
- **Tehachapi East Afterbay Project, California Department of Water Resources, Los Angeles County, CA.** Aspen provided on-call environmental assessment, compliance, and monitoring services for projects associated with the State Water Project in southern California. In preparation for the construction of a reservoir near the bifurcation of the East Branch and West Branch of the California Aqueduct, Ms. Inouye conducted burrowing owl surveys.
- **Matilija Dam Ecosystem Restoration EIS/EIR and Feasibility Studies, U.S. Army Corps of Engineers, Ventura County, CA.** Ms. Inouye assisted with the alternatives analysis for removing Matilija Dam in order to allow passage for steelhead trout and replenishment of sediment on area beaches. Ms. Inouye also prepared the Facts and Findings Statement and the Statement of Overriding Considerations.
- **Ormond Beach Restoration Feasibility Study, Ventura County, CA.** This project has been recognized by the Southern California Wetlands Recovery Project as the most significant wetland restoration project in southern California. Ms. Inouye prepared the Land Use, Socioeconomic, and Recreation analyses of the study area. She also contributed to the opportunities and constraints assessment that guided the evaluation of future restoration alternatives.

### CONSTRUCTION AND RETROFIT PROJECTS

- **South Storke Road Widening Project, City of Goleta, CA.** Aspen is preparing an EIR for a proposed widening of South Storke Road that would improve traffic and circulation patterns within the University of California at Santa Barbara (UCSB) campus and the City of Goleta. Ms. Inouye is analyzing project impacts to Land Use and Recreation, which will evaluate project consistency with the City's planning and zoning reguations, including its Local Coastal Program, as well as with USCB development plans and policies.

- **Institution Road Reconstruction and Maintenance Project, San Bernardino County Department of Public Works, San Bernardino County, CA.** This Initial Study evaluated the impacts of reconstructing a 5,400-foot extent of Institution Road that traverses the City of San Bernardino as well as unincoporated County areas. Ms. Inouye provided technical review of the Agriculture and Forestry, Land Use and Planning, and Recreation analyses.
- **Fire Camp 8 Helispot Improvement, Los Angeles County Department of Public Works, Los Angeles County, CA.** For this proposed 1,807-foot long water pipe that would be constructed at an existing fire department facility, Ms. Inouye prepared a memorandum that summarized the technical documentation to support a CEQA Categorical Exemption for the project.
- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, California Department of Water Resources, Los Angeles County, CA.** This Initial Study evaluated the effects of repairing erosion damage at 4 sites that access Department of Water Resources facilities along Piru Creek. Ms. Inouye prepared the Aesthetics, Agriculture, Land Use, Public Services, Recreation, and Utilities and Service Systems sections.
- **Transpacific Fiber Optic Cables Project, City of Hermosa Beach, Los Angeles County, CA.** To support the City's review of this project that was proposed by MC GLOBAL BP4, Aspen prepared an EIR to analyze and disclose potentially significant environmental effects associated with the installation, operation, maintenance, and decommissioning of up to four transpacific submarine cable systems. Ms. Inouye completed the alternatives analysis and is assisting the project manager with editorial review.
- **Los Angeles Unified School District (LAUSD)**

  Aspen assisted LAUSD with its review of a four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of surrounding jurisdictions covering 700 square miles). Aspen was awarded 38 CEQA document assignments for new school projects, school expansions, and additions. In support of this contract, Ms. Inouye prepared impact assessments for the following IS/MND and EIR documents.

  - **New School Construction Program EIR.** The New School Construction Program EIR was developed as a guiding document to establish a consistent process for CEQA review of future LAUSD projects. Ms. Inouye researched local community plans and prepared an environmental assessment of applicable policies for Land Use.
  - **South Region Elementary School No. 1**. For the Initial Study and Mitigated Negative Declaration, Ms. Inouye served as deputy Project Manager in the preparation of this document. In addition to coordinating the public review period, she prepared the Aesthetics, Land Use, Population and Housing, Recreation, and Utilities sections.
  - **Central Region Middle School No. 7**. For the Initial Study and Mitigated Negative Declaration, Ms. Inouye served as deputy Project Manager in the preparation of this document. In addition to coordinating the public review period, she prepared the Aesthetics, Agriculture, Biological Resources, Land Use, Population and Housing, Recreation, and Minerals sections.
  - **South Region Middle School No. 6.** Ms. Inouye prepared the biological resources section for the Initial Study and the subsequent Environmental Impact Report. She assisted the Project Manager with the Public Scoping Meetings in Los Angeles, California.

- **Central Region Elementary School No. 16.** Ms. Inouye prepared the public services and utilities sections for the Initial Study. Her role included document coordination and editing of the Traffic Impact Analysis.
- **Modernization of Hughes Middle School and Relocation of El Camino Real-Canoga Park Adult School.** Ms. Inouye prepared an environmental assessment of Public Services and Utilities for the Initial Study.

#### OTHER PLANNING PROJECTS

- **Joint Red Flag '05 Exercise, U.S. Army Corps of Engineers, Lincoln County, NV.** Ms. Inouye prepared the Land Use, Socioeconomic, and Recreation analyses for the Environmental Assessment to analyze the impacts associated with the ground component of a military exercise on Bureau of Land Management lands.

## Previous Experience

### Student Conservation Association

**Conservation Associate, Channel Islands National Park (2002).** Ms. Inouye monitored 5 species of seabirds on Santa Barbara Island and wrote the end of season summaries for the Channel Islands National Park Seabird Monitoring Program.

**Resource Assistant, Indiana Dunes National Lakeshore (1998).** Ms. Inouye conducted vegetative surveys and implemented invasive species removal programs at Indiana Dunes National Lakeshore. She completed introductory wildland fire certification and worked for 3 months as a Seasonal Wildland Firefighter.

### United States Peace Corps

**Environmental Educator, Jamaica (1999-2001).** Ms. Inouye served as an Environmental Educator in Jamaica and developed a number of programs for a rural primary and junior high school. These programs included integrating an environmental and computer curriculum for 550 students, training 19 staff members in basic computer skills and Microsoft Word, managing a bottle recycling program and coordinating 2 community clean-up events. She wrote four successful grant proposals to fund a $25,000.00 classroom construction project. Other activities included supervising 5 schools in the Jamaica National Schools' Environment Program and creating environmental classes for summer camps.

## Professional Certifications/Affiliations

- Association of Environmental Professionals

## Additional Training and Courses

- *Land Use Law and Planning Conference.* UCLA Extension. January 2015.
- *CEQA Basics Workshop.* Association of Environmental Professionals. November 2003
- *Introduction to NEPA.* Donald Bren School of Environmental Science and Management. October 2003
- *Decision-Making Tools for Implementing Environmental Management Systems Workshop*. Air and Waste Management Association, Channel Islands Chapter. November 2002

# DECLARATION OF
Steven Kerr

I, Steven Kerr, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting and Compliance Office of the Energy Facilities Siting Division as an Energy Resources Specialist III (Supervisory).

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Alternatives for Alamitos Energy Center Project based on staff's and my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and staff's and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/18/16 Signed: S.A. Kerr

At: Sacramento, California

# Steven Kerr

**Professional Experience:**

California Energy Commission — Sacramento, CA
January 2012-Present — *Energy Resources Specialist III*

- Supervise the preparation of alternatives, land use, and socioeconomics staff analyses.
- Review power plant applications and amendments for alternatives, land use, socioeconomic, land use, transportation, and visual impacts.
- Evaluate projects in accordance with CEQA, the California Energy Commission siting regulations, and federal, state and local laws, ordinances, regulations, standards (LORS).
- Participate in public workshops and hearings regarding proposals.
- Write environmental analysis documents.

Thomas P. Kerr Inc. — Sacramento, CA
August 2011-January 2012 — *Property Manager*

- Management of properties and assets throughout California and Oregon.
- Assist in the preparation of mobile home park closure impact report for Port of San Luis.
- Use various software applications to produce and review billing and financial records.
- Work with local agencies to coordinate infrastructure improvements.

Ground(ctrl) — Sacramento, CA
February 2010-August 2011 — *Director of Customer Support*

- Coordinate and provide customer support for A-list musical artist fan clubs, online stores, e-mail marketing, ticketing, aggressive online marketing, and much more.
- Resolve escalated customer support issues, credit card disputes, and Better Business Bureau cases.
- Supervise and train customer support team members and interns.

City of Sacramento — Sacramento, CA
General Services Department — *Customer Service Representative*
July 2009-February 2010

- Perform concurrently multiple customer service related duties for all City of Sacramento departments by phone/email.
- Interpret and apply City regulations and procedures as applicable to billing, fees, and collections.
- Learn and explain the organization, procedure and operation details of the City.
- Use a variety of business software applications and assess maps.

City of Sacramento — Sacramento, CA
Development Services Department — *Assistant Planner*
February 2007-July 2009

- Project manager for various residential, commercial, industrial, and office development projects.
- Assist customers with zoning, design review, preservation, environmental, subdivision code, and sign questions, both at the public counter and by phone/email.
- Provide customers with required entitlement information, fee estimates, and accept applications for proposed development projects.
- Review applications and plans for consistency with city codes, general plan, and applicable community plans, specific plans and planned unit development guidelines.
- Present projects at community meetings and work with neighborhood association leaders on controversial projects.
- Write staff reports and conditions of approval.
- Present projects at Zoning Administrator, Planning Commission, and City Council public hearings.
- Research development and entitlement histories of parcels.

City of Atascadero Atascadero, CA
Community Development Department *Planning Intern*
March 2005-June 2006

- Prepare environmental review documents.
- Review business licenses and building permits.
- Draft letters and staff reports.
- Respond to questions from the public on planning and zoning related issues.
- Access and update information in GIS and Excel

**Education:**

2000-2005 California State Polytechnic University, San Luis Obispo, CA
Bachelor of Science in City and Regional Planning

# DECLARATION OF
## SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Alamitos Energy Center** project based on my independent analysis of the Supplemental Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge. I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony, and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: [signature]

At: Sacramento, California

# DECLARATION OF
## SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Alamitos Energy Center** project based on my independent analysis of the Supplemental Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge. I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony, and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: [signature]

At: Sacramento, California

# DECLARATION OF
## SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Facility Design** for the **Alamitos Energy Center** project based on my independent analysis of the Supplemental Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge. I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony, and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: [signature]

At: Sacramento, California

# DECLARATION OF
## SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Alamitos Energy Center** project based on my independent analysis of the Supplemental Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge. I attest to the accuracy of this testimony, and support its conclusions, finding and recommendations hereto.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony, and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: [signature]

At: Sacramento, California

**Shahab Khoshmashrab**
Senior Mechanical Engineer

## Experience Summary

Eighteen years experience in the mechanical, civil, structural, and manufacturing engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

## Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California
  License No. M 32883, Exp. 9/30/2014

## Professional Experience

**2001-Current**—Senior Mechanical Engineer – Siting, Transmission, and Environmental Protection Division – California Energy Commission

- Perform analysis of generating capacity, system reliability and safety, energy efficiency, noise and vibration, jurisdictional determination, and the mechanical, civil, electrical, and structural aspects of power plants during licensing, construction, and operation.

- As the Facility Design Unit's lead, or senior, review and manage the work of technical staff (other engineers) and contractors; ensure project deadlines are met; and ensure that projects propose and implement the most energy efficient technologies to satisfy project objectives while protecting the environment;

- Independently review and evaluate Applications for Certification to ensure compliance of power plants and related facilities with applicable laws, ordinances, regulations, and standards and California Environmental Quality Act, or CEQA;

- Prepare and recommend to the Siting Committee, conditions of certification (including mitigation measures) under which power plants should be licensed, constructed and operated;

- Present oral and written expert testimonies in support of analysis at evidentiary hearings held before the Siting Committee and the public; and

- Assist the California Energy Commission in policy making related to power generation.

**1998-2001**—Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced both structural plans and detailed shop drawings using AutoCAD.

**1995-1998**—Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

# DECLARATION OF JENNIFER LANCASTER

I, Jennifer Lancaster, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as Biologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Biological Resources for the Alamitos Energy Center Project based on my independent analysis of the Application for Certification, Supplemental Application for Certification, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: JLancaster

At: Agoura Hills, California

# JENNIFER LANCASTER

**Senior Biologist/Project Manager**

## Academic Background

MS, Biology, California State University, Northridge, 2005
BS, Biology, University of California, Riverside, 2002

## Professional Experience

Ms. Lancaster has over nine years of experience at Aspen Environmental Group managing and preparing documents in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), as well as NEPA/CEQA joint documents. She is also experienced with supporting agency clients through the Section 7 process and compliance with the federal and California Endangered Species Acts, as well as participating in environmental policy working groups on behalf of agency clients. She has 16 years of experience in botanical and wildlife field surveys and report preparation. Her biological background includes native habitat restoration, rare plant field studies, laboratory analysis, experimental design, logistical support for field surveys, and teaching at the college level.

**Aspen Environmental Group..........................................................................2007-present**

Select project experience at Aspen includes the following:

- **Coachella Valley Trails Development Project, Coachella Valley Mountains Conservancy, Project Manager (2015-present).** Ms. Lancaster is managing this joint IS/MND and EA for the development of three recreational trails and associated trailhead facilities in the northern Coachella Valley in Riverside County, near Joshua Tree National Park. The three trails would be mostly on conservation land previously acquired in accordance with the Coachella Valley Multiple Species Habitat Conservation Plan, as administered by the Coachella Valley Conservation Commission. Some portions of the proposed trails and trailheads are also on public land administered by the federal Bureau of Land Management (BLM), and on several privately owned parcels. BLM is the NEPA lead agency. Ms. Lancaster is also managing preparation of the Biological Assessment.
- **Lake Gregory Dam Rehabilitation Project, San Bernardino County Special Districts Department, Deputy Project Manager (2014-2016).** Lake Gregory is located in the San Bernardino Mountains approximately 14 miles north of the City of San Bernardino in the community of Crestline. The Lake Gregory Dam Rehabilitation Project consists of the construction of physical improvements to the dam, earthen material excavation from borrow sites, earthen material hauling and processing, relocation of utilities on Lake Drive, and interim traffic detour routes. Aspen is prepared an EIR, MMRP, and supporting technical studies.
- **Del Sur Solar Project, City of Lancaster, Deputy Project Manager (2015).** Ms. Lancaster served as Deputy Project Manager and prepared portions of the EIR for this proposed 100-MW solar photovoltaic solar project, including gen-tie and communication line, on 725 acres in the City of Lancaster. The project required a Conditional Use Permit, General Plan Amendment, and Zone Change from the City. This fast-tracked EIR was certified just 8 months after project kick-off.
- **Tehachapi Renewable Transmission Line Project, CPUC/US Forest Service (USFS), Biologist (2007-present).** Ms. Lancaster assisted with the preparation of the biological resources analysis for the joint EIR/EIS and the Biological Assessment under Section 7 of the federal ESA for this 500-kV transmission line proposed by Southern California Edison in support of wind energy projects. In addition, she prepared the Riparian Conservation Area (RCA) and Management Indicator Species

(MIS) analyses required by the USFS for project impacts on the ANF. She is currently reviewing reports and providing biological resources technical support during compliance monitoring for construction of this project, including evaluation of proposed compensation lands and participating in an interagency working group to develop solutions to allow construction during the bird breeding season while maintaining compliance with State and federal regulations protecting nesting birds. This transmission line is over 100 miles in length and two separate lines cross the Angeles National Forest. Some of the key issues on this project include potential impacts to least Bell's vireo, coastal California gnatcatcher, desert tortoise, arroyo toad, California condor, California spotted owl, and a host of Forest Service Sensitive plant species.

- **Inyo County Renewable Energy General Plan Amendment, Inyo County, Biologist and Interim Project Manager (2013-2015).** The County of Inyo is amending its General Plan to include policies for Renewable Energy Development. Ms. Lancaster prepared the assessment of biological resources for the Opportunities and Constraints Technical Study in support of the General Plan amendment. She also served as interim project manager for Aspen's contract with Helix, in support of the Programmatic EIR for the Renewable Energy General Plan Amendment.
- **Desert Harvest Solar Project, BLM, Biologist (2011-2013).** Ms. Lancaster prepared the biological resources analyses of the EIS for a 150-MW solar photovoltaic facility that is proposed on 1,200 acres near Desert Center in Riverside County, California. In addition to the EIS, Ms. Lancaster prepared analyses and documentation to support consultation and permitting for compliance with the state and federal Endangered Species Acts and federal Bald and Golden Eagle Protection Act, in coordination with BLM, CDFG, and USFWS. Important biological resources issues include the threatened desert tortoise, golden eagle, and wildlife habitat connectivity.
- **Coolwater-Lugo Transmission Project, California Public Utilities Commission (CPUC), Biologist (2013-present).** Ms. Lancaster is preparing the analysis of impacts to biological resources for the EIR/EIS being prepared for this large, controversial transmission project that includes over 64 miles of 500/220-kV transmission line, the proposed Desert View Substation, upgrades at multiple existing substations, installation of fiber optic cable, and a microwave tower. She is also preparing the Biological Assessment and assisting the BLM in Section 7 consultation with the USFWS.
- **San Luis Transmission Project EIS/EIR, Western Area Power Administration/San Luis & Delta-Mendota Water Authority, Biologist (2013-present).** Ms. Lancaster is preparing the biological resources analysis for the EIS/EIR for this 62-mile transmission line in Central California. Some of the key issues on this project include potential impacts to listed fairy shrimp, California tiger salamander, giant garter snake, Alameda whipsnake, Swainson's hawk, giant kangaroo rat, San Joaquin kit fox, and several other listed animals and plants.
- **Downs Substation Expansion Project, CPUC, Biologist (2010-present).** Ms. Lancaster is reviewing mitigation compliance submittals and providing biological resources technical support during compliance monitoring for construction of this project, which includes the upgrade/expansion of the existing Downs Substation and new telecommunications lines on approximately 58 miles of existing 115-kV poles. Approximately 6 existing poles would need to be replaced to accommodate the telecommunications line.
- **San Luis Obispo Renewable Energy Streamlining Program (RESP), San Luis Obispo County, Biologist (2013-present).** Ms. Lancaster is leading the assessment of biological resources for this project. The RESP involves analyzing and mapping opportunities and constraints for renewable energy siting and revising County plans and policies to streamline development of appropriately sited renewable energy facilities.

