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Application for Certification
(15-AFC-01)

Puente Power Project (P3)
Oxnard, CA

Responses to CEC Data Request Set 2

November 2015

Submitted to:
The California Energy Commission

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RESPONSES TO CEC DATA REQUESTS SET 2

LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AFC	Application for Certification
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEC	California Energy Commission
COC	condition of certification
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPM	Compliance Project Manager
°F	Fahrenheit
HARP2	Hotspots Analysis and Reporting Program Version 2
HP	horsepower
HRA	health risk assessment
ID	identification
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LT	long-term
$\mu g/m^3$	microgram per cubic meter
MGS	Mandalay Generating Station
mph	miles per hour
MW	megawatt
NAAQS	national ambient air quality standard
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
OTC	once-through cooling
P3	Puente Power Project
$PM_{2.5}$	particulates less than or equal to 2.5 microns in diameter
PM_{10}	particulates less than or equal to 10 microns in diameter
UTM	Universal Transverse Mercator

Technical Area: Air Quality Modeling
Author: Wenjun Qian

BACKGROUND: EXHAUST PARAMETERS

Appendix C-5 of the Application for Certification (AFC) shows the input parameters that the applicant used in the air quality modeling analysis. Table C-5.2 shows that the applicant used a stack exhaust temperature of 900°F for all operating scenarios of the new gas turbine, including startups, shutdowns, and commissioning. Note a under Table 4.1-16 on Page 4.1-58 of the AFC shows that the exhaust characteristics, including the stack exhaust temperature of 900°F, reflect the ambient temperature of 39°F and 100 percent load, which results in maximum heat input/power output. However, staff believes that the stack exhaust parameters, including the stack exhaust temperature, would be different for different operating scenarios. Different exhaust temperature would result in different plume rise and possibly higher ground-level air quality impacts. In addition, the AFC does not show how the stack parameters for Mandalay Generating Station (MGS) Units 1, 2, and 3 were determined for the air quality modeling analysis.

DATA REQUEST

49. Please update the air quality modeling analysis using the stack parameters obtained for the above data request.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to California Energy Commission (CEC) Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the Puente Power Project (P3) due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1.

BACKGROUND: MODELING OF OVERLAP PERIODS

Page 4.1-28 of the AFC shows that during the commissioning phase of the proposed project, the existing MGS Units 1, 2, and 3 would remain available for operation and the commissioning modeling analysis accounts for the combined impacts for the new unit (undergoing commissioning) and operation of the existing units. Once the commissioning tests are complete and the new CTG is available for commercial operation, MGS Units 1 and 2 will no longer be operated and will be decommissioned; MGS Unit 3 would remain in operation.

During construction of the proposed project, the existing MGS Units 1, 2, and 3 would remain available for operation. The applicant did not model the combined impacts for the construction of the new units and the operation of the existing MGS Units 1, 2, and 3.

The applicant has shown that the emissions associated with decommissioning of the existing MGS Units 1 and 2 would be lower than the emissions associated with the construction of the proposed project. Thus the applicant did not perform a separate modeling analysis examining the impacts for the decommissioning activities. The Project Description section shows that decommissioning includes:

- De-energize electrical equipment;
- Purge gases from equipment (e.g., natural gas, hydrogen);
- Remove oil from all pumps, motors, pipes, oil reservoirs, transformers, and other equipment;
- Electrically isolate equipment;
- Physically isolate equipment by disconnecting from piping systems or other means;
- Operate and maintain equipment as required for environmental permit compliance (e.g., storm drainage system);
- Remove from service the backup diesel generator; and
- Verify that all facilities are left in a safe condition.

During decommissioning of the existing MGS Units 1 and 2, the proposed project would be operating and the existing MGS Unit 3 would remain in service. The applicant did not model the air quality impacts for the overlap period when the existing MGS Units 1 and 2 are decommissioned and the proposed project and existing MGS Unit 3 are operating.

