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PUENTE POWER PLANT

Preliminary Staff Assessmen Part 2

CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown, Jr, Governor

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PUENTE POWER PLANT PROJECT (15-AFC-01)
PRELIMINARY STAFF ASSESSMENT
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FACILITY DESIGN

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The California Energy Commission 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 Puente Power Project (P3). 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 both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- 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;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; 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 (LORS)

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 Oxnard building and engineering regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

The following **Facility Design** conditions of certification require the project to comply with the California Building Standards Code and city of Oxnard 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

P3 would be built on the existing site of the Mandalay Generating Station, an existing power plant in Oxnard. 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.

P3 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 (PPP 2015a, AFC §§ 2.7, 2.8, 2.9, 2.12.2.9, Appendices A2-A5). Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that P3 is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under 2013 CBC, Division II, Section 104, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself 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 2013 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, Energy Commission 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 for 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.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, 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 P3 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.

Energy Commission 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 review); and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall 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 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 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.

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 2013 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 2013 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 2013 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 2013 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 2013 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 2013 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 2013 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 2013 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 2013 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 Oxnard codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: 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.

Verification: 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 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

PPP 2015a – NRG Energy Center Oxnard LLC/John Chillemi (TN 204219-1 – 204220-14). Application for Certification, dated April 13, 2015. Submitted to Robert Oglesby/CEC/Docket Unit on April 16, 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) 2013

Steel Structures Painting Council (SSPC) − Standards and Specifications

American Society of Civil Engineers (ASCE) – Standards and Recommended Practices

International Building Code (IBC) 2012 Edition with Los Angeles County Amendments

United States Geological Survey (USGS)

2. Structural Engineering LORS:

California Building Code, 2013 Edition with Los Angeles County Amendments

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:

California Building Standards Code, 2013 Edition with Los Angeles County Amendments

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. Oxnard LORS:

City of Oxnard building and engineering regulations and ordinances

GEOLOGY AND PALEONTOLOGY

Paul Marshall, CEG

SUMMARY OF CONCLUSIONS

The proposed Puente Power Project (P3) site is located in a geologically active area along the Ventura-Oxnard coast of Southern California.

The site is not underlain by an active fault or subject to surface fault rupture. The closest known active fault is a segment of the Ventura fault which is located approximately 9 miles north of the proposed project site. Numerous other potentially active faults are located in both the onshore and offshore vicinity of the project site.

The project site is bounded by, but not currently located in, a tsunami inundation zone. Staff concludes the potential for major flooding and structural impact from tsunami is insignificant. However, the best estimates of sea level rise near the end of the life of the facility coupled with the maximum estimated tsunami wave height suggest there may be less than one vertical foot of separation between the minimum site elevation and mapped inundation zone. Staff is concerned that there could be limited flooding that would present a health and safety threat to employees and visitors. Staff recommends the applicant implement a Tsunami Hazard Mitigation Plan to protect employees and visitors.

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 P3 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, in accordance with proposed Condition of Certification **GEO-2** and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, would require incorporation of standard engineering design requirements for mitigation of strong seismic shaking, liquefaction and potential excessive settlement due to dynamic compaction.

Petroleum is the only economic geologic resource in the project vicinity. Other than petroleum, there are no known viable mineralogic or geologic resources at the proposed P3 site.

The near surface of the project site is flat lying, covered with low lying, vegetation. Surface soils consist of active younger Holocene fine to medium grain windblown (dune) sand. These near surface soils are not likely to contain fossils. At depth, these young deposits are underlain by older native soils that have low potential to contain significant fossils. However, since the results of a field survey were inconclusive, and fossils in

similar deposits have been found in other areas of southern coastal California, staff recommends monitoring of construction activities in accordance with proposed Conditions of Certification **PAL-1** through **PAL-8**.

Based on this information, California Energy Commission (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 P3 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

In this section, Energy Commission staff (staff) discusses the potential impacts of geologic hazards on the proposed P3 facility as well as the P3's potential impact on geologic, mineralogic, and paleontologic resources. Staff's purpose 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 that there would be no significant adverse impacts to geological and paleontological resources during the project construction operation, closure and demolition, 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 that, if implemented, would reduce any project impacts to geologic hazards and geologic, mineralogic, and paleontologic resources to less than significant levels.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the Application for Certification (AFC) (PPP 2015a). The following 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	
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, 2013).
California Coastal Act (Public Resources Code, Division 20)	The policies of the Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the Commission and by local governments. Policies address issues associated within the designated Coastal Zone, such as shoreline public access and recreation, terrestrial and marine habitat protection, landform alteration, industrial uses, and water quality.
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), sections 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 sections 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.
California Building Code	Requires buildings and other construction to be designed to protect the public from geological hazards.
Local	
County of Ventura General Plan	Outlines objectives and policies related to geologic hazards. Requires development to be designed to avoid impacts to significant paleontological resources.
City of Oxnard General Plan	Outlines City objectives and policies related to geology and seismicity. Requires suspension of earthwork until paleontological significance is determined following discovery.
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 2008-009	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

The project site is located on the coast near the city of Oxnard approximately 50 miles west of Los Angeles (**Geology and Paleontology - Figure 1**). P3 would occupy the northern 3 acres of the 36-acre Mandalay Generating Station (MGS) power plant site. Topography of the site is generally flat, resulting from site grading for the MGS facility in the 1950s.

GEOLOGY AND PALEONTOLOGY - FIGURE 1
Puente Power Project (P3) - Regional Vicinity Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: NRG 2015a

Land use in the site vicinity is largely coastal industrial and agricultural, with oil production facilities located to the north, south, and east, and row crops to the east and northeast. The site is bordered to the west by sand dunes and the Pacific Ocean and McGrath Lake State Park to the north. **(Geology and Paleontology - Figure 2)**.

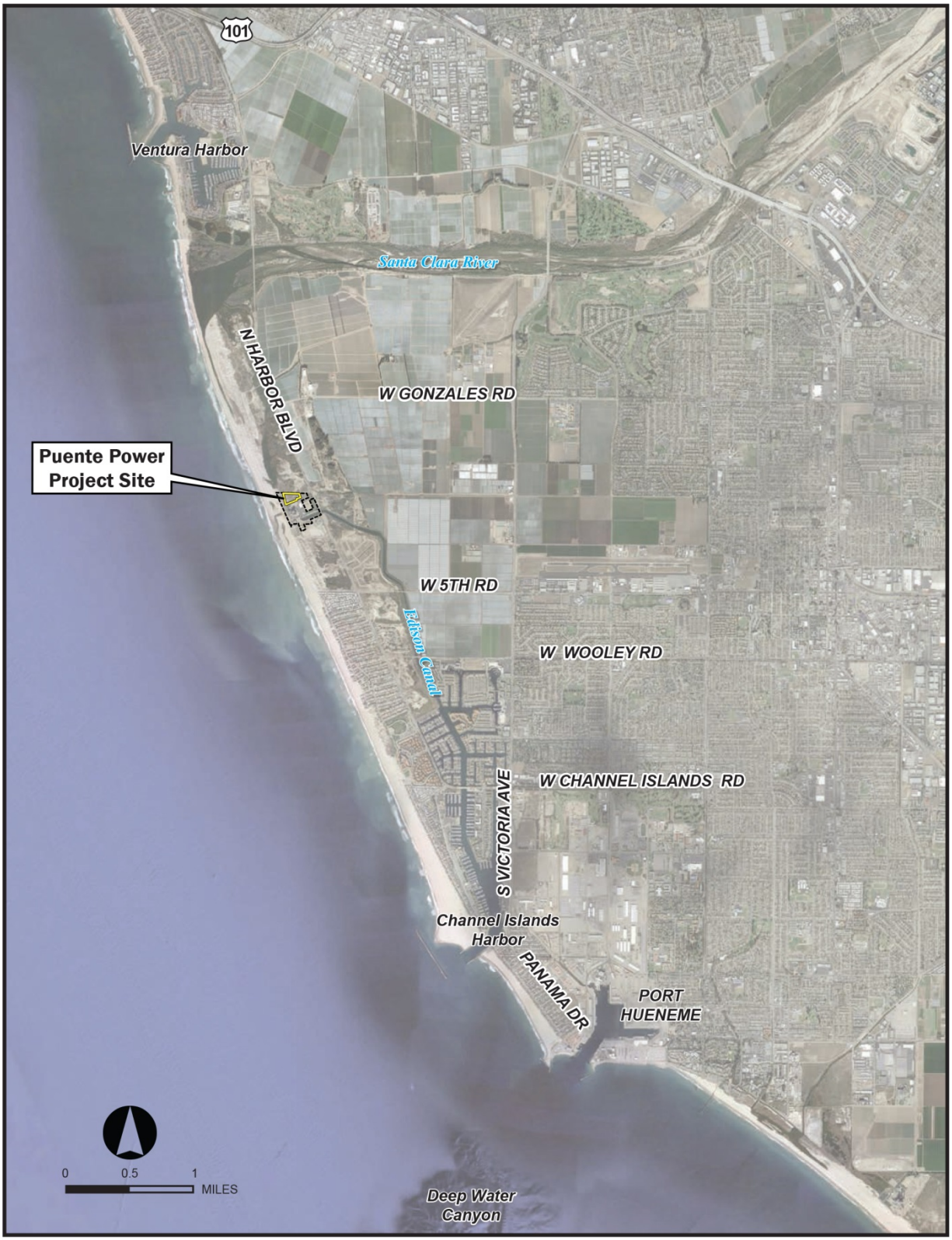
REGIONAL SETTING

Formation of the western coast of North America began in late Triassic during the inception of the Mid-Atlantic rise (DeCourten 2008). Lateral crustal spreading from the mid-Atlantic rise separated the European and African continents from the North American and South American continents. This motion caused the continental North American crustal plate to migrate westward. At this time, the east Pacific rise was also active forming new oceanic crust that was spreading west forming the Pacific plate and east forming the Farallon plate. 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 Miocoene (Yeats 2010). 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 (Yeats 2010). This deformation caused the Channel Islands-San Nicolas Island crustal block and the Transverse Ranges crustal block to move west from the Peninsular Ranges.

In early Miocene, plate motion slowly shifted from subduction along the western margin of the North American Continent to transform faulting. As the area was subjected to simple right-lateral shear in late Miocene and early Pliocene time, the pre-existing faults in the Mesozoic basement rocks (formed during the earlier subduction period), propagated upward into the Cenozoic marine sediments as transform fault systems. The orientation of these “new” transform fault systems was controlled by the orientation of the older faults. Localization of shear within these faults caused the older, diversely oriented normal and reverse faults to become inactive as shear stresses reoccupied these pre-existing structures producing the shear (strike–slip) system of today (Yeats 2010). During this time, the Transverse Ranges block became impinged at its northern end by a bend in the plate boundary, while its southern end could move freely. This condition caused the block to rotate clockwise (Bartolomeo 2010).

While the Transverse Ranges block was rotating, the Pacific-North American transform margin was well established on the pacific side of the Peninsular Ranges, creating a transtensional plate margin. The rotation continued until approximately 5 Mega-annum (Ma) when the Pacific Plate captured the Peninsular Ranges and the plate boundary shifted east to the San Andreas fault system (Bartolomeo 2010). Since the Peninsular Ranges were already moving with Pacific plate motion, it did not rotate but was transported northwest, causing spreading in the Gulf of California, and ramming its northern end into southern California. The pressure of the Peninsular Ranges pushing northwest created the two transpressional bends in the San Andreas and changed the tectonic regime in the Continental Borderlands from transtensional to transpressional. In

GEOLOGY AND PALEONTOLOGY - FIGURE 2
Puente Power Project (P3) - Local Setting



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: NRG 2015b

this new configuration, the Transverse Ranges block was trapped at its eastern end against the larger of the two transpressional bends in the San Andreas Fault and was being extruded westward around it and shortened north-south. To accommodate the westward-extension, major left-lateral faults, including the Santa Cruz Island Fault, have formed along the southern edge of the block. North -south shortening is accommodated through extensive compressional folding and reverse faulting.

The project site is located within the western portion of the Transverse Ranges geomorphic province (**Geology and Paleontology - Figure 3**). The western Transverse Ranges constitute an east to west trending structural province that cross cuts the northwest-southeast structural grain of southern California. The province is bounded on the north and south by east to west trending left lateral strike slip faults. The northwest trending faults in the Peninsular Ranges terminate against these east-to-west trending left slip faults. The Transverse Ranges have been subjected to extreme compression forces demonstrated by the pervasive presence of large scale folding and reverse faulting.

The deepest structural depression (syncline) of the Transverse Ranges is the Ventura basin, which extends from the San Gabriel fault westward down the Santa Clara Valley and across the Santa Barbara Channel to the continental slope. The Santa Clara River follows this east to west structural depression collecting runoff from the highlands and discharging to the ocean approximately 1 mile north of the site. Lateral migration of the Santa Clara River was largely responsible for the development of the coastal Oxnard Plain. The project site is located on the coastal edge of the gently sloping Oxnard Plain.

The Oxnard Plain is a large gently sloping alluvial coastal plain in southwest Ventura County that was formed by lateral migration of both Calleguas Creek and the Santa Clara River. The Oxnard Plain is bounded by the Santa Monica Mountains, the Santa Susana Mountains, and Oak Ridge to the east, the Topatopa Mountains to the north, the Santa Clara River Valley to the northeast and the Pacific Ocean to the south and west.

PROJECT SITE DESCRIPTION

The project site is bordered by the Pacific Ocean to the west, McGrath Lake and wetlands to the north, North Harbor Boulevard to the east and sparse industrial development to the south.The site is entirely within the existing MGS property and the site's surface is flat lying as a result of initial MGS grading that took place in the1950s. The western edge of the property is defined by a tall sand dune complex. As part of the MGS development an earthen berm was constructed along the northern boundary for flood protection (Ninyo 2013). As presented in the AFC, the site occupies an elevation of approximately 14 feet North American Vertical Datum of 1988 (NAVD88) (PPP 2015a). Groundwater occurs beneath the site at a depth of approximately 9 feet below ground surface (Ninyo 2013).

The scope of the P3 project as discussed in the AFC is to install new equipment to provide 262 MW of electricity using one natural gas-fired combustion turbine generator (PPP 2015aPPP 2015a). The AFC was amended in a supplement to also include the

GEOLOGY AND PALEONTOLOGY - FIGURE 3

Puente Power Project (P3) - Geomorphic Provinces

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Department of Conservation, California Geological Survey, 2002.

demolition of MGS Units 1 and 2 (PPP 2015y). A detailed explanation of the proposed development is provided in the Project Description section of this document.

In general, the proposed project elements will be built at or near the existing site grade and earthwork associated with construction would include preparation of structure and equipment pads, pavement and hardscape areas, and trench excavations for pipelines and utility lines at depths less than 10 feet below ground surface (Ninyo 2013).

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 various documents and the paleontological resources section of the AFC (PPP 2015a). To develop the paleontological resources section, the applicant reviewed published and available unpublished geological and paleontological literature to develop a baseline paleontological resource inventory of the project area and surrounding lands, and to assess the potential paleontological productivity of the stratigraphic units that may be encountered during construction-related excavations. Sources reviewed included geological maps, satellite photography, technical and scientific reports, and available electronic databases. Subsurface investigations have recently been performed in the project area (Ninyo 2013), and were included in the applicant's analysis.

A paleontological resources record review was conducted by the Los Angeles County Museum of Natural History (LACM) which reviewed their vertebrate paleontology

archives (PPP 2015a).

If paleontological resources are present, or likely to be present, conditions of certification which outline required procedures to mitigate adverse effects to paleontological resources are proposed to be included as part of this project's approval.

The California Building Standards Code (CBSC) and CBC 2013 provide geotechnical and geological investigation and design guidelines, which 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 adopt a compliance monitoring scheme ensuring ongoing compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Geologic and Mineralogic Resources

The project is located above the West Montalvo Oil Field (**Geology and Paleontology - Figure 4)**. The West Montalvo Oil Field contains 29 active wells and 24 inactive or plugged wells. Based on existing information, no active or abandoned oil wells occur on the site (DOGGR 2012).

The project location is designated as Mineral Resources Zone-1, an area of no significant aggregate deposits (CDMG 1993). Many sand and gravel sites exist north of the site along the Santa Clara River. However, no mineral resources are known to occur at the present site and there are no significant sand or gravel mines in the immediate vicinity.