- **Conservation and Open Space Element of the Imperial County General Plan, Imperial County, Biologist (2014-present).** Ms. Lancaster is preparing the biological resources analysis for the Baseline Environmental Inventory Report. This report will support development of the Conservation and Open Space Element of the General Plan update.
- **Santa Margarita Quarry Expansion Project, County of San Luis Obispo Department of Planning and Building, Biologist (2013 – Present).** Ms. Lancaster is preparing the biological resources analysis of the EIR for this mining expansion project.
- **Huntington Beach Energy Project, California Energy Commission (CEC), Biologist (2013 – 2014).** Ms. Lancaster prepared the biological resources impacts assessment for this 939 MW natural gas-fired power plant in coastal Orange County that will replace the existing Huntington Beach Generating Station. Important biological issues for this project included indirect impacts to nearby wetlands and preserves, including noise and vibration impacts to listed birds (e.g., clapper rail).
- **Alamitos Energy Center, CEC, Biologist (2014 – present).** Ms. Lancaster is preparing the biological resources impacts assessment for this 1,936 MW natural gas-fired power plant in Long Beach, CA that will replace the existing Alamitos Generating Station. Important biological issues for this project include indirect impacts to nearby wetlands and preserves, including noise and vibration impacts to listed birds and green sea turtles.
- **Thousand Palms Flood Control Project Subsequent EIR/EIS, Riverside County (2011 – present).** Ms. Lancaster is preparing the biological resources analysis and associated reports for this Subsequent EIR/EIS for this proposed flood control improvement project located in the Thousand Palms area of Riverside County. The Coachella Valley Water District is the CEQA Lead Agency, and the Regulatory Division of the U.S. Army Corps of Engineers (USACE) is the NEPA Lead Agency. The proposed project includes a series of levees and channels to direct stormwater flows from the Indio Mountains away from developed areas and into an existing stormwater conveyance system, to protect community areas from flooding hazards. In addition to preparing the biological resources technical analysis for the EIR/EIS, Ms. Lancaster will be preparing the Biological Assessment and supporting the USACE with consultation with the US Fish and Wildlife Service under Section 7 of the federal Endangered Species Act.
- **Littlerock Reservoir Sediment Removal Project, Palmdale Water District/USFS, Biologist/Project Assistant (2008-present).** Ms. Lancaster is providing support to the Project Manager and assisting in the preparation of the biological resources section of this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. In addition, Ms. Lancaster provided biological monitoring during drilling activities associated with design of a grade control structure. The Palmdale Water District (PWD) (CEQA Lead Agency) proposes to remove approximately 540,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad and least Bell's vireo, extensive coordination with USFWS for a Section 7 consultation and CDFW for an Incidental Take Permit, incorporation of new Forest Service Plan updates and requirements into the analysis, and preparation of the Forest Service required BE/BA and MIS reports.
- **Desert Renewable Energy Conservation Plan EIR/EIS, CEC, Biologist and Technical Assistant (2013-present).** Ms. Lancaster is preparing the analysis of biological resources impacts resulting from transmission line build-out outside of the Plan Area, extending north into the San Joaquin Valley, east into the Los Angeles Area and south into San Diego and Imperial counties. She is also providing technical editing and QA/QC review for various sections of the document.

- **Rio Mesa Solar Electric Generating Facility, CEC, Biologist (2012-2013).** Ms. Lancaster assisted in the preparation of the biological resources analysis of the Staff Assessment for a 4,000-acre solar energy project in the Colorado Deserts, and conducted agency consultations and permitting in compliance with CDFW Lake and Streambed Authorization Agreement and Incidental Take Permit programs. The proposed project was cancelled by the developer in 2013.
- **Palmdale Hybrid Power Plant, CEC, Biologist (2009-2011).** Ms. Lancaster assisted in the preparation of the biological resources analysis for the Staff Assessment being prepared for a proposed 570-MW hybrid combined-cycle and solar thermal electrical generation facility and associated 35.6-mile transmission line. The proposed project would be located in the City of Palmdale and unincorporated Los Angeles County. Some of the key issues on this project included potential impacts to Mohave ground squirrel, desert tortoise, golden eagle, and Swainson's hawk.
- **Rice Solar Energy Project, CEC, Biologist (2009-2010).** Ms. Lancaster contributed to the biological resources analysis of the Staff Assessment that was prepared for this solar energy project proposed by Rice Solar Energy, LLC (a wholly owned subsidiary of SolarReserve, LLC). The proposed project would include a 150-MW solar generation facility consisting of up to 17,500 solar-tracking heliostats, a central tower, and associated infrastructure and appurtenant structures. The solar field site would be located on approximately 1,410 acres of privately owned land in eastern Riverside County. In addition, a 10-mile 230-kV generator tie-line would be constructed to interconnect the project with Western Area Power Administration's existing Parker-Blythe transmission line. The new transmission line would traverse lands primarily under the jurisdiction of the Bureau of Land Management (BLM). The new transmission line would also require the construction of a new 4.6-mile access road, also largely located on BLM lands. Key issues include potential impacts to desert tortoise and golden eagle, and potential impacts to birds in general from the solar technology.
- **Calico Solar Project (formerly SES Solar One Project), CEC, Biologist (2009-2010).** Ms. Lancaster assisted with the preparation of the biological resources analysis for the Staff Assessment that was prepared for this solar energy project proposed by Calico Solar, LLC. The proposed project would be located in San Bernardino County and includes the construction and operation of an 850-MW Stirling engine solar generation facility, which would include approximately 34,000 SunCatcher solar dish Stirling systems on approximately 8,230 acres. Key issues included potential impacts to desert tortoise, Mojave fringe-toed lizard, Nelson's bighorn sheep, burrowing owl, golden eagle, and rare plants, as well as large-scale modifications to existing drainages and interference with regional wildlife movement.
- **El Casco System Project, CPUC, Project Assistant (2007-2008).** Ms. Lancaster served as Project Assistant for the El Casco System Project EIR. She provided support to the Project Manager, provided technical review of the environmental analysis, coordinated the cumulative impacts analysis, completed various public participation activities during the review periods for the Draft EIR and Recirculated Draft EIR, and assisted in preparing the Final EIR and Recirculated Final EIR. The project is located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa.
- **Alta–Oak Creek Mojave Project, Kern County, Issue Area Coordinator (2008-2009).** Ms. Lancaster was Issue Area Coordinator for Natural Resources and prepared the biological resources analysis of this Initial Study and EIR evaluating a proposed 800 MW wind development in the Tehachapi Wind Resource Area. Key issues included potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, California condor, Swainson's hawk, golden eagle, and Bakersfield cactus.

- **Alta East Wind Project, Kern County, Biologist (2011-2013).** Ms. Lancaster prepared the biological resources analysis of the EIR/EIS for a proposed 300-MW wind energy generation facility in the Mojave region of Kern County. The NEPA Lead Agency was BLM. The proposed project included up to 120 wind turbine generators, a substation, transmission interconnection to the SCE Windhub Substation, access roads, and ancillary facilities. The project area comprises 3,200 acres, 2,083 acres of which are on BLM land three miles northwest of the unincorporated town of Mojave in southeastern Kern County, California. Key issues included potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, Mohave ground squirrel, California condor, and golden eagle.
- **Alta-Oak Creek Mojave Supplement, Kern County, Biologist (2011).** Ms. Lancaster prepared the biological resources analysis of the SEIR for a proposed infill to the existing Alta Oak Cree-Mojave Project, a wind energy development in the Mojave region of Kern County. Key issues included potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, Mohave ground squirrel, California condor, and golden eagle.
- **Morgan Hills Wind Energy Project, Kern County, Biologist (2011).** Ms. Lancaster prepared the biological resources analysis of the EIR for a proposed 230-MW wind energy generation facility in the Mojave region of Kern County. Key issues included potential impacts to birds and bats from the wind turbines as well as potential impacts to California condor and golden eagle.
- **North Sky River Wind Project and Jawbone Wind Energy Project, Kern County, Biologist (2010-2011).** Ms. Lancaster prepared the biological resources analysis of the EIR for a proposed 250-MW wind energy generation facility in the Mojave region of Kern County. Key issues included potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, Mohave ground squirrel, California condor, and golden eagle.
- **Eagle Rock Aggregate Terminal Project, POLB, Biologist (2011-2013).** Ms. Lancaster prepared the terrestrial biological resources analysis of the EIS/EIR for a proposed sand, gravel, and granite aggregate receiving, storage, and distribution terminal located within the Port of Long Beach. The U.S. Army Corps of Engineers (Corps) is the NEPA Lead Agency and the City of Long Beach, acting by and through its Board of Harbor Commissioners for the Port of Long Beach, is the CEQA Lead Agency. Key issues included potential impacts to marine and shore birds, including the peregrine falcon, which nests nearby in the Port.

## Los Angeles and Ventura Community College Districts ............................................ 2005-2007

**Biology Instructor.** Ms. Lancaster taught undergraduate courses including biology for majors, biology for non-majors, and human anatomy.

## National Park Service, Santa Monica Mountains ..................................................... 2002-2003

**Biological Science Technician.** Ms. Lancaster conducted invasive weed surveys in the Santa Monica Mountains. She also participated in a restoration project for the endangered sunflower *Pentachaeta lyonii* and assisted with an ongoing reptile and amphibian diversity monitoring program in the region.

## Sedgwick Reserve, Santa Barbara County .......................................................................... 2001

**Restoration Intern.** Ms. Lancaster created vegetation maps of the reserve, constructed and directed an on-site nursery for the propagation of native plants for restoration projects, assisted with an entomological survey on the reserve, and assisted with a black abalone survey at the K.S. Norris Rancho Marino Reserve in Cambria.

## Selected Publications and Presentations

- Lancaster, J.R., P. Wilson, and R.E. Espinoza. 2006. Physiological benefits as precursors of sociality: why banded geckos band. *Animal Behaviour*, 72:199-207.
- Lancaster, J.R. and R.E. Espinoza. January 2005. *What good is grouping for geckos? Testing the benefits of aggregation in Coleonyx variegatus.* (poster). Society for Integrative and Comparative Biology, San Diego, California.

# DECLARATION OF
## Matthew Layton, PE

I, **Matthew Layton**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Supervising Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Clutches and Synchronous Condensers for the **Alamitos Energy Center (13-AFC-01)** Application for Certification Final Staff Assessment section on Alternatives based on my independent analysis of the Application and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and, if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept 15 2016

Signed: Matthew Layton

At: Sacramento, California

**MATTHEW S. LAYTON**
**1516 Ninth Street, MS-40 Sacramento, CA 95814**
**(916) 654-3868 matthew.layton@energy.ca.gov**

## Experience Summary

Thirty five years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

## Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

## Experience

**2009-present** – Supervising Mechanical Engineer, Engineering Office, Siting, Transmission and Environmental Protection Division, California Energy Commission; managing a multidiscipline program providing engineering and public health assessments of complex energy systems.

**1987-2009** – Senior Mechanical Engineer, STEP Division, Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:
- Air quality resources and potential impacts, and mitigation measures;
- Public Heath; and
- Transmission Line Safety and Nuisance.

Prepared Energy Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

**1983-1986** – Control Systems Engineer, Bechtel Power Corporation. Part of a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment - performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions.

**1981-1983** – Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

# DECLARATION OF
## Ellen LeFevre

I, Ellen LeFevre, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting Transmission and Environmental Protection Division as a Planner I.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Socioeconomics for the Alamitos Energy Center based on my independent analysis of the Application of Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/18/16 Signed: Ellen LeFevre

At: Sacramento, California

Ellen LeFevre

(916) 651-2907

Ellen.lefevre@energy.ca.gov

**Education:**

Sacramento State
Degree: Bachelor of Science in Geology with minor in Anthropology

American River College
Degree: Associate in Science in Mathematics with emphasis in General Science

University of California, Santa Cruz
Studied Biology and Chemistry

**Work Experience:**

Planner I
California Energy Commission, State of California

- Evaluate and analyze environmental and socioeconomic effects of proposed energy facilities to ensure the requirements of the Warren-Alquist Act and California Environmental Quality Act are satisfied.
- Prepare socioeconomic, environmental justice, and land use assessments for proposed and existing energy facility sites.
- Coordinate and work with federal, state, regional, and local governments regarding energy-related issues and to assure their input into the Commission power plant siting process.
- Evaluate the licensee's compliance with conditions of certification for power plant facilities.

Associate Personnel Analyst
Department of Alcoholic Beverage Control, State of California

- Administer/lead the administration of exams which include the development of job analyses, exam questions with consultation of Subject Matter Experts, and serve as chairperson on exam panels.
- Conduct classification studies/surveys and prepare formal memoranda and reports.
- Review proposed personnel actions for compliance with regulations and allocations.
- Interpret and apply civil service laws, rules, and procedures.
- Advise and consult with managers on progressive discipline issues.

**Fieldwork and Research Experience:**

Advanced Field Geology

- Utilize advanced principles and methods of geologic mapping, interpretation, and geologic report writing for selected field areas in southeastern California.

Field Geology and Field Techniques

- Utilize a variety of geologic field methods including descriptions of rocks, geologic mapping, observation, interpretation, and geologic report writing.
- Use topographic and geologic maps, stratigraphic columns and cross sections, and compass and GPS instruments.

Structural Geology

- Complete detailed field descriptions, mapping, and interpretation of geologic structures.
- Utilize techniques of taking detailed field notes, geologic map and cross section construction, stereonet analysis, and report writing.

USGS East Bay Seismic Experiment

- Setup seismometers at specific locations in and around CSU East Bay campus.

Sacramento State American River Restoration

- Record various measurements of rock size, location, and water samples.

**Key Skills and Abilities**

| | |
|---|---|
| Statistical Analysis | Microsoft Word, Excel, and Power Point |
| Report writing (technical and analytical) | ESRI ArcGIS |

# DECLARATION OF
# GEOFF LESH

I, Geoff Lesh, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission, and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimonies on Hazardous Materials Management and on Worker Safety / Fire Protection for the Alamitos Energy Center Amendment based on my independent analysis of the Petition to Amend and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/2016 Signed: Geoffrey C Lesh

At: Sacramento, California

**Geoffrey Lesh, PE**

WORK HISTORY

California Energy Commission    Senior Mechanical Engineer    2002 - Current

- Analyze siting permit applications for gas-fired and solar-thermal power plants in the technical areas of hazardous materials management, fire safety, security, and worker safety plans
- Provide written and oral expert witness testimony at commission hearings on power plant fire protection plans, risk assessments, and adequacy of local fire departments
- Recommend mitigations as needed
- Inspect power plants during construction and operational phases
- Investigate accident, fire, and hazardous materials incidents at power plants

Self-Employed    Independent Investor    2000 - 2002

- Wrote market analysis computer software

Read-Rite Corp    Wafer Engineering Manager    1994 - 2000

- Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation
- Managed process and equipment selection for manufacturing processes
- Processes included vacuum processed metals and ceramics, grinding-polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting

Dastek Corp    (Komag Joint Venture Start-up) Wafer Engineering Manager    1992 - 1994

- Developed wafer processes for new-technology recording head for hard disk drives
- Managed team of engineers and technicians
- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

Komag, Inc    Alloy Development Manager    1989 - 1992

- Developed new vacuum-deposited recording alloys
- Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations
- Extensive process modeling, experiment design and data analysis

Verbatim Corp  (Kodak)    Process Development Manager    1983 – 1989

- Mechanical/materials engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic-plastic processes for optical disk development
- Production processes included metal plating, metal evaporation, reactive sputtering, laser-based photolithography, injection molding
- Steering Committee Member, Center for Magnetic Recording Research, UC San Diego
- Steering Committee Member, Institute for Information Storage Technology, Santa Clara University

IBM Corp    Mechanical/Process Engineer    1977 - 1983

- Product development for photocopiers, semiconductors, and computer data tape-storage systems

EDUCATION

| | |
|---|---|
| Stanford University, Master of Science Degree | Materials Science and Engineering |
| UC-Berkeley, Bachelor of Science Degree (Double Major) | Mechanical Engineering, Materials Science and Engineering |
| University of Santa Clara, Graduate Certificate | Magnetic Recording Engineering |

PROFESSIONAL LICENSES and CERTIFICATIONS

| | |
|---|---|
| Registered Professional Engineer, California (PE) | Mechanical #M32576<br>Fire Protection #FP1827<br>Metallurgical #MT1940 |
| Certified Safety Professional (CSP) | Board of Certified Safety Professionals |
| Certified Fire Protection Specialist (CFPS) | Certified Fire Protection Specialist Board of NFPA |
| Certified Fire and Explosion Investigator (CFEI) | Board of National Association of Fire Investigators |

OSHA 40-hr HAZWOPER Hazardous Materials Incident Training

PROFESSIONAL ASSOCIATIONS

American Society of Safety Engineers – Professional Member
Society of Fire Protection Engineers – Professional Member
National Fire Protection Association – Member
National Association of Fire Investigators – Member

PUBLICATIONS

All-Solid Lithium Electrodes with Mixed-Conductor Matrix, J. Electrocchem. Soc. 128, 725 (1981).
Proc. Symp. on Lithium Batteries, H.V. Venkatasetty, Ed., Electrochem Soc (1981), p. 467.

PATENTS

Method of Preparing Thermo-Magneto-Optic Recording Elements, US Patent# 4,892,634, (assigned to Eastman Kodak Co.)

# DECLARATION OF
## Garry Maurath, Engineering Geologist

I, Garry Maurath, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting Transmission and Environmental Protection Division as an Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Geology and Paleontology for the Alamitos Energy Center Final Staff Assessment based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 15 August 2016 Signed: Gary Maurath

At: Sacramento, California

Garry Maurath, Ph.D., P.G., C.Hg.
Engineering Geologist

*Experience Summary*
Dr. Maurath has 40+ years of experience in the design, management, and execution of geologic, hydrogeologic, geotechnical, geophysical, geothermal, and environmental investigations. Dr. Maurath has conducted numerous licensing studies and performed feasibility studies, site assessments, and construction support for power plants, hazardous waste facilities, dams, canals, tunnels, levees, high-temperature geothermal projects, strategic fuel depots, solid waste landfills, hazardous, toxic and radioactive waste (HTRW) facilities, and both permanent and tactical military infrastructure. He has been responsible for examining and evaluating present and potential geology, paleontology, hydrogeology, and environmental conditions for the planning, design, construction, maintenance, and/or clean-up of numerous facilities. This work has been performed in urban, rural, and remote settings.

His work has included CERCLA and RCRA site remedial investigations and feasibility studies, surface geologic mapping in volcanic, metamorphic, and sedimentary terrain, surface geophysical surveys, borehole siting, drilling, logging, aquifer evaluation and testing, subsurface mine evaluations, mine sampling, construction dewatering, and mercury soil surveys. Dr. Maurath has been responsible for the execution of hazardous waste, low-level, and high-level radioactive waste projects within local, state and federal regulatory guidelines in US EPA regions III, V and IX. He has been involved in the preparation of NEPA and CEQA documentation, EISs, EIRs, NDs, MNDs, NPDES permits, and numerous license applications for the Federal Energy Regulatory Commission and the California Energy Commission.