DATA REQUEST

51. Please model the combined impacts for the construction of the new units and the operation of the existing MGS Units 1, 2, and 3.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to California Energy Commission (CEC) Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1. The updated air quality/public health modeling analysis includes updated construction activity modeling, including the combined impacts from MGS Units 1, 2, and 3.

DATA REQUEST

52. ***Please model the overlap period when the existing MGS Units 1 and 2 are undergoing decommissioning with the proposed project and existing MGS Unit 3 operating.***

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to California Energy Commission (CEC) Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1. The updated air quality/public health modeling analysis includes decommissioning activity modeling, including the combined impacts from the new P3 gas turbine, new emergency generator engine, and existing MGS Unit 3.

BACKGROUND: PAIRED-SUM APPROACH FOR NO_2 MODELING

In order to demonstrate compliance with the federal 1-hour NO_2 standard, the applicant used the paired-sum approach, which combines concurrent hourly project impacts with hourly background NO_2 data. Although the paired-sum approach is allowed by the CAPCOA's 2011 guidance document, U.S. EPA does not recommend such an approach except in rare cases of relatively isolated sources where the available monitor can be shown to be representative of the ambient concentration levels in the areas of maximum impact from the proposed new source (U.S. EPA 2011 memorandum Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard). U.S. EPA also mentions another situation where such an approach may be justified in which the modeled emission inventory clearly represents the majority of emissions that could potentially contribute to the cumulative impact assessment and where inclusion of the monitored background concentration is intended to conservatively represent the potential contribution from minor sources and natural or regional background levels not reflected in the modeled inventory. For other Energy Commission siting cases, staff has been using seasonal hour-of-day background NO_2 data for the federal 1-hour NO_2 impact analysis, as suggested by U.S. EPA.

DATA REQUEST

57. If justification for the paired-sum approach could not be provided, please update the air quality modeling using seasonal hour-of-day background NO_2.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to CEC Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1. For this revised modeling, the Applicant used the monthly hour-of-day background NO_2 approach in the AERMOD model to determine ambient NO_2 impacts for the project. The monthly hour-of-day background NO_2 approach is a more conservative lower-tier approach compared to the seasonal hour-of-day background NO_2 approach.

BACKGROUND: FUMIGATION ANALYSIS

The applicant modeled the inversion break-up fumigation impacts and shoreline fumigation impacts for the new gas turbine and MGS Units 1 and 2. The applicant did not model the fumigation impacts for the emergency generator or the MGS Unit 3 because the applicant believes that this type of modeling is not performed for small combustion sources with relatively short stacks. Even though the stacks for the emergency generator and the MGS Unit 3 are relatively short, the buoyancy of the plumes would result in plume rise so that the plumes could interact with the inversion layer and the Thermal Internal Boundary Layer (TIBL, for shoreline fumigation). U.S. EPA guidance document Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (dated October 1992) provides tables showing downwind distances to the maximum ground level concentrations for inversion break-up fumigation (Table 4-4) and for shoreline fumigation (Table 4-5) as a function of stack height and plume height. The lowest stack height shown in these tables is 10 meters (32.8 ft.), which is lower than the stack height of 54 ft. for MGS Unit 3 and 70 ft. for the new emergency generator. Staff believes that the fumigation impacts need to be analyzed for MGS Unit 3 and the new emergency generator.

The applicant used SCREEN3 to model the inversion break-up fumigation impacts and shoreline fumigation impacts. U.S. EPA released a screening version of AERMOD, AERSCREEN, in 2010. The SCREEN3 model is essentially a screening version of the ISCST3 model, which was replaced by AERMOD. Thus AERSCREEN has replaced SCREEN3 as the recommended screening modeling. U.S. EPA has incorporated the fumigation algorithms in the new version of AERSCREEN (version 15181). The AERSCREEN (version 15181) model is capable of analyzing the fumigation impacts of the project.

DATA REQUEST

59. Please provide fumigation impacts analysis for MGS Unit 3 and the new emergency generator.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to CEC Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1. For this revised modeling, the Applicant used the AERSCREEN model (version 15181) to determine fumigation impacts for the new P3 gas turbine, new emergency generator engine, and MGS Unit 3.

