DOCKETED

Docket Number:	08-AFC-09C
Project Title:	Palmdale Hybrid Power Project - Compliance
TN #:	205394-1
Document Title:	Palmdale Energy Project Revised Petition to Amend
Description:	N/A
Filer:	Marie Fleming
Organization:	Galati | Blek LLP
Submitter Role:	Applicant Representative
Submission Date:	7/17/2015 5:26:37 PM
Docketed Date:	7/20/2015

REVISED
PETITION TO AMEND

PALMDALE ENERGY PROJECT

08-AFC-9C

Submitted to the:

California Energy Commission

Submitted by:

PALMDALE ENERGY, LLC

Prepared by:

GALATI | BLEK LLP

JULY 2015

GALATI | BLEK LLP

455 Capitol Mall Suite 315
Sacramento CA 95814
Tel • 916.441.6575

July 17, 2015

Eric Veerkamp
Compliance Project Manager
Siting, Transmission and Environmental Protection Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814-5512

Subject: **PALMDALE ENERGY, LLC'S REVISED PETITION FOR AMENDMENT - PALMDALE ENERGY PROJECT DOCKET NO. (08-AFC-9C)**

Dear Mr. Veerkamp,

On behalf of Palmdale Energy, LLC, (Palmdale Energy) GalatiBlek LLP hereby submits Palmdale Energy LLC's Revised Petition for Amendment (Revised Petition) for the Palmdale Energy Project (08-AFC-9C). Palmdale Energy filed its original Petition on April 30, 2015 and agreed to file supplemental information that was unavailable at the time of submittal. Commission Staff contacted Palmdale Energy and requested that rather than filing a Supplement, it would prefer that the original Petition be revised to include the supplemental information. This Revised Petition therefore includes all of the information provided in the original April 30, 2015 Petition. Specifically, the original Petition has been modified by the Revised Petition as follows:

- The Project Description has been revised to reflect that the stack heights have been revised from 145 feet to 160 feet.
- Figures 2.5a and 2.5b have been modified to reflect the increase in stack height
- Section 4.1 has been revised to include the Air Quality, Greenhouse Gas Emissions, and Public Health analyses.
- Section 6.2, Socioeconomic Resources has been revised to include the most recent available census data.
- Section 6.3, Traffic and Transportation has been revised to include the modified results of the thermal plume analysis and the revised FAA 7460 forms have been included.
- Section 6.4, Noise and Vibration has been revised to include the revised noise analysis results.
- Section 6.5, Visual Resources has been revised to include a visual graphic to inform the analysis of visual impacts.
- Section 8, Cumulative Scenario has been updated to reflect the current list of projects in the area.

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge. I also certify that I am authorized to submit Palmdale Energy's Petition on behalf of Palmdale Energy.

Sincerely,

Scott A. Galati
Counsel to Palmdale Energy, LLC

CONTENTS

APPENDICES

FIGURES

Section 1 INTRODUCTION

1.1 INTRODUCTION TO REVISED PETITION

Palmdale Energy, LLC (Palmdale Energy), a solely owned subsidiary of Summit Power Project Holdings, LLC, files this Revised Petition For Amendment (Petition) with the California Energy Commission (Commission) to modify the Palmdale Hybrid Power Project (PHPP) by eliminating the solar energy component and reconfiguring the two on one combined cycle power block configuration to incorporate new gas turbine technology to meet pending need for "Flexible Resources" to support integration of renewable energy.

Palmdale Energy filed its original Petition on April 30, 2015 and agreed to file supplemental information that was unavailable at the time of submittal. Commission Staff contacted Palmdale Energy and requested that rather than filing a Supplement, it would prefer that the original Petition be revised to include the supplemental information. This Revised Petition therefore includes all of the information provided in the original April 30, 2015 Petition. Specifically, the original Petition has been modified by the Revised Petition as follows:

- The Project Description has been revised to reflect that the stack heights have been revised from 145 feet to 160 feet.
- Figures 2.5a and 2.5b have been modified to reflect the increase in stack height
- Section 4.1 has been revised to include the Air Quality, Greenhouse Gas Emissions, and Public Health analyses.
- Section 6.2, Socioeconomic Resources has been revised to include the most recent available census data.
- Section 6.3, Traffic and Transportation has been revised to include the modified results of the thermal plume analysis; the FAA Determination of No Hazard for the stacks; and the Notice of Proposed Case and FAA Response (based on the Palmdale Energy submittal of FAA Forms 7460-1) for the construction crane have been included.
- Section 6.4, Noise and Vibration has been revised to include the revised noise analysis results.

- Section 6.5, Visual Resources has been revised to include a visual graphic to inform the analysis of visual impacts.
- Section 8, Cumulative Scenario has been updated to reflect the current list of projects in the area.

This section describes the procedural background of the PHPP and the authority for the Commission to process this Petition. The purpose and need for the Petition and the benefits from the project after modification are also described in this section.

Section 2 of the Petition provides a complete new project description.

Sections 3, 4, 5 and 6 contain analysis of the proposed modifications comparing the potential environmental impacts from the proposed new configuration to the potential environmental impacts of the original project as approved in the Commission Final Decision. These sections also include an update of laws, ordinances, regulations or standards, if any, applicable to the modified project. Where appropriate each technical section proposes modifications to the Conditions of Certification contained in the Final Decision.

Section 7 contains an analysis demonstrating that the modifications do not increase any potential effects on nearby property owners.

1.2 FINAL DECISION BACKGROUND

On August 4, 2008, the City of Palmdale filed an Application For Certification (AFC) with the Commission to construct and operate a nominal 570 megawatt (MW) hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 333-acre site. The combined-cycle equipment would have utilized two natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG). The solar thermal equipment was planned to use arrays of parabolic collectors to heat a high-temperature working fluid. The hot working fluid would have been used to boil water to generate steam. The combined-cycle equipment was to be integrated thermally with the solar equipment at the HRSG and both utilize the single STG.

The Commission issued a Final Decision approving the PHPP on August 10, 2011 (Order No. 11-0810-09, the “Final Decision”, 08-AFC-9). The Final Decision also approved two alternative generation tie-line routes.

1.3 CHANGE IN OWNERSHIP AND PROJECT NAME

The current owner of the Project is Palmdale Energy, LLC (Palmdale Energy). Palmdale Energy is a wholly owned subsidiary of Summit Power Projects Holdings, LLC (SPPH). SPPH is owned by Summit Power Group, LLC a long standing developer of energy projects in the US. On April 30, 2015, Palmdale Energy closed with the City of Palmdale for the purchase of all rights, licenses, permits, options, etc. in existence. On April 30, 2015, Palmdale Energy filed a Petition for Change in Ownership with the CEC. The Petition for Change or Ownership transfer was approved by the Commission on June 10, 2015.[1]

Palmdale Energy also requests that the PHPP name be changed to Palmdale Energy Project (PEP).

For convenience, the term "Approved Project" refers to the PHPP as described in the Final Decision. The term "Modified Project" refers to the PEP as proposed in this Petition.

1.4 SUMMARY OF PROJECT MODIFICATIONS

The project modifications proposed by this amendment include:

- Replacement of the General Electric gas turbines with new Siemens SGT6-5000Fs to meet pending need for "Flexible Resources" to support integration of renewable energy.
- Elimination of the solar components of the Approved Project.
- Elimination of Brine Concentrator/Crystallizer systems.
- Replacement of the wet cooling tower with an Air Cooled Condenser (ACC).
- Reduction of the site from 333 acres to 50 acres.
- Reduction of the construction laydown and parking area from 50 acres to 20 acres.
- Reorientation of the power block with the HRSG stacks now on the east and the combustion turbine inlets to the west.

[1] Order Number 15-0610-1a, dated July 10, 2015.

- Relocation of the site access road connection to East Avenue M to a point further east on East Avenue M.
- Relocation of the point where the 230 kV transmission line turns south to the generating facility from East Avenue M to a point further west on East Avenue M.
- Addition of three 230 kV transmission line towers along the south side of East Avenue M north of the project site and extension of the generation tie-line westerly approximately 1,800 feet along the south side of East Avenue M.
- Addition of a waste stream consisting of combustion turbine evaporative cooler blowdown, water treatment system reject, and plant drains.
- Reduction in the length of the Approved Project sewer pipeline which will now interconnect with an existing City of Palmdale sewer pipeline along the south side of East Avenue M.
- Change in the water steam cycle chemistry control system from a phosphate based system to an all volatile system.
- Possible change from a CO_2 based fire suppression system for some components to an FM200 based system.

The project modifications proposed by this amendment do not include modifications to any of the Approved linear routes beyond the immediate vicinity of the Modified Project site.

1.5 PURPOSE AND NEED FOR AMENDMENT

Palmdale Energy is acquiring the site in order to develop fast-start flexible generation to meet the changing California power demands, specifically to assist in the integration of renewable energy generated in California. This change in technology could not have been anticipated during the original permitting process because at the time of the original licensing the PHPP was owned by the City of Palmdale whose objectives for the project were different. Palmdale Energy was not part of the original proceedings.

The Final Decision identified that the City of Palmdale's original project objectives were to:

- Provide an efficient, reliable, and environmentally sound power generating facility to meet future electrical power needs of the rapidly growing City of Palmdale and surrounding area, as well as provide additional generating capacity for the region and California;

- Locate the facility within the boundaries of the City of Palmdale and under City ownership and control. The City can, thereby, increase its level of assurance that residential, commercial, and industrial power needs in the City can be met, while at the same time supplying power to the regional grid;

- Use solar technology to generate a portion of the facility's power output and thereby support the State of California's goal of increasing the percentage of renewable energy in the state's electricity mix;

- Integrate the solar component of the project and its combined-cycle component in a way that maximizes the synergies between the two technologies to increase project efficiency; and

- Site the facility in a location zoned and planned for industrial use in an industrial area and with ready access both to adequate supplies of non-potable water to meet the facility's process water needs and to a natural gas pipeline that can supply the Project without requiring significant modifications to the regional gas supply system. [2]

The revised project objectives are as follows:

- Provide an efficient, flexible, reliable and environmentally sound power generating facility to meet future electrical power needs of California.

- Provide daily fast start and fast ramping capabilities needed to provide Flexible Capacity that is required manage the integration of intermittent resources.

- Locate the facility within the boundaries of the City of Palmdale to provide economic development and tax revenue to the City and surrounding areas.

- Site the facility in a location zoned and planned for industrial use in an industrial area and with ready access both to adequate supplies of non-potable water to meet the facility's process water needs and to a natural gas pipeline that can supply the Project without requiring significant modifications to the regional gas supply system.

- Design the Palmdale Energy Project to minimize water usage as much as practical.

- Utilize the existing CAISO Large Generator Interconnection Agreement.

[2] Final Decision, Page 3-6 and 3-7.

The CAISO electric grid is undergoing significant transformation. The State of California has adopted renewable portfolio standards for electric utilities requiring that 33 percent of retail electric sales be served by renewable energy sources by 2020, which represents approximately 20,000 megawatts of capacity from new variable energy resources. Current estimates are by 2024 there may be 25,000 megawatts of capacity from variable energy resources. In addition, 12,079 megawatts of once through cooling resources will likely retire over the next eight years rather than meet environmental regulations. Further, California is currently examining policies to achieve 12,000 megawatts of distributed generation.

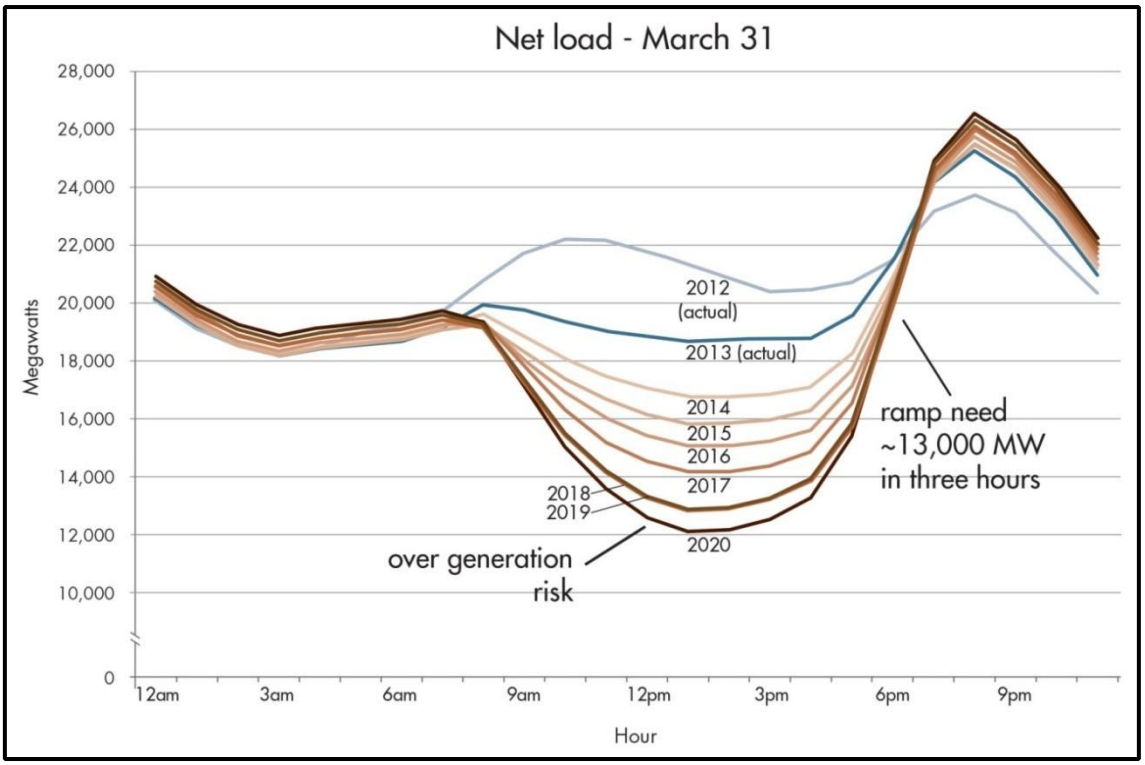
CAISO studies[3] show that to reliably operate the grid with this heightened level of uncertainty and variability, the CAISO will have an increased need for resources that can ramp up and down quickly and start and shut down potentially multiple times per day, *i.e.,* flexible capacity. At the same time, the once-through-cooling retirements[4] will reduce the number of existing resources that are available to provide the flexibility necessary to manage the increased variability and maintain day-to-day reliability.

Figure 1-1, commonly referred to as the "duck chart", uses net load curves to illustrate the steepening net load ramps expected over the next six years during the spring season. The duck chart shows the system requirement to supply an additional 13,000 MW of upward ramping capability, all within approximately three hours, to replace the electricity lost by solar power as the sun sets. The duck chart illustrates the larger ramping needs, as evidenced by the "fattening of the duck" as more renewables come on line and the multiple ramps each day.

[3] See Integration of Renewable Resources: Transmission and operating issues and recommendations for integrating renewable resources on the California CAISO-controlled Grid (November 2007). The CAISO has conducted numerous other studies regarding the impact of the integration of renewable resources. *See, e.g.*, August 31, 2010; and CAISO studies conducted as part of the CPUC 2010 Long Term Planning Process proceeding.

[4] *See* Once Through Cooling Water Policy, Adoption and Amendments.

Figure 1-1



On May 4, 2010, the California State Water Board adopted the "Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling." The once-through cooling policy applies to the 19 existing power plants that withdraw water from California's oceans and bays for use in a single-pass cooling system, also known as once-through cooling. Thirteen conventional thermal generators (representing about 17,500 MW) and California's nuclear generators must retrofit, repower, or retire by 2020 and 2024, respectively, to comply with the once-through cooling policy. The unavailability of these resources will significantly limit the CAISO's access to the flexible capacity necessary to integrate renewable resources reliably.

The CAISO has begun to conduct an annual flexible capacity technical study to determine the flexible capacity needed to help ensure the ISO system reliability as provided in ISO tariff section 40.10.1. On April 8, 2015 the CAISO issued the draft 2016 Flexibly Capacity Needs Assessment. The study concluded that System-wide flexible capacity range from 7,244 MW in June to 12,817 MW in December[5] in 2016 and will continue to grow in 2017 and beyond.

[5] See http://www.caiso.com/informed/Pages/StakeholderProcesses/FlexibleCapacityNeedsTechnicalStudyProcess.aspx

The ISO also looks at the type of flexible capacity resource needed. The most valuable category is base flexible capacity, which is made up of units can that have the capability to start frequently (at least twice per day) and operate through both the morning and evening peaks (operate for a minimum of 6 hours each day). The minimum amount of flexible capacity needed from the "base flexibility" category is 87 percent of the total amount of flexible capacity in the summer months (May – September) and 54 percent of the total amount of flexible capacity for the non-summer months (October – April). The PEP is being designed to serve this need for base flexibility resource.

1.6 PROJECT AMENDMENT BENEFITS

The project site received a Commission Final Decision in 2011. The modifications proposed in this Petition provide an opportunity to modify the project to meet the new regional demand without the need to permit a new site.

In addition, as described in this Petition, the Modified Project will substantially reduce the original footprint avoiding significant environmental impacts. The use of a fully permitted site (as reconfigured), with an approved LGIA, is a responsible approach to helping California achieve its regional demand and to further integrate renewable resources.

Specifically, the Modified Project reduces the project footprint (excluding linears) from up to 333 acres to approximately 50 acres (additional 20 acres for temporary construction laydown and parking) and provides the following environmental benefits:

- Reduces permanent habitat impacts from 333 acres to 50 acres.
- Reduces temporary habitat impacts from 50 acres to 20 acres (construction laydown and parking areas)
- Reduces operational water use from 4,125 acre feet per year (AFY) to approximately 320 AFY primarily by replacing the wet cooling tower with an ACC.
- Elimination of onsite waste treatment associated with the Brine Concentrator/Crystallizer system.
- Reduces water use during construction from 807 acre feet to less than 100 acre feet.
- Reduces mass grading of 283 acres as a result of elimination of the solar field.
- Eliminates grading across the solar field thereby reducing direct and indirect impacts to washes.

- Eliminates the use of 260,000 gallons of Therminol.
- Eliminates the potential glint and glare impacts from the solar reflectors and other visual impacts from the 250 acres of the solar field.
- Eliminates the visual plume which occurs with a “wet” cooling tower.
- Reduces the visual impact to viewers be elimination of the large south field
- Reduces construction emissions.
- Reduces traffic impacts due to the smaller peak and average construction labor force.
- Eliminates the need to install a one-mile, sanitary wastewater pipeline from the PEP plant site to the intersection of 10th St East and East Ave L.

1.7 SCOPE OF ANALYSIS

Palmdale Energy requests the Commission to process this Petition in accordance with Section 1769 of its regulations and the well-established principles of practice the Commission has followed when processing other petitions for amendment. This Petition has been prepared in accordance with those principles, focusing on comparing the modifications proposed herein for the Modified Project to those of the Approved Project as described in the Final Decision.

Section 2 DESCRIPTION OF PROJECT AMENDMENT

This section provides a description of the modifications to the Approved Project that are proposed by Palmdale Energy. The Final Decision describes the PHPP as a hybrid combined cycle project. Under the Modified Project, the solar components and associated Therminol will be eliminated, the size of the site will be reduced and the PEP will be reconfigured to incorporate fast start flexible gas turbines with an Air Cooled Condenser (ACC). For completeness purposes, this section contains a summary of the proposed changes and a complete description of the Modified Project.

2.1 SUMMARY OF PROJECT MODIFICATIONS

The project modifications proposed by this amendment include:

- Replacement of the General Electric gas turbines with new Siemens SGT6-5000Fs to meet pending need for "Flexible Resources" to support integration of renewable energy.
- Elimination of the solar components of the Approved Project.
- Elimination of Brine Concentrator/Crystallizer systems.
- Replacement of the wet cooling tower with an Air Cooled Condenser (ACC).
- Reduction of the site from 333 acres to 50 acres.
- Reduction of the construction laydown and parking area from 50 acres to 20 acres.
- Reorientation of the power block with the HRSG stacks now on the east and the combustion turbine inlets to the west.
- Relocation of the site access road connection to East Avenue M to a point further east on East Avenue M.
- Relocation of the point where the 230 kV transmission line turns south to the generating facility from East Avenue M to a point further west on East Avenue M.
- Addition of three 230 kV transmission line towers along the south side of East Avenue M north of the project site and extension of the generation tie-line westerly approximately 1,800 feet along the south side of East Avenue M.
- Addition of a waste stream consisting of combustion turbine evaporative cooler blowdown, water treatment system reject, and plant drains.
- Reduction in the length of the Approved Project sewer pipeline which will now interconnect with an existing City of Palmdale sewer pipeline along the south side of East Avenue M.
- Change in the water steam cycle chemistry control system from a phosphate based system to an all volatile system.
- Possible change from a CO_2 based fire suppression system for some components to an FM200 based system.

The project modifications proposed by this amendment do not include modifications to any of the linear facilities beyond the immediate vicinity of the Modified Project site.

2.2 INTRODUCTION AND OVERVIEW OF PEP

Palmdale Energy proposes to construct, own, and operate the Palmdale Energy Project (PEP or Project). The PEP consists of a natural gas-fired combined-cycle generating equipment to be developed on an approximately 50-acre site in the northern portions of the City of Palmdale (City). The combined-cycle equipment utilizes two Siemens SGT6-5000F natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG).

The Modified Project will have a nominal electrical output of 645 MW at average annual conditions and commercial operation is planned for summer 2019/summer 2020. The Modified Project will be fueled with natural gas delivered via a new natural gas pipeline. The Southern California Gas Company (SCG) will design and construct the approximately 8.7-mile pipeline in existing street rights-of-way (ROW) within the City of Palmdale (see Figure 2-1 at the end of this section of the Petition, as are all figures in the section). This Petition does not propose any changes to the natural gas pipeline or route contained in the Final Decision for the Approved Project.

The PEP plant site is located south of East Avenue M in the northernmost areas of the City of Palmdale. The 50-acre plant site was formerly part of an approximately 600-acre City-owned property that is bounded by Sierra Highway to the west, East Avenue M (Columbia Way) to the north, and U.S. Air Force Plant 42 on the south and east. Air Force Plant 42 is a Government Owned Contractor Operated (GOCO) facility for the production, engineering, final assembly and flight testing of high performance aircraft. Under a Joint-Use Agreement with the U.S. Air Force, Los Angeles World Airport (LAWA) currently operates a passenger terminal on Air Force Plant 42 as LA/Palmdale Regional Airport.[6]

The proposed interconnection point for the PEP with the Southern California Edison (SCE) electrical transmission system is at SCE's existing Vincent Substation south of Palmdale. This Petition proposes a minor modification to one of the approved generation tie-line routes by extending westerly approximately 1,800 feet along the south side of East Avenue M to accommodate the change in the switchyard location.

[6] To commemorate the City of Palmdale's rich aviation history and culture, some city streets are identified by both a geographic name (e.g. East Avenue M) and a historic name (e.g., Columbia Way). Thus, East Avenue M is also sometimes referred to as Columbia Way, and 10th Street East is also called Challenger Way, in both cases commemorating the fact that all six of America's Space Shuttles were manufactured at Air Force Plant 42.

See Figure 2-1. No other modifications to the generation tie-line or routes contained in the Final Decision for the Approved Project are proposed.

Reclaimed water for the Modified Project's uses will be supplied from the City of Palmdale Water Reclamation Plant (PWRP) or the City of Lancaster Advanced Waste Water Treatment Plant (AWWTP) both which are operated by the Sanitation Districts of Los Angeles County through one of the following options:

1. Trucking water from the PWRP to the Plant until the Modified Project is connected to a reclaimed water pipeline.

2. Interconnection to the existing reclaimed water pipeline located at near the intersection of Sierra Highway and East Avenue M which is along the is proposed, reclaimed water pipeline route see (see Figure 2-1).

3. Through the construction of a new 7.4 mile reclaimed water pipeline which would connect the PWPP and AWWTP. The pipeline will be installed in existing City street ROWs primarily within the City of Palmdale, although a small portion of the pipeline in the immediate area of the PWRP is in unincorporated Los Angeles County (see Figure 2-1).

This Petition does not propose modifications to the recycled water pipeline or route contained in the Final Decision for the Approved Project.

In addition to the reserve volume of water provided by onsite tank storage, the Modified Project will have a backup water source in the event of a more extended outage in the PWPP by having water supplied by the AWWTP.

During Project operations, potable water for drinking, sanitary uses, safety showers, etc. will be obtained from the Los Angeles County Waterworks District No. 40. LA County Waterworks District No. 40 has a potable water pipeline along East Avenue M that currently terminates a short distance west of the plant site's northern border. A 1.0-mile pipeline along East Avenue M will be constructed to connect the PEP to the existing pipeline (see Figure 2-1). Portable sanitary facilities and bottled water will be used during Project construction. This Petition does not propose any modifications to the water pipeline or route contained in the Final Decision for the Approved Project.

Process blowdowns and sanitary wastewater will be disposed by connecting City of Palmdale sewer system. Since the time of issuance of the Final License, the City of Palmdale has constructed an 18-inch sewer line that runs along the south side of East Avenue M. The Modified Project will connect to this existing sewer line at the point that

the sewer line intercepts the Modified Project access road, approximately 0.25 miles north of the plant site (see Figure 2-1). The sewer line, although owned by the City of Palmdale delivers waste to the same location for treatment as the Approved Project.

2.3 LOCATION OF FACILITIES

The PEP address is 950 E Ave M, Palmdale, California, 93550. As shown on Figure 2-1, the Project site is located on an approximately 50-acre parcel west of the northwest corner of U.S. Air Force Plant 42, and east of the intersection of Sierra Highway and East Avenue M. The 50-acre power plant site is currently vacant and undeveloped land owned by the City of Palmdale. Palmdale Energy has an option to purchase the 50 acre parcel from the City of Palmdale.

The plant site and most linear facilities routes are entirely within the City of Palmdale. Most of Segment 1 of the transmission line is within the City of Palmdale; the remainder of Segment 1 and all of Segment 2 are in unincorporated Los Angeles County. Similarly, a small portion of the reclaimed water supply pipeline is in unincorporated Los Angeles County with the remainder in the City of Palmdale. The transmission line and various pipeline easements are either along City-controlled parcels, land owned by the applicable utility (e.g., SCG and SCE), or are on land that the City intends to purchase.

2.4 SITE DESCRIPTION

The following paragraphs describe the PEP power plant site.

2.4.1 Existing Site Condition

The PEP plant site is located in an industrial area of the City of Palmdale. The site is currently vacant and undeveloped. The site is largely flat, with elevations ranging from approximately 2,500 feet to 2,505 feet above sea level.

The legal description of the plant site is as follows: a portion of Section 1, Township 6 North, Range 12 West, (San Bernardino Base and Meridian), located within the north of the City of Palmdale. The assessor's parcel numbers that comprise the plant site and 20 acre laydown and parking area are provided in Table 2-1. See Figure 2-2 for the parcel map that includes the 50-acre parcel and adjacent parcel for the 20 acre laydown and parking area proposed for the Modified Project. Updated Ownership information for the properties surrounding the plant site and along the linear facilities routes is provided in Appendix 7-A to this Petition.[7]

[7] Ownership information provided by City of Palmdale in April, 2015.

Table 2-1
PEP Plant Site Parcels- Assessor's Parcel Numbers (APN)

Parcel 1 of Parcel Map No. 070999 in the City of Palmdale, County of Los Angeles, State of California, per map recorded in Book 380 pages 77-79 of Parcel Maps in the Office of the County Recorder of Said County	***Parcel 2 of Parcel Map No. 070999 in the City of Palmdale, County of Los Angeles, State of California, per map recorded in Book 380 pages 77-79 of Parcel Maps in the Office of the County Recorder of Said County***

2.4.2 Site Surveys

Detailed land and topographic surveys were performed to establish site boundaries, to understand grading requirements and to establish a baseline drainage plan. A preliminary geotechnical report of the PEP plant site was performed to evaluate general subsurface conditions, seismicity and other geologic hazards and to provide recommendations for design and construction of the foundations for Project structures. A copy of this report for the Approved Project was included as Appendix B to the Approved Project's AFC.

In general, the study found the plant site geo-technically feasible for construction of the proposed electrical generating facilities. Supplementary geotechnical investigations will be performed to support detailed design.

2.5 GENERATING FACILITY DESCRIPTION

The following sections describe the PEP site arrangement and the processes, systems and equipment that constitute the proposed power plant. All Project facilities will be designed, constructed and operated in accordance with applicable laws, ordinances, regulations and standards (LORS).

2.5.1 Site Arrangement

Figure 2-3 shows the layout of Project facilities including:

- Plant site and laydown area,
- The site access road to Avenue M.,
- The project's 230 kV switchyard

Figure 2-4 is a general arrangement of the Modified Project's power block. As shown on Figure 2-4, major components of the Modified Project include:

- Two CTGs each with a HRSG,
- One STG,
- One Air Cooled Condenser,
- A 230-kV switchyard,
- An operations building that incorporates control, warehouse, maintenance, and administrative functions, and
- A gas metering station.

Figure 2-5a is an elevation drawing looking north and Figure 2-5b is an elevation drawing looking east. Equipment dimensions are provided in Appendix 2-A.

2.5.2 Process Description

This section describes the power generation process and thermodynamic cycle employed by the Project. The power plant consists of:

- Two CTGs equipped with dry low NO_X combustors and evaporative inlet air coolers,
- Two HRSGs equipped with duct burners, and
- One STG

The CTGs and duct burners are fueled exclusively with pipeline natural gas. The duct burners provide additional heat, which enable the HRSGs to produce more steam in order to obtain peaking output from the STG.

At full load, each CTG generates approximately 220 MW (gross) at average ambient conditions with the evaporative coolers in service. Heat from the CTG exhausts is used in the HRSGs to generate steam and to reheat steam. With the CTGs at full load and the evaporative coolers in service and the duct burners out-of-service, the HRSGs produce sufficient steam for operation of the STG at an output of 232 MW (gross) at average ambient conditions, which results in an overall plant output of approximately 672 MW (gross).

With the CTGs at full load and the duct burners in-service, the HRSGs produce sufficient steam for operation of the STG at its peaking output of 276.2 MW (gross) at average ambient conditions, which results in an overall plant gross output of approximately 699.4 MW (net).

The PEP's interconnect agreement limits plant net output to 570 MW (more correctly 570 MW at the point of interconnection but this discussion will use net plant output for simplicity). Plant net output would exceed 570 MW without the evaporative coolers or duct burners in service at temperatures below approximately 96°F. Additionally, plant output would exceed 570 MW at any temperature with the evaporative coolers in service and/or the duct burners in service. At ambient conditions during which the plant could exceed 570 MW without evaporative cooling and duct firing, the PEP plant net output will be limited to 570 MW by controlling fuel flow to the combustion turbines through the plant control system.

At all ambient conditions, a plant net output of 570 MW can be achieved without the use of duct burners, assuming the evaporative coolers can be put into service with both gas turbines operating. However there are likely be conditions where the plant is operated with one gas turbine off-line and the duct burners can provide additional capacity.

Overall, annual availability of the PEP is expected to be in the range of 90 to 95 percent. The plant's capacity factor will depend on the provisions of bilateral power sales contracts, as well as market prices for electricity, ancillary services, and natural gas. The design of the Modified Project provides for operating flexibility (the ability to rapidly start up, shut down, turn down and provide peaking output), so operations may be readily adapted to changing market conditions and provide the flexible capacity necessary to integrate intermittent resources in the CAISO.

The "Flex 30" fast start plant concept offered by Siemens Energy, the supplier of the Modified Project's combustion equipment, allows for faster starting of the gas turbines by mitigating the restrictions of former HRSG designs. Traditionally, the CTGs are brought to full load slowly to limit combined stresses in the high-pressure steam drum of the HRSG, due to the exhaust temperature of the CTGs. The new Siemens design incorporates their "drum plus" concept for the HP steam drum which reduces startup limits imposed by traditional HP drums. Additional equipment to support the fast start plant includes an auxiliary boiler, which will supply sealing steam and allow startup of the steam turbine, shortly after the gas turbines.

A heat balance diagram corresponding to base load operation of the PEP is shown in Figure 2-6a. This base load heat balance is based on average ambient conditions of 64°F/40% relative humidity, evaporative coolers in-service, and duct burners out-of-service. A heat balance at the same conditions but with the evaporative coolers in-service is provided as Figure 2-6b. A heat balance diagram corresponding to peak load operation of the facility is shown in Figure 2-6c This peak load heat balance is based on the same average ambient conditions as the base load heat balance, with evaporative

coolers in service, and duct burners in service providing the STG with extra steam for peaking output.

The following provides a brief description of the combined-cycle equipment's thermodynamic cycle (a combination of the Brayton and Rankine cycles):

- Air flows through the inlet air filter, evaporative cooler, and associated inlet air ductwork of each CTG and is then compressed in the CTG compressor.
- Compressed air exiting the compressor flows to the CTG combustors.
- Natural gas fuel is then injected into the combustors and ignited. The hot combustion gases expand through the CTG's turbine to drive the entire CTG, including the compressor and the electric generator which share a common shaft with the turbine.
- The hot combustion gases exit the turbine and enter the HRSG dedicated to that CTG. Duct burners installed in each HRSG further heat the CTG exhausts at times when peaking output is desired.
- In the HRSGs, heat from the CTG exhausts is transferred to water pumped into the HRSG pressure parts (economizers, evaporators, etc.).
- The water is converted to superheated steam and is delivered to the STG at three pressures, high pressure (HP), intermediate pressure (IP), and low pressure (LP). Note: The use of multiple steam delivery pressures provides an increase in cycle efficiency.
- HP steam from the HRSG is admitted to the HP section of the STG, the steam expands through the HP section to drive the STG, and exits the HP section as 'cold reheat' steam.
- Cold reheat steam is combined with IP steam from the HRSG and delivered to the HRSG reheater.
- Hot reheat steam leaving the reheater is admitted to the IP section of the STG and expands through the IP and LP sections to further drive the STG.
- LP steam from the HRSG is admitted to the LP section of the STG and expands through the LP section to also further drive the STG.
- Steam leaving the LP section of the STG enters an air cooled condenser, gives up its latent heat to atmosphere, and is condensed to liquid.

- The condensate then pumped back to the condensate/feed system for feed to the HRSGs.

2.5.3 Energy Conversion Facilities Description

This section describes the major energy conversion components of the proposed PEP including the CTGs, HRSGs, and STG.

2.5.3.1 Combustion Turbine-Generators (CTG)

Thermal energy is produced in each of the two Siemens SGT6-5000F CTGs through the combustion of natural gas. The thermal energy is then converted into mechanical energy by the CTG turbine that drives the CTG compressor and electric generator. The CTGs proposed for the PEP employ 'F' technology and are supplied by Siemens Energy. Each CTG consists of a heavy duty, single shaft, combustion turbine-generator and associated auxiliary equipment. The CTGs are equipped with dry low NO_X combustors designed for natural gas. Procurement of the CTGs is based on functional performance criteria, including the following:

- Air emissions at the gas turbine exhaust shall not exceed specified levels.
- Noise emissions shall not exceed specified near-field and property line levels.
- Each CTG shall be capable of operating at 50 percent to 100 percent load, while meeting specified air emissions performance criteria.
- Each CTG shall be capable of a specified number of startups per year.

The CTGs are equipped with accessories required to provide efficient, safe and reliable operation, including the following:

- Inlet air filters and on-line filter cleaning system,
- Evaporative inlet air coolers,
- On-line and off-line compressor wash system,
- Fire detection and protection system,
- Lubrication oil system including oil coolers and filters,
- Generator coolers,
- Starting system, auxiliary power system, and control system, and

- Metal acoustical enclosures designed for outdoor service.

2.5.3.2 Heat Recovery Steam Generators (HRSG) and Steam Cycle

In the combined-cycle configuration, each gas turbine will exhaust to a dedicated HRSG. Each of the two trains will consist of one CTG and one HRSG. Both CTG-HRSG trains will feed steam into a common STG (a standard 2-on-1 configuration).

Each HRSG is a horizontal, natural circulation type unit with three pressure levels of steam generation and reheat loop. High-pressure steam at 1902 pounds per square inch gage (psig) and 1,050°F is produced in the HRSG and flows to the steam turbine throttle inlet (average annual conditions - evaporative coolers on, no duct firing). The exhausted cold reheat steam is mixed with intermediate pressure steam and reintroduced into the HRSG through the reheat loop. The hot reheat steam flows to the intermediate-pressure section of the STG and then to the low-pressure section of the STG. Low-pressure steam from the HRSG also flows to the low-pressure section of the STG. The STG drives an electric generator to produce electricity. The STG exhaust steam is condensed in the air cooled condenser.

Siemens "Flex 30". As noted earlier, the PEP is designed with Siemens Flex 30, which will allow the CTG to reach base load more quickly, reducing startup emissions. Since emission rates are higher during startup, than during normal steady-state operations, the Flex 30 design will facilitate the Modified Project's compliance with air emission requirements.

To facilitate the Flex 30 approach, the HRSG design will be modified. Typical HRSG designs limit the CTG start rate, due to the exhaust temperature heating the steam drum too quickly. This limitation is caused by thermal stress limitations on the high-pressure steam drum due to the shell thickness. To avoid this limitation, Siemens will incorporate a "drum plus" design for the high pressure steam drum. This allows a smaller pressure vessel for the high pressure drum which results in shorter warm up time for the thick walled drum.

2.5.3.3 Auxiliary Boiler

Another limiting factor for startup of combined-cycle equipment is the ability to draw a vacuum on the condenser, which is necessary to commence STG startup. The PEP will use an auxiliary boiler to facilitate rapid startup by providing STG sealing steam prior to CTG startup, thereby allowing the condenser vacuum to be established and the condenser be in a condition ready to accept steam as soon as it is needed. This also avoids the need to vent considerable steam to the atmosphere while waiting for

condenser vacuum to be established following CTG start and the beginning of steam generation within the HRSG.

2.5.3.4 Steam Turbine-Generator (STG)

Steam from the HRSGs is sent to the STG. The steam expands through the STG turbine blades to drive the steam turbine, which in turn drives the generator. The PEP's STG is a "reheat" type and is equipped with accessories required to provide efficient, safe, and reliable operation, including the following:

- Governor system,
- Steam admission system,
- Gland seal system,
- Lubrication oil system including oil coolers and filters,
- Generator coolers, and
- Metal acoustical enclosures designed for outdoor service.

2.5.3.5 Electrical System Description

This section describes the major electrical systems and equipment proposed for the PEP. Almost all of the power produced will be delivered to the regional grid through the Modified Project's interconnection with the SCE transmission system. A small amount of the Modified Project's output will be used on-site for plant auxiliaries such as pumps, control systems and general facility loads including lighting and heating-ventilation-air conditioning (HVAC). Some of the power needed for on-site uses will be converted from alternating current (AC) to direct current (DC) for power plant control systems and emergency backup systems. The descriptions of the major electrical systems and equipment provided in the following subsections reflect AC power unless otherwise noted. One-line diagrams of the major electrical systems are presented in Figures 3-1a and 3-1b.

2.5.3.6 Major Electrical Equipment and Systems

A small amount of the Modified Project's electric power output will be used onsite to power auxiliaries and general facility loads. Power will be generated by the two CTGs and one STG at 18 kV and stepped up by three fan-cooled generator step-up transformers to 230 kV for transmission to the grid. Auxiliary power will be back-fed through two of the step-up transformers. Once the CTGs are running, they will supply

the plant auxiliary power. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 230-kV system, caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within berms designed to contain the non-PCB transformer oil in the event of a leak or spill. Fire protection systems will be provided. The high-voltage side of the step- up transformers will be connected to 230-kV circuit breakers, then to overhead lines that extend off-site to connect with SCE's regional transmission system at the Vincent Substation.

2.5.3.7 Grounding

The electrical system is susceptible to ground faults, lightning strikes and switching surges that result in high voltage potential hazards to site personnel and electrical equipment. The station grounding system provides an adequate path to permit the dissipation of current created by these events. The station- grounding grid will be designed for adequate capacity to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentration. The grid spacing will maintain safe step voltage gradients.

Bare conductors will be installed below-grade in an engineered grid pattern. Each junction of the grid will be bonded together by an exothermic weld or compression connection. Ground resistivity readings will be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under severe fault conditions. Grounding stingers will be brought from the ground grid to connect to building steel and non-energized metallic parts of electrical equipment.

2.5.3.8 Electrical Generation

Power is generated at 18 kV by the two CTGs and STG, and then is stepped up to 230 kV for delivery to the power plant's interconnection with the regional grid. Each of the Modified Project's three generators is connected by 18-kV bus to an 18/230-kV oil-filled, step-up transformer dedicated to the generator. Each step-up transformer rests on a concrete pad designed to contain the transformer oil in the event of a leak or spill. The 230-kV side of each step-up transformer is connected by overhead conductors to a breaker and one-half 230-kV switchyard at the plant site.

2.5.3.9 Electrical System for Plant Auxiliaries

Power for plant auxiliaries is supplied at 4160V from two auxiliary transformers. The 18-kV bus of each CTG is provided with a tap connection to an 18-kV/4160-V oil-filled, step-down, auxiliary transformer. The 4160V side of each transformer is connected to 4160V switchgear. Each CTG is provided with an 18-kV generator breaker located

between the generator and the tap connection. This configuration allows power for plant auxiliaries to be supplied from the plant switchyard regardless of whether the CTGs and STG are online or offline. The auxiliary transformers rest on concrete pads designed to contain the transformer oil in the event of a leak or spill.

The 4160V switchgear distributes power to the plant's 4160V motors, to the CTG starting system and to the 4160/480V transformers. The low voltage side of the 4160/480V transformers is connected to 480V switchgear. The 480V switchgear distributes power to the plant's large 480V loads and to 480V motor control centers (MCCs). The MCCs distribute power to the plant's intermediate 480V loads and to power panels serving small 480V loads. The MCCs also distribute power to 480/277V isolation transformers serving 277V single-phase loads and to 480/208/120 transformers serving 208V and 120V loads.