Dr. Maurath has been a senior scientist and managed projects for small, medium, and large size companies; local, state, and federal government agencies; and non-profit organizations. He has worked with or for the U.S. Army Corps of Engineers (USACE) and several DOE facilities/national laboratories, including Los Alamos, SANDIA, INEL, Savannah River, Maxey Flats, and Hanford. His career has given him the opportunity to work in more than 26 states and 21 countries throughout the world.

Selected Project Experience [technical position/project name/location/lead agency or owner]
- Engineering Geologist, North of the Delta Off-stream Storage (NODOS) Project [Sites], US Bureau of Reclamation
- Engineering Geologist, North Umpqua River Project, Roseburg, Oregon
- Engineering Geologist, Piñon Pine Power Project, Sierra Pacific Power Company
- Engineering Geologist, Protected Fuel Depots Feasibility Study, Kuala Lumpur, Malaysia, Malaysian Ministry of Defense
- Engineering Geologist, Sanitary Landfill Siting Investigation, Fort Drum, New York, US Army Corps of Engineers
- Engineering Geologist, Sharp Army Depot Building S-4 Geohazard Assessment, US Army Corps of Engineers
- Engineering Geologist, Site Characterization of Superconducting Super-Collider (SSC) Sites, New York, NY UDC.
- Engineering Geologist, Union Valley Penstock Bifurcation Study, Upper American River, CA, SMUD
- Engineering Geologist, Upper Gorge Bypass Power Plant, Los Angeles Department of Water and Power
- Environmental Geologist, Gardena Sumps, Gardena, California, Atlantic Richfield
- Environmental Geologist, Low-level Radioactive Waste Disposal Site, Moorehead, KY, Maxey Flats Steering Committee.
- Environmental Geologist, Regulatory Compliance and Emergency Reporting Requirements, EG&G
- Field Coordinator, Feather River West Levee Rehabilitation Project, Sutter Butte Flood Control Agency and CA DWR
- Geochemist, Office of Nuclear Waste Isolation Licensing Project Manager, Columbus, OH, Battelle Memorial Institute
- Geologist – Geology and Soils, Supplemental CEQA Document - Slab Creek, SMUD.
- Geologist, Alternative Energy Feasibility Study, Ohiopyle State Park, Pennsylvania, PA Department of Natural Resources
- Geologist, Assessment of Geothermal and Precious Metal Prospects, Western United States, AMAX Exploration
- Geologist, Clearlake Hot Dry Rock Demonstration Project, Clearlake, CA, California Energy Commission
- Geologist, Hydropower Relicensing EIS's, California, Federal Energy Regulatory Commission
- Geologist, Paleoliquefaction Studies along the Eastern Seaboard of the United States, Nuclear Regulatory Commission
- Geologist, Public Hearings on the North Carolina Low-Level Waste Siting
- Geologist, Rocky Point Pumped Storage Project, Taylor Park, Colorado, Natural Energy Resource Company
- Geologist, Statewide Liquid Geothermal Resource Evaluation, California, California Energy Commission
- Geologist/Paleontologist - compliance, more than a dozen power projects throughout California, California Energy Commission
- Geologist/Paleontologist, Alamitos Energy Center, Huntington Beach, California, California Energy Commission
- Geologist/Paleontologist, Huntington Beach Energy Center, Huntington Beach, California, California Energy Commission
- Geologist/Paleontologist, Mission Rock Energy Center, Santa Paula, California, California Energy Commission
- Geologist/Paleontologist, Pomona Energy Center, Pomona, California, California Energy Commission
- Geotechnical Field Coordinator, Delta Habitat Conservation and Conveyance Project (DHCCP), CA DWR
- Hydrogeologist, Arco 5550 – City of Pomona Well-29, California, BP/Atlantic Richfield
- Hydrogeologist, ARCO Alegria/Gaviota Marine Terminal, Gaviota, California, BP/Atlantic Richfield
- Hydrogeologist, Assessment of 14 U.S. EPA Superfund Sites, CA, NJ, VA, OH, PA, and NY, US EPA
- Hydrogeologist, Auburn Tunnel Pumping Project, Auburn, California, City of Auburn
- Hydrogeologist, Defense Fuel Supply Point Ozol, Benicia, California, U.S. Army Corps of Engineers

- Hydrogeologist, Delta Habitat Conservation and Conveyance Project (DHCCP), CA DWR
- Hydrogeologist, Destruction of Wells N-11, N-18, & N-19, Sacramento, CA, Sacramento Suburban Water District
- Hydrogeologist, Diamond Valley Reservoir, Hemet, CA, Metropolitan Water District of Southern California
- Hydrogeologist, Geff Alternative Site Aquifer Characterization, Chicago, IL, State of Illinois
- Hydrogeologist, Groundwater Modeling of Alternative Low-level Waste Vault Designs, Savannah River, Westinghouse
- Hydrogeologist, Groundwater Monitoring in the Globe Mining District, Globe Arizona, Gila River Indian Community
- Hydrogeologist, Hydrogeologic Assessment of Potential Hazardous Waste Sites, San Francisco Bay Area, CA, PG&E
- Hydrogeologist, Kern Water Bank Evaluation Project, Kern Water Bank
- Hydrogeologist, Lake Skinner Groundwater Seepage Adjudication, Metropolitan Water District of Southern California
- Hydrogeologist, Los Baños Grandes Groundwater Resource Evaluation, Los Baños, California, CA DWR
- Hydrogeologist, Mt. Hope Pumped Storage Project, Mt. Hope, New Jersey, Federal Energy Regulatory Commission
- Hydrogeologist, Municipal Water Supply Well Siting, Design, & Construction, Alleghany County Water District
- Hydrogeologist, Platte River EIS, Wyoming and Nebraska, Federal Energy Regulatory
- Hydrogeologist, Sacramento Ethanol and Power Cogeneration Project, Sacramento, CA, ARK Energy
- Hydrogeologist, Sutter Power Plant AFC with the California Energy Commission, Sutter County, Calpine
- Hydrogeologist, Upper Rio Grande Flood Control Sys. Replacement, TX, Int. Boundary & Water Com.- US & Mexico
- Hydrogeologist, Vinvale Terminal, Southgate, California, BP/ARCO
- Hydrogeologist, Well 23 Assessment, Sacramento, CA, Sacramento Suburban Water District
- Hydrogeologist, Well 6 Destruction and Re-design, Sacramento, CA, Sacramento Suburban Water District
- Hydrogeologist, Well15 Rehabilitation, Rio Linda, CA, Rio Linda Elverta Community Water District, Rio Linda
- Independent Technical Reviewer, Calaveras Dam Replacement Project
- Independent Technical Reviewer, Diablo Canyon Nuclear Power Plant, Diablo Canyon, California, CEC
- Independent Technical Reviewer, Panama Canal Pacific Access Channel Project #4, Panama Canal Authority.
- Independent Technical Reviewer, Searchlight Wind Energy Project EIS, Bureau of Land Management
- Program QA/QC Manager, Urban and Non-Urban Evaluation Program (ULE/NULE), Sacramento, California, CA DWR
- Project Manager, Castaic Power Plant FERC Relicensing, Los Angeles Department of Water and Power (LADWP
- Project Manager, Dos Pueblos Pipeline Removal Project, Goleta, California, BP/Atlantic Richfield
- Project Manager, Hanford, Technical Baseline Studies, Hanford, Washington, Westinghouse Hanford Company
- Project Manager, Los Angeles Terminal, Los Angeles, California, Conoco-Phillips
- Soils Analyst, Soil Trafficability Surveys, Federal Republic of Germany, U.S. Army Corps of Engineers
- Subject Mater Expert - California Geology, CA Board of Professional Engineers, Land Surveyors, and Geologists
- Subject Mater Expert - Hydrogeology, CA Board of Professional Engineers, Land Surveyors, and Geologists
- Task Order Manager, Non-Urban Levee Evaluation Project (NULE), Sacramento Delta, California, CA DWR

<u>Education</u>

- PhD/Geology/1989/Kent State University, OH
- MS/Geology/1980/Kent State University, OH
- BS/Geology/1974/Lehigh University, PA

<u>Registration</u>

- 2008/Certified Hydrogeologist/CA/#906
- 1992/Professional Geologist/CA/#8346
- 1985/HAZWOPER/OHSA
- 1991/HAZWOPER Supervisor Certification/OHSA

<u>Professional Societies/Affiliates</u>

- Sigma Xi, Scientific Research Society, Life Member
- Association of Environmental and Engineering Geologists (Finance Committee co-chair, former member Board of Directors; former Sacramento Branch Chairperson, Secretary and Newsletter editor)
- Groundwater Resources Association of California, founding member, currently affiliated with the Sacramento Chapter

<u>Publications</u>

Dr. Maurath has more than 40 publications covering topics including paleoliquefaction, terrestrial heat flow, numerical modeling, hydrogeology, nuclear waste, hazardous waste, and geothermal energy. He is currently co-editor of *Geology of Sacramento* and *Geology of San Francisco*, which are both scheduled to be published in early 2018.

<u>Academia</u>

Dr. Maurath has taught undergraduate courses in Physical Geology, Hydrogeology, Environmental Habitats, and Laboratory Safety; and graduate level courses in Geology of the Bahamian Platform, Carbonate Deposition, Reef Ecology, Data Management, and Laboratory Techniques for Trace Element Geochemistry. Dr. Maurath has been affiliated with Kent State University, University of California at Davis, California State University Sacramento, Monmouth College, and the University of St. Francis.

# DECLARATION OF
# MELISSA MOURKAS

I, Melissa Mourkas, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Cultural Resources (built environment resources) for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/2016 Signed: ______________

At: Sacramento, California

# MELISSA MOURKAS

## EDUCATION

**MASTER OF ARTS, LANDSCAPE DESIGN & PLANNING, 1994**
**CONWAY SCHOOL OF LANDSCAPE DESIGN, CONWAY, MASSACHUSETTS**
Graduate landscape design program providing professional training in site design and land-use planning. Curriculum emphasis is on sustainable landscape planning and design. Graduate projects included: Master Plan for a 45-acre historic resort, original landscape designed by F.L. Olmsted and Performance Standards for a proposed industrial park.

**BACHELOR OF ARTS, HISTORY OF ARCHITECTURE & ART, 1981**
**SCRIPPS COLLEGE, CLAREMONT, CALIFORNIA**
Major studies in Art and Architectural History, Urban Development. Senior thesis: documentation and analysis of the innovative residential designs and construction techniques of California modern architect Rudolf M. Schindler. Minor studies in Art and the Humanities.

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## PROFESSIONAL EXPERIENCE/QUALIFICATIONS

- Licensed Landscape Architect, California # 5139
- Qualified Architectural Historian, Secretary of the Interior's Standards for Historic Preservation, Code of Federal Regulations, 36 CFR Part 61.

### *PLANNING AND HISTORIC PRESERVATION*:

**April 2010 to Present: Planner II, California Energy Commission, Siting, Transmission and Environmental Protection Division**. Provide technical environmental analysis of proposed energy facilities and development. Review of EIR/EIS documents prepared by other agencies under NEPA. Specific tasks include: the assessment of potential impacts of new electric power plants on both Visual and Cultural Resources; identification of suitable mitigation measures under CEQA; preparation of written testimony; participation in public workshops; presentation of sworn testimony during evidentiary hearings, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Cultural Resources specialty in the built environment, architectural and landscape history. Section 106 review of federally-funded energy efficiency upgrades under Programmatic Agreement with California OHP.

**2008-2014: Member, City of Sacramento Preservation Commission** (Chair 2013-2014)

**2005 to 2008: Assistant Planner, Historic Preservation Office, City of Sacramento, CA**
Responsible for design review and approval for private and public development projects involving rehabilitation, preservation and restoration of historic resources and districts under CEQA. Prepared staff reports for Preservation Commission and Council, and coordinated with other planning staff on concurrent entitlements. Staff liaison on municipal development projects involving historic resources.

### *LANDSCAPE ARCHITECTURE*:

**1994 to Present: Landscape Architecture and Design.** Experience in landscape architecture, landscape construction estimating, site planning, historic landscapes and landscape master plans. Provide landscape architecture and consulting services to private clients, public organizations, contractors, and design firms. Preparation of Cultural Landscape Reports. Frequent speaker to various groups on landscape design, construction and cultural landscapes.

# DECLARATION OF
## WENJUN QIAN

I, Wenjun Qian, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Biological Resources-Appendix-1 Nitrogen Deposition Analysis and Traffic and Transportation Appendix TT-1: Plume Velocity Analysis for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and, if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/2016 Signed: [signature]

At: Sacramento, California

# Wenjun Qian, Ph.D., P.E.

## Professional Experience

**Air Resources Engineer** ***(July 2010 – Present)***
***California Energy Commission, Siting Transmission and Environmental Protection Division***

Currently acting as air quality technical staff on siting projects filed with the Energy Commission, including El Segundo, Russell City, Palomar, Oakley, Huntington Beach etc. Specific responsibilities include the following:

- Analyze the impacts of the construction and operation of large power generation projects on air quality, Green House Gas and climate change
- Determine the conformance to applicable U.S. EPA, ARB and local air district regulations and standards
- Investigate and recommend appropriate emission mitigation measures
- Prepare air quality staff assessments and technical testimony
- Develop and monitor air quality compliance plans
- Review and evaluate U.S. EPA, ARB, and local air district air quality rules and regulations
- Collect, analyze, and evaluate data for the effects of air pollutants and power plant emissions on human health and the environment
- Assist staff in other technical areas by evaluating nitrogen deposition, thermal plume, and visible plume impacts from power plants

**Research Assistant** ***(Sept. 2005 – June 2010)***
***University of California, Riverside, Mechanical Engineering***

- Evaluated air quality impact of distributed generations in South Coast Air Basin of California
- Estimated air quality impact from the key power plant of Los Angeles Department of Water and Power in shoreline urban areas
- Improved air quality model results by evaluation with experimental data
- Prepared and presented multiple comprehensive reports, journal papers, and conference papers

## Education

PhD Mechanical Engineering, University of California, Riverside (August 2010)
MS Mechanical Engineering, George Washington University (August 2005)
BS Mechanical Engineering, Shanghai Jiao Tong University (June 2004)

# DECLARATION OF

I, Jacquelyn Leyva Record declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Efficiency and Reliability** for the **Alamitos Energy Center** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/17/16 Signed: Jacquelyn Leyva Record

At: Sacramento, California

# Jacquelyn Leyva Record

## Experience

**March ’09 – Present CA Energy Commission Sacramento, CA**
**Air Resources Engineer**
- Currently authoring staff assessment analyses for the technical area of air quality for the Engineering and Siting Division permitting power plant projects over 50 MW in the state of CA. Worked on renewable ARRA funding projects along with natural gas power projects.
- Reviewing emission compliance reports
- Authored staff analyses for project amendments
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

**August ’08 – March ‘09 ERRG, Inc. Martinez, CA**
**Engineering Assistant**
- Assisted with both technical and field duties for a variety of environmental investigations.
- Assisted on an environmental site assessment, preliminary assessments (PA), site inspections, and remedial investigations feasibility studies.
- Field duties performed include groundwater sampling and air sampling

**June ’07 – March ‘08 Tetra Tech EC, Inc Santa Ana, CA**
**Engineering Assistant Intern**
- Working on various Department of Defense projects in environmental engineering.
- Helped assist in 5 year review of remediation approaches.
- Helping assist with a commercial project creating a water reuse/recycle treatment plant.

**June ’05 – September ’05 SF Regional Water Board Oakland, CA**
**Contract Work – Special Project**
- Wrote a memorandum regarding total petroleum hydrocarbons showing up as false positives in submitted quarterly monitoring reports for NPDES FUEL permit.
- Researched various EPA methods of testing for VOC, and Fuel constituents in water.
- Communicated with consultants from Weiss Associates and state funded laboratories to come to a conclusion for memorandum.
- Site inspections, site reports.

## Education

2003-June 2008 University of California Irvine Irvine, CA
- B.S., Chemical Engineering
- MAES (Mexican American Engineers and Scientists) - Vice Chair 2004-2005
- CAMP summer science program participant 2003

# DECLARATION OF GABRIEL ROARK

I, Gabriel Roark, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Cultural Resources (archaeological resources) for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 08/17/2016 Signed: [signature]

At: Sacramento, California

# GABRIEL ROARK, M.A.

## Archaeologist

Since 1999, Mr. Roark has directed and conducted cultural resource investigations for projects involving the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Section 106 of the National Historic Preservation Act (NHPA). Mr. Roark possesses extensive professional experience in prehistoric archaeology, historical archaeology, and regulatory compliance, routinely serving as the project manager and technical lead on several projects simultaneously. He specializes in the design and implementation of archaeological monitoring programs, archaeological surveys and excavations, archival research, and CEQA and Section impact analyses. His Section 106 experience includes drafting memoranda of agreement, programmatic agreements, and historic properties treatment plans.

## Professional Employment History

State Energy Resources Conservation and Development Commission (Energy Commission). Energy Planner II. June 1, 2012–present. Sacramento, California.

Mr. Roark's primary duty at the Energy Commission is the preparation of independent analyses of the potential cultural resource impacts engendered by proposed power plant projects and amendments. Analysis consists of reviewing applications for certification and various other applicant submittals, verifying and augmenting the information contained therein through independent research. As a staff archaeologist in the Cultural Resources Unit, he personally examines proposed project sites to verify and record current conditions on-site. Duties also include management of consultants; application of local, state, and federal laws, ordinances, regulations, and standards to proposed projects; reviewing compliance documents for existing power plants; and assistance with tribal consultation.

ICF International (formerly Jones & Stokes). Senior Associate (Archaeologist). February 23, 1999–May 30, 2012. Sacramento, California.

Mr. Roark provided comprehensive cultural resources management services to federal, state, and local agencies across

### Years of Experience

- Professional start date: 02/23/1999

### Education

- MA, Anthropology, California State University, Sacramento, 2009
- BA, Anthropology, California State University, Sacramento, 1999

### Professional Memberships

- Archaeological Resources Committee, State Historical Resources Commission

### Special Training

- Cascade Range Archaeological Project, Crew Chief, California State University, Sacramento, 1999
- Archaeological Field School, Mammoth Lakes, California State University, Sacramento (Dr. Mark E. Basgall, Director), 1999
- Anthropology 199: Introduction to Analysis of California Gold Rush Chinese Ceramics, Independent Study, California State University, Sacramento (Dr. Jerald J. Johnson, Instructor), 1999
- Anthropology 195A and 192: Fieldwork and Laboratory Work in Archaeology, Coloma, California State University, Sacramento (Dr. Jerald J. Johnson and Dr. Tom Strasser, Instructors), 1997

resource and business sectors, as well as to non-profit organizations and for-profit developers. Although the emphasis of this work was in archaeological resource management, Mr. Roark also consulted with Indian tribes regarding traditional cultural properties and conducted supervised architectural recordation. Regulatory experience includes CEQA, Warren-Alquist Act, Section 106 of the NHPA, NEPA, Archaeological Resources Protection Act, State–tribal gaming compacts (tribal environmental impact reports) and the Native American Graves Protection and Repatriation Act (NAGPRA). He has authored and co-authored a wide variety of cultural resources management documents: constraints analyses, categorical exemptions and exclusions, cultural resources inventory reports, archaeological survey reports, archaeological research designs (presence/absence testing, test excavation, and data recovery), cultural resources management plans, construction monitoring programs, environmental compliance training, test excavation reports, geoarchaeological analyses, initial studies, environmental assessments, and environmental impact reports/statements. Mr. Roark has surveyed, evaluated, and excavated several archaeological and cultural resources in the North Coast Ranges, Central Valley, Cascade Ranges, Sierra Nevada, South Coast Ranges, Mojave Desert, and Los Angeles Basin of California.