DATA REQUEST

60. Please update the fumigation impacts analysis using AERSCREEN (version 15181).

RESPONSE

See the Data Response 59.

Technical Area: Greenhouse Gases
Author: Jacquelyn Record

BACKGROUND: CARBON POLLUTION STANDARDS FOR NEW POWER PLANTS

On August 3, 2015, the U.S. EPA Administrator, Gina McCarthy signed a final rule[1] under Clean Air Act Section 111(b) to limit the greenhouse gas emissions from new, modified, and reconstructed stationary sources: electric utility generating units. The final rule eliminates the originally-proposed criteria and establishes different limits of greenhouse gas emissions for base load and non-base load natural gas-fired turbines. A "non-base load" natural gas-fired turbine is one that has a capacity factor less than or equal to the lower heating value efficiency of the turbine, expressed as a percentage. Staff would like verification that the proposed P3 would comply with this final rule.

DATA REQUEST

63. Please demonstrate how P3 would comply with the recently-signed carbon pollution standards for new power plants.

RESPONSE

As indicated in Staff's data request, the final carbon pollution standard (CPS) rule, published at 40 CFR 60 Subpart TTTT on October 23, 2015, contains different applicability and subcategorization criteria as compared to USEPA's January 2014 proposal. While P3 will no longer be exempt (as it was under the proposed rule), it would comply with the clean fuels input-based standard established by the final CPS for the non-base load natural gas-fired combustion turbine subcategory. The applicable CO_2 emission standard from Table 2 to Subpart TTTT is as follows:

Affected Electric Generating Unit (EGU)	CO_2 Emission Standard
Newly constructed or reconstructed stationary combustion turbine that supplies its design efficiency or 50 percent, whichever is less, times its potential electric output or less as net-electric sales on either a 12-operating month or a 3-year rolling average basis and combusts more than 90% natural gas on a heat input basis on a 12-operating month rolling average basis.	50 kg CO_2 per gigajoule (GJ) of heat input (120 lb CO_2/MMBtu).

"Design efficiency" is defined in the rule as "the rated overall net efficiency (*e.g.,* electric plus useful thermal output) on a lower heating value basis at the base load rating, at ISO conditions …."

"Potential electric output" is defined in the rule as "33 percent or the base load rating design efficiency at the maximum electric production rate …, whichever is greater, multiplied by the

[1] U.S. EPA, 2015 - Environmental Protection Agency, Final Carbon Pollution Standards for New, Modified and Reconstructed Power Plants, August 3, 2015. The U.S. EPA Administrator, Gina McCarthy, signed the following notice on August 3, 2015, and U.S. EPA is submitting it for publication in the Federal Register (FR).

base load rating (expressed in MMBtu/h) of the EGU, multiplied by 106 Btu/ MMBtu, divided by 3,413 Btu/KWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 h/yr…"

Based on the current ISO heat rate of 8,317 Btu/kWh (electrical) (LHV) and a conversion factor of 3412.1416 Btu/kWh (thermal), it takes 2.4375 kWh (thermal) input to produce 1 kWh (electrical) output (8317 Btu/kWh ÷ 3412.1416 Btu/kWh = 2.4375). The base load rating design efficiency for the P3 gas turbine is therefore 1 kWh (electrical) / 2.4375 kWh (thermal) = 41%.

The percentage electric sales threshold that distinguishes base load and non-base load units is based on the specific turbine's design efficiency (commonly known as "the sliding-scale approach") and varies from 33 to 50 percent. Specifically, all units that have annual average electric sales (expressed as a capacity factor) greater than their net lower heating value (LHV) design efficiencies (as a percentage of potential electric output) are base load units. All units that have annual average electric sales (expressed as a capacity factor) less than or equal to their net LHV design efficiencies are non-base load units. As discussed in the revised air quality modeling analysis enclosed as Appendix 49-1, it is expected that on an annual average basis the new gas turbine associated with P3 would supply less than one-third of its potential electric output to a utility power distribution system. Because this expected potential annual average electric sales is less than the 41% design efficiency, the new gas turbine associated with P3 would be a non-base load unit under the final CPS.