2.5.3.10 DC Power Supply System

The plant's DC power supply system consists of a 125VDC battery, a 125VDC battery charger, metering, ground detectors and distribution panels and is distributed amongst the two CTG's. In addition, a similar DC power supply system is provided as part of each CTG's auxiliary power system. Under normal operating conditions, the battery charger supplies DC power to the DC loads. The battery charger receives 480V, three-phase AC power from the electrical system serving plant auxiliaries. The battery charger continuously charges the battery bank, while supplying DC power to the DC loads. Under abnormal or emergency conditions when AC power is not available, the battery bank supplies DC power to the DC loads. The battery bank is sized to power the DC loads for a sufficient amount of time to provide for safe and damage-free shut down of the power plant. Recharging the battery bank occurs whenever AC power becomes available.

The DC power supply system provides power for critical control circuits, power for control of the 4160V and 480V switchgear and power for DC emergency backup systems. Emergency backup systems include DC lighting and DC lubes oil and seal oil pumps for the CTGs and STG.

2.5.3.11 Essential Service AC Systems

An essential service AC system (120V, single-phase) provides power to essential instrumentation, critical equipment loads, safety systems and equipment protection systems that require uninterruptible AC power. The essential service AC system and the DC power supply system are both designed to ensure that critical safety and equipment protection control circuits are always energized and able to function in the event of unit trip or loss of AC power.

The essential service AC system consists of an inverter, a solid-state transfer switch, a manual bypass switch, an alternate AC source transformer and voltage regulator and AC panel boards. The DC power supply system is the normal source of power to the essential service AC system. Power flows from the DC power supply system through the inverter to the AC panel boards. The solid-state transfer switch continuously monitors both the inverter output and the alternate AC source. Upon loss of the inverter output and without interruption of power, the transfer switch automatically transfers essential service AC loads from the inverter output to the alternate AC source. The manual bypass switch enables isolation of the inverter and transfer switch for testing and maintenance without interruption of power to the essential service AC loads.

2.5.3.12 Emergency Generator

The emergency diesel generator will supply electrical power to the power plant critical services in the event of a total power outage of the switchyard and the plant. The plant critical services will include battery chargers, turning gear, lubricating oil systems, DCS/PLC controls and critical lighting.

The generator will be designed, tested, rated, assembled and installed in accordance with all the applicable standards of ANSI, NEC, ISO, U.L., IEEE and NEMA. The equipment shall meet the requirements of NEC and all applicable codes and regulation.

The generator will be Standby rated at 1500 KVA, 1,800 RPM, at 0.8 power factor, 480VAC, 3 phase, 4 wire, 60 hertz, 480/277VAC, wyes connected to a high resistance grounded system, including radiator fan and all parasitic loads. The diesel generator will have auto-sync capabilities.

The emergency diesel generator will be installed in a dedicated area in the combined-cycle area of the plant site and will include the following major components:

- Diesel Engine,
- Governor,
- Lubricating System,
- Generator,
- Exciter,
- Voltage Regulator,
- Remote Synchronizing Panel, including protective relaying and metering,

- Generator Mounted Control Panel,
- Cooling System,
- Fuel System - Fuel Piping and 24 hours Fuel Tank,
- Exhaust System,
- Starting System including Batteries and Batteries Charger, and
- Weather Protective Enclosure.

Emergency Generator Operation Description. The plant critical or essential auxiliary electric loads will be served by the normal plant auxiliary power system at 480V or less, except when the normal source of power is interrupted or in the case of complete power shutdown at the plant. The emergency generator power system and the critical equipment system will be designed and arranged such that in the event of failure of the normal auxiliary power, the emergency diesel generator will be automatically connected within 10 seconds to the essential loads and the switching devices (time delay or non-automatic) that are supplying the critical/essential loads.

When the normal plant auxiliary power source is restored, and after a time delay, the automatic transfer switch will disconnect the emergency power source and connect the load to the normal power source. The emergency diesel generator will be periodically tested to confirm it's mechanical, electrical and control equipment integrity. The emergency generator system will be synchronized with the normal auxiliary power system from time to time to test its total output power into the system.

2.5.4 Plant Auxiliary Systems and Process Descriptions

The following subsections describe the various plant auxiliary systems (fuel supply, water supply, water treatment, cooling systems, air emissions control, waste management, etc.) associated with the PEP.

2.5.4.1 Fuel Supply and Use

The CTGs and duct burners are designed to burn natural gas. The fuel requirement for base load operation at average ambient conditions is approximately 4442.8x10^6 Btu/hr. (HHV). The fuel requirement for peaking operation at average ambient conditions is approximately 4848.4x10^6 Btu/hr (HHV).

The Modified Project will be fueled with natural gas delivered via a new 20-inch gas pipeline to be installed by Southern California Gas. No modifications to the natural gas pipeline route of the Approved Project are being proposed in the Petition. Natural gas

for the duct burner systems branches off and is regulated to a lower pressure. Safety pressure relief valves are provided downstream of pressure regulation valves. The CTG systems include a natural gas preheater and flow modulation equipment. The duct burner systems also have flow modulation equipment. Table 2-4 shows the typical composition of the natural gas that will fuel the PEP.

Table 2-4
Typical Natural Gas Composition

Component	Molar % Average
Methane, CH_4	95.358
Ethane, C_2H_6	2.978
Propane, C_3H_8	0.197
Butane, C_4H_{10}	0.025
Pentane, C_5H_{12}	0.000
Hexane, C_6H_{14}	0.011
Carbon Dioxide, CO_2	0.998
Nitrogen, N_2	0.393
Isobutane, CH10	0.023
Isopentane, C5H12	0.003
Total	100.00
Specific Gravity	0.583
BTU (Higher Heating Value)	1027
Natural Gas Ratio (HHV/LHV)	1.109
(Source: SCE 2014 Gas Composition from SoCal Gas)	

2.5.4.2 Water Supply and Use

The PEP's various water uses include makeup for the HRSGs, makeup for the CTG evaporative coolers, service water, potable water and fire protection water. A water balance diagram corresponding to base load operation of the power plant at the average ambient conditions of 64°F and 40 percent relative humidity is presented in Figure 2-7a. A similar diagram at the average ambient conditions with the evaporative coolers on is presented in Figure 2-7b, while Figure 2-7c is a water balance diagram at average annual conditions at base load with the evaporative coolers in service and the duct burners on.

Water Requirements. Figures 2-7a, 2-7b, and 2-7c provide estimated flow rates in gallons per minute (gpm). The estimated daily rate requirements for the power plant's various water uses are presented in Table 2-5. The estimated maximum annual process water requirements are also presented in Table 2-5, based on an upper bound 95 percent capacity factor. Equipment sizing will be consistent with peak daily rates to ensure adequate design margin.

The peak daily process water usage is estimated at approximately 385,500 gallons per day and the estimated annual process water use is 320 acre feet (AF).

Table 2-5
Daily and Annual Water Uses

Water Use	Average Daily Rate (gpm)	Peak Daily Rate (gpm)	Estimated Maximum Annual Use (Acre-Feet)
Process water	198	268	320
Potable water	2.2	3.8	3.6

Primary Water Source and Quality. PEP process water needs will be met by use of reclaimed water supplied by the PWPP. The small quantity of potable water required by the Modified Project (for human use for drinking, toilets, washing, etc.) will be provided by the Los Angeles County Waterworks District No. 40. Both agencies have provided Will Serve Letters, which are provided in the original AFC Appendix E. An onsite raw water storage tank with a capacity of 1,000,000 gallons will hold 800,000 gallons of reclaimed water for plant operations (sufficient to cover a week interruption of water supply to the facility), plus 200,000 gallons of reclaimed water dedicated to the plant's fire protection water system. As described in the AFC and analyzed for the Approved Project, the anticipated quality of reclaimed water that will be supplied by the PWRP is shown in Table 2-6. The PWRP currently treats water to produce tertiary-treated (reclaimed) water. The information provided in Table 2-6 is from the PWRP Quarterly Water Recycling Monitoring Report for the Fourth Quarter of 2014

Table 2-6
Expected Palmdale Water Reclamation Plant Reclaimed Water Quality Data

Water Quality Parameter	Average Concentration
Total Dissolved Solids	~548 mg/l
Residual Chlorine	3.86 – 4.06 mg/l
Turbidity	0.45 – 0.63 NTU
Ammonia as Nitrogen	2.10 – 4.42 mg/l
Nitrate as Nitrogen	2.21 – 5.10 mg/l
From Palmdale Reclamation Plant Water Recycling Monitoring Report – 4th Quarter 2014	

Backup Water Source. In the same manner as the Approved Project, in addition to the reserve volume of water provided by onsite tank storage, the Modified Project will have a backup water source in the event of a more extended outage in the City of Palmdale's reclaimed water supply system. This backup source will also be reclaimed water using a planned regional reclaimed water backbone system, linking the City of Palmdale with the City of Lancaster which will allow the Lancaster treatment plant to also provide reclaimed water to the Modified Project.

Water Treatment. The base load and peak-load water-balance diagrams presented in Figures 2-7a, 2-7b, and 2-7c show the power plant's various water uses and water treatment processes. The HRSG makeup, and CTG evaporative cooler makeup (described in the following subsections) all require onsite treatment; the treatment varies according to the quality required for each of these uses. The service water, potable water and fire protection water does not require onsite treatment other than treatment with a biocide. The following paragraphs describe the PEP's water treatment processes.

The raw water used as feed water for the CTG inlet air evaporative coolers may be blended with demineralized water based on final engineering design.

HRSG Makeup Water. Makeup water for the HRSGs must meet stringent specifications for suspended and dissolved solids. To meet these specifications, water from the raw water storage tank is processed through a demineralizer process. Demineralization is accomplished through a module with a single train system. The number of modules and capacity of the demineralizer system is determined based on start-up and operating demineralized water requirements. The demineralization process may include multi-media or membrane filtration and micron cartridge type filtration, reverse osmosis, and/or electrode ionization. Periodically media filters are backwashed. The micron filter cartridges are changed periodically. Demineralized product water is stored in a 265,000-gallon demineralized water storage tank. The RO concentrate is directed to the municipal sewer system.

Additional conditioning of the condensate and feedwater circulating in the steam cycle is provided by means of an all volatile chemical feed system. The chemical feed system includes the necessary feed tanks and two full-capacity metering pumps.

A steam cycle sampling and analysis system monitors the water quality at various points in the plant's steam cycle. The water quality data is used to guide adjustments in water treatment processes and to determine the need for other corrective operational or maintenance measures. Steam and water samples are routed to a sample panel where steam samples are condensed and the pressure and temperature of all samples are reduced as necessary. The samples are then directed to automatic analyzers for continuous monitoring of conductivity and pH. All monitored values are indicated at the

sample panel and critical values are transmitted to the plant control room. Grab samples are periodically obtained at the sample panel for chemical analyses that provide information on a range of water quality parameters.

2.5.4.3 Cooling Systems

The power plant includes two cooling systems; 1) the steam cycle heat rejection system (e.g., air cooled condenser) and 2) the lube oil cooling systems (equipment cooling), each of which is discussed below:

Steam Cycle Heat Rejection System. The heat rejection from the steam cycle will be via an air cooled condenser (ACC). The ACC is a direct cooling system where the steam exhaust from the low pressure turbine section is condensed inside air-cooled finned tubes. The ACC is made of modules arranged in parallel rows. Each module contains a number of finned tube bundles. An axial flow fan located in each module forces the cooling air across the heat exchange area of the fin tubes. The heat rejection system will include the ACC, the supporting structure, steam ducting from the LP turbine interface, auxiliaries such as the condensate and drain pumps, condensate and duct drain tanks, the air evacuation pumps, and related piping works and instrumentation.

Closed Cooling Water System. The closed cooling water system is filled with a coolant such as a mixture of glycol and water. This coolant is pumped in a closed loop for the purpose of cooling equipment including - the CTG and STG lubrication oil coolers, the CTG and STG generator coolers, the air compressor aftercoolers, the steam cycle sample coolers, etc. The coolant picks up heat from the various equipment items being cooled and then the coolant itself is then cooled by a fin-fan cooler

2.5.4.4 Waste Generation and Management

Project wastes include wastewater, non-hazardous solid waste, hazardous solid waste, and hazardous liquid waste. Wastes generated by the PEP will be collected, managed and disposed in accordance with applicable LORS.

Wastewater. The base load and peak load water balance diagrams show the power plant's wastewater streams and the disposition of wastewater. Plant Wastewater will be collected and discharged off site into the City of Palmdale sewer system.

Wastewater sources for processing include the following:

- HRSG Blowdown,
- CTG Evaporative Cooler Blowdown,

- Demineralization System Wastewater,
- Chemical Feed Area Drains,
- General Plant Drains, and
- Sanitary wastewater.

The Modified Project's sanitary system collects wastewater from sanitary facilities such as sinks and toilets. The Modified Project's sanitary wastewater system will be sized to accommodate the needs of a small work force (23 people for 24/7 operations).

Preliminary engineering indicates a six to twelve inch line will be sufficient to handle the plant wastewater streams for interconnection to the City of Palmdale sewer system.

Non-Hazardous Solid Waste. The operation and maintenance of the PEP will generate non- hazardous solid wastes typical of power generation facilities. These wastes include scrap metal, insulation material, paper, glass, empty containers, plastics and other miscellaneous solid wastes. These materials will be disposed of by means of contracted refuse collection and recycling services.

Hazardous Solid and Liquid Waste. Hazardous wastes will be generated during Project construction and operation. Most of the hazardous wastes during the construction phase (e.g., paint and primer, thinners, solvents) will be recycled. Hazardous solid and liquid waste streams generated during PEP operations include spent SCR catalyst; used hydraulic fluids, oils, greases, filters, etc.; spent cleaning solutions and spent batteries. To the extent possible, operation phase hazardous wastes will be recycled.

2.5.4.5 Hazardous Materials Management

There will be a variety of hazardous materials used and stored during construction and operation of the PEP. Section 4.3 of this Petition provides and updated list of hazardous materials for use in Appendix A to Condition of Certification **HAZ-1.**

All hazardous materials will be stored onsite in storage tanks or vessels that are specifically designed for the characteristics of the materials to be stored. The storage facilities will include the needed secondary containment in case of tank/vessel failure.

Hazardous materials that will be used during construction include gasoline, diesel fuel, oil, lubricants and small quantities of solvents and paints. During operation, hazardous materials that will be stored and used onsite include aqueous ammonia for the SCR

system (aqueous ammonia is a dilute solution of less than 20 percent ammonia, with the balance water). A 30,000-gallon carbon steel aqueous ammonia storage tank will be provided with a containment basin draining to a covered collection sump. The collection sump will be sized to contain the entire contents of the storage tank.

Carbon steel tanks also will be used to store lube oil and diesel fuel (largest tank is 2,200 gallons). Secondary containment will be provided for the tank.

A variety of safety-related plans and programs will be developed and implemented to ensure safe handling, storage, and use of hazardous materials (e.g., Risk Management Program and Hazardous Material Business Plan). Plant personnel will be supplied with appropriate personal protective equipment (PPE) and will be properly trained in the use of PPE. Additional training will include the handling, use and cleanup of hazardous materials used at the facility, as well as procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials will be stored onsite.

2.5.4.6 Air Emissions Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs and duct burners are controlled by state-of- the-art systems. Emissions that are controlled include nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), fine particulate matter (PM10) and sulfur dioxide (SO_2). Continuous emissions monitoring is performed to ensure that the control systems perform correctly and to provide compliance documentation. All emissions values stated in the following subsections are based on parts per million by volume, dry basis (ppmvd) corrected to 15 percent oxygen (O_2). A summary of emission rates from the combined-cycle equipment is shown in Table 2-7. A brief description of planned air emissions control methods is provided in the following paragraphs.

Table 2-7
Combined-Cycle Emission Rates

Pollutant	Load Range % of GT Base	Ambient Temperature Range ºF	Duct Burner Status	Emission Rate
NO_X Emissions, ppmvd, Ref. 15 % O_2	50 to 100	18-108	Off	2 ppmvd
NO_X Emissions, ppmvd, Ref. 15 % O_2	Base	18-108	On	2 ppmvd
NH_3 Emissions, ppmvd, Ref. 15 % O_2	50 to 100	18-108	Off	5 ppmvd
NH_3 Emissions, ppmvd, Ref. 15 % O_2	Base	18-108	On	5 ppmvd
CO Emissions, ppmvd, Ref. 15 % O_2	50 to 100	18-108	Off	2 ppmvd
CO Emissions, ppmvd, Ref. 15 % O_2	Base	18-108	On	2 ppmvd
VOC Emissions, ppmvdRef.15% O_2 as CH_4	50 to 100	18-108	Off	1 ppmvd
VOCEmissions, ppmvdRef.15% O_2 as CH_4	Base	18-108	On	2 ppmvd
Total PM10 lb/hr per Stack	50 to 100	18-108	Off	10 lb/hr
Total PM10 lb/hr per Stack	Base	18-108	On	12 lb/hr

Nitrogen Oxides Emissions Control. Stack emissions of NO_X will be controlled by use of dry low-NO_X (DLN) combustors in the CTGs followed by selective catalytic reduction (SCR) in the HRSGs. The DLN combustors control NO_X emissions at the CTG exhausts by pre-mixing fuel and air immediately prior to combustion. Pre-mixing inhibits NO_X formation by minimizing both the flame temperature and the concentration of oxygen at the flame front.

The SCR process uses aqueous ammonia (NH_4OH) as a reagent. Stack emissions of ammonia, referred to as 'ammonia slip,' are up to 5 ppmvd. The SCR system includes a catalyst bed located within each HRSG, an ammonia storage system and an

ammonia injection system. The catalyst bed is located in a temperature zone of the HRSG where the catalyst is most effective over the range of loads at which the plant will operate. The ammonia injection grid is located upstream of the catalyst bed.

A 30,000-gallon aqueous ammonia storage tank located on the PEP plant site will provide sufficient capacity for more than 5 days of continuous operation.

Other Criteria Pollutant Emissions Control. An oxidation catalyst located within each HRSG controls stack emissions of CO. The oxidation catalyst also reduces stack emissions of VOC.

Fine particulate (particulate matter smaller than 10 microns in size, referred to as PM10) emissions are controlled by inlet air filtration and by the use of natural gas fuel, which contains essentially zero particulate matter. Stack emissions of PM10 consist primarily of hydrocarbon particles formed during combustion. Sulfur dioxide emissions are controlled by the use of natural gas fuel, which contains only trace quantities of sulfur.

Continuous Emissions Monitoring System (CEMS). The Modified Project's CEMS will be in a self-enclosed, climate controlled enclosure and will sample, analyze and record NO_X, CO, and O_2 concentrations in the stack exhaust. The CEMS will generate a log of emissions data for compliance documentation and activate an alarm in the plant control room when stack emissions exceed specified limits.

2.5.4.7 Fire Protection

Fire protection systems are provided to limit personnel injury, property loss, and Project downtime resulting from a fire. The systems include a fire protection water system, FM200 or CO_2 fire suppression systems for the CTGs and portable fire extinguishers.

The PEP's fire protection water system will be supplied from a dedicated 200,000-gallon portion of the 1,000,000-gallon raw water storage tank located on the Modified Project site. One diesel-driven fire pump, with a capacity of 500 gallons per minute will deliver water to the fire protection water-piping network. A second electric motor-driven pump (a small capacity jockey pump) will maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, the fire pump starts automatically.

The piping network will be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. The piping network will supply fire hydrants located at intervals throughout the power plant site, a sprinkler deluge system at each unit transformer and a sprinkler system in the operations building.

The FM200 or CO_2 fire suppression system provided for each CTG will include a storage tank, piping and nozzles, fire detection sensors and a control system. Upon detection and automated confirmation of the existence of a fire, the control system will automatically shut down the CTG, turn off ventilation fans, close ventilation openings and release FM200 or CO_2. The FM200 or CO_2 fire suppression systems will cover the turbine and accessory equipment enclosures of each CTG. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.

2.5.4.8 Plant Auxiliary Systems

The following plant auxiliary systems control, protect and support the Modified Project and its operation.

Distributed Control System. The Distributed Control System (DCS) provides control, monitoring, alarm and data storage functions for power plant systems. These include:

- Control of the CTGs, STG, HRSGs and balance-of-plant systems in a coordinated manner,
- Monitoring of operating parameters from plant systems and equipment,
- Visual display of the associated operating data to control operators and technician
- Detection of abnormal operating parameters and parameter trends and provision of visual and audible alarms to apprise control operators of such conditions, and
- Storage and retrieval of historical operating data.

The DCS is a Siemens expandable microprocessor-based system. Redundant capability is provided for critical DCS components, such that no single component failure will cause a plant outage. The DCS consists of the following major components:

- Flat Panel-based control operator interface (redundant),
- Flat Panel-based control technician work station,
- Multi-function and expandable processors (redundant),
- Input/output processors (redundant for critical control parameters),
- Field sensors and distributed processors (redundant for critical control parameters),
- Historical data archive, and

- Printers, data highways, data links, control cabling and cable trays.

The DCS is linked to the control systems furnished with the Siemens CTG and STG scope of supply. These data links provide CTG and STG control, monitoring, alarm and data storage functions via the Flat Panel based control operator interface and control technician workstation of the DCS. The DCS will provide Automatic Generation Control (AGC) and Remote Interface Gateway (switchyard control) for CAISO.

Lighting System. The Modified Project's lighting system will provide operations and maintenance personnel with illumination in both normal and emergency conditions. The system will consist primarily of AC lighting, but will include DC lighting for activities or emergency egress required during an outage of the plant's AC electrical system. The lighting system also will provide AC convenience outlets for portable lamps and tools. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity.

Cathodic and Freeze Protection Systems. Cathodic protection systems protect against electrochemical corrosion of underground metal piping and structures. Underground metal structures of the Modified Project will have cathodic protection.

Freeze protection systems are not needed for the combined-cycle equipment because of the infrequency and short duration of below-freezing ambient temperatures at the Modified Project site.

Service Air and Instrument Air Systems. The service air system supplies compressed air to hose connections located at intervals throughout the power plant. Compressors deliver compressed air at a regulated pressure to the service air-piping network.

The instrument air system provides dry, filtered air to pneumatic operators and devices throughout the power plant. Air from the service air system is dried, filtered, and pressure regulated prior to delivery to the instrument air-piping network.

2.5.5 Project Civil/Structural Features

The following subsections describe civil/structural features of the Modified Project, as illustrated in the Figures 2-3 and 2-4. The power plant will be designed in conformance with California Building Code seismic criteria.

2.5.5.1 CTGs, HRSGs, STG, and Associated Equipment

The CTGs, HRSGs, STG, and air cooled condenser will be located outdoors and supported on reinforced concrete mat foundations. The STG foundation will include a reinforced concrete pedestal that supports the STG above the piping to the air cooled condenser. The three step-up transformers and two auxiliary transformers also will be supported on reinforced concrete mat foundations. Balance-of-plant (BOP) mechanical and electrical equipment will be supported on individual reinforced concrete pads. BOP components/materials include piping, valves, cables, switches, etc. that are not included with major equipment and are generally installed or erected onsite.

2.5.5.2 HRSG Stacks

Each of the two HRSGs will have with a self-supporting steel stack. The stacks will be 22 feet in diameter and no more than 160 feet tall. The stacks include sampling ports, ladders, platforms, and electrical grounding.

2.5.5.3 Buildings

The Project operations building will incorporate control, maintenance and administrative functions. The design and construction of the operations building will be consistent with normal building standards. Other onsite "buildings" will include a number of pre-engineered enclosures or structures for mechanical and electrical equipment (e.g., fire pump building, water treatment sample analysis building, and switchyard module). Building columns are supported on reinforced concrete mat foundations or individual spread footings and the structures rest on reinforced concrete slabs. The total square footage of the various Project buildings and pre-engineered enclosures is approximately 33,000 square feet.

2.5.5.4 Water Storage Tanks

There will be a number of covered water tanks onsite including a 1,000,000-gallon raw water storage tank for short-term makeup water supply, with a portion (200,000 gallons) dedicated to the plant's fire protection water system. There also will be a 265,000-gallon storage tank for storage of demineralized water. Water storage tanks will be vertical, cylindrical, field-erected steel tanks supported on foundations consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

2.5.5.5 Roads and Fencing

As noted earlier, the PEP site is located west of the Air Force Plant 42 and south of East Avenue M. The main access to the site during construction and operation will be via a 100' wide easement connecting the 50 acre project site to East Avenue M.

The roads in Project site will be paved with asphalt, where there will be a paved parking lot and roads encircling the turbine-generator and HRSG areas. In total, the power block and switchyard will be approximately 15 acres with approximately two and a half acres of paved area. The asphalt paved roads will have two 12-foot wide lanes and a 5-foot wide shoulder on each side. Unpaved ground surfaces in and around the main equipment area of the power block will be covered with crushed stone or gravel.

The PEP plant site will be secured with eight-foot tall security fencing, with barbed wire or razor wire on top. Fencing will enclose the entire site including the storm water basin. Additionally, desert-style landscaping is expected to be used to enhance the facility's appearance. The plant site's eastern fence line and southern fence lines will not receive landscaping in order to accommodate the security requirements of Air Force Plant 42. The remaining perimeter will include aesthetic landscaping. The landscaping will be limited to drought-tolerant plants; the central element will be Joshua trees presently occupying the plant site that will be transplanted to locations along the site perimeter

Controlled access gates will be located at the site entrance. Within the site, chain-link security fencing will be provided around the switchyard. Access to the PEP plant site will be controlled through a security gate located on the west side of the proposed power block at the entrance drive.

2.5.5.6 Site Drainage

Existing site topography shows an average slope of less than one percent toward the north to northeast. There are no drainage ditches or storm drains onsite. Site drainage currently flows towards the north and northeast,

Palmdale Energy, will update the drainage, erosion and sediment control plan (DESCP) to address only the 50 acre project site and 20 acre temporary laydown area with the proposed equipment when additional details of the project civil works are known. The plan will comply with the intent of the Approved Project's DESCP with necessary modifications to recognize the much smaller area to be addressed by the plan. No storm water runoff discharge will leave the Project site. The Draft DESCP and Preliminary Grading Plans will be submitted under separate cover in August2015.

The PEP will employ a comprehensive system of management controls, including site-specific Best Management Practices (BMP), to minimize storm water contact with contaminants and thus minimize pollutants in storm water. These management controls, which will be described in the Project's Storm Water Pollution Prevention Plans (SWPPP) and Drainage Erosion and Sediment Control Plan (DESCP), include:

- Employee Training Program,
- Erosion and Sediment Control,
- Good Housekeeping Programs,
- Preventive Maintenance Programs,
- Structural BMPs,
- Temporary containments during maintenance activities
- Permanent secondary containment structures at chemical storage and process areas
- Materials, Equipment and Vehicle Management Practices,
- Spill Prevention and Response Programs, and
- Inspection Programs.

The Modified Project's power block area will be graded to allow for a balanced distribution of material, so there is not a requirement to truck large quantities of earth materials to or from the site. The cut and fill grading necessary to create suitable conditions for Project construction will result in an elevation of approximately 2,500 feet amsl. Current estimates are that offsite import or export of soil will not be required.

Adjustments will be made to provide engineered fill as required for stabilization under equipment and structure foundations per the Project geotechnical report. Only soil materials approved by a geotechnical engineer for structural fill will be used. Additionally, specialized granular materials may need to be imported to the proposed site for road base and possible use below foundations.

2.5.5.7 Earthwork

As noted earlier, existing site elevations range from approximately 2,500 feet amsl to 2,505 amsl and the site generally slopes an average of approximately one percent toward the north to northeast. Mass grading of the site will occur at the beginning of the

Project construction phase. The power block area, approximately 15 acres, will be on elevated fill area to avoid flooding during any major rainfall event. Earthwork associated will also include a stormwater retention basin, equipment foundations, and underground systems. Current estimates are that no import of soil from offsite locations or export of soil from the plant site will be required.

2.5.6 Pipeline Facilities Description

The following sections describe the PEP's pipeline facilities and routes.

2.5.6.1 Fuel Gas Supply Line

SCG will construct an 8.7-mile, 20-inch fuel gas supply line to serve the Modified Project in the same manner as the described in the Final Decision for the Approved Project. The pipeline will originate at the SCG facility on East Ave S and terminate at the PEP plant site, as shown on Figure 2-1. The route is completely within the City of Palmdale. It will be installed in existing street ROWs and is mostly within developed areas. This Petition does not modify the natural gas pipeline or route.

2.5.6.2 Reclaimed Water Supply Line

The City of Palmdale will install a 7.4-mile, 14-inch reclaimed water line from the PWRP to the PEP plant site to provide water for power plant process makeup, as shown on Figure 2-1. All but a small section of the route near the PWRP is within the City of Palmdale. It will be routed in existing city street ROWs and is within developed areas. This Petition does no modify the reclaimed water supply line route.

2.5.6.3 Sanitary Wastewater Disposal Line

Since the time of issuance of the Final License, the City of Palmdale constructed an 18-inch sewer pipeline along the south side of East Avenue M. The Modified Project will now interconnect with this sewer pipeline instead of the pipeline that was located along Avenue L. The Modified Project will install a 0.25-mile, six to twelve-inch sanitary wastewater pipeline from the PEP plant site to a connection point at the intersection the project access road and East Avenue M, as shown on Figure 2-1.

2.5.7 Project Construction

The planned PEP construction schedule will last 25 months, with the construction workforce for the combined cycle component and laterals peaking at 706 during Month 11 of the construction schedule; over the entire construction period, there will be an average workforce of approximately 339. A high level project construction schedule is provided as Figure 2-8. The on-site workforce will consist of laborers, craftsmen,

supervisory personnel, support personnel, and construction management personnel. An estimate of the construction workforce by month over the entire construction period for the Modified Project including a comparison to the workforce estimated for the Approved Project is provided in Appendix 6-C of this Petition.

A 20-acre temporary construction laydown and parking area will be provided, as shown on Figure 2-1. The temporary construction laydown and parking area will be restored after use. The construction sequence for power plant construction includes the following general steps:

- Site Preparation: this includes detailed construction surveys, grading, and preparation of drainage features.
- Foundations: this includes excavations for large equipment (CTGs, STG, HRSG, etc.). This work will begin in the combined-cycle equipment area.
- Major Equipment Installation: once the foundations are complete the larger equipment will be installed.
- Balance of Plant (BOP): with the major equipment in place, the remaining fieldwork will involve piping, electrical, and smaller component installations.
- Testing and Commissioning: testing of subsystems will be done as they are completed. Major equipment will be tested once all supporting subsystems are installed and tested.

Construction of the Project transmission system will begin in the third month of the overall construction schedule with work on Segment 2, which extends between the Pearblossom and Vincent Substations to the south of the plant site. Transmission line construction then will proceed northward to Segment 1. Construction of the various Project pipelines will begin in the third month of the construction schedule.

Equipment and materials will be delivered to the Project site by truck; large components (e.g., CTG) will be brought to the Palmdale area by rail and brought to the site by special transporter trucks designed for large loads. Construction will typically take place between the hours of 6 am and 6 pm, Monday through Friday.

2.5.8 Facility Operation

The Modified Project will have a small workforce during operation. Actual power plant operations will be controlled by three to five individuals during each operating shift. Additional maintenance and supervisory personnel will be present during the day shift

and as required by specific operations or maintenance activities, during evening and night shifts. The Modified Project is expected to employ 23 full-time personnel.

The power plant will be operated up to 7 days per week, 24 hours per day. When the plant is not operating, personnel will be present as necessary for maintenance, to prepare the plant for startup, and/or for site security. Section 3.0 discusses facility closure, both temporary and permanent at the end of the Project's operational life.

2.6 TRANSMISSION SYSTEM DESCRIPTION

This Petition does not modify the majority of the Approved Project's alternative transmission lines and routes. The only modification proposed is near the Modified Project site to account for a new location of the project switchyard as shown on Figure 2-1. The modifications consist of added 1,800 linear feet and three new poles along Avenue M in order to continue the route southerly across the easement to the location of the new switchyard. The poles will be identical to those for the Approved Project.

SCE (under the direction of the California Independent System Operator or CAISO), completed a System Impact Study (SIS) pursuant to an Interconnection System Impact Study Agreement. In December 2012 the CAISO determined that there was Approved Project would have full deliverability status. SCE and the CAISO executed a Large Generator Interconnection Agreement (LGIA) in March 2013 and the LGIA is in suspension to allow for permit amendments.

2.7 ALTERNATIVE TECHNOLOGIES CONSIDERED

2.7.1 Modified Project Objectives

Palmdale Energy evaluated several different technologies to meet the Modified Project Objectives which are summarized as follows:

- Provide an efficient, flexible, reliable and environmentally sound power generating facility to meet future electrical power needs of California.
- Provide daily fast start and fast ramping capabilities needed to provide Flexible Capacity that is required manage the integration of intermittent resources.
- Locate the facility within the boundaries of the City of Palmdale to provide economic development and tax revenue to the City and surrounding areas.
- Site the facility in a location zoned and planned for industrial use in an industrial area and with ready access both to adequate supplies of non-potable water to meet the facility's process water needs and to a natural gas pipeline that can

supply the Project without requiring significant modifications to the regional gas supply system.

- Design the Palmdale Energy Project to minimize water usage as much as practical.
- Utilize the existing CAISO Large Generator Interconnection Agreement.

2.7.2 Technologies Evaluated

2.7.2.1 Solar Hybrid

The Approved Project included solar thermal equipment that proposed to utilizes arrays of parabolic collectors to heat a high-temperature working fluid. The hot working fluid would then be used to boil water to generate steam and the steam would be injected into the HRSG drums/piping systems. The combined-cycle equipment is integrated thermally with the solar equipment at the HRSG and both utilize the single gas turbine.

A solar hybrid project's economics are dependent on having the combined cycle plant operating at base load when the solar generated steam is available to supplement natural gas fuel, otherwise there is no way to generate power with the solar portion of the plant and the economic value of that energy is lost. This will not generally be the case with in a flexible capacity resource which will typically operate the meet the ramping and peak load requirements in the morning and late afternoon thus helping to integrate the ramp up and ramp down of solar generation.

In addition, solar thermal trough technology is not cost effective with PV solar technology today. Five years ago PV and concentrating solar had similar costs but PV panels have become more efficient and cost effective. While there were many combined cycle hybrid projects proposed in the last 10 years, only one large scale project has been built in the US at FP&L's Martin Energy Center.

After review, it is determined that a solar hybrid is not cost effective and consistent with the Project Objectives to be a flexible capacity resource.

2.7.2.2 Wet Cooling

The original licensed project proposed wet cooling which would have required approximately 4000 acre feet of water annually. A dry cooling system uses an air-cooled condenser (ACC) to condense steam. The dry cooling system reduces water consumption by more nearly 90 percent. The cost of the ACC system is higher that a wet cooling tower but the cost is partially offset by lower capital cost for water treatment

and the elimination of zero liquid discharge (ZLD) system. Wet cooled systems have higher efficiency at high temperatures than an ACC.

The wet cooled system requires a ZLD systems that is not as well suited for low load factor plants such as a flexible capacity plant which may only operate for 3-6 hours on some days. While the original plant would have used a reclaimed waste water source, this use of reclaimed water by the Power Plant would have prevented other long-term beneficial uses of the reclaimed water for irrigation, ground water recharge or other industrial/commercial businesses.

After review, dry cooling was a better alternative than wet cooling in light of the current water supply issues in California and wet cooling did not meet the objective to minimize water usage.

2.7.2.3 Frame Peaking Units

Simple Cycle "Frame" Gas Turbine peaking units can provide the daily fast start and fast ramping capabilities needed to provide Flexible Capacity and are lower cost to install than a combined cycle plant. Frame units are much less efficient however, resulting in approximately 40 percent higher fuel consumption and greenhouse gas emissions than a combined cycle plant. Because simple cycle "frame" gas turbines have much higher exhaust temperatures they have the potential to produce a much higher velocity thermal plume. Based on a screening analysis using Spillane methodology it was determined that plume vertical velocities of 4.3 m/s extended beyond 3500 ft-agl.

After review of Frame Peaking unit, it was concluded that the lower gas turbine efficiencies in combination with the potential for significant thermal plume impacts to the near-by Palmdale Regional Airport, would not be the best technology alternative at the Palmdale Energy Project Site .

2.7.2.4 Aero Derivative Peaking Units

Palmdale Energy also evaluated the use of aero-derivate type simple cycle gas turbine generators (General Electric LMS 100's) at the Palmdale Energy Site. We excluded this technology as an option due to the:

- high capital cost/MW (nearly the same as an equivalent size combined cycle project)
- Higher fuel use (lower efficiency than a combined cycle plant)
- Higher greenhouse gas emissions

- Higher water use because of water injection and intercooling than the air cooled combined cycle project.

Section 3 ENGINEERING ANALYSIS

The following sections provide a description of the modifications proposed to the PPP as they may affect the assumptions, rationale, and Conditions of Certification in the Final Decision for the areas of 3.1 Facility Design, Efficiency and Reliability, 3.2 Transmission System Engineering, and 3.3 Transmission Line Safety and Nuisance.

3.1 FACILITY DESIGN, RELIABILITY AND EFFICIENCY

This section outlines the portions of the Modified Project that may affect the analysis, rationale, conclusions, and Conditions of Certification contained in the Final Decision for the Approved Project.

3.1.1 Facility Design

A description of the Modified Project is provided in Section 2.0 of this Petition.

The PEP will be designed to maximize safe construction and operation and will comply with the existing Conditions of Certification for the Approved Project. Potential hazards that could affect the facility include earthquake, flood, and fire. The Modified Project will be designed in accordance with all applicable codes regarding these hazards. Facility operators will be trained in safe operation, maintenance, and emergency response procedures to minimize the risk of personal injury and damage to the facility.

3.1.1.1 Natural Hazards

The principal natural hazard associated with the project site is earthquakes. As required by the Decision for the Approved Project, the Modified Project structures will be designed to meet the seismic requirements of California Code of Regulations Title 24 and the 2010 California Building Standards Code (CBC). Potential seismic hazards will be mitigated by implementing the 2010 CBC construction guidelines.

3.1.1.2 Emergency Systems and Safety Precautions

This subsection discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel.

3.1.1.2.1 Fire Protection Systems

The project will rely on both onsite fire protection systems and local fire protection services.

3.1.1.2.1.1 Onsite Fire Protection Systems

The fire protection systems are designed to protect personnel as well as to limit property loss and plant downtime from fire. The Modified Project's fire protection features are described in Section 2.5.4.7 of this Petition.

3.1.1.2.1.2 Local Fire Protection Services

Appropriate plant personnel will be trained as a hazardous materials response team and one or more spill response kits will be available on-site. In the event of a large incident involving hazardous materials, backup support will be provided by the Los Angeles County Fire Department Fire Station 129, which has a hazmat response unit located in Lancaster at 42110 6th Street West (about 1.8 miles away) and could respond within 0.1 hours.

3.1.1.2.2 Personnel Safety Program

PEP will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety.

3.1.2 Facility Reliability

This subsection discusses the expected facility availability, equipment redundancy, fuel availability, water availability, and project quality control measures.

3.1.2.1 Facility Availability

The expected facility availability is greater than 95%. Combined cycle plants with similar Siemens combustion turbines have consistently achieved greater 95% availability when operated and maintained in accordance with Siemens specifications. Palmdale Energy will contract with Siemens or a fully qualified operations and maintenance provider to operate and maintain the plant.

3.1.2.2 Redundancy of Critical Components

The following subsection identifies equipment redundancy as it applies to project availability. A summary of equipment redundancy is shown in Table 3.1-1.

Table 3.1-1
Major Equipment Redundancy

Description	Number	Note
Boiler Feed water Pumps	Three	3x50% on plant basis
Unit Auxiliary Transformers	Two	One per GT but limited ability to supply other GT.
Vacuum Pumps	Two	Hybrid air evacuation system with 2x20% vacuum pumps and 2x100% holding ejectors
Condensate Pumps	Three	3x50% on plant basis
Demin Water Forwarding Pumps	Two	2x100%
Raw Water Forwarding Pumps	Two	2x100%
Fire Water Pumps	Two	100% capacity electric pump and 100% capacity diesel powered pump
GT Lube Oil Pumps	Two	2x100% AC Pumps
ST Lube Oil Pumps	Two	2x100% AC Pumps
DCS	Various	Redundant for critical components, no single failure will cause a plant outage
Combustion Turbines	Two	Generating facility can operate with one CT out of service

3.1.2.2.1 Distributed Control System

The Approved Project and Modified Project would use DCS systems provided by the turbine manufacturers, GE and Siemens, respectively. The systems are functionally equivalent though not identical systems.

3.1.2.3 Fuel Availability

Natural gas will be delivered via pipeline as described previously in Section 2.3 of this Petition.

3.1.2.4 Water Availability

Water availability is as described in previously in Section 2.2 of this petition.

3.1.2.5 Project Quality Control

3.1.2.5.1 Project Stages

For quality assurance planning purposes, the project activities have been divided into the following nine stages that apply to specific periods of time during the project:

1. **Conceptual Design Criteria.** Activities such as definition of requirements and engineering analyses.

2. **Detail Design.** Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.

3. **Procurement Specification Preparation.** Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.

4. **Manufacturer's Control and Surveillance.** Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.

5. **Manufacturer Data Review.** Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components, and conformance to procurement specifications.

6. **Receipt Inspection.** Inspection and review of product at the time of delivery to the construction site.

7. **Construction/Installation.** Inspection and review of storage, installation, cleaning, and initial testing of systems or components at the facility.