## Representative Project Experience—California Energy Commission

In addition to the proposed Huntington Beach Energy Project, Mr. Roark presently serves as the lead cultural resources analyst and archaeologist for the Hydrogen Energy California project (Kern County), Alamitos Energy Center (Los Angeles County), Redondo Beach Energy Project (Los Angeles County), and El Segundo Energy Center (Los Angeles County).

Duties include review of applicant submittals, issuing data requests, research in historical repositories and online, and preparation of staff assessments.

## Representative Project Experience—ICF International/Jones & Stokes

### *Energy and Fuels*

#### Grimes Pipeline Environmental Services—CPN Pipeline Company, Sutter County, California (2010–2012)

Archaeologist. As lead archaeologist for this proposed natural gas pipeline, Mr. Roark was responsible for helping CPN Pipeline comply with the cultural resources requirements of the California Energy Commission and Section 106 of the NHPA. Duties included records search and literature review; tribal consultation; coordination with Commission staff; archaeological survey; preparation of cultural resources reports, management plans, and portions of the application for certification; and direction of a geoarchaeological investigation.

### Tri-Valley 2002 Capacity Increase Project—Pacific Gas and Electric Company (PG&E), Alameda and Contra Costa Counties, California (2000–2004)

Cultural Resources Manager. Mr. Roark designed a program of cultural resource compliance to satisfy the mitigation monitoring program previously prepared for the project. The cultural resources compliance program included archival research, consultation with Native Americans, cultural resource inventories and evaluations, and preparation of a comprehensive cultural resources treatment plan (CRTP). The CRTP set the procedures and standards for archaeological monitoring during construction, procedures for dealing with accidental discoveries, and reporting methods. Also monitored construction in sensitive areas and assisted with an inadvertent discovery of archaeological materials.

### Los Banos-Gates 500-kV Transmission Line Project (Path 15)—Infrasource, Inc., Merced and Fresno Counties, California (2003–2005)

Lead Archaeologist for the Path 15 archaeological monitoring program designed by the Western Area Power Administration (Western). Evaluated cultural resources identified by resource monitors, including Native American monitors, over an 84-mile project corridor. Responded to over 70 inadvertent discoveries—recording, test excavating, and researching a total of 26 archaeological sites. Also surveyed newly added project elements and assisted Western and Infrasource with Section 106 compliance.

### Path 15 GPS Data Collection Project—Western Area Power Administration, Merced and Fresno Counties, California (2011–2012)

Principal investigator and field director. Western hired ICF to evaluate the National Register eligibility of eight historic and prehistoric archaeological sites that I had recorded between 2003 and 2005. Mr. Roark prepared a research design for evaluating the sites in consultation with Western. The research design presented research questions that could be answered through detailed analysis of surface manifestations alone under favorable conditions or through archival research. Mr. Roark directed fieldwork, which consisted of intensive surface recordation.

**Vantage Wind Energy Project Cultural Resources Inventory—Kittitas County, Washington (2011)**

Archaeologist. Contributing author responsible for reporting survey methods and findings, as well as recommendations for the treatment of archaeological resources. Also prepared environmental and cultural contexts for the report.

**Central Valley Gas Storage Project Section 106 Consultation—Central Valley Gas Storage, LLC, Colusa County, California (2010–2011)**

Lead archaeologist. The project consisted of a 17-mile natural gas pipeline from the Sacramento River across the Colusa Sink to the foothills on the eastern flank of the North Coast Ranges. Completed a cultural resources inventory for compliance with Section 106, CEQA, and California Public Utilities compliance. Tasks included records searches, correspondence with Indian tribes, a geoachaeological assessment (literature based) of the project area, and preparation of an inventory report.

**Carrizo-Midway 230kV Transmission Line Reconductoring Project—Pacific Gas and Electric Company (PG&E), Kern and San Luis Obispo Counties, California (2010–2011)**

Lead cultural resources manager. Responsible for CEQA and Section 106 compliance on a 30-mile transmission line reconductoring project. Directed all aspects of the cultural resources work: research, geoarchaeological assessment, Indian consultation, survey, and reporting. Advised PG&E on feasible avoidance measures to protect about a dozen archaeological sites.

**Palermo to East Nicolaus Transmission Line Reconstruction Project Proponent's EA Preparation—Pacific Gas and Electric Company (PG&E), Northern California (2006–2009)**

Project manager and lead archaeologist. Managed Section 106 and CEQA compliance tasks, including research, consultation with Indians and historical societies, archaeological and historic structures surveys, evaluation of identified resources (historic archaeological and built environment), report preparation (cultural resources report and section of proponent's EA), and agency coordination. Designed the survey parameters such that PG&E did not have to authorize additional survey during construction.

**Central California Clean Energy Transmission Project Proponent's EA—Pacific Gas and Electric Company (PG&E),**

### Fresno, Kern, Kings, Madera, and Tulare Counties, California (2009–2010)

Lead cultural resources manager. Advised PG&E regarding cultural resources regulatory compliance strategy and responsibilities from the project design phase through late-stage project planning. Ranked several alternative transmission line routes via a GIS-based model of cultural resources distribution and sensitivity. Conducted records searches and research, consulted with Indian groups, directed archaeological and built-environment surveys, and prepared iterative cultural resource reports.

*Transportation*

### I-5/Cosumnes River Boulevard Interchange Project—City of Sacramento, California (2001–2002)

Lead Archaeologist for analysis of an 880-acre study area (slated for the extension of Cosumnes River Boulevard to I-5) to comply with Section 106 of the NHPA and CEQA. In addition to using standard inventory methods, Mr. Roark led a five-person crew in presence/absence excavations designed to explore geophysical anomalies detected through remote-sensing applications.

### Preconstruction and Construction Environmental Monitoring—City of Sacramento/ Vali Cooper, Sacramento, California (2011–2012)

Project Manager and Lead Archaeological Monitor. Mr. Roark managed the biological and archaeological mitigation monitoring program for the first phase of the Sacramento Intermodal Transportation Facility (track relocation). His responsibilities consisted of interfacing with construction management staff to ensure that ICF is informed of construction activities and their schedule, deploying biological and archaeological monitors as needed, and responding to inadvertent archaeological discoveries.

### Cultural Resources Compliance Support for the Railyards Initial Phase Project—Kimley-Horn Associates, Sacramento, California (2009–2012)

Project manager and lead archaeologist. Coauthored the archaeological testing plan for prehistoric and historic archaeological sites, using geotechnical data and historic maps to identify archaeologically sensitive areas. Also prepared the project inadvertent archaeological discovery plan. Crew chief for mechanical archaeological testing; identified the historic 6th Street Levee.

### Railyards Archaeological Monitoring of Soil Remediation—Thomas Enterprises/ERM West, Sacramento, California (2007–2012)

Project manager and lead archaeological monitor. Responsibilities included construction monitoring, staff scheduling, evaluating inadvertent archaeological discoveries and coordinating such evaluations with staff from the California State Railroad Museum, reporting, and training construction staff in the proper procedures for archaeological discoveries.

### Sacramento Intermodal Transit Facility Track Relocation Project Environmental Documents for CEQA/NEPA—City of Sacramento, California (2008–2012)

Lead archaeologist and project manager. Advised Caltrans and the City of Sacramento as to Section 106 and NEPA compliance concerning cultural resources. Due to the shortened compliance schedule entailed with American Recovery and Reinvestment Act funding, recommended a tiered approach that secured funding and protected cultural resources. Directed identification of surface archaeological resources, archival and geoarchaeological research to isolate potential buried archaeological resources, and preparation of an archaeological resources treatment plan. Exploratory and evaluative test excavations, components of the treatment plan, are underway. In 2011, Mr. Roark was selected to manage preparation of a NEPA re-validation document, air quality conformity analysis, and cultural resources inventory of a modification to the project.

*Water*

### Freeport Regional Water Project—Freeport Regional Water Authority, Sacramento and San Joaquin Counties, California (2005–2009)

Lead cultural resource manager and lead archaeological monitor. Prior to construction of the FRWP, led ICF's cultural resources inventory of the 30-mile-long project and drafted a memorandum of agreement (MOA), to direct compliance with Section 106 of the NHPA. The MOA established procedures for the inventory of changes to the FRWP area, treatment of a historic property, and inadvertent archaeological discoveries during construction. Construction resulted in one inadvertent discovery of cultural resources. Worked with Bureau of Reclamation and construction staff to comply with the project MOA while allowing the contractor to continue work on the project. The construction contractors identified the need for additional work areas after the MOA was executed. These areas needed to be surveyed and reported to the lead federal agency, Reclamation, and SHPO, which began to cause construction delays. Negotiated an amended MOA with Reclamation and the SHPO that streamlined the review process for newly identified project components.

### Battle Creek Salmon and Steelhead Restoration Project—U.S. Bureau of Reclamation (Reclamation) and State Water Board, Shasta and Tehama Counties, California (2003–2005)

Principal investigator. Prepared a research design and guided archaeological test excavations of five prehistoric archaeological sites in the Cascade Range foothills near Red Bluff. Worked closely with Reclamation archaeologists to devise a suitable research design and a schedule and approach to completing Section 106 consultation under a stringent timeline.

### Lower Northwest Interceptor Project—Sacramento Regional County Sanitation District, Sacramento and Yolo Counties, California (2001–2005)

Lead cultural resources manager. Coordinated efforts to identify potential cultural resources issues for the pre-design and design phase of a 19-mile sewer alignment. The proposed alignment was routed through portions of the greater Sacramento region that are highly sensitive for the presence of buried archaeological sites. Led a research program consisting of archival research, modeling of historic environments, extensive cooperation with Native Americans and local archaeologists, and architectural and archaeological surveys to recommend appropriate mitigation measures for known and potential cultural resources. Prepared the cultural resources section of an EIR and the cultural resources inventory report for the project.

### Lower Northwest Interceptor Project—Sacramento Regional County Sanitation District, Sacramento and Yolo Counties, California (2005–2007)

Lead archaeological monitor. Devised an archaeological monitoring program designed to comply with complex federal regulatory requirements, determined whether construction was likely to disturb buried archaeological deposits, trained monitors and construction staff in their roles as resource stewards during construction, and oversaw staff archaeologists' fieldwork and reporting. Monitoring program included excavation of 298 auger tests to determine whether archaeological deposits were present in the project area and monitoring by qualified archaeologists to verify the results of the auger tests.

### Sacramento River Bank Protection Project EIS/EIR—U.S. Army Corps of Engineers (Corps)/HDR-JSA JV, Sacramento County, California (2008–2012)

Primary author of the programmatic agreement and historic properties treatment plan (HPTP) for this state/federal levee repair program. The programmatic agreement will guide the Corps' cultural resources program for the life of the project particularly in the areas of consultation and documentation of cultural resource activities. The HPTP is a multidisciplinary document that stipulates appropriate identification efforts and treatment of a variety of property types: prehistoric and historic archaeology, non-archaeological properties of concern to Native Americans, historic built environment properties, cultural landscapes, and submerged resources.

*Parks, Trails, and Open Space*

### Expansion of Frank Raines Regional Park—Stanislaus County Parks Department, Stanislaus County, California (1999)

Cultural Resources Manager. Conducted a literature review to determine the cultural resource sensitivity of the existing park and expansion area, then assisted County and ICF staff with the siting and development planning for new off-highway vehicle (OHV) trails so as to avoid known cultural resources and sensitive area. Also surveyed the various alternative OHV trails for the presence of cultural resources. Prepared a cultural resources inventory report in support of CEQA impact assessment.

### El Dorado Hills Data Recovery—Serrano Associates, LLC, El Dorado County, California (2000)

Crew Member for archaeological excavations at 19th century mining camps and homestead sites located near the historic town of Clarksville. Member of the artifact analysis team and contributed to report preparation.

### Suisun Marsh Management Plan EIS/EIR—California Department of Fish and Game (DFG), Solano County, California (2006–2010)

Cultural resources manager. Prepared a geoarchaeological assessment of Suisun Marsh to estimate the potential for buried and surface-manifested cultural resources for three project alternatives. Together with records search data and historic map research; the geoarchaeological assessment formed the crux of the analysis presented in the cultural resources section of the EIS/EIR.

*Native American Projects*

### Big Sandy Casino and Resort Project EIS—Big Sandy Rancheria Band of Western Mono Indians, Fresno County, California (2007–present)

Cultural resources manager/principal investigator. Assisted Big Sandy Rancheria and the Bureau of Indian Affairs (BIA) with cultural resources compliance under NEPA and Section 106. Directed records searches and archival research, supported BIA's consultation with Indian tribes, corresponded with historical societies and non-federally recognized tribes, met with the state historic preservation officer to discuss compliance effort, conducted archaeological surveys and directed two evaluative test excavations. In addition, worked with BIA, Big Sandy, and Table Mountain Rancheria to devise a plan of action, pursuant to the NAGPRA, for the treatment of Indian human remains discovered during excavations. Also assisted with reburial of Indian remains. Preparation of cultural resources reports and EIS sections.

### Buena Vista Rancheria Gaming and Entertainment Facility Tribal EIR—Stevens & O'Connell, Amador County, California (2006–2008)

Lead Cultural Resources Manager. Responsible for coordinating archaeological and built-environment inventories and assessments of off-reservation road improvements. Responsibilities included conducting records searches, archival research, ethnographic literature review, archaeological survey, and contributions to the Tribal EIR. Additionally, prepared a cultural resources management plan for the Buena Vista Band of Me-Wuk Indians' property to guide heritage preservation on the casino property. Also led the Section 106 compliance effort by meeting with agency personnel, Indian groups, and other concerned groups to arrive at reasonable terms for a memorandum of agreement.

*Ports and Harbors*

### Promenade Report of Archaeological Monitoring—Port of Los Angeles, San Pedro, California (2009)

Archaeologist. Contributing author to the archaeological monitoring report for numerous inadvertent archaeological discoveries in the historic neighborhood known as Mexican Hollywood. Contributions included archaeological feature descriptions, tabulated artifact (functional group) analysis, and interpretation of materials.

*Development/Redevelopment Projects*

### Seaview Vineyard Development—Peter Michael Winery, Sonoma County, California (2000–2002)

Cultural Resources Team Leader on an archaeological test excavation of prehistoric site CA-SON-2306 that would be affected by development of a vineyard in coastal Sonoma County. The excavation was conducted to evaluate the site for California Register of Historical Resources and NRHP eligibility. Responsible for research, development of a test excavation program, excavation, ground stone analysis, report preparation, and overall project management.

*Fiber-Optic Cable*

### ARE-ON Fiber Expansion—University of Arkansas/BHC Rhodes, Arkansas (2010)

Cultural resources manager. Prepared Section 106 consultation letters and corresponded by telephone with Indian tribes on behalf of the National Telecommunications and Information Administration. Analyzed data provided by a local cultural resources consulting firm and prepared a environmental assessment sections on the basis of these data. The project covered 36 counties in Arkansas and consisted of several hundred miles of fiber-optic line.

### Sacramento Region Fiber Optic Projects—XO California, Inc., Placer, Sacramento, and Yolo Counties, California (2000–2002)

Lead archaeologist. Managed cultural resources task, which consisted of providing sensitivity assessments, conducting inventories, and monitoring recommendations for more than 20 proposed fiber optic builds. Because the majority of the proposed builds were located in urban settings not surveyed for archaeological sites before development, designed inventory and assessment methods to identify areas that likely contained buried archaeological deposits. According to the results of each assessment, assigned archaeological or Native American monitors to sensitive project areas.

## Publication

Roark, Gabriel A. 2009. An Archaeological Study of Culture Process and Projectile Point Variability in the Southern North Coast Ranges of California. Unpublished M.A. thesis, Department of Anthropology, California State University, Sacramento. Electronic document, http://csusdspace.calstate.edu/handle/10211.9/660, accessed April 24, 2014.

# DECLARATION OF
## Ellen Townsend-Hough, Associate Mechanical Engineer

I, Ellen Townsend-Hough, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting Transmission and Environmental Protection Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Waste Management for the Alamitos Energy Center Final Staff Assessment based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Aug 27, 2016 Signed: ______________________

At: Sacramento, California

# Ellen Townsend-Hough
## Associate Mechanical Engineer

## SUMMARY

I am a chemical engineer with 32 years of mechanical engineering experience. I have a working knowledge of the California Environmental Quality Act. I have working knowledge of the National Environmental Policy Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, and Worker Safety, for electric generating stations. I worked as a policy advisor for a California Energy Commission Commissioner. I am also an US Environmental Protection Agency Environmental Justice trainer.

One of the primary functions of the Energy Commission is CEQA review of license applications to build and operate power plants 50 MW and greater in California. In the Energy Commission's Engineering Office, I fulfill this function by working through and managing a wide variety of CEQA and environmental policy issues. The product of this effort is expressed in expert testimony and staff analysis for siting new power plants and power plant compliance activity. This testimony and analyses cover, waste management. I participate as a technical speaker at public workshops as needed.

I have worked on simple-cycle, combined cycle, cogeneration, geothermal, and large-scale thermal solar power plants, and is familiar with most of the major power plants in construction and operation in California today. I have conducted construction and operation compliance inspections at many of these plants.

I have knowledge of CEQA/NEPA impact analysis and mitigation involving waste management. The assessments I has authored waste management, worker safety, fire protection, hazardous materials and public health.

**Power Plant/Utility Experience**
**California Energy Commission**,

A list of power plant siting cases for which I have authored assessments, in whole or in part follows: Abengoa Solar (Solar Thermal), Chevron USA (Natural Gas), CPV Sentinel (Natural Gas), Ivanpah SEGS (Solar Thermal), Carlsbad Energy Center (Natural Gas), Quail Brush (Natural Gas),Pio Pico (Natural Gas), Hidden Hills (Solar Thermal), Genesis (Solar Thermal), Rio Mesa SEGF (Solar Thermal), Huntington Beach Energy Project, Alamitos Energy Project, Puente Power Plant and San Joaquin Solar (Solar Thermal-Biomass).