As a non-base load unit, under the final CPS the potential electric output for P3 is calculated as follows:

Potential electric output =

$$\text{Design efficiency (\%)} \times \text{Heat Input Rate, MMBtu/hr} \times \frac{10^6\ \text{Btu}}{\text{MMBtu}} \times \frac{1\ \text{kWh}}{3412.1416\ \text{Btu}} \times \frac{1\ \text{MWh}}{1{,}000\ \text{kWh}} \times 8{,}760\ \text{hrs/yr}$$

= 0.41 * 2,567.81 MMBtu/hr * 10^6 Btu/MMBtu * 1 kWh/3412.1416 Btu * 1 MWh/1000 kWh * 8,760 hrs/yr

= 308.55 MWh * 8,760 hrs/yr = <u>2,702,862 MW per year</u>

Under the CPS, as long as the P3 gas turbine has net electric sales of less than 0.41 * 2,702,862 MW, or <u>1,108,173 MW per year</u>, it will be subject to the 120 lb CO_2/MMBtu limit for non-base load gas turbines. As discussed in the revised air quality modeling analysis enclosed as Appendix 49-1, the new gas turbine associated with P3 is expected to operate with an annual capacity factor of approximately 25%. With a full load net nominal output of approximately 262 MW, the P3 unit would supply a maximum of approximately 25% x 8760 hrs/year x 262 MW/hr = <u>573,780 MW per year</u> to a utility power distribution system. Since this output is less than the allowable level of 1,108,173 MW per year, the P3 gas turbine would be a non-base load unit under the final CPS and would be subject to the Best System of Emission Reduction (BSER) established for that subcategory.

In the final CPS, EPA determined that the BSER for non-base load natural gas-fired units is the use of clean fuels, specifically natural gas with a small allowance for distillate oil. USEPA concluded that it did not have sufficient information to set a meaningful output-based standard for non-base load natural gas-fired combustion turbines. The input-based standard requires non-base load units to burn fuels with an average emission rate of 120 lb CO_2/MMBtu or less. As noted by USEPA, this standard is readily achievable because the CO_2 emission rate of natural gas is 117 lb CO_2/MMBtu. Owners and operators of non-base load natural gas-fired combustion turbines burning fuels with consistent chemical compositions that meet the clean fuels requirement (e.g., natural gas, ethane, ethylene, propane, naphtha, jet fuel kerosene, distillate oils 1 and 2, and biodiesel) will only need to maintain records that they burned these fuels in the combustion turbine. No additional recordkeeping or reporting will be required. As the P3 gas turbine would burn natural gas, it would comply with the final CPS by maintaining appropriate records.

Moreover, the P3 gas turbine will have a CO_2 emission rate of 53.060 kg/MMBtu of natural gas, based on the 40 CFR 98, Table C-1, CO_2 emission factor for natural gas combustion. This is equivalent to 116.98 lb/MMBtu, which is below the 120 lb/MMBtu limit in the NSPS.

BACKGROUND: COMPLIANCE WITH AVENAL PRECEDENT

As described in the AFC, P3 would be a simple-cycle combustion turbine with reliability, efficiency, turndown, ramp rate, startup time, and time to restart characteristics that will allow it to meet the terms of its power purchase agreement (PPA). Further, the AFC states that these characteristics would allow P3 to integrate into the local reliability area and transmission grid. However, the efficiency of the proposed turbine is not as high as some other simple-cycle options and staff would need to determine if the proposed project would comply with the Avenal Precedent. The Avenal Precedent Decision requires finding as a conclusion of law that any new natural gas-fired power plant certified by the Energy Commission must:

- "not increase the overall system heat rate for natural gas plants;
- not interfere with generation from existing renewables or with the integration of new renewable generation; and
- taking into account the two preceding factors, reduce system-wide GHG emissions."