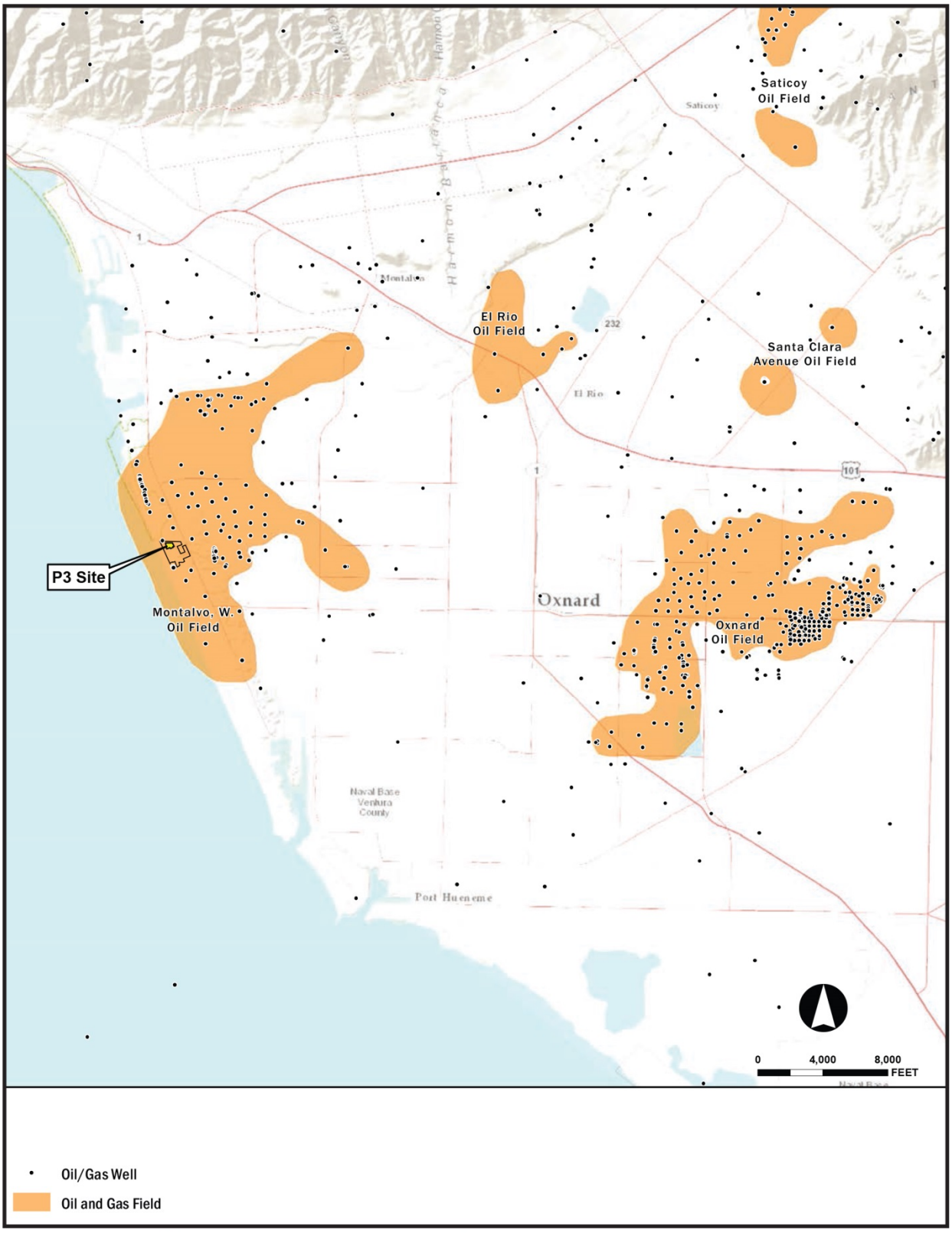
At the P3 site, the geologic units at the surface and in the subsurface are predominantly sand and silty sand sediments with some interbedded sandy silt and clay (**Geology and Paleontology - Figure 5)**. These geologic units are not unique in terms of recreational, commercial, or scientific value.

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.

GEOLOGY AND PALEONTOLOGY - FIGURE 4

Puente Power Project (P3) - Ventura Basin Oil Fields

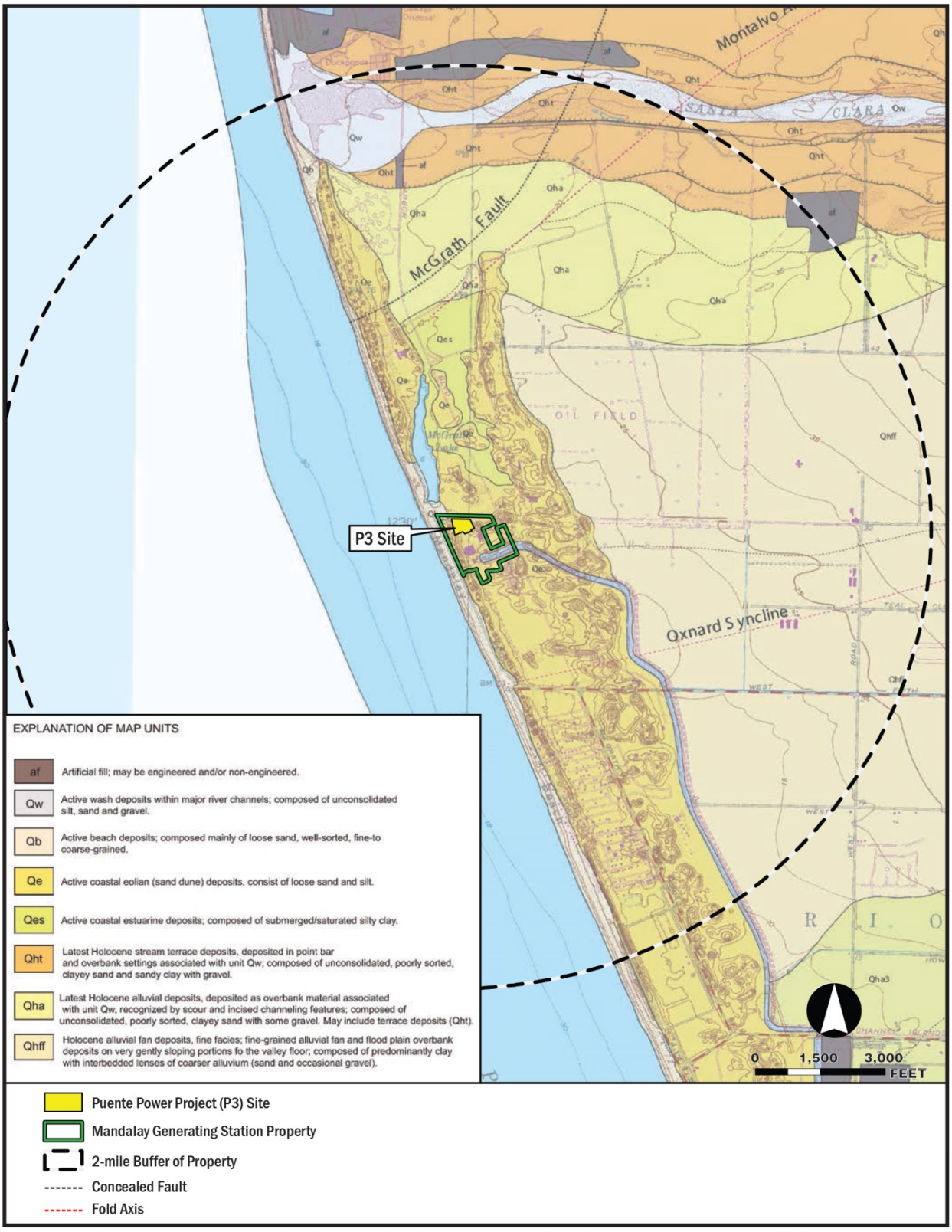


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: NRG 2015a

GEOLOGY AND PALEONTOLOGY - FIGURE 5

Puente Power Project (P3) - Regional Geology



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SOURCE: NRG 2015a

PALEONTOLOGICAL RESOURCES

To evaluate potential impacts to paleontological resources staff first analyzed the potential for these resources to occur on the site. This included a review of site geology to determine whether geologic units known to, or amenable to, containing fossils are present. This generally consists of a review of geologic literature, mapping, and aerial reconnaissance of the site.

Staff then used the criteria established by the Society of Vertebrate Paleontologists (SVP 2010) in their standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, to identify the sensitivity of the geologic or stratigraphic units at the site. The sensitivity criteria are defined as follows:

> High Sensitivity. Stratigraphic units in which fossils have been previously found have a high potential to produce additional fossils, and are therefore considered to be highly sensitive. In the significance criteria of the SVP (1995), all vertebrate fossils are categorized as having significant scientific value, and all stratigraphic units in which vertebrate fossils have previously been found have high sensitivity. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.
>
> Low Sensitivity. Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are considered to have low sensitivity. Monitoring is usually not recommended or needed during excavation in a stratigraphic unit with low sensitivity.
>
> Undetermined Sensitivity. Stratigraphic units that have not had any previous paleontological resource surveys or any fossil finds are considered to have undetermined sensitivity. After reconnaissance surveys, observation of artificial exposures (such as road cuts) and natural exposures (such as stream banks), and possible subsurface testing (such as augering or trenching), an experienced professional paleontologist can often determine whether the stratigraphic unit should be categorized as having high or low sensitivity.

The project site occupies a portion of the Santa Clara River delta (Beller 2011). Migration of the river mouth ranged from Ventura to the north to Magu Lagoon to the south, forming a broad coastal alluvial plain. Various transgressions and regressions of the shore line have resulted in deposition of both marine and non-marine sediments at depth. An environmental assessment of the site conducted by CH2M Hill in 1997 indicates that the site is underlain by several thousand feet of undifferentiated Pleistocene and Pliocene fine sands and silts with varying degrees of consolidation (PPP 2015a).

Recent subsurface investigations indicate the site is mantled with aeolian dune sands and beach deposits that are underlain by at least 50 feet of sand and silty sand, interbedded with sandy silt and clay (Ninyo 2013). These deposits are interpreted by staff to represent Holocene near shore and dune deposits, early Holocene marsh/wetland deposits and older Pleistocene marine and alluvial deposits. The project

site appears to be located in an area where the recent aeolian dune deposits have been graded and partially removed (**Geology and Paleontology - Figure 5**). These recent deposits also likely underlie the shallow portions of the site. Using SVP criteria the site stratigraphic units would have low sensitivity.

As a part of the paleontological resources analysis conducted by the applicant, NRG requested a paleontological resources record review by the Los Angeles County Museum of Natural History (LACM) which reviewed their vertebrate paleontology archives (PPP 2015a). LACM stated there are no known fossil localities on the project site. LACM identified the closest fossil locality as being in Quaternary deposits in Sexton Creek located north-northeast of the project site. That locality produced a fossil specimen of a goose. They also point out that a site among coastal dunes in Huntington Beach, California, which are similar to P3 site conditions, produced a Pleistocene vertebrate fauna dated at approximately 40,000 kiloannum (ka) - thousands of years before present in geologic time (Wake and Roeder, 2009). That site was 1 kilometer inland from the shore.

The project owner also conducted a field survey, including visual inspection of sedimentary exposures in the project area, to assess the presence of sediments suitable for containing fossil remains and the presence of any previously unrecorded fossil sites. During the field survey, attempts were made to detect the presence and nature of native sediments. Some native sediments were exposed, but much of the area could not be accessed or has been substantially modified due to industrial and commercial history of the area. The results of the survey appear to be inconclusive as to whether significant paleontologic resource potential exists on site.

It is unlikely that fossil remains would be discovered in the site's dune and beach deposits. These are relatively recent deposits that are not old enough to contain significant fossilized material and are prone to active movement and erosive forces which reduces potential for paleontologic resources to be encountered. It is possible that deep excavations at the project site could encounter older sedimentary deposits but there would still be low potential for significant fossils to be encountered in the excavations. However, the possibility of encountering fossils remains. As discussed above, since the results of the field survey were inconclusive, and fossils in similar deposits have been found in other areas of southern coastal California, staff recommends monitoring of construction activities in accordance with the proposed conditions of certification. These conditions provide for concentrating monitoring efforts in those areas where deeper excavations will be conducted. They also provide for changes in frequency in monitoring based on conditions encountered during construction.

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).

In accordance with **PAL-3**, the applicant would prepare a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for approval by staff. The PRMMP would function as the formal guide for identifying where monitoring would occur based on sensitivity. Low sensitivity areas such as areas where the recent aeolian dune deposits have been graded and likely also underlie the shallow portions of the site, would not require monitoring. However, where there are deep excavations such as for foundations or utilities, older sedimentary deposits may be encountered and monitoring would be required. The PRMMP would also identify collecting and sampling methods where monitoring is conducted. Earthwork would be halted in the immediate area of a find any time potential fossils are recognized by either the paleontological monitor or the worker. When properly implemented, the conditions of certification would yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated.

A paleontological resource specialist would be retained for the proposed project by the applicant to produce the 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 and the Preliminary Geotechnical Evaluation (Ninyo 2013) provide documentation of potential geologic hazards at the proposed P3 plant site. Staff reviewed information presented in the documents 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 (30 years), would be low. However, the potential and probability for the site to be affected by geologic hazards such as strong seismic shaking, liquefaction, dynamic compaction and inundation by tsunami would need to be addressed in a project geotechnical report per CBC 2013 requirements. Recommendations from the geotechnical report must be incorporated in project design.

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed P3 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

The project site is situated near the northern edge of the Ventura Basin. The Ventura Basin is one of the more active tectonic regions of the world, formed as a syncline by tectonic compressional down warping. Earthquakes occurring in the crust beneath the basin indicate the earth's crust in this area has been down warped 7 to 10 km into the

Moho layer (ductile zone below the crust) relative to the surrounding area. The Ventura Basin has been filled with approximately 15 km of sediments (Yeats 1988).

Counter to the Ventura Basin syncline is the Ventura Avenue anticline (Hubbard 2013). The Ventura Avenue anticline is located immediately north of the Santa Clara river approximately 10 miles north of the project site. The Ventura Avenue anticline is one of the fastest uplifting structures in southern California, rising at approximately 5 mm/yr (Rockwell et al., 1988).

Earthquakes in this region occur primarily on compressional (reverse) faults. The most significant fault systems that could produce significant ground shaking in the project area include the San Cayetano Fault, the Red Mountain Fault, the Oak Ridge fault, the McGrath Fault, and the Ventura fault and associated Pitas Point fault. Earthquakes on left lateral strike slip faults such as that on the Mission Ridge, Arroyo Parida, and Santa Ana faults may also occur where westward movement of the Transverse Range is accommodated (**Geology and Paleontology - Figure 6**).

San Cayetano Fault

The San Cayetano fault is a major, active east-west trending, north-dipping reverse fault that extends for 40 km along the northern edge of the Ventura Basin into the mountains west of Fillmore (Dolan 2001). Recent research indicates that the most recent event on the eastern part of the San Cayetano fault generated at least 4.3 m of surface slip. Age determinations from detrital charcoal recovered in a trench excavated across the faulted section indicate that this surface rupture occurred after A.D.1660. Further, the faulted deposits are overlain by unfaulted historical alluvium containing abundant metal fragments and a leather glove. Comparison of the large surface slip (4.3 m) in this event with data from other earthquakes indicates that the most recent eastern San Cayetano surface rupture was larger than Moment Magnitude (Mw) 7 and was probably of the order of magnitude 7.5, much larger than any earthquakes that have occurred on Los Angeles metropolitan region faults during the past 150 years. (Dolan 2001).

Age dating of sediments collected from subsurface investigations across the fault coupled with the location and amount of measured offset suggest that the eastern portion of the San Cayetano fault was also responsible for the damaging earthquake of December 21, 1812 (Dolan 2001).

Red Mountain Fault

The Red Mountain Fault is a north-dipping, thrust fault, located approximately 9 miles north of the project area. The fault is approximately 9 miles long and is thought to have a slip rate of 0.4 to 1.5 millimeters per year. This fault is estimated to be capable of producing earthquakes of Mw 6.0 to 6.8 (SCEDC 2016).