8. **System/Component Testing.** Actual operation of generating facility components in a system in a controlled manner to ensure that the performance of systems and components conform to specified requirements.

9. **Plant Operation.** Operation of the facility's systems and equipment by operations personnel according to manufacturer's recommendations and instructions.

As the project progresses, the design, procurement, fabrication, erection, and checkout of the facility system will progress through the nine stages defined above.

3.1.2.5.2 Quality Control Records

The following quality control records will be maintained for review and reference:

- Project instructions manuals
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issues, change orders, etc.)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities will be evaluated. The evaluation will consider suppliers and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities are accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operations. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The subcontractors' quality compliance will be surveyed through inspections, audits, and administration of independent testing contracts.

A plant operation and maintenance program, typical of a project this size, will be implemented by the applicant to control operation and maintenance quality. A specific program for this project will be defined and implemented during initial plant startup.

3.1.3 Power Plant Efficiency

The combined cycle configuration proposed for Palmdale Energy is inherently highly efficient and with the Siemens Flex-Plant 30 features the plant is able to reach the desired plant output more quickly and is well matched for efficient power as a flexible capacity resource as well as a base load resource. With the fast start capabilities of the Siemens design, the combustion turbines can be at base load within fifteen minutes for most startups; this improves the plants overall efficiency with respect to combined cycle plants without the fast start capability.

As the project will be provided with two combustion turbines, it will have the flexibility to be able to provide highly efficient power at loads of approximately fifty percent of base loads. With the plant's inlet evaporative cooling system and duct firing capability, additional operational benefits are realized.

Net plant heat rates at annual average conditions with the evaporative coolers and duct burners in and out of service are provided in Figures 2.6-a through 22.6.c. At base load with the evaporative coolers in service, the net plant heat rate is 6100 Btu/kWh (LHV), this compares favorably with the installed fleet of gas fired generation in California.

3.1.4 Compliance with LORS

The Commission Decision concluded that, with implementation of the Conditions, the Approved Project would comply with all applicable LORS. No LORS have been identified that are uniquely applicable to the PEP. In fact, some of the LORS that would have been applicable to the Approved Project, such as those associated with the design of the facility components using HTF, would no longer be applicable to the Modified Project. As with the Approved Project, the Modified Project would comply with all applicable LORS.

3.1.5 Conditions of Certification

The Conditions of Certification consistently refer to the 2007 CBC. A global replacement is required to reflect that the 2010 CBC will be applicable to the PPP.

Condition of Certification **GEN-2** contains a table of major structures associated with the Approved Project. The table should be modified as follows:

Equipment/System	Quantity (Plant)
Raw and Fire Water Storage Tank Foundation and Connections	1
Demineralized Water Tank Foundation and Connections	1
Combustion Turbine Wash Drain Tank Foundation and Connections	2
Closed Cooling Water Fin-Fan Coolers Foundation and Connections	1
Air Cooled Condenser Foundations and Connections	1
Condensate Return Tank Foundations and Connections	1
Fire Pump Module Foundation and Connections	1
Admin/Control Building Warehouse Foundation and Connections	1
Water Treatment Module Foundation and Connections	1
Water Treatment Module Area MCC	1
Sampling Container Foundations and Connections	1
Laboratory Container Foundations and Connections	1
STG Power Control Center Foundation and Connections	1
Cycle Chemical Feed Module Foundation and Connections	1
Ammonia Storage Foundation and Connections	1
HRSG Structure, Foundation and Connections	2
CEMS Foundation and Connections	2
Combustion Turbine Generator Foundation and Connections	2
Combustion Turbine Inlet Air Filter Foundation and Connections	2
Fuel Gas Filter/separator Foundation and Connections	2
Fuel Gas Pre-heater Foundation and Connections	2
Rotor Air Cooler Foundations and Connections	2
CT Lube Oil Skid and Coolers Foundations and Connections	2
Auxiliary Transformer Foundation and Connections	2
Generator Step-Up Transformer Foundations and Connections	3
Oil/water Separator Foundation and Connections	1
Emergency Shutdown Generator Foundation and Connections	1
CT Electrical Package	2
MV Switchgear Module Foundation and Connections	2
BOP Power Control Center	1
Air Cooled Condenser Power Control Center	1
Switchyard Module Foundation and Connections	1
Steam Turbine Lube Oil Skid Foundation and Connections	1
Steam Turbine Generator Foundation and Connections	1
Steam Turbine Generator Enclosure/Building Foundations and Connections	1
Generator Circuit Breakers	2
Auxiliary Boiler Foundations and Connections	1

Condition of Certification **ELEC-1** refers to 13.8 kV systems. The Modified Project will use Siemens equipment and therefore references to 13.8 kV voltages should be replaced with 18 kV.

No other modifications to the Conditions of Certification contained in the Final Decision sections addressing Facility Design, Efficiency or Reliability are required for the PEP.

3.2 TRANSMISSION SYSTEM ENGINEERING

This section outlines the portions of the Modified Project that may affect the analysis, rationale, conclusions, and Conditions of Certification contained in the Final Decision for the Approved Project.

3.2.1 Relevant Modifications to Project Description

The only modifications to the Approved alternative generation tie-line routes are the addition of approximately 1,800 feet of conductor and three transmission poles along the south side of Avenue M to allow for interconnection with the new project switchyard location. See Figure 2-1. No other modifications to the alternative generation tie-line routes are proposed by this Petition.

Since the Modified Project is replacing the generation equipment, new preliminary single line diagrams are provided at this end of Section 3 of this Petition. Figure 3.1a shows the single-line diagram for the new project switchyard and Figure 3.1b shows a single-line diagram for the power block.

Palmdale Energy has conducted an internal review and determined that the proposed technology change will not constitute a “material modification” to the LGIA (as that term is defined by the interconnection policies and procedures of the California Independent System Operator (CAISO)). Palmdale Energy will submit the results of its analysis to CAISO for concurrence and expects CAISO to concur with the conclusion that the technology change does not constitute a “material modification” by June 30, 2015.

Because the Modified Project will limit its output to the terms of its LGIA the new technology, although capable of additional output, will not exceed the requested interconnection capacity, there will be no change to the downstream transmission system upgrades identified in the previous CAISO studies, upon which the LGIA was based.

3.2.2 Compliance with LORS

The Modified Project will comply with all transmission system engineering related laws, ordinances, regulations and standards. This will be ensured by enforcement of the existing Conditions of Certification which do not require modification.

3.2.3 Proposed Modifications to Conditions of Certification

No modifications of Conditions of Certification contained in the Final Decision are proposed to accommodate the Modified Project.

3.3 TRANSMISSION LINE SAFETY AND NUISANCE

There will be no changes to the Commission's assumptions, analysis, rationale or Conditions of Certification as a result of the Modified Project to the technical area of Transmission Line Safety and Nuisance because the characteristics of the Approved Transmission Line are not changing.

Section 4 PUBLIC HEALTH AND SAFETY

The following sections provide a description of the modifications proposed to the PHPP as they may affect the assumptions, rationale, and Conditions of Certification in the Final Decision for the following technical areas: 4.1 Air Quality, Greenhouse Gas Emissions, and Public Health; 4.2 Worker Health and Safety/Fire Protection; 4.3 Hazardous Materials Management; and 4.4 Waste Management.

4.1 AIR QUALITY, GREENHOUSE GASES AND PUBLIC HEALTH

This section of the Petition presents a complete and new air quality analysis for the Palmdale Energy Project (PEP) which reflects the changes in turbine technology and associated operations profile to reflect the use of the PEP as a much needed flexible resource. The changes in emissions from those analyzed for Approved Project are summarized in Table 4.1-1 below.

Table 4.1-1
Emissions Comparison Table

Facility	Lbs/Hr				
	NO_x	**VOC**	**So_x**	**CO**	**PM10/2.5**
PHPP	106.41	34.77	4.32	453.2	49.67
PEP	116.14	63.79	3.08	842.95	24.57
	Lbs/Day				
PHPP	1359	577	64	4853	931
PEP	1140.73	472.30	72.14	2179.05	568.21
	Tons/Yr				
PHPP	115	40	9	255	127
PEP	138.99	51.64	11.39	351.09	81.01

All values include startups and shutdowns.
PHPP emissions: CEC FSA, December 2010, Air Quality Table 10, and EPA Region Fact Sheet, 8/2011.
PEP emissions: new application, June 2015, Air Section 4.1, Table 4.1-11

The changes in emissions relate to a slightly larger turbine, use of duct firing, and more startup and shutdown events. These emission changes are necessary to provide the flexibility necessary to integrate renewable energy resources and while the allowable emissions increase for NO_x, VOC, SO_x and CO, the emissions decrease for PM.

Unlike other sections of the Petition where the analysis was focused only on the modifications to the project, we have presented a full air quality analysis for the PEP and will be filing a new application for a Determination of Compliance with the Antelope Valley Air Quality Management District (AVAQMD). However, since the Commission issued a Final Decision for the Approved Project, the focus of the amendment analysis by CEC Staff should be on the changes in air quality impacts from the Approved Project caused by the PEP. Our analysis of the changes in impacts is summarized in Table 4.1-2 below.

Table 4.1-2
Comparison of Palmdale Modeled Concentrations
June 2011 Presiding Member's Proposed Decision vs. Current Application

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Total w/ Background ($\mu g/m^3$)	Maximum Concentration ($\mu g/m^3$)	Total w/ Background ($\mu g/m^3$)	Ambient Air Quality Standards CAAQS/NAAQS	
		June 2011 CEC Decision		Current Permit Application		($\mu g/m^3$)	($\mu g/m^3$)
Normal Facility Operations							
NO_2 [a]	1-hour CAAQS	N/A	203.1	204.7	303	339	-
	1-hour NAAQS	N/A	175.3	13.49	94	-	188
	Annual Max	1.0	29.2	0.981	16.1	57	100
CO	1-hour Max	367	4,047	123.8	2,300	23,000	40,000
	8-hour Max	20.4	1,998	29.48	1,632	10,000	10,000
SO_2	1-hour CAAQS	1.6	30.4	1.51	18	655	196
	3-hour NAAQS	1.3	24.9	1.14	17	-	1,300
	24-hour CAAQS	0.9	14.0	0.80	9	105	-
PM10	24-hour CAAQS	18	199	7.22	192	50	150
	Annual Max	1.8	32	0.75	29.1	20	-
PM2.5	24-hour NAAQS	11.6	27.9	4.73	23	-	35
	Annual NAAQS	1.2	10.1	0.723	6.8	12	12.0
Startup/Shutdown Conditions							
NO_2 [a]	1-hour CAAQS	N/A	314	58.29	156	339	-
	1-hour NAAQS	N/A	N/A	49.10	130	-	188
CO	1-hour Max	714	4,373	574.5	2,751	23,000	40,000
	8-hour Max	482	2,460	88.57	1,692	10,000	10,000

4.1.1 Introduction

This section presents the methodology and results of an analysis performed to assess potential impacts of airborne emissions from the construction and routine operation of the PEP modification. Section 4.1.1 presents the introduction, applicant information, and the basic AVAQMD rules applicable to the Project. Section 4.1.2 presents the Project description, both current and proposed. Section 4.1.3 presents data on the

emissions of criteria and air toxic pollutants from the Project. Section 4.1.4 discusses the Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) evaluations for the Project. Section 4.1.5 presents the air quality impact analysis for the Project. Section 4.1.6 presents applicable laws, ordinances, regulations, and standards (LORS). Section 4.1.6 presents agency contacts, and Section 4.1.6 presents permit requirements and schedules. Section 4.1.7 presents the public health analysis and Section 4.1.8 contains references cited or consulted in preparing this section.

The Palmdale Energy Project (PEP) is proposing to construct and operate a fast start (Flex Plant) 645 MW (nominal average annual rated) natural gas-fired combined-cycle power plant. The project is planning to operate as a base loaded power plant and is proposed to operate up to approximately 8,000 hours per year, with an expected facility capacity factor at 60 to 80 percent. However, the dispatch profile may change as market conditions evolve. Thus, in addition to the base load operational profile, two additional operational profiles were considered which are based on more of a cycling or peaking type of project. Thus, as discussed in the sections below, the worst-case daily and annual emissions profiles will be dependent upon each pollutant and which worst-case dispatch assumption produces the maximum annual potential to emit.

The project will consist of the following:

- Installation of two (2) Siemens SGT6-5000F Combustion Turbine Generators, each rated at a nominal 214 MW each (average annual). Each turbine will be equipped with Dry Low NO_x (DLN) combustors and evaporative inlet air cooling.
- Installation of two (2) fired heat recovery steam generators (HRSGs) with a supplemental firing rate of 193.1 MMBtu/hr (HHV),
- A steam turbine rated at 276 MW (average annual including duct firing)
- SCR and CO catalyst systems on both turbine/HRSG power trains.
- Flex Plant Design allowing for fast plant start and load following capabilities
- Installation of an auxiliary boiler rated at 110 MMBtu/hr, firing natural gas. The boiler will provide auxiliary steam when the main power block is offline and during startups. The boiler will be equipped with ultralow NO_x burners and flue gas recirculation (FGR). The use of this boiler will aid the fast startup design.
- Installation of air cooled condenser to provide cooling and heat rejection from the power block process

- A diesel fired emergency generator set,
- A diesel fired fire pump engine,
- Necessary support systems and processes.

The Project design will incorporate the air pollution emission controls designed to meet AVAQMD BACT/LAER determinations. These controls will include DLN combustors in the CTGs and low NO_x duct burners to limit nitrogen oxide (NO_x) production, Selective Catalytic Reduction (SCR) with aqueous ammonia for additional NO_x reduction along with an oxidation catalyst to control carbon monoxide (CO) and volatile organic compounds (VOC) emissions. The auxiliary boiler will incorporate low NO_x burners and flue gas recirculation in order to limit the emissions of NO_x. Fuels to be used will be pipeline specification natural gas in the turbines, duct burners and auxiliary boiler, and California ultra low-sulfur diesel fuel in the fire pump and generator set engines. The ammonia slip will be limited to 5 parts per million (ppm).

4.1.1.1 Regulatory Items Affecting New Source Review

The applicant is submitting the air quality impact analyses to both the Antelope Valley Air Quality Management District (AVAQMD) and the California Energy Commission (CEC). The application includes discussions of emissions calculations, control technology assessments, regulatory review and modeling analysis which include impact evaluations for criteria and hazardous air pollutants.

The project is expected to result in emissions that will exceed the AVAQMD Rule 1303 Major Facility significance thresholds for oxides of nitrogen (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and fine particulate matter (PM10/2.5). Emissions of sulfur dioxide (SO2) are expected to be less than the major source thresholds.

The project will trigger AVAQMD and CEC modeling requirements. The air quality analysis will be conducted to demonstrate that impacts from NO_x, CO, SO_x, PM10 and PM2.5 will comply with the California and National Ambient Air Quality Standards (CAAQS/NAAQS) for the applicable averaging periods. Impacts from nearby sources (cumulative impacts) are also assessed for criteria pollutants.

The project will trigger the Prevention of Significant Deterioration (PSD) permitting requirements, which would be required for combined cycle design with a facility wide emissions equaling or exceeding 100 tons per year (tpy) for any criteria pollutant. A separate PSD modeling protocol and permit submittal will be prepared for EPA Region 9.

The project will require an AVAQMD Regulation XIII New Source Review (NSR) permit as specified under Rules 1300-1320. Currently, the AVAQMD air basin is federal and State attainment/unclassified for NO_2, SO_2, PM2.5, and CO. The area is in attainment for the federal PM10 standards as well, but is nonattainment for the federal 8-hour ozone (O_3) standard. It is also State non-attainment for PM10 and O_3 standards. Based on the values in Table 4.1-13, the new facility will be a major new stationary source per AVAQMD New Source Review (NSR) Regulation XIII.

Worst-case annual emissions are summarized in Table 4.1-3 below and represent the operational scenario that produces the highest potential to emit.

Table 4.1-3
Facility PTE Summary

Pollutant	PEP TPY	AVAQMD Rule 1303 Major Facility Thresholds TPY	EPA Major PSD Source Thresholds (TPY)*
NO_x	139	25	40
CO	351	100	100
VOC	52	25	40
SO_x	11	25	40
PM10	81	15	15
PM2.5	81	15	10
CO_2e	2,117,730	-	75,000
*PSD major source is triggered for combined cycle turbine at 100 tpy, from which the major modification thresholds are then used for the remaining pollutants. PSD is not triggered for CO_2 emissions alone.			

Although a regulatory compliance analysis (LORS) is presented in Section 4.1.6, there are several AVAQMD regulations that directly affect the application and review process. These regulations include:

- AVAQMD New Source Review (NSR) Regulation XIII, Rule 1303 requires that Best Available Control Technology (BACT) be applied to all proposed new or modified sources not exempted from the permitting requirements which have the potential to emit any nonattainment pollutant in excess of 25 lbs per day or 25 tons per year.

- AVAQMD Regulation XIII, Rule 1302, requires all emission reduction credits must be surrendered prior to the commencement of construction of the new source.

- AVAQMD Regulation XIII, Rules 1302 and 1303 required that an air impact analysis be prepared.

- AVAQMD Regulation XIII, Rule 1302, also requires that prior to the issuance of the Authority to Construct (ATC) all major stationary sources owned or operated by the Applicant, which are subject to emissions limitations, are either in compliance or on a schedule for compliance with all applicable emissions limitations under the Clean Air Act (CAA).

- The project will require a PSD permit, per Rule 1300. Currently, the AVAQMD does not have delegation of the PSD program. Thus, the Environmental Protection Agency (EPA) Region 9 will require a separate PSD permit application which will be prepared and submitted to EPA under separate cover.

4.1.2 Project Description

4.1.2.1 PEP Site Location

The PEP will be located in the Antelope Valley, which forms the western tip of the Mohave Desert. The topography of the area is characterized as high desert with very little variation in terrain until the desert abuts the mountain ranges. The project site is located about 10 kilometers (km) northeast of the San Gabriel Mountains, which separate Antelope Valley from the City of Los Angeles, and 50 km southeast of the Tehachapi Mountains, which separate Antelope Valley from the San Joaquin Valley. The proposed project site is located in northern Los Angeles County just west-northwest of the Palmdale-Air Force Plant 42 Complex. The location is in the northern portion of the city of Palmdale and near the southern boundary of the city of Lancaster.

The PEP site location is located on an approximately 50-acre undeveloped parcel west of the northwest corner of U.S. Air Force Plant 42, and east of the intersection of Sierra Highway and East Avenue M. The PEP address is 950 East Avenue M, Palmdale California. The Universal Transverse Mercator (UTM) North American Datum (NAD) 83, Zone 11 coordinates are 398,600 meters east and 3,833,700 meters north. The site elevation is approximately 2,512 feet above mean sea level (amsl). Figures 4.1-1 and 4.1-2 present the location of the proposed project.

4.1.2.2 Project Equipment Specifications

The Flex Plant rapid start design will consist of the following major equipment.

- Two 214 MW Siemens SGT6-5000F combustion turbines with inlet evaporative cooling

- One 276 MW Siemens steam turbine
- Two natural gas fired 193.1 MMBtu/hr HRSGs
- One 110 MMBtu/hr auxiliary boiler
- One air-cooled condenser
- One diesel powered fire pump
- One diesel powered emergency generator

All power from the facility will be delivered to the California power grid under the control of the California Independent System Operator (CAISO).

The turbine equipment output specifications are summarized in Table 4.1-4 as follows:

Table 4.1-4
Combustion Equipment Output Specifications

Parameter	Minimum Cold Day (23°F)	Annual Average Day (64°F)	Maximum Hot Day (108°F)
Case # (Temperature Conditions)	2	12	22
Net Power, MW	714.4*	699.4	664.3
Net Heat Rate, btu/kW-hr (HHV)	6909	6887	7053
Gross GT Power, MW	457.4	440.7	419.2
Gross ST Power, MW	274.6	276.2	262.4
Ref: Siemens Performance data sheets, with duct firing mode On. Appendix 4.1A. HHV ~= LHV x 1.109 * Plant output will be limited to 700 MW via automatic control system.			

Equipment specifications are summarized as follows:

Combustion Turbines and Duct Fired HRSGs (2)

- Manufacturer: Siemens
- Model: SGT6-5000F
- Fuel: Natural gas
- Heat Input: 2409.95 MMBtu/hr (Case 7-ISO day, baseload, with duct firing)
  2467.10 MMBtu/hr (Case 2-Cold day, baseload with duct firing)

- Maximum Fuel consumption: <=105,943 lbs per hour (Case 2-baseload, cold day, with duct firing)
- Exhaust flow: <=4.383,814 lbs/hr (Case 2-baseload, cold day, with duct firing)
- Exhaust temperature: ~186 degrees Fahrenheit (□F) at the stack exit
- Duct Burners rated at 193.1 MMBtu/hr firing natural gas (Case 2, baseload)
- Steam Turbine rating at 276 MW (nominal ISO baseload)

Fire Pump (1)

- Manufacturer: Clarke or equivalent (Tier 3)
- Fuel: Ultra low sulfur diesel
- Horsepower: 140 BHP

Emergency Gen Set (1)

- Manufacturer: Caterpillar or equivalent (Tier 2)
- Fuel: Ultra low sulfur diesel
- Horsepower: 2011 BHP (1500 kW)

Auxiliary Boiler (1)

- Manufacturer: Cleaver Brooks or equivalent
- Model: NB-300D-65 Water tube type or equivalent
- With ultra-low-NO_x burners and flue gas recirculation (FGR)
- Fuel: Natural gas
- Rating: 110 MMBtu/hr

Dry Cooling System

The heat rejection from the steam cycle will be via an air cooled condenser (ACC). The ACC is a direct cooling system where the steam exhaust from the low pressure turbine section is condensed inside air-cooled finned tubes. The ACC is made of modules arranged in parallel rows. Each module contains a number of finned tube bundles. An axial flow fan located in each module forces the cooling air across the heat exchange

area of the fin tubes. The heat rejection system will include the ACC, the supporting structure, steam ducting from the LP turbine interface, auxiliaries such as the condensate and drain pumps, condensate and duct drain tanks, the air evacuation pumps, and related piping works and instrumentation.

Fuels

Natural gas will be the only fuel used during plant operation with the exception of the emergency diesel equipment, which will fire ultra-low sulfur diesel fuel. The typical natural gas composition is shown in Appendix 4.1A. Natural gas combustion results in the formation of NO_x, CO, VOCs, SO2, PM10, and PM2.5. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM10, PM2.5, and SO2.

The fuel used on this project is similar to the fuels used on similar combined cycle power generation facilities. The natural gas will meet the Public Utility Commission (PUC) grade specifications. The diesel fuel sulfur will be limited to 15 ppm, and will meet all California low sulfur diesel specifications. Table 4.1-5 presents a fuel use summary for the facility. Fuel use values are based on the maximum heat rating of each system, fuel specifications, and maximum operational scenario. Fuel analysis data for both natural gas and diesel fuel is presented in Appendix 4.1A.

Table 4.1-5
Estimated Fuel Use Summary for the Project

Source	Fuel	Per Hour, mmscf	Per Day, mmscf	Per Year, mmscf
CT-1 with DB	Natural gas	2.4093	57.8226	17630.43
CT-2 with DB	Natural gas	2.4093	57.8226	17630.43
CT-1 w/o DB	Natural gas	2.2206	53.2932	14100.82
CT-2 w/o DB	Natural gas	2.2206	53.2932	14100.82
Auxiliary Boiler	Natural gas	0.1074	2.5776	524.65
Source	**Fuel**	**Per Hour, gals**	**Per Day, gals**	**Per Year, gals**
Diesel Fire Pump	Diesel Fuel	9.2	9.2	478.4
Emergency Generator	Diesel Fuel	104.6	52.3	2719.6

CT – Combustion Turbine

DB – Duct Burner

The fire pump will be tested up to 1 hour per day and 1 day per week, or 52 hours per year, per NFPA testing requirements.

The EGS will be tested up to 0.5 hour per day and 1 day per week, or 26 hours per year

HHV of fuel is 1024 BTU/SCF (average)

DB cases: Hourly and daily fuel rates based on cold day (Case 2) for 24-hours, annual fuel rate based on annual average 64 degree F (Cases 11 and 12).

Non-DB cases: Hourly and daily fuel rates based on cold day (Case 1), annual fuel rate based on average annual 64 degree F (Case 11).

Max turbine hours per day = 24 (including SU/SD hours). Max turbine hours per year (see Appendix 4.1A)

Max Auxiliary boiler operation up to 24-hours per day, 4,884 hours per year.

4.1.2.3 Climate and Meteorology

The proposed site in the Palmdale, California area, within the north-eastern portion of Los Angeles County, experiences the following climate and meteorology patterns.

The Mojave Desert Air Basin (MDAB) is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada Mountains to the north. Air masses pushed onshore in southern California by differential heating are channeled through the MDAB. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevada Mountains in the north by the Tehachapi Pass (3,800 ft elevation). The Antelope Valley

is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 ft). The Mojave Desert is bordered in the southwest by the San Bernardino Mountains, separated from the San Gabriel's by the Cajon Pass (4,200 ft). A lesser channel lies between the San Bernardino Mountains and the Little San Bernardino Mountains (the Morongo Valley).

During the summer the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least three months have maximum average temperatures over 100.4° F.

The climatic pattern for the Project region is a typical desert climate within the Mediterranean climate classification. The warmest month for the region is typically July, with December being the coldest month. The month with the highest precipitation is usually February. The eastern Mojave Desert region experiences a large number of days each year with sunshine, generally 345+ days per year. The region also traditionally experiences excellent visibility, i.e., greater than 10 miles or more 95 percent of the time.

Representative climatic data for the Project Area was derived from the Palmdale AF Plant 42 Station (Period of Record 1998-2008) located to the west of the Project Site. A summary of data from this site indicates the following:

Average annual maximum daily temperature: 77.1°F

Average annual minimum daily temperature: 47.2°F

Average temperature (annual): 64°F

Extreme maximum temperature: 113°F

Extreme minimum temperature: 10°F

Mean annual precipitation: 5.25 inches

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the nature of the emitting source, the topography of the air basin, and the local meteorological conditions. In the Project Area, inversions and light winds can

result in conditions for pollutants to accumulate in the region. Annual and quarterly wind roses for the Palmdale Air Force Plant 42 Automated Surface Observing System (ASOS) weather station for the period 2010-2014 are presented in Appendix 4.1B. The wind pattern in the project area is primarily from the southwest (south through west-northwest). Calm winds occur approximately 3.82% of the time on an annual average basis.

4.1.3 Emissions Evaluation

4.1.3.1 Facility Emissions and Permit Limitations

The approximately 50 acre site is currently vacant, and consists of open desert lands. There are no current air pollution sources on the proposed site (except for naturally occurring dust emissions), and there are no facilities on the current site that are permitted by the AVAQMD.

4.1.3.2 Facility Emissions

Installation and operation of the project will result in the emissions signature for the site that will be greater than 100 tpy for some criteria pollutants, and as such the project will be considered a major NSR source for NO_x, CO, VOC, and PM10/2.5 under the AVAQMD rules. The project will trigger the requirements of the Federal PSD program since the emissions of one or more criteria pollutants will exceed the 100 tpy major source applicability thresholds. The applicability determination for PSD is based on the post commissioning year emissions. Criteria pollutant emissions from the new combustion turbines/HRSGs and auxiliary equipment are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 4.1.7. Backup data for both the criteria and hazardous air pollutant emission calculations are provided in Appendix 4.1A.

The hourly, daily and annual emissions for all criteria pollutants are based upon a series of worst-case assumptions for each pollutant. The intent was to envelope the project emissions based upon the three (3) dispatch profiles provided in Appendix 4.1A and below. The daily operation always assumes 24 hours of operation with at least one cold or warm/hot start and one shutdown (except for PM and SO2, which is based on 24-hour of continuous operation). The worst-case annual emissions profiles will be dependent upon pollutant and which worst-case dispatch assumption produces the maximum annual potential to emit. Thus, the following assumptions will apply to the proposed project:

- For the highest annual emissions of NO_x, SO_2, PM10/2.5 and CO_2e, up to 7,960 hours of operation at base load, up to 35 warm starts, five (5) cold start, and up

to 40 shutdowns per year for a total of 8,000 hours per year with up to 24 hours per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 836 hours per year. This is identified on the attached spreadsheet in Appendix 4.1-A as Operational Scenario 1 (Table 4.1A-1A).

- For the highest annual emissions of CO and VOC, up to 3,625 hours at base load with up to 360 hot starts, 360 warm starts, five (5) cold starts, and up to 725 shutdowns for a total of 4,320 hours per year with up to 24-hour per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 4,884 hours per year. This is identified in Appendix 4.1-A as Operational Scenario 2 (Table 4.1A-1B).

- The third Operational Scenario is based on 4,470hours per year of base load operation, up to 180 hot starts, 360 warm starts, 5 cold starts, and up to 545 shutdowns per year for a total of 5,000 hours per year with up to 24-hours per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 4,136 hours per year. This is identified in Appendix 4.1-A as Operational Scenario 3 (Table 4.1A-1C).

- All three emissions scenarios include 1,500 hours per year for the duct burners in the HRSG with up to 24 hours per day of operation, and 50 hours per year for fire pump and 26 hours per year for the emergency generator testing.

Based on the enveloping of emissions, the goal for the Authority to Construct permit is to not have any limits on the number of turbine start events (either cold, warm or hot), the number of hours of facility operation, the number duct burner operational hours, or the number shutdown events. By enveloping the emission scenarios, we presented several ways in which the facility may operate, but there could be other scenarios with more starts and less run-time hours. Thus, the applicant would propose that the facility limits be based on total short-term and annual emissions rather than operational hours or operational events. The turbines/HRSGs will be required to install continuous emission monitors (CEMs) for NO_x and CO. Hourly fuel use monitoring along with source test requirements will establish a compliance method to allow for continuous tracking of all emissions at the PEP. For example, the maximum annual emissions of NO_x at 139 tons per year would establish the facility potential to emit (PTE). PEP would propose and accept hourly, daily and annual emission limits for this pollutant, but would propose that the permit would not contain any limit on the number of start events or hours of operation as the established emission limits would be continuously monitored. This way, the facility operational profiles would be solely based on PTE rather than hours which would allow for a flexible response to changing power market conditions.

Thus, the short-term and annual emissions limits would establish the facility PTE rather than the individual operational profiles.

During the first year of operation, plant commissioning activities, which are planned to occur over an estimated 639 operating hours during the first year of operation, will have higher hourly and daily emission profiles than during normal operations in the subsequent years of operation. The emissions during the first year of operation are presented below and were included in the air quality modeling analysis along with subsequent post commissioning yearly emissions.

The proposed project will be a major NSR source as defined by the AVAQMD Regulation XIII and will be subject to AVAQMD requirements for emission offsets and air quality modeling analyses for criteria pollutants and toxics. The applicant has prepared an air quality emissions and impact analysis to comply with the AVAQMD and the CEC regulations. The modeling analysis includes impact evaluations for those pollutants shown in Table 4.1-6 and the CEC requirements for evaluation of project air quality impacts. The emissions presented in Table 4.1-6 are the worst-case potential emissions on an annual basis.

Table 4.1-6
Significant Emissions Threshold Summary

Pollutant	Cumulative Increase, tpy	Federal/ State Attainment		Federal and AVAQMD Major Source Thresholds PSD/NNSR, tpy		Significant Emissions Rate, tpy	Major Source (PSD/NSR)	Significant Emissions Increase
NO_x	139	Y	Y	100	25	40	PSD/NSR	Y
SO_2	11	Y	Y	100	25	40	No	N
CO	351	Y	Y	100	100	100	PSD/NSR	Y
PM10	81	Y	N	100	15	15	PSD/NSR	Y
PM2.5	81	Y	Y	100	15	10	PSD/NSR	Y
VOC (O_3 Precursor)	52	N	N	100	25	40	PSD/NSR	Y
CO_2e	2,117,730	-	-	100,000	-	75,000	PSD	Y

Installation and operation of the Project will result in a change in the emissions signature for the site and will be considered a major source under the AVAQMD rules. The project will trigger the major new source thresholds for Prevention of Significant Deterioration. Criteria pollutant emissions from the new combustion turbines, aux boiler, and emergency equipment, are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 4.1.7. Support data for both the criteria and hazardous air pollutant emission calculations are provided in Appendix 4.1A.

The emissions calculations presented in the application represent the highest potential emissions based on the proposed operational scenarios.

The proposed mitigation, through the surrender of emission reduction credits as presented in Appendix 4.1G is based on the maximum of the three (3) operational profiles of the PEP. There may be a lack of available ERCs for purchase from the existing and surrounding air basins to satisfy the maximum operational scenario for NO_x and VOCs (Operational Scenario 1). If this case arises, then PEP is proposing to lower the operational emissions to a level based on the available emission offsets until such time that the offsets are available. Lowering the emissions would also lower the corresponding air quality impacts. Therefore, the existing modeling assessment represents a conservative estimate of project air quality impacts.

4.1.3.3 Normal Operations

Operation of the proposed process and equipment systems will result in emissions to the atmosphere of both criteria and toxic air pollutants. Criteria pollutant emissions will consist primarily of NO_x, CO, VOCs, sulfur oxides (SO_x), total suspended particulates (TSP), PM10, and PM2.5. Air toxic pollutants will consist of a combination of toxic gases and toxic PM species. Table 4.1-7, lists the pollutants that may potentially be emitted from the Project.

Table 4.1-7
Potentially Emitted Criteria and Toxic Pollutants

Criteria Pollutants	**Toxic Pollutants (cont'd)**
NO_x	Benzene
CO	1-3 Butadiene
VOCs	Ethylbenzene
SO_x	Formaldehyde
TSP	Hexane (n-Hexane)
PM10/2.5	Naphthalene
	Propylene
Toxic Pollutants	Propylene Oxide
Ammonia	Toluene
PAHs	Xylene
Acetaldehyde	Diesel Particulate Matter
Acrolein	

4.1.3.4 Criteria Pollutant Emissions

Tables 4.1-8 through 4.1-11 present data on the criteria pollutant emissions expected from the facility equipment and systems under normal operating scenarios. The maximum hourly emissions are based on Case 2 (23°F day at base load operation with duct firing) or are based on cold start maximum hourly emission rates. A cold start is defined as a one hour event with the turbine/HRSG stack emissions in BACT compliance at the end of the first hour (the duct burners will not be operated during the first hour of any type of startup). The worst case day for emissions is defined at one cold start (39 minutes of start plus 21 minutes of base load, no duct burner), one shutdown (30 minutes of shutdown plus 30 minutes of base load with duct burner), and 22 hours of base load operation with duct burner (Case 2).

As mentioned earlier, three (3) operational profiles were examined for this application and are summarized in Appendix 4.1A. The differences between the three operational

profiles are based on annual run time hours and the total annual startup/shutdown events. For each operational profile, the number of hours for the auxiliary boiler will also vary as the boiler is used to keep the steam turbine in a warm state to allow for faster start times. For NO_x, PM10/2.5, SO_x and CO_2e, the maximum potential to emit is Operational Scenario 1, which has the most based loaded hours per year. For CO and VOC's, Operational Scenario 2 has the highest emissions, and is based on the case which has the most number of startup and shutdown hours. The Operational Scenario for the worst-case auxiliary boiler emissions is based on the Scenario 2, which like the case for CO and VOCs, this case has the least amount of base loaded hours of operation. Thus, for each pollutant, the maximum potential to emit is presented in Appendix 4.1A and in the tables below.

Table 4.1-8
Combustion Turbine/HRSG and Auxiliary Boiler Emissions
(Startup and Steady State Operation Per Turbine/HRSG)

Combustion Turbine/HRSG					
Pollutant	**Emission Factor and Units**	**Max Hour Emissions at Cold Startup (lb/hr)**	**Max Hour Emissions Steady State w/o DB (lb/hr)**	**Max Hour Emissions Steady State w/DB (lbs)**	**Max Daily Emissions (lbs)[a]**
NO_x	2.0 ppmvd	57.47	17.1	18.5	564.54
CO	2.0 ppmvd	419.44	10.4	11.3	1084.14
VOC	2.0 ppmvd	-	-	6.36	235.25
VOC	1 ppmvd	31.41	3.0	-	-
SOx[b]	0.2 gr S/100scf	1.46	1.4	1.5	36.00
PM10/2.5	<=0.0047 (CT) <=0.011 (DB) lbs/MMBtu	11.75	9.8	11.8	283.2
NH_3	5.0 ppmvd	13.79	15.8	17.2	412.8
CO_2e	116.89 lb/mmbtu	2,112,350 (Max TPY-Scenario 1)			

Auxiliary Boiler Emissions				
Pollutant	**Emissions Factor and Units**	**Max Hour Emissions (lb/hr)**	**Max Daily Emissions (lb/hr)**	**Max Annual Emissions (tpy)[c]**
NO_x	9.0 ppm	1.21	29.04	2.95
CO	50 ppm	4.07	97.68	9.94
VOC	15 ppm	0.55	15.84	1.61
SO_x	0.0006 lb/MMBtu	0.07	1.58	0.16
PM10/2.5	0.007 lb/MMBtu	0.77	18.48	1.88
CO_2e	116.89 lb/MMBtu	-	-	31,430.9

[a] Worst-case 23-hour day based on Case 2 (23°F day) with one (1) warm start, one (1) hot start, two (2) shutdowns plus remaining 22.08 hours at full load with duct burner on. For PM and SO_2, maximum daily assumes 24-hours of operation with the duct burner on. See Appendix 4.1A.

[b] Short term and annual fuel sulfur limit is based on 0.2 gr/100scf, per Sempra email to Summit Power.

[c] Auxiliary boiler annual emissions is based on Operational Scenario 2 with 4,884 hours per year and 24-hours per worst-case day. See Appendix 4.1A. Auxiliary boiler startup emissions are equal to a steady state hour.

Turbine/HRSG ppm reference = 15% O_2 dry

Auxiliary boiler ppm reference = 3% O_2 dry

CT = Combustion Turbine

DB = Duct Burner

Table 4.1-9
Startup and Shutdown Emissions Per Turbine

Parameter/Mode	Cold Startup to 100% Turbine Load	Warm Startup to 100% Turbine Load	Hot Start to 100% Turbine Load	Shutdown from 100% Turbine Load
NO_x, lbs/event	51.48	46.8	43.2	33.0
CO, lbs/event	415.80	378	304.8	75.9
VOC, lbs/event	30.36	27.6	27.6	19.8
PM10/2.5, lbs/event	8.32	7.56	6.48	4.07
SO_x, lbs/event	0.88	0.88	0.75	0.75
Event Time, minutes (hours)	39 (0.65)	35 (0.583)	30 (0.5)	25 (0.417)
Maximum Number of Events/Year (Operational Scenario)	5 (Operational Scenario 1, 2 and 3)	360 (Operational Scenario 2 and 3)	360 (Operational Scenario 2)	725 (Operational Scenario 2)

* A 20% and 10% margin has been added to the startup and shutdown emissions, respectively. During the remaining minutes during the start hour, Case 1 (23^oF) full load, non-duct burner emissions are used.

Cold start event data is based on 100% turbine load at the end of the start cycle. Duct burner operation would not be available during the first hour of any start.

Table 4.1-10
Two Combustion Turbine/HRSG Emissions (Including Base Load with DB, Cold/Warm/Hot Startup and Shutdown, Whichever is Greater) for the Non-Commissioning Year

Pollutant	Emission Factor	Max Hour Emissions (pounds)	Max Daily Emissions (pounds)	Max Annual Emissions (tons)
NO_x	N/A	114.93	1129.07	138.24
CO	N/A	838.88	2168.28	341.08
VOCs	N/A	62.82	470.50	50.02
SO_x	N/A	3.0	72.51	11.36
PM10/2.5	N/A	23.60	566.40	80.67
NH_3	N/A	27.58	825.60	124.68
CO_2e	N/A	-	-	2112350

See Appendix 4.1A, for detailed emissions and operational data.

Maximum hour based on two turbines in cold startup, except for PM10/2.5 and SO_x which is based on Case 2 operation with duct burner.

Emergency equipment readiness testing will not occur during a turbine startup hour.

Maximum day is based on Operational Scenario 2 with two startups and shutdowns, with remaining hours at Case 2 operation with duct burner. PM10/2.5 and SO_x just based on 24-hour of Case 2 emissions with duct burner.

Maximum annual NOx, SO_x, NH_3, CO_2e and PM10/2.5 based on Operational Scenario 1.

Maximum annual CO and VOCs based on Operational Scenario 2.

DB = Duct Burner

Table 4.1-11
Diesel Fire Pump and Generator Engine Emissions

140 BHP Fire Pump (Tier 3)				
Pollutant	**g/hp-hr**	**Max Hour Emissions (pounds)**	**Max Daily Emissions (pounds)**	**Max Annual Emissions (tons)**
PM10/2.5	0.22	0.068	0.068	0.002
NO_x	2.80	0.864	0.864	0.022
SO_x	0.0015% by weight	0.0019	0.0019	0.00005
CO	3.70	1.142	1.142	0.03
VOC	0.20	0.062	0.062	0.002
CO_2e	-	-	-	5.3
2011 BHP Emergency Generator (Tier 2)				
PM10/2.5	0.09	0.2	0.2	0.005
NO_x	3.78	8.38	8.38	0.218
SO_x	0.0015% by weight	0.011	0.011	0.0003
CO	0.67	1.485	1.485	0.039
VOC	0.19	0.421	0.421	0.011
CO_2e	-	-	-	30.2

Notes: SO_x emissions based on fuel S content of 15 ppm.

Emergency generator daily testing will be restricted to 30 minutes per test. The hourly emissions represent the 30 minute readiness testing runtime per test or 50 hours per year.

The fire pump testing is based on 60 minutes per day, 50 hours per year.

Table 4.1-12 presents a summary of the annual emissions for each operational scenario.