DATA REQUEST

To evaluate compliance with the Avenal Precedent please provide all of the following:

64. Please explain why this turbine was selected rather than one with a higher efficiency.

RESPONSE

The proposed GE 7HA.01 gas turbine is one of the most efficient simple-cycle turbines available, with an ISO baseload efficiency of approximately 41% (LHV). This turbine model was selected because it provided the best available combination of reliability, efficiency, turndown, ramp rate, startup time, and time to restart characteristics. As discussed in Section 2.3 of the AFC, P3 is being developed in response to an SCE Request for Offer (RFO), under which NRG was awarded a contract for 262 MW (net) nominal of state-of-the-art, more flexible and efficient generation. The GE 7HA.01 allows P3 to provide this generation using a single gas turbine that is capable of operating at loads down to approximately 25%.

According to Gas Turbine World,[2] the following simple cycle gas turbines have higher baseload ISO efficiencies than the 41% efficiency of the GE 7HA.01:

Turbine Model	ISO Baseload Rating, MW	ISO Efficiency (LHV)
GE LM6000 PD/PF/Sprint	43.1 to 48.1 MW	41.7 – 41.9%
GE LMS100PA	103.5 MW	43.6%
GE LMS100PB	99.4 MW	44.3%
Rolls Royce Trent 60	51.7 to 64 MW	41.6 to 42.7%

Providing a net nominal 262 MW of capacity using these gas turbines with slightly higher efficiencies would require the installation of at least three units, increasing costs and operational complexity. Using three gas turbines instead of one for load-following also has the potential to require more gas turbine startups and higher emissions, as smaller units are brought on- and off-line instead of the single, larger gas turbine ramping up and down from minimum load.

[2] Gas Turbine World, 2012 Performance Specs, 28th Edition.

Therefore, the Applicant believes the overall benefits associated with using a single GE 7HA.01 gas turbine outweigh the slight increase in efficiency associated with using the above smaller gas turbines.

DATA REQUEST

65. Please explain how the capacity factor and efficiency of P3 would not increase the overall system heat rate for natural gas plants.

RESPONSE

As discussed in Section 4.1.4.2 of the AFC, P3 will operate as a fast-starting, flexible generating resource that will enhance the reliability of existing and future intermittent renewable resources, thereby furthering California's Renewable Portfolio Standard and GHG goals. The CEC's 2009 Framework report[3] concludes that net GHG emissions for the integrated electric system will decline when new gas-fired power plants are added that (1) serve load growth or capacity needs more efficiently than the existing fleet; (2) improve the overall efficiency of the electric system; and/or (3) permit increased penetration of renewable generation. As a fast-starting, fast-ramping and highly efficient facility, P3 will meet all three of these criteria.

Because electricity generation and demand must be in balance at all times, the energy provided by a new generating resource must simultaneously displace the same amount of energy from an existing resource. The AFC proposes a maximum annual capacity factor of approximately 25% for P3, but P3 will be called upon to operate only when needed, and its actual capacity factor will be dependent upon actual operation. Therefore, P3's capacity factor will be determined by its efficiency relative to other available resources. The electricity from P3 will be dispatched only if it will be less expensive to operate than other available generating resources, which will occur when P3 is more efficient than the other available resources. By definition, P3 will produce fewer GHG emissions than the resource it is displacing,[4] thereby reducing the overall system heat rate.

P3 would also displace less efficient peaker power plant generation in the California Independent System Operator (CAISO) designated Big Creek/Ventura Local Capacity Area (LCA), reducing the GHG emissions associated with providing local reliability services and facilitating the retirement of the Mandalay Generating Station (MGS), an aging, less efficient, and higher GHG-emitting resource in the Big Creek/Ventura LCA.