Oak Ridge Fault

The Oak Ridge Fault is a southeast-dipping thrust fault; at its nearest approach, it is located approximately 3 miles north of the project area (Fisher 2005). The Oak Ridge

Fault is approximately 54 miles long, and is thought to have a slip rate between 3.5 and 6 millimeters per year. The Oak Ridge Fault strikes generally parallel to State Route 126 from the town of Piru in the east extending out to sea to a point approximately 12 miles south of Santa Barbara. This fault is estimated to be capable of producing earthquakes of Mw 6.5 to 7.5. In the basin, the Oak Ridge fault accommodates high rates of oblique crustal strain and, along with several other major faults, is considered a significant seismic hazard to a large urban population. The 1994 Mw6.7 Northridge earthquake occurred on a blind, south-dipping fault beneath the San Fernando Valley that is considered part of the same active fault and fold system that extends westward into the central Ventura Basin. Assessing the nature, geometry, and seismic potential of these active subsurface faults is difficult because (1) many of these structures are blind or buried and do not crop out where they can be easily characterized; and (2) many of these structures have experienced a complicated history of tectonic deformation (Hopps 1992).

McGrath Fault

Several researchers have mentioned the existence of the McGrath, (sometimes referred to as Montalvo) fault. The McGrath fault is suggested to be a relatively short splay from the Oak Ridge fault. The mapped (or lack of mapping) locations of the fault vary from author to author and the sense of activity is not consistent among the researchers. The closest mapped location is near the northern border of the project site (Yerkes 1987, Yeats 1988).

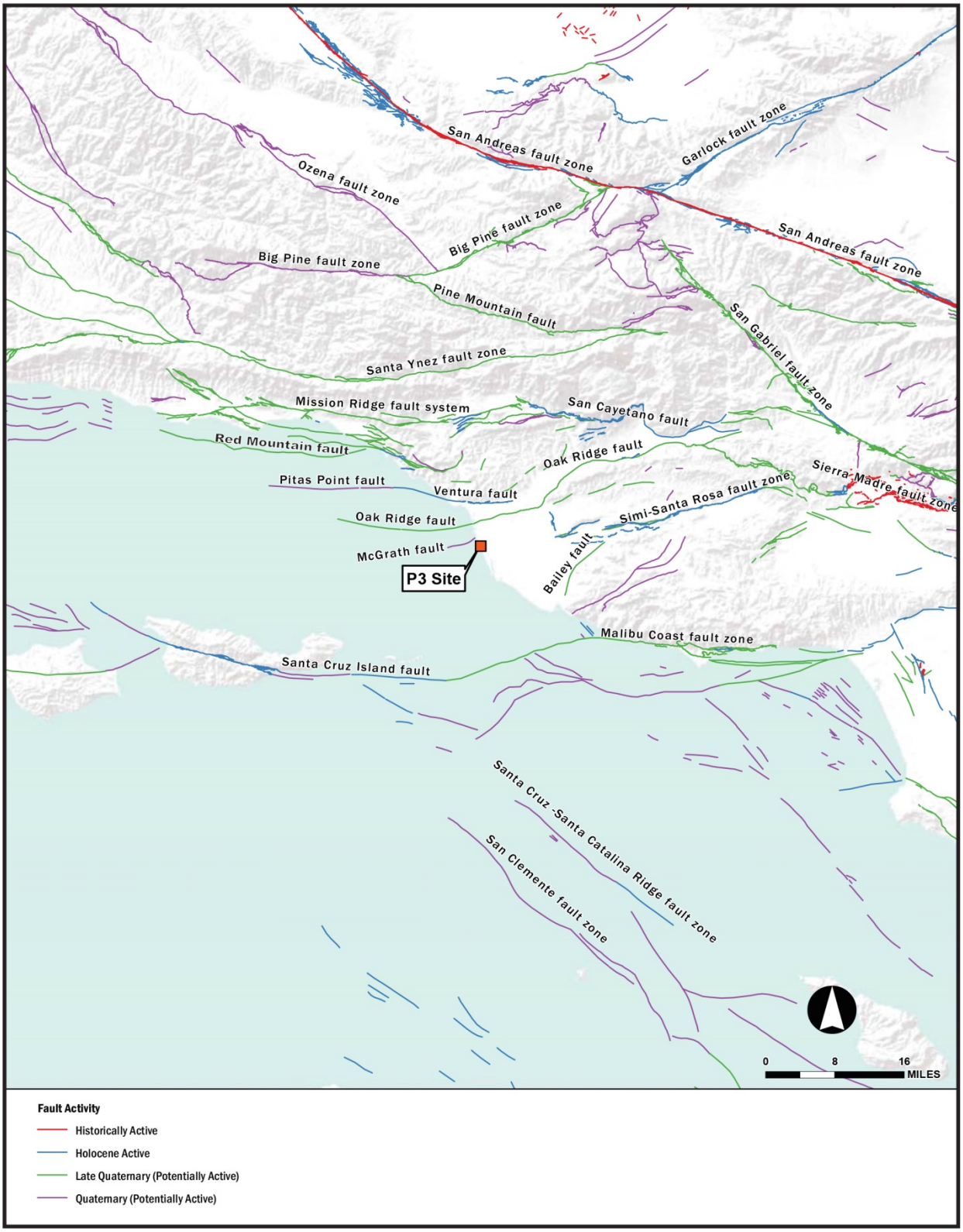
The surface trace of the McGrath fault was not identified during the active fault mapping efforts conducted by the California Geologic Survey in compliance with the Alquist-Priolo Act. Therefore, while some maps indicate a concealed location of the McGrath Fault proximal to the project site, there is a lack of concurrence among the researchers regarding its existence, location, and activity.

Ventura Fault

The Ventura Fault is the active on-land trace of the Ventura-Pitas Point fault. This on land trace is approximately 12 miles long, and is thought to have a slip rate of approximately 0.5 to 1.5 millimeters per year.

Despite the lack of historical earthquakes on the Ventura fault, high-resolution seismic data show that it is a north-dipping thrust fault, located approximately 9 miles north of the project site. The fault deforms upper Pleistocene and younger strata, and the fault has been mapped as offsetting an alluvial fan (Sarna-Wojcicki et al., 1976). The Ventura fault lies in a transition zone between two major north-dipping faults, the San Cayetano to the east and the Red Mountain fault to the west.

GEOLOGY AND PALEONTOLOGY - FIGURE 6
Puente Power Project (P3) - Regional Faults



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SOURCE: NRG 2015a

North Channel-Pitas Point Fault System

To the west, the Ventura fault continues offshore as the Ventura–Pitas Point fault, becoming the North Channel-Pitas Point fault system (Sorlein 2014). The Ventura–Pitas Point fault system extends north-northwest approximately 120 km to the vicinity of west of Point Conception. Other regional faults, including the San Cayetano and Red Mountain faults link with this system at depth. It is suggested that below 7.5 km, these faults may form a nearly continuous surface, posing the threat of large, multi-segment earthquakes of Mw 7.3-7.8 or greater (Hubbard 2014). This conclusion is further supported by new evidence from uplifted Holocene terraces, which shows that the Ventura Avenue anticline likely rises in discrete events with 5-10 m of uplift, requiring an earthquake of approximately Mw 7.7-8.1 every 400-2600 years, with the latest event approximately 800 years ago (Rockwell, 2011). Recent studies indicate that the Ventura-Pitas Point fault appears to slip at a rate of 5.6-7.1 mm/yr, with higher rates up to 12.2 mm/yr on the deeper ramps to the north.

Most seismic hazard assessments and models of reverse fault earthquakes in southern California involve the rupture of individual faults in the Transverse Ranges with moderately large Mw 7 events (McAuliffe 2015). While the seismic threat posed by these individual faults is significant, as was demonstrated by the 1994 Mw 6.7 Northridge earthquake (the costliest natural disaster in U.S. history prior to Hurricane Katrina [Science 1994]), a larger threat presents itself if several of these faults rupture together. A system wide, multi-fault rupture involving the North Channel-Pitas Point fault system could cause catastrophic damage to the densely urbanized areas of the Ventura and Los Angeles Basins (McAuliffe 2015).

One of the largest of these potential multi-fault earthquakes involves rupture of the rapidly slipping eastern San Cayetano fault westward via the blind southern San Cayetano fault, onto the blind Ventura thrust fault together with correlative faults to the west (e.g., Pitas Point fault). Such a 75- to 100-km-long multi-segment rupture could potentially encompass a fault-plane area of as much as several thousand square kilometers—similar to the rupture area of the great 1857 Mw 7.8 Fort Tejon and 1906 Mw 7.9 San Francisco earthquakes on the San Andreas fault, and comparable to other large-magnitude reverse fault earthquakes such as the 2008 Mw 7.9 Wenchuan event (McAuliffe 2015).

The potential occurrence of such large-magnitude events has critically important implications for seismic hazard assessment in southern California. Specifically, the occurrence of large thrust fault earthquakes adjacent to the deep (>10 km) Ventura Basin would cause significant amplification of seismic waves, leading to damaging ground motions over much of the region, including the project site. Moreover, large-displacement ruptures of the offshore western continuation of the North Channel-Pitas Point fault system could potentially generate significant tsunamis near the coast, with limited potential warning times. It is worth noting, however, that the relatively shallow water depths at the fault-seafloor interface will reduce the overall volume of the water mass involved in any such tsunamis (McAuliffe 2015).

Mission Ridge-Arroyo Parida-Santa Ana Faults

The Mission Ridge, Arroyo Parida, and Santa Ana faults make up an essentially continuous fault system running west to east from Goleta to Ojai, on the southern flank of the Santa Ynez Mountains. This fault zone is left-lateral with varied vertical slip, and it is believed to be capable of a Mw 7.2 event. It has most likely ruptured during Holocene times; however, the most recent documented rupture was 30,000 years ago (SCEDC 2016).

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 (CGS 2007a). Earthquake Fault Zones 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 P3 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.

These parameters are project-specific and, based on P3's location, were calculated using latitude and longitude inputs of 34.208 degrees north and -119.251 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 P3 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 (nonessential) 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 will 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 CBC 2013 in accordance with proposed Condition of Certification **GEO-2** and proposed **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.

Geology and Paleontology Table 2
Planning Level 2010 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	2.189 g
S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period	0.763 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	1.314 g
SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period	1.221 g
SMS – Spectral Response Acceleration, Short (0.2 Second) Period	1.970 g
SM1 – Spectral Response Acceleration, Long (1.0 Second) Period	1.832 g

ASCE = American Society of Civil Engineers
Values from USGS 2010b

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) (Ninyo 2013).

The proposed project site is mapped within a Liquefaction Investigation Zone on the State of California Seismic Hazard Zone Map for the Oxnard Quadrangle (CGS 2002). 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 2002).

Groundwater was observed in exploratory borings drilled on site at a depth of approximately 9 feet below ground surface (bgs) (Ninyo 2013). This measured depth was not considered to be the stabilized water table as groundwater levels are likely to be influenced by tidal fluctuations, precipitation, irrigation, projected sea level rise and other factors. Historic high groundwater levels near the site have been mapped at approximately 5 feet bgs (Ninyo 2013). The presence of shallow groundwater raises concerns about liquefaction potential, settlement rates, and the likely need for construction dewatering.

Based on site observations, laboratory testing and computer modeling, it was determined that scattered saturated sandy alluvial layers between depths of approximately five and 50 feet are potentially liquefiable (Ninyo 2013). Groundwater levels must be confirmed and the liquefaction potential on the proposed P3 site must be addressed in a project-specific geotechnical report, per CBC 2013 in accordance with proposed Condition of Certification **GEO-1** and proposed **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, channel). An empirical model is typically used to predict the amount of horizontal ground displacement within a site (Ninyo 2013). 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. Based on the relative density of the potentially liquefiable soil layers, Ninyo and Moore concluded in their Preliminary Geotechnical Evaluation that “the site is not considered susceptible to significant seismically induced lateral spread" (Ninyo 2013). However, the susceptibility of the underlying beds to lateral spread beneath the proposed P3 site must be addressed in a project-specific geotechnical report, per CBC 2013 in accordance with proposed Condition of Certification **GEO-1** and proposed **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 more dense state (an increase in

soil density). 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 & Moore used seismically induced cyclic stress ratios and corrected blow counts (N-values) to calculate the potential volumetric strain of the soil (Ninyo 2013). Their analysis indicated that seismically induced settlement at the project site would be approximately two 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 CBC 2013 in accordance with proposed Conditions of Certification **GEO-1** and proposed **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 moderate severity and over-excavation and replacement for areas of minimal hazard.

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 and/or the presence of undocumented fill or soft clay soils. The site is underlain by sandy aeolian and alluvial sediments. These materials are generally not considered to be potentially compressible.

The potential for, and mitigation of, the effects of consolidation of site soils must be addressed in a project-specific geotechnical report, per CBC 2013 in accordance with proposed Conditions of Certification **GEO-1** and proposed **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 at a 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.

As mentioned above, the site is underlain by mostly noncohesive alluvial and aeolian or sandy sediments (Ninyo 2013). While unlikely, 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 CBC 2013 in accordance with proposed Condition of

Certification **GEO-1** and proposed **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-treated (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.

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 preliminary geotechnical report did not include an evaluation of corrosive soils (Ninyo 2013). The potential for, and mitigation of, the effects of corrosive soils on the project site must be addressed in a project-specific geotechnical report, per CBC 2013 in accordance with proposed Condition of Certification **GEO-2** and proposed **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 earthquake activity, 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 (oversteepening). 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 oversteepened. 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 485 meters, 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, an agency since renamed the

California Office of Emergency Services – OES - in 2012) 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.”

The inundation map has been compiled with the best currently available scientific information and is used by local agencies for emergency planning purposes. 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 7**). The map shows the site is bounded on the west by the inundation zone.

Based on modeling of a dozen distant and local “worst case” sources, USGS determined that the high incoming wave elevation is 9.51 feet and maximum onshore runup elevation would be approximately 10 feet in the Oxnard 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 16 feet NAVD88(CGS 2009) along the dunes at the project site. The two sources that could produce a tsunami with this maximum flood level are a magnitude 9.2 earthquake from the Alaska-Aleutians 3 scenario and the Goleta Landslide slide No. 2 scenario (Wood 2013).

Recent tsunami studies in the project region were conducted using a 3-D dynamic rupture model of an earthquake on the Pitas Point and Lower Red Mountain faults to model low-frequency ground motion and the resulting tsunami (Ryan 2015). This would be characteristic of the multisegment earthquakes of Mw 7.3-7.8 or greater on the North Channel- Pitas Point Fault System discussed above. The model uses an average stress drop of 6 MegaPascals, an average fault slip of 7.4 m, and a moment magnitude of 7.7, consistent with regional paleoseismic data (Hubbard 2014). This represents a significantly greater magnitude local event that is not currently considered for predictions of inundation published by CGS (2009) at the project site. Such an event may be plausible given the study discussed above under the Faulting section (Rockwell, 2011; Hubbard et. al. 2014).

Ryan et. al. modeled the tsunami resulting from recent modeling of rupture from such an event on the Pitas Point and Lower Red Mountain faults ,using the Cornell Multi-grid Coupled Tsunami (COMCOT) Model (Ryan 2015). The corresponding tsunami model uses final seafloor displacement from the rupture model as initial conditions to compute local propagation and inundation, resulting in large peak tsunami amplitudes northward and eastward due to site and path effects.

The vertical seafloor displacement from the earthquake rupture scenario produces a strong local tsunami wave train. Coastal areas with the largest local amplitude are northward (i.e., Santa Barbara) and eastward (i.e., Ventura and Oxnard) of the surface rupture. Large amplitudes northward result from the direct propagation of the northward-directed tsunami toward decreasing water depth as the tsunami approaches the coastline. The more unexpected large amplitudes to the east result from two main effects: strong eastward refraction of the south-ward directed tsunami wave train as the waves encounter deeper water to the south in the Santa Barbara Channel, and focusing of the waves guided by bathymetry (Ryan 2015).