I also work on power plant construction and operation compliance, some of which are: Abengoa Solar, Colusa, Carlsbad, Canyon, Genesis, Elk Hills, various geothermal power plants, Henrietta, Inland Empire, Ivanpah SEGS, La Paloma, Marsh Landing, Mountain View, TID Almond, SEGS III-VII, SEGS VII & IX, and Sutter.

## EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania
1981

<u>Continuing Education</u>
Hazardous Material Management Certificate, University California Davis

Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer
Community Emergency Response Team Certified

## PROFESSIONAL EXPERIENCE

### Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provide licensing recommendations and function as an expert witness in regulatory hearings.

- Provide waste management and sustainability analysis on construction, demolition and operation of power plant design.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

### Technical Proficiencies

- Establish mitigation that reduces the potential for human exposure to levels which not result in significant health impact or risk in any segment of the exposed population.
- Conduct environmental audits and inspections of electrical generating stations during construction and operation to assure compliance with Commission decisions.
- Evaluate and prescribe Fire Protection Systems. Technical liaison with local fire departments.
- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.
- Operating Systems:  MS Windows Server
- Networking:  Local Area Network (LAN)
- Software:  MS Office (WORD, EXCEL, POWERPOINT)

### Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission’s power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner’s position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

# DECLARATION OF
## Negar Vahidi

I**, Negar Vahidi,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a consultant to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Senior Project Manager/Senior Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **Alamitos Energy Center Project Final Staff Assessment,** based on my independent analysis of the Application for Certification and supplement hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Negar Vahidi Signed: September 22, 2016

At: Santa Monica, California

**NEGAR VAHIDI**
Senior Associate/Social Sciences Group Manager

## Academic Background

Master of Public Administration, University of Southern California, 1993
BA (with Highest Honors), Political Science, University of California, Irvine, 1991

## Professional Experience

Ms. Vahidi has over 18 years of experience managing and preparing a variety of federal, State, and local environmental, planning, and analytical documents for large-scale energy and water infrastructure and development projects. She currently serves as a Senior Project Manager and Aspen's Group Manager for land use, policy analysis, and socioecenomics issues. She brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, land use and public policy analyses, socioeconomics and environmental justice analyses, and public involvement programs. Her diversity and experience in management and technical analyses can be shown through a sample of her projects described below.

**Aspen Environmental Group........................................................ 1992-1998 and 2001-present**

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects throughout the State, providing land use, agriculture, public policy, and socioeconomics expertise as well as managing Public Participation Programs. Her specific projects are described below.

#### RENEWABLE ENERGY PLANNING PROJECTS

- **San Luis Obispo County Renewable Energy Streamlining Program and EIR.** Project Manager for Aspen (under contract to PMC). Aspen is working collaboratively with PMC and the County by preparing an Opportunities and Constraints Technical Study (OCTS) to determine Renewable Energy Development Areas (REDAs) suitable for siting of small-scale renewable energy (RE) in the County. The OCTS is intended to inform the County in developing it's renewable energy policy updates, its RE Combining Designation for its Open Space Element, and development and adoption of its RE Ordinance. This process has been funded by the CEC Renewable Energy Planning Grant Program. SLO County was one of five counties awarded a grant.
- **Inyo County Renewable Energy General Plan Amendment and Program EIR.** Senior Technical Adviser and Senior Socioeconomics Technical Expert for Aspen's contract with Helix. Aspen is working collaboratively with the County by preparing an OCTS to determine Renewable Energy Development Areas (REDAs) suitable for siting of renewable energy (RE) in the County. The OCTS is intended to inform the County in developing its renewable energy policy updates for its General Plan Amendment. This process has been funded by the CEC Renewable Energy Planning Grant Program. Inyo County was one of five counties awarded a grant.
- **San Bernardino County General Plan Renewable Energy Element and Program EIR.** Project Manager for Aspen (under contract to PMC). Aspen is working collaboratively with PMC and the County to develop renewable energy case studies, participate in stakeholder outreach, develop the County's Renewable Energy Element, and the associated CEQA Program EIR. Aspen will help the county identify Renewable Energy Development Areas (REDAs) suitable for siting of renewable energy (RE) in the County. San Bernardino County was one of five counties awarded a grant funded by the CEC Renewable Energy Planning Grant Program.
- **Desert Renewable Energy Conservation Plan and EIS/EIR, southern CA desert.** Senior Technical Specialist for BLM Lands/Realty, Environmental Justice, and Socioeconomics for Desert Renewable

Energy Conservation Plan (DRECP) and its Environmental Impact Report/Environmental Impact Statement (EIR/EIS). She's also serving as: the land use technical specialist for the land valuation team of the DRECP: the task Leader for the EIS/EIR analysis of transmission corridor route alternatives; and serves on the BLM "Red Team" for EIR/EIS technical review.

### POWER GENERATION PROJECTS

### *California Energy Commission (CEC)*

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under five separate contracts. Ms. Vahidi has served as expert witness and Technical Senior for land use (since 2001), and a specialist for socioeconomics and environmental justice, and alternatives analyses and special studies. Her specific projects are listed below.

- Technical Assistance in Application for Certification Review (Contract # 700-99-014; 3/6/2000 through 12/31/2003)
  - **Woodland Generation Station No. 2, Modesto, CA.** As the land use Technical Specialist, prepared the Land Use and Recreation, and Agricultural Resources Staff Assessments of this 80-MW nominal, natural gas-fired power generating facility and associated linear facilities (i.e., gas and water pipeline and transmission line. The Staff Assessment evaluated potential impacts on nearby residential, recreational, and agricultural land uses, including important farmlands being traversed by linear faculties.
  - **Valero Cogeneration Project, Benicia, CA.** Prepared the Socioeconomics Staff Assessment for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
  - **Rio Linda/Elverta Power Project, Sacramento, CA.** Prepared the Socioeconomics Staff Assessment for a 560-MW natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
  - **Magnolia Power Project, Burbank, CA.** As the Socioeconomics technical specialist, prepared the Staff Assessment for this nominal 250-MW natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated
  - **Potrero Power Plant Project, San Francisco, CA.** Prepared the land use portion of the Alternatives Staff Assessment for this proposed nominal 540-MW natural gas–fired, combined-cycle power generating facility. Analysis included review of several alternative sites for development of the power plant and the comparative merits of those alternatives with the proposed site located on the San Francisco Bay.
  - **Los Esteros Critical Energy Facility, San Jose, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of this 180-MW natural gas-fired simple cycle peaking facility. Issues included potential impacts resulting from loss of agricultural land, and impacts associated with the project's non-compliance with local General Plan land use and zoning designations.
  - **East Altamont Energy Center, Alameda County, CA.** Senior Technical Specialist for the Land Use Assessment for a 1,100-MW nominal, natural gas-fired power plant and associated linear facilities. Provided expert witness testimony on Land Use Staff Assessment. Major issues addressed in

the Staff Assessment included loss of Prime Farmlands, recommendation of land preservation mitigation, and the project's non-compliance with local General Plan land use and zoning designations.

- **Tracy Peaker Project, Tracy, CA.** Senior Technical Specialist for the Land Use Staff Assessment of this 169-MW simple-cycle peaking facility in an unincorporated area of San Joaquin County. Provided expert witness testimony on Land Use Staff Assessment. Issues included potential impacts resulting from loss of agricultural land under Williamson Act Contract, and evaluation of cumulative development in the fast-growing surrounding area. The agriculture Condition of Certification from the Land Use Staff Assessment resulted in an Agricultural Mitigation Plan currently being implemented, and amended for continued implementation for the Tracy Combined-cycle Power Plant (see below).
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600 MW combined-cycle electrical generating facility, and associated linear facilities.
- **Tesla Power Project, Alameda County, CA.** Land Use Technical Senior and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project would consist of a natural gas-fired combined-cycle power generator, with 0.8 miles of double-circuit 230-kV transmission line connected to the Tesla PG&E substation, 24-inch 2.8-mile natural gas pipeline, and 1.7-mile water line constructed along Midway Road.
- **Sacramento Municipal Utility District Consumes Power Plant Project, Sacramento, CA.** Socioeconomics and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,000-MW combined-cycle natural gas facility. Provided expert witness testimony on Socioeconomics Staff Assessment. The project would include the construction and operation of a natural gas power plant at the Rancho Seco Nuclear Plant, 25 miles southeast of the City of Sacramento, in Sacramento County. The project would be located on a 30-acre portion of an overall 2,480-acre site owned by SMUD.
- **Inland Empire Energy Center, Riverside County, CA.** Senior Technical Specialist for the Land Use Assessment for a 670-MW natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. Provided expert witness testimony on Land Use Staff Assessment. The project would be located on approximately 46 acres near Romoland, in Riverside County. Major issues addressed in the Staff Assessment included potential loss of agricultural lands, impacts to planned school uses, and the project's potential non-compliance with local General Plan land use and zoning designations.
- **Senior Technical Lead, Land Use Resources.** The CEC requested that the Aspen Team provide Technical Seniors for the Land Use Resources area in order to help coordinate and review Land Use Resource Assessments. As a Technical Senior, Negar Vahidi was responsible for the technical review of Land Use sections of Staff Assessments for various power plants.
- **Legislative Bill Review.** As a Land Use Technical Senior for the CEC, Ms. Vahidi conducted legislative bill review related to energy facilities siting. She conducted portions of the CEC Systems Assessment & Facilities Siting Division analysis of Senate Bill 1550 which was intended to give the Superintendent of Public Instruction/CDE approval authority over siting of power plants within one mile of existing or proposed K-12 school sites by requiring the CDE (in coordination with the State Architect, and the commission) to develop appropriate siting guidelines.

- Engineering & Environmental Technical Assistance to Support the Energy Facility Planning and Licensing Program Contract (Contract # 700-02-004; 6/30/03 through 3/30/06)

- **Environmental Performance Report (EPR).** Ms. Vahidi managed the preparation of the Socioeconomics chapter of the EPR for the California Energy Commission, which eventually became part of the State of California's Integrated Energy Policy Report (IEPR). The Socioeconomics chapter addressed: the importance of reliable and affordable electricity supply power plant construction and operation impacts, including labor force, taxation, etc.; and trends in the energy section, including renewable power sources such as wind and solar. She also conducted the analysis of a new portion of the Land Resources Chapter, which addressed the siting and land use issues associated with renewable power. This new portion of the land use analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants.
- **Coastal Plant Study.** Ms. Vahidi served as the Social Sciences Task Manager for this special study being conducted as part of Aspen's contract with the California Energy Commission. The study included identification and evaluation of potential issues associated with the possible modernization, re-tooling, or expansion of California's 25 coastal power plants including: northern California power plants such as Humboldt, Potrero, Hunter's Point, Pittsburg, and Oakland; central coast power plants such as Contra Costa, Diablo Canyon Nuclear, Morro Bay, Moss Landing, Elwood, Mandalay, and Ormond Power Plants; and southern California power plants such as the Alamitos, Long Beach, Los Angeles Harbor, Haynes, Redondo Beach, Scattergood, El Segundo, Huntington Beach, Encina, Silver Gate, South Bay, and San Onofre Nuclear. As Task Manager her responsibilities included, identification of potential political, social, community, and physical land use impacts that may arise from the potential increased output of energy from plants in highly sensitive coastal communities. The intent of the study is to identify red flag items for the Energy Commission in order to streamline future licensing processes. Her task as the Social Science Task Manager also included a thorough review of applicable Local Coastal Plans, and Coastal Commission regulations associated with Coastal Development Permits and Consistency Determinations.
- **Natural Gas Market Outlook Report (NGMOR**). Ms. Vahidi assisted the CEC's Natural Gas Unit as a technical editor in their preparation and publication of the NGMOR. She managed Aspen's efforts, including format and graphics, to edit technical sections prepared by Natural Gas Unit Staff under a condensed time frame. The Preliminary NGMOR was released for public review in June 2003.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through present); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/10)
  - **Chula Vista Energy Upgrade Project, Chula Vista, CA.** Senior Technical Specialist for the Land Use Staff Assessment for MMC Energy, Inc.'s Application for Certification (AFC) to construct and operate replacements and upgrades of equipment at the Chula Vista Power Plant, located on a 3.8-acre parcel in the City of Chula Vista's Main Street Industrial Corridor and within the City's Light Industrial zoning district. Issues of concern include the impacts of the power plant on adjacent residential and open space land uses, and compliance with applicable local LORS, including recently adopted city environmental justice policies. Provided expert witness testimony on Land Use Staff Assessment.
  - **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-MW solar thermal electric power generating system. The project's technology would include heliostat mirror fields focus-

ing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County. The document was prepared in compliance with both NEPA and CEQA requirements. Issues of concern included taxation, property values, environmental justice, local labor force concerns, project-related worker housing.

- **Sentinel Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for CPV Sentinel's Application for Certification (AFC) to construct and operate an 850-MW peaking electrical generating facility near SCE's Devers Substation. The proposed project site consisted of 37 acres of land situated approximately eight miles northwest of the center of the City of Palm Springs with portions of the construction laydown area and natural gas pipeline within the Palm Springs city limits. Land use issues of concern included the project's compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 MW net. The CESF site was proposed to be located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of California Valley. The CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site encompassed approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern included the impacts of the power plant on agricultural land conversion, compatibility with adjacent land uses, and compliance with applicable local LORS. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.
- **Carlsbad Energy Center Project, Carlsbad, CA.** Senior Technical Specialist and expert witness for the Land Use and Alternatives Staff Assessments for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558-MW gross combined-cycle generating facility configured using two units with one natural gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5. Ms. Vahidi conducted the California Coast Act Consistency Determination in lieu of the California Coastal Commission (CCC), because the CCC opted to have the CEC conduct the consistency analysis with the Coastal Act.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Mirant Marsh Landing, LLC AFC for a 930-MW natural gas-fired power plant, which would be would be sited adjacent to the existing Contra Costa Power Plant in unincorporated Contra Costa County, near the City of Antioch. Issues of concern included impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200-MW simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority

(SCPPA). This project is a peaking power plant project located within the City of Anaheim. Issues of concern included impacts to local employment and housing.

- **Willow Pass Generating Station, Pittsburg, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, approximately 550-MW dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar One Project (a.k.a. Stirling Energy Systems Solar One), San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 850 MW Stirling engine project. The primary equipment for the generating facility would include the 34,000 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses, compliance with BLM's CDCA Plan, access to landlocked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.
- **Imperial Valley Solar Project (a.k.a. Stirling Energy Systems Solar Two), Imperial County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 750-MW Stirling engine project. The primary equipment for the generating facility would include the approximately 30,000 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, compliance with the BLM's CDCA plan and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Ms. Vahidi coordinated extensively with Imperial County regarding the project's inconsistencies with local LORS.
- **GWF Tracy Combined-Cycle Power Plant, San Joaquin County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment for GWF's proposal to modify the existing TPP (see description above), a nominal 169-MW simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity. Major issues of concern included conversion of Important Farmlands, and the continued implementation of the Agricultural Mitigation Plan resulting from the agriculture Condition of Certification imposed on the Tracy Peaker Project.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. Also, authored the comprehensive land use analysis of two transmission line alternatives included as an appendix to the Staff Assessment. The PHPP consists of a hybrid of natural gas–fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.

- **Lodi Energy Center, Lodi, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-MW power generating facility. Issues of concern included impacts to local workforce and employment, and taxation.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of a nominal 250-MW solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversion of 1,765 acres of Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Genesis Solar Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for two independent solar electric generating facilities with a nominal net electrical output of 125 MW each, for a total net electrical output of 250 MW. Electrical power would be produced using steam turbine generators fed from solar steam generators. The project is located approximately 25 miles west of the city of Blythe. Major issues of concern include conversion of 4,460 acres of BLM lands to an industrial use, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands.
- **Oakley Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 MW. The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

- Siting, Transmission, and Environmental Protection Peak Workload (Contract # 700-11-027; 6/30/12 through 5/31/15)
  - **Hydrogen Energy California (HECA) Power Plant, Kern County, CA.** Senior Technical Specialist and expert witness in charge of preparation of the Alternatives Staff Assessment for this integrated gasification combined cycle (IGCC) power generating facility. The project includes an integrated fertilizer production plant, and a rail spur for use in coal and pet-coke deliveries and transporting the nitrogen-based fertilizer, degassed liquid sulphur, and gasification solids. This is a joint SA/EIS, with US DOE as the lead NEPA agency.
  - **Redondo Beach Energy Project (RBEP), Los Angeles, CA.** Senior Technical Specialist and expert witness in charge of preparation of the Alternatives Staff Assessment for this proposed natural-gas fired, combined-cycle, air-cooled electrical generating facility with a net generating capacity of 496 megawatt (MW), which will replace, and be constructed on the site of the AES Redondo Beach Generating Station.
  - **Huntington Beach Energy Project (HBEP), Huntington Beach, CA.** Senior Technical Specialist and expert witness in charge of preparation of the Alternatives Staff Assessment for this proposed natural-gas fired, combined-cycle, air-cooled, 939-megawatt (MW) electrical generating facility that will replace the AES Huntington Beach Generating Station.

### *Other Agencies*

- **California Department of Boating and Waterways, Boating Facilities Division – Environmental Consulting Services, Southern California Projects.** Project Manager for completing the necessary environmental documentation to meet CEQA and NEPA requirements and provide the permit application materials to complete the permit process on behalf of the DBW for the following six southern California recreational facilities: Pyramid Lake Floating Campsites, Pyramid Lake Spanish Point Visitor Dock, Pyramid Lake Serrano Boat-In Site Improvements, Castaic Lake East Ramp Entrance Road Improvements, Castaic Lake Shade Ramada Replacement, and Silverwood Lake Boat-In Site Improvements. Due to State budgetary issues, work on these projects was halted and the contract was cancelled.