Table DR-65 summarizes the thermal efficiency of other simple cycle gas turbine units in the project area. The proposed P3 has the best thermal efficiency—that is, the lowest heat rate-- of any of the projects listed.[5] Moreover, it is significantly more efficient than the least efficient facilities listed. Electricity from P3 would be available to displace generation from these (and other) peaking units, thereby reducing operation of these less efficient units. Therefore, P3 satisfies the first part of the *Avenal* test, regarding its efficiency relative to other peaking generators.

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[3] California Energy Commission (CEC). 2009. Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California, CEC-700-2009-009. May.

[4] California Energy Commission (CEC). 2015. Carlsbad Energy Center Project Amendment (07-AFC-06C) Final Staff Assessment, Appendix AQ-1, February 2015.

[5] In the Carlsbad PMPD, the Committee indicated that in considering a new facility's effect on overall system heat rate, it is "appropriate to compare like to like, i.e., combined-cycle to combined cycle; simple-cycle to simple-cycle." (pp. 6.1-7 and 8). Therefore, only simple-cycle gas turbines are included in this comparison.

Table DR-65 Heat Rates, Capacity Factors and GHG Emissions Performance for SCE Peakers, 2014					
Plant Name	**Capacity (MW)**	**Output (MWh)**	**Heat Rate (Btu/kWh)[a]**	**Capacity Factor**	**GHG Performance[b] ($MTCO_2$/MWh)**
Colton Agua Mansa Peaker	43	23,670	10,145	6.3%	0.537
Wildflower Indigo	141	67,977	10,394	5.5%	0.550
Etiwanda Unit 5	120	14,044	10,668	1.3%	0.564
Riverside Springs	44	1,135	13,687	0.3%	0.724
Ellwood	54	1,075	14,374	0.2%	0.760
Colton Power Drews	41	1,239	15,067	0.3%	0.797
Colton Power Century	41	1,005	15,292	0.3%	0.809
Long Beach Peaker	170	20,376	16,653	1.4%	0.881
Mandalay Unit 3	130	955	22,236	0.08%	1.176
Total or Average (as applicable)	**786**	**131,477**	**11,577**	**1.9%**	**0.612**
P3	**275[c]**		**9,149**		**0.484**

Source: Energy Commission QFER Database,
http://energyalmanac.ca.gov/electricity/web_qfer/Heat_Rates.php?goSort=HEAT_RATE&year=2014
Notes:
a. Based on the Higher Heating Value or HHV of the fuel. The heat rate includes start-up and low load operations fuel use.
b. GHG performance conversion factor for natural gas of 0.529 MTCO2/MW per 10,000 Btu/KWh was used to derive these performance values.
c. Based on ISO baseload gross output.

DATA REQUEST

66. Please explain how the capacity factor and efficiency of P3 would not interfere with the generation from existing renewables or with the integration of new renewable generation.

RESPONSE

The dispatch of P3 would not be expected to result in the displacement of energy from existing renewable resources or interfere with the integration of new renewable generation. Most renewable resources have must-take contracts with utilities, guaranteeing purchase of essentially all the energy produced by these renewable generators. Even in those instances where this is not the case (e.g., where renewable generation is participating in a spot market for energy) the variable costs associated with renewable generation are far lower than those associated with P3 (because fuel costs for wind, solar and other renewable generation technologies are zero or minimal); these resources can bid into spot markets for energy at prices far below P3 and other natural gas-fired generators.

California law requires the state’s utilities to obtain at least 20 percent of their electricity supplies from renewable sources by the year 2013, 33 percent by the year 2020, and 50 percent by

2030.[6] Much of this energy will come from variable wind and solar resources to be developed in California, or on an "as generated" basis from neighboring states.[7] Even so, gas-fired power plants are likely to have continuing roles in an evolving high-renewables, low GHG system by providing variable generation and grid operations support; meeting local capacity requirements; satisfying extreme load and system emergency requirements; and providing general energy support.[8] The CEC staff has also determined that, at levels of renewable energy penetration in excess of 33 percent, relatively efficient fast-start, fast-ramping resources such as P3 further contribute to GHG emission reductions by increasing the amount of renewable energy that can be integrated into the electricity system.[9]

This need for gas-fired generation to reliably operate the system was reaffirmed in the CPUC Decision authorizing SCE to procure from 215 MW to 290 MW of electrical capacity in the Moorpark sub-area of the Big Creek/Ventura local reliability area.[10]

DATA REQUEST

67. Taking into account the two preceding factors, please explain how the capacity factor and the efficiency of P3 would reduce system-wide GHG emissions.