GEOLOGY AND PALEONTOLOGY - FIGURE 7

Puente Power Project (P3) - Tsunami Inundation Map

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SOURCE: NRG 2015a

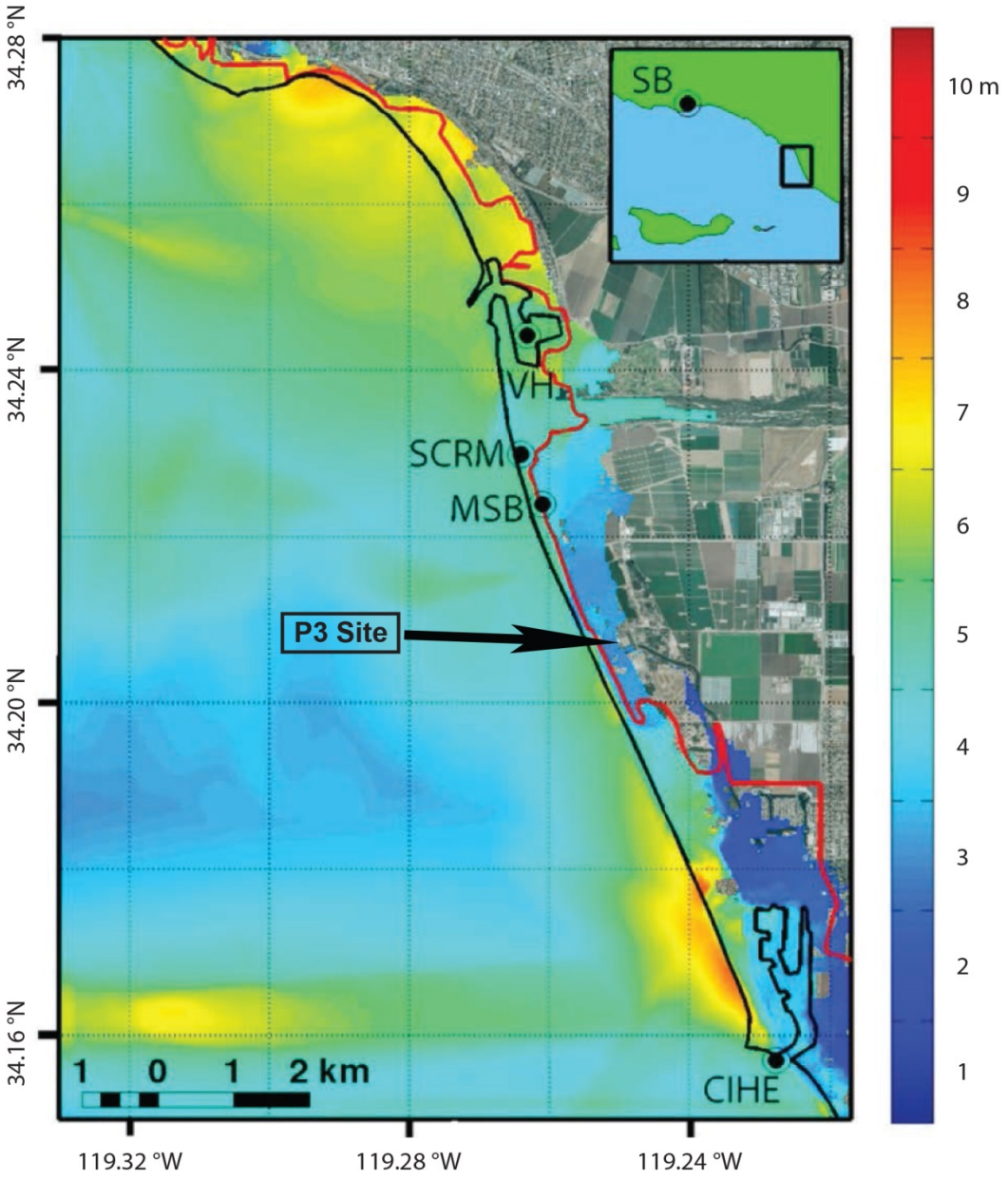
Key geographic locations used in the model include: Santa Barbara, Ventura Harbor, the Santa Clara River Mouth, McGrath State Beach, and the Channel Islands Harbor Entrance. The modeled tsunami inundation exceeds the CGS estimate in multiple locations (Ryan 2015). Even though the modeled tsunami inundation zone exceeds the CGS estimate in many locations near the project site, the predicted areas of inundation are adjacent to or may only occur at shallow depths on portions of the site (**Geology and Paleontology - Figure 8)**. Staff points out that the scale of the mapping is not sufficient to make site specific determinations and the study (Ryan 2015) clarifies that the model is not complete enough to provide a true quantitative measure of tsunami hazard or the precise spatial extent of the inundation zone in the Ventura and Oxnard region. Staff understands CGS and USGS are evaluating the results of this recent study to determine if any updates or modifications to inundation mapping for emergency response may be needed.

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 has 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 half an hour or so 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 100 km (Piper 1987). However the areal dimension of the sliding mass could easily reach hundreds of square meters (Piper 1987). Tsunamis caused by submarine mass failures are more geographically

GEOLOGY AND PALEONTOLOGY - FIGURE 8

Puente Power Project (P3) - North Channel - Pitas Point Tsunami Inundation



Map of localized peak tsunami amplitude, in meters (around Ventura, CA), resulting from slip on the North Channel-Pitas Point fault system. The solid black line indicates the coastline. The solid red line is the statewide tsunami inundation map coordinated by the California Emergency Management Agency. Letters indicate example locations (approximate): SB = Santa Barbara, VH = Ventura Harbor, SCRM = Santa Clara River Mouth, MSB = McGrath State Beach, CIHE = Channel Islands Harbor Entrance. Inset shows the map boundary in black. Note that inundation from the model is significantly greater in many places than the statewide estimate.

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SOURCE: Ryan, 2015

contained, although they may give rise to higher amplitudes in the local field (Plafker 1969).

Current research has demonstrated that modeling of landslide tsunami hazards requires information and data from seismology, marine geology, geotechnical engineering and hydrodynamics (Bardet 2003). The outcomes of hydrodynamic simulations were found to depend largely on the assumptions made on the geological and geotechnical processes governing mass failures. These discoveries raised fundamental issues in the modeling of tsunamis, especially about the prediction of future mass failure events.

Recent investigations using the Monterey Bay Aquarium Research Institute's (MBARI) Remotely Operated Vehicles (ROVs) "Ventana" and "Tiburon" and interpretation of MBARI's EM 300 30 kHz multibeam bathymetric data show that the northern flank of the Santa Barbara Basin has experienced massive slope failures (Greene 2006). It is likely that the most recent slope failure was attributed to the Dec 21,1812, earthquake on the San Cayetano fault which triggered a submarine landslide and resulting tsunami (Rockwell 2001). A submarine landslide scenario similar to that event is referred to as the Goleta No. 2. As discussed above, the Goleta No. 2 event scenario is one of the two tsunami sources considered to potentially affect the project site.

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 PSA.

The National Academy of Sciences, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, Committee on Sea Level Rise in California, Oregon, and Washington, Board on Earth Sciences and Resources and Ocean Studies Board, Division on Earth and Life Studies*, National Research Council, 2012 (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 1 cm per year (cm/yr) between the years 2000 to 2030, and 1.54 cm/yr between the years 2030 and 2050. Using these maximum rates, between the years 2020 and 2050, sea level could rise 40.6 cm (1.3 feet) at the site during the project's design life (2020 – 2050) and 60.8 cm (2 feet) above the year 2000 sea level. Based on the rate of sea level rise of 1 cm/yr, mean sea level in 1992 was 8 cm (3 inches lower than sea level in 2000).

The site grading plan 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 reconciled 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 2050, sea level is predicted to rise to a level 2.3 feet higher than what sea level was in 1992.

Using the NAVD88 datum (-2.6 MSL 1992) and the NRC projections (+2.3 feet 1992 MSL), sea level in 2050 is predicted to be at an elevation of 4.9 feet above NAVD88.

Therefore, if sea level rises as projected (4.9 feet above NAVD88), and the maximum tsunami (9.51feet) 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 16.4 feet.

The top of the dunes to the west of the P3 site range from approximately elevation 21 to 32 feet (NAVD88). An artificial berm was constructed along the northern and eastern edges of the property in the early 1970s to protect the facility from flooding. The top of the engineered berm is at an elevation of approximately 17 to 20 feet (NAVD88).

The major portions of the project are designed to be constructed at elevations of approximately 14 feet above NAVD88. Without the protection of the dunes and flood control berms, the site could be subject to inundation by as much as 2.4 feet of water following the "worst case" tsunami. However, based on the elevations of the protective dunes and flood control berm, the site would not be subject to impacts from inundation. Using these estimates with sea level rise rates as they are accepted today, there is less than a one foot of vertical separation between the low point on the site flood control berm protecting the site and the tsunami inundation area which extends to the project boundary. Since these estimates are not precise and, in an abundance of caution, staff concludes there is potential for flooding that could impact worker safety. Mitigation for potential tsunami flooding is discussed below.

Staff acknowledges the CGS (2009) tsunami inundation maps reflect state of the art science for modeling using high accuracy elevation data and accepted earthquake events that could impact the site. The maps also note however, that the accuracy of the inundation line is subject to limitations in the accuracy and completeness of terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena expressed in the model used for mapping. 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. The dunes at the western boundary of the site that are 7 to 18 feet above the site elevation of 14 feet would provide significant protection from the predicted tsunami inundation and it is possible that only limited flooding of the site would occur under the current planning scenarios. Therefore, impacts to the facility from direct tsunami impact are unlikely and would require no fortifications for structural protection. However, given the current estimates of berm height and inundation elevation uncertainties in sea level rise and predicting tsunami wave height, staff concludes there is a need for emergency planning to protect the workers from the effects of flooding due to a tsunami. Mitigation for potential tsunami flooding is discussed below.

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 by tsunamis. 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. The McGrath Lake is located approximately 500 feet northwest of the site. The lake is shallow and narrow, and while a seiche could possibly form within the basin, its rather diminutive size and the elevated surface of the project site would isolate the project from any perceived inundation and the likelihood of a seiche is considered low.

Tsunami Impact Mitigation

Given the current planning scenarios that show the project site is bounded by the tsunami inundation zone (CGS 2009) and protected by a flood control berm with less than one foot of vertical separation, staff is concerned there may be a threat of impact to worker 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. In addition, recent fault studies and tsunami modeling that are currently being evaluated by the scientific community could also indicate additional potential for tsunami impacts at the site. Staff concludes that it would be appropriate for the project owner to be prepared to respond to a potential tsunami event and ensure that all workers and site visitors would be safe from an event similar to the nearby areas of the city of Oxnard that are located in a tsunami evacuation zone.

The County of Ventura recently released their 2015 Hazard Mitigation Plan which outlines the steps to be taken in the event of an earthquake and impending tsunami event. The city of Oxnard has also published literature and implements the Ventura County Operational Area Tsunami Evacuation Plan. The plan includes evacuation routes, and potential reunification areas for the city of Oxnard. The plan points out that in general, in Oxnard, if you are within a mile of the ocean, you may be in a potential tsunami inundation area. All low-lying coastal areas, including Mandalay Bay,

Oxnard Shores, Hollywood Beach, and Channel Island Harbor, which are all near the project site, can be struck by a tsunami.

Staff recommends the project owner be required to prepare and implement a Tsunami Hazard Mitigation Plan (THMP) in accordance with Condition of Certification **GEO-1.** The THMP would include among other things a discussion of the Ventura County Hazard Mitigation Plan and City of Oxnard Tsunami Evacuation Plan and how they apply to the project. It would also include discussion of criteria for a response to ensure worker safety for a tsunami event and show where on- and offsite refuge can be accessed, and evacuation routes that are recommended by the applicable Ventura County and city of Oxnard tsunami hazard response plans. 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.

The THMP would be updated whenever a later version of the Ventura County and city of Oxnard hazard response plans are updated and ensure 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.

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 that should be protected. Development of this project is not expected to lead to a significantly cumulative effect on geologic and mineralogic resources within the project area.

Significant paleontological resources have been documented in the general area of the proposed project but not in sediments which 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 P3 would be situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC 2013. The potential for lateral spreading and liquefaction must be addressed and mitigated through appropriate facility design. Compressible soils and soils that may be subject to settlement due to dynamic compaction must be addressed and mitigated in accordance with a design-level geotechnical investigation as required by the CBC 2013 in accordance with proposed Conditions of Certification **GEO-1** and proposed **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 or along its proposed linears. 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.

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 P3 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.

The project site is bounded by, but is not currently located in, a tsunami inundation zone. Staff concludes the potential for major flooding and structural impact from tsunami is insignificant. However, the best estimates of sea level rise near the end of the life of the facility coupled with the maximum estimated tsunami wave height suggest there may be less than one vertical foot of separation between the minimum site elevation and mapped inundation zone. Staff is concerned that there could be limited flooding that would present a health and safety threat to employees and visitors. Staff recommends the applicant implement GEO-1 requiring the implementation of a Tsunami Hazard Mitigation Plan to protect employees and visitors.

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 CBC 2013 in accordance with proposed Conditions of Certification **GEO-2** 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.

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 P3 site.

The near surface of the project site is flat lying covered with low lying vegetation. Surface soils consist of active younger Holocene fine to medium grain windblown (dune) sand. These near surface soils are not likely to contain fossils. At depth, these young deposits are underlain by older native soils that have a high potential to contain fossils.

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, California Energy Commission (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 P3 can be designed and constructed in accordance with all LORS, and in a manner that both protects environmental quality and assures public safety.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes a condition of certification to ensure public health and safety in the event of inundation due to a tsunami in **GEO-1**. 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-2** of this section. **GEO-2** also focuses on ensuring adequate design consideration is given to the effects of a tsunami event on the facility. Proposed paleontological Conditions of Certification follow in **PAL-1** through **PAL-8**. It is staff's opinion that the likelihood of encountering paleontologic resources is possible 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 if data shows there are no significant paleontological resources present.

GEO-1 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 2015 Ventura County Hazard Mitigation Plan 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 Ventura County Hazard Mitigation Plan and Ventura County Operational Area Tsunami Evacuation Plan and how they apply 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 that are recommended by the applicable Ventura County Operational Area Tsunami Evacuation Plan.

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. 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 it is necessary to evacuate the project site. The project owner may include the training for tsunami hazard response as a part of the Worker Environmental Awareness Program required in **PAL-4** below. The training shall include:

1. 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;

2. Graphics showing methods of seeking refuge and routes for evacuation of the site;

3. A certification of completion form signed by each worker indicating that he/she has received the training; and

4. A sticker that shall be placed on hard hats indicating that training has been completed.

5. 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.

The THMP shall be updated whenever a later version of the Ventura County Operational Area Tsunami Evacuation Plan is updated and ensure 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.

GEO-2 A Soils Engineering Report as required by Section 1803 of the California Building Code (CBC 2013), or its successor 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. The tsunami discussion shall incorporate the highest rate of sea level rise, as presented in NRC 2012, into the run up calculations for the operating life of the project. 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.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for strong seismic shaking; liquefaction; dynamic compaction; settlement due to compressible soils; corrosive soils: and tsunami, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the delegate chief building official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

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 project owner shall keep resumes on file for qualified paleontological resources monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM for review and approval.

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 or combination of the following qualifications approved by the CPM:

- 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.

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 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated PRMs for the project. The letter shall state that the identified monitors meet the minimum qualifications for paleontological resource monitoring as required by this condition of certification. If additional monitors 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 change in 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 laydown 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 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 five 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 monitor, 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 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.

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 kick-off and 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. Following project kick-off, 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. An example of a suitable WEAP certification completion form is provided below. 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 augering 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. The PRS may informally 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. 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 ten 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.

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 showing fees have been paid for curation and the owner relinquishes control and ownership of all fossil material.

PUENTE POWER PROJECT (15-AFC-01)
Certification of Completion
Worker Environmental Awareness Program

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.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature: _____ Date: ___/___/____

PaleoTrainer: _____ Signature: _____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date: ___/___/__

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POWER PLANT EFFICIENCY

Edward Brady and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Puente Power Project (P3) would generate 262 MW (net output[1]) of electricity at an overall project fuel efficiency of 42 percent lower heating value (LHV)[2] at maximum full load and average design conditions.[3] 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 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), the 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 inefficient and unnecessary consumption of energy for P3 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.

SETTING

The applicant proposes to install and operate a General Electric (GE) 7HA.01 natural gas-fired combustion turbine generator (also referred to as a gas turbine, combustion

[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 59°F and relative humidity of 60 percent (PPP 2015a, § 2.7.1, Table 2.7-1, Case 3)

turbine, or CTG) in a simple-cycle configuration (PPP 2015a, § 2.0). P3 would provide peaking and load following power to the Ventura County area (PPP 2015a, §§ 1.2, 2.7, 2.13.1.2). There are two existing natural gas-fired conventional steam turbine units on the project site referred to as Mandalay Generating Station (MGS) Units 1 and 2, which were constructed in the 1950s and have a combined generating capacity of 430 MW net. These units are to be retired, decommissioned, and removed and 262 MW of their total net capacity would be replaced by P3. The 130 MW MGS Unit 3, a peaking combustion turbine, will remain on-line and operational.