- **Environmental Review Policy Document/Fresno-to-Bakersfield High-Speed Rail Revised Draft EIR/EIS Review, Kern County, CA.** The Kern Council of Governments (COG) selected Aspen to prepare their policy guidance document for review of CEQA documents and to conduct Kern COG's review of the High-Speed Rail Revised Draft EIS/EIR. Ms. Vahidi served as Aspen's Project Manager. The project was canceled.
- **Alta East Wind Project EIR/EIS, Kern County, CA.** Ms. Vahidi served as Aspen's Project Manager for the proposed Alta East Wind Project EIR/EIS, which would generate up to 300 megawatts (MW) of electricity through wind power. The NEPA Lead Agency is BLM. The proposed project includes up to 120 wind turbine generators, a substation, transmission interconnection to the SCE Windhub Substation, access roads, and ancillary facilities. The proposed project area comprises 3,200 acres, 2,083 acres of which are on BLM land three miles northwest of the unincorporated town of Mojave in southeastern Kern County, California. The project was approved by the Kern County Board of Supervisors in January 2013. The Record of Decision was published in the Federal Register on May 24, 2013.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA.** Under contract to the Bureau of Land Management (BLM), Ms. Vahidi is serving as Aspen's Project Manager and assisting the BLM in reviewing the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.
- **Ocotillo Express Wind Energy Project EIS/EIR, Imperial County, CA.** Ms. Vahidi serves as senior technical reviewer for the EIR/EIS with expertise in CEQA, NEPA, Social Science issues, and BLM requirements. Aspen is prepared the EIS/EIR for the BLM and the County of Imperial for a 550-MW wind energy project near the town of Ocotillo. The proposed project is spread across a 14,980-acre site and consists of the installation of 193 wind turbine generators and construction of a substation.
- **Topaz Solar Project EIR, County of San Luis Obispo, CA** (Applicant: First Solar). Aspen is managing preparation of an EIR for this 500-MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the California Department of Conservation LESA Model. One major issue of concern related to agricultural resources is impacts to lands under Williamson Act contracts. She will be guiding the analysis.
- **California Valley Solar Ranch EIR** (Applicant: SunPower), **County of San Luis Obispo, CA**. Aspen is managing preparation of an EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 4,000 acres of open space to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the California Department of Conservation LESA Model. She will be guiding the analysis.

- **San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project, San Clemente, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR for the California Public Utilities Commission (CPUC). This project EIR addressed the environmental effects of SCE's proposed replacement of Steam Generator Units 2 & 3 at the SONGS Nuclear Power Plant located entirely within the boundaries of the US Marine Corps Base at Camp Pendleton. Issues of concern included potential conflicts resulting from the transport of the large units through sensitive recreation areas such as beaches, and the San Onofre State Park.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project, San Luis Obispo County, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR prepared for the CPUC. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.
- **EIR for South San Joaquin Irrigation District's (SSJID) Plan to Provide Retail Electric Service, Sphere Plan, MSR, and Annexation, San Joaquin County, CA.** This Subsequent EIR (SEIR) evaluates environmental impacts associated with the SSJID application to provide retail electric service, and evaluates changes in the project and changes with respect to the circumstances under which the project would be undertaken that have occurred since the original 2006 Final EIR was certified. LAFCo may then certify the Final SEIR and take action to adopt the Sphere Plan and MSR, adopt the proposed SOI, approve the annexation, and approve the application to provide retail electric service. Ms. Vahidi provided CEQA expertise to SSJID, and served as the Senior Technical lead for the social science sections of the SEIR, including agriculture, land use, policy analysis, and socioeconomics.
- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the LADWP, Ms. Vahidi managed the preparation of a comprehensive report (over 150 pages) documenting all of the structures and facilities located at the Valley Generating Station (VGS). The report includes exhibits that illustrate locations of each structure at the VGS, a detailed appendix of color photos of each structure, and a written description of each structure. The report also provides a general discussion of the history and background of the VGS and its development to provide a context for the structures on site.
- **Pine Tree Wind Project, Kern County, CA.** Under Aspen's on-going environmental services contract with the LADWP, Ms. Vahidi managed the preparation of a detailed comparison matrix of the changes to the EIR/EA (LADWP/BLM) project description and environmental impacts of the originally proposed project and the revised proposed project for the 120 MW Pine Tree Wind Power Project, the largest municipally owned wind farm in the U.S. Additionally, the emissions presented in the original EIR/EA were provided for comparison. Upon completion of the proposed project's emission estimates using information from the second proposed design, the results of the analysis were incorporated into the Air Quality Technical Report.

### Transmission Line and Substation Projects

- **Western Area Power Administration, Desert Southwest Region.** Under Aspen's master contract with U.S. DOE, Western Area Power Administration, Desert Southwest Region, Ms. Vahidi serves as a Task Order Manger for Western's operations and maintenance activities of its transmission line system, and associated access roads and rights-of-way (ROW). Task Orders typically include background research and surveys in support of NEPA Categorical Exclusions (CXs). The Task Orders she has managed include:

- **Electrical District #2-Saguaro #1 (ED2-SGR1) 115-kV Transmission Line Project CX, Pinal County, Arizona.** Pole replacement along two segments of the existing ED2-SGR1 115-kV transmission line ROW: 9.4 along ED2-ED4; and 17 miles along ED5-SGR1. Ms. Vahidi managed the biological resources surveys, the cultural resource surveys in support of NHPA Section 106 permitting and a CX determination for pole replacement. She also prepared the NEPA CX.
- **Parker-Blythe #1 Cross Arm Replacement Project, La Paz County, Arizona.** Western proposes to repair or replace cross arms on eleven existing structures of the Parker-Blythe #1 Transmission Line located just east of the Colorado River. Portions of the ROW are on tribal lands managed by the Bureau of Indian Affairs and lands managed by the Arizona State Land Trust. The Project includes four helicopter staging, including three one that is located on private land across the river in San Bernardino County, California. Ms. Vahidi is managing the biological resources surveys, the cultural resource surveys in support of NHPA Section 106 permitting and a CX determination.
- **Mead-Liberty Transmission Line Access Road Project, Maricopa County, Arizona.** Western proposes to conduct access road maintenance and remove vegetation along the existing Mead-Liberty 345-kV transmission line. This work is necessary to maintain the safety and reliability of the bulk electrical system. Ms. Vahidi is managing the biological resources surveys, the cultural resource surveys in support of NHPA Section 106 permitting and a CX determination, and review of the visual effects on BLM Lands through coordination with the BLM Hassayampa Field Office to determine the BLM VRM classifications.
- **Prescott-Pinnacle Peak Access Road Maintenance Project, southern Yavapai and northern Maricopa Counties, Arizona.** Western proposes to conduct access road maintenance and vegetation management along three segments of the Prescott-Pinnacle Peak 230 kV Transmission Line right-of-way (ROW). Access road maintenance, including brush clearance, would occur along 5.8 miles of existing 50-foot wide access roads. Ms. Vahidi is managing the biological resources surveys, the cultural resource surveys in support of NHPA Section 106 permitting, the Clean Water Act compliance, and review of the visual effects on BLM Lands through coordination with the BLM Hassayampa Field Office to determine the BLM VRM classifications.
- **Henderson-Mead Access Road Maintenance Project, Clark County, Nevada.** Western proposes to conduct Road improvement work along approximately 4.1 miles of the Henderson-Mead #1 230-kV Transmission Line, with a total of approximately 1.8 miles of existing roads that will require maintenance. Aspen has prepared the Biological Resources Survey Report and Draft Preliminary Jurisdictional Waters/Wetlands Delineation Report. Based on recommendations from these reports, Aspen is in the process of preparing the Pre-construction Notification and Permit Application Report to support a Clean Water Act Section 404 Nationwide permit for impacts to waters of the U.S., including wetlands, from the U.S. Army Corps of Engineers; and a Clean Water Act Section 401 water quality certification from the Arizona Department of Environmental Quality. Ms. Vahidi is managing the preparation of these items.
- **Blythe-Knob Transmission Line Maintenance Project, eastern Riverside and Imperial Counties, California**. Western proposes to conduct maintenance activities along the Blythe-Knob (BLY-KNB) 161-kV Transmission Line, which is 64.4 miles in length, between the Blythe Substation near Highway 10 in Riverside County, and the Knob Substation near Highway 8 in Imperial County. The Gold Tap Substation is located along the Blythe-Knob Transmission Line, about 43

miles north of the Knob Substation, also in Imperial County. Maintenance activities are proposed at 116 of 484 towers along this line and include the following repairs: 24 pole replacements; 73 cross arm replacements; 21 cross arm brace replacements; 2 insulator replacements; 4 loose pole ground replacements; and 1 replacement of twisted armor rod. Ms. Vahidi is managing the preparation of the Biological Resources Surveys.

- **Rattlesnake-Del Bac Access road and Vegetation Management Project, Pima County, Arizona.** Western proposes to conduct access road maintenance and vegetation management activities along its Rattlesnake to Del Bac 115-kV transmission line. The project segment is the access road between Twin Peaks Pump and Sandario Pump. Ms. Vahidi is currently managing the biological resources surveys for the Project.

- **TANC Transmission Project (TTP), several Northern California Counties.** Ms. Vahidi served as the Deputy Project Manager in charge of preparation of the EIR/EIS and guiding the CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the US Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of approximately 600 miles of new and upgraded 500-kilovolt (kV) and 230-kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area. Ms. Vahidi worked with TANC and Western to initiate the scoping process, including preparation of the NOP, preparing for scoping meetings, frameworking the EIR/EIS document, etc. She also led the preparation of the project scoping report. The project was cancelled in July 2009.

- **El Casco System Project, Riverside, CA.** Ms. Vahidi served as the Project Manager for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115-kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115-kV subtransmission line and Maraschino–El Casco 115-kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis. The project is currently under construction.

- **Sacramento Area Voltage Support Supplemental Environmental Impact Statement (SEIS), Western Area Power Administration.** Ms. Vahidi served as the task leader for several social science sections for the SEIS for a double-circuit 230-kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. New transmission lines and transmission upgrades are needed to mitigate transmission line overload, reduce the frequency of automatic generation and load curtailment during the summer peak load periods, and help maintain reliability of the interconnected system operation. Ms. Vahidi directed the preparation of the land use, aesthetics, socioeconomics, and environmental justice sections of the SEIS.

- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City. Ms. Vahidi served as the Environmental Project Manager for the initial stages of CEQA documentation prepared for the City's Utility Department.

- **Devers–Palo Verde 500-kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by US Bureau of Land Management and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Devers–Palo Verde 500-kV Transmission Line Project MMCRP, southern California.** For the Mitigation Monitoring, Reporting, and Compliance Program (MMCRP), Ms. Vahidi is serving as Senior Land Use specialist reviewing pre-construction mitigation implementation plans. Currently, she is reviewing the Construction Notification Plan prepared by SCE.
- **Antelope-Pardee 500-kV Transmission Line Project (a.k.a. TRTP Segment 1) EIR/EIS, Los Angeles County.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 26-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **Antelope Transmission Project (a.k.a. TRTP), Segments 2 & 3 EIR, Los Angeles and Kern Counties.** For this EIR being prepared by the CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, to SCE's existing Vincent Substation in Los Angeles County. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Tehachapi Renewable Transmission Project (TRTP, Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is served as the Deputy Project Manager in the early stages (i.e., during Scoping) of the project for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described above.
- **Jefferson-Martin 230 kV Transmission Line Project EIR, San Francisco Bay Area, CA.** Ms. Vahidi served as the Issue Area Coordinator for the Social Science issues of the EIR, and was responsible for preparation of the socioeconomics, recreation, and public utilities sections of the EIR prepared on

behalf of the California Public Utilities Commission (CPUC) to evaluate a proposed 27-mile transmission line in San Mateo County. Major issues of concern included EMF and visual impacts on property values, impacts on the area's vas recreational resources, and evaluation of several route alternatives.

- **Miguel-Mission 230 kV #2 Project EIR, San Diego County, CA.** Ms. Vahidi conducted the land use, recreation, socioeconomics, and environmental justice analyses for this EIR for a proposed 230-kV circuit within an existing transmission line ROW between Miguel and Mission substations in San Diego County. The proposed project included installing a new 230-kV circuit on existing towers along the 35-mile ROW, as well as relocate 69-kV and 138-kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation would be modified to accommodate the new 230-kV transmission circuit.
- **Viejo System Project, Orange County, CA.** Ms. Vahidi served as the Deputy Project Manager for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12-kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.
- **SCE Calnev Power Line and Substation Project IS/MND, Colton, CA.** Aspen was contracted to thoroughly review and analyze Southern California Edison Company's Application for a Permit to Construct and Proponent's Environmental Assessment (PEA) for the Calnev Power Line and Substation Project in the City of Colton. Ms. Vahidi served as the Deputy Project Manager for preparation of the IS/MND. Tasks include: a site visit, and evaluation of the project's compliance with the Commission's General Order 131D, Rule 17.1, and associated information submittal requirements; and preparation of a letter report identifying data deficiencies of the Application and PEA. Upon formal CPUC acceptance of the Application and PEA, Aspen prepared a CEQA Initial Study Checklist by identifying baseline data, project characteristics, and determining impact significance for each issue area. Each issue area's impact determination was supported by a paragraph or more of analysis describing the rationale for the impact identified, or for the lack of a significant impact. Upon completion of the Initial Study, the Mandatory Findings of Significance were prepared and Aspen determine that a Mitigated Negative Declaration should be prepared per CEQA Guidelines.
- **SCE Six Flags Substation and Power Line Project IS/MND, Valencia, CA.** Ms. Vahidi served as Deputy Project Manager for preparation of the IS/MND. Reviewed and provided comments on the permit application by SCE to construct a substation and power line to provide electrical service to Six Flags Amusement Park in Valencia. Subsequent to the application completeness review, she prepared the project's Initial Study Checklist and Mitigated Negative Declaration for the California Public Utilities Commission (CPUC). Identified possible deficiencies and provided recommendations.
- **Alturas Transmission Line Project EIR/EIS, several Northeastern California counties.** Ms. Vahidi conducted the analysis of potential impacts on minority populations and low-income populations in compliance with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates, and the potential impacts of the transmission line on affected communities. She also prepared the cumulative projects list and map used for analyses of cumulative impacts. She managed development of

meeting handouts; scheduling and logistics for four scoping meetings; developed and maintained project mailing list; reviewed public scoping comments and prepared the Scoping Report; coordinated four sets of informational workshops and public hearings for the Draft EIR/EIS; supervised the distribution of comments on the Draft EIR/EIS to the project team; and coordinated the distribution of the Draft and Final EIR/EIS to affected public agencies, organizations, and citizens.

### WATER INFRASTRUCTURE AND SUPPLY PROJECTS

- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Ms. Vahidi is the Project Manager for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The Palmdale Water District (District) [CEQA Lead Agency] proposes to remove approximately 1,000,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal air quality conformity requirements. Under Ms. Vahidi's direction, Aspen developed several different project alternatives for sediment removal and deposition, involving detailed hydraulics analysis and preparation of a hydraulics technical report, and coordinaton with off-site uses that can accept sediment. The most feasible of these alternatives (grade control structure) was chosen by the PWD as their proposed project to be evaluated in the EIS/EIR. In addition, the PWD is currently considering an additional alternative (use of a slurry line for sediment removal) presented by Aspen. Aspen is currently developing the project design and working on the Administrative Draft EIR/EIS and.
- **Santa Ana Valley Pipeline Repairs Project, San Bernardino and Riverside Counties, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation and permitting efforts related to the repair of 12 sites along the pipeline portion of the East Branch of the California Aqueduct. The repair of the 12 sites was crucial because, eight of the Priority 1 sites included areas of the pipeline that were under high stress and subject to rupture. Issues of concern included, potential impacts to special status species, sensitive receptors, and traffic. As the DWR's CEQA consultant, Ms. Vahidi determined that the proposed SAPL Repairs Project would qualify for a CEQA Categorical Exemption, and recommended the preparation of a Technical Memorandum to justify this exemption. The Technical Memorandum and supporting documentation, including a Biological Constraints Report, and analyses of proposed project potential construction-related air quality, noise, and traffic impacts, were prepared and presented to DWR as one packet to support both a Class 1 and Class 2 CEQA Exemption. Subsequent to preparation of this packet, DWR filed a Notice of Exemption on June 13, 2003 for their repair activities.
- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation for this project. An IS/MND was prepared to evaluate the impacts of the project, which proposed to maintain four access routes to DWR's facilities along the West Branch of the California Aqueduct downstream of the Pyramid Dam. Repair and improvement activities would occur on Osito Canyon (an intermittent tributary to Piru Creek) at Osito Adit, adjacent to Old Highway 99 at North Adit (or access tunnel), alongside an eroded section of Old Highway 99 along Piru Creek, and at Pyramid Dam Bridge. Repair activities would serve to improve conditions of access routes, as well as strengthening and reinforcing them against seismic or flood events. Project-related construction could result in potentially significant impacts to biological

resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic.

- **Pyramid Lake Repairs and Improvements Project, northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation, ADA (Americans with Disabilities Act) compliance, and permitting efforts for this project. DWR and the Department of Boating and Waterways (DBW) are planning repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. The lake is also part of Federal Energy Regulatory Commission Project 2426. Aspen worked with DWR and DBW to determine ADA compliance components at each site. CEQA documentation in support of a Class 1 and 2 Categorical Exemption was prepared to evaluate the potential impacts of the repairs and improvements, and provide CEQA clearance for filing of required permit applications, including but not necessarily limited to 404, 401, and 1602 permits. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Task Leader for land use issues and is in charge of development and analysis of project alternatives for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Taylor Yard Water Recycling Project (TYWRP), Los Angeles and Glendale, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable land-

scaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the summer of 2007.

### OIL AND GAS PROJECTS

- **Cabrillo Port Liquefied Natural Gas (LNG) Deepwater Port, Ventura County, CA.** Under contract to the City of Oxnard, Aspen was tasked to review the Draft EIS/EIR for this the proposed construction and operation of an offshore floating storage and regasification unit (FSRU) that would be moored in Federal waters offshore of Ventura County. As proposed, liquefied natural gas (LNG) from the Pacific basin would be delivered by an LNG Carrier to and offloaded onto, the FSRU; re-gasified; and delivered onshore via two new 21.1-mile (33.8-kilometer), 24-inch (0.6-meter) diameter natural gas pipelines laid on the ocean floor. These pipelines would come onshore at Ormond Beach near Oxnard to connect through proposed new onshore pipelines to the existing Southern California Gas Company intrastate pipeline system to distribute natural gas throughout the Southern California region. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socio-economics, and Environmental Justice.
- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, Environmental Justice, and Port Master Plan Amendment.
- **Post-Suspension Activities of the Nine Federal Undeveloped Units and Lease OCS-P 0409, Offshore Southern California, CA.** Aspen assisted the US Department of the Interior, Minerals Management Service (MMS) to prepare an Environmental Information Document (EID) evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf (OCS) located offshore southern California. These undeveloped leases lie between 3 and 12 miles offshore Santa Barbara, Ventura and southern San Luis Obispo Counties and are grouped into nine units, with one individual lease that is not unitized. As the Senior Aspen social scientist, Ms. Vahidi guided the analysis of community characteristics and tourism resources, recreation, visual resources, social and economic environment, and military operations.
- **Kinder Morgan Concord-Sacramento Pipeline EIR.** Ms. Vahidi prepared the environmental justice and utilities and service systems sections of an EIR evaluating a proposed 70-mile petroleum products pipeline for the California State Lands Commission. Analysis included consideration of potential impacts of pipeline accidents in Contra Costa, Solano, and Yolo Counties.
- **Shore Marine Terminal Lease Consideration Project EIR, Contra Costa County, CA.** Served as Aspen's Project Manager (under contract to Chambers Group, Inc.) in charge of conducting the preparation of the Land Use, Recreation, Air Quality, and Noise sections of this EIR evaluating Shore Terminal, LLC's application to the California State Lands Commission (CLSC) to exercise the first of two 10-year lease renewal options, with no change in current operations. Shore Terminals operations comprise the marine terminal and on-land storage facilities in an industrial part of the city of Martinez. The marine terminal is on public land leased from the CSLC with the upland storage facilities located on private land.
- **City of Hermosa Beach Urban Drillsite, Hermosa Beach, CA.** Served as project assistant for Aspen's contract to assist the City of Hermosa Beach with the review of the risk assessment for the Macpherson Oil Project.