RESPONSE

The CAISO is responsible for operating the system so that it provides power reliably and at the lowest cost.[11] Thus, the CAISO dispatches generating facilities generally in order of cheapest to operate (typically the most efficient) to most expensive (typically the least efficient). Therefore, P3 would be expected to be dispatched only when it is a cheaper source of energy than an alternative, that is, when it would displace a more expensive, less efficient resource. Eighty to 90 percent of the cost of dispatching a power plant is the cost of fuel.[12] It follows that P3 would be dispatched when it is more efficient than, or burns less fuel per MWh than, the resource(s) it displaces. If P3 burns less fuel than the resource it displaces, it will by definition produce fewer GHG emissions than that resource. The development and operation of P3 would reduce the use of less efficient generating resources, thereby reducing system-wide GHG emissions.

Also, and as presented in Section 4.1.4.2 of the AFC, P3's compliance with the California Air Resources Board (CARB) Cap-and-Trade Program is an additional basis for finding that P3's GHG emissions will not cause a significant environmental impact. It is incomplete to consider the GHG emissions from the operation of P3 in isolation, without consideration of the overall effect on the electricity grid. However, even if the GHG emissions of the P3 were considered in isolation, its operational GHG impacts would not be significant. This is because, in addition to being consistent with the state's goals, P3 will be required to comply with the state's Cap-and-Trade Program.

CARB adopted the California Cap-and-Trade Program pursuant to its authority under Assembly Bill 32. The Cap-and-Trade Program[13] is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and

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[6] Pub. Util. Code §§ 399.11 et seq. The Governor signed Senate Bill 350 on October 7, 2015.
[7] CEC, FSA for the Carlsbad Energy Center Project Amendments, Air Quality Appendix AQ-1, February 2015.
[8] CEC, FSA for the Carlsbad Energy Center Project Amendments, Air Quality Appendix AQ-1, February 2015.
[9] CEC, PMPD for the Carlsbad Energy Center Project Amendments, June 2015.
[10] CPUC Decision 13-02-015, February 13, 2013.
[11] https://www.caiso.com/market/Pages/MarketProcesses.aspx
[12] IEA/NEA, Projected Costs of Generating Electricity, 2015 Edition. "Fuel cost represents on average nearly 80% of the total levelised cost and up to nearly 90% in some cases." https://www.iea.org/Textbase/npsum/ElecCost2015SUM.pdf
[13] 17 CCR §§ 95800 to 96023.

employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors[14] (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the Program's duration.

Under the Cap-and-Trade Program, CARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities that emit more than 25,000 MTCO2e per year must comply with the Cap-and-Trade Program.[15] Triggering of the 25,000 MTCO2e per year "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Mandatory Reporting Rule or "MRR").[16]

Each covered entity with a compliance obligation is required to surrender "compliance instruments"[17] for each MTCO2e of GHG they emit. Covered entities are allocated free allowances in whole or part (if eligible), buy allowances at auction, purchase allowances from others, or purchase offset credits. A "compliance period" is the time frame during which the compliance obligation is calculated. The years 2013 and 2014 are the first compliance period, the years 2015–2017 are the second compliance period, and the third compliance period is from 2018–2020. At the end of each compliance period, each facility will be required to surrender compliance instruments to ARB equivalent to their total GHG emissions throughout the compliance period. There also are requirements to surrender compliance instruments covering 30% of the prior year's compliance obligation by November of each year. For example, in November 2014, a covered entity was required to submit compliance instruments to cover 30% of its 2013 GHG emissions.