Natural gas would be delivered to P3 via a 10-inch-diameter pipeline from an existing Southern California Gas Company (SoCalGas) natural gas pipeline (PPP 2015a, §§ 1.10.1, 2.1, 2.7.4).

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 2,500 million Btu[4] (mmBtu) per hour and consume 6,790,000 mmBtu annually. Additional fuel consumed to support an estimated 200 annual start-up and shutdown sequences would be about 78,000 mmBtu. This is a substantial rate of energy consumption, but would not

[4] British thermal units

impact energy supplies (See **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES** below for further discussion). P3 would generate electricity at a full-load efficiency of approximately 42 percent (PPP 2015a, § 2.0). This efficiency level compares favorably with the average fuel efficiency of a typical simple-cycle power plant. Also, the project would improve the overall thermal efficiency of electricity production compared to the existing MGS Units 1 and 2 due to the higher efficiency of the GE 7HA.01 CTG.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (PPP 2015a, § 2.7.4). 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. If SoCalGas' Aliso Canyon natural gas storage facility, located above the San Fernando Valley near Los Angeles, remains closed, it would not affect the delivery of natural gas to P3, since P3 would be located on the existing MGS site which is outside the Aliso Canyon gas delivery area. Staff concludes that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas would be delivered to the project site via a new 500-foot-long natural gas pipeline that would be connected to an existing SoCalGas natural gas transmission pipeline (PPP 2015a, §§ 2.1, 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, P3 would not require additional natural gas capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of P3.

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

P3 would be configured as a single CTG which would utilize GE's quick-start technology. This configuration, with its short start-up time and fast ramping[5] capability, is well suited for providing peaking power.

[5] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

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 P3. 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.

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 7HA.01 heavy duty CTG proposed for the P3 project is nominally rated at 280 MW gross with a 42 percent ISO-rated[6] efficiency (GTW 2016). Alternative machines that can meet the project's objectives of the generating capacity requirement and peaking/load following services are the GE LMS100, which is an aeroderivative gas turbine adapted from GE's aircraft engines, and the Mitsubishi M501GAC from Mitsubishi's power generation fleet of heavy duty turbines.

The latest version of the LMS100, the LMS100PB, is nominally rated at 109 MW gross and a fuel efficiency of 44 percent at ISO conditions in a simple-cycle configuration (GTW 2016). The M501GAC gas turbine is nominally rated at 276 MW[7] gross and 40 percent efficiency at ISO conditions in a simple-cycle configuration (GTW 2016).

[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 gross values are used here because site-specific values are not available for the comparable systems, such as the LMS100PB and M501GAC. The 280 MW gross rating used here for the 7HA.01 machine, thus, does not reflect the site-specific design conditions such as site elevation, air inlet and outlet pressures, and parasitic loads, which result in 262 MW net referenced elsewhere in this analysis.

See **Efficiency Table 1** below for comparison.

Efficiency Table 1
Simple-Cycle Comparison at ISO Conditions

Machine	ISO Rated Net Output (MW)	ISO Efficiency (Percent)
GE 7HA.01	280	42
GE LMS100PB	109	44
Mitsubishi M501GAC	276	40

Source: GTW 2016

As shown in **Efficiency Table 1** above, the LMS100PB CTG offers a slightly higher ISO rated efficiency than the 7HA.01. 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 P3 generating capacity requirement of 262 MW net with the LMS100PB CTGs, three of them would be needed, since two of them would result in only approximately 200 MW net. The project site's available footprint is not large enough to accommodate three LMS100s.

Also as seen in **Efficiency Table 1**, the M501GAC CTG demonstrates a slightly lower efficiency than the 7HA.01, but any differences in actual operating efficiency between these two machines may be insignificant.

Staff concludes that in terms of thermal efficiency, the GE 7HA.01 is an appropriate choice of machine 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.

Given the climate at the project site (mild summers) and the relative lack of clear superiority of one system over another, staff has determined that the evaporative gas turbine inlet air cooling system proposed by the applicant (PPP 2015a, Table 2.7-1) would have no significant adverse energy impacts.

In conclusion, the project configuration (simple-cycle) and generating equipment (7HA.01) chosen represent a sufficiently efficient combination to satisfy the project objectives of efficient power production with operational flexibility as identified in the AFC (PPP 2015a, § 1.4). 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. If SoCalGas' Aliso Canyon natural gas storage facility remains closed, it would not affect the delivery of natural gas to P3, since P3 would be located on the existing MGS site which is outside the Aliso Canyon gas delivery area. Staff concludes that the SoCalGas system is adequate to supply the project without creating a significant cumulative impact.

CONCLUSIONS

The project would generate 262 MW (net output) of electricity at an overall project fuel efficiency of 42 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 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

GTW 2016 – Gas Turbine World. *Gas Turbine World 2016 Performance Specs*, *Simple Cycle OEM Design Ratings*, pp. 4-15.

PPP 2015a – NRG Energy Center Oxnard LLC/John Chillemi (TN 204219-1 – 204220-14). Application for Certification, dated April 13, 2015. Submitted to Robert Oglesby/CEC/Docket Unit on April 16, 2015.

POWER PLANT RELIABILITY

Edward Brady and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Staff concludes that Puente Power Project (P3) 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 between 94 and 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 P3 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 (PPP 2015a, § 2.12.2.9) 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 (PPP 2015a, § 2.12.2.2). 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 CTG 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. P3 would develop its maintenance program the same way (PPP 2015a, § 2.12.2.1). Additionally, because P3 would be expected to operate only up to 30 percent of the time (PPP 2015a, § 2.7.4), 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

P3 would use natural gas supplied by Southern California Gas Company (SoCalGas) and would connect to a new gas metering station adjacent to the P3 power block (PPP 2015a, § 2.7.4). 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. The closure of SoCalGas' Aliso Canyon natural gas storage facility located in

southern California would not affect the delivery of natural gas to P3, since P3 would be located on the existing Mandalay Generating Station (MGS) site which is outside the Aliso Canyon gas delivery area. Therefore, staff believes there would be adequate fuel supply to meet the project's needs.

Water Supply Reliability

P3 would be a simple-cycle project, meaning it would not have a steam cycle for power production. With the elimination of once through cooling and steam cycle make-up, the consumptive demand for P3 is projected to be substantially less than the amount of water currently provided to MGS Units 1 and 2 (PPP 2015a, Tables 2.7-4 through 2.7-10). The project's process water and potable water source would be from the city of Oxnard; the point of connection would be to the existing onsite MGS Units 1 and 2 water supply (PPP 2015a, §§ 2.7.5, 2.12.2.7, 4.15). The 2012 Kennedy Jenks "Urban Water Management Plan" conducted at the request of the city of Oxnard, confirmed 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

No active faults are present within the project boundaries or within a 2.4 mile radius of the site (PPP 2015a, §§ 2.12.1.1, 2.13.1.7); 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 (PPP 2015a, § 2.13, Appendices A-2 and A-3). 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-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 P3 power block is at an elevation of approximately 14 feet above mean sea level (PPP 2015a, § 4.4.1.2). It is not in the Federal Emergency Management Agency (FEMA) 100-year flood zone (PPP 2015a, § 2.12.1.1, Appendix A-3). 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 along Mandalay Beach on the western side of the dunes that border the western side of the MGS property. The dunes are elevated up to approximately 20 to 30 feet and offer protection to the site from tsunami run-up.

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. P3 would be designed and constructed in accordance with this code (as required by **GEN-1** and **GEO-2**). This, combined with the protection already provided by the existing dunes on the site, would adequately protect the project from tsunami. (For further discussion, see the **Geology and Paleontology** section of this PSA).

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 200-299 MW (NERC 2014). Since P3, consisting of a 262-MW CTG, falls within this range, staff uses this 80 percent availability factor for comparison to P3.

The project's CTG would be a modern General Electric (GE) 7H turbine. This is the larger, next generation version of the GE 7F model which has been in commercial operation for many years and has exhibited high reliability. The P3's CTG can well be expected to outperform the fleet of various, mostly older CTGs that make up the NERC statistics. The anticipated maturation period of P3's power block 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 (PPP 2015a, § 2.12.2.4). 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 CTG would be equipped with redundant features. And finally, because P3 would be expected to operate only up to 30 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 94 to 98 percent (beyond the 6- to 12- month maturation period) is reasonable when compared to the NERC's availability factor of 80 percent.

CONCLUSIONS

The applicant predicts an equivalent availability factor of between 94 and 98 percent, which staff believes is achievable. Staff concludes that P3 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

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.

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TRANSMISSION SYSTEM ENGINEERING

Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Puente Power Project (P3) facilities between the new generators and the Southern California Edison (SCE) Mandalay Substation, including the step-up transformer, the 230 kV overhead transmission line, and the termination, are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The P3 interconnection with the transmission grid would not require additional downstream transmission facilities (other than those proposed by the applicant) that require California Environmental Quality Act (CEQA) review.

- Interconnection of the P3 would not trigger any downstream transmission system upgrades.
- The existing breakers are adequate, no breaker upgrades are required.
- Any upgrades would occur inside the substation and no downstream environmental impacts are anticipated.

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. Additionally, under the CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Cal Code Regs, tit 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities that would be required downstream of the proposed interconnection and that represent the "whole of the action."

Energy Commission staff analyzes studies performed by the interconnecting authority, in this case the California Independent System Operator (California ISO), to determine the impacts on the transmission grid from the proposed interconnection. Staff's analysis also identifies new or modified facilities downstream of the first point of interconnection that may require mitigation measures. The proposed project would connect to the SCE transmission network and requires analysis by SCE and approval of the California ISO.

ROLE OF SOUTHERN CALIFORNIA EDISON

SCE is responsible for ensuring electric system reliability on its transmission system with the addition of the proposed transmission modifications, and determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards.

The California ISO will provide analysis in its Phase I and Phase II Interconnection Studies, its approval for the facilities, and changes required in its system to add the proposed transmission modifications.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for dispatching generating units in California, ensuring electric system reliability for all participating transmission owners and for developing the standards and procedures necessary to maintain system reliability. The California ISO will review SCE's studies to ensure the adequacy of the proposed transmission interconnection. The California ISO will also determine if the proposed transmission modifications of the SCE transmission system will impact overall system reliability. According to the California ISO Tariff, it will determine the need for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. Usually, the California ISO performs Phase I and Phase II Interconnection Studies and provides its analysis, conclusions, and recommendations. If necessary, the California ISO will provides written and verbal testimony on its findings at the Energy Commission hearings. The P3 has been exempted from the California ISO interconnection study process due to the unsubstantial change of its generation capacity. No Phase I or Phase II Interconnection Study is required.

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 (CPUC) 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, 1999, provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage, and stability limits. These standards include the reliability criteria for system

adequacy and security, system modeling data requirements, system protection and control and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table” and on Section I.D, “NERC and WECC Standards for Voltage Support and Reactive Power”. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards and guidelines to assure the adequacy, security, and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these planning standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to 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 guidelines for construction of all transmission additions/upgrades (projects) within the California ISO-controlled grid. The California ISO determines the “need” for the proposed modified project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the cost responsibility of the proposed modified project and provides an operational review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

PROJECT DESCRIPTION AND INTERCONNECTION FACILITIES

The Puente Power Project (P3) would be a natural gas-fired, simple-cycle generating facility located in the city of Oxnard, Ventura County, California. The P3 would consist of one combustion turbine-generator (CTG). The CTG is expected to generate at 267 megawatts (MW). With the generator auxiliary load of approximately 5 MW, the net output of the P3 to the transmission grid would be 262 MW. The P3 would be interconnected to the SCE Mandalay Substation. The proposed commercial operation date of the P3 is June 2020.

The combustion turbine generator is rated at 318 Megavolt Ampere (MVA) with a power factor of 0.85. The combustion turbine generator would be connected through its own 12,000 ampere generator circuit breaker through a short 12,000 ampere isolated phase bus duct to the low side of its dedicated 186/248/310 MVA generator step-up (18/230 kV) transformer. The high side of the generator step-up transformer would be connected through its dedicated 1200-ampere circuit breaker, a 1200-ampere disconnect switch, to the generator tie bus. The single 230 kV generator tie-line, supported by single-circuit steel structures, approximately 735 feet long, would be strung with 1033 kcmil ACSR conductor. The generator tie-line would leave the P3 switchyard connecting to the SCE Mandalay Substation existing breaker position.

The auxiliary load, approximately 5.2 MW, would be provided by the CTG through its dedicated 1200-ampere isolated phase bus ducts and its dedicated back-fed step-down (18/4.16 kV) transformer.

The Mandalay Substation is connected to the SCE Santa Clara Substation. Power would be transmitted to the grid from the Santa Clara Substation (PPP 2015a section 2.1, section 2.12.2.8, section 3.0, section 3.5, PPP 2015b, PPP 2015h Revised Figure 2.7-5a, Revised Figure 2.7-5b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility (SCE in this case) and the control area operator (California ISO) are responsible for ensuring grid reliability. These entities 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 planning standards, WECC reliability criteria, and California ISO reliability criteria. The Phase I and Phase II Interconnection Studies are used to determine the impacts of the proposed project on the transmission grid. Staff relies on these studies and any review conducted by the California ISO 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 P3 has been exempted from the California ISO interconnection study process because the project has been found to be substantially unchanged from the existing Mandalay facility. A Repower Study Report was performed following Generating Unit Repowering procedures of the California ISO's Business Practice Manual (PPP 2015 b section 1).

CALIFORNIA INDEPENDENT SYSTEM OPERATOR STUDY

The California ISO has completed the Repower Study Report for P3. The analysis of the interconnection impacts is based on the Repower Study Report.

SCOPE OF REPOWER STUDY REPORT

The May 28, 2015, Repower Study Report was prepared by the California ISO in coordination with SCE. The Repower Study Report was conducted by using the 2019 WECC base case for both peak and off-peak conditions with the P3 at a net output of 262 MW. The P3 would replace the existing Mandalay Generating Station (MGS) units 1 and 2. MGS units 1 and 2 will be retired by the completion and commercial operation of the P3. Since the proposed P3 generation output (262 MW) is less than the existing MGS unit 1 and unit 2 outputs (430 MW), the reduced generation of P3 would not be considered a substantial change to the total capability of the generating unit; therefore, the P3 is not required to participate in the generation interconnection study process. A technical assessment (Repower Study) was performed to verify the repower does not substantially change the total capability and/or electrical characteristics of the electric generating facility (PPP 2015b section 1).

REPOWER STUDY RESULTS

Power Flow Study Results and Mitigation Measures

The Repower Study Report identified that since the proposed P3 generation output of 262 MW is less than the existing MGS unit 1 and unit 2 outputs of 430 MW, the reduction of generation is considered not a substantial change to the total capability of the generating unit. There would not be adverse impacts to the transmission system from a power flow standpoint. No mitigation is required (PPP 2015b section 4).

Short Circuit Analysis and mitigation Measures

The Short Circuit Duty evaluation assessed the maximum symmetrical three-phase-to-ground fault and single-phase-to-ground-fault short circuit duties at Mandalay 220 kV bus. The evaluation used the existing MGS Unit 1 and Unit 2, and the P3 generators and transformer data provided by the applicant, and concluded that the reduction of generation at Mandalay Substation would result in a reduction of short circuit duties as shown in Table 2, section 4 of the Repower Study Report. The P3 will not substantially change the electric characteristics of the switchyard. No breaker upgrades would be required for the interconnection of the P3 (PPP 2015b section 4).

Transient Stability and Post-Transient Voltage Study Results and Mitigation Measures

Transient stability studies were conducted using the 2019 peak and off-peak base cases to ensure that the transmission system would remain in operating equilibrium after the P3 generation project became operational.

The Post-Transient Voltage Stability studies were conducted using the 2019 peak and off-peak base cases to determine the performance of the P3 is in accordance with the NERC/WECC planning criteria.

Both the Transient Stability and the Post-Transient Voltage studies indicated that the addition of the P3 would not cause any adverse impacts to the SCE system (PPP 2015b section 4).