- **Technical Support to NEPA Lawsuit, Angeles National Forest, CA.** Ms. Vahidi prepared a detailed project chronology and a list of all applicable federal, State, and local laws and regulations in support of the USDA Office of General Counsel and National Forest's response to the City of Los Angeles' 1996 lawsuit on the adequacy of the Pacific Pipeline EIS.
- **Yellowstone Pipeline EIS, Lolo National Forest, Montana.** Environmental Justice and Public Services Issue Area Specialist. Responsible for conducting the analysis of project impacts on minority and low-income populations to comply with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates to determine the potential for disproportionate project impacts on affected communities. Also responsible for conducting analysis of project impacts such as population inmigration and pipeline accidents on public services in western Montana. During the EIS scoping process, she served as the project public participation coordinator and was responsible for preparation of the project newsletter, setup of the first round of scoping meetings, and determination of project information centers.
- **Santa Fe Pacific Pipeline Project EIR, Norwalk, CA.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.
- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP), Los Angeles and Kern Counties, CA.** Ms. Vahidi served as the expert technical reviewer for the socioeconomics and environmental justice issues. As the MMCRP Agency Liaison, she was responsible for developing protocol for efficient interagency communication procedures in coordination of mitigation activities with the CPUC, USFS, Responsible Agencies, and the project proponent. She was also responsible for the development and management of the MMCRP Community Outreach and Public Access Program.
- **Pacific Pipeline Project EIR, Santa Barbara, Ventura, and Los Angeles Counties, CA.** For the California Public Utilities Commission's (CPUC) EIR on the originally proposed route of this proposed pipeline (from Santa Barbara County to Los Angeles), Ms. Vahidi developed and coordinated a public participation program to comply with CEQA's mandate for information disclosure and public involvement in decision-making. The Final EIR was certified in September 1993.
- **Pacific Pipeline Project EIS and Subsequent EIR, Los Angeles and Kern Counties, CA.** Ms. Vahidi prepared the socioeconomics and public services analysis, the Environmental Justice analysis in compliance with Presidential Executive Order 12898, as well as portions of the Land Use and Public Recreation analyses, including a comprehensive comparative analysis of project alternatives on this EIS/Subsequent EIR for the US Forest Service (Angeles National Forest) and the CPUC. Ms. Vahidi managed the subsequent GIS mapping of socioeconomic data relative to pipeline corridor alternatives and other industrial facilities. She also prepared the cumulative projects list (covering a five county area for the Proposed Project and its alternatives) used for the cumulative scenario analyses of the various issue areas in the EIS/SEIR. As the Public Participation Program Coordinator for the project, she developed, implemented, and managed the public involvement efforts for the NEPA and CEQA environmental review processes. This included: setup and logistics for 20 separate scoping meetings, informational workshops, and public hearings along the project route; preparation of all meeting handouts; preparation of project newsletters and public notices; placement of project documents on Internet; and maintenance of the a project telephone information hotline. She also reviewed over 2,000 public comments (written and verbal) received on the Draft EIS/SEIR, for subsequent distribution to the project team.

### FIBER OPTIC PROJECTS

- **MARS EIR/EIS, Monterey Bay, CA.** Ms. Vahidi served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI) [NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, several northern and southern California counties.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompassed the evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Ms. Vahidi served as the Deputy Project Manager and Study Area Manager for the Los Angeles Basin for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Issues of concern focused on potential construction impacts of linear alignments in highly urbanized rights-of-way, and resultant land use, traffic and utilities conflicts.

### OTHER PROJECTS

- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP), San Diego County, CA.** Ms. Vahidi served as a Technical Senior for social science and land use issues. The ORWMP focused on developing strategies to protect and enhance beneficial uses within this watershed and thereby comply with the San Diego Region's NPDES permit, and the SAMP intended to achieve a balance between reasonable economic development and aquatic resource preservation, enhancement, and restoration in this 145-square-mile (93,000-acre) area through the issuance of Corps and CDFG programmatic permits.
- **US Army Corps of Engineers, Los Angeles District.** Ms. Vahidi is responsible for managing Delivery Orders and conducting the analyses of the social science issue areas for 16 projects throughout southern California and Arizona as part of two environmental services contracts. Delivery orders have included:
  - **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** As the project manager guided the preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
  - **Imperial Beach Shore Protection EIS/EIR, Imperial Beach, CA.** Responsible for preparing the affected environment and environmental consequences sections for the land use, recreation, aesthetics, and socioeconomics issue areas. This EIS will analyze the impacts of shore protection measures along a 4.7-mile stretch of beach in southwest San Diego County.
  - **US Food and Drug Administration Laboratory EIS/EIR, Irvine, CA.** Prepared the land use and recreation; socioeconomics, public services, and utilities; and visual resources/aesthetics analyses

for this proposed “mega-laboratory” on the University of California Irvine Campus. Also developed the cumulative projects scenario for analyses of cumulative impacts. As the Public Participation Coordinator for the EIS/EIR review process, prepared the NOP, set up the scoping meeting and public hearing, prepared meeting handouts, and developed the project mailing list.

- **San Antonio Dam EIS, Los Angeles and San Bernardino Counties, CA.** Responsible for preparing the cultural resources, land use and recreation, and aesthetics sections for the analysis of impacts resulting from the re-operation of San Antonio Dam to increase flood protection.
- **Rio Salado Environmental Restoration EIS, Phoenix and Tempe, AZ.** Conducted the land use and recreation, and aesthetics analyses for this environmental restoration project in the Salt River and Indian Bend Wash located in the Cities of Phoenix and Tempe. Incidental to the primary objective of the Proposed Action (environmental restoration) is the creation of passive recreational opportunities associated with the restored habitat areas, such as trails for walking and biking, and areas for observing wildlife and learning about the natural history of the river.
- **Airspace Restrictions EA, Ft. Irwin, CA.** Conducted the land use, recreation, aesthetics, and socioeconomics analyses of impacts for the conversion of unrestricted airspace to restricted airspace above Ft. Irwin in the Mojave Desert.
- **National Guard Armory Building EA, Los Angeles, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the cumulative impacts and policy consistency sections.
- **Supplemental EA for the Seven Oaks Dam Woolly Star Land Exchange, San Bernardino County, CA.** Prepared the land use and recreation analyses and policy consistency section.
- **Lower Santa Ana River Operations and Maintenance EA, Orange County, CA.** Responsible for conducting the land use, recreation, aesthetics, socioeconomics, and cultural resources analyses.
- **EA for Area Lighting, Fencing, and Roadways at the International Border, San Diego, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the policy consistency section.
- **Border Patrol Checkpoint Station EA, San Clemente, CA.** Analyzed the aesthetic impacts of the installation of a concrete center divider and a Pre-inspected Automated Lane adjacent to and parallel to Interstate 5.
- **Upper Newport Bay Environmental Restoration Project, Newport Beach, CA.** Prepared physical setting, socioeconomics, land and water uses, and cultural resources sections for the Baseline Conditions Report and the Environmental Planning Report.
- **Whitewater/Thousand Palms Flood Control Project, Thousand Palms, CA.** Prepared the land use and recreation, aesthetics, and socioeconomics affected environment sections for the project’s Baseline Conditions Report that was incorporated into the project EIS.
- **San Antonio Creek Bridges Project, Vandenberg Air Force Base, CA.** Prepared the physical setting, land use, socioeconomics, utilities, and aesthetics sections for analyses of bridge alternative impacts for missile transport on Vandenberg Air Force Base.
- **Ft. Irwin Expansion Mitigation Plan, Mojave Desert, CA.** Responsible for developing Ft. Irwin's Public Access Policy based on mitigation measures from the Army’s Land Acquisition EIS for the National Training Center. Policy includes provisions for access by research and scientific uses.

- **Industrywide Survey for the South Coast Air Quality Management District.** Ms. Vahidi coordinated Aspen’s work for an Air Toxics Survey of harmful emissions by auto body and paint shops, performed in compliance with AB2588. She was responsible for development of an industrywide emission inventory for these facilities; she also performed information management, facility verifications, survey mail-outs, emissions calculations, analysis of calculated results, and preparation of the final report.

### INSTITUTIONAL PROJECTS

- **Los Angeles Unified School District (LAUSD).** Between 2002 and 2008, Ms. Vahidi served as the Program/Contract Manager for Aspen's Environmental Master Services Agreement with the LAUSD (nation's second largest school district) to prepare CEQA documents (EIRs, IS/MNDs, Categorical Exemptions) in review of the LAUSD's four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of 28 surrounding jurisdictions cover 700 square miles of land). As the Program Manager, she was responsible for client interface and providing CEQA expertise to the LAUSD on day-to-day basis, QA/QC activities for all Aspen documents submitted, budget tracking and allocation, staff assignments, and the general day-to-day management of this contract. Aspen was awarded 54 work authorizations, of which 48 were CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi managed the preparation of several CEQA documents under this contract, including:
  - **East Valley Middle School No. 2 EIR, Los Angeles, CA.** This middle school was proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
  - **Canoga Park New Elementary School IS/MND, Los Angeles, CA.** This elementary school would be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "Turn-Key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
  - **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND Los Angeles, CA.** This project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, were impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.
  - **New School Construction Program EIR.** Serves as a Study Area Manager (Valley Districts), and Issue Area Coordinator (IAC) (i.e., technical lead and reviewer) for social science issues, including land use, socioeconomics, public services, population and housing, and utilities and service systems. As the IAC, she has formulated the scope of work and methodology for analysis of issues and mitigation options. In addition to her managerial duties, Ms. Vahidi is preparing the Land Use section of the EIR, and directing the preparation of the Project's Scoping Report.
  - **Belmont Senior High School 20-Classroom Modular Building Addition Project, Los Angeles, CA.** Under Aspen's on-going master services agreement with the LAUSD, served as the project manager for CEQA documentation and permitting efforts related to the addition of modular classrooms to the existing Belmont Senior High School campus. Issues of concern included,

potential impacts to sensitive receptors adjacent to the school from construction-related air quality, noise, and traffic, and operation-related noise generated by the new classrooms. As the LAUSD's CEQA consultant, Ms. Vahidi directed the preparation of technical documentation in support of a Class 32 In-Fill CEQA Categorical Exemption. This technical documentation included analyses of potential project-related air quality, noise, and traffic impacts, which were then submitted to LAUSD as one packet. Subsequent to preparation of this packet, LAUSD filed a CEQA Notice of Exemption for the classroom addition project.

- **Narbonne High School Stadium Lighting Project MND Addendum, Los Angeles, CA.** Served as the project manager for this project proposed to add a new stadium, lighting, and associated sport facilities needed to address existing needs at Narbonne High School. Issues of concern include lighting impacts to the surrounding neighborhood, and available parking stock.

**EIP Associates........................................................................................................1998-2001**

- **Program EIR for the Divestiture of PG&E's Hydroelectric Generation Assets.** For the CPUC's EIR evaluating the Pacific Gas & Electric Company's (PG&E) proposal to divest their hydroelectric facilities in California, served as the land use technical analyst for two watershed areas, and the Task Manager for the Socioeconomics and Transportation sections of the EIR covering five watershed areas. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management. The land use section of the EIR examines the implications of the change in ownership of lands and the potential for impacts due to development or potential changes in use. Contributed significantly to the extensive GIS analysis, which was conducted to determine the development suitability and potential intensity of development that might occur on the lands if sold. These results served as one of the primary bases for analysis of impacts associated with the sale of the hydroelectric assets.
- **Section 108 Loan Guarantee EA/FONSI for the Waterfront Development Project, Huntington Beach, CA.** Served as the Manager and Principal Preparer for this EA/FONSI for the City of Huntington Beach Economic Development Department. Prepared NEPA documentation evaluating the impacts resulting from the use of HUD Section 108 Loan guarantee funds for the Waterfront Resort Expansion Project in accordance with The HUD NEPA Guidelines and Format 1 (Environmental Assessments at the Community Level). Tasks included: (1) Evaluation of activities that would be categorically excluded from NEPA based on an assessment of the NEPA Implementing Guidelines for HUD Projects; (2) Evaluation of proposed actions compliance with all applicable federal statutes, regulations, and policies; and (3) Preparation of an Environmental Assessment/Mitigated Finding of No Significant Impact (EA/FONSI) for proposed actions that are not categorically excluded. Proposed actions to be evaluated consisted mainly of infrastructure improvement projects, rehabilitation and/or development of affordable housing, provision of relocation assistance, facilitation of development and/or redevelopment plans, property acquisition, provision of open space, etc.
- **MTA Mid Cities/Westside Transit Corridor Study EIS/EIR, Los Angeles, Beverly Hills, and Santa Monica, CA.** Served as the EIS/EIR Deputy Project Manager (DPM) for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the

Los Angeles, Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to her duties as DPM for this comprehensive joint EIS/EIR, Ms. Vahidi prepared the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.

- **Wes Thompson Ranch Development Project EIR, Santa Clarita, CA.** Served as the EIR Project Manager for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources.

- **City of Santa Monica Environmental Assessments.** As one of the City's qualified CEQA consultants managed several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA, including:

  - **Berkeley Manor Condominium EIR and Technical Reports.** This one-issue EIR originally was a CEQA Categorical Exemption per direction of the City. During preparation of the Categorical Exemption documentation, it was determined that project-generated traffic would have potentially significant impacts. As a result, a traffic technical report was prepared as the background document for and EIR. In addition, shade and shadow impacts were evaluated in a technical report to ensure that shading impacts from the proposed structure on surrounding uses would not be significant. A simple Excel model was developed for calculation of shade and shadow angles.

  - **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.

  - **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.

  - **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.

  - **North Main Street Mixed-Use Development Project EIR.** This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial

Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

- **Specific Plans and Redevelopment Projects.** As the senior technical lead for land use, prepared the project description, alternatives screening and development, cumulative scenario, and land use analysis for:
  - **Cabrillo Plaza Specific Plan EIR, Santa Barbara, CA.** This project consisted of a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
  - **Culver City Redevelopment Plan and Merger EIR, Culver City, CA.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
  - **Dana Point Headlands Specific Plan EIR, Dana Point, CA.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generated population inducement.
  - **Blocks 104/105 Redevelopment Project EIR, Huntington Beach, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the City's Waterfront Redevelopment Zone. Issues of concern evaluated included traffic, land use, and impacts to on-site historic structures. Ms. Vahidi served as EIR Project Manager.

## Honors and Awards

- 2013 California Association of Environmental Professionals, Outstanding Award for Environmental Analysis for the Ocotillo Wind Energy Farm EIS/EIR
- 2006 American Planning Association, Los Angeles Section Environmental Award for the Los Angeles Unified School District New School Construction Program, Program EIR
- 2004 Association of Environmental Professionals Statewide Best EIR Award for the Jefferson-Martin 230-kV Transmission Project EIR
- 2001 Outstanding Performance Award from the State of California Energy Commission
- 1992-93 recipient of the USC Merit ("Ides of March") Scholarship from the Southern California Association of Public Administrators (SCAPA)
- University of California, Irvine, School of Social Sciences. Graduated with Highest Honors in Political Science.

## Professional Associations

- American Planning Association (APA), Los Angeles Section Executive Board Member 1999-2001
- Association of Environmental Professionals (AEP)

# DECLARATION OF
# DAVID VIDAVER

I, David Vidaver, declare as follows:

1. I am presently employed by the California Energy Commission in the Supply Analysis Office of the Energy Assessments Division as an Electric Generation System Program Specialist II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Air Quality and Alternatives for the Alamitos Energy Center based on my independent analysis of the Application for Certification, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/22/16 Signed: David Vidaver

At: Sacramento, California

**Dave Vidaver**
Supply Analysis Office
Energy Assessments Division
California Energy Commission
(916) 654-4656
david.vidaver@energy. ca.gov

**Employment (all with the California Energy Commission)**

Electric Generation System Program Specialist II, Electricity Analysis Office 2011 – present

> Senior analyst responsible for evaluation of procurement, resource adequacy and renewable generation development policies, potential impacts of generation resource development on greenhouse gas emissions.

Electric Generation System Specialist III, Electricity Analysis Office, 2005 - 2011

> Supervisor of Procurement and Resource Adequacy Unit, supervise nine staff responsible for evaluating utility procurement and resource adequacy, combined heat and power and distributed generation issues, role of aging and once-through cooled power plants, compiling and maintaining office databases.

Energy Commission Specialist II, Demand Analysis Office, 2005

> Monitoring near-term load growth at utility and regional level across the WECC; assessing load-temperature relationships for California and major western utilities and long-term changes in temperatures and load-temperature relationships.

Electric Generation System Specialist II, Electricity Analysis Office 2002 – 2005

> Supervisor of Electricity System Modeling Unit; supervised four staff responsible for studies of resource adequacy, market price forecasts, emissions and fuel use studies, assessments of market conditions, role of aging power plants; contributing and principal author of numerous reports, papers, and presentations,

Electric Generation System Specialist I, Electricity Analysis Office, 1998 – 2002

> Simulation modeling of WECC for studies of resource adequacy, market price forecasts, emissions and fuel use studies; assessments of market conditions; contributing and principal author of numerous papers, reports and presentations.

## Education

BA, Political Science, University of California, Berkeley
MS, Agricultural Economics, University of California, Davis

## Additional Information

Member of the Northwest Power and Conservation Council's Generation Resource Committee, which characterizes the cost and performance of generation technologies for studies undertaken in support of the Council's 5-year power plans; numerous reports at conferences and symposia on topics ranging from natural gas demand in California's electricity sector to implementation of resource adequacy measures in California during 2001- 2004; participant in collaborative proceedings with CPUC (resource adequacy, long-term procurement).