Table 4.1-12
PEP Maximum Potential to Emit
by Operational Scenario (Tons/Year)

Pollutant	Operational Scenario 1	Operational Scenario 2	Operational Scenario 3
NO_x	138.75	122.17	122.11
CO	102.43	351.02	289.60
VOCs	30.83	51.63	45.39
SO_x	11.39	6.52	7.41
TSP/PM10/PM2.5	81.0	48.08	54.09
NH_3	124.68	57.92	70.93
CO_2e	2,117,730	1,187,288	1,359,218
Emergency engine emissions not included.			

As discussed earlier, the goal of this application is to present three (3) operational profiles that would envelope the emissions on a pollutant specific basis, with the maximum from the three (3) profiles used to represent the PEP potential to emit.

Based on the emissions summarized in Table 4.1-12 and the previous tables, Table 4.1-13 presents the maximum proposed emissions for the PEP on a pollutant specific basis.

Table 4.1-13
Summary of Maximum Facility Emissions for the Project
(Highest Operating Scenario Values)

Pollutant	lbs/hour	lbs/day	tons/year
NO_x	116.14	1140.73	138.99
CO	842.95	2179.05	351.09
VOCs	63.79	472.30	51.64
SO_x	3.08	72.14	11.39
TSP/PM10/2.5	24.57	568.21	81.01
NH_3	27.58	825.60	124.68
CO_2e	-	-	2,117,775.06

Normal Operation Assumptions:

For the highest annual emissions of NO_x, SO_x, PM10/2.5 and CO_2e, up to 7,960 hours of operation at base load, up to 35 warm starts, five (5) cold start, and up to 40 shutdowns per year for a total of 8,000 hours per year with up to 24 hours per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 836 hours per year. (Operational Scenario 1)

For the highest annual emissions of CO and VOC, up to 3,625 hours at base load with up to 360 hot starts, 360 warm starts, five (5) cold starts, and up to 725 shutdowns for a total of 4,320 hours per year with up to 24-hour per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 4,884 hours per year. (Operational Scenario 2)

The third Operational Scenario is based on 4,470hours per year of base load operation, up to 180 hot starts, 360 warm starts, 5 cold starts, and up to 545 shutdowns per year for a total of 5,000 hours per year with up to 24-hours per day of operation. For this scenario, the auxiliary boiler is expected to operate up to 4,136 hours per year. (Operational Scenario 3)

All three emissions scenarios include 1,500 hours per year for the duct burners in the HRSG with up to 24 hours per day of operation, and 50 hours per year for fire pump and 26 hours per year for the emergency generator testing.

Total facility estimated maximum emissions (including turbine SU/SD emissions).

Hourly emissions include the auxiliary boiler for all pollutants. The emergency generator is only included for SO_x and PM10/2.5 hourly as the maximum hour for NOx, CO and VOCs is based on startup (no emergency engine testing).

Daily emissions assume two (2) startups and two (2) shutdowns with the remaining hours at full load with duct burners, except for SO_x and PM10/2.5 which is based on 24-hours of full load with duct burners. The auxiliary boiler is assumed to operate two hours for the worst-case day.

In addition to the normal operational profiles presented above, during the first year of operation, plant commissioning activities will occur. These are planned to occur over an estimated 1,278 hours, will have higher hourly and daily emission profiles than during normal operations in the subsequent years of operation. For commissioning, the worst-

case hour and the worst-case day is assumed to be one (1) turbine undergoing first fire and synch checks with the other turbine in emissions and combustion tuning. No two turbines will be undergoing the same commissioning activity during any one hour or day until the final tuning and testing phase. The commissioning activities and emissions are summarized in Appendix 4.1-A.

Greenhouse Gas Emissions

Climate Change and Global Warming

The California regulatory framework sees to address climate change and global warming through regulation of Greenhouse Gas Emissions (GHG). State law defines GHG to include the following: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (Health and Safety Code §38505(g)). The most common GHG that results from human activity is CO_2, followed by CH_4 and N_2O.

Legislative Action

Assembly Bill (AB) 1493 (June 2002)

On July 22, 2002, the Governor of California signed into law Assembly Bill (AB) 1493, a statute directing the California Air Resources Board (CARB) to "develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." The statute required CARB to develop and adopt the regulations no later than January 1, 2005. AB 1493 allows credits for reductions in GHG emissions occurring before CARB's regulations become final (i.e., an early reduction credit). AB 1493 also required that no later than July 1, 2003, the California Climate Action Registry, in consultation with the CARB, shall adopt procedures for the reporting of reductions in GHG emissions from mobile sources.

Executive Order S-3-05 (June 2005)

On June 1, 2005, the Governor announced GHG emission reduction targets for California. The governor signed Executive Order S-3-05 which established GHG emission reduction targets and charged the secretary of the California Environmental Protection Agency (CalEPA) with the coordination of the oversight of efforts to achieve them. The Executive Order establishes three targets for reducing global warming pollution:

- Reduce GHG emissions to 2000 emission levels by 2010;
- Reduce GHG emissions to 1990 emission levels by 2020; and,

- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

Global Warming Solutions Act of 2006 (AB 32)

The Global Warming Solutions Act of 2006 (AB32) was signed into law on September 27, 2006. AB32 does not "limit or expand" existing authority of districts. Specifically, AB32 requires CARB to:

- Establish a statewide greenhouse gas emissions cap for 2020, based on 1990 emissions by January 1, 2008;
- Adopt mandatory reporting rules for significant sources of greenhouse gases by January 1, 2009;
- Adopt a plan by January 1, 2009, that indicates how emission reductions will be achieved from significant greenhouse gas sources via regulations, market mechanisms and other actions;
- Adopt regulations by January 1, 2011, that will achieve the maximum technologically feasible and cost-effective reductions in greenhouse gases, including provisions for using both market mechanisms and alternative compliance mechanisms;
- Convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB;
- Ensure public notice and opportunity for comment for all CARB actions;
- Adopt rules for "sources" of greenhouse gases, including non-vehicular sources; and
- Prior to imposing any mandates or authorizing market mechanisms, evaluate several factors, including but not limited to impacts on California's economy, the environment and public health, equity between regulated entities; electricity reliability, and conformance with other environmental laws, and ensure that the rules do not disproportionately impact low-income communities.

Consistent with the requirement to develop a Scoping Plan indicating how GHG emission reductions will be achieved through regulations, market mechanisms, and other actions, the Proposed Scoping Plan was released for public review and comment in October 2008. The Proposed Scoping Plan calls for reducing greenhouse gas emissions to 1990 levels by 2020. This means cutting approximately 30 percent from business-as-usual (BAU) emission levels projected for 2020, or about 15 percent from

today's levels. Key elements of CARB staff's recommendations for reducing California's greenhouse gas emissions to 1990 levels by 2020 contained in the Proposed Scoping Plan include the following:

- Expansion and strengthening of existing energy efficiency programs and building and appliance standards;
- Expansion of the Renewables Portfolio Standard to 33 percent;
- Development of a California cap-and-trade program that links with other Western Climate Initiative (WCI) Partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gases and pursuing policies and incentives to achieve those targets;
- Adoption and implementation of existing State laws and policies, including California's clean car standards goods movement measures, and the Low Carbon Fuel Standard; and
- Targeted fees, including a public good charge on water use, fees on high GWP gases and a fee to fund the State's long-term commitment to AB 32 administration.

Senate Bill (SB) 97 (August 2007)

In August 2007, the Governor signed into law Senate Bill (SB) 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research (OPR) and the Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." Specifically, SB 97 requires OPR, by July 1, 2009, to prepare, develop, and transmit guidelines to the Resources Agency for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The Resources Agency would be required to certify and adopt those guidelines by January 1, 2010. The OPR would be required to periodically update the guidelines to incorporate new information or criteria established by the CARB pursuant to the California Global Warming Solutions Act of 2006. SB 97 also identifies a limited number of types of projects that would be exempt under CEQA from analyzing GHG emissions. Finally, SB 97 will be repealed on January 1, 2010.

Consistent with SB 97, on June 19, 2008, OPR released its "Technical Advisory on CEQA and Climate Change," which was developed in cooperation with the Resources

Agency, the California Environmental Protection Agency (Cal/EPA), and the California Air Resources Board (CARB). According to OPR, the "Technical Advisory" offers the informal interim guidance regarding the steps lead agencies should take to address climate change in their CEQA documents, until CEQA guidelines are developed pursuant to SB 97 on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

According to OPR, lead agencies should determine whether greenhouse gases may be generated by a proposed project, and if so, quantify or estimate the GHG emissions by type and source. Second, the lead agency must assess whether those emissions are individually or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though it's GHG contribution may be individually limited, the lead agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the lead agency determines that the GHG emissions from the project as proposed are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

Greenhouse Gas Impacts and CEQA

General scientific consensus and increasing public awareness regarding global warming and climate change have placed new focus on the CEQA review process as a means to address the effects of GHG emissions from proposed projects on climate change. Public agencies are striving to determine the appropriate means by which to evaluate and mitigate the impacts of proposed projects on climate change. Subsequent to the adoption of AB 32, the California Attorney General's Office determined that GHG emissions contributing to global climate change contribute to potential adverse environmental impacts that should be evaluated pursuant to the CEQA. The Attorney General's Office has submitted numerous comment letters to lead agencies on their CEQA documents for failure to analyze GHG emissions, failure to make a significance determination, and failure to implement feasible mitigation measures to reduce GHG emissions to the maximum extent feasible (SCAQMD, 2008).

Project GHG Estimates

GHG emissions have been estimated for both the construction and operation phases of the project.

Construction emissions are presented in Appendix 4.1-E and include emission evaluations for the following source types:

- On and offsite construction equipment exhaust,
- Construction site delivery vehicle exhaust emissions (including railroad emissions),
- Construction site support vehicle exhaust emissions, and,
- Construction worker travel exhaust emissions.

Operational emissions of CO_2e will be primarily from the combustion of fuels in the turbine, auxiliary boiler, and the emergency equipment along with SF6 emissions from the circuit breakers. Appendix 4.1A, contains the support data for the GHG emissions evaluation. Estimated carbon dioxide equivalents emissions for the project operational phase, based on annual average conditions, are as follows:

CO_2e <= 2,143,826 tons/year (=1,948,933 metric tons/year)

The emission factors and calculation methods are based on the California Climate Action Registry General Protocol, January 2009, BAAQMD guidance, and CARB GHG Reporting Guidelines-2009.

Based upon the annual emissions presented in Table 4.1-13, the facility will also trigger the Prevention of Significant Deterioration (PSD) program requirements for the following pollutants: NO_x, VOC, TSP, PM10, PM2.5, CO, and GHGs. Therefore a PSD modeling analysis protocol, which includes a Class I impact assessment will be required for submittal to the Environmental Protection Agency Region 9 (see Appendix 4.1C).

The PEP, pursuant to the AVAQMD NSR Rule 1302, is required to generate or acquire sufficient emission reduction credits to offset the proposed project emissions due to its status as a major NSR source. Table 4.1-14 below summarizes these requirements. Although the proposed facility is being permitted for full operations, the facility will be operated such that the current level of mitigation credits are not exceeded. As additional mitigation credits are obtained the facility will increase operations to comply with the new level of credits (on an annual basis).

Table 4.1-14
AVAQMD Emission Bank Credits Required By PEP

	PM_{10}[2]	VOC	NO_x	SO_2
AVAQMD Offset Trigger Thresholds, tpy	15	25	25	25
Facility PTE[1], tpy	81.01	51.64	138.99	11.39
AVAQMD Offset Ratio	1:1	1.3:1	1.3:1	1:1
Total Offsets Required, tpy	81.01	57.13	181.99	0
Total Mitigation Required at 1.5:1 Ratio from ERC Transfers > 15 Miles from AVAQMD Boundary, tpy	0	77.46	209.99	0

[1] Values derived from Section 4.1.
[2] PM2.5 is both State and federal attainment, thus no offsets/mitigation is required.

The sources of emission offsets could be from any of the following strategies or combination of strategies. Any required offsets or additional mitigations pursuant to CEQA and/or the District NSR regulations, will be negotiated, acquired, and implemented per the AVAQMD regulations and CEC guidance. These mitigations may be one or a combination of the following strategies:

- Acquisition of existing ERCs from the AVAQMD bank.
- Acquisition of existing ERCs from other District banks within the air basin
- Acquisition of existing ERCs from other District banks outside the air basin
- Generation of PM10 ERCs from road paving
- Inter-pollutant offsets (i.e., NO_x for VOC and VOC for NO_x)

The project owner will demonstrate to the satisfaction of the AVAQMD and the CEC and that adequate emission reduction credits have been purchased prior to start of construction of the project. The project emissions of 138.99 and 51.64 tons per year of NO_x and VOC, respectively, shall be offset at a ratio of 1.3 to one for ERC's within the air basin or areas in the San Joaquin Valley that are within 15 miles of the AVAQMD western boundary. If ERCs are obtained from locations greater than 15 miles from the western portion of the AVAQMD, an offset ratio of 1.5 to one shall be utilized for those offsets. Appendix 4.1G (Mitigation) provides the details of the proposed use of offsets to mitigate the project emissions.

New Source Performance Standards (NSPS)

NSPS are federal standards promulgated for new and modified sources in designated categories codified in 40 CFR Part 60. NSPS are emission standards that are progressively tightened over time in order to achieve ongoing air quality improvement without unreasonable economic disruption. The NSPS impose uniform requirements on new and modified sources throughout the nation. The format of the standard can vary from source to source. It can be a numerical emission limit, a design standard, an equipment standard, or a work practice standard. Primary enforcement responsibility of the NSPS rests with EPA, but this authority has delegated to the AVAQMD, which is enforced through Regulation 9.

Subpart A General Provisions.

Any source subject to an applicable standard under 40 CFR Part 60 is also subject to the general provisions of Subpart A. Because the Project is subject to Subparts IIII and KKKK, the requirements of Subpart A will also apply. The Project operator will comply with the applicable notifications, performance testing, recordkeeping and reporting outlined in Subpart A.

Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units.

The affected facility to which this subpart applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 100 MMBtu/hr. The rule imposes limits on SO_2 emissions for oil- and coal-fired units; limits on PM emissions for units that combust coal, wood or municipal solid waste, alone or in combination with other fuels; and limits on NO_x emissions for natural gas-fired units of 0.20 lb/MMBtu.

Subpart Db would only apply to the auxiliary boiler because it has a heat input rate exceeding 100 MMBtu/hr. This boiler will only be fueled with natural gas, thus Subpart Db does not limit SO_2 or PM emissions from natural gas–fired units. Subpart Db limits NO_x emissions to 0.20 lb/MMBtu from natural gas-fired units. The BACT-derived NOx emission limit of 0.011 lb/MMBtu is substantially less than the Subpart Db limit; thus the auxiliary boiler will comply with the NSPS requirements.

While the HRSG and associated duct burners that will be in excess of 100 MMBtu/hr, this unit is exempt from the requirements of Db. Rather, they are regulated under Subpart KKKK.

Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

Subpart IIII is applicable to owners and operators of stationary compression ignition (CI) internal combustion engines that commence construction after July 11, 2005. Relevant to the proposed Project, the rule applies to the fire water pump CI engine and to the emergency electrical generator CI engine as follows:

(i) Non fire water pump engines manufactured after April 1, 2006;

(ii) Fire water pump engines with less than 30 liters per cylinder manufactured after 2009;

Or

(iii) Fire water pump engines manufactured as a certified National Fire Protection Association fire water pump engine after July 1, 2006.

For the purpose of this rule, "manufactured" means the date the owner places the order for the equipment. Based on the timeline projected for obtaining approval of the Project, the applicant expects that the engines will be ordered (and thus manufactured) in 2018/2018.

Owners and operators of fire water pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards listed for all pollutants. For model year 2016 or later 175-horsepower (hp) engines, the limits are 2.6 grams per horsepower-hour (g/hp-hr) for CO, 3.0 g/hp-hr for non-methane hydrocarbons (NMHC) and NO_x combined, and 0.22 g/hp-hr for PM. The PEP will install a Tier 3 engine meeting these standards.

Owners and operators of non-fire pump engines must comply with the emission standards listed for all pollutants. For a model year 2016 or later engine with 750 hp or more, the limits are 2.6 g/hp-hr for CO, 4.8 g/hp-hr for NMHC and NO_x combined, and 0.15 g/hp-hr for PM. The Project will install a Tier 2 emergency generator engine meeting these standards.

Subpart KKKK Standards of Performance for Stationary Combustion Turbines.

Subpart KKKK places emission limits of NO_x and SO_2 on new combustion turbines and the associated HRSG and duct burners. For new combustion turbines firing natural gas with a rated heat input greater than 850 MMBtu/hr, NO_x emissions are limited to 15 ppm at 15 percent O_2 of useful output (0.43 pounds per megawatt-hour [lb/MWh]).

SO_x emissions are limited by either of the following compliance options:

1. The operator must not cause to be discharged into the atmosphere from the subject stationary combustion turbine any gases which contain SO_2 in excess of 110 ng/J (0.90 lb/MWh) gross output, or

2. The operator must not burn in the subject stationary combustion turbine any fuel which contains total potential sulfur emissions in excess of 0.060 lbs SO_2/MMBtu heat input. If the turbine simultaneously fires multiple fuels, each fuel must meet this requirement.

As described in the BACT section, the PEP will use a SCR system to reduce NO_x emissions to 2.0 ppm and pipeline natural gas to limit SO_2 emissions to 0.0006 pounds per MMBtu to meet BACT requirements, which ensures that the Project will satisfy the requirements of Subpart KKKK.

NSPS Part 60 Greenhouse Gas Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units.

In January, 2014, the USEPA re-proposed the standards of performance regulating CO_2 emissions from new affected fossil-fuel-fired generating units, pursuant to Section 111(b) of the Clean Air Act. The proposed standards would be 1,100 lbs CO_2/MWh (gross energy output on a 12 operating month rolling average basis). While the final standards have not yet been promulgated, the PEP would comply with this proposed standard.

National Emission Standards for Hazardous Air Pollutants (Parts 61 and 63)

There are no Part 61 standards applicable to the facility operations. As discussed in Section 5.0 and shown in the emission calculations in Appendix B, the Project Hazardous Air Pollutant (HAP) emissions are well below the thresholds for the NESHAP programs (i.e., 10 tpy of any single HAP and 25 tpy of all HAP combined) and, hence, 40 CFR Part 63 standards are not applicable to this Project.

Chemical Accident Prevention (Part 68)

The use of 19.5 percent concentration ammonia for the Project exempts the Project from Federal RMP applicability. The facility will be subject to California's Accidental Release Prevention Program for aqueous ammonia storage and use, which is similar to the Federal RMP program.

Title V, Facility Operating Permits (Part 70)

The Project is required to comply with the Federal Operating Permits Program, also known as Title V. As required by AVAQMD rules, the Project will comply with these requirements by submitting a Title V application within 12 months after starting commercial operation of the facility.

Title IV, Acid Rain (Part 72)

The Project is also required to comply with the Acid Rain requirements (Title IV). Since the AVAQMD has received delegation for its Title V permit program, the Applicant will secure a Title V permit that imposes the necessary requirements for compliance with the Title IV Acid Rain provisions from the AVAQMD.

4.1.3.5 Hazardous Air Pollutants

See Section 4.1.7, Public Health, for a detailed discussion and quantification of HAP emissions from the Project and the results of the health risk assessment. See Appendix 4.1D, for the public health analysis health risk assessment (HRA) support materials. Section 4.1.7, Public Health, also discusses the need for Risk Management Plans pursuant to 40 CFR 68 and the California Accidental Release Program regulations.

4.1.3.6 Construction

Construction-related emissions are based on the following:

- The Applicant owns the current Project Site. The site is approximately 50 acres in size. The construction laydown area will be contained within the 50 acre site. The Applicant may also leas an additional 20 acres from the City of Palmdale during construction. This 20 acre parcel is adjacent to the northern boundary of the site.

- Moderate site preparation will be required prior to construction of the turbine/HRSG, and cooling tower cells, building foundations, support structures, etc.

- Construction activity is expected to last for a total of 23 months (not including startup and commissioning).

Construction-related issues and emissions at the Project Site are consistent with issues and emissions encountered at any construction site. Compliance with the provisions of the following permits will generally result in minimal site emissions: (1) grading permit, (2) Stormwater Pollution Prevention Plan (SWPPP) requirements (construction site

provisions), (3) building permits, and (4) the AVAQMD Permit to Construct (PTC), which will require compliance with the provisions of all applicable fugitive dust rules that pertain to the site construction phase.

The current proposed project is very similar to the previous project with only one major difference, i.e., the deletion of the solar component. The applicant has chosen to rely upon the construction emissions estimates for the previous project taking into account the removal of those emissions connected to the solar component. In addition, the applicant believes that the exhaust emissions as previously calculated will be conservative in that the equipment to be used on the new project will represent a mix of newer and cleaner engine types as compared to the previous estimates. Construction emissions are summarized in Appendix 4.1E. These emissions were used to establish construction related impacts.

The existing Conditions of Certification incorporate the following mitigation measures or control strategies which will remain unchanged for the PEP:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.

- All unpaved roads and disturbed areas in the Project and Construction Laydown and Parking Area will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of two times per day during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.

- On-site vehicle speeds will be limited to 5 mph on unpaved areas within the Project construction site.

- The construction site entrance will be posted with visible speed limit signs.

- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.

- Gravel ramps will be provided at the tire cleaning area.

- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.

- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.

- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.

- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.

- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.

- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.

- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.

- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the Applicant will:

- Work with the general contractor to utilize to the extent feasible, Environmental Protection Agency (EPA)/Air Resources Board Tier II/Tier III engine compliant equipment for equipment over 100 horsepower.

- Ensure periodic maintenance and inspections per the manufacturers specifications.

- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (<=15 ppmw Sulfur).

Based on the temporary nature and the time frame for construction, the Applicant believes that these measures will reduce construction emissions and impacts to levels that are less than significant, the same conclusion contained in the Final Decision for the Approved Project. Use of these mitigation measures and control strategies will ensure that the site does not cause any violations of existing air quality standards as a result of construction-related activities. Appendix 4.1E, presents the evaluation of construction related emissions as well as data on the construction related ambient air quality impacts.

Table 4.1-15 presents data on the regional air quality significance thresholds currently being implemented by the AVAQMD. The specific construction and operational thresholds were derived from the AVAQMD California Environmental Quality Act (CEQA) guidance.

Table 4.1-15
AVAQMD CEQA Significance Thresholds

Pollutant	Annual Thresholds	Daily Thresholds
NO_x	25 tons/yr	137 lbs/day
CO	100 tons/yr	548 lbs/day
VOCs	25 tons/yr	137 lbs/day
SO_x	25 tons/yr	137 lbs/day
PM10	15 tons/yr	82 lbs/day
PM2.5	15 tons/yr	82 lbs/day
Source: AVAQMD website, 3/9/15.		

Construction emissions, from all onsite and offsite activities are expected to exceed the AVAQMD CEQA thresholds for NOx only on a daily and annual basis.

In addition to the local significance criteria, the following general conformity analysis thresholds are as follows in accordance with Code of Federal Regulations (40 CFR Parts 6 and 51), and AVAQMD Rule 1901:

NO_x – 50 tons per year

VOCs – 50 tons per year

CO – 100 tons per year

SO_x – 100 tons per year

PM10 – 100 tons per year

PM2.5 – 100 tons per year

Emissions from the construction phase are not estimated to exceed the conformity levels noted above. Emissions from the operational phase are subject to the AVAQMD NSR and the EPA PSD permitting provisions, and as such, are exempt from a conformity determination or analysis.

4.1.4 Best Available Control Technology Evaluation

4.1.4.1 Current Control Technologies

Table 4.1-16 summarizes the control technologies currently proposed for use on combustion turbines/HRSGs and auxiliary boiler.

Table 4.1-16
BACT Values for Combustion Turbines/HRSGs

Pollutant	BACT Emissions Range[1]	Proposed BACT
NO_x	2.0 – 2.5 ppmvd	2.0 ppmvd
CO	2.0 – 4.0 ppmvd	2.0 ppmvd
VOCs	0.7 - 3.0 ppmvd	1 ppmvd no DB 2.0 ppmvd with DB
SO_x	Natural Gas 0.20 to 0.75 gr S/100 scf	Natural Gas 0.20 gr S/100 scf
PM10/PM2.5	0.003 – 0.009 lbs/MMBtu	<= 0.0048 lbs/MMBtu
Auxiliary Boiler		
NO_x	7 - 36 ppmvd	9.0 ppmvd
CO	50 - 100 ppmvd	50 ppmvd
VOCs	10-13.5 ppmvd	0.005 lb/MMBtu
SO_x Natural Gas	0.20 to 0.75 gr S/100 scf	0.20 gr S/100 scf
PM10/PM2.5	0.005 – 0.8 lb/MMBtu	0.007 lb/MMBtu

Source: CARB, AVAQMD, SDAVAQMD, SJVUAVAQMD, and BAAQMD BACT Guidelines.
[1] Data derived from CARB, AVAQMD, SDAVAQMD, SJVUAVAQMD, and BAAQMD.
DB = duct burner

4.1.4.2 Proposed Best Available Control Technology

Table 4.1-17 presents the proposed BACT for the new combustion turbines/HRSGs and the auxiliary boiler. The new combustion turbines will utilize aqueous ammonia as the primary reactant in the SCR system.

Table 4.1-17
Proposed BACT for the Combustion Turbines/HRSGs and Auxiliary Boiler

Pollutant	Proposed BACT Emissions Level	Proposed BACT System(s)	Meets Current BACT Requirements
NO_x	2.0 ppmvd	DLN combustors with SCR	Yes
CO	2.0 ppmvd	Oxidation Catalyst	Yes
VOCs	2.0 ppmvd With DB 1 ppmvd No DB	Oxidation Catalyst	Yes
SO_x	0.20 gr S/100 scf (long term)	Natural Gas	Yes
PM10/ PM2.5	<= 11.8 lbs/hr	Natural Gas	Yes
NH_3	5.0 ppmvd	NH_3 Reagent/SCR System	Yes
Auxiliary Boiler			
NO_x	9.0 ppmvd	ULNB/FGR/GCPs	Yes
CO	50 ppmvd	Natural Gas/GCPs	Yes
VOCs	0.005 lb/MMBtu/15 ppmvd	Natural Gas/GCPs	Yes
SO_x	0.20 gr S/100 scf	Natural Gas	Yes
PM10/ PM2.5	0.007 lb/MMBtu	Natural Gas/GCPs	Yes
NH_3	na	na	na

Source: CARB, AVAQMD, SDAVAQMD, SJVUAVAQMD, and BAAQMD BACT Guidelines.
HRSGs with duct burners.
DB – Duct Burner
UNLB – Ultra Low NOx Burner
FGR – Flue Gas Recirculation

Fire Pump Engine BACT

The fire pump engine will be fired exclusively on California certified ultra low sulfur diesel fuel, and will meet all the emissions standards as specified in; (1) CARB ATCM, (2) EPA/CARB Tier III, and (3) NSPS Subpart IIII. Due to the low use rate of the engine for testing and maintenance, as well as its intended use for emergency fire protection, the engine meets the current BACT requirements of the AVAQMD.

Emergency Generator Engine BACT

The emergency generator engine will be fired exclusively on California certified ultra low sulfur diesel fuel, and will meet all the emissions standards as specified in; (1) CARB ATCM, (2) EPA/CARB Tier II, and (3) NSPS Subpart IIII. Due to the low use rate of the engine for testing and maintenance, as well as its intended use for emergency power production, the engine meets the current BACT requirements of the AVAQMD.

Dry Cooling System BACT

The proposed facility will use dry cooling technology, i.e., an air cooled condenser. The system has no emissions potential and is exempt from permitting per AVAQMD Rule 291(E)(4)(c). This system represents BACT.

Summary

Based on the above data, the proposed emissions levels for the new combustion turbines, auxiliary boiler, emergency generator and fire pump engine satisfy the BACT requirements of the AVAQMD under Regulation XIII, Rule 1303. Specifics associated with the BACT analyses can be found in Appendix 4.1F.

4.1.5 Air Quality Impact Analysis

This section describes the results, in both magnitude and spatial extent of ground level concentrations resulting from emissions from the Project. The maximum-modeled concentrations were added to the maximum background concentrations to calculate a total impact.

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described herein and presented in the April 2015 Modeling Protocol previously submitted and approved by the AVAQMD and the CEC. A copy of the April 2015 Modeling Protocol is included in Appendix 4.1C. All input and output modeling files are contained on a CD ROM disk provided to the AVAQMD and CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the AVAQMD and CEC through development of a modeling protocol. Modeling analyses specific to the PSD permitting process will be submitted separately to EPA Region 9.

4.1.5.1 Dispersion Modeling

For modeling the potential impact of the Project in terrain that is both below and above stack top (defined as simple terrain when the terrain is below stack top and complex terrain when it is above stack top) the United States Environmental Protection Agency (USEPA) guideline model AERMOD (version14134) was used as well as the latest versions of the AERMOD preprocessors to determine surface characteristics (AERSURFACE version13016), to process meteorological data (AERMET version 14134 and AERMINUTE 14337), and to determine receptor elevations and slope factors (AERMAP version11103). The purpose of the AERMOD modeling analysis was to evaluate compliance with the California state and Federal air quality standards.

Hourly observations of certain meteorological parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. These data must meet certain criteria established by the USEPA and the later discussion details the proposed data and its applicability to this project.

The proposed project site is located in northern Los Angeles County just west of the northwest corner of the Palmdale Air Force Plant 42 Complex (aka Palmdale Airport) and about 2.5 km west-northwest of the ASOS (Automated Surface Observing System) meteorological monitoring site at the Palmdale Airport. ASOS monitoring sites measure surface meteorological data such as wind speed and direction, temperature, pressure, cloud heights, and sky cover. ASOS surface data are generally selected for processing for AERMOD because ASOS hourly data are routinely recorded and archived, generally meet USEPA data completeness criteria, instruments are located in unobstructed areas meeting USEPA siting criteria, and instrument heights and sensor sensitivities meet USEPA instrument specifications. Also, short-term (1-minute) wind direction and speed data are generally available that can be processed by USEPA programs to eliminate excessive calm observations and to give hourly averages consistent with USEPA modeling requirements. These Palmdale ASOS surface data, when processed with AERMET as described below, result in data recovery rates greater than 90 percent for every quarter in the five-year period in accordance with USEPA requirements ("Meteorological Monitoring Guidance for Regulatory Modeling Applications," EPA-454/R-99-005). Generally, surface data parameters of wind speed, wind direction, and temperature must individually exceed 90% both by quarter and year, as well as wind speed, direction, and stability (turbulence) parameters combined, before any substitutions. These criteria are equaled for all quarterly/annual periods of the surface data selected (the only data substitutions used for any the meteorological data processing were for upper air data in the second quarter of 2010 as described later).

All of these data (hourly and minute surface data from the Palmdale Airport and appropriate upper air data) were processed with the USEPA-programs described above (AERMET and AERMINUTE) to generate meteorological datasets to be input to AERMOD.

AERMOD input data options are listed below. Use of these options follows the USEPA's modeling guidance. Default model option for temperature gradients, wind profile exponents, and calm processing, which includes final plume rise, stack-tip downwash, and elevated receptor (complex terrain) heights option. All sources were modeled as rural sources.

AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on updated characterizations of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. AERMOD also uses the advanced PRIME algorithm to account for building wake effects.

Flagpole receptors are not proposed to be used (ground level concentrations will be calculated). AERMAP will be used to calculate receptor elevations and hill height scales for all receptors from NED data in accordance with USEPA guidance. Selection of the receptor grids is discussed below.

NO_2 Modeling Procedures: Project only NO_2 impacts were assessed using a conservative Tier 2 analysis, using the Ambient Ratio Method (ARM), adopted in the *Guideline on Air Quality Models*. The Guideline allows a nationwide default conversion rate of 75% for annual NO_2/NO_x ratios and 80% for 1-hour NO_2/NO_x ratios (not to be confused with the proposed ARM2 methodology). ARM may be performed either by using the ARM model option or by multiplying the modeled NO_x concentrations by the appropriate ratios. The Tier 2 analyses can be performed without justification to, or prior approval of, the permitting authority.

A Tier 3 analysis was used to assess cumulative 1-hour NO_2 impacts which was based entirely on the Lockheed and Northrup multisource inventories. The Tier 3 analysis was based on the methodology described in the April 2015 Modeling Protocol. The Tier 3 analysis calculated one-hour NO_2 concentrations for comparison with the CAAQS and NAAQS by using the ozone limiting method (OLM). The OLM analysis used ambient hourly background ozone measured at the Lancaster monitoring station for the modeled years of 2010-2014. The Lancaster monitoring data has been shown above to be a conservative representation of the project site.

The ozone data was first processed to remove missing data similar to procedures outlined in the CAPCOA guidance document *"Modeling Compliance of The Federal 1-Hour NO_2 NAAQS"* (October 27, 2011). This was accomplished by interpolating ozone concentrations for periods with one to three missing hours (nightly calibrations usually result in 1-2 hours of missing data at the same time for all days), substituting ozone concentrations from periods with up to 24 missing hours with the maximum ozone concentration from the hour before/after to missing period, and the same hour for the

days before/after the missing period. The few remaining extended periods of missing data (probably requiring extensive analyzer repairs) were replaced with the maximum ozone concentrations for the same hour for the four days before/after the missing hour.

Compliance with the 1-hour NAAQS for the cumulative modeling analyses also included using the 3rd highest seasonal NO_2 concentration for each hour from the Lancaster monitoring station, averaged over the three years, for determining the background NO_2 concentration, as outlined in USEPA guidance documents (March 1, 2011 USEPA memorandum *"Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour N0$_2$ National Ambient Air Quality Standard"*). The three year NO_2 background data was for the period of December 2010 through November 2013. This data period was used in order to keep seasonal periods consistent across years of data, per the CAPCOA NO_2 modeling guidance (December-February must be contiguous). Also, calendar year 2014 was not used since there were a large number of extended periods of missing NO_2 data. Missing periods of NO_2 data were replaced using similar procedures to those used for ozone.

In support of the Tier 3 OLM NAAQS analysis, the modeling methods also included:

- In-stack NO_2/NOx ratios (ISR) for all PEP modeled sources (turbines, auxiliary boiler, emergency generator, and fire pump) were based on the national default of 0.5.
- For the cumulative background sources (i.e., Lockheed and Northrup), the default NO_2/NO_x ISR of 0.2 was used per recent USEPA guidance (September 30, 2014 USEPA memorandum "*Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the N0$_2$ National Ambient Air Quality Standard"*). The use of the default 0.2 ISR was selected as per the Guidance for the background sources that are at distances greater than one to three kilometers from the project site.
- AERMOD-default ambient equilibrium NO_2/NOx ratio of 0.9 was used.
- The option OLMGROUP ALL was used.

For the 1-hour NO_2 CAAQS cumulative assessment, OLM was used with the maximum 1-hour NO_2 background concentration added to the modeled 1-hour concentration. For the annual cumulative NO_2 NAAQS/CAAQS, the ARM was used with 0.8.

4.1.5.2 Additional Model Selection

In addition to AERMOD and its pre-processors, several other USEPA and ARB models and programs were used to quantify pollutant impacts on the surrounding environment

based on the emission sources operating parameters and their locations. The models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274), HARP 2.03, and the SCREEN3 (version 13043) dispersion model for fumigation impacts. These models, along with options for their use and how they are used, are discussed below.

Comparison of impacts to significant impact levels (SILs).

Compliance with State and federal ambient air quality standards (AAQS).

Calculation of health risk effects through the use of HARP.

4.1.5.3 Good Engineering Practice Stack Height Analysis

Formula Good Engineering Practice (GEP) stack height is the greater of 65 meters or the height was calculated at 99.05 meters for the all the facility stacks (turbines, auxiliary boiler, fire pump, and emergency generator) due to the location of the air cooled condenser. The design stack heights are all less than their GEP stack heights, so downwash effects were included in the modeling analysis.

BPIP-PRIME was used to generate the wind-direction-specific building dimensions for input into AERMOD. Figure 4.1-3 shows the structures included in the BPIP-PRIME downwash analysis.

4.1.5.4 Receptor Grid Selection and Coverage

Receptor and source base elevations and receptor hill slope factors were determined from the U.S. Geological Survey (USGS) National Elevation Dataset (NED) using either 1/3-arcsecond (~10-meter) spacing for receptor grids with spacing between adjacent receptors of less than 100 meters or 1-arcsecond (~30-meter) spacing for receptor grids with spacing greater than 100 meters. All coordinates were referenced to UTM North American Datum 1983 (NAD83), Zone 11. The NED files will extend beyond the receptor grid boundaries as appropriate for the hill slope factors.

Cartesian coordinate receptor grids are used to provide adequate spatial coverage surrounding the Project Area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. The receptor grids used in this analysis are listed below.

- Receptors were placed along the proposed Project fenceline with a 10-meter or less receptor spacing.
- Receptors extending outwards from the proposed Project fenceline in all directions at least 500 meters from project with a 20-meter receptor spacing were modeled, called the downwash receptor grid.
- An intermediate receptor grid with a 100-meter resolution was modeled that extended outwards from the edge of the downwash grid to one (1) kilometer (km) from the Project.
- The first coarse receptor grid with 200-meter spacing extended outwards from the edge of the intermediate grid to 5 km from the Project, while the second coarse grid with 500-meter receptor spacing extended to 10 km from the Project.
- In addition, the 500-meter spaced coarse grid was extended to 20 km from the Project in order to delineate the extent of the NO_2 significant impact area.
- Finally, if necessary, refined receptors grids with 20-meter resolution were modeled around any location on the coarse and intermediate grids where a maximum impact was modeled that was above the concentrations on the downwash grid. Based on the locations of the maximum modeled concentrations, no refined receptor grids were required as all maximum impacts occurred on the 10-meter fenceline or 20-meter downwash receptor grids.

Concentrations within the facility fenceline will not be calculated. Receptor grid Figures 4.1-4 and 4.1-5 displays the receptors grids used in the modeling assessment with respect to the PEP fenceline.

4.1.5.5 Meteorological Data Selection

The project vicinity and immediate areas of Antelope Valley are relatively flat, an important consideration in the selection of surface meteorological data for use in assessing the projects impacts on regional air quality. Under these circumstances (large expanses of relatively flat terrain), the nearest surface meteorological data meeting USEPA siting and instrument criteria would be expected to be the most representative of the project location. The Palmdale Air Force Plant 42 Complex (aka Palmdale Airport) ASOS (Automated Surface Observing System) data fulfill both criteria, being located in the immediate project vicinity and meeting USEPA siting and instrument criteria. Thus, the Palmdale Airport ASOS data are proposed as the surface meteorological data for modeling facility emissions. The ASOS monitoring site is located only about 2.5 km east-southeast of the PEP location at nearly the identical

elevation above mean sea level. The close proximity of the ASOS station to the project site virtually assures that it could be considered representative, if not the equivalent, of onsite data.

Both the ASOS and PEP sites are located in the relatively flat Antelope Valley at nearly identical distances and orientations from the relatively distant mountains which define the valley boundaries. There are no intervening terrain features between the ASOS location and project site to adversely affect the relative synoptic-scale wind patterns at either location (compared to each other). The current ASOS location from the NCDC Historical Observing Metadata Repository (HOMR) was verified and then refined to its exact location based on Google Earth photos (location is shown in Figure 4.1-7). The 1-minute and 1-hour ASOS data for Palmdale Airport were downloaded from the appropriate National Climatic Data Center (NCDC) FTP websites, and processed with the USEPA-programs AERMET and AERMINUTE.

The representative radiosonde upper air observations nearest to the project site are Edwards Air Force Base and the Yuma Proving Ground. Unfortunately, soundings at military installations like Edwards and Yuma, Arizona are not taken every day. The nearest representative civilian airports with 12Z soundings taken every day are Las Vegas, NV, Phoenix AZ, and Tucson, AZ – all relatively high desert locations in the Southwest United States. Recent radiosonde measurements at Las Vegas did not begin until December 2010, which would preclude the collection of a complete continuous 5-year period of meteorological data using Las Vegas soundings alone. Phoenix soundings are taken only during the summer months, i.e., June 21st through September 18th for 2010, but the data are relatively complete for the three months with soundings and are more representative of the site than Tucson. Tucson soundings are taken for all of 2010, but many of the second and third quarter soundings are missing the first few levels of data, including the surface level. Therefore, the second quarter Tucson data were supplemented with soundings taken at Edwards (April 8, 10, 12, 14, 16, 17, 19, 20; May 15, 17, 18, 19, 25, 27; and June 2, 14) and Yuma (April 5, 28; May 13; and June 1, 3, 7, 8). These Phoenix/Tucson (2010, supplemented with Edwards AFB/Yuma) and Las Vegas (2011-2014) radiosonde data were processed with AERMET as the upper air meteorological data for modeling facility emissions. These data were downloaded from the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) website.

The Palmdale Airport ASOS instrumentation has been at its present location with the current configuration of sensors since February 8, 2007 according to HOMR (with available 1-minute data since January 2007). Therefore, the most recent five-year period (2010-2014) was selected. The surface and upper air data selected were described in the April 2015 Modeling Protocol and were approved for use in the

modeling analysis by AVAQMD. These 2010-2014 Palmdale ASOS surface data and concurrent Las Vegas/Phoenix/Tucson radiosonde data were processed with the latest versions of AERMET (14134) and AERMINUTE (14337). AERMINUTE/AERMOD default and standard options will be used, including MODIFY for upper air data in Stage 1, the default ±1 hour window for 12 Zulu (Z) sounding data (4 AM Pacific Standard Time) in Stage 3, and a 0.5 m/s threshold wind speed for 1-minute ASOS data in Stage 3.