CUMULATIVE IMPACTS

The TSE analysis focuses on whether or not a proposed project would meet required codes and standards. At all times the transmission grid must remain in compliance with reliability standards, whether one project or many projects interconnect. Potential cumulative impacts on the transmission network are identified through the California ISO and utility generator interconnection process. In cases where a significant number of proposed generation projects could affect a particular portion of the transmission grid, the interconnecting utility or the California ISO can study the cluster of projects in order to identify the most efficient means to interconnect all of the proposed projects.

COMPLIANCE WITH LORS

The proposed interconnecting facilities include the P3 230 kV switchyard, one 230 kV overhead generator tie-line, and the termination at the SCE Mandalay Substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff. Staff believes that Conditions of Certification TSE-1 through TSE-5 will ensure the proposed P3 complies with applicable LORS:

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 P3 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 applicable LORS.

2. Staff proposed Condition of Certification TSE-2 to ensure the final design of the proposed transmission facilities would comply with applicable LORS.

3. Staff proposed Condition of Certification TSE-3 to ensure that the proposed project would be properly interconnected to the transmission grid. 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 has been built to required specifications and the operation of the facilities would comply with applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed P3 facilities between the new generators and the SCE Mandalay Substation including the step-up transformer, the 230 kV overhead transmission line, and termination are acceptable and would comply with all applicable LORS. The P3 interconnection with the transmission grid would not require additional downstream transmission facilities (other than those proposed by the applicant) that require CEQA review.
- Interconnection of the P3 would not trigger any downstream transmission system upgrades.
- The existing breakers are adequate, no breaker upgrades would be required.
- The upgrades would occur inside the existing substation and no downstream environmental impacts are anticipated.

PROPOSED CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall furnish to the CPM and to the 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 construction of transmission facilities, 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 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
Take-off facilities
Electrical control building
Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 For the power plant switchyard, outlet line and termination, the project owner shall not begin any construction until plans for that increment of construction 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 verifying compliance with all 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 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 of 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) 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 shall be sized to accommodate the full output of the project.

e) Termination facilities shall comply with applicable SCE interconnection standards.

f) The project owner shall provide to the CPM:

   i) Special Protection System (SPS) sequencing and timing if applicable,

   ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

   iii) A copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

Verification: 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 and 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

1 Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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) Special Protection System (SPS) sequencing and timing, if applicable, shall be provided concurrently to the CPM.

e) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

f) A copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

Prior to the start of construction of or 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.

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.

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 April 1998, Amendments 1,4,5,6, and 7 incorporated.

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, February 7, 2002.

California ISO (California Independent System Operator) 2007a – California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March, 2007.

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PPP 2015h – Latham & Watkins LLP (206212). Supplemental Information regarding Transmission System Engineering. Dated September 25, 2015. Submitted to CEC/Docket Unit on September 25, 2015

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WECC (Western Electricity Coordinating Council) 2006 – NERC/WECC Planning Standards, August 2006.

DEFINITION OF TERMS

AAC	All aluminum conductor.
ACSR	Aluminum conductor steel-reinforced.
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.
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 management	A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.
Double–contingency condition	Also known as emergency or N-2 condition, a forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Emergency overload	See single–contingency condition. This is also called an N-1 condition.
kcmil	One-thousand circular mil. A unit of the conductor's cross-sectional area divided by 1,273 to obtain the area in square inches.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
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.

Megavar — One megavolt ampere reactive.

Megavars — Mega-volt-ampere-reactive. One million volt-ampere-reactive. 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 equal to 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.

N-0 condition — See normal operation/normal overload.

Normal operation/normal overload (N-0)

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 condition.

N-2 condition — See double–contingency condition.

Outlet — Transmission facilities (e.g., circuit, transformer, circuit breaker) 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 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, will trip a selected generating unit upon a circuit overload.

SF6 — Sulfur hexafluoride is an insulating medium.

Single–contingency condition

Also known as emergency or N-1 condition, occurs when one major transmission element (e.g., circuit, transformer, circuit breaker) 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.

Special protection scheme/system (SPS)

An SPS detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.

Switchyard — A power plant 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.

Tap — A transmission configuration creating an interconnection through a sort single circuit to a small- or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by using 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.

WASTE MANAGEMENT

Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

The Puente Power Project (P3) would be located on approximately 3 acres within the existing 36-acre Mandalay Generating Station (MGS) site. The MGS site is a highly disturbed brownfield site that requires remediation. The owner, NRG, or previous owner Southern California Edison (SCE), would ensure that impacted or contaminated areas on the P3 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 P3'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 Preliminary Staff Assessment (PSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the P3. 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 & Fire Protection** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The Energy Commission staff's 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

Waste Management Table 1 shows federal, state, and local environmental laws, ordinances, regulations, and standards (LORS) that 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 P3 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. 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. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • waste labeling practices and use of appropriate containers; • use of a manifest when transporting wastes; • submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its ten regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
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. • Part 246 addresses source separation for materials recovery guidelines. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). 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 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.

Interim Final Rule 29 CFR Part 1926.62	Provides uniform inspection and compliance guidance for Lead Exposure in Construction.
29 CFR 1926.1101	Regulates asbestos exposure in workplace for abatement workers and contractors.
National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR 61	An asbestos standard that protects the general public from asbestos exposure due to demolition or demolition activities.
29 CFR 1926.1101	Regulates asbestos exposure in the workplace for abatement workers and contractors.
State	
California Health and Safety Code, Chapter 6.5, § 25100 et seq. 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. 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 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. The standards addressed by Title 22, CCR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§ 66261.1, et seq.) • Standards Applicable to Generators of Hazardous Waste (Chapter 12, §§ 66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§ 66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §§ 66273.1, et seq.) • *Standards for the Management of Used Oil (Chapter 29, §§ 66279.1, et seq.)* • *Requirements* for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§ 67450.1, et seq.) 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.
California Health and Safety Code, Chapter 6.11, §§ 25404–25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	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. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program • Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program 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). The County of Ventura Fire Department Health Hazardous Materials Division and the Oxnard Fire Department are the area CUPA. 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 Safety & Fire Protection** analysis sections.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, § 15100 et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§ 15600–15620).
California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, § 25244.12 et seq. 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 four year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, CCR, § 67100.1 et seq. 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.
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).
Title 14, CCR, Division 7, § 17200 et seq. 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. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
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. CalRecycle, 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.
Title 8, CCR,§ 1532.1, Cal OSHA's Lead in Construction Standard	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, § 35001	Requirements for lead hazard evaluation and abatement activities, accreditation of training providers, and certification of individuals engaged in lead-based paint activities.
Assembly Bill (AB) 341	California's Mandatory Commercial Recycling Law: A business (includes public entities) that generates four cubic yards or more of commercial solid waste per week or is a multifamily residential dwelling of five units or more shall arrange for recycling services.
Title 22, CCR, Division 4.5, Chapter 14	Standards for owners and operators of Hazardous Waste transfer, treatment, storage and disposal facilities.
Title 22, CCR, Division 4.5, Chapter 15	Interim standards for owners and operators of Hazardous Waste transfer, treatment, storage and disposal facilities.
Local	
City of Oxnard Demolition & Recycling, Construction, and Demolition Ordinance	Oxnard Environmental Resources Management and Recycling C&D Plan must be submitted and approved prior to issuance of a building permit. Alter completion of construction and/or demolition, the Applicant will complete the Environmental Resources Management and Recycling C&D Report. C&D forms must be submitted to the City of Oxnard, Public Works Department, Environmental Resources Division.

SETTING

PROPOSED PROJECT

P3 would replace two aging gas-fired steam units at the existing MGS with one single-fuel combustion turbine generator and associated auxiliaries on approximately three acres within the 36-acre MGS site at 393 North Harbor Boulevard in Oxnard, Ventura County, California. The P3 site is located on the north end of the MGS property. The property is bounded to the north by undeveloped land and McGrath Lake and to the west by sand dunes and the Pacific Ocean. To the south and southwest are three retention basins, MGS Units 1, 2 and 3, and the MGS maintenance shop and Southern California Edison (SCE) switchyard (PPP 2015a, page 4.14-1).

Construction of the project consists of four sequential phases:

- Site preparation, construction, and commissioning of P3;
- Operation of P3;
- Shutdown and decommissioning MGS Units 1 and 2; and
- Demolition of MGS Units 1 and 2.

Site preparation and construction of P3 is estimated to take approximately 21 months. When the completed power plant is commissioned and operational, the shutdown and decommissioning of MGS Units 1 and 2 would occur, which is expected to occur from June 2020 to August 2020. Therefore, MGS Units 1-2 decommissioning and demolition would follow P3 completed construction, but would be concurrent with P3 operations.

Refer to the **Project Description** section of this PSA for more information on major features of the proposed project. **Project Description Figures 2** and **4** show the location of P3 with respect to MGS.

The waste management portions of the P3 project are as follows:

- Removal of abandoned 500 feet of 10-inch-diameter fuel-oil pipe;
- Relocation of existing 30-inch and 10-inch underground gas lines serving MGS Units 1 and 2, and Unit 3;
- Construction of one new power block;
- Remodeling for new control room and upgrading the administration building, including windows, plumbing fixtures, and HVAC equipment;
- Construction of a new 3-inch diameter 1,450 feet water line to connect to the existing MGS demineralized-water storage tanks;
- Construction of a new 3-inch diameter 1,440 feet water line to the existing MGS service-water storage tanks;
- Construction of a 2-inch diameter 630 feet water line to existing MGS domestic-water supply tie-in;
- Construction of a 2-inch diameter 630 feet water line;

- Construction of a 10-inch diameter 500 feet gas line to new P3 gas-metering station;
- Construction of a new underground fire loop to be fed from existing MGS fire system;
- Construction of a new stormwater collection and conveyance system to existing MGS basins;
- Construction a new process wastewater conveyance system to existing MGS basins;
- Construction of single-circuit 220-kV transmission lines from the new generator to SCE switchyard;
- Addition of a new backup diesel generator (PPP 2015a page 1-4); and
- Demolition of MGS Units 1 and 2 (PPP 2015v).

Preparation of the P3 proposed site and demolition of MGS Units 1 and 2 would produce wood, metals, concrete, empty containers, waste oil filters, and a variety of other wastes. The construction of the new power block and associated auxiliaries would produce a variety of mixed wastes, such as soil, wood, metal, and concrete, etc. (PPP 2015a, § 4.14.2.2.1). Waste would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill. The hazardous waste generated during demolition and construction would consist of asbestos debris, heavy metal dust, used oils, universal wastes, solvents, batteries, waste oil filters 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 nonhazardous and 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.

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 for workers, the public, sensitive species or environmental areas 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 Energy Commission 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 of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

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 whether 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 determined 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 there are no significant impacts to any of these receptors.

The most recent Phase I ESA for the MGS project site is dated March 31, 2015, and was prepared by AECOM. The ESA evaluated the entire 36-acres of the MGS site. The ESA was completed in accordance with the American Society for Testing and Materials Standard Practice E 1527-13 for ESAs. The Phase I ESA identified a number of Recognized Environmental Conditions. A 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 MGS was built between 1956 and 1958. The property consists of two natural gas-fired steam turbine units, one gas peaking unit and associated equipment; various buildings, three retention basins; aboveground storage tanks; pipelines; electrical switching and transmission features; a cooling water canal; and areas of undeveloped land. The peaker unit was built in 1970. There are a number of RECs associated with the MGS property. The RECs on the MGS site are listed below (P3 2015a, Appendix M-1):

- Hazardous waste was stored in unpermitted surface impoundments (the east, north and south retention basins) and associated sumps. Above-background concentrations of arsenic, nickel, and vanadium were detected;
- Subsurface impacts around Units 1, 2, and 3, the transformer area, former insulator test site, pipeline areas, oil pumping areas, historical dredge spoil pile areas, the oil/water separator and collection sump, aboveground storage tanks, and the chemical storage areas;
- Soil impacted beneath the MGS 21,000-barrel distillate tank; and
- Potential subsurface impacts from a former tank farm on an adjacent property.

The applicant proposes to build P3 on three brownfield-acres on the northwest corner of the MGS site (PPP 2015a page 1-1). This three-acre site was slated for development of MGS Units 3 and 4. These units were never constructed; however, a 30-inch-diameter gas line was built and currently traverses the site (PPP 2015a page 4.14-2). The gas pipeline would be demolished and removed from the proposed P3 site (PPP 2015a page 2-15). Stormwater runoff from the curbed areas of the plant site, and process wastewater would be directed to the existing MGS north and south basins (PPP 2015a Section 2.7.6.1 and page 4.14-8). The project owner would demolish MGS Units 1 and 2 following their retirement and decommissioning (PPP 2015v). Five-hundred feet of an abandoned 10-inch diameter fuel-oil pipeline located south of MGS Unit 2 would be removed (PPP 2015a page 4.14-4). A portion of the MGS warehouse would be upgraded and redesigned to include the P3 control room. For a complete description of the project please read the **Project Description**.

Previous environmental investigations of the MGS facility identified known and potential subsurface impacts on the proposed P3 project site. **Waste Management Table 2** provides the description of the potential impacts.

Waste Management Table 2
P3 Project Site
Known and Potential Subsurface Impacts

Year	Activity
1950	Site grading and installation of the 30-inch diameter gas line
1970	Construction of the Flood Protection berm
1970	Construction of an insulator test facility. The facility was used from 1971 to 1978.
1983	Temporary storage of approximately 7,000 cubic yards of dredged spoils from the canal.
1996-1997	Installation of the 10-inch diameter gas line from the gas metering station to MGS Unit 3.
2000	Temporary storage of approximately 7,000 cubic yards of dredged spoils from the canal.
2003-2005	Approximately 75,000 cubic yards of accumulated sediment from the canal were excavated and placed on the P3 site.
2011	As part of the SCE Retention Basin remediation project, the P3 site was used for temporary storage of contaminated soil (stored on a plastic barrier).

Source: P3 Application for Certification page 4.14-2.

Impacts to soil and groundwater are currently being assessed by the former owner, SCE. 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 on 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 MGS is one of the facilities cited in the agreement. A MGS Retention Basin Closure Plan (Envirostar 600001192) was prepared and submitted to Department of Toxic Substances Control (DTSC). Closure is required when a treatment is unauthorized; the business must remove or decontaminate all containment system components, soil, or equipment contaminated with hazardous waste from the unit. The MGS basin closure case is still open, and would likely need to have post-closure monitoring. The basins were remediated and re-lined. Basin closure would include monitoring to understand the ultimate fate and transport of the constituents of concern that could result in closure with a Land Use Covenant. The basins were cleaned, re-built and put into service for NRG's use (Johnsen 2016a). MGS is using the basins for stormwater collection and process wastewater and discharge.

Remediation and closure activities associated with contamination of soil and water from prior operations on the MGS property are not part of the proposed project (PPP 2015v page 4-57). If contamination is found during demolition, samples would be taken to determine the type and potential extent of contamination (PPP 2015v page 2-7). SCE is responsible for a Resources Conservation and Recovery Act[2] (RCRA) Facility Investigation (RFI) within the fence line of MGS. The RFI is a site-wide investigation that is required for sites that have RCRA permitted units (the retention basins). The retention basins fall under Interim Status Permitted Units (covered by Cal. Code Regs., tit. 22, §66265) rather than permitted RCRA units (covered by Cal. Code Regs., tit. 22, §66264). The requirements are basically identical. SCE is required to sample at locations that may have been sources of contamination and identify any potential sources of releases to the subsurface on the MGS site associated with the previous operations at the plant (Johnsen 2016b).

Based on historic use of the P3 property there is potential for encountering contamination during project construction. The project owner has developed a Draft Soil Management Plan (SMP) for the P3 (PPP 2015a Appendix M). The project owner would use the 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-1** 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-1** to ensure protective measures for workers are implemented as needed. These measures include soil removal, dust suppression techniques, workers wearing personal protective equipment for short durations, and a combination of all three

[2] The Resource Conservation and Recovery Act (RCRA), enacted in 1976, is the principal federal law in the United States governing the disposal of solid waste and hazardous waste.

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 “wetting agent”, and continuously covering stockpiled soils).

Furthermore, staff proposes Conditions of Certification **WASTE-2** and **WASTE-3** be adopted to address any soil contamination contingency that may be encountered during project construction. **WASTE-2** 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-3** 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 compliance project manager (CPM) with findings and recommended actions. **WASTE–2** also addresses identification and investigation of any previously unidentified soil or groundwater contamination that may be encountered.