# DECLARATION OF SCOTT WHITE

I, Scott White, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as Senior Biologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Biological Resources for the Alamitos Energy Center Project based on my independent analysis of the Application for Certification, Supplemental Application for Certification, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 16 August 2016 Signed: Scott D White

At: Upland, California

## Academic Background

MA, Biology, Humboldt State University, 1992
BA, Biology, Humboldt State University, 1981
Secondary Teaching Credential, Life Science, 1982

## Professional Experience

Scott D. White has 28 years of experience managing and writing field survey reports, impact assessments, and mitigation plans. He is an expert with southern California plants, habitats, and natural history. He is a coauthor of *Vascular Plants of Western Riverside County*, he instructs field courses for Rancho Santa Ana Botanic Garden, and serves as a peer reviewer for US Fish and Wildlife Service Federal Register notices. He has extensive experience evaluating habitat suitability and project impacts for special-status wildlife species. At Aspen his projects have included CEQA and NEPA analyses for local districts, county, state and federal lead agencies; state and federal Endangered Species Act consultation; state and federal streambed and wetland delineations and permitting; programmatic environmental analyses and conservation plans; and state and federal consultation for Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and state Fish and Game Code nesting bird compliance. Other projects have included land management planning; focused surveys for rare plants and wildlife; revegetation planning and monitoring; and long-term land use planning on public and private lands. Mr. White provides expert witness testimony and supports client legal staff in case review and preparation of briefs. He has extensive experience with federal, state and local agency coordination, and he has published a number of studies in professional literature.

**Aspen Environmental Group.......................................................................2009-present**

**California Energy Commission Power Plant Siting Projects.** Prepares biological resources CEQA analyses for CEC's Staff Assessments. In addition to CEQA requirements, each project analysis addresses state-jurisdictional streambed impacts and state-listed threatened or endangered species take, to support CEC's permitting authority under the Warren-Alquist Act. Each project includes coordination with CEC project management, technical specialists, and legal staff; data requests; coordination among project applicants, intervenors, and resource agencies including CDFW, BLM, and USFWS in public workshops; assessing project impacts and preparing conditions of certification; reviewing CEC proposed decisions. Several project assignments also include expert witness testimony in Evidentiary Hearings.

- **Huntington Beach Energy Project (2013-2014).** Staff Assessment, Workshops, and Evidentiary Hearing (pending revised application). The project would replace water-cooled generating facilities with new air-cooled generators. Adjacent wetlands habitat supporting listed birds are addressed in the Staff Assessment.
- **Alamitos Energy Center (2013-ongoing).** Staff Assessment. The project would replace existing water-cooled generating facilities with new air-cooled generators. Biological resources include federally listed Pacific green sea turtles occupying adjacent aquatic habitat, and nearby wetlands habitat supporting listed birds.
- **Rio Mesa Solar Electric Generating Facility (2011-2013).** Preliminary Staff Assessment, workshops, extensive review of technology hazard to birds (application withdrawn). The project would have developed approximately 3,960 acres in eastern Riverside County, using "power tower" solar thermal generators. Biological resources issues included listed wildlife (desert tortoise, Gila woodpecker); technology hazard for migratory birds; and desert dry wash woodland. The applicant suspended the project in January 2013.

- **Calico Solar Project (2009-2011).** Final Staff Assessment, extensive series of workshops and Evidentiary Hearings, including extensive revisions to FSA following project redesign. The project would develop Sterling "SunCatcher" generators on approximately 4,200 acres in the central Mojave Desert, San Bernardino County. Important biological resources issues included desert tortoise, rare plant species, and wildlife habitat connectivity. Following project authorization, Mr. White prepared responses for CEC legal staff response to California Supreme Court filings by Sierra Club and California Unions for Reliable Energy.
- **Rice Solar Energy Project (2009-2010).** Staff Assessment/DEIS with Western Area Power Administration as the NEPA lead agency, Final Staff Assessment, workshops. The project would develop a "power tower" solar thermal generator on approximately 1,500 acres in the Colorado Desert, in eastern Riverside County. Important biological resources issues included the threatened desert tortoise and migratory birds.

**California Public Utilities Commission**

- **West of Devers Upgrade Project (2013-ongoing).** Lead biologist for the joint CEQA/NEPA project analysis, with CPUC and BLM as lead agencies. Responsible for review and verification of SCE's biological field surveys and reports, co-authorship of EIR/EIS Biological Resources analysis, and extensive coordination among SCE, CDFW, USFWS, and BLM on Nesting Bird Management Plan and all biological resources issues. The transmission line route crosses two Multiple Species Habitat Conservation Plan areas (Coachella Valley MSHCP and Western Riverside MSHCP), designated California gnatcatcher critical habitat, and occupied desert tortoise habitat.
- **Devers – Palo Verde II Transmission Project (2010-2014).** Evaluated mitigation plans, activities, and reports for EIR/EIS compliance, and state and federal ESA incidental take permits. Coordinated extensively with CPUC, SCE, CDFW, BLM, and USFWS staff to ensure that implementation met mitigation measures adopted by the lead agencies.
- **Colorado River Substation (2011-2013).** Prepared biological impacts analysis and mitigation for the CPUC's Supplemental EIR evaluating substation redesign and relocation; coordinated with CPUC, SCE, CDFW, BLM, and USFWS regarding substation siting to reduce impacts to windblown sand habitat; and evaluated mitigation plans, activities, and reports for EIR/EIS compliance.
- **Desert Sunlight Solar Farm / Red Bluff Substation EIS (2011).** Extensively revised the Administrative FEIS Biological Resources analysis immediately before its publication, in coordination with CPUC project management and legal staff, to address CEQA adequacy under CEQA Guidelines §15221.
- **Tehachapi Renewable Transmission Project EIR/EIS (2008-ongoing).** Managed field crews and surveyed the southern right-of-way and alternate routes for rare plants to support the EIR/EIS. Evaluated mitigation plans, activities, and reports for EIR/EIS compliance, and state and federal ESA incidental take permits. Supporting ongoing construction compliance monitoring. Coordination among CPUC, SCE, CDFW, USFWS, and US Forest Service.

**Western Area Power Administration Desert Southwest Region.** Managed or prepared biological resources analysis, provided QA/QC review, and prepared ESA Section 7 Biological Assessments for numerous projects in California, Arizona, and Nevada, including the following California projects:

- Black Point Communication Facility
- Black Point Reroute
- Blythe-Knob Maintenance Project
- Gila – North Gila Rebuild and Upgrade Project
- Parker – Blythe Transmission Line Maintenance Project Parker – Davis Transmission System Routine Maintenance Project
- Parker – Headgate Rock Transmission Line Reroute Project

**San Bernardino County Department of Public Works.** Under Aspen's contract with the Department, Mr. White manages biological resources technical staff and is responsible for QA/QC review for CEQA documentation and regulatory permitting, including state and federal jurisdictional waters and Endangered Species Acts:

- Institution Road Reconstruction and Maintenance Project (2015-ongoing)
- Donnell Basin (2013).
- Rimforest Storm Drain Project (2012-ongoing).
- Mission Zanja Channel (2013-ongoing).
- Rialto Channel (2015).
- Dola and Lanzit Historic National Trails Highway / Route 66 bridge replacement (2014-2016).

**Other Projects**

- **Evaluation of Oil and Gas Well Stimulation Treatments in California, California Department of Conservation (2013 – 2015).** Managed and coauthored biological resources analysis for an EIR evaluating oil and gas well stimulation treatments throughout California, as required by Senate Bill 4, as signed into law in 2013. The EIR is a programmatic evaluation of well stimulation treatments geographically according to the Department of Oil, Gas and Geothermal Resources (DOGGR) six administrative Districts.

- **Hollister Oil and Gas Facilities Leasing and Development (2015).** Managed and coauthored biological resources analysis for BLM's EIS evaluating oil and gas leasing and development on lands managed by the Hollister Field Office. The EIS is a programmatic evaluation of anticipated oil and gas activities that may be located in existing fields or new leases.

- **Desert Harvest Solar Project EIS (2010 – 2014).** Prepared Biological Resources sections and supporting documents for BLM's EIS analyzing a 1,200 acre photovoltaic project. Managed staff and subcontractors to conduct field surveys and compile data; managed consultation and permitting for state and federal Endangered Species Acts, CDFW Lake and Streambed Alteration Agreement, and federal Bald and Golden Eagle Protection Act, in coordination with BLM, CDFW, and USFWS.

- **Coachella Flats Wind Project Repower (2014).** Managed technical staff and subconsultants to prepare a Biological Resources Technical Report, to support joint NEPA and CEQA analysis of the proposed repower project, located on BLM and private lands in the western Coachella Valley, Riverside County. Important issues include listed threatened and endangered species (Coachella Valley fringe-toed lizard, Coachella Valley milk-vetch), and compliance with the Coachella Valley Multiple Species Habitat Conservation Plan.

- **Mesa Wind Project Repower (2013 – ongoing).** Managing technical staff and subconsultants to prepare a Biological Resources Technical Report, Jurisdictional Delineation, and to support NEPA analysis of the proposed repower project, located on BLM lands in the southeastern San Bernardino Mountains, Riverside County. Important issues include listed threatened and endangered species (desert tortoise), streambed impacts, bird mortality, and compliance with the Coachella Valley Multiple Species Habitat Conservation Plan.

- **California Valley Solar Ranch (2011 – 2014).** Coordinated with San Luis Obispo County Planning staff and applicant to review and approve field survey reports and mitigation plans to ensure conformance with the project's Conditions of Approval. Major issues of concern included planning and mitigation for listed threatened or endangered species (giant kangaroo rat, San Joaquin kit fox), other special-status species, and timely completion of approvals to meet the developer's construction schedule. Ongoing review and analysis of bird mortality data.

- **Alta–Oak Creek Mojave Project EIR, Kern County, Biological Resources Data Review, Vegetation Mapping, Rare Plant Surveys and Impacts Analysis (2008 – 2009).** Managed field work and authored reports to review and update the applicant's botanical surveys and vegetation maps and descriptions; analyzed project impacts to rare plants including the endangered Bakersfield cactus.
- **Newhall Ranch CEQA Consultation Services, California Department of Fish and Wildlife (CDFW), Biological Resources Analysis and CDFW CEQA review (2006 – 2010).** Extensive review, revision, and analyses of multiple biological resources documents in coordination with the applicant and CDFW for the Newhall Ranch Specific Plan. Documents included EIR/EIS with CDFW and the USACE as lead agencies, resource management plans, and state and federal wetlands and streambed permitting and incidental take authorization for listed threatened and endangered species, including San Fernando Valley spineflower.

## Scott White Biological Consulting and other firms ................................................ 1989-2009

**Consulting Biologist: Scott White Biological Consulting; White & Leatherman BioServices 1998-2009; Psomas and Associates, 1995-1998; Tierra Madre Consultants 1989-1995.** Mr. White managed and performed field surveys, prepared survey reports and impact analyses, and coordinated among clients and resource agencies. Specialties include rare plant surveys, wetlands delineations, vegetation mapping and description, wildlife habitat evaluation, revegetation planning, and mitigation design.

- **Fort Irwin Gas Pipeline (2004 – 2005):** Managed and conducted field surveys, prepared Biological Resources Technical Report and impacts analysis for rare, threatened, and endangered plants and animals (e.g., desert tortoise, Lane Mountain milk vetch) on proposed pipeline alignments.
- **Carbonate Habitat Management Strategy (1999 – 2004):** Consulting support, document review and revision for limestone quarry operators in preparation of a management plan balancing land use for mining and listed limestone-endemic plants in the San Bernardino Mountains. Plan participants included US Forest Service, USFWS, CDFW, San Bernardino County, claimholders, and industry. The final Plan lead to a Section 7 Biological Opinion for future and ongoing mining operations.
- **West Coast Aggregate Desert Tortoise Surveys, Biological Technical Reports, Revegetation Plans (1999 – 2007):** Managed and conducted field surveys, data collection, and analysis; prepared technical reports and plans for a series of mining plan revisions, per CEQA and SMARA. Scott White Biological Consulting was contracted to West Coast Aggregate to prepare baseline data in support of local, state and federal CEQA, NEPA, and SMARA requirements. The project site is in the Coachella Valley, Riverside County.
- **Lucerne Valley–Big Bear Lake Fiber Optic Cable (2005):** Coordinated with applicant (Verizon) and San Bernardino National Forest (SBNF); surveyed route from desert floor to Big Bear Lake area and analyzed impacts to threatened, and endangered plants; wrote SBNF Biological Assessment; managed construction monitoring; San Bernardino County.
- **SCE Sierra Nevada Hydroelectric Projects (1997).** Collected and analyzed data on riparian plant communities, species occurrence, channel hydrology, and soils for SCE/ Inyo National Forest monitoring projects on Rush Creek and Lee Vining Creek.

## Botanist: San Bernardino National Forest ............................................................ 1987-1989

Team leader for data collection; analyzed data for chaparral ecosystem classification; mapped vegetation and recommended prescribed burn activities and other habitat management projects; conducted vegetation sampling of California spotted owl territories; prepared Environmental Assessments in compliance with NEPA.

# DECLARATION OF
Keith Winstead

I, Keith Winstead, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting and Compliance Office of the Energy Facilities Siting Division as a Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the Executive Summary for Alamitos Energy Center Project based on staff's and my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and staff's and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8-18-16 Signed: Keith Winstead

At: Sacramento, California

# Keith Winstead

1516 Ninth Street
Sacramento, CA  95814
916-654-5191


## WORK HISTORY:

**CALIFORNIA ENERGY COMMISSION, Sacramento**
Siting, Transmission & Environmental Protection
Project Manager (2012 – present) --

**CALIFORNIA DEPARTMENT OF TRANSPORTATION, Sacramento**
Chief of Plant Operations (2007 - 2012) --

**CALIFORNIA DEPARTMENT OF GENERAL SERVICES, Sacramento**
Chief Engineer II (2005 - 2007) --

**CALIFORNIA DEPARTMENT OF GENERAL SERVICES, Sacramento**
Engineer (1994 - 2005) --

**EDUCATION**

- Sacramento City College Mechanical Electrical Technology
  1994-1997
- Diploma (BOMI) "Real Property Administrator (RPA), Facilities Management Administrator (FMA)
  2004-2011
- UC Davis  "Introduction to Project Management" PMBOK
  2008
- Cert., EPA, A.H.E.R.A., "Asbestos Building Inspector, Management Planner, Project Monitor/Sup.
  2007-2011
- Certificate "Energy Management System Programmer, Operator, Designer"
  2003
- American River College Sacramento , "Business Management"
  1981
- Allerton/Honeywell Energy Management Controls
  2003
- Total Quality Management
  1993

# DECLARATION OF
# LISA WORRALL

I, Lisa Worrall, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission, and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Traffic and Transportation for the Alamitos Energy Center based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 25, 2016 Signed: Lisa Worrall

At: Sacramento, California

# LISA WORRALL

*Summary*

- Preparation of environmental documents in compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), California Energy Commission siting regulations, and federal, state and local laws, ordinances, regulations and standards (LORS).
- Projects include thermal power plants, private residential and commercial development, county and public works, and state transportation.

*Employment Experience*

**California Energy Commission**
***Planner II*** — Sacramento, California
January 2010 to Present

- Prepare an independent CEQA analysis of the environmental impacts from thermal power plants related to land use and socioeconomics.
- Evaluate projects in accordance with CEQA, the California Energy Commission siting regulations, and federal, state and local LORS.
- Review information provided by the project applicant and other resources to assess the environmental effects of energy facility proposals

**Sacramento County Department of Environmental Review & Assessment**
***Associate Environmental Analyst*** — Sacramento, California
April, 2006 – May, 2009

- Prepared a variety of environmental documents in compliance with CEQA, NEPA and local, state and federal LORS.
- Conducted project site assessments, reviewed engineering plans, and researched and interpreted scientific data for project impact analysis.
- Managed multiple public works and private development projects with a variety of environmental concerns and overlapping deadlines.
- Maintained effective relationships with other Sacramento County departments, agencies, and service providers to ensure comments and recommended conditions of project approval were obtained and any associated environmental impacts assessed.

**Analytical Environmental Services** — Sacramento, California
***Associate*** — April, 2004 – October, 2005

- Interpreted highly technical traffic impact studies, utilizing the information to develop a traffic impact assessment chapter for use in a variety of environmental documents complying with CEQA, NEPA, and county and city transportation policies and codes.
- Managed the preparation of traffic studies, including developing the scope of study, securing the contract, and reviewing the work product.
- Managed multiple private development projects simultaneously under tight deadlines. Clients included Native American tribes and cities.
- Coordinated with state, county and city officials in the development of traffic study methodology, parameters and assumptions for proposed projects.

- Worked closely with transportation engineers to understand the complexities of each project's specific traffic impacts.

**California Department of Transportation (Caltrans)** Fresno, California
***Associate Environmental Planner*** March, 2003 – March, 2004
***Environmental Planner*** August, 2000 – March, 2003

- Prepared all levels of environmental documentation for transportation projects in compliance with CEQA and NEPA.
- Coordinated and interpreted environmental technical studies for incorporation into the environmental document and for explanation to other team members, agencies, and the public.
- Managed and represented environmental concerns with other functional units.
- Led and participated in public outreach events.
- Coordinated project development with other Caltrans departments, agencies and the public.

*Education*

**California State University, Northridge** May, 2000
Bachelor of Arts in Geography

# Preparation Team

# ALAMITOS ENERGY CENTER (13-AFC-01)
# FINAL STAFF ASSESSMENT – PART 1

## PREPARATION TEAM

Executive Summary ....................Keith Winstead

Introduction ....................Keith Winstead

Project Description ....................Keith Winstead

**Environmental Assessment**

~~Air Quality....................~~

Biological Resources....................Jennifer Lancaster, Wenjun Qian, P.E., and Scott D. White

Cultural Resources....................Matthew Braun, Melissa Mourkas, and Gabriel Roark

Hazardous Materials Management .................... Brett Fooks, P.E. and Geoff Lesh, P.E.

Land Use.................... Tatiana Inouye and Negar Vahidi

Noise and Vibration.................... Joseph Hughes and Shahab Khoshmashrab

~~Public Health ....................~~

Socioeconomics ....................Ellen LeFevre

Soil and Water Resources.................... Abdel-Karim Abulaban, P.E.

Traffic and Transportation .................... Nancy Fletcher, Wenjun Qian, P.E., and Lisa Worrall

Transmission Line Safety and Nuisance .................... Huei-An (Ann) Chu, Ph.D.

Visual Resources .................... John Hope

Waste Management .................... Ellen Townsend-Hough

Worker Safety and Fire Protection .................... Brett Fooks, P.E. and Geoff Lesh, P.E.

**Engineering Assessment**

Facility Design.................... Shahab Khoshmashrab

Geology and Paleontology .................... Garry Maurath, Ph.D., P.G., CHg

Power Plant Efficiency....................Shahab Khoshmashrab and Jacquelyn Record

Power Plant Reliability....................Shahab Khoshmashrab and Jacquelyn Record

Transmission System Engineering....................Ajoy Guha, P.E. and Mark Hesters

**Alternatives**....................Steven Kerr, Matthew Layton, P.E., and David Vidaver

**Compliance Conditions** ....................Joseph Douglas

**Staff Counsel** ....................Jared Babula

**Project Assistant**....................Alicia Campos