The proposed use of the five (5) years of Palmdale Airport ASOS surface meteorological data would satisfy the definition of on-site data. USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the facility and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility." This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the On-Site Meteorological Program Guidance for Regulatory Modeling Applications (USEPA, 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected.

First, the Palmdale Airport meteorological monitoring site is the closest ASOS site and located in very close proximity to the facility location, about 2.5 kilometers to the east-southeast, with nearly identical elevations above mean sea level (amsl). Second, both locations are located in the same area of the broad and relatively flat Antelope Valley. Third, the ASOS monitoring location at the airport was selected to be far enough from wind flow perturbations caused by buildings and other features. Fourth, the period of meteorological data selected at the time of the modeling analyses (2010-2014) would be expected to be the most representative of current conditions, with the same general land uses surrounding the current ASOS location and airport as well as the proposed project site. In fact, a review of historical and current Google Earth photo aerials, shows that nearby land uses now at both locations are similar to the land uses reflected in the 1992 NLCD. These data meet the USEPA data recovery requirements for air quality modeling as described above.

The surface characteristics of land uses, roughness lengths, Bowen ratios, and albedos are very similar for the two locations. AERSURFACE results for both the ASOS location

and proposed project site for the areas circumscribed by a 1 km radius around each location are shown on Table 4.1-18.

Table 4.1-18
Surface Characteristics for Palmdale ASOS Location and the PEP Site

Standardized Land Use Category (for area within a 1km radius)	ASOS Location	PEP Site
Low Intensity Residential:	0.3%	0.7%
Commercial/Industrial/Transportation:	32.1%	10.3%
Bare Rock/Sand/Clay:	1.0%	5.1%
Shrubland:	54.0%	80.6%
Grasslands/Herbaceous:	11.7%	3.3%
Pasture/Hay:	0.8%	-
Row Crops:	0.1%	-

Most of the land use in the general region consists of shrubland or agricultural classifications. The larger percentage of commercial land use for Palmdale ASOS location is due to the airport runways as shown in Figure 4.1-6. Transportation land use has smaller roughness lengths than commercial/industrial land uses and would be similar to the roughness lengths for shrubland and grasslands that predominate the project site. Therefore, land use categories at the two site locations are very similar with transportation/shrublands/grasslands comprising 90% or more of the total land use types within 1 km of both locations.

Representativeness is defined in the document “Workshop on the Representativeness of Meteorological Observations” (Nappo et. al., 1982) as “the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application.” Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the meteorological monitoring site and the proposed project location. In determining the representativeness of the meteorological data set for use in the dispersion models at the project site, the consideration of the correlation of terrain features to prevailing meteorological conditions, as discussed earlier, would be nearly identical to both locations since the orientation and aspect of terrain at the proposed project location correlates well with the prevailing wind fields as measured by and contained in the meteorological dataset. In other words, the same mesoscale and localized geographic and topographic features that influence wind flow patterns at the

meteorological monitoring site also influence the wind flow patterns at the proposed project site.

For these reasons, the Palmdale Airport meteorological data selected for use in modeling emissions from the proposed project are expected to satisfy the definition of representative meteorological data and are similar to the dispersion conditions at the project site and to the regional area. Annual and quarterly wind roses for the five-year modeling period are shown in Appendix 4.1B.

In addition to surface and upper air meteorological data, AERMET requires input summaries of the surface characteristics for the area surrounding the surface data monitoring site, which are processed and included in the AERMET meteorological data input to AERMOD. These input surface characteristics to AERMET were calculated with the USEPA-program AERSURFACE (version 13016) based on USEPA guidance. AERSURFACE uses 1992 National Land Cover Data (NLCD) from the United States Geological Survey (USGS) to determine land use based on standardized land cover categories. For this analysis, the Southern California NLCD file from the USGS website referenced in the AERSURFACE User's Manual: (http://edcftp.cr.usgs.gov/pub/data/landcover/states/) will be used. A review of historical Google Earth images shows only minor changes in land use within 1 km of the current Palmdale ASOS location from the time of the 1992 NLCD to the present time. Therefore, the primary surface characteristics derived from the 1992 data (roughness length) should be representative of current conditions.

AERSURFACE was executed in accordance with the USEPA guidance documents "*AERMOD Implementation Guide,"* March 19, 2009, and "*AERSURFACE User's Guide*," EPA-454/B-08-001, revised January 16, 2013. AERSURFACE determines the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. *Bowen ratio* is based on a simple unweighted geometric mean while *albedo* is based on a simple unweighted arithmetic mean, both for the 10x10 km square area centered on the selected location (i.e., no direction or distance dependence for either parameter). *Surface roughness length* is based on an inverse distance-weighted geometric mean for upwind distances up to the USEPA-recommended one (1) km radius from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (USEPA guidance recommends that no sector be less than 30º in width). However, only one 360° sector was used for calculating roughness lengths due to the homogeneity of the area within the USEPA-recommended radius of 1 km, as shown in Figure 4.1-7. Aerial photographs showing the land use in areas around the Palmdale ASOS site and project site are included in the Modeling Protocol, which has been included for reference in Appendix 4.1B. Months were assigned to seasons in

AERSURFACE as follows: November through April as fall (autumn with un-harvested cropland) and May through October as summer (midsummer with lush vegetation) as has been done for previous projects in the Mojave Desert Air Basin. Other AERSURFACE options will be selected as Airport=YES, continuous snow cover = NO, and arid = YES.

Temporal variations of monthly precipitation must be considered to calculate the albedo for AERMET processing in accordance with USEPA recommendations. Precipitation data should be measured at the nearest representative location to the surface data with the most complete precipitation record, particularly for the years of meteorology being modeled. Historical precipitation data are measured at the both Palmdale and Lancaster Airports, as well as cooperative stations at both cities. Palmdale Airport is obviously the most representative and has the most complete data for the modeling period (2010-2014) as well as a 30-year period (although not continuous since precipitation data weren't measured/recorded from 1974-1998). The monthly precipitation amounts from the Palmdale Airport for the latest 30 years (1960-1973 and 1999-2014) were sorted and compared to the monthly precipitation amounts for the five years of meteorological data modeled with AERMOD (2010-2014). The modeled months with precipitation amounts in the range of the driest 9 years by month for the 30-year climatology are given the albedo for DRY conditions. The modeled months with precipitations amounts in the range of the wettest 9 years by month for the 30-year climatology are given the albedo for WET conditions. The remainder of the modeled months is given the albedo for AVG (average) conditions and represents the middle 22 years by month in the 30-year precipitation climatology (in addition, any modeled month with 0.05" or less of precipitation are given the albedo for DRY conditions). The 30-year precipitation climatology is shown in Table 4.1-19 and the AERSURFACE inputs/outputs are shown in Table 4.1-20.

Table 4.1-19
Palmdale Airport 30-year Precipitation Climatology Summary

SORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83
3	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.96
4	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08
5	0.03	0.06	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21
6	0.03	0.07	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44
7	0.03	0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.73
8	0.05	0.18	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	2.93
9	0.09	0.23	0.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.14	3.73
10	0.10	0.32	0.22	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.16	3.74
11	0.14	0.43	0.22	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.17	3.80
12	0.18	0.43	0.25	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.18	3.80
13	0.22	0.50	0.29	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.27	0.23	3.98
14	0.22	0.54	0.33	0.11	0.00	0.00	0.00	0.00	0.00	0.02	0.34	0.32	4.06
15	0.23	0.69	0.40	0.13	0.00	0.00	0.00	0.00	0.00	0.02	0.34	0.35	4.11
16	0.26	0.81	0.42	0.13	0.00	0.00	0.01	0.00	0.00	0.06	0.43	0.60	4.47
17	0.36	0.82	0.49	0.19	0.01	0.00	0.01	0.00	0.00	0.08	0.45	0.62	5.07
18	0.42	0.97	0.50	0.23	0.02	0.00	0.01	0.00	0.00	0.08	0.51	0.67	5.43
19	0.43	1.23	0.53	0.28	0.03	0.00	0.01	0.01	0.00	0.13	0.73	0.71	5.65
20	0.59	1.39	0.57	0.34	0.03	0.00	0.03	0.04	0.01	0.14	0.73	0.71	5.78
21	0.84	1.44	0.65	0.37	0.07	0.00	0.04	0.04	0.02	0.15	0.87	0.77	5.91
22	0.97	1.93	0.68	0.43	0.13	0.00	0.04	0.04	0.04	0.21	1.00	1.03	6.05
23	1.19	2.17	0.68	0.45	0.15	0.00	0.04	0.05	0.12	0.21	1.00	1.11	6.90
24	1.23	2.33	0.69	0.51	0.16	0.00	0.05	0.09	0.24	0.22	1.15	1.43	7.27
25	1.35	2.72	0.88	0.62	0.18	0.02	0.06	0.12	0.26	0.23	1.18	1.74	7.55
26	1.48	2.87	0.94	0.65	0.18	0.11	0.09	0.12	0.33	0.31	1.60	1.89	8.45
27	1.81	3.33	1.02	0.67	0.24	0.15	0.14	0.14	0.40	1.39	1.86	2.57	9.04
28	2.86	3.60	1.29	0.74	0.25	0.22	0.15	0.32	0.66	1.56	2.40	2.97	9.44
29	3.04	3.75	1.41	1.47	0.32	0.29	0.50	0.36	0.85	2.69	4.01	3.30	10.90
30	3.15	4.57	1.56	1.52	0.96	0.45	0.58	1.76	1.75	2.76	4.89	3.42	12.96
2010	2.86	1.93	0.29	0.65	0.00	0.00	0.04	0.00	0.00	1.56	0.27	3.30	10.90
2011	0.42	0.69	1.41	0.01	0.01	0.00	0.14	0.00	0.85	0.14	0.45	0.35	4.47
2012	0.09	0.43	0.65	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.18	2.08
2013	0.36	0.10	0.25	0.00	0.15	0.00	0.09	0.04	0.00	0.08	1.86	0.00	2.93
2014	0.00	1.39	0.57	0.13	0.96	0.00	0.00	0.04	0.12	0.00	0.00	2.57	5.78

Sorted Data - The 30-years of climatology were SORTED to determine DRY/AVG/WET months. Generally, the driest and wettest 9 years were used to delineate DRY/WET (AVG was anything in-between). The one exception: months with precipitation ≤ 0.05" were considered DRY.

Table 4.1-20
Palmdale Airport Monthly Inputs/Outputs to AERSURFACE

Month	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
Seasonal Assumptions for Surface Roughness (meters) and Albedo												
Season	Fall	Fall	Fall	Fall	Summer	Summer	Summer	Summer	Summer	Summer	Fall	Fall
Arid	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Airport	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Surface Roughness (meters)												
	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119
Noontime Albedo												
	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Bowen Ratio based on the following surface moisture contents												
2010	WET	WET	AVG	WET	DRY	DRY	DRY	DRY	DRY	WET	AVG	WET
2011	AVG	AVG	WET	DRY	DRY	DRY	WET	DRY	WET	AVG	AVG	AVG
2012	DRY	AVG	AVG	WET	DRY	DRY	DRY	DRY	DRY	DRY	DRY	AVG
2013	AVG	DRY	AVG	DRY	WET	DRY	WET	DRY	DRY	AVG	WET	DRY
2014	DRY	AVG	AVG	AVG	WET	DRY	DRY	DRY	WET	DRY	DRY	WET
Bowen Ratio by Year/Month												
2010	0.89	0.89	1.96	0.89	2.98	2.98	2.98	2.98	2.98	0.70	1.96	0.89
2011	1.96	1.96	0.89	4.14	2.98	2.98	0.70	2.98	0.70	1.42	1.96	1.96
2012	4.14	1.96	1.96	0.89	2.98	2.98	2.98	2.98	2.98	2.98	4.14	1.96
2013	1.96	4.14	1.96	4.14	0.70	2.98	0.70	2.98	2.98	1.42	0.89	4.14
2014	4.14	1.96	1.96	1.96	0.70	2.98	2.98	2.98	0.70	2.98	4.14	0.89

These surface characteristics were used in the USEPA-program AERMET to generate representative meteorological data for modeling the proposed PEP emissions. Land use surrounding the facility location has changed little since the 1992 NLCD based on historical Google Earth photos as described above, so AERSURFACE was used to determine urban/rural land uses and percentages for the area within three (3) km of the proposed site location. About 15% of this area around the proposed project site is characterized as urban, consisting of commercial (airport buildings) and transportation (runways) land uses. The other 85% of this area would be characterized as rural, consisting mostly of shrubland (66%), grasslands/pasture/hay (8%), bare rock (7%), and residential (4%) land uses. In accordance with the Auer land use classification methodology (USEPA's "*Guideline on Air Quality Models*"), since the land use within the area circumscribed by a three km radius around the facility is greater than 50 percent

rural, the urban dispersion options in AERMOD will not be used in the modeling analyses supporting the permitting of the facility.

4.1.5.6 Background Air Quality

In 1970, the United States Congress instructed the USEPA to establish standards for air pollutants, which were of nationwide concern. This directive resulted from the concern of the impacts of air pollutants on the health and welfare of the public. The resulting Clean Air Act (CAA) set forth air quality standards to protect the health and welfare of the public. Two levels of standards were promulgated—primary standards and secondary standards. Primary national ambient air quality standards (NAAQS) are "those which, in the judgment of the administrator [of the USEPA], based on air quality criteria and allowing an adequate margin of safety, are requisite to protect the public health (state of general health of community or population)." The secondary NAAQS are "those which in the judgment of the administrator [of the USEPA], based on air quality criteria, are requisite to protect the public welfare and ecosystems associated with the presence of air pollutants in the ambient air." To date, NAAQS have been established for seven criteria pollutants as follows: SO_2, CO, ozone, NO_2, PM10, PM2.5, and lead.

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health effects. USEPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of California has also established AAQS that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both USEPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated and amended over the years following adoption.

Each federal or state AAQS is comprised of two basic elements: (1) a numerical limit expressed as an allowable concentration, and (2) an averaging time which specifies the period over which the concentration value is to be measured. Table 4.1-21 presents the current federal and state AAQS.

Table 4.1-21
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 μg/m^3)	-
	8-hour	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3) (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8-hour	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3) (3-year average of annual 98th percentile daily max's)
Sulfur dioxide	Annual Average	-	-
	24-hour	0.04 ppm (105 μg/m^3)	-
	3-hour	-	0.5 ppm (1,300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3) (3-year average of annual 99th percentile daily max's)
Respirable particulate matter (10 micron)	24-hour	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	-
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3 (3-year average)
	24-hour	-	35 μg/m^3 (3-year average of annual 98th percentiles)
Sulfates	24-hour	25 μg/m^3	-
Lead	30-day	1.5 μg/m^3	-
	3 Month Rolling Average	-	0.15 μg/m^3

Source: CARB website, table updated 6/4/13
Notes:
μg/m^3 = micrograms per cubic meter
ppm = parts per million

Brief descriptions of health effects for the main criteria pollutants are as follows.

Ozone—Ozone is a reactive pollutant that is not emitted directly into the atmosphere, but rather is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving precursor organic compounds (POC) and NO_x. POC and NO_x are therefore known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a

stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of POC and NO_x under the influence of wind and sunlight. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. In addition to causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide—CO is a non-reactive pollutant that is a product of incomplete combustion. Ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing. Under inversion conditions, CO concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses.

Particulate Matter (PM10 and PM2.5)—PM10 consists of particulate matter that is 10 microns or less in diameter (a micron is 1 millionth of a meter), and fine particulate matter, PM2.5, consists of particulate matter 2.5 microns or less in diameter. Both PM10 and PM2.5 represent fractions of particulate matter, which can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local PM10 concentrations, while others, such as vehicular traffic, affect regional PM10 concentrations.

Several studies that the USEPA relied on for its staff report have shown an association between exposure to particulate matter, both PM10 and PM2.5, and respiratory ailments or cardiovascular disease. Other studies have related particulate matter to increases in asthma attacks. In general, these studies have shown that short-term and long-term exposure to particulate matter can cause acute and chronic health effects. PM2.5, which can penetrate deep into the lungs, causes more serious respiratory ailments.

Nitrogen Dioxide and Sulfur Dioxide—NO_2 and SO_2 are two gaseous compounds within a larger group of compounds, NO_x and SO_x, respectively, which are products of the combustion of fuel. NO_x and SO_x emission sources can elevate local NO_2 and SO_2 concentrations, and both are regional precursor compounds to particulate matter. As

described above, NO_x is also an ozone precursor compound and can affect regional visibility. (NO_2 is the "whiskey brown-colored" gas readily visible during periods of heavy air pollution.) Elevated concentrations of these compounds are associated with increased risk of acute and chronic respiratory disease.

SO_2 and NO_2 emissions can be oxidized in the atmosphere to eventually form sulfates and nitrates, which contribute to acid rain. Large power facilities with high emissions of these substances from the use of coal or oil are subject to emissions reductions under the Phase I Acid Rain Program of Title IV of the 1990 CAA Amendments. Power facilities, with individual equipment capacity of 25 MW or greater that use natural gas or other fuels with low sulfur content, are subject to the Phase II Program of Title IV. The Phase II program requires facilities to install Continuous Emission Monitoring Systems (CEMS) in accordance with 40 CFR Part 75 and report annual emissions of SO_x and NO_x. Currently, the acid rain program provisions do not apply to the existing facility but will apply to the Project. The Project will participate in the Acid Rain allowance program through the purchase of SO_2 allowances. Sufficient quantities of SO_2 allowances are available for use on this Project.

Lead—Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can result in gastrointestinal disturbances, anemia, and kidney disease, and, in severe cases, neuromuscular and neurological dysfunction. The use of lead additives in motor vehicle fuel has been eliminated in California and lead concentrations have declined substantially as a result.

Table 4.1-22 presents the AVAQMD attainment/nonattainment status. The nearest representative air quality monitoring station is the Lancaster Division Street site. The monitoring station is 2.5 miles north from the PEP in the city of Lancaster, which has an approximate population of 160,000 and is near the Sierra Highway (110 meters), the Antelope Valley Freeway (SR-14) (4 kilometers), Division Street (50 meters), and the Southern Pacific Railway (80 meters). This monitoring station collects NO_2, CO, PM10, PM2.5 and O_3 data. Based on the siting of this station in a very urban setting, along with its close proximity to roadways, it would provide a conservative estimate of background air quality. This site also satisfies the EPA requirements for sitting NO_2 and O_3 monitoring stations near well-traveled roadways. The nearest monitoring station for SO_2 is located in Victorville, which has a population of 127,000. This urban location would also be considered conservative for background data.

Ambient monitoring data for these sites for the most recent three-year period (2012-2014) are summarized in Table 4.1-23, Air Quality Monitoring Data. Data from these

sites are a reasonable representation of background air quality for the Project Site and impact area.

Table 4.1-22
AVAQMD Attainment Status

Pollutant	Averaging Time	Federal Status	State Status
Ozone	1-hr	Nonattainment	Nonattainment
Ozone	8-hr	Nonattainment	Nonattainment
CO	All	Attainment	Attainment
NO_2	All	Unclassified/Attainment	Attainment
SO_2	All	Attainment/Unclassified	Attainment
PM10	All	Unclassified	Nonattainment
PM2.5	All	Unclassified/Attainment	Unclassified
Source: CARB website status maps, 3/2015. AVAQMD CEQA Guidelines, 3/2015.			

Table 4.1-23 presents a summary of the air quality monitoring data representative of the project region.

Table 4.1-23
Air Quality Monitoring Values for 2012-2014

Pollutant	Site	Averaging Time	2012	2013	2014
Ozone, ppm	Lancaster	1 Hr Max CAAQS	0.112	0.108	0.101
		8 Hr Max* C/NAAQS	0.095	0.094	0.087
PM10, µg/m^3	Lancaster	24 Hr Max CAAQS	47	185	131
		24-Hr H2H NAAQS	38	74	80
		Annual Mean CAAQS	19.8	28.3	24.3
PM2.5, µg/m^3	Lancaster	24 Hr 98th% NAAQS	14**	11	28
		Annual Mean C/NAAQS	5.4**	5.8	7.2
NO_2, ppb	Lancaster	1 Hr Max CAAQS	49	48	52
		1 Hr 98th% NAAQS	46	44	40
		Annual Mean	9	8	8
CO, ppm	Lancaster	1 Hr Max* C/NAAQS	1.9	1.9	N/A
		8 Hr Max* C/NAAQS	1.4	1.2	N/A
SO_2, ppb	Victorville	1 Hr Max CAAQS	6	4	5
		1 Hr 99th% NAAQS	5	4	4
		24 Hr Max CAAQS	3	2	2

*For 1-hour and 8-hour ozone and CO, the maximum measured background concentration required for the CAAQS assessment will likely be used for the NAAQS assessment. Normally, the NAAQS assessments are based on lesser concentrations such as the second-highest measured concentration each year for 24-hour PM10 and 1-hour and 8-hour CO, and the fourth-highest daily maximum 8-hour concentration averaged over three years for the ozone NAAQS.

**Incomplete data for year (does not meet ARB/USEPA criteria).

Source: USEPA AirData website (www.epa.gov/airdata) except for annual PM10 and NO_2, taken from ARB iADAM Top -4 website (http://www.arb.ca.gov/adam/topfour/topfour1.php). Due to periods of suspect or invalid data in the USEPA AirData for 2014, Lancaster CO data were not used and Victorville SO_2 data were taken from the ARB AQMIS2 website.

Table 4.1-24 shows the background air quality values based upon the data presented in Table 4.1-18. The background values represent the highest values reported for any site during any single year of the most recent three-year period for the CAAQS assessments and the appropriate values for the NAAQS according to the format of the standard as noted below. Appendix 4.1B presents the background air quality data summaries.

Table 4.1-24
Background Air Quality Data

Pollutant and Averaging Time	Background Value
Ozone – 1-hour Maximum CAAQS	0.112 ppm (220 μg/m^3)
Ozone – 8-hour Maximum CAAQS/NAAQS	0.095 ppm (187 μg/m^3)
PM10 – 24-hour Maximum CAAQS	185 μg/m^3
PM10 – 24-hour High Second-High NAAQS	80 μg/m^3
PM10 – Annual Maximum CAAQS	28.3 μg/m^3
PM2.5 – 3-Year Average of Annual 24-hour 98th Percentiles NAAQS	18 μg/m^3
PM2.5 – Annual Maximum CAAQS	7.2 μg/m^3
PM2.5 – 3-Year Average of Annual Values NAAQS	6.1 μg/m^3
CO – 1-hour Maximum CAAQS/NAAQS	1.9 ppm (2176 μg/m^3)
CO – 8-hour Maximum CAAQS/NAAQS	1.4 ppm (1603 μg/m^3)
NO_2 – 1-hour Maximum CAAQS	0.052 ppm (98 μg/m^3)
NO_2 – 3-Year Average of Annual 1-hour 98th Percentile Daily Maxima NAAQS	0.043 ppm (81 μg/m^3)
NO_2 – Annual Maximum CAAQS/NAAQS	0.008 ppm (15.1 μg/m^3)
SO_2 – 1-hour Maximum CAAQS	0.006 ppm (16 μg/m^3)
SO_2 – 3-Year Average of Annual 1-hour 99th Percentile Daily Maxima NAAQS	0.004 ppm (10 μg/m^3)
SO_2 – 3-hour Maximum NAAQS (Set equal to 1-hour Maximum)	0.006 ppm (16 μg/m^3)
SO_2 – 24-hour	0.003 ppm (8 μg/m^3)

* The 3rd highest seasonal NO_2 concentration for each hour, averaged over the past three years, were used in the cumulative multisource inventory 1-hour NO_2 NAAQS analyses.

For conversion from the ppm measurements to μg/m^3 concentrations typically required for the modeling analyses, used: μg/m^3 = ppm x 40.9 x MW where MW = 48, 28, 46, and 64 for ozone, CO, NO_2, and SO_2, respectively.

Air Quality Analyses

The following sections present the analyses for determining the changes to ambient air quality concentrations in the region of the PEP. These analyses are comprised of a project only screening assessment to determine the worst-case emissions and stack parameters, refined modeling assessment used to calculate the proposed project changes to ambient air quality, and cumulative assessments, which are used to analyze the proposed project plus nearby existing sources.

Screening Analysis

Operational characteristics of the combustion turbines, such as emission rate, exit velocity, and exit temperature vary by operating loads and ambient temperatures. The PEP turbines will be operated over a variety of temperature and load conditions from 40% to 100%, with and without duct-firing and evaporative cooling systems. In addition, the auxiliary boiler, which allows the project to have fast start capability, will be in utilized when the turbines are not operational. Thus, an air quality screening analysis was performed that considered these effects.

For the turbines, a range of operational characteristics over a variety of ambient temperatures was assessed using AERMOD and all five years of hourly meteorology (year 2010-2014). This included various turbine loads and duct firing and evaporative cooling conditions for four ambient temperatures: 23°F (a cold day), 64°F (annual average conditions), 98°F (a hot day), and 108°F (maximum high temperature day). The combustion turbine operating condition that resulted in the highest modeled concentration in the screening analysis for each pollutant and for averaging periods of 24 hours or less were used in the refined impact analyses. The 64°F condition was assumed to represent annual average conditions. As such, no screening analyses were performed for annual average concentrations (the annual refined analyses were modeled with the stack parameters for the 64°F case at 100 percent load without duct firing, which is the majority case duct firing will only occur for 1,500 hours per year).

The results of the turbine load/temperature screening analysis are listed in Appendix 4.1B. The screening analysis shows that the worst-case load and ambient temperature condition is 100 percent load with duct firing and without evaporative cooling at 23°F (Case 2) for all pollutants and averaging times other than 24-hour PM10/PM2.5. For PM10/PM2.5, the 64^{o}F case at 43 percent load without duct burner is the worst-case condition (Case 27). It should be noted that this low load case would not be expected to occur for a full 24-hour period as the facility operator would most likely utilize a single turbine at full load in place of two turbines at a very low load. Thus, Case 2 was also used to assess the PM10/PM2.5 24-hour averages as it produced the second highest impacts for this pollutant and averaging times.

A screening analysis was also performed for the auxiliary boiler, which may be used continuously when the turbines are not in operation. This analysis showed that the auxiliary boiler (without the turbines) produced maximum 8-hour CO impacts (as compared to 1-hour of auxiliary boiler operation and 8 hours of turbine operations).

4.1.5.7 Refined Analysis

Based on the results of the screening analyses, all PEP sources were modeled in the refined analysis for comparisons with Significant Impact Levels (SILs) and California Ambient Air Quality Standards (CAAQS)/National Ambient Air Quality Standards (NAAQS).

Impacts during normal operations were based on continuous turbine operations at the worst-case screening condition and appropriate auxiliary boiler operations – i.e., one hour of auxiliary boiler operation for 1-hour and 3-hour averaging times and two hours of auxiliary boiler operation for 8-hour and 24-hour averaging times. As noted above in the screening analyses, the auxiliary boiler produced higher impacts by itself for continuous operation (without turbine emissions) and Project only CO impacts were modeled as such in the refined analysis.

Testing of the fire pump and emergency generator will not take place during the same hour or during startup of the turbines. Therefore, the refined modeling analyses considered operation of either the fire pump or emergency generator, but not both, for one (1) hour averaging times. This was done as the engine with the higher emissions does not always produce the largest concentrations, due in part to the difference in source location relative to fenceline, differing downwash effects, and differences in final plume rise. The refined modeling analysis results showed that the fire pump produced higher 1-hour Project impacts for CO while the emergency generator produced higher 1-hour Project impacts for NO_2 and SO_2. Since both engines will NOT be tested during turbine startup, the emergency equipment was not included in the startup/shutdown analyses for 1-hour averaging times. For longer periods (3-hour, 8-hour, and 24-hour short-term averaging times) for both normal and startup/shutdown conditions, both the fire pump and emergency generator were modeled for one testing period per day (60 minutes for the fire pump and 30 minutes for the emergency generator). Also, since these two pieces of emergency equipment would be tested far less than 100 hours/year, they were included in 1-hour NO_2 and SO_2 NAAQS modeling analyses at their annual average emission rates per USEPA guidance due to the statistical nature of these standards.

For startup operations, the PEP will use Siemens Flex Plant design which will allow for fast facility startup and shutdown times to 45 minutes or less. Since Gaussian modeling is based on one (1) hour steady state conditions, the startup/shutdown emission rates used for refined modeling assumed the remaining one (1) hour time periods were at full load, non-duct fired operation (while the turbines can be at 100 percent full load at the end of each start cycle, 100 percent plant load is not achieved until the second hour). For example, to model the one (1) hour cold start condition of 39 minutes, the entire

cold start emissions were assumed to be emitted over 39 minutes with the remaining 21 minutes in the hour set to full load, non-duct fired operation emissions after adjusting the full load emission by the time (0.35). For the two (2) proposed turbines, start-up/shutdown emissions were also accounted for in the refined analysis for all short-term (24-hours or less) and long-term (annual) averages in the air quality modeling. For modeling the short-term averaging times, the highest one-hour startup emissions from the combustion turbines (cold start) were used for determining one-hour NO_x and CO impacts. For the eight-hour CO modeling during startup, one cold start (1-hour), one shutdown (1-hour), one hot start and four (4) hours of base load operation were assumed (this scenario was used to assess a turbine trip during a startup period). The annual emission estimates already included emissions from start-up, shutdown, and maintenance activities. Detailed emission calculations for all averaging periods are included in Appendix 4.1A. The refined modeling assessment included the following assumptions and conditions for both normal and startup/shutdown conditions:

- Auxiliary boiler operation is up to 24 hours per day during turbine non-operation and 4,884 hours per year
- Fire pump testing occurs up to 60 minutes per day, 52 hours per year
- The emergency generator testing occurs up to 30 minutes per day, up to 26 hours per year
- Evaporative fluid cooler operates 24 hours per day
- Turbines can operate 24 hours per day with duct firing
- Worst-case annual modeled emissions for NO_x, PM10 and PM2.5: 6,460 hours base load, 1,500 hours of duct burner operation, 35 warm starts, 5 cold starts, 40 shutdowns = 8,000 hours (Operational Case 1), with stack characteristics for the most frequent annual operating condition (Case 11)
- Cold, warm, and hot start stack parameters are based on Case 27 at 43 percent load
- Cold start is 39 minutes which is the worst case start plus 21 minutes of non-duct fired base load emissions for the 23^{o}F day. The auxiliary boiler is in operation until the end of the startup period.
- Based on the limited number of cold starts per year (no more than 52 are possible) compliance with the statistical form of the 1-hour NO_2 and SO_2 NAAQS was based on warm and/or hot start emissions in accordance with USEPA requirements (startup conditions that occur infrequently, in this case less than

100 hours/year, do not need be considered for these two NAAQS). Compliance with the CO NAAQS was based on cold start emissions/conditions based on the deterministic form of the standard (highest of the annual second-high concentrations modeled over five years).

- For all the CAAQS, cold starts emissions/conditions were assessed based on the deterministic nature of all California state standards (maximum concentration over the five years modeled for one (1)hour CO, NO_2 and SO_2 standards, etc.)

- CO 8-hour impacts calculated as one (1) cold start + one (1) hot start + two (2) shutdowns + four hours base load with duct burners. The auxiliary boiler has two hours of operations. Both the fire pump and emergency generator are assumed to be tested during the eight hour period.

- For any one hour time period, both turbines could be in cold, warm, hot startup or shutdown.

- Fire pump or the emergency generator will not be tested during one (1) hour turbine start cycle but is included in the eight (8) hour start case

- Auxiliary boiler assumed to operate during the period of any type of start until the end of the start cycle.

- PM10 and PM2.5 24-hour modeled concentrations were based on both the worst-case screening condition (two turbines at 43 percent load for 24-hours for 64°F (Case 27)), as well as 24-hours of turbine full load operation (no start up or shutdowns) with duct burners on a 23^{o}F day (Case 2) since Case 27 was not considered realistic. The maximum of both cases is reported in the analyses. The auxiliary boiler was assumed to be in operation for two (2) hours for both PM cases modeled. Both the fire pump and emergency generator were also assumed to be tested during this time frame.

Also, since startup emissions for SO_2 and PM10/PM2.5 would be less than during normal operations, the short-term impacts analyses for these pollutants did not consider start-up conditions (i.e., startup conditions were already considered in the refined analyses by modeling normal operating conditions/emissions). Detailed emission calculations for all averaging periods are included in Appendix 4.1A.

The worst-case modeling input information for each pollutant and averaging period are shown in Table 4.1-25 for normal operating conditions and combustion turbine startup/shutdown conditions. As discussed above, the combustion turbine stack parameters used in modeling the impacts for each pollutant and averaging period

reflected the worst-case operating condition for that pollutant and averaging period identified in the load screening analysis.

Table 4.1-25
Stack Parameters and Emission Rates for Each of the Modeled Sources

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	PM10/2.5
Averaging Period: 1-hour for Normal Operating Conditions (Case 2)								
Each Turbine	48.768	358.7	17.68	6.7056	2.331	0.189	1.424	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	8.316E-3	0.510	-
Fire Pump	5.944	823.71	28.13	0.1270	0.109	2.389E-4	0.144	-
Emergency Generator	6.096	677.04	158.76	0.2032	1.056	1.358E-3	0.187	-
Averaging Period: 3-hours for Normal Operating Conditions (Case 2)								
Each Turbine	48.768	358.7	17.68	6.7056		0.189		
Auxiliary Boiler	18.288	422.04	20.42	0.9144		2.772E-3		
Fire Pump	5.944	823.71	28.13	0.1270	-	7.964E-5	-	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	4.527E-4	-	-
Averaging Period: 8-hours for Normal Operating Conditions (Auxiliary Boiler Only)								
Each Turbine	48.768	358.7	17.68	6.7056		-	N/A	
Auxiliary Boiler	18.288	422.04	20.42	0.9144		-	0.510	
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-
Averaging Period: 24-hours for Normal Operating Conditions (Case 2 for SO_2/PM and Case 27 for PM)								
Each Turbine (SO_2/PM)	48.768	358.7	17.68	6.7056		0.189		1.487
Each Turbine (PM)	48.768	353.7	10.48	6.7056	-	-	-	1.008
Auxiliary Boiler	18.288	422.04	20.42	0.9144		6.930E-4		8.505E-3
Fire Pump	5.944	823.71	28.13	0.1270	-	9.954E-6	-	3.565E-4
Emergency Generator	6.096	677.04	158.76	0.2032	-	5.659E-5	-	1.047E-3
Averaging Period: Annual (Case 11 with no DB, no EVAP)								
Each Turbine	48.768	363.7	17.84	6.7056	1.988	-	-	1.160
Auxiliary Boiler	18.288	422.04	20.42	0.9144	1.455E-2	-	-	9.740E-3
Fire Pump	5.944	823.71	28.13	0.1270	6.464E-4	-	-	5.079E-5
Emergency Generator	6.096	677.04	158.76	0.2032	6.267E-3	-	-	1.492E-4
Averaging Period: 1-hour for Start-up/Shutdown Conditions (Case 27)								

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	PM10/2.5
Each Turbine	48.768	353.7	10.48	6.7056	6.795		52.849	
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-
Averaging Period: 8-hours for Start-up/Shutdown Conditions (Case 2)								
Each Turbine	48.768	358.7	17.68	6.7056		-	15.944	
Auxiliary Boiler	18.288	422.04	20.42	0.9144		-	0.128	
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-

4.1.5.8 Normal Operations Impact Analysis

In order to determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used with all five (5) years of meteorology. Table 4.1-26 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods. The annual average concentrations of NO_2 were computed using the Ambient Ratio Method (ARM) following USEPA guidance, namely using national default values of 0.80 (80%) and 0.75 (75%) for 1-hour and annual average NO_2/NO_x ratios, respectively. For all of the refined modeling analyses of the 1-hour CAAQS NO_2 concentrations, AERMOD demonstrated that facility base load operations produced higher concentrations than startup or shutdown because of the routine testing of the emergency generator impacts (testing won't occur concurrently with the fire pump or during startup/shutdown periods).

The maximum impacts for normal and startup/shutdown facility operating conditions are compared on Table 4.1-26 to the USEPA significant impact levels (SILs) for all applicable pollutants. As applicable, the maximum modeled impacts for all five years of meteorological data were used for comparisons to the SILs for all CAAQS and NAAQS, in keeping with the form of the standards. The 5-year average of the daily 1-hour maximum impacts was used for the 1-hour NO_2, 1-hour SO_2, 24-hour PM2.5, and annual PM2.5 SILs in accordance with USEPA guidance. The maximum PEP concentrations of 1-hour NO_2, 24-hour PM10 and PM2.5, and annual PM2.5 are greater than the USEPA SILs. The maximum distance from the PEP for the furthest significant impact is shown in Table 4.1-26 as 18.9 kilometers (km) for 1-hour NO_2, 1.76 km for 24-hour PM2.5, 1.18 km for annual PM2.5, and 0.65 km for 24-hour PM10. These significant impact areas (SIAs), and receptors, are shown in Figures 4.1-8 through 4.1-11. Maximum PEP concentrations for CO, SO_2 (all averaging times), annual NO_2 and annual PM10 are less than the applicable SILs, so no SIAs would occur.

Table 4.1-26
Air Quality Impact Results for
Refined Modeling Analysis of Project – Significant Impact Levels

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Class II SIL ($\mu g/m^3$)	Sig.Impact Area Radius (km)
Normal Operating Conditions				
NO_2 [a]	1-hour Max (CAAQS)	204.7	-	N/A
	1-hr 5-year Avg of Max's	14.22	7.5	18.9
	Annual Max	0.981	1.0	N/A
CO	1-hour Max	123.8	2,000	N/A
	8-hour Max	29.48 [b]	500	N/A
SO_2	1-hour Max	1.51	-	N/A
	1-hr 5-year Avg of Max's	1.38	7.8	N/A
	3-hour Max	1.20	25	N/A
	24-hour Max	0.801	5	N/A
PM10	24-hour Max	7.22[c] (6.34)	5	0.57[c] (0.65)
	Annual Max	0.750	1	N/A
PM2.5	24-hr 5-yr Avg of Max's	6.46[c] (5.59)	1.2	1.76[c] (1.68)
	Annual Max	0.750	-	N/A
	5-yr Avg of Ann.Conc's	0.723	0.3	1.18
Start-up/Shutdown Periods				
NO_2 [a]	1-hour Max	58.29	-	N/A
	1-hr 5-year Avg of Max's	54.61	7.5	N/A
CO	1-hour Max	574.5	2,000	N/A
	8-hour Max	88.58	500	N/A

[a] NO_2 1-hour and annual impacts evaluated using the Ambient Ratio Method with 0.80 (80%) and 0.75 (75%) ratios, respectively.

[b] CO 8-hour facility impacts greater for auxiliary boiler operating continuously without any concurrent turbine operations.

[c] PM10/PM2.5 24-hour worst-case impacts are for 43% load Case 27, which would be unlikely to occur for two turbines for a full 24-hours (i.e., two turbines at less than 50% load). The worst-case for 24-hour operations at 75% and 100% loads for PM10/PM2.5 is the same as the other pollutants – Case 2 (these impacts shown in parentheses).

Maximum PEP concentrations are compared in Table 4.1-27 to the CAAQS and NAAQS. All of the maximum PEP concentrations occurred in the immediate vicinity of proposed project, either on the facility fence-line or on the downwash receptor grid. The maximum concentrations for all five years of meteorological data modeled were used for

comparison to all the CAAQS, the annual NO_2 NAAQS and the 1-hour and 8-hour NAAQS for CO. For the other NAAQS, the PEP concentrations in the table were based on the form of the NAAQS, namely: High Second-High (H2H) values for the 3-hour SO_2 NAAQS and 24-hour PM10; the 5-year average of the annual 98^{th} and 99^{th} percentile 1-hour daily maxima for 1-hour NO_2 and SO_2 NAAQS, respectively; for PM2.5, the 5-year average of the annual 98^{th} percentile 24-hour impacts and the 5-year average of the annual impacts. Compliance with the NAAQS and CAAQS were calculated for all pollutants other than the CAAQS for PM10, which because of high background concentrations, already exceed the CAAQS (the area is already designated as State nonattainment for the PM10 CAAQS).

Table 4.1-27
Air Quality Impact Results for
Refined Modeling Analysis of Project – Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Ambient Air Quality Standards CAAQS/NAAQS ($\mu g/m^3$)	
Normal Operating Conditions						
NO_2 [a]	1-hour Max	204.7	98	303	339	-
	1-hr 5-yr Avg of 98th%	13.49	81	94	-	188
	Annual Max	0.981	15.1	16.1	57	100
CO	1-hour Max	123.8	2,176	2,300	23,000	40,000
	8-hour Max	29.48 [b]	1,603	1,632	10,000	10,000
SO_2	1-hour Max	1.51	16	18	655	-
	1-hr 5-yr Avg of 99th%	1.34	10	11	-	196
	3-hour H2H	1.14	16	17	-	1,300
	24-hour Max	0.801	8	9	105	-
PM10	24-hour Max	7.22[c] (6.34)	185	192	50	-
	24-hour H2H	6.93[c] (6.07)	80	97	-	150
	Annual Max	0.750	28.3	29.1	20	-
PM2.5	24-hr 5-yr Avg of 98th%	4.74[c] (4.15)	18	23	-	35
	Annual Max	0.750	7.2	8.0	12	-
	5-yr Avg of Annual Conc's	0.723	6.1	6.8	-	12.0
Start-up/Shutdown Periods						
NO_2 [a]	1-hour Max	58.29	98	156	339	-
	1-hr 5-yr Avg of 98th%	49.10	81	130	-	188
CO	1-hour Max	574.5	2,176	2,751	23,000	40,000
	8-hour Max	88.58	1,603	1,692	10,000	10,000

[a] NO_2 1-hour and annual impacts evaluated using the Ambient Ratio Method with 0.80 (80%) and 0.75 (75%) ratios, respectively.