Asbestos and lead would come from the demolition of Units 1 and 2, including but not limited to, insulation around tanks, vessels and piping. Flaking or peeling lead-based paint could also be present in facilities to be demolished. The applicant would comply with Title 17, California Code of Regulations, 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 PSA.

WASTE-5 requires that the project owner submit to the CPM the Ventura County Air Pollution Control District (APCD) Notification of Demolition or Renovation form for review prior to removal and disposal of asbestos, NESHAP 40 CFR 61. All friable asbestos collected during demolition activities would be disposed of as hazardous waste.

Demolition and Construction Impacts and Mitigation

Nonhazardous Wastes

Demolition, site preparation, and construction of the proposed power plant and associated facilities would last approximately 21 months (PPP 2015a, page 4.14-6). Before demolition and construction can begin, the project owner would be required to develop a city of Oxnard Construction and Demolition (C&D) Environmental Resources Management and Recycling Plan (Plan). The California Integrated Waste Management Act of 1989 (Act, AB 939) requires that local governments ensure that solid wastes are diverted from the landfill and reduced, reused or recycled. In order to continue compliance with the California Integrated Waste Management Act of 1989 for diverting solid wastes, the city of Oxnard requires that project developers submit the appropriate C&D worksheets to ensure that the wastes being generated during the construction and demolition phases are being properly diverted.

Nonhazardous waste would be generated from the MGS Units 1 and 2 demolition and construction of the P3 power block and ancillary facilities. The applicant estimates that

11,400 cubic yards of soil, 1,000 tons of scrap wood, 12,000 tons of scrap metal, 18,000 tons of concrete, 33 pounds per month of spent welding , and 93 pounds per month of waste oil filters would be generated during demolition (PPP 2015y). Construction waste would consist of 60 cubic yards of wood, glass, plastic, paper, scrap metals, cardboard and various insulations (P3 2012a, Table 4.14-2). All other non-hazardous wastes would be recycled, per AB 341 requirements, to the greatest extent possible.

The city of Oxnard has a Construction & Demolition (C&D) Materials Program. The program is designed to encourage permit applicants to recycle C&D materials. Applicants must demonstrate 50 percent demolition and construction project waste diversion. Adoption of Condition of Certification **WASTE-4** would facilitate proper management of project demolition and construction wastes since the city of Oxnard maintains a (C&D) program. Staff proposes Condition of Certification **WASTE-4** requiring the project owner to develop and implement an Environmental Resources Management and Recycling Plan[3] and submit copies of C&D paperwork to the city of Oxnard and 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. Compliance with proposed Condition of Certification **WASTE-4** would assist the applicant's compliance with the CalGreen Building Code requirements. And 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.

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 hazardous waste generated from the project would include: asbestos waste, electrical equipment, used oils, universal wastes, and lead-acid storage batteries (PPP 2015a and 2015v, Tables 14.4-2 and 2-1). It is estimated that 1,267 tons of asbestos would be generated from the demolition of MGS Units 1 & 2. Additional asbestos may be generated from the removal of the abandoned pipelines and demolition associated with the administration building. The Ventura County Air Pollution Control District (APCD) requires the owner or operator of a demolition or renovation project to submit an APCD Notification of Demolition or Renovation form at least ten working days before any asbestos stripping or removal work begins. Condition of Certification **WASTE-5** requires that the project owner submit the APCD Demolition or Renovation Plan for review prior to removal and disposal of asbestos. This program ensures there would be no release of asbestos that could impact public health and safety.

[3] http://publicworks.cityofoxnard.org/Uploads/ER/2015%20form-C&D_Report.pdf

The generation of hazardous wastes anticipated during P3 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 AFC. The applicant or contractor could obtain an additional or temporary hazardous waste generator identification number for the site prior to starting demolition. New, additional or temporary identification numbers should be reported to the CPM pursuant to proposed Condition of Certification **WASTE-6.** Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site. The majority of the hazardous waste would be recycled.

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 Table 4.14-1 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-8** to notify the Energy Commission's 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-1, WASTE-2** and **WASTE-3** 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.

Operation Impacts and Mitigation

The proposed P3 would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions (PPP 2015a Table 4.14-3). The AFC Table 4.14-3 presents a summary of the operation waste streams, expected waste volumes, generation frequency, and proposed management methods. 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**. This will ensure project wastes are appropriately managed and disposed.

Non-Hazardous Solid Wastes

The generation of non-hazardous solid wastes is expected during project operation. Routine maintenance wastes that would be generated include used air filters, spent deionization resins, sand and filter media, as well as domestic and office wastes (such as office paper, aluminum cans, plastic, and glass; PPP 2015a, page 4.14-7). 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 (PPP 2015a, § 4.14.2.3.2).

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

Approximately four tons per year of hazardous waste generation would be expected during routine project operation, including used hydraulic fluids, oils, greases, oily filters and rags, spent selective catalytic reduction catalysts, cleaning solutions and solvents, and batteries (PPP 2015a, Table 14.4.3). 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 PSA.

The amount of hazardous wastes generated during the operation of P3 would be minor with source reduction and recycling of wastes implemented whenever possible (PPP 2015a Table 4.14-3). 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 (Cal. Code Regs., tit. 22, §§ 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-8** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

The P3 facility would generate nonhazardous solid waste that would add to the total waste generated in Ventura County, California. The proposed project would generate solid waste during demolition, construction, and operation. Staff estimates 64,000 cubic yards of demolition waste would be generated (PPP 2015a Table 4.14-2 and PPP2015v Table 2-1).[4] Comparing P3 to other projects of similar size, the project could produce as much as 1,500 cubic yards of waste during construction and 50 cubic yards per year of

[4] To obtain cubic yards staff used CalRecycle conversion factors and estimated 300 pounds per cubic yard for mixed waste http://www.calrecycle.ca.gov/LGCentral/Library/DSG/ICandD.htm

nonhazardous waste during operation.[5] Nonhazardous waste would be disposed in a California Class III landfill. **Waste Management Table 3** displays information on Class III landfills in the vicinity of the project and Class I landfills available in California. (PPP 2015a Table 4.14-1).

Waste Management Table 3
Recycling/Disposal Facilities

Landfill	Location (City)	Remaining Capacity (Cubic yards)	Estimated Closure Date
Class III –Nonhazardous			
Toland Landfill	Santa Paula, CA	21.983 million[1]	2027
Simi Valley Landfill and Recycling Center	Glendale, CA	119.6 million[1]	2052
Chemical Waste Management-Kettleman (Class III)	Kettleman, CA	17.469 million	
Class I -Hazardous Waste			
Clean Harbors Buttonwillow (Class I)	Kern, CA	13.350 million	2040
Waste Management Kettleman Hills (Class I) Phase 3	Kings, CA	5 million	2044
Source: PPP 2015a Table 4.14-1 page 4.14-18			

The combined remaining capacity for the three available landfill facilities is approximately 159 million cubic yards. The total amount of nonhazardous waste generated from project demolition, construction and operation would contribute significantly less than 1 percent of the available landfill capacity. Staff finds that disposal of the solid wastes generated by the P3 project could occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Hazardous wastes generated during demolition, construction and operation would be recycled to the extent possible and practical. Any wastes that cannot be recycled would be transported off-site to a permitted Class I landfill. Based on previous licensed projects P3 could produce as much as 6.75 tons (45 cubic yards) of hazardous waste during construction and one ton per year (6.7 cubic yards per year) during operation. The Clean Harbors Buttonwillow Landfill in Kern County has 13.35 million cubic yards of remaining hazardous waste disposal capacity.

Given the availability of recycling facilities for high volume hazardous wastes such as used oil and solvents, along with the remaining capacity available at Class I disposal facilities, staff concludes that the volume of hazardous waste from the P3 project requiring off-site disposal would be minor and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

[5] Project size compared to waste estimates for Lodi, Mariposa, and Sutter Energy Projects.

The P3 project's proposed waste management methods and mitigation measures (implementation of source reduction, waste minimization and recycling), along with the proposed Conditions of Certification discussed below (including compliance with the city of Oxnard's construction 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.

Ventura 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 as required by AB 939. Condition of Certification **WASTE-5** would require the project owner to submit a construction and demolition waste management plan for approval by the Energy Commission CPM that demonstrates that the project met the construction waste diversion requirements of 50 percent pursuant to the CalGreen Building Codes. Ventura County and the city of Oxnard ordinances require 50 percent diversion of C&D materials from disposal through reuse and recycling methods. The applicant would be responsible for recycling fifty percent of the 18,000 tons of concrete and 12,000 tons of metals. Pursuant to recommended Condition of Certification **WASTE-5,** the applicant would also be required to submit to the CPM for approval and to the city of Oxnard a Construction and Demolition (C & D) Environmental Resources Management and Recycling Plan, 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, with comments from the city, would determine if the plan would divert recyclables to the maximum extent feasible. If the C&D 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.

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative effects as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."

Long-term cumulative impacts are not anticipated with the implementation of P3 and the 130 projects listed in the **Executive Summary** Cumulative Projects list because each project is required to comply with CEQA Guidelines requirements for evaluating potential cumulative impacts, and/or obtain approval from the city/county prior to permitting and construction by demonstrating conformance to existing CalRecycle (Title 24). As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the P3 would add to the total quantity of waste generated in the State of California, Ventura County, and city of Oxnard. The three Class III or solid waste landfills listed in the AFC have an estimated 159 million cubic yards of remaining capacity. There is 15 million cubic yards of hazardous capacity available for disposal in the state of California.

Waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. In comparison, the total solid waste disposal in

Ventura County in 2015 was 1,300,383 tons[6]. P3's contribution would be less than 1 percent of the county's annual waste generation.

In the **Socioeconomics** section of this staff assessment, staff presents census information that shows that there are minority populations within one mile and six miles of the project. Since staff has added conditions of certification that would reduce the risk associated with contaminated soils, and disposal of non-hazardous or hazardous waste to a less than significant level, staff concludes that there would be no significant impact from demolition, construction or operation of the power plant on minority populations. Therefore, there are no environmental justice issues for Waste Management.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed P3 would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during demolition of the existing Mandalay Generating Station Units 1 and 2, and P3 demolition, 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 demolition and project construction and operation, the P3 would be required to obtain a hazardous waste generator identification number from U.S. EPA. The P3 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.

CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the **Introduction** subsection of this analysis), staff provides the following conclusions:

1) Existing conditions at the P3 site 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 would be 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**, **5**, **6**, **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 P3 would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

[6] http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/.

2) 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 non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated on site 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 P3 owner identifies which areas of contamination would be investigated, staff's proposed conditions would ensure the project site is investigated, any contamination identified is referred to the responsible party, and appropriate professional and regulatory agency oversight (**WASTE-1**, **2**, **3**, **5**, **6**, **7**, and **9**.).
   - Prepare Construction and Demolition 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-4,** and **8**).
   - Obtain a new or temporary hazardous waste generator identification number (**WASTE-6**).
   - 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 would be reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-9)**.

3) Regarding impacts of project wastes on existing waste disposal facilities, staff uses a waste volume threshold equal to 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 three Class III landfills that may be used to manage nonhazardous project wastes exceeds 159 million cubic yards. The total amount of nonhazardous wastes generated from demolition of MGS, and construction and operation of P3, would contribute less than 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 P3 have a combined remaining capacity in excess of 15 million cubic yards. The total amount of

hazardous wastes generated by P3 would contribute less than 1 percent of the remaining permitted capacity. Therefore, impacts from disposal of P3 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 P3 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 P3 AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall prepare and submit to the compliance project manager (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. All earthwork at the site shall be conducted in accordance with SMP. 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 Puente Power Plant.
- 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 Puente Power Plant.
- Names and positions of individuals involved with soils management and their specific role.
- An earthwork schedule.
- A description of protocols for the investigation and evaluation of historically related chemicals such as DDE and previously unidentified contamination that may be potentially encountered, including any temporary and permanent controls that may be required to reduce exposure to onsite workers, visitors and the public.
- Requirements for site-specific Health and Safety Plan (HSP) to be prepared by all contractors at Puente Power Plant. The HSP should be prepared by a Certified Industrial Hygienist and would protect on-site 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. A SMP summary shall be submitted to CPM within 25 days of completion of any earthwork.

WASTE-2 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 to the CPM for review and approval.

WASTE-3 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 handheld 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 Department of Toxic Substances Control, 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 Department of Toxic Substances Control 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 five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall prepare a Construction and Demolition (C & D) Environmental Resources Management and Recycling Plan for demolition and construction wastes generated and shall submit a copy of the plan to the city of Oxnard Public Works Department for review, and to the CPM for review and approval. The plan shall contain, at a minimum, the following information:

- 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 50 percent pursuant to the CalGreen Code and city of Oxnard's Construction & Demolition Ordinance.

Verification: The project owner shall submit the C & D Environmental Resources Management and Recycling Plan to the city of Oxnard Public Works Department for review, and the CPM for review and approval, no less than 30 days prior to the initiation of demolition 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 and Demolition Waste Management Plan; and update the Construction and Demolition Waste Management Plan, as necessary, to address current waste generation and management practices.

WASTE-5 Prior to demolition of pipelines, buildings, and associated structures, the project owner shall complete and submit a copy of a Ventura County Air Pollution Control District's Notification of Demolition or Renovation form to the CPM and the APCD. The project owner shall remove all asbestos-containing material (ACM) from the site prior to demolition.

Verification: No less than 60 days prior to commencement of structure demolition, the project owner shall provide the Notification of Demolition or Renovation form to the CPM for review. The project owner shall inform the CPM, via the Monthly Compliance Report, of the data when all ACM is removed from the site.

WASTE-6 The project owner shall report new or temporary hazardous waste generator identification numbers from the United States Environmental Protection Agency prior to generating any hazardous waste during demolition, construction and operations.

Verification: The project owner shall keep a copy of the identification number(s) on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM is only needed once, unless there is a change in ownership, operation, waste generation, or waste characteristics, that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM in the next scheduled compliance report.

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 ten days 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 Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notifications of enforcement actions, 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 48 hours of the date the release was discovered.

REFERENCES

CEC 2015a – California Energy Commission/Chris Davis (TN 204392). Notice of Receipt of an Application for Certification for the Puente Power Project, dated April 24, 2015. Submitted to CEC/Docket Unit on April 27, 2015.

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Johnsen 2016a – John Johnsen, SCE, Email. Email from SCE to Steve Rounds, Department of Toxic Substances Control, Chatsworth, discussing status of the Mandalay Retention Basins. March 25, 2016.

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PPP 2015c – Latham & Watkins LLP/Paul Kihm (TN 205765). Responses to CEC Data Requests Set 1 (1-47), Dated August 2015. Submitted to CEC/Docket Unit on August 17, 2015.

PPP 2015e – Latham & Watkins LLP (TN 205912). Applicant's Presentation: P3 A Bridge to California's Energy Future – Informational Hearing & Site Visit August 27, 2015. Submitted to CEC/Docket Unit on August 28, 2015.

PPP 2015u –Applicant's responses to CEC Data Requests, Set 2 (48-74) (TN 206614). Latham & Wilkins LLP Submitted on November 13, 2015. CEC/Docket on November 13, 2015.

PPP 2015v –Appendix 74-1 to Applicant's Responses to CEC Data Requests, Set 2 (48-74) Latham & Watkins LLP (TN 206621). Submitted on November 13, 2015. CEC/Docket Unit on November 13, 2015.

PPP 2015y –Latham & Watkins LLP Project Enhancement and Refinement, Demolition of Mandalay Generating Station Units 1 and 2 (TN 206698). Submitted on November 19, 2015. CEC/Docket Unit on November 19, 2015.

PPP 2015z – Latham & Watkins LLP Applicant's Responses to CEC Data Request, Set 2 (TN 206791). Submitted on November 30, 2015. CEC/Docket Unit on November 30, 2015.

PPP 2016e – Applicant's Responses to CEC Data Request, Set 3 (75-76) Latham & Watkins, LLP (TN 210302). Submitted to CEC/Docket Unit on February 12, 2016.

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WORKER SAFETY AND FIRE PROTECTION

Brett Fooks, PE and Geoff Lesh, PE

SUMMARY OF CONCLUSIONS

Staff concludes that the proposed Puente Power Project (P3) would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). Staff recommends the project owner provide a Project Construction Safety and Health Program, a Project Operations and Maintenance Safety and Health Program, and a Demolition Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1** and **-2**, and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-7**. The proposed conditions of certification require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

The Oxnard Fire Department has stated that its ability to respond to emergency calls would not be significantly impacted by the construction and operation of the P3 (OFD 2016).

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 Preliminary Staff Assessment (PSA) is to assess the worker safety and fire protection measures proposed by the P3 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 Law	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).
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 Oxnard Municipal Code Chapter 14 Building Codes Article XV: Fire Code Sections 14-24 through 14-26	The City of Oxnard 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 Oxnard within an industrial area that is currently located within the service area of the Oxnard Fire Department (OFD). There are a total of seven fire stations within the City of Oxnard. The closest station to

the P3 site is Station #6 of the OFD located at 2601 Peninsula Road, approximately 3.0 miles away. The total response time from the moment a call is made to the point of arrival at the site would be approximately 6 minutes. The next closest station is Station #1, located at 491 South K Street, about 3.9 miles away, which would respond in about 9 minutes.

The first responders to a hazardous materials incident would be from Station #6 of the OFD. If needed, a full hazardous material response would be provided by the OFD Hazardous Materials Response Team (OFD-HMRT) located at OFD Station #7, located at 3300 Turnout Park Circle, approximately 7.6 miles away. The OFD-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 OFD could also call upon mutual aid agreements with the city of Ventura and with Ventura County.

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 (PPP 2015a, Section 4.14.1.1). To address the possibility that soil contamination would be encountered during construction of P3, 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-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 P3 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

P3 encompasses construction and operation of a natural gas-fired facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple-cycle facility.

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 (PPP 2015a, Section 4.16.4.1). Prior to the start of construction of P3, detailed programs and plans would be provided to the California Energy Commission compliance project manager (CPM) and to the OFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Demolition Safety and Health Program

The project owner submitted supplementary documents (PPP 2015y) to the AFC detailing the demolition of the existing Mandalay Generating Station (MGS) Units 1 and 2. The demolition of the existing MGS units would be similar to the construction of P3 with a few additional considerations due to the age of MGS. MGS has identified areas containing lead and asbestos, each of which present hazards to workers. The project

owner would be responsible to develop a Demolition Health and Safety Program which would be very similar in scope to P3's Construction Health and Safety Program with two additions that would be included:

- Lead Abatement Program (Cal Code Regs., tit. 8, § 1532.1)
- Asbestos Abatement Program (Cal Code Regs., tit. 8, § 1529)

Prior to the start of demolition of MGS, a detailed Demolition Health and Safety Program that includes all of the elements mentioned above would be provided to the CPM for review and approval and to the OFD for review pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at P3, 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 P3 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 (PPP 2015a, Section 4.16.4.2). Prior to operation of P3, all detailed programs and plans would be provided to the CPM and OFD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

The applicant provided the proposed outlines for both a Construction and Demolition 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 as presented in the AFC (PPP 2015a, Section 4.16.4.2.1):

- 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 OFD 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 OFD 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 P3 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 (PPP 2015a, Section 4.16.4.2.2).

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.

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 Demolition 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/Demolition 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/Demolition Safety Supervisors, Construction/Demolition 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/Demolition 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 serve as an “extra set of eyes” 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 P3, 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 OFD’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 OFD (PPP 2015a, Sections 2.7.9 & 4.16.6.3).

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 (PPP 2015a, Section 4.16.6.2). In addition, the P3 proposed site is within the boundary of the existing Mandalay 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 P3 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 P3. 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 the existing hydrant system and any extensions needed for new P3 structures. Any new fire hydrants would be installed per NFPA requirements. The fire water would be supplied from the existing fire water tank with water pressure maintained by two existing electric pumps from MGS. The power supplies to each electric pump would be revised to ensure that each is independent from the other to provide reliable backup power. (PPP 2015a, Section 2.7.9).

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 (PPP 2015a, Section 2.7.9).

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 (PPP 2015a, Section 2.7.9). These systems are standard requirements of NFPA and the California Fire Code, and staff has determined that they will ensure adequate fire protection.

Staff determined that the AFC is silent in one fire protection-related area, that which pertains to fire department emergency access to the site. Staff asked the OFD about their policy for emergency access to the site. The OFD has requested that a secondary emergency access be provided. Staff concurs with the OFD that this is a sound fire safety practice and allows 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 applicant provided an easement agreement that the existing MGS has with the McGrath Peaker Station owned by Southern California Edison (SCE). The easement agreement provides an emergency secondary access road to the P3 site for the OFD. The agreement also makes provisions to keep the emergency road open and any modifications to the road must meet current LORS for emergency fire department access for as long as the agreement is in effect. Staff concludes that the existing agreement meets the definition of an emergency secondary access. However, staff recognizes that the P3 site would have an expected lifespan of 30 years or longer. The current easement agreement may not be applicable in the future if the owner McGrath Peaker changes or the agreement were canceled. 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 Oxnard Municipal Code for emergency response vehicles.

Natural Gas Compressor Enclosure Fire Protection Systems

The proposed natural gas compressor would be enclosed to mitigate for noise and would be located at the north end of the facility near the gas metering station (PPP2015a, Section 2.7.4). However, the AFC does not clarify whether or not the natural gas compressor would be surrounded by four sound walls or completely enclosed in a building for noise mitigation. Staff asked the applicant to clarify which design solution would be chosen, but the applicant stated that the decision would not be made until the Engineering, Procurement, and Construction (EPC) contract negotiation begins (TN# 211649). If the enclosed-building design option were chosen, there exists the potential for explosion if leakage of natural gas were to occur inside. The accumulation of natural gas in the enclosure can create a flammable and potentially explosive mixture of fuel and air. If the sound wall option were chosen instead, the likelihood of an explosion would be negligible and the mitigation outlined below would not be required.

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 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 treats the compressor enclosure as an industrial enclosure and requires compliance with 40 CFR 192 Sections 163 through 173 which describe fire protection measures. 40 CFR 192 normally would not be applicable, as these provisions normally apply only to compressor enclosures along a natural gas transmission pipeline.

However, staff recommends the provisions and protection afforded by compliance to 40 CFR 192. 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 in the event of a larger release of fuel. 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 building option were chosen.

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 P3 combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the OFD 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 OFD, 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 OFD has stated that its ability to respond to emergency calls will not be affected by the construction and operation of the P3. Therefore, staff agrees with the applicant that mitigation is not required (OFD 032416).

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of P3 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.

CONCLUSIONS

Staff concludes that if the applicant for the proposed P3 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.
- a Mandalay Generating Station Demolition Health and Safety Program

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, the Fire Prevention Plan, and the Mandalay Generating Station Demolition Health and Safety Program shall be submitted to the Oxnard 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 Oxnard Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan. At least 30 days prior to the start of the demolition of the Mandalay Generation Station, the project owner shall submit to the CPM for review and approval a copy of the Mandalay Generating Station Demolition Plan. The project owner shall provide a copy to the CPM of a letter from the Oxnard Fire Department stating the fire department's timely comments on the Mandalay Generating Station Demolition Plan.

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 Oxnard 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 Oxnard Fire Department stating the fire department's timely comments 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/Demolition 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 CSS shall submit 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;
- report any visits from Cal/OSHA and/or any complaints from workers to Cal/OSHA; and
- report of accidents 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 based upon a reasonable fee schedule 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 and report directly to the DCBO 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.

Verification: 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, commissioning, and demolition, 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/Demolition Project Manager or delegate, the Construction/Demolition 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.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) is available to be on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall prepare an Emergency Access Plan that shows a secondary emergency access to the P3 site where the specifications of the roadway will comply with the Oxnard 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.

Verification: 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 Oxnard Fire Department for review and timely comment, and to the CPM for review and approval. If the secondary access to the site changes, the project owner must inform the CPM that the secondary access will be changing 90 days before it occurs. The project owner must also submit an updated Emergency Access Plan to the CPM for approval that shows the new location/arrangement for the new secondary emergency access road.

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.

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 Oxnard 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 If the natural gas compressor building is enclosed with a roof, the project owner shall ensure that the natural gas compressor building at the Puente Power Project will comply with NFPA requirements for compressor enclosures and that it will also comply with the requirements set forth in 40 CFR 192 Sections 163 through 173 regarding fire and explosion protection systems.

Verification: At least 90 days prior to the start of construction of the natural gas compressor building the project owner shall submit to the OFD for review and comment, and to the CPM for review and approval, documentation of plans for the compressor enclosure at the Puente Power Project demonstrating compliance with the condition described above.

REFERENCES

PPP 2015a– NRG Energy Center Oxnard LLC/John Chillemi (TN 204219-1 – 204220-14). Application for Certification, dated April 13, 2015. Submitted to Robert Oglesby/CEC/Docket Unit on April 16, 2015.

PPP 2015y -- Latham & Watkins LLP Project Enhancement and Refinement, Demolition of Mandalay Generating Station Units 1 and 2 (TN 206698). Submitted on November 19, 2015. CEC/Docket Unit on November 19, 2015.

OFD 032416 – Martinez, Sergio. City of Oxnard Fire Department, Battalion Chief. Personal Communication with Brett Fooks, California Energy Commission. March 24, 2016.

COMPLIANCE CONDITIONS AND COMPLIANCE MONITORING PLAN

Mary Dyas

INTRODUCTION

The Puente Power Project (P3) 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 below a level of significance that are associated with construction, operation, and closure; 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. The project retains

the same docket number it had during its siting review, but the letter "C" is added at the end (for example, 15-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; and

5. any minimally invasive work to provide safe access to the site for any of the purposes specified in 1 through 4, above.

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 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 P3 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

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]

Informal Resolution Process

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.

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 (7) 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.

[1] The California Office of Administrative Law provides on-line access to the California Code of Regulations at http://www.oal.ca.gov/.

Emergencies Requiring Immediate Action

If the CPM determines there is a situation that constitutes an emergency requiring immediate action to protect the public health, welfare, or safety, the CPM will request that the project owner take appropriate action, which may entail shutting down the facility. If the project owner fails to act as requested, the CPM may initiate the formal process for seeking injunctive relief as set forth in Public Resources Code 25900.

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 five thousand ($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 seven hundred fifty thousand dollars ($750,000), a 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(e), 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.

COMPLIANCE CONDITIONS OF CERTIFICATION

For the P3 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
PUENTE POWER PROJECT (15-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 or closure, the project owner shall send a letter to property owners within one (1) mile of the project, 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 (5) 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 for an unanticipated event;

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. The project owner shall notify the CPM or Compliance Office Manager, by telephone and e-mail, within one (1) hour after it is safe and feasible, upon identification of any incident at the power plant or appurtenant facilities that results or could result in any of the following:

1. a reduction in the maximum output capability of a generating unit of at least ten (10) MW or five (5) percent, whichever is greater, that lasts for fifteen (15) minutes or longer (or such values as trigger CAISO no prior notice outage reporting requirements under any subsequent modifications to CAISO tariff 9.3.10.3.1); facility's ability to respond to dispatch (excluding forced outages cause by protective equipment or other typically encountered shutdown events);

2. potential health impacts to the surrounding population or any release that could result in an off-site odor issue; and/or

3. 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.

The notice 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 (1) 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. If the facility ceases operation temporarily (excluding planned maintenance), for longer than one (1) week (or other CPM-approved date), but less than three (3) months (or other CPM-approved date), the project owner shall notify the CPM, interested agencies, and nearby property owners. Notice of planned non-operation shall be given at least two (2) weeks prior to the scheduled date. Notice of unplanned non-operation shall be provided no later than one (1) 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 (1) 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.

    a. Written monthly updates (or other CPM-approved intervals) to the CPM for non-operational periods, until operation resumes, shall include:

6. Progress relative to the schedule;

7. Developments that delayed or advanced progress or that may delay or advance future progress;

8. Any public, agency, or media comments or complaints; and

9. Projected date for the resumption of operation.

During non-operation, all applicable conditions of certification and reporting requirements remain in effect. If, after one (1) 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 Executive Director may assign suspended status to the facility and recommend commencement of permanent closure activities. Within 90 days of the Executive Director's determination, the project owner shall do one of the following:

1. If the facility has a closure plan, the project owner shall update it and submit it for Energy Commission review and approval; or

2. If the facility does not have a closure plan, the project owner shall develop one consistent with the requirements in this Compliance Plan and submit it for Energy Commission review and approval.

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 Energy Commission to plan and prepare for eventual permanent closure.

A. Provisional Closure Plan

To assure satisfactory long-term site maintenance and adequate closure for "the whole of a project," the project owner shall include within the first ACR a Provisional Closure Plan for CPM review and approval. The CPM may require Provisional Closure Plan updates to reflect project modifications approved by the Energy Commission. The Provisional Closure Plan shall consider applicable final closure plan requirements, including interim and long-term maintenance costs and reflect that qualified personnel will carry out permanent closure and long-term maintenance activities.

The Provisional Closure Plan shall reflect the most current regulatory standards, best management practices, and applicable LORS, and provide for a phased closure process and include but not be limited to:

1. comprehensive scope of work;

2. dismantling and demolition;

3. recycling and site clean-up;

4. mitigation and monitoring direct, indirect, and cumulative impacts;

5. site remediation and/or restoration;

6. interim and long-term operation monitoring and maintenance, including long-term equipment replacement costs; and

7. contingencies.

B. Final Closure Plan and Cost Estimate

No less than one (1) year (or other CPM-approved date) prior to initiating a permanent facility 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.

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.

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 proposal of 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 and Listserv of all responsible agencies, potentially interested parties, and property owners within one (1) mile of the facility;

14. identification of alternatives to plant closure and assessment of the feasibility and environmental impacts of these; and

15. 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).

If the Energy Commission-approved Final Closure Plan and Cost Estimate are not initiated within one (1) year of its approval date, it shall be updated and re-submitted to the Energy Commission for supplementary review and approval. If a project owner initiates but then suspends closure activities, and the suspension continues for longer than one (1) year, the Energy Commission may initiate correction actions against the project owner to complete facility closure. The project owner remains liable for all costs of contingency planning and closure.

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: • Project owner has submitted a pre-construction matrix identifying conditions to be fulfilled before the start of construction; • Project owner has completed all pre-construction conditions to the CPM's satisfaction; and • 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 a one-mile radius 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 ten 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 (1) hour of an incident and submit a detailed incident report within (1) 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 (2) weeks prior to a facility's planned non-operation, or no later than one (1) week after the start of unplanned non-operation, the project owner shall notify the CPM, interested agencies and nearby property owners of this status. During non-operation, the project owner shall provide written updates to the CPM.
COM-15	Facility Closure Planning	Within the first ACR, the project owner shall submit a Provisional Closure Plan for permanent closure. No less than one (1) year prior to closing, 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 AME:_____

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:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING PHOTO/DOCUMENTATION, AS REQUIRED)

PUENTE POWER PLANT PROJECT (15-AFC-01)
PRELIMINARY STAFF ASSESSMENT

PREPARATION TEAM

Executive Summary ..... Jon R. Hilliard

Introduction ..... Jon R. Hilliard

Project Description ..... Jon R. Hilliard

Environmental Assessment

Air Quality ..... Jaque Leyva Record/Tao Jiang

Alternatives ..... Jeanine Hinde

Biological Resources ..... Carol Watson

Cultural Resources ..... Melissa Mourkas/Matt Braun

Hazardous Materials Management ..... Brett Fooks /Geoff Lesh

Land Use ..... Ashley Gutierrez/Eric Knight

Noise and Vibration ..... Edward Brady/ Shahab Khoshmashrab

Public Health ..... Ann Chu

Socioeconomics ..... Lisa Worrall

Soil and Water Resources ..... Marylou Taylor

Traffic and Transportation ..... Andrea Koch/Ashley Gutierrez

Transmission Line Safety and Nuisance ..... Ann Chu

Visual Resources ..... Eric Knight

Engineering Assessment

Facility Design ..... Edward Brady

Geology and Paleontology ..... Paul Marshall

Power Plant Efficiency ..... Edward Brady/Shahab Khoshmashrab

Power Plant Reliability ..... Edward Brady/Shahab Khoshmashrab

Transmission System Engineering ..... Liaping Ng

Waste Management ..... Ellie Townsend-Hough

Worker Safety and Fire Protection ..... Brett Fooks/ Geoff Lesh

Compliance Conditions and Compliance Monitoring Plan ..... Mary Dyas

Project Assistant ..... Cathy Hickman/ Cenne Jackson