[b] CO 8-hour facility impacts greater for auxiliary boiler operating continuously without any concurrent turbine operations.

[c] PM10/PM2.5 24-hour worst-case impacts are for 43% load Case 27, which would be unlikely to occur for two turbines for a full 24-hours (i.e., two turbines at less than 50% load). The worst-case for 24-hour operations at 75% and 100% loads for PM10/PM2.5 is the same as the other pollutants – Case 2 (these impacts shown in parentheses).

4.1.5.9 Cumulative Impact Analysis

In addition to modeling the PEP concentrations, the AVAQMD requested a cumulative modeling analysis of nearby sources in the Project area. Typically, based on the General Air Quality Modeling Guidelines, sources with a significant concentration gradient in the vicinity of a new source need to be included (GAQM 8.2.3). Two nearby source groups could generate this concentration gradient and are those based on Lockheed Martin Aeronautics and Northrup Grumman, both within or adjacent to U.S. Plant 42 near the Palmdale airport. Inventories of emissions and stack parameters were provided as CEDAIRs transaction files by the AVAQMD and were comprised of over 250 sources at these two facilities. In support of limiting the inventory of sources, as many of the emission points at both facilities were comprised of sources with very low emissions, Mr. Chris Anderson, Air Quality Engineer at AVAQMD requested that the small mobile sources not be included.

The emission inventory data provided by the AVAQMD included both maximum short-term hourly emissions as well as annual emissions. For the short term averaging periods, the maximum hourly emissions as provided were assumed to occur for 1-, 3, 8-, or 24-hour time periods. It was also assumed that all of the sources would be in operation for any 1-,3-,8-24-hour average. The annual emissions, based on actuals for the years 2013 and 2014 were used to represent the annual concentration impacts.

The results of the PEP sources combined with the Lockheed and Northrup emissions were then added to the background monitored data collected at the Lancaster monitor, located approximately 2.5 miles from the PEP. The cumulative modeling analyses would be considered conservative as many of the modeled sources are, for many time periods, already in the background air quality data. The use of the Lancaster monitoring station data is conservative in of itself, as the location of the monitor is near the Sierra Highway (110 meters), the Antelope Valley Freeway (< 4 km), and within 50 meters of Division Street. The Southern Pacific Railway is within 80 meters of the monitoring station. Thus, this monitoring data when combined with the cumulative inventories from Plant 42 plus the PEP emissions would produce a conservative modeling analysis.

The modeled cumulative inventory is presented in Tables 4.1-28 and 4.1-29 and were prepared in consultation with and approved by the AVAQMD. These sources are also regionally displayed in Figure 4.1-12. For modeling consistency, the source base elevations were calculated with the USEPA-program AERMAP (version 11103) from USGS NED data, as used to calculate the receptor elevations and hill slope factors. A large number of sources at both facilities are emergency equipment or sources that operated only intermittently – i.e., that operate far less than 50 hours/year. For these sources (identified in Table 4.1-29 with an asterisk), comparisons with the statistical

form of the 1-hour NO_2 and SO_2 NAAQS were not made, in accordance with EPA guidance. These sources were modeled for comparisons with the 1-hour CAAQS. The remaining (non-emergency) sources were assessed for the statistical forms of the 1-hour NO_2 and SO_2 NAAQS. For longer averaging periods of 3, 8 and 24-hour, all sources were assumed to operate continuously for each averaging period. The ozone limiting method (OLM) was used for the 1-hour NO_2 cumulative modeling analyses (both CAAQS and NAAQS) as described above. NO_2/NO_x ISR ratios were based on USEPA guidance (a default of 0.5 for the PEP project sources (for all operating cases including startup) and a default of 0.2 for background sources in the cumulative inventory). Concurrent ozone data (2010-2014) used in the Tier 3 OLM analysis were obtained from the Lancaster monitoring station. For the cumulative 1-hour NO_2 NAAQS analyses, the third highest seasonal value by hour, averaged over three years, were included in the AERMOD modeling per USEPA guidance (March 1, 2011 USEPA memorandum *"Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $N0_2$ National Ambient Air Quality Standard"*). A more complete discussion of the OLM data and techniques is described above and included in the April 2015 Modeling Protocol.

Table 4.1-28
Modeled Cumulative Inventory Sources–Short-Term/Annual Emissions

Stack ID#	Short-Term (1-hour) Emission Rates (g/s)					Long-Term (Annual) Emission Rates (g/s)				
Lockheed Sources	NOx	SO_2	CO	PM10	PM2.5	NOx	SO_2	CO	PM10	PM2.5
50020	-	-	-	8.026E-8	8.026E-8	-	-	-	3.653E-8	3.653E-8
90001	4.533E-2	1.104E-3	5.922E-3	3.503E-3	3.503E-3	2.475E-3	-	-	1.910E-4	1.910E-4
90003	4.301E-2	1.104E-3	4.599E-3	3.503E-3	3.503E-3	5.332E-3	-	-	4.335E-4	4.335E-4
90004	4.882E-1	1.217E-2	1.284E-1	1.368E-2	1.321E-2	4.681E-4	-	-	1.312E-5	1.267E-5
90038	5.689E-2	7.069E-3	5.065E-2	2.238E-2	2.238E-2	1.774E-2	-	-	6.978E-3	6.978E-3
90039	2.477E-1	6.703E-3	9.853E-3	2.121E-2	2.121E-2	1.244E-2	-	-	1.064E-3	1.064E-3
90040	4.497E-1	6.703E-3	1.115E-2	2.121E-2	2.121E-2	1.309E-2	-	-	6.175E-4	6.175E-4
90041	1.336E+0	2.594E-2	1.303E-1	1.391E-2	1.343E-2	5.032E-4	-	-	4.141E-6	5.061E-6
90047	4.721E-1	5.547E-3	1.017E-1	2.362E-2	2.281E-2	4.203E-4	-	-	2.103E-5	2.031E-5
90055	6.167E-1	1.682E-2	2.759E-1	1.323E-2	1.278E-2	4.295E-4	-	-	9.215E-6	8.899E-6
90139	2.370E-1	3.802E-3	3.894E-1	2.409E-2	2.327E-2	1.650E-4	-	-	1.678E-5	1.620E-5
90142	8.634E-2	2.952E-3	5.488E-2	1.229E-2	1.187E-2	4.731E-5	-	-	6.733E-6	6.503E-6
90182	2.243E-2	7.434E-4	1.876E-1	1.971E-1	1.971E-1	4.731E-5	-	-	6.733E-6	6.503E-6
90184	2.817E-3	4.427E-6	2.894E-3	1.659E-4	1.137E-4	1.318E-4	-	-	7.764E-6	5.322E-6
90185	1.126E-1	1.777E-4	1.158E-1	6.640E-3	6.640E-3	1.286E-5	-	-	7.566E-7	5.192E-7
Stack ID#	**Short-Term (1-hour) Emission Rates (g/s)**					**Long-Term (Annual) Emission Rates (g/s)**				
Northrup Sources	**NOx**	**SO_2**	**CO**	**PM10**	**PM2.5**	**NOx**	**SO_2**	**CO**	**PM10**	**PM2.5**
61201	-	-	-	7.557E-2	7.557E-2	-	-	-	7.566E-2	7.566E-2
61202	-	-	-	7.557E-2	7.557E-2	-	-	-	7.566E-2	7.566E-2
61203	-	-	-	4.400E-4	4.400E-4	-	-	-	4.401E-4	4.401E-4
61204	-	-	-	4.400E-4	4.400E-4	-	-	-	4.401E-4	4.401E-4
61205	-	-	-	4.400E-4	4.400E-4	-	-	-	4.401E-4	4.401E-4
61206	-	-	-	4.400E-4	4.400E-4	-	-	-	4.401E-4	4.401E-4
61207	-	-	-	4.400E-4	4.400E-4	-	-	-	4.401E-4	4.401E-4
90101	4.760E-2	3.092E-3	2.512E-1	9.790E-3	9.790E-3	2.419E-3	-	-	4.975E-4	4.975E-4
90102	3.797E-2	2.466E-3	2.004E-1	7.809E-3	7.809E-3	6.378E-3	-	-	1.312E-3	1.312E-3
90103	4.760E-2	3.092E-3	2.512E-1	9.790E-3	9.790E-3	3.508E-5	-	-	7.215E-6	7.215E-6
90106	1.292E-1	2.518E-3	1.637E+0	7.972E-3	7.972E-3	1.695E-2	-	-	1.046E-3	1.046E-3
90301	7.301E-2	2.562E-3	2.517E-1	0.000E+0	1.083E-2	5.044E-5	-	-	7.482E-6	7.482E-6

90302	1.512E-4	2.583E-6	4.246E-5	3.100E-2	3.100E-2	1.620E-4	-	-	1.697E-5	1.697E-5
90401	1.541E+0	1.812E-2	3.322E-1	7.706E-2	7.448E-2	8.437E-3	-	-	4.218E-4	4.077E-4

Table 4.1-29
Modeled Cumulative Inventory Sources–Stack Parameters

Stack ID#	Stack Height (m)	Temp(K)	Velocity (m/s)	Diameter (m)	Source Type	UTM-X(m)	UTM-Y(m)	Z(m)
Lockheed Sources								
50020	6.10	30.4**	5.68**	-	VOLUME	397897.00	3830714.10	788.36
90001	2.60	551.8	101.29	1.676	POINT	400183.01	3833420.90	761.44
90003	3.05	551.8	101.29	1.676	POINT	400155.00	3833420.90	761.48
90004*	16.76	1005.2	7.70	0.091	POINT	400148.99	3833431.90	761.44
90038	3.05	551.8	286.14	1.219	POINT	397997.01	3830564.90	787.18
90039	2.60	551.8	271.23	1.219	POINT	397959.01	3830562.00	787.57
90040	5.35	551.8	271.23	1.219	POINT	397968.99	3830562.00	787.45
90041*	12.19	942.5	16.68	0.152	POINT	398015.99	3830576.90	787.03
90047*	6.10	1005.2	2.87	0.061	POINT	397468.99	3831076.90	790.46
90055*	13.72	930.5	10.68	0.152	POINT	397355.99	3830518.10	793.26
90139*	6.10	881.8	2.67	0.091	POINT	397217.99	3831059.10	791.48
90142*	12.19	979.8	1.31	0.091	POINT	398468.99	3831727.10	780.90
90182	3.05	340.15	3.048	1.2192	POINT	398002.01	3830731.00	787.09
90184	1.83	948.5	3.81	0.091	POINT	400162.99	3833612.10	759.81
90185*	12.19	925.2	2.34	0.091	POINT	399420.99	3831331.10	775.96
Northrup Sources								
61201	6.10	291.8	3.05	3.048	POINT	401017.79	3833341.06	758.96
61202	6.10	291.8	3.05	3.048	POINT	401022.31	3833341.06	758.96
61203	6.10	291.8	3.05	3.048	POINT	402096.59	3833716.06	757.26
61204	6.10	291.8	3.05	3.048	POINT	402100.49	3833717.04	757.25
61205	6.10	291.8	3.05	3.048	POINT	402103.61	3833717.04	757.25
61206	6.10	291.8	3.05	3.048	POINT	402076.11	3833710.94	757.28
61207	6.10	291.8	3.05	3.048	POINT	402078.09	3833710.94	757.28
90101	12.50	551.8	6.62	0.914	POINT	401232.61	3833498.05	758.19
90102	12.50	551.8	8.84	0.914	POINT	401243.99	3833496.09	758.19
90103	12.50	551.8	11.09	0.914	POINT	401244.11	3833498.05	758.18
90106	7.32	551.8	0.03	0.610	POINT	402026.89	3833710.94	757.26
90301*	10.67	505.2	18.29	0.305	POINT	402047.09	3833710.94	757.26

90302	10.67	505.2	18.29	0.305	POINT	402049.19	3833710.94	757.26
90401*	10.36	605.2	1.37	0.213	POINT	402051.39	3833710.94	757.26
'*Emergency equipment not included in 1-hour NO2/SO2 NAAQS analyses and assumed to run one hour for 3/8/24-hr analyses. '**Volume source horizontal and vertical dimensions, respectively, instead of temperature and velocity.								

Results of the multisource inventory cumulative modeling analyses were then compared to the CAAQS and NAAQS in Table 4.1-30. All averaging period complied with both the NAAQS and CAAQS, with the exception of PM10, where the background by itself already exceeds the CAAQS. As noted above, these modeling analyses were performed to comply with AVAQMD requirements. Additional cumulative modeling analyses will be submitted separately to CEC for newly permitted sources within six (6) miles of the proposed project location. In support of the PSD permit application process, additional cumulative sources may be included based on the maximum radial extent of the significance area(s) for each major (PSD) source pollutant.

Table 4.1-30
Air Quality Impact Results for
Cumulative Modeling Analysis – Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Ambient Air Quality Standards CAAQS/NAAQS ($\mu g/m^3$)	
Normal Operating Conditions						
NO_2 [a]	1-hour Max	208.7	98	307	339	-
	1-hr 5-yr Avg of 98th%	N/A	N/A	151.3	-	188
	Annual Max	0.985	15.1	16.1	57	100
CO	1-hour Max	1309.9	2,176	3,486	23,000	40,000
	8-hour Max	502.3 [b]	1,603	2,105	10,000	10,000
SO_2	1-hour Max	5.85	16	22	655	-
	1-hr 5-yr Avg of 99th%	1.87	10	12	-	196
	3-hour H2H	1.57	16	18	-	1,300
	24-hour Max	0.801	8	9	105	-
PM10	24-hour Max	13.25[c] (13.25)	185	198	50	-
	24-hour H2H	11.34[c] (11.35)	80	91	-	150
	Annual Max	0.932	28.3	29.2	20	-
PM2.5	24-hr 5-yr Avg of 98th%	4.76[c] (4.47)	18	23	-	35
	Annual Max	0.932	7.2	8.1	12	-
	5-yr Avg of Annual Conc's	0.815	6.1	6.9	-	12.0
Start-up/Shutdown Periods						
NO_2 [a]	1-hour Max	202.8	98	301	339	-
	1-hr 5-yr Avg of 98th%	N/A	N/A	151.3	-	188
CO	1-hour Max	1309.9	2,176	3,486	23,000	40,000
	8-hour Max	502.3	1,603	2,105	10,000	10,000

[a] NO_2 1-hour and annual impacts evaluated using the Ambient Ratio Method with 0.80 (80%) and 0.75 (75%) ratios, respectively.

[b] CO 8-hour facility impacts greater for auxiliary boiler operating continuously without any concurrent turbine operations.

[c] PM10/PM2.5 24-hour worst-case impacts are for 43% load Case 27, which would be unlikely to occur for two turbines for a full 24-hours (i.e., two turbines at less than 50% load). The worst-case for 24-hour operations at 75% and 100% loads for PM10/PM2.5 is the same as the other pollutants – Case 2 (these impacts shown in parentheses).

4.1.5.10 Project Commissioning Impact Analysis

During the first year of operation, plant commissioning activities, which are planned to occur over an estimated 1,278 hours, will have higher hourly and daily emissions profiles than during normal operations in the subsequent years of operation. There are four (4) scenarios that are possible during commissioning, which are expected to result in NO_x, CO, VOC, and PM10/2.5 emissions that are greater than during normal operations. (During commissioning, SO_2 and PM10/2.5 emissions are expected to be no greater than full load operations.) Typically, some of these commissioning activities occur prior to the installation of the pollution control equipment, e.g., SCR and oxidation catalyst, while the combustion turbines are being tuned to achieve optimum performance. During the initial combustion turbine tuning, NO_x and CO emission control systems would not be functioning.

For the purposes of air quality modeling, NO_2, and CO impacts could be higher during commissioning than under other operating conditions already evaluated. The commissioning activities for the combustion turbine are expected to consist of four (4) phases. Siemens, the turbine vendor, has provided estimates of emissions and hours for each phase of the commissioning process. This schedule is summarized in Table 4.1-31 with additional details in Appendix 4.1A. The worst case short-term emissions profile during expected commissioning-period operating loads are summarized in Table 4.1-32.

Table 4.1-31
Commissioning Schedule

Commissioning Phase	1 First Fire and Synch Checks	2 GT Emissions and Combustion Tuning	3 SCR Commissioning	4 CC Tuning & Testing
SCR Installed	No	No	50%	Yes
CO Catalyst Installed	No	No	Yes	Yes
Hours per Unit	11	73	130	425
# Units Operating Simultaneously	1	1	1	2
Avg Load %	0	50	75	100
Total NOx lbs (2 units)	2,684	19,272	14,040	24,650
Total CO lbs (2 units)	99,000	116,216	50,440	104,550
Total VOC lbs (2 units)	11,352	13,140	5,720	13,600
Total PM10/2.5 (2 units)	216	1,431	2,458	8,330
Total SO_x (2 units)	31	204	364	1,190
Notes: per Siemens 5/15/15, see Appendix 4.1A				

Table 4.1-32
Maximum Hourly Emissions Rates During Each Phase of Commissioning

Commissioning Stage	Emission Rate	NO_X	CO	VOC	PM10/2.5	SO_x
1	lb/hr	122	4500	516	9.8	1.4
2	lb/hr	132	796	90	9.8	1.4
3	lb/hr	54	194	22	9.8	1.4
4	lb/hr	29	123	16	9.8	1.4

Notes: per Siemens 5/15/15, see Appendix 4.1A for commissioning schedule.

Days with continuous 24-hour operation were assumed in order to reduce the number of starts during the testing periods.

The modeling assumed each turbine would be in the commissioning activity that produced the maximum emissions. So for NO_x and CO, one turbine would be in GT Emissions and Combustion Tuning with the other in First Fire and Synch Checks.

Simultaneous operation of the auxiliary boiler would not occur until the final phase of commissioning.

The total emissions from both turbines during the 1,278 hours of commissioning activities (639 hours per turbine unit) are expected to be as follows:

- NO_x – 30.3 tons
- CO - 185.1 tons
- VOC - 21.9 tons
- TSP, PM10/2.5 - 6.3 tons
- SO_x – 0.9 ton

Appendix 4.1A lists the specific emissions during each phase of the commissioning activity, and the proposed detailed commissioning schedule. The modeling presented in Table 4.1-33 summarizes the results of the commissioning assessment. As can be seen, the modeling demonstrates that commissioning activities will comply with all NO_2 and CO National and California state ambient air quality standards (NAAQS/CAAQS).

Table 4.1-33
Air Quality Impact Results for
Commissioning Modeling Analysis – Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Ambient Air Quality Standards CAAQS/NAAQS ($\mu g/m^3$)	
NO_2 [a]	1-hour Max	137.6	98	236	339	-
	1-hr 5-yr Avg of 98th%	88.2	81	169	-	188
CO	1-hour Max	3,959	2,176	6,135	23,000	40,000
	8-hour Max	3.097	1,603	4,700	10,000	10,000

[a] NO_2 1-hour and annual impacts evaluated using the Ambient Ratio Method with 0.80 (80%) and 0.75 (75%) ratios, respectively.

Fumigation Analysis

Fumigation analyses with the USEPA Model SCREEN3 (version 13043) were conducted for inversion breakup conditions based on USEPA guidance given in *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019). The worst-case stack parameters identified in the screening analysis for the turbine stacks for 1-hour averaging times were modeled (100 percent load with duct firing and without evaporative cooling at an ambient temperature

of 23°F). Shoreline fumigation impacts were not assessed since the nearest distance to the shoreline of any large bodies of water is greater than 3 kilometers.

An inversion breakup fumigation impact was predicted to occur at 18,448 meters from the turbine stacks and 2,419 meters from the auxiliary boiler stack. These results are predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speeds at the stack release heights. No inversion breakup fumigation impacts are predicted by SCREEN3 for the shorter fire pump and emergency generator stacks. Since the site vicinity is rural in nature, there was no need to adjust fumigation impacts for urban dispersion conditions. One-hour averaging times were initially evaluated (fumigation impacts are generally expected to occur for 90-minutes or less).

For total facility inversion breakup fumigation impacts, maximum SCREEN3 impacts under rural conditions for all SCREEN3 meteorological combinations were determined for the other sources at the turbine and auxiliary boiler inversion breakup distances. These impacts were combined with the fumigation impact as shown in the following table. All of the NO_2 impacts shown are for conservatively calculated as total NOx (no conversion to NO_2 based on the Ambient Ratio Method or any other procedures). These maximum 1-hour total fumigation impacts are less than the SCREEN3 maxima predicted to occur under normal dispersion conditions anywhere off-site for all the sources combined (shown in the modeling documents). Since one-hour fumigation impacts are less than the maximum overall SCREEN3 one-hour impacts, no further analysis of additional short-term averaging times (3-hours, 8-hours, or 24-hours) is required as described in Section 4.5.3 of *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019). The maximum 1-hour total fumigation impacts are also less than the maximum 1-hour AERMOD facility impacts as shown in the Table 4.1-34, so the refined analysis impacts are conservative.

Table 4.1-34
Fumigation Impact Summary

Pollutant /Averaging Time	Turbine Impacts ($\mu g/m^3$)	Auxiliary Boiler Impact ($\mu g/m^3$)	Emergency Generator Impact ($\mu g/m^3$)	Fire pump Impact ($\mu g/m^3$)	Total Facility Impact ($\mu g/m^3$)
Turbine Inversion Breakup Location (18,448 meters)					
NO_2 1-hour	4.797	0.992	10.824	1.029	17.642
SO_2 1-hour	0.389	0.054	0.014	0.002	0.459
CO 1-hour	2.931	3.329	1.917	1.36	9.537
Auxiliary Boiler Inversion Breakup Location (2,419 meters)					
NO_2 1-hour	4.012	2.514	90.89	5.725	103.141
SO_2 1-hour	6.252	0.298	0.117	0.013	6.68
CO 1-hour	47.106	18.284	16.095	7.563	89.048
Overall SCREEN3 Maximum Impacts for Normal Dispersion (119-145 meters)					
NO_2 1-hour	25.38	56.742	1824.768	29.07	1935.96
SO_2 1-hour	2.16	3.104	2.347	0.058	7.669
CO 1-hour	15.505	190.383	323.136	38.405	567.429

4.1.5.11 Impacts on Soils, Vegetation, and Sensitive Species

Nitrogen deposition on proximal soils is expected to occur over time as a result of Project operations. While nitrogen deposition may benefit non-native annual grasses occurring in the immediate vicinity of the PEP to a small degree, this deposition is not expected to substantially impact native plant and animal species and communities occurring in the area owing to the high level of urban and agricultural development in the immediate Project area.

Therefore, impacts on soils, vegetation, and sensitive species were determined to be "insignificant" for the following reasons:

- No soils were identified in the project area, which are recognized to have any known sensitivity to the types or amounts of air pollutants emitted by the proposed facility.
- No vegetation species were identified in the project area, which are recognized to have any known sensitivity to the types or amounts of air pollutants emitted by the proposed facility.

- The facility emissions are expected to be in compliance with all applicable air quality rules and regulations.
- The facility impacts are less than significance and result in no violations of existing air quality standards, nor will the emissions cause an exacerbation of an existing violation of any quality standard.
- No animal species were identified in the project area, which are recognized to have any known sensitivity to the types or amounts of air pollutants emitted by the proposed facility.

4.1.6 Laws, Ordinances, Regulations, and Statutes (LORS)

Table 4.1-35 presents a summary of local, state, and federal air quality LORS deemed applicable to the Project. Specific LORS are discussed in greater detail in Section 4.1.6.1.

Table 4.1-35
Summary of LORS - Air Quality

LORS	Applicability	Conformance (PTA Section)
Federal Regulations		
CAAA of 1990, 40 CFR 50	Project operations will not cause violations of state or federal AAQS.	4.1.5.1–4.1.5.9
40 CFR 52.21 (PSD)	Impact analysis shows compliance with NAAQS, Project will be subject to PSD.	4.1.5.1-4.1.5.9, 4.1.3.4, Appendix 4.1B, Appendix 4.1C
40 CFR 72-75 (Acid Rain)	Project will submit all required applications for inclusion to the Acid Rain program and allowance system, CEMS will be installed as required. The Project is subject to Title IV.	4.1.6.1, 4.1.6.2
40 CFR 60 (NSPS)	Project will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements. 40 CFR 60, Subpart KKKK will apply to the turbines/HRSGs. Subpart IIII will apply to the fire pump engine.	4.1.6, 4.1.6.1
40 CFR 70 (Title V)	Title V application will be submitted pursuant to the timeframes noted in AVAQMD Regulation XXX.	4.1.6.1, 4.1.6.2
40 CFR 68 (RMP)	Project will evaluate substances and amounts stored, determine applicability, and comply with all program level requirements. The existing RMP and OCA will be evaluated for necessary revisions.	4.5
40 CFR 64 (CAM Rule)	Facility will be exempt from CAM Rule provisions.	4.1.6, 4.1.6.1

LORS	Applicability	Conformance (PTA Section)
40 CFR 63 (HAPs, MACT)	Subpart YYYY applies to stationary combustion turbines constructed after 1-14-03 located at a major HAPs source. Emissions limits in the rule are currently stayed.	4.1.6.1
State Regulations (CARB)		
CHSC 44300 et seq.	Project will determine applicability, and prepare inventory plans and reports as required.	4.1.6, 4.1.6.1
CHSC 41700	AVAQMD Permit to Construct (PTC) will ensure that no public nuisance results from operation of facility.	4.1.6.1, 4.1.6.2
Gov. Code 65920 et seq.	Pursuant to the Permit Streamlining Act, the Applicant believes the Project is a "development project" as defined, and is seeking approvals as applicable under the Act.	n/a
Local Regulations (AVAQMD)		
Rule 401	Limits visible emissions. Project will comply with all limits per BACT and clean fuel use.	4.1.6, 4.1.6.1
Rule 402	Prohibits public nuisances. Project is not expected to cause or create any type of public nuisance.	4.1.6, 4.1.6.1
Rule 403	Fugitive dust limits and mitigation measures. Project will comply with all rule provisions during construction and operation.	4.1.3.6, 4.1.6.1 Appendix 4.1E
Rule 404	Establishes standards for exhaust particulate matter. BACT and clean fuel use will insure compliance. This rule does not apply to combustion turbines firing gaseous fuels.	4.1.3.6, 4.1.6.1 Appendix 4.1F
Rule 405	Limits particulate matter emissions from fuel combustion on mass per unit processed basis (fuel combusted). BACT and clean fuel use will insure compliance.	4.1.3.6, 4.1.6.1 Appendix 4.1F
Rule 407	Limits CO and SO2 emissions from stationary sources. BACT and clean fuel use will insure compliance.	4.1.6, 4.1.6.1, Appendix 4.1A and 4.1F
Rule 409	Limits PM emissions from fuel combustion. BACT and clean fuel use will insure compliance.	4.1.6, 4.1.6.1, Appendix 4.1A and 4.1F
Rule 429	Limits startup and shutdown times with respect to NO_x emissions. Combustion turbines subject to Rule 1134 are exempt from Rule 429.	4.1.6
Rule 431.1	Limits the sulfur content of gaseous fuels. BACT and clean fuel use (natural gas) will insure compliance.	4.1.6
Rule 431.2	Limits the sulfur content of liquid fuels. BACT and clean fuel use (ULSD) will insure compliance.	4.1.6
Rule 475	Limits NOx and PM emissions from EPGE fuel combustion. BACT and clean fuel use will insure compliance.	4.1.6, 4.1.6.1, Appendix 4.1A and 4.1F

LORS	Applicability	Conformance (PTA Section)
Rule 476	Limits NO_x and combustion contaminant emissions from steam generating equipment fuel combustion.	4.1.6, 4.1.6.1, Appendix 4.1A and 4.1E
Rule 1134	Limits NOx and CO emissions from stationary gas turbines. Use of BACT and clean fuels (natural gas) will insure compliance with this rule.	4.1.6, Appendix 4.1A
Regulation XIII	NSR provisions. Project will meet all NSR rule requirements (BACT, offsets, AQ impact analysis, etc.)	Section 4.1
Rule 1300	Ensures that PSD requirements applies. The project will submit a PSD permit application to EPA, Region 9 to comply with Rule 1300	Section 4.1
Rule 1302	*Procedure* requires certification of compliance with the Federal Clean Air Act, applicable implementation plans, and all applicable AVAQMD rules and regulations. The ATC application package for the proposed project includes sufficient documentation to comply with Rule 1302(D)(5)(b)(iii). Permit conditions for the proposed project will require compliance with Rule 1302(D(5)(b)(iv).	
Rule 1303	Requirements requires BACT and offsets for selected large new sources. Permit conditions will limit the emissions from the proposed project to a level which has been defined as BACT for the proposed project, bringing the proposed project into compliance with Rule 1302(A). Prior to ·the commencement of construction the proposed project shall have obtained sufficient offsets to comply with Rule 1303(B)(1).	Section 4.1, Appendix 4.1F
Rule 1305	Provides for increases in the offset ratio based on distance of the available ERCs. Also allows for inter-pollutant offsets.	Section 4.1, Appendix 4.1G
Rule 1306	*Electric Energy Generating Facilities* places additional administrative requirements on projects involving approval by the California Energy Commission. The proposed project will not receive an ATC without CEC's approval of their Application for Certification, ensuring compliance with Rule 1306.	Section 4.1
Rule 1401	*NSR for Toxics (Project will comply with all provisions of Rule 1401-New Sources) See Appendix 4.1D, and Section 4.5 Public Health for analysis and compliance data.*	Section 4.5, 4.1.6.1, Appendix 4.1D
Regulation IX (NSPS)	*See Federal LORS section.*	
Regulation XXX (Title V)	*Project will submit the required Title V application per the timeframes required in Rule 3002, i.e., within 12 months of becoming operational.*	4.1.6.1
Rule 3010 (Acid Rain)	*Rule 3010 requires compliance with all applicable provisions of the Title IV Acid Rain program. The facility will be subject to Title IV.*	4.1.6.2

4.1.6.1 Specific LORS Discussion

Federal LORS

The federal EPA implements and enforces the requirements of many of the federal air quality laws. EPA has adopted the following stationary source regulatory programs in its effort to implement the requirements of the CAA:

New Source Performance Standards (NSPS)

National Emission Standards for Hazardous Air Pollutants (NESHAP)

Prevention of Significant Deterioration (PSD)

New Source Review (NSR)

Title IV: Acid Rain/Deposition Program

Title V: Operating Permits Program

CAM Rule

National Standards of Performance for New Stationary Sources - 40 CFR Part 60, Subparts Db, KKKK and IIII

The NSPS program provisions limit the emission of criteria pollutants from new or modified facilities in specific source categories. The applicability of these regulations depends on the equipment size or rating; material or fuel process rate; and/or the date of construction, or modification. Reconstructed sources can be affected by NSPS as well. Applicability of Subpart KKKK to the proposed new turbine supersedes applicability of Subpart GG. The HRSG and duct burners are also subject to KKKK (they are exempt from Db). Compliance with BACT will insure compliance with the emissions limits of Subpart KKKK. The auxiliary boiler is subject to Db and will comply this this standard. Subpart IIII is expected to apply to the proposed fire pump engine. Compliance with the EPA and CARB tiered emissions standards, and the CARB/AVAQMD ATCM for stationary CI engines, will insure compliance with IIII.

National Emission Standards for Hazardous Air Pollutants - 40 CFR Part 63

The NESHAPs program provisions limits hazardous air pollutant emissions from existing major sources of HAP emissions in specific source categories. The NESHAPs program also requires the application of maximum achievable control technology (MACT) to any new or reconstructed major source of HAP emissions to minimize those emissions. Subpart YYYY will apply to the proposed turbine. The emissions provisions

of Subpart YYYY are currently subject to “stay” by EPA. Notwithstanding the foregoing, the proposed turbine is expected to comply with the emissions provisions.

Prevention of Significant Deterioration Program - 40 CFR Parts 51 and 52

The PSD program requires the review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. PSD applies only to pollutants for which ambient concentrations do not exceed the corresponding NAAQS. The PSD program allows new sources of air pollution to be constructed, and existing sources to be modified, while maintaining the existing ambient air quality levels in the Project region and protecting Class I areas from air quality degradation. The facility will trigger the PSD program requirements.

New Source Review - 40 CFR Parts 51 and 52

The NSR program requires the review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment of AAQS. NSR applies to pollutants for which ambient concentrations exceed the corresponding NAAQS. The AFC air quality analysis complies with all applicable NSR provisions.

Title IV - Acid Rain Program - 40 CFR Parts 72-75

The Title IV program requires the monitoring and reduction of emissions of acid rain compounds and their precursors. The primary source of these compounds is the combustion of fossil fuels. Title IV establishes national standards to limit SO_x and NO_x emissions from electrical power generating facilities. The proposed new turbines will be subject to Title IV, and will submit the appropriate applications to the air District as part of the PTC application process. The Project will participate in the Acid Rain allowance program through the purchase of SO_2 allowances. Sufficient quantities of SO_2 allowances are available for use on this Project.

Title V - Operating Permits Program - 40 CFR Part 70

The Title V program requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities, acid rain facilities, subject solid waste incinerator facilities, and any facility listed by EPA as requiring a Title V permit. Title V application forms applicable to the proposed new facility will be submitted pursuant to the District Title V permitting rule timeframes.

CAM Rule - 40 CFR Part 64

The CAM rules require facilities to monitor the operation and maintenance of emissions control systems and report malfunctions of any control system to the appropriate regulatory agency. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. However, emission control systems governed by Title V operating permits requiring continuous compliance determination methods are exempt from the CAM rule. Since the project will be issued a Title V permit requiring the installation and operation of continuous emissions monitoring systems, the project will qualify for this exemption from the requirements of the CAM rule.

Toxic Release Inventory Program (TRI) - Emergency Planning and Community Right-to-Know Act

The TRI program as applied to electric utilities, affects only those facilities in Standard Industrial Classification (SIC) Codes 4911, 4931, and 4939 that combust coal and/or oil for the purpose of generating electricity for distribution in commerce must report under this regulation. The proposed project SIC Code is 4911. However, the proposed Project will not combust coal and/or oil for the purpose of generating electricity for distribution in commerce. Therefore, this program does not apply to the proposed Project.

State LORS

CARB's jurisdiction and responsibilities fall into the following five areas; (1) implement the state's motor vehicle pollution control program; (2) administer and coordinate the state's air pollution research program; (3) adopt and update the state's AAQS; (4) review the operations of the local air pollution control districts (AVAQMDs) to insure compliance with state laws; and, (5) to review and coordinate preparation of the State Implementation Plan (SIP).

Air Toxic "Hot Spots" Act – H&SC §44300-44384

The Air Toxics "Hot Spots" Information and Assessment Act requires the development of a statewide inventory of Toxic Air Contaminants (TAC) emissions from stationary sources. The program requires affected facilities to; (1) prepare an emissions inventory plan that identifies relevant TACs and sources of TAC emissions; (2) prepare an emissions inventory report quantifying TAC emissions; and (3) prepare an HRA, if necessary, to quantify the health risks to the exposed public. Facilities with significant health risks must notify the exposed population, and in some instances must implement risk management plans to reduce the associated health risks.

Public Nuisance – H&SC § 41700

Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or which endanger the comfort, repose, health, or safety of the public, or that damage business or property.

Local Air District LORS-Mojave Desert AQMD

AQMD Regulation II - Permits

AQMD Regulation II establishes the basic framework for acquiring permits to construct and operate from the air district. The AFC will be the basis for the Districts Determination of Compliance. A separate ATC application is not required per the AVAQMD regulations, i.e., the AFC per Rule 1306 is equivalent to the ATC application. The district permitting forms are included in Appendix 4.1I.

AQMD Preconstruction Review for Criteria Pollutants

The AQMD has several preconstruction review programs for new or modified sources of criteria pollutant emissions, as follows:

> Regulation XIII (New Source Review) – Regulation XIII provides for review of non-attainment pollutants and their precursors, and requires the following analyses to be conducted; (1) BACT, (2) mitigation analysis (offsets), (3) air quality impact analysis, (4) Class I Area impact analysis, (5) visibility, soils, and vegetation impact analysis, and (6) pre-construction monitoring. The AFC analysis meets the requirements of the NSR rule required analysis.
>
> Regulation XVII (Prevention of Significant Deterioration) - Regulation XVII provides for review of attainment pollutants, and requires the following analyses to be conducted; (1) BACT, (2) air quality impact analysis, (3) Class I Area impact analysis, (4) visibility, soils, and vegetation impact analysis, and (5) pre-construction monitoring. The facility is not expected to trigger the requirements of the PSD program.

AQMD Regulation XIV - New Source Review of Toxic Air Contaminants

Rule 1401 (NSR for Toxic Air Contaminants) establishes risk thresholds for new or modified sources of TAC emissions. Rule 1401 establishes limits for maximum individual cancer risk, cancer burden, and non-carcinogenic acute and chronic hazard indices for new or modified sources of TAC emissions. The public health analysis contained in Section 4.1.7 and Appendix 4.1D, shows compliance with all Rule 1401 requirements.

AQMD Regulation XX – RECLAIM

Regulation XX was rescinded on 1/20/98 and is no longer in effect in the AVAQMD.

AQMD Regulation XXX - Federal Operating Permit Program

Regulation XXX (Title V Permits) implements the federal operating permit program at the local District level. Rule 3002 requires major emitting facilities and acid rain facilities undergoing modifications to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the CAA of 1990. The Title V application will be filed pursuant to the timeframes noted in the rule, i.e., within 12 months of becoming operational.

AQMD Regulation XXX - Acid Rain Program

Regulation XXX (Rule 3010) addresses the requirements of the federal acid rain program via the Title V permitting program. The facility will be subject to the acid rain program provisions.

AQMD Regulation IX- NSPS

Regulation IX (NSPS) incorporates by reference the provisions of 40 CFR 60, Chapter 1. See Table 4.1-27 and the Federal LORS discussion above.

AQMD Prohibitory or Source Specific Rules

Table 4.1-35 above delineates a number of District prohibitory rules (Regulation IV), and source specific rules (Regulation XI). Each of these rules will be complied with via the imposition of BACT, use of clean fuels, conditions placed on the ATC/PTO via the DoC by the AVAQMD, and Conditions of Certification imposed by CEC.

4.1.6.2 Agency Jurisdiction and Contacts

Table 4.1-36 presents data on the following: (1) air quality agencies that may or will exercise jurisdiction over air quality issues resulting from the power facility, (2) the most appropriate agency contact for the Project, (3) contact address and phone information, and (4) the agency involvement in required permits or approvals.

Table 4.1-36
Agencies, Contacts, Jurisdictional Involvement, Required Permits For Air Quality

Agency	Contact	Jurisdictional Area	Permit Status
California Energy Commission (CEC)	Assigned Project Manager 1516 Ninth St. Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the facility under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
Mojave Desert AQMD	Eldon Easton APCO 43301 Division St. Suite 206 Lancaster, CA 93535 (661) 723-8070	Prepares Determination of Compliance (DOC) for CEC, Issues AVAQMD Authority to Construct (ATC) and Permit to Operate (PTO), Primary air regulatory and enforcement agency.	DOC will be prepared subsequent to AFC submittal. AFC serves as the ATC application per Rule 1306.
California Air Resources Board (CARB)	Mike Tollstrup Chief, Project Assessment Branch 1001 I St., 6th Floor Sacramento, CA 95814 (916) 322-6026	Oversight of AQMD stationary source permitting and enforcement program	CARB staff will provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on draft ATC.
Environmental Protection Agency, Region IX	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974	Oversight of all AQMD programs, including permitting and enforcement programs. PSD permitting authority for AVAQMD.	USEPA Region 9 staff will receive a copy of the DOC. USEPA Region 9 staff will have opportunity to comment on draft ATC. EPA will also be the PSD permit issuing authority.

4.1.6.3 Permit Requirements and Schedules

An ATC application is required in accordance with the AVAQMD rules. Pursuant to AVAQMD Rule 1306, the AFC is considered to be equivalent to the AQMD permitting application. The required district permitting forms are included in Appendix 4.1I. These application forms in conjunction with the AFC comprise the required AQMD permitting application package. A separate PSD application will be prepared for EPA Region 9 which will mirror the CEC analysis for the designated attainment PSD pollutants only.

4.1.6.4 Conditions of Certification

Palmdale Energy understands that the air quality Conditions of Certification will be updated to reflect the conditions of the DOC and therefore has not attempted to provide recommended changes to those conditions at this time. However, Palmdale Energy is

proposing minor changes to the Staff proposed Conditions of Certification to reflect deletion of the solar components of the project, reflect the emission offsets required, and to provide clarification language.

Palmdale Energy propose to modify Condition of Certification **AQ-SC6** because the use of the term “minor activities” seems vague and subject to many interpretations. To clarify the following modifications are proposed.

AQ-SC6 ~~Except for minor activities as allowed by the AQCMM, such as cement pours~~, **Mass grading** ~~construction~~ activities shall be limited to the hours between one hour after sunrise and one hour before sunset from November 5 through February 15. **Mass grading** ~~Construction~~ activities taking place from February 16 through November 4 shall be limited to the hours between one hour after sunrise and thirty (30) minutes before sunset.

Verification: The project owner shall include in the MCR a summary of all actions taken to maintain compliance with this condition.

AQ-SC7 The project owner, when obtaining dedicated vehicles for ~~mirror washing activities and other~~ facility maintenance activities, shall only obtain vehicles that meet California on-road vehicle emission standards or appropriate U.S. EPA/California off-road engine emission standards for the latest model year available when obtained. The plan required in **AQ-SC 2** shall describe the approach the facility owner will use to meet this condition.

Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified in this condition.

Verification: At least 30 days prior to the start of commercial production, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report.

AQ-SC8 The project owner shall provide a site operations dust control plan, including all applicable fugitive dust control measures identified in **AQ- SC3** that would be applicable to reducing fugitive dust from ongoing operations; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit ~~traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition,~~ vehicle speed ~~shall be limited~~ to no more than 10 miles per hour on ~~these~~ unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent, with or without the use of geotextiles, that can be determined to be both as or more efficient for fugitive dust control than ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM and the District for review and approval a copy of the plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed

limit signs. Within 60 days after commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC9 through AQ-SC16 should be deleted as they are only applicable to the solar components which have been eliminated.

AQ-SC18 and AQ-SC19 should be revised to reflect the offset requirements from the PEP annual emissions

AQ-SC18 The project owner shall demonstrate to the satisfaction of the CPM that adequate emission reduction credits have been purchased prior to start of construction of the project. The project emissions of **139.99** ~~115~~ and **51.64**~~40~~ tons per year of NOx and VOC, respectively, shall be offset at a ratio of 1.3 to one for ERC's within the MDAB or areas in the SJVAB that are within 15 miles of the AVAQMD western boundary (**181.997**~~149.5~~ and **57.13** ~~52~~ tons per year for NOx and VOC, respectively). If ERCs are obtained from locations greater than 15 miles from the western portion of the AVAQMD, an offset ratio of 1.5 to one shall be utilized for those offsets.

Verification: The project owner shall submit to the CPM a copy of all ERCs to be surrendered to the District at least 60 days prior to start construction. Construction shall not begin until the CPM has approved all ERCS. This approval shall be done in consultation with the District.

AQ-SC19 The project owner shall provide **92.4** ~~137~~ tons per year of PM10 ERCs (**81.01** ~~128~~ tons per year for PM10 emissions and **11.39** ~~9~~ tons per year for PM10-precursor SOx emissions) that are banked consistent with the Rules and Regulations of the AVAQMD. Should the project owner pursue road paving as the method to obtain the necessary PM10 ERCs, the project owner shall pave, with asphalt concrete that meets the current county road standards, unpaved local roads to provide emission reductions of **92.4** ~~137~~ tons per year of PM10, prior to start of construction of the project. The project owner shall submit a road paving plan that includes a list and pictures of candidate roads to be paved, their actual daily average traffic count including classifications of vehicles (ADT), and daily vehicle miles travel (DVMT), their actual road dust silt content,

and calculations showing the appropriate amount of emissions reductions due to paving of each road segment. Calculations of PM10 emission reduction credits shall be performed in accordance with Sections 3.2.1 and 13.2.2 of the U.S. EPA's AP-42 "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources", Fifth Edition.

Verification: At least 30 days prior to start of construction, the project owner shall submit documentation showing that the project has obtained 92.4 tons of banked PM10 ERCs. If the project owner chooses to use road paving to obtain the necessary ERCs, the project owner shall submit to the CPM for review and approval, the road paving plan 30 days prior to submittal of the plan to the AVAQMD. Construction shall not begin until the CPM has approved all ERCs. This approval shall be done in consultation with the District. All paving of roads done for PM10 offset purposes shall be completed at least 15 days prior to start construction of the project.

As shown in Table 4.1-33 the Commissioning emissions will no longer cause a violation according to the new commissioning plan. Therefore Condition of Certification AQ-SC20 is no longer necessary to mitigate impacts and should be deleted.

4.1.7 Public Health

This section presents the methodology and results of a human Health Risk Assessment (HRA) performed to assess potential effects and public exposure associated with airborne emissions from the routine operation of the Palmdale Energy Project (PEP or Project). Section 4.1.7.1 describes the affected environment. Section 4.1.7.2 discusses the environmental consequences from the operation of the power facility and associated facilities. Section 4.1.7.3 discusses cumulative effects. Section 4.1.7.4 discusses mitigation measures. Section 4.1.7.5 presents applicable laws, ordinances, regulations, and standards (LORS), permit requirements, schedules, and agency contacts. Section 4.1.8 contains references cited or consulted in preparing this section.

Palmdale Energy Project, LLC, the Applicant, is proposing to construct and operate a 645 MW (nominal rated) combined-cycle power plant consisting of three Siemens SGT6-5000F Combustion Turbine Generators with duct firing; a steam turbine, an auxiliary boiler for fast start capability, an emergency fire pump system, and an emergency electrical generator set; and associated support equipment. The facility will be equipped with dry cooling technology. A complete description of the proposed facility is presented in Section 2.0.

Air will be the dominant pathway for public exposure to chemical substances released by the Project. Emissions to the air will consist primarily of combustion by-products produced by the new combustion turbine and emergency diesel equipment. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling, however, direct inhalation is considered the most likely exposure pathway. The HRA was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board (CARB).

Combustion byproducts with established California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS), including nitrogen oxides (NO_x), carbon monoxide (CO), and fine particulate matter (PM_{10}/$PM_{2.5}$) are addressed in Section 4.1, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in the Hazardous Materials Handling section.

4.1.7.1 Affected Environment

The project is located in the Antelope Valley, which forms the western tip of the Mohave Desert. The topography of the area is characterized as high desert with very little variation in terrain until the desert abuts the mountain ranges. The project site is located about 10 kilometers (km) northeast of the San Gabriel Mountains, which separate Antelope Valley from the City of Los Angeles, and 50 km southeast of the Tehachapi Mountains, which separate Antelope Valley from the San Joaquin Valley. The proposed project site is located in northern Los Angeles County just west-northwest of the Palmdale-Air Force Plant 42 Complex. The location is in the northern portion of the city of Palmdale and near the southern boundary of the city of Lancaster.

The site is situated in Los Angeles County census tract 9800.04.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools, both public and private, day care facilities, convalescent homes, and hospitals are of particular concern. A partial list of the nearest sensitive receptors based upon receptor type, are listed in Table 4.1-37. Appendix 4.1D, delineates data on the population by census tract within a 6-mile radius of the site, as well as a comprehensive list of sensitive receptors analyzed in the HRA.

Table 4.1-37
Nearest Sensitive Receptors By Receptor Type

Receptor Type	UTM Coordinates (E/N), m	Elevation, ft AMSL
Residence-North	397665, 3835984	2472
Residence-South	398134, 3829028	2606
Residence-East	404685, 3832278	2513
Residence-West	394220, 3832614	2596
Worker	397889, 3834469	2514
School	397951, 3837174	2446
Hospital/Health Facility	397086, 3837027	2444
Daycare Center	394441, 3837238	2412
Convalescent Home	none	-
Jail/Detention Center	394673, 3839132	2362

Source: All coordinates from Google Earth (center location of each receptor location), converted to NAD83.
[1] The nearest school is approximately 2 miles (10,500 feet) from the site, therefore no AVAQMD Risk notifications are required.
See Appendix 4.1D for a complete list of sensitive receptors analyzed in the HRA.

Air quality and health risk data presented by CARB in the 2008 Almanac of Emissions and Air Quality for the state shows that over the period from 1990 through 2008, the average concentrations for the top 10 toxic air contaminants (TACs) have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in the Mojave Desert Air Basin (MDAB). CARB-estimated emissions inventory values for the top 10 TACs for 2008 are presented in Table 4.1-38. Data for years subsequent to 2008 is not available from CARB at this time. The applicant is not aware of any recent (within the last 5 years) public health studies related to respiratory illnesses, cancers or related diseases concerning the local area within a 6 mile radius of the proposed site. Several studies have been conducted in the Antelope Valley Service Planning Area 1 (AVSPA1). These studies were conducted or completed in 2004 and 2005. The CARB study completed in 2004 concentrated on chronic adverse respiratory effects in elementary school children and the potential for new cases of asthma. A 2005 study by the Los Angeles County DPH estimated lung cancer rates in the service planning area at 46.9 per 100,000 population. Another DPH study in 2005 found that the service area had the highest asthma rate in the county.

Table 4.1-38
Top 10 Toxic Air Contaminants for the MDAB

TAC	Statewide Year 2008 Emissions (tons/yr)	MDAB Year 2008 Emissions (tons/yr)	Predicted Cancer Risk[1], per 10^6
Acetaldehyde	9103	349	ND
Benzene	10794	397	ND
1,3 Butadiene	3754	111	ND
Carbon tetrachloride	4.04	0.07	ND
Chromium 6	0.61	0.02	ND
Para-Dichlorobenzene	1508	-	ND
Formaldehyde	20951	799	ND
Methylene Chloride	6436	-	ND
Perchloroethylene	4982	-	ND
Diesel PM	35884	1450	ND
Source: California Almanac of Emissions and Air Quality-2008, CARB-PTSD.			

4.1.7.2 Environmental Consequences

4.1.7.2.1 Significance Criteria

Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health effect. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in a million due to a project is considered to be a significant effect on public health. For example, the 10 in a million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

Non-Cancer Risk

Non-cancer health effects can be classified as either chronic or acute. In determining the potential health risks of non-cancerous air toxics, it is assumed there is a dose of the chemical of concern below which there would be no effect on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the

calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this HRA, all hazard quotients were summed regardless of target organ. This method leads to a conservative, upper-bound assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated July 2014 (Consolidated Table of OEHHR/ARB Approved Risk Assessment Health Values).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the exposure duration is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by the acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposures to air toxics.

4.1.7.2.2 Construction Phase Effects

The construction phase of the Project is expected to take approximately 24 months (followed by several months of startup and commissioning). No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 4.1.7.5). In addition, mitigation measures to reduce air emissions from construction effects will be implemented as described in Section 4.1, Air Quality, and Appendix 4.1E.

Temporary emissions from construction-related activities are discussed in Section 4.1, Air Quality and Appendix 4.1E. Construction-related emissions are temporary and localized, resulting in no long-term effects to the public.

Small quantities of hazardous waste may be generated during the construction phase of the Project. Hazardous waste management plans will be in place so the potential for

public exposure is minimal. Refer to the Waste Management, for more information. No acutely hazardous materials will be used or stored on-site during construction (see the Hazardous Materials Handling section). To ensure worker safety during construction, safe work practices will be followed (see the Worker Safety section).

4.1.7.2.3 Operational Phase Effects

Environmental consequences potentially associated with the operation of the Project are potential human exposure to chemical substances emitted to the air. The human health risks potentially associated with these chemical substances were evaluated in a HRA. The chemical substances potentially emitted to the air from the Project turbine/HRSGs, aux boiler, and IC engines are listed in Table 4.1-39.

Table 4.1-40
Chemical Substances Potentially Emitted to the Air from the Project

Criteria Pollutants
Particulate Matter
Carbon Monoxide
Sulfur Oxides
Nitrogen Oxides
Volatile Organic Compounds
Lead
Noncriteria Pollutants (Toxic Pollutants)
Ammonia
PAHs
Acetaldehyde
Acrolein
Benzene
1-3 Butadiene
Ethylbenzene
Formaldehyde
Hexane (n-Hexane)
Naphthalene
Propylene
Propylene Oxide
Toluene
Xylene
Diesel Particulate Matter

Tables 4.1-40 and 4.1-41 present the estimated toxic pollutant emissions from the facility processes.

Table 4.1-40
Toxic Pollutant Emissions Estimates (lbs/hr)

Pollutant/Device	Turbine 1	Turbine 2	Aux Boiler	Fire Pump	Emergency Generator
Ammonia	17.20	17.20	-	-	-
PAHs	0.000116	0.000116	0.0000107	-	-
Acetaldehyde	0.066	0.066	0.0000967	-	-
Acrolein	0.00911	0.00911	0.0000859	-	-
Benzene	0.00641	0.00641	0.000183	-	-
1-3 Butadiene	0.0000612	0.0000612	-	-	-
Ethylbenzene	0.00863	0.00863	0.000215	-	-
Formaldehyde	1.10	1.10	0.000387	-	-
Hexane	0.125	0.125	0.00014	-	-
Naphthalene	0.0008	0.0008	0.0000322	-	-
Propylene	0.372	0.372	0.00166	-	-
Propylene Oxide	0.023	0.023	-	-	-
Toluene	0.0342	0.0342	0.000838	-	-
Xylene	0.0126	0.0126	0.000623	-	-
Diesel PM	-	-	-	0.0679	0.399

Table 4.1-41
Toxic Pollutant Emissions Estimates (lbs/year)

Pollutant/Device	Turbine 1	Turbine 2	Aux Boiler	Fire Pump	Emergency Gen
Ammonia	138000	138000	-	-	-
PAHs	0.850	0.850	0.0525	-	-
Acetaldehyde	483	483	0.472	-	-
Acrolein	66.60	66.60	0.420	-	-
Benzene	46.90	46.90	0.892	-	-
1-3 Butadiene	0.448	0.448	-	-	-
Ethylbenzene	63.1	63.1	1.05	-	-
Formaldehyde	8080	8080	1.89	-	-
Hexane	913	913	0.682	-	-
Naphthalene	5.85	5.85	0.157	-	-

Propylene	2720	2720	8.13	-	-
Propylene Oxide	169	169	-	-	-
Toluene	250	250	4.09	-	-
Xylene	92	92	3.04	-	-
Diesel PM	-	-	-	3.50	10.4

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 4.1, Air Quality. The Project also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under Mojave Desert Air Quality Management District (AVAQMD) rules. Offsets will be required because the Project will be a major source under the Districts NSR rule. Finally, air dispersion modeling results (presented in Section 4.1, Air Quality) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the Project is not anticipated to have a significant effect on public health from emissions of criteria pollutants.

Potential effects associated with emissions of toxic pollutants to the air from the Project are summarized in Appendix 4.1D. The HRA was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the Hotspots Analysis and Reporting Program (HARP2) model (Version 2.0.3).

4.1.7.2.4 Public Health Effect Study Methods

Emissions of toxic pollutants potentially associated with the Project were estimated using emission factors approved by CARB and the U.S. Environmental Protection Agency (USEPA). Concentrations of these pollutants in air potentially associated with Project emissions were estimated using the HARP dispersion modeling module. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in an HRA, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in the air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR). The hypothetical MEI is an individual assumed to be located at the MIR location, which is a residential receptor where the highest concentrations of air pollutants associated with Project emissions are predicted

to occur, based on the air dispersion modeling. Human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any location in the vicinity of the Project. The highest offsite concentration location represents the MIR.

Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in the air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in the air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in the air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in the air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in the air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB, 7/2014), and are presented in Table 4.1-42.

Table 4.1-42
Toxicity Values Used to Characterize Health Risks (Inhalation)

Compound	Unit Risk Factor ($\mu g/m^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)	8 Hr Reference Exposure Level ($\mu g/m^3$)
Ammonia	-	200	3,200	-
Acetaldehyde	0.0000027	140	470	300
Acrolein	-	0.35	2.5	0.7
Benzene	0.000029	3	27	3
1-3 Butadiene	0.00017	2	660	9
Ethylbenzene	0.0000025	2,000	-	-
Formaldehyde	0.000006	9	55	9
Hexane	-	7,000	-	-
Naphthalene	0.000034	0	-	-
PAHs (as BaP)	0.0011	-	-	-
Propylene	-	3,000	-	
Propylene Oxide	.0000037	30	3,100	-
Toluene	-	300	37,000	-
Xylene	-	700	22,000	-
Diesel Particulate	0.0003	5	-	-
Source: CARB/OEHHA, 7/2014.				

Emissions of the various toxic and/or hazardous air pollutants are delineated in detail in Appendix 4.1A.

4.1.7.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the Project MIR location is estimated to be 3.284×10^{-6}. Excess lifetime cancer risks at this level are unlikely to represent significant public health effects that require additional controls of facility emissions. Risks higher than 1×10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed in Table 4.1-43, Health Effects Significant Threshold Levels for AVAQMD. Risks associated with pollutants potentially emitted from the Project are presented in Table 4.1-44. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 4.1D. As described previously, human health risks associated

with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the Project.

Table 4.1-43
Health Effects Significant Threshold Levels for AVAQMD

Risk Category	Risk Threshold
Moderate Risk	>1 x 10^{-6}
Significant Risk	>=100 x 10^{-6} HI >= 10
Significant Health Risk	>=10 x 10^{-6} HI >= 1
Cancer Burden	>=0.5 If population is exposed to risk at >= 1x10^{-6}
Source: Per AVAQMD Rule 1401.	

Table 4.1-44
Project HRA Summary

	Turbines w/DBs, Fire Pump, Gen Set, Aux Boiler	
Risk Category	**MIR Project Values**	**Applicable Significance Threshold**
Cancer Risk	3.284 x 10^{-6}	See values in Table 4.1-44.
Chronic Hazard Index	0.0154	
Acute Hazard Index	0.0271	
Cancer Burden	0.0012	
Source: Palmdale Energy Project Team, 2015. Notes: [1] MIR effect area lies within Tract 9800.04.MIR receptor lies at the eastern edge of the facility site in vacant land.		

To evaluate population risk, regulatory agencies have used the cancer burden as a method to account for the number of excess cancer cases that could potentially occur in a population. The population burden can be calculated by multiplying the cancer risk at a census block centroid times the number of people who live in the census block, and adding up the cancer cases across the zone of impact. A census block is defined as the smallest entity for which the Census Bureau collects and tabulates decennial census

information; it is bounded on all sides by visible and non-visible features shown on Census Bureau maps. A centroid is defined as the central location within a specified geographic area.

Cancer burden is calculated on the basis of lifetime (70 year) risks. It is independent of how many people move in or out of the vicinity of an individual facility. The number of cancer cases is considered independent of the number of people exposed, within some lower limits of exposed population size, and the length of exposure (within reason). For example, if 10,000 people are exposed to a carcinogen at a concentration with a 1x10-5 cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1 x 10-5 risk the cancer burden is 1.

There are different methods that can be used as measure of population burden. The number of individuals residing within a 1×10^{-6}, 1×10^{-5}, and/or 1×10^{-4} isopleth is another potential measure of population burden. The approach used herein is based on this method using the 1×10^{-6} isopleth distance and the estimated population values within that established radius. Appendix 4.1D presents the data assumptions used to calculate cancer burden for the project.

As described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 3.284×10^{-6}. The estimated cancer burden was ~0.0012, indicating that emissions from the Project would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the Rule 1401 threshold values. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that Project emissions are unlikely to represent a significant public health effect in terms of cancer risk.

The acute and chronic hazard quotients associated with concentrations in air are shown in Table 4.1-10. The acute and chronic hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant effect to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in the *HARP-2 Users Guides (CARB)* as well as the *OEHHA 2015 Air Toxics Hot Spots Health Risk Assessment Guidance* document. As described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in the air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the Project.

Detailed risk and hazard values are provided in the HARP-2 output presented in Appendix 4.1D, (electronic files on CD).

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans. In other words, the assumption is that humans are as sensitive as the most sensitive animal species. Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration to use quantitative HRA for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose," has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one in a million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four in ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the Project MIR are well below the 10×10^{-6} significance level, and the aggregated cancer burden associated this risk level is less than 0.5 excess cancer case. In addition, the cancer burden is less than the State of California recommended threshold value of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the Project emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstates the risks from Project emissions. Based on the results of this

HRA, there are no significant public health effects anticipated from emissions of toxic pollutant to the air from the Project.

4.1.7.2.6 Hazardous Materials

Hazardous materials may be used and stored at the Project Site. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in the Hazardous Materials Handling section. Use of chemicals at the Project Site will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant effects to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate off-site could result in potential effects to the public.

The California Accidental Release Program regulations (CalARP) and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. Any RMP-listed materials proposed to be used at the Project are discussed in the Hazardous Materials Handling section.

The proposed new turbines Selective Catalytic Reduction (SCR) systems will use an on-site ammonia storage and distribution systems. New storage tanks for substances such as ammonia for the SCR system will be installed for the new turbines. An off-site consequence analysis will be performed to assess potential risks to off-site human populations if a spill were to occur.

4.1.7.2.7 Operation Odors

The Project is not expected to emit or cause to be emitted any substances that could cause odors.

4.1.7.2.8 Electromagnetic Field Exposure

Electromagnetic fields (EMFs) occur independently of one another as electric and magnetic fields at the 60- Hertz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when the electric charges are moving. The magnitude of both electric and magnetic fields falls off rapidly as the distance from the source increases (proportional to the inverse of the square of distance).

Because the electric transmission line does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), EMF exposures are not expected to result in a significant effect on public health. The NIEHS report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm" (NIEHS 1999).

California does not presently have a regulatory level for magnetic fields. However, the values estimated for the Project are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 milligauss to 250 milligauss at the edge of the right-of-way, depending on voltage. The California Energy Commission does not presently specify limits on magnetic fields for standard types and sizes of transmission lines.

4.1.7.2.9 Legionella

The proposed facility will not have any wet cooling towers, but rather a dry cooling system with an air cooled condenser. Therefore Legionella is not an issue of concern and no mitigations are required at this time.

4.1.7.2.10 Summary of Effects

Results from the air toxics HRA based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the Project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM_{10} will not significantly affect air quality (Section 4.1, Air Quality). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

4.1.7.3 Cumulative Effects

The HRA for the Project indicates that the maximum cancer risk will be approximately 3.284×10^{-6} at the point of maximum exposure to air toxics from power facility emissions. The project risk level is well below the AVAQMD "significant risk" and "significant health risk" thresholds. Non-cancer chronic and acute effects, i.e. hazard index values, are also well below the AVAQMD significance thresholds, as is the estimated cancer burden rate.

An analysis of the cumulative impacts of the Project, per CEC practice based on modeling studies conducted by staff, is only required if the proposed facility is generally within 0.5 miles of another existing large toxics emissions source. No such sources were identified within the default distance of 0.5 miles. The AVAQMD identified two neighboring facilities, Lockheed Martin and Northrop Grumman that have been evaluated for health risk impacts in the recent past. Each of these facilities is well over 2 miles from the project site. The evaluation of these two facilities was conducted by the AVAQMD using a prioritization score method. The facility prioritization score for the two facilities are 9.927 and 4.088 respectively. AVAQMD ranked these facilities as intermediate priority, not requiring a detailed HRA. In addition, neither of these facilities meets the federal emissions threshold definition for a major source of HAPs, i.e., 10 tpy of a single HAP, or 25 tpy total of all HAPs. Based on the priority scores of these two stationary sources, and the distances of each from the project site, the background health risk impacts would not be significant in the area neighboring the Project power plant site. In addition, the cancer risks and non-cancer health impacts estimated for the PEP using conservative assumptions are below significance with minimal predicted impacts to offsite receptors.

Therefore, a significant cumulative increase in health risk impacts is not predicted to occur due to the operation of the PEP. It should be noted that Plant 42 is listed as a separate entity in the CARB toxics emissions inventory, but no toxic emissions are noted for this facility, and total organic emissions are listed as 0.1 tpy, thus this source would be insignificant for toxics emissions. Appendix 4.1D contains the 2012 AB2588 air toxics emissions inventory listings for the Lockheed and Northrop facilities.

In 1998, the OEHHA listed DPM, a primary combustion product from diesel engines, as a TAC, based on its potential to cause cancer, premature deaths, and other health problems. According to ARB and EPA, mobile source emissions account for much of the sources of cancer risk associated with TAC. According to EPA estimates, mobile sources (e.g., cars, trucks, and buses) of TAC account for as much as half of all cancers attributed to outdoor sources of TAC. More recent research illustrates that health risks from DPM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. Additionally, the MATES-III (2008) study conducted by the South Coast Air Quality Management District (SCAQMD) showed that mobile sources in the South Coast Air Basin represent the greatest contributors to the estimated cancer risks (about 84 percent).

Standards have been adopted by ARB and EPA to reduce DPM emissions from new on-road heavy-duty vehicles. EPA estimates that, when fully implemented, the program is predicted to result in particulate emission levels and the corresponding health impacts that are approximately 95 percent below baseline levels. In addition, ongoing Federal

and State diesel motor vehicle emission reduction programs are in place and will continue to significantly reduce DPM emissions. These programs indicate that the Project's potential health impact will not be cumulatively significant.

4.1.7.4 Mitigation Measures

4.1.7.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the Project. BACT for the turbines, auxiliary boiler, emergency gen set engine, and fire pump engine, is delineated in Appendix 4.1F.

The Project location is in an area that is designated by the federal air agencies as non-attainment for ozone and unclassified-attainment for particulate matter. Pursuant to AVAQMD New Source Review Rule, offsets are required for the Project. Therefore, further mitigation of emissions is not required to protect public health.

4.1.7.4.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of BACT/T-BACT at the Project.

Condition of Certification PUBLIC HEALTH-1

Since the project is not proposing the use of wet cooling towers, there is no need at this time for the development of a Legionella mitigation plan and therefore Condition of Certification **PUBLIC HEALTH-1** can be deleted. Although the PEP will have evaporative coolers for each combustion turbine inlet air system, each with a small basin, the intent of the basin is not to provide an inventory of water as is the case with a cooling tower basin. When the feed water to the evaporative coolers is turned off, the basin(s) is/are allowed to empty. The evaporative cooler media and basins are on the downstream side of the inlet filters and are in a locked portion of the filter house, accessible only to maintenance personnel.

4.1.7.4.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in the Hazardous Materials Handling section. Potential public health effects from the use of hazardous materials are only expected to occur as a result of an accidental release. The facility has many safety features designed to prevent and minimize effects from the use and accidental release of hazardous materials. The Project Site will include the design features listed below.

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of all storage systems will be in accordance with applicable construction standards, seismic standards, and LORS.

If required, a RMP for the facility will be prepared prior to commencement of Project operations. The RMP will estimate the risk presented by handling affected materials at the Project Site. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for Project personnel include power facility evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or to holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

4.1.7.5 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to the Project are identified in Table 4.1-. The conformity of the Project to each of the LORS applicable to public health is also presented in this table, as well as references to the selection locations within this report where each of these issues is addressed. Table 4.5-9 also summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

Table 4.1-45
Summary of LORS – Public Health

LORS	Applicability	Primary Regulatory Agency	Project Conformance	Conformance (AFC Section)
Federal Clean Air Act Title III	Public exposure to air pollutants	USEPA Region 9 CARB AVAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the Project.	4.1.7.1.5, and Appendix 4.1D
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings.	4.1.7.1.5, 4.1.7.1.6, 4.1.7.3.3, and Appendix 4.1D
40 CFR Part 68 (Risk Management Plan) and CalARP Program Title 19	Public exposure to acutely hazardous materials	USEPA Region 9 Riverside County Dept. of Health Services Riverside County Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. An RMP (if required) will be prepared prior to commencement of Project operations.	4.1.7.1.6, and Appendix 4.1D
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Riverside County Dept. of Health Services CARB AVAQMD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank.	4.1.7.1.6, and Appendix 4.1D
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Riverside County Dept. of Environmental Health	Prepare all required HazMat plans and inventories, distribute to affected agencies	See Hazardous Materials Section 4.3
CHSC 44300 et seq.	AB2588 Air Toxics Program	AVAQMD	Participate in the AB2588 inventory and reporting program at the District level.	Appendix 4.1A, Appendix 4.1D, initial reporting TBD by AVAQMD
AVAQMD Rule 1401	Toxics NSR	AVAQMD	Application of BACT and T-BACT, preparation of HRA	Section 4.1, Section 4.1, Appendix 4.1D
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements.	See Haz Mat Section 4.3

LORS	Applicability	Primary Regulatory Agency	Project Conformance	Conformance (AFC Section)
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB AVAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.	4.1.7.1, Appendix 4.1D

4.1.7.5.1 Permits Required and Schedule

Agency-required permits related to public health include an RMP and AVAQMD Permit to Construct/Permit to Operate. These requirements are discussed in detail in the Hazardous Materials Handling section and section 4.1, Air Quality, respectively.

4.1.7.5.2 Agencies Involved and Agency Contacts

Table 4.1-10 provides contact information for agencies involved with Public Health.

Table 4.1-46
Summary of Agency Contacts for Public Health

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to air pollutants	USEPA Region 9	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	CARB	Mike Tollstrup 1001 1 Street, 19th Floor Sacramento, CA 95814 (916) 322-6026
	AVAQMD	Eldon Easton, APCO 43301 Division St. Suite 206 Lancaster, CA 93535 (661) 723-8070

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long P.O. Box 4010 Sacramento, CA 95812-4010 (916) 445-6900
Public exposure to acutely hazardous materials	USEPA Region 9	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	Los Angeles County FD Hazmat Division	LA County FD/HHMD North County Office 14425 Olive View Dr. Sylmar, CA. 91342 (818) 364-7120
Source: Palmdale Energy Project Team, 2015.		

4.1.8 References

CARB (California Air Resources Board). 2014. Consolidated table of OEHHA/ARB approved risk assessment health values. (http://arbis.arb.ca.gov/toxics/healthval/contable.pdf)

HARP (Hotspots Analysis and Reporting Program) User Guide, Version 2.0.3. CalEPA-Air Resources Board, March 2015.

Hutt. P.B. 1985. Use of quantitative risk assessment in regulatory decision making under federal health and safety statutes, in Risk Quantitation and Regulatory Policy. Eds. D.G. Hoel, R.A. Merrill and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.

National Institute of Environmental Health Sciences (NIEHS). 1999. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health.

OEHHA/CARB (Office of Environmental Health Hazard Assessment/California Air Resources Board). 2003. Air Toxics Hot Spots Program Risk Assessment

Guidelines, CalEPA, August 2003. HARP Model, Version 1.4f and 2.0, Updated February 2015. Section 8.2.1, Table 8.3.

SCAQMD (South Coast Air Quality Management District). 2005. Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588). July 2005.

Travis, C.C., E.A.C. Crouch, R. Wilson and E.D. Klema. 1987. Cancer risk management: A review of 132 federal regulatory cases. Environ. Sci. Technol. 21:415-420.

Risk Science Associates, Inc., Liberty Energy XXIII-Renewable Energy Power Plant Project, Draft EIR, Public Health Section D.11, Aspen Environmental Group, June 2008.

Palmdale Energy Project Team. 2015. Fieldwork, observations, and research

Air and Waste Management Association (AWMA). 2002. Technical Paper #42752. July.

California Air Resources Board (CARB). 1999. Guidance for Power Plant Siting and Best Available Control Technology, PAB-SSD. July.

CARB. 2015. Best Available Control Technology Clearinghouse Program, http://www.arb.ca.gov/bact/bact.htm. August.

CARB. 2015. California Air Quality Data Statistics, 2010-2014 Data, ADAM Database at http://www.arb.ca.gov/adam and AQMIS2 Database at http://arb.ca.gov/aqmis2/aqmis2.php, Air Quality Data Branch, Sacramento, California. June.

CARB. 2009. The 2009 California Almanac of Emissions and Air Quality. CARB, Technical Support Division.

California Energy Commission (CEC). 2015. Energy Facilities Siting/Licensing Process Web Site. http://www.energy.ca.gov/sitingcases/index.html. March.

California State Atlas. 2015. Files of Digital Orthographic Quarter Quadrangles (DOQQ) aerial photographs from http://www.atlas.ca.gov/download.html. June.

Geocommunity website. 2015. Digital Raster Graphics (DRG) files purchased for local and surrounding 1:24000 (7.5') and 1:250,000 (1x2 degree) USGS quadrangle maps at http://data.geocomm.com.

Midwest Research Institute (MRI). 1996. Improvement of Specific Emission Factors (BACM Project No. 1), Final Report. Prepared by Midwest Research Institute for South Coast AQMD. March.

Antelope Valley Air Quality Management District (AVAQMD). 2011. CEQA Air Quality Handbook. August.

AVAQMD website. March 2015. http://www.AVAQMD.ca.gov/.

Nappo et. al. 1982. The Workshop on the Representativeness of Meteorological Observations, Bull. Am. Meteorological Society, 63, 761-764.

National Climatic Data Center (NCDC). 2015. California Climate data — Normals, Means, and Extremes for the Palmdale AF Plant 42.

National Climatic Data Center (NCDC). 2015. NCDC Climate Data Online (CDO), Palmdale ASOS surface data in hourly and 1-minute formats. ftp://ftp.ncdc.noaa.gov/pub/data/noaa/ and ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/.

National Oceanic and Atmospheric Administration (NOAA), Earth System Research Laboratory, 2015. Radiosonde database access for Edwards AFB, Las Vegas, Phoenix, and Tucson. http://raob.fsl.noaa.gov.

U.S. Department of Agriculture Forest Service. 2002. USDA Forest Service Class I Area Information. http://www.fs.fed.us/r6/aq/natarm/r5/. August.

U.S. Environmental Protection Agency (USEPA). 1985. Guideline for Determination of Good Engineering Practice (GEP) Stack Height (Technical Support Document for the Stack Height Regulation) (Revised), EPA-450/4-80-023R. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. June.

USEPA. 1989. 40 CFR Part 51, Appendix W: Guideline on Air Quality Models and CARB (Reference Document for California Statewide Modeling Guideline). April.

USEPA. 1991. Nonroad Engine and Vehicle Emission Study — Report, 21A-2001, Office of Mobile Sources, Washington, D.C. 20460. November.

USEPA. 1992. Workbook for Plume Visual Impact Screening and Analysis (Revised), EPA-454/R-92-023, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. October.

USEPA. 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. October.

USEPA. 1995. Compilation of Air Pollution Emission Factors, Volume I, Fifth Edition; AP-42.

USEPA. 1995. Onsite Meteorological Program Guidance for Regulatory Model Applications, EPA-450/4-87-013, August.

USEPA. 1993. User's Guide to the Building Profile Input Program (Revised), EPA-454/R-93-038, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. October. With February 8, 1995 and April 21, 2004 Addendums.

USEPA. 1997. Addendum to ISC3 User's Guide - The PRIME Plume Rise and Building Downwash Model. Submitted by Electric Power Research Institute, November.

USEPA. 1995. SCREEN3 Model User's Guide, EPA-454/R-95-004, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. September.

USEPA. 2004. User's Guide for the AMS/EPA Regulatory Model - AERMOD, EPA-454/B-03-001, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. September. With May 2014 Addendum.

USEPA. 2004. User's Guide for the AERMOD Terrain Preprocessor (AERMAP), EPA-454/B-03-003, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. October. With March 2011 Addendum.

USEPA. 2004. User's Guide for the AERMOD Meteorological Preprocessor (AERMET), EPA-454/B-03-002, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. November. With May 2014 Addendum.

USEPA. 2009. AERMOD Implementation Guide, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. March 19, 2009.

USEPA. 2008. AERSURFACE User's Guide, USEPA-454/B-08-001, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. January. Revised January 16, 2013.

USEPA. 2014. AERMINUTE User's Instructions (for Version 14337). December.

USEPA. 2010. Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program. Memo from Stephen D. Page, Director, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. June 29, 2010.

USEPA. 2010. General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level. Memo from Anna Marie Wood, Acting Director, Air Quality Policy Division, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. June 28, 2010.

USEPA. 2010. Applicability of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard. Memo from Tyler Fox, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. June 28, 2010.

USEPA. 2011. Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard. Memo from Tyler Fox, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. March 1, 2011.

USEPA. 2014. Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the 1-hour NO_2 National Ambient Air Quality Standard. Memo from R. Chris Owen and Roger Brode, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. September 30, 2014.

USEPA. 2010. Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program. Memo from Stephen D. Page, Director, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. August 23, 2010.

USEPA. 2010. General Guidance for Implementing the 1-hour SO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO_2 Significant Impact Level. Memo from Anna Marie Wood, Acting Director, Air Quality Policy Division, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. August 23, 2010.

USEPA. 2010. Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard. Memo from Tyler Fox, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. August 23, 2010.

USEPA. 2010. Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS. Memo from Tyler Fox, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. February 26, 2010.

USEPA. 2010. Protocol for Modeling of 24-Hour and Annual Impacts Under the New NAAQS. Memo from Erik Snyder and Jeff Robinson to Tyler Fox, Air Quality Modeling Group, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. February 4, 2010.

USEPA. 2010. Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS. Memo from Stephen D. Page, Director, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. March 23, 2010.

USEPA. 2014. Guidance for PM2.5 Permit Modeling. Memo/Document from Stephen D. Page, Director, Office of Quality Planning and Standards, Research Triangle Park, North Carolina 27711. May 20, 2014.

USEPA. 2015. Air Quality Data Statistics, 2012-2014 Data. AirData Database at http://www.epa.gov/airdata. June.

U.S. Geological Survey (USGS). 2015. National Elevation Data (NED) available on the Multi-Resolution Land Characteristics (MRLC) Consortium website at http://www.mrlc.gov/viewerjs/.

USGS. 2015. National Land Cover Dataset compiled from Landsat satellite TM imagery (circa 1992). Statewide Land Use and Land Cover (LULC) files at http://edcftp.cr.usgs.gov/pub/data/landcover/states.

Western Regional Climate Center (WRCC) at the Desert Research Institute, 2015. Monthly Precipitation Data for Palmdale Airport.

4.2 WORKER SAFETY/FIRE PROTECTION

This section discusses the reduction in impacts to worker safety and fire protection for the Modified Project.

4.2.1 Project Changes Related to Worker Safety and Fire Protection

4.2.2 Changes in Environmental Impacts

4.2.2.1 Worker Safety

The relative risks to worker health and safety for all aspects of the Modified Project are similar to the Approved Project, except for the reduced risk due to the elimination of Therminol.

4.2.2.1.1 Construction

For the vast majority of construction activities, the relative risks to worker health and safety are the same as those identified and analyzed by the Commission in the Final Decision. Palmdale Energy and its EPC contractor will employ a comprehensive set of plans and procedures to ensure that all workers adhere to LORS and follow all safety management procedures to mitigate these and other construction related risks. The Conditions of Certification for the Approved Project already incorporate these safety management procedures, plans and LORS and, therefore, will mitigate this and other risks to workers during construction to less than significant levels.

4.2.2.1.2 Operation

With the elimination of Therminol workers no longer have to implement safety measures related to the transportation, storage, use and management of these highly combustible materials. Therefore, the potential impacts to workers during facility operation are less than for the Approved Project.

4.2.2.2 Fire Protection

As described in the Final Decision for the Approved Project, local fire protection services would be provided by Los Angeles County Fire Department. With the elimination of Therminol, the risk of fire is reduced. Therefore, fire-related impacts to the local fire department from the Modified Project are similar or less than those for the Approved Project.

4.2.3 Changes in LORS Conformance and Other Permits

In the Final Decision, the Commission concluded that, with the implementation of the Conditions of Certification, the Approved Project would comply with all applicable LORS. As with the Approved Project, the Modified Project would comply with all applicable LORS, and no new or additional LORS have been identified.

4.2.4 Conditions of Certification

No modifications of Conditions of Certification contained in the Final Decision are proposed to accommodate the Modified Project.

4.3 HAZARDOUS MATERIALS MANAGEMENT

As described in detail below, impacts of the Modified Project to hazardous materials management are expected to be less than or equal to those of the Approved Project and will remain less than significant.

4.3.1 Project Changes Related to Hazardous Materials Management

The Modified Project proposes to eliminate the use of solar trough. The most relevant modifications are that the Modified Project eliminates the storage and use, transportation, and on-site storage of 260,000 of gallons of Therminol, the HTF utilized by the solar trough technology. Therminol was used by the Approved Project throughout the solar field, is flammable and its uses, transport, storage and management and potential for leaks was the focus of the Hazardous Materials analysis during Licensing of the Approved Project. Since the Therminol has been eliminated the Modified Project no longer has Land Treatment Units to handle and contain soil contaminated by spills or leaks of Therminol throughout the solar field.

Hazardous materials used during construction will be the same for the Modified Project as for the Approved Project.

4.3.2 Changes in Environmental Impacts

4.3.2.1 Construction

The types and amounts of hazardous materials to be used during construction for the Modified Project are the same in type and amount as the hazardous materials as contemplated for the Approved Project. Therefore, the Modified Project's impacts to public health and safety associated with the use of hazardous materials during construction would be similar to the impacts from the Approved Project and would remain less than significant.

4.3.2.2 Operations

The types of hazardous materials that would be used during operation under the Modified Project would be less than those assumed for the Approved Project because the HTF would be completely eliminated.

4.3.3 Compliance with LORS

In the Commission Final Decision, the Commission concluded that, with the implementation of the Conditions of Certification, the Approved Project would comply with all applicable LORS. As with the Approved Project, the Modified Project would comply with all applicable LORS, and no new or additional LORS have been identified.

4.3.4 Conditions of Certification

Condition of Certification **HAZ-1** includes a list of the types and quantities of hazardous materials the Modified Project would be allowed to use (Appendix A). The current list in Appendix A should be replaced with the list below.

Hazardous Materials Appendix A
Hazardous Materials Proposed for Use at the PEP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity	Federal Reportable
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: toxic	800 cubic feet	NA
Aqueous Ammonia <20% solution	7664-41-7	NO_X Emissions	Health: high toxicity Physical: corrosive, irritant	30,000 gallons	100 pounds
Boiler Water Treatment Chemicals; may include: Carbohydrazide Diethylhydroxylamine Sodium bisulfite Sodium metabisulfite Sodium sulfite Morpholine, Cyclohexamine, Diethylaminoethanol Aminomethylpropan	Various 497-18-7 3710-84-7 7631-90-5 7681-57-4 7757-83-7 110-91-8 108-91-8 100-37-8 124-68-5 5332-73-0	Oxygen scavenger and neutralizing amine for boiler water treatment.	Health: low to moderate toxicity Physical: varies by ingredient, may be flammable, combustible, and/or corrosive	660 gallons	NA except for Sodium bisulfite: 5,000 pounds
Calcium Oxide (Lime)	1305-78-8	pH Adjustment	Health: low toxicity	4,000 pounds	NA

Carbon Dioxide/ FM200 agent	124-38-9	Fire suppression	Health: low toxicity Physical: non- flammable	24 tons	NA
Diesel Fuel	68476-34-6	Emergency Diesel generator fuel, fire-water pump engine	Health: low toxicity Physical: combustible liquid	2,180 gallons (generator), 300 gallons (fire-water pump	NA
Hydraulic Fluid	None		Health: low to moderate toxicity Physical: Class IIIB combustible	500 gallons in equipment, 110 gallons	NA
Lubrication Oil	64742-65-0	Lubricate rotating equipment	Health: low toxicity	21,000 gallons in equipment, 440 gallons in storage	NA
Mineral Insulation Oil	8042-47-5		Health: low toxicity	65,000 gallons	NA
NALCO Tri-Act 1800 Cyclohexlyamine (5 – 10%) Monoehtonolamine (10 – 30%) Methoxyproplyamnie (10 – 30%)	108-91-8 141-43-5 5332-73-0	Water Treatment Chemical	Health: high toxicity Physical: corrosive, Class II combustible liquid	Plastic Totes, 2 x 400 gallons	NA
NALCO Elimin-Ox Carbohydazide	497-18-7	Water Treatment	Health: moderate toxicity Physical: sensitizer	Plastic Totes, 2 x 400	NA
NALCO Permacare ® PC-7408 Sodium Bisulfite	7631-90-5	Water Treatment Chemical	Health: low toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	5,000 pounds
Natural Gas	74-82-8	Fuel for the CTGs	Health: low toxicity Physical: flammable gas	400 pounds in equipment and piping	NA
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical:	800 cubic feet	NA
Sodium Hydroxide (50%)	1310-73-2	pH control	Health: high toxicity Physical: corrosive	7,500 gallons	1,000 pounds
Sodium Hypochlorite	7681-52-9	biocide	Health: high toxicity Physical: poison-b, corrosive	2,500 gallons	100 pounds
Caustic Soda (50% wt)		Water Treatment		220 gallons	

Inhibitor (Hypersperse or equivalent)		Water Treatment		220 gallons	
PermaClean PC77		Water Treatment		220 gallons	
PermaClean PC98		Water Treatment		220 gallons	
PermaClean PC11		Water Treatment		220 gallons	
Perma Treat PC-191T		Water Treatment		220 gallons	
Hydrochloric Acid (33%)		Water Treatment		220 gallons	

Conditions of Certification **HAZ-2, HAZ-7, and HAZ-9** should be modified as follows to remove the requirements pertaining to the handling and storing of Therminol, which has been eliminated.

HAZ-2 The project owner shall provide a Business Plan, ~~a Spill Prevention, Control, and Countermeasure Plan (SPCC), a Process Safety Management Plan (PSMP~~) and a Risk Management Plan (RMP) to the Health Hazardous Materials Division of the Los Angeles County Fire Department and the CPM for review. After receiving comments from the Health Hazardous Materials Division of the Los Angeles County Fire Department and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final plans shall then be provided to the Health Hazardous Materials Division of the Los Angeles County Fire Department for information and to the CPM for approval.

Verification: At least 30 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval.

At least 30 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

~~At least 30 days prior to delivery of Therminol to the site, the project owner shall provide the final PSM Plan and SPCC Plan to the CUPA for information and to the CPM for approval.~~

~~**HAZ-7** The project owner shall place an adequate number of isolation valves in the Heat transfer Fluid (HTF) pipe loops so as to be able to isolate a solar panel loop in the event of a leak of fluid such that the volume of a total loss of HTF from that isolated loop will not exceed 1,250 gallons. These valves shall be capable of being actuated manually and remotely. The engineering design drawings showing the number, location, and type of isolation valves shall be provided to the CPM for review and approval prior to the commencement of the solar array construction.~~

~~**Verification**: At least 60 days prior to the commencement of solar array construction, the project owner shall provide the design drawings as described above to the CPM for review and approval.~~

HAZ-9 The project owner shall prepare a site-specific Security Plan for the operational phase and shall submit it to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described as below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high around the Power Block ~~and Solar Field~~ and meet the requirements specified in Condition of Certification **BIO-11**;

2. Main entrance security gate, either hand operable or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;

6. a. A statement (refer to sample, attachment "A") signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

   b. A statement(s) (refer to sample, attachment "B") signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractor personnel that visit the project site.

7. Site access controls for employees, contractors, vendors, and visitors;

8. A statement(s) (refer to sample, attachment "C") signed by the owners or authorized representative of ~~Therminol, hydrogen~~, 93 percent sulfuric acid, and aqueous ammonia transport vendors certifying that they have prepared and implemented security plans in conformity with 49 CFR 172.802, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed Circuit TV (CCTV) monitoring system able to pan, tilt, and zoom (PTZ), recordable, and viewable in the power plant control room and security station (if

separate from the control room) providing a view of the main entrance gate, the entrance to the control room, and the ammonia storage tank but angled and physically restricted so as to not view or record any activity at Air Force Plant 42; and

10. Additional measures to ensure adequate perimeter security consisting of either:

    1. a. Security guard(s) present 24 hours per day, seven days per week, or

    2. b. Power plant personnel on-site 24 hours per day, seven days per week and:

        ~~1)~~ The ~~northern and western sections of the~~ perimeter fence ~~around the solar array~~ shall be viewable by the CCTV system;

        ~~2) have perimeter breach detectors or on-site motion detectors for all fence lines. The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power plant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.~~

Verification: At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify the CPM that a site-specific Operations Site Security Plan is available for review and approval. In the Annual Compliance Report, the project owner shall include a

statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

4.4 WASTE MANAGEMENT

This section describes the changes proposed by the Modified Project that may affect the analysis, conclusions or Conditions of Certification of the Final Decision for the Approved Project.

4.4.1 Project Changes Related to Waste Management

The changes proposed by the Modified Project relevant to waste management are the elimination of the wastes associated with the solar field's use of Therminol, the elimination of the cooling tower and its associated sludge, and the reduction in the length of the sanitary sewer pipeline.

4.4.2 Changes in Environmental Impacts

4.4.2.1 Construction

The types and quantities of wastes generated and the management methods for such wastes during construction of the Modified Project would be consistent with the wastes and management methods contemplated for the Approved Project. For both the Approved Project and the Modified Project, solid waste, non-recyclable waste, and hazardous and non-hazardous waste would be treated in a similar manner. Therefore, the Modified Project's waste management impacts would be less than or equal to impacts under the Approved Project and would be less than significant.

4.4.2.2 Operations

The types of wastes generated and the management methods for such wastes during operation of the Modified Project would be consistent with the wastes and management methods contemplated for the Approved Project, with the exception that waste associated with the use of Therminol and cooling tower sludge will be eliminated. Therefore, the Modified Project's waste management impacts from operation are anticipated to be less than or equal to the impacts under the Approved Project and would continue to be less than significant.

4.4.3 Changes in LORS Conformance and Other Permits

In the Final Decision the Commission concluded that, with the implementation of the Condition of Certification, the Approved Project would comply with all applicable LORS. As with the Approved Project, the Modified Project would comply with all applicable LORS, and no new or additional LORS have been identified. The Modified Project

would no longer be required to comply with LORS which address the delivery, storage, handling and disposal of Therminol-related wastes.

4.4.4 Changes in Conditions of Certification

Condition of Certification **WASTE-11** should be deleted because it is only applicable to the use of Therminol, which has been eliminated. Condition of Certification **WASTE-12** should also be deleted because it is only applicable to cooling tower sludge which has been eliminated with removal of the cooling tower and replacement with an Air Cooled Condenser.

Section 5 ENVIRONMENTAL ANALYSIS

The following sections provide a description of the modifications proposed to the PHPP as they may affect the assumptions, rationale, and Conditions of Certification in the Final Decision. In general, all of the impacts related to ground disturbing activities are reduced because the overall footprint of the Modified Project encompasses less acreage than the Approved Project.

The overall footprint of the facility is entirely within the boundaries of the Approved Project except for extending one of the Approved generation tie-line routes approximately 1,800 feet along East Avenue M.

The Modification will reduce the amount of water consumed during operations to approximately 7% of the amount of the Approved Project.

The following sections evaluate these and other reduction in impacts.

5.1 BIOLOGICAL RESOURCES

The following paragraphs describe the characteristics of the Modified Project that could affect biological resources in a different manner than the Approved Project.

5.1.1 Project Changes Related to Biological Resources

The primary modification related to biological resources includes the elimination of the solar field and reduction of the on-site project footprint from 333 acres (and 50-acre temporary construction laydown and parking area) to 50 acres (and a 20-acre temporary construction laydown and parking area). Additionally, all of the solar components have been eliminated.

5.1.2 Changes in Environmental Impacts

5.1.2.1 Construction

The Final Decision classified the Approved Project site and linears by habitat type and fully evaluated all impacts of construction to biological resources. The primary change to that analysis involves reduction of impacted acreages.

The Final Decision concluded at Finding 2, page 7.1-33:

> 2. The project has the potential to result in significant impacts on the desert tortoise, Mohave ground squirrel, burrowing owl, arroyo toad, Swainson's hawk, Joshua tree woodland, and other common and special-status animal and plant species.

The Final Decision found that with the implementation of the Conditions of Certification biological resources impacts would be mitigated to less than significant levels and would comply with applicable LORS.[8] The Final Decision, at page 7.1-33, outlined the following habitat mitigation strategy to determine habitat compensation requirements and security amounts:

> 3. The habitat mitigation strategy of 2:1 ratio for the power plant site and 3:1 ratio for the linear facilities, requiring the acquisition and maintenance of at least 665 acres, is adequate to compensate for the permanent loss of habitat for Swainson's hawk, desert tortoise,

[8] Final Decision, 7.1-34.

and Mohave ground squirrel caused by construction and operation of the project.

The 665 acres of habitat compensation for Mohave Ground Squirrel (MGS) was based on a site acreage with suitable habitat of 299.7 acres. This was multiplied by the 2 to represent the 2:1 habitat compensation ratio for a total of 599.4 acres required habitat compensation for the plant site

The transmission facilities were estimated to disturb 21.84 acres. This was multiplied by 3 to represent the 3:1 habitat compensation for linear facilities for a total of 65.5 acres for the transmission line.

Table 5.1-1 provides the disturbance acreages calculations for the Modified Project.

Table 5.1-1
On-Site Disturbance Acreage Calculations

Site	50.8 acres
Access Road and Utility	3.2 acres
Emergency Access Road	0.97 acres
Less 45 foot set- back (50-5 for fence)	-5.47 acres
Total acres	49.5

For calculating on-site habitat compensation requirements we have rounded the total disturbance of 49.5 acres up to 50 acres.

The temporary construction laydown and parking area for the Modified Project would be restored and therefore is not included in the habitat compensation requirements for the Modified Project.

The 1,800 foot extension of the transmission line along Avenue M would involve three additional transmission poles for a total disturbance of approximately 0.25 acres. Therefore the total permanent disturbance for the Modified Project would be 72.09 acres.

Using the same ratios outlined in the Final Decision for MGS would require 100 acres MGS habitat compensation for the site and 66.25 acres for the linear facilities (3 times 0.25 acres equals 0.75 acres added to the 65.5 acres).

Therefore, the total MGS habitat compensation mitigation for the Modified Project would be reduced from 665 acres to 166.25 acres (100 plus 66.25).

The Final Decision used a 2:1 ratio for Swainson Hawk calculations. Therefore, the total Swainson Hawk habitat compensation mitigation for the Modified Project would be reduced from 610 acres to 144.2 acres (72.1 acres times 2).

The Final Decision contained Tables 4a and 4b to calculate security requirements for the habitat mitigation. The tables are modified below with the new security amounts based on the revised disturbance and mitigation amounts. In addition a column has been added to the tables so that Staff can review the calculation methods used.

Biological Resources Table 4a
Swainson's Hawk Compensation Cost Estimate[1]

	Task	Cost per Acre	Cost
1.	Land Acquisition ~~305~~ **72.1** acres at 2:1 ratio= **144.2** ~~610~~ acres	$10,000 per acre[2]	**$1,442,000**
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]	**$9,000**
3.	Appraisal	$5000 per parcel	**$15,000**
4.	Initial site work - clean-up, enhancement, restoration	$250 per acre[4]	**$36,050**
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction	**$15,000**
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel	**$15,000**
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)	**$144,200**
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels.	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)	**$253,071**
	SUBTOTAL *- Acquisition & Initial Site Work*	***~~$8,116,050.00~~***	***$1,929,321***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]	**$209,090**
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***~~$9,000,550.00~~***	***$2,138,411***
	NFWF Fees		

10.	Establish the project specific account	n/a (presumes establishment of Mohave ground squirrel account for project)	
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL	**$64,153**
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund	**$2,091**
13.	Call for and Process Pre-Proposal Modified RFP	n/a (presumes establishment of Mohave ground	
	***TOTAL** for deposit in REAT-NFWF Project Specific Account*	~~***$9,252,876.50***~~	***$2,204,655***

1. Estimates prepared in consultation with CDFG. All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
2. Based on mean of data provided by CDFG for land acquisition in Los Angeles County. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project- specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note:
3. regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
4. For the purposes of determining costs, an average parcel is 60 acres (based on input from DFG).
5. Based on information from CDFG.
6. Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition. (Ex. 300, p. 4.2-55.)

Biological Resources Table 4b

Mohave Ground Squirrel Compensation Cost Estimate[1]

	Task	**Cost per acre**	**Cost**
1.	Land Acquisition (total of ~~665~~ **166.25** acres) 2:1 ratio on power plant site 3:1 on transmission line	$10,000 per acre[2]	**$1,662,500**
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]	**$9,000**
3.	Appraisal	$5000 per parcel	**$15,000**
4.	Initial site work - clean-up, enhancement, restoration	$250 per acre[4]	**$41,563**
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction	**$15,000**
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel	**$15,000**

7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)	**$166,250**
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)	**$291,769**
	***SUBTOTAL** - Acquisition & Initial Site Work*	***~~$8,847,825.00~~***	***$2,216,172***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]	**$240,990**
	***SUBTOTAL** - Acquisition, Initial Site Work, & LTMM*	***$9,812,075.00***	***$2,457,162***
	NFWF Fees		
10.	Establish the project specific account	$12,000	**$12,000**
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL	**$73,715**
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund	**$2,410**
13.	Call for and Process Pre-Proposal Modified RFP	$30,000	**$30,000**
	***TOTAL** for deposit in REAT-NFWF*	***~~$10,141,152~~***	***$2,575,287***

1. Estimates prepared in consultation with CDFG. All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
2. Based on mean of data provided by CDFG for land acquisition in Los Angeles County. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
3. For the purposes of determining costs, an average parcel is 60 acres (based on input from CDFG).
4. Based on information from CDFG.
5. Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition. (Ex. 300, p. 4.2-63)

5.1.2.2 Operations

The primary change in operational impacts for the Modified Project is the avoidance of potential bird collisions with the solar mirrors and associated components, which have been eliminated.

5.1.3 Changes in LORS Conformance and Other Permits

In the Final Decision the Commission concluded that, with the implementation of the Condition of Certification, the Approved Project would comply with all applicable LORS. As with the Approved Project, the Modified Project would comply with all applicable LORS, and no new or additional LORS have been identified.

5.1.4 Changes in Conditions of Certification

The recommended modifications to the Conditions of Certification reflect elimination of the solar thermal components and the reduction in impact acreages.

Condition of Certification **BIO-14** requires payment of a fee to REAT Regional Raven Management Program. The amount of the fee is based solely on the permanently disturbed acreages. The modification reduces the total disturbance acreage on-site of 333 acres to 50 acres. Therefore the total fee included in Item 2. of the condition should be reduced by 283 acres as follows.

> 2. Contribute to the REAT Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the REAT Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre (~~458.5~~ **72.25** acres) of permanent disturbance fee ~~$48,142.50~~.**7,586.25**

Condition of Certification BIO-17 should be revised to reflect the security amounts and habitat compensation acreages shown in Table 4a.

Condition of Certification BIO-20 should be revised to reflect the security amounts and habitat compensation acreages shown in Table 4b.

Condition of Certification BIO-24 requires monitoring of birds in order to mitigate impacts associated with collisions with solar components. With the elimination of the solar components this condition should be deleted.

Condition of Certification BIO-25 requires a closure plan and was included in the Final Decision consistent with other solar applications before the Commission. With the elimination of the mass grading for the solar component of the Approved Project, the existing compliance and closure requirements implemented by the Commission for similar types of natural gas projects is sufficient to ensure impacts to biological resources are mitigated from closure and decommissioning of the Modified Project. Therefore Condition of Certification **BIO-25** should be deleted.

5.2 SOIL AND WATER RESOURCES

The following paragraphs describe the characteristics of the Modified Project that could affect soil and water resources in a different manner than the Approved Project.

5.2.1 Project Changes Related to Water Resources

5.2.2 Changes in Environmental Impacts

The Final Decision concluded that, with the implementation of the Conditions of Certification, the Approved Project would comply with all applicable LORS, and would not result in any unmitigated and significant direct, indirect or cumulative adverse impacts related to soils and water resources.

The Final Decision addressed three areas within the context of water resources. Those areas are: 1) potential storm water impacts related to flooding/drainage, erosion and sedimentation; 2) water supply and use, including groundwater; and 3) groundwater quality. As described below, in all cases the Modified Project results in less potential impacts than the Approved Project.

5.2.3 Storm Water: Flooding, Erosion and Sedimentation

The Modified Project results in less potential impact than the Approved Project as the project site plus temporary laydown area has been reduced from 377 acres to 70 acres.

5.2.4 Water Supply and Use

Because of the use of an air cooled condenser instead of a cooling tower for process cooling, the makeup water requirement for the Modified Project has been reduced by more than 90% and the Modified Project results in less potential impacts than the Approved Project.

5.2.5 Wastewater

5.2.5.1 Sanitary Wastewater

The sanitary wastewater impacts of the Modified Project are the same as the impacts of the Approved Project.

5.2.5.2 Construction Wastewater

Wastewater generated during construction would consist of similar types and quantities as in the Approved Project.

5.2.5.3 Process Wastewater

The Modified Project will have a small process wastewater stream that is directed to the municipal water treatment system. The Approved Project had a zero liquid discharge system that while it did not have a process wastewater stream did require solids from its wastewater stream to be removed from the project site.

5.2.6 Soil Resources

With respect to soil resources the primary modification is the reduction in grading of 283 acres reflecting the reduction in the on-site project footprint from 333 acres to 50 acres. Therefore, the only change in environmental impact to soil resources is a reduction in the potential soil loss due to grading activities, and therefore the Modified Project's soil loss calculations will be substantially less than those anticipated for the Approved Project.

5.2.7 Compliance with LORS

In the Commission Final Decision, the Commission concluded that, with the implementation of the Conditions, the Approved Project would comply with all applicable LORS. The same conclusion can be made for the Modified Project as there are neither changed circumstances nor new LORS applicable to the Modified Project since the Final Decision.

5.2.8 Conditions of Certification

Condition of Certification **SOIL&WATER-7** should be deleted to reflect that the Modified Project eliminates the Zero Liquid Discharge system.

5.3 CULTURAL RESOURCES

This section describes and compares the potential impacts to cultural resources between the Modified Project and the Approved Project. As demonstrated below, the Modified Project's potential environmental impacts are less than those identified in the Commission Final Decision for the Approved Project.

5.3.1 Summary of Project Changes Related to Cultural Resources

The only modification proposed in the Modified Project related to cultural resources is the reduction in the project footprint from 333 acres to 50 acres (and a 20-acre temporary construction laydown and parking area).

5.3.2 Changes in Environmental Impacts

The reduction in project footprint will reduce the amount of grading on site by 263 acres. The only additional area of minor disturbance is the installation of three transmission poles along the south side of East Avenue M to accommodate an approximately 1,800 foot extension of one of the Approved generation tie-line routes. This modification is necessary to accommodate the change in the project switchyard. However these poles will be installed in the existing right of way of East Avenue M.

5.3.3 Changes in LORS

There are no new LORS that would affect the Commission's findings that the Approved Project would comply with cultural-resource related LORS.

5.3.4 Changes in Conditions of Certification

No modifications to the Approved Conditions of Certification are warranted for the Modified Project.

5.4 GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

This section describes the portions of the Modified Project that may affect the analysis, rationale, conclusions, and Conditions of Certification contained in the Final Decision for the Approved Project as it relates to geological and paleontological resources.

5.4.1 Summary of Project Changes

The only modification proposed in this Petition that is relevant to geological and paleontological resources is the reduction in project footprint of the Modified Project.

5.4.2 Changes in Environmental Impacts

The reduction in project footprint and elimination of the solar field reduces mass grading substantially. Therefore, the potential to discover paleontological resources for the Modified Project is substantially less than the Approved Project.

5.4.3 Compliance With LORS

There are no differences in the LORS analysis between the Modified Project and the Approved Project. LORS relating to the design of the Modified Project as contained in the Final Decision would ensure the Modified Project is designed to minimize impacts to and from geologic hazards.

Similarly, there are no specific LORS designed to protect paleontological resources that would be applicable to the Modified Project in a manner different than would be applicable to the Approved Project.

5.4.4 Changes in Conditions of Certification

No changes to Conditions of Certification in the areas of Geological or Paleontological Resources are necessary for the Modified Project.

Section 6 LOCAL IMPACT ANALYSIS

The following sections provide a description of the modifications proposed to the Approved Project as they may affect the assumptions, rationale, and Conditions of Certification in the Final Decision for the technical areas of Land Use, Socioeconomics, and Noise.

6.1 LAND USE

As described in below impacts of the Modified Project to land use are expected to remain the same as those of the Approved Project.

6.1.1 Summary of Project Changes Related to Land Use

The only change relevant to land use is the parcel split that was performed by the City of Palmdale to create a new parcel encompassing 50 acres for the Modified Project. Figure 2-2 provides the parcel map and Appendix 6-A provides formal documentation that the City of Palmdale has officially approved the parcel split. There are no other modifications that would require further analysis in Land Use for the Modified Project.

6.2 SOCIECONOMICS

As described below, the impacts of the Modified Project to socioeconomics are expected to remain the same as those of the Approved Project.

6.2.1 Summary of Project Changes Related to Socioeconomics

The only changes proposed by the Modified Project that are relevant to socioeconomics are (a) a reduction in operations workforce, from 36 to 23 employees, and (b) a reduction in the number of workers during construction, from an average of approximately 367 daily construction workers with a peak workforce of 767 workers for the Approved Project to an average of approximately 339 daily construction workers with a peak workforce of 706 workers for the Modified Project.

6.2.2 Changes in Environmental Impacts

The only change in socioeconomic analysis results from a reduction in operations and construction workforce. The anticipated construction schedule is reduced (27 months for the Approved Project and 25 months for the Modified Project).

While the Modified Project reduces the estimated number of operation and construction personnel the project will still produce a beneficial economic impact to the community by creating a significant number of new jobs for skilled and unskilled workers.

New census data is currently being compiled and an analysis of whether there are new or different environmental justice communities requiring new analysis will be submitted under separate cover in May 2015.

A summary of the Modified Project's total economic impacts from construction and operation is presented in Table 6.2-1. The economic benefits associated with anticipated construction payrolls, local purchases of materials and supplies and sales tax revenues generated by expenditures will be equal to or greater than the Approved Project. Therefore, the Modified Project will still have a beneficial effect on the local and regional economy.

Socioeconomics Table 6.2-1
Economic Impacts

Fiscal Benefits	
Estimated annual property taxes	$5-6 million
State and local sales taxes: Construction	$34 million
State and local sales taxes: Operation	$88,000 would be generated annually or approximately $2.6 million for the nominal 30-year operating life of the project.
School Impact Fee	Exempt
Non-Fiscal Benefits	
Total capital costs	$723 million
Construction payroll	$132 million
Annual Operations and Maintenance	
Construction materials and supplies annual during construction	$21 million
Operations and maintenance supplies annual during operation.	$1.1 million
Direct, Indirect, and Induced Benefits	
Estimated Direct	
Construction	339 jobs (average per month for 25 months)
Operation	23 full-time positions
Estimated Indirect	
Construction Jobs	864
Construction Income	$131,000,000
Operation Jobs	41 workers
Operation Income	N/A
Estimated Induced	
Construction Jobs	939
Construction Income	$123,000,000
Operation Jobs	39 workers
Operation Income	N/A

Table 5.11-17 of the original AFC provided base environmental justice characteristics based on information using the 2000 U.S. Census data. Table 6.2-2 below provides an update to original Table 5.11-17 using the now available 2010 U.S Census information; raw data is provided in Appendix 6-D. The updated information does not change the analysis contained in the Final Staff Assessment and the Final Decision for the Approved Project which identified an environmental justice community in the area but concluded that the environmental justice community would not be subjected to disproportionate impacts.

Socioeconomics Table 6.2-2
Updated Environmental Justice Characteristics

Geographic Area (Census Tract)	Census Block Group	Total Minority Population Excludes Whites with Hispanic Origin (Percent)	Total Minority Population Includes Whites with Hispanic Origin (Percent)	Total Poverty Level Population (Percent)
~~9101.00~~	~~9101.00.1~~	~~75.79~~		~~21.10~~
9005.01	9005.01.1	~~47.77~~**50.72**	**69.98**	~~20.60~~**18.80**
	9005.01.2	~~55.03~~**58.67**	**78.56**	
9005.04	9005.04.1	~~50.72~~**52.91**	**67.53**	~~12.00~~**13.50**
	9005.04.2	~~47.06~~**54.30**	**71.84**	
9007.04	9007.04.1	~~56.67~~**61.19**	**75.34**	~~30.80~~**11.20**
9102.01	9102.01.1	~~28.80~~**38.91**	**53.37**	~~19.20~~**29.30**
9800.04		***49.11***	***53.25***	***0***
County of Los Angeles		~~51.30~~**49.72**	**72.21**	~~17.91~~**24.40**

Source: U.S. Bureau of the Census, **2010**. **American Community Survey 5-Year Estimate, 2006-2010.** Note: Italicized block group contains the PEP plant site.

Table 5.11-17 of the original AFC.

6.2.3 Changes in LORS Conformance and Other Permits

There are no changes to LORS that would be applicable to the Modified Project. Therefore, the analysis contained in the Final Decision should remain unchanged for the Modified Project.

6.2.4 Changes in Conditions of Certification

There were no Conditions of Certification in the area of Socioeconomics. Consequently, no changes or additions to the Conditions of Certification are necessary for the Modified Project.

6.3 TRAFFIC AND TRANSPORTATION

As described below, the impacts of the Modified Project to Traffic and Transportation are expected to remain the same or less than those of the Approved Project.

6.3.1 Summary of Project Changes Related to Traffic and Transportation

The changes to Traffic and Transportation result from the Modified Project's reduction in the operations workforce, from 36 to 23 employees, and the reduction in the number of workers during construction. The Approved Project has an average of approximately 367 daily construction workers with a peak workforce of 767 workers. The Modified Project has a reduced construction workforce of an average of approximately 339 daily construction workers with a peak workforce of 706 workers. In addition, the Modified Project will not construct the solar components. All other assumptions concerning truck traffic and deliveries for the Approved Project are valid for evaluating the Modified Project.

6.3.2 Changes in Environmental Impacts

6.3.2.1 Construction

The traffic and transportation-related impacts from construction workers commuting to and from the site and identified in the Final Decision for the Approved Project were ultimately mitigated by the incorporation of Condition of Certification **TRANS-1**. At Page 8.2-7 of the Final Decision the Commission concluded:

> Condition of Certification **TRANS-1** will reduce the project's impacts on local roads to a less than significant level by: requiring construction workers to avoid using SR-14 on and off ramps to East Avenue M and the intersection of Sierra Highway and East Avenue M during peak traffic periods; limiting heavy equipment and building materials to off peak periods (9:30 a.m. to 3:30 p.m.); and developing traffic diversion plans to ensure access during temporary lane/road closures. (Ex. 300, p. 4.10-12.)

Therefore, in order to assess whether such mitigation would continue to be effective, a comparison was made of the existing traffic counts for the same roadways used for evaluation of the Approved Project and new traffic counts for the same roadways recently provided by the City of Palmdale. Figure 6.3-1 shows updated 24-hour Bi Directional Lane Volume Counts for roadways within the vicinity of the Modified Project.

The Final Decision included the following table at Page 8.2-6:

Traffic and Transportation Table 1
Project Construction and 2011 Roadway Segment Characteristics

Roadway Segment	Roadway Classification/ Lanes	Projected Construction Traffic	Existing ADT	Capacity	2011 Estimated ADT	Capacity
SR-14 South of Ave M	Arterial/6	536	99,000	132,000	126,675	132,000
Ave M Sierra Hwy To 10th St W	Arterial/4	1534	21,800	36,000	26,500	36,000
Ave M 10th St to 20th St	Arterial/4	1534	14,010	36,000	17,950	36,000

ADT = Average daily traffic Source: Ex. 300, p. 4.10-11.

Relying on this table, the Commission at Page 8.2-5 concluded:

> **Traffic and Transportation Table 1** shows background traffic volumes for SR- 4 and projects 536 construction related traffic trips on SR-14 south of Avenue M. Peak construction is likely to occur during 2011 or later. **Traffic and Transportation Table 1** shows that construction related traffic would not cause traffic volumes to exceed the design capacity of SR-14 or Avenue M. As noted earlier, Avenue M (accessed by SR-14 or Sierra Highway) would be the most direct route to the PHPP site. The evidence forecasts that Avenue M would incur 1,534 peak construction related trips. This represents about a 4 percent increase to the overall traffic volume capacity for this road (36,000 per day). Some construction workforce traffic could use other routes, such as Sierra Highway, because the worker trip might originate in Palmdale or Lancaster. Sierra Highway currently operates at 83 percent of capacity (25,000 ADT). (Ex. 300, p. 4.10-10.)

According to the current traffic counts provided by the City of Palmdale (Figure 6.3-1 and Appendix 6-B) the Average Daily Traffic (ADT) for East Avenue M from Sierra Highway to 10th Street the ADT is currently 19,618. This traffic volume is below the Existing ADT (21,800) and the 2011 predicted ADT(26,500) for the same segment that was the basis for evaluating impacts for the Approved Project. Since the Modified Project actually will reduce construction traffic volumes slightly due to lower average and peak workers from the Approved Project and the baseline traffic conditions have not increased since the time of the Final Decision, the Modified Project will not result in greater impacts to this segment of East Avenue M.

With respect to SR-14, Condition of Certification **TRANS-1** already restricts its use in the vicinity of the project site during peak times during construction. This restriction will continue to reduce the impacts on SR-14 from the Modified Project to an acceptable level.

Truck traffic during construction is estimated to be less for the Modified Project than for the Approved Project because of the elimination of all deliveries associated with construction the solar components.

6.3.2.2 Operation

6.3.2.2.1 Glint and Glare

The primary impacts identified from operation of the Approved Project were to air traffic at the nearby airport. All of the glint and glare-related impacts from the solar components are eliminated by the Modified Project.

6.3.2.2.2 Air Traffic Obstructions

Palmdale Energy filed for new FAA Determinations of No Hazard from its stacks and HRSG construction crane. The FAA issued Determination of No Hazard for each stack and requested that the HRSG construction crane be surveyed before it can issue its determination. Therefore, Palmdale Energy will refile its 7460-1 form for the HRSG construction crane prior to its use to erect the HRSGs. Copies of the FAA Notices, Determinations and correspondence are included in Appendix 6-E.

6.3.2.2.3 Thermal Plumes

Palmdale Energy commissioned a Thermal Plume Modeling Analysis to be conducted to evaluate the potential for thermal plumes from the Modified Project stacks to impact air traffic. The report containing the modeling techniques and results is presented in Appendix 6-F. The results of the study indicate that the thermal plume with a velocity of 4.3 m/s could potentially rise to levels ranging from 714 to 1,296 feet above ground level. The PEP results in a slight increase in plume height over the Approved Project. However, the worst case predicted plume height is well below the 1,500 feet level provided in Condition of Certification **TRANS-4** which would mitigate the potential impact by warning and notifying pilots through a Notice to Airmen (NOTAM) to avoid overflying the Modified Project at heights below 1,500 feet.

6.3.3 Changes in LORS Conformance and Other Permits

There are no changes to LORS that would be applicable to the Modified Project. Therefore, the analysis contained in the Final Decision should remain unchanged for the Modified Project.

6.3.4 Changes in Conditions of Certification

Palmdale Energy proposes the following modifications be made to the Conditions of Certification to reflect the elimination of the solar components, elimination of the zero liquid discharge system, and replacement of the wet cooling tower with an ACC.

TRANS-2 The project owner shall obtain Determinations of No Hazard to Navigable Airspace from the FAA for U.S. Air Force Plant 42 regarding the project's transmission towers, **Air Cooled Condenser** ~~cooling tower, clarified water tank, crystallizer~~, and construction crane that would penetrate the Plant's airspace.

Verification: At least 90 days prior to the construction,, the project owner shall provide the CPM copies of the FAA Determinations of No Hazard to Navigable Airspace regarding the project structures identified above and the project owner must comply with specific recommendations contained in the FAA determinations.

TRANS-4 Pilot Notification and Awareness

The project owner shall initiate the following actions to ensure pilots are aware of the project location and potential hazards to aviation:

a) Submit a letter to the FAA requesting a Notice to Airmen (NOTAM) be issued advising pilots of the location of the **PEP**~~PHPP~~ and recommending avoidance of overflight of the project site below 1,500 feet AGL. The letter shall also request that the NOTAM be maintained in active status until all navigational charts and Airport Facility Directories (AFDs) have been updated.

b) Submit a letter to the FAA requesting a power plant depiction symbol be placed at the **PEP** ~~PHPP~~ site location on the Los Angeles Sectional Chart with a notice to "avoid overflight below 1,500 feet AGL".

c) Submit a request to and coordinate with the USAF Plant Commander to add a new remark to the Automated Surface Observing System (ASOS) identifying the location of the **PEP** ~~PHPP~~ and advising pilots to avoid direct overflight

below 1,500 feet AGL as they approach or depart the airport.

d) Request that TRACON (SOCAL) and/or the Los Angeles Air Traffic Control Center submit aerodrome remarks describing the location of the **PEP** ~~PHPP~~ plant and advising against direct overflight below 1,500 feet AGL to:

   1) FAA AeroNav Services, formerly the FAA National Aeronautical Charting Office (Airport/Facility Directory)
   2) Jeppesen Sanderson Inc. (JeppGuide Airport Directory, Western Region)
   3) Airguide Publications (Flight Guide, Western States)

e) Install one, non-blinking red aviation obstruction light on each of the project's two, **160** ~~145~~-foot tall HRSG stacks, both ends of the 135~~48~~-foot tall ~~cooling tower~~ **Air Cooled Condenser**~~,~~ and at each corner of the power block area.

Verification: Within 30 days following the start of construction, the project owner shall submit draft language for the letters of request to the FAA (including SOCAL TRACON) and Air Force Plant 42 to the CPM for review and approval.

At least 60 days prior to the start of operations, the project owner shall submit the required letters of request to the FAA and request that TRACON (SOCAL) submit aerodrome remarks to the listed agencies. The project owner shall submit copies of these requests to the CPM. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

If the project owner does not receive a response from any of the above agencies within 45 days of the request (or by 15 days prior to the start of operations) the project owner shall follow up with a letter to the respective agency/ies to confirm implementation of the request. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

The project owner shall contact the CPM within 72 hours if notified that any or all of the requested notices cannot be implemented.[9] Should this occur, the project owner shall appeal such a determination, consistent with any established appeal process and in consultation with the CPM. A

[9] The Energy Commission does not have the authority to compel issuance of a NOTAM or require the FAA or Byron Airport to publish the location of or remarks regarding the project in any aviation chart or guide, or add that information to the Byron Airport ASOS.

final decision from the jurisdictional agency denying the request, as a result of the appeal process, shall release the project owner from any additional action related to that request and shall be deemed compliance with that portion of this Condition of Certification.

Conditions of Certification **TRANS-8** and **TRANS-9** should be deleted to reflect elimination of the glint and glare causing solar components from the Modified Project.

6.4 NOISE AND VIBRATION

This section describes the portions of the Modified Project that may affect the analysis, rationale, conclusions, and Conditions of Certification contained in the Final Decision for the Approved Project as it relates to noise and vibration.

6.4.1 Summary of Project Changes

The primary features of the Modfied Project that affect noise and vibration are the sound power levels associated with the new turbine technology and replacement of the wet cooling tower with an Air Cooled Condenser.

6.4.2 Changes in Environmental Impacts

In order to evaluate whether the Modified Project would result in different noise impacts, Palmdale Energy commissioned a noise evaluation to be conducted by Acentech, the consultant that performed the noise evaluation for the Approved Project. Appendix 6-G contains Acentech's Technical Noise Study.

Table 6.4-1 provides a comparison of the Modified Project to the Approved Project and to the measured ambient noise levels for the four quietest hours of the night for the nearest noise sensitive property. The Modified Project noise levels are less than 2 dB higher than the Approved Project. The Modified Project noise plus the ambient L(90) is 43.5 dBA. In accordance with CEC requirements, this does not represent a significant adverse noise impact since the ambient increase during the four quietest hours of the night is less than 5 dB, the CEC Staff significance threshold.

TABLE 6.4-1
COMPARISON OF PHPP AND PEP NOISE LEVELS TO NIGHTTIME AMBIENT NOISE LEVELS

Name	PEP Leq(1hr)	PHPP Leq(1hr)	Increase (PEP – PHPP)	Nighttime Ambient L(90) [a]	dB Above Ambient (PEP – Ambient)
	(dBA)	(dBA)	(dB)	(dBA)	(dB)
Loc 1	41.7	40.2	1.5	38.9	2.8

Note a) Ambient L(90) averaged over the 4 quietest nighttime hours. The ambient L(90) averaged over the entire nighttime 9-hour period was 43.8 dBA.

6.4.3 Compliance With LORS

There are no changes to LORS that would be applicable to the Modified Project. Therefore, the analysis contained in the Final Decision should remain unchanged for the Modified Project.

6.4.4 Changes in Conditions of Certification

Condition of Certification **NOISE-4** sets an operational noise restriction that was based on the noise modeling of the Approved Project. As described above, the noise modeling for the Modified Project predicts slightly louder operational noise levels, although still below the CEC significance thresholds. To reflect the new modeled levels, the following modifications to Condition of Certification **NOISE-4** are suggested.

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due solely to plant operation to exceed an average of **42**~~40~~ dBA Leq measured at Measurement Location ML 1, near the residence identified as R2 in **Noise and Vibration Figure 2**. No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

6.5 VISUAL RESOURCES

This section describes the portions of the Modified Project that may affect the analysis, rationale, conclusions, and Conditions of Certification contained in the Final Decision for the Approved Project as it relates to visual resources.

6.5.1 Summary of Project Changes

The primary changes proposed by the Modified Project that affect visual resources include:

- the elimination of the solar thermal components; and
- the reconfiguration of the power block to accommodate the new equipment including the elimination of the large brine concentrator/crystallizer used in the zero liquid discharge system and the replacement of the wet cooled tower with an Air Cooled Condenser.

6.5.2 Changes in Environmental Impacts

6.5.2.1 Elimination of Solar Components

The removal of solar components eliminates all glint and glare impacts associated with the mirrors, including those impacts associated with the potential effects on nearby air traffic.

The Final Decision evaluated several KOPs and for most of them the primary feature creating a visual impact was the solar mirrors of the Approved Project which were approved to be constructed very near roadways. With the elimination of the mirrors, the Modified Project will appear more distant than the Approved Project for these KOPs.

6.5.2.2 Reconfiguration of the Power Block

The Modified Project will essentially flip the layout of the power block by 180 degrees in the same portion of the Approved site. However, with the new Siemen's equipment the zero liquid discharge system including its tall brine concentrator/crystallizer will be eliminated. In addition the wet cooling tower will be replaced with an ACC which has a slightly larger footprint. The wet cooling tower for the Approved Project was 300 feet long x 100 feet wide x 60 feet tall. The ACC will be 350 feet long x 190 feet wide x 135 feet tall and will present a more dominant visual appearance than the wet cooling tower.

However, the large visual plume from the cooling tower will be eliminated with the use of the ACC.

The only KOP analyzed in the Final Decision that is not dominated by the solar array and where the power block can be clearly viewed is KOP 4. To graphically represent the change in the view, Palmdale Energy provides Figure 6.5-1 a graphical depiction of the Modified Project on the original Visual Simulation from KOP-4. While the ACC will be a larger structure, the view from KOP-4 with the Modified Project will be less intrusive than the view from KOP-4 with the Approved Project because that view is dominated by the large visual plume, which would be eliminated by the Modified Project. Therefore, the Modified Project does not create any additional visual impact than the Approved Project.

6.5.3 Compliance With LORS

There are no changes to LORS that would be applicable to the Modified Project. Therefore, the analysis contained in the Final Decision should remain unchanged for the Modified Project.

6.5.4 Changes in Conditions of Certification

With the elimination of the solar components and the associated construction activities that would have taken place along the roadways, we proposed deletion of Condition of Certification **VIS-1,** as it is no longer necessary to mitigate the impact of construction activities of the solar field.

Section 7 POTENTIAL EFFECTS ON PROPERTY OWNERS

The Commission's Power Plant Siting Regulations require a Petition For Amendment to include 1) a discussion of how the modification affects the public; 2) a list of property owners potentially affected by the modification; and 3) a discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.

An updated property owner list was obtained from the City of Palmdale in April 2015 and reflects the latest ownership information. The list is very large and is provided electronically as Appendix 7-A of this Petition. Almost all of the property owners are located along the linear features which are not being modified by this Petition. Potential effects on property owners have therefore been addressed during the proceedings for the Approved Project. The previous sections of this Petition contain analyses of environmental impacts for the Modified Project.

Section 8 UPDATED CUMULATIVE SCENARIO

At a prefilling meeting with CEC Staff, Palmdale Energy was asked to provide an update of the cumulative projects in the region. Palmdale Energy requested information from the surrounding local jurisdictions and presents the information provided as a list of current projects contemplated within the City of Palmdale, the City of Lancaster and the North Antelope Valley region of Los Angeles County that could contribute to cumulative impacts of the Modified Project.

Forseeable projects within the City of Palmdale are included in Appendix 8-A. Forseeable projects within the City of Lancaster are inlcuced in Appendix 8-B.