The Cap-and-Trade Regulation provides a firm cap, ensuring that the 2020 statewide emission limit will not be exceeded. An inherent feature of the Cap-and-Trade Program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by CARB in its First Update to the Climate Change Scoping Plan:

> *The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer* ***allowances. But as the cap declines, aggregate emissions must be reduced.***[18]

As climate change is a global phenomenon and the effects of GHG emissions are considered cumulative in nature, a focus on aggregate GHG emissions reductions is warranted.

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[14] See generally 17 CCR §§ 95811, 95812.
[15] 17 CCR § 95812.
[16] 17 CCR §§ 95100-95158.
[17] Compliance instruments are permits to emit, the majority of which will be "allowances," but entities also are allowed to use ARB-approved offset credits to meet up to 8% of their compliance obligations.
[18] CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, at 86 (May 2014) (emphasis added).

If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will be responsible for relatively more emissions reductions. In other words, the Cap-and-Trade Program functions sort of like an insurance policy for meeting California 2020's GHG emissions reduction mandate:

> *The Cap-and-Trade Program establishes an overall limit on GHG emissions from most of the California economy—the "capped sectors." Within the capped sectors, some of the reductions are being accomplished through direct regulations, such as improved building and appliance efficiency standards, the [Low Carbon Fuel Standard] LCFS, and the 33 percent [Renewables Portfolio Standard] RPS. Whatever additional reductions are needed to bring emissions within the cap is accomplished through price incentives posed by emissions allowance prices. Together, direct regulation and price incentives assure that emissions are brought down cost-effectively to the level of the overall cap.*[19]

> *[T]he Cap-and-Trade Regulation provides assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions.*[20]

While the 2020 cap would remain in effect post-2020,[21] the Cap-and-Trade Program is not currently scheduled to extend beyond 2020 in terms of additional GHG emissions reductions. However, CARB has expressed its intention to extend the Cap-and-Trade Program beyond 2020 in conjunction with setting a mid-term target. The "recommended action" in the First Update to the Climate Change Scoping Plan for the Cap-and-Trade Program is: "Develop a plan for a post-2020 Cap-and-Trade Program, including cost containment, to provide market certainty and address a mid-term emissions target."[22] The "expected completion date" for this recommended action is 2017.[23]

Per CEQA Guidelines Section 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project will comply with an approved plan or mitigation program that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area of the project. To qualify as adequate mitigation, such a plan or program must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plan, [and] plans or regulations for the reduction of greenhouse gas emissions." Put another way, CEQA Guidelines Section 15064(h)(3) allows a lead agency to make a finding of non-significance for GHG emissions if a project complies with the CARB Cap-and-Trade Program.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has taken this approach via the adoption of a policy to provide guidance to SJVAPCD staff on how to determine significance of GHG emissions from projects subject to the Cap-and-Trade Program or occurring at entities

[19] Id. at 88.
[20] Id. at 86-87.
[21] California Health & Safety Code § 38551(a) ("The statewide greenhouse gas emissions limit shall remain in effect unless otherwise amended or repealed.").
[22] CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, at 98 (May 2014).
[23] Id.

subject to the Cap-and-Trade Program.[24] By its terms, this policy applies both when the SJVAPCD is the lead agency and when it is a responsible agency under CEQA. The SJVAPCD "has determined that GHG emissions increases that are covered under ARB's Cap-and-Trade regulation cannot constitute significant increases under CEQA…."[25] Other pertinent statements in the SJVAPCD policy are as follows:

> *Consistent with [14] CCR §15064(h)(3), the District finds that compliance with ARB's Cap-and-Trade regulation would avoid or substantially lessen the impact of project-specific GHG emissions on global climate change. … The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change.*[26]

In sum, the SJVAPCD modified its existing CEQA significance threshold for GHG emissions to acknowledge the progress being made by the state in regulating and reducing such emissions, in particular with regard to the Cap-and-Trade Program.

As described in more detail above, the design of the Cap-and-Trade Program assures reductions in GHG emissions. Accordingly, a project's GHG emissions subject to the Cap-and-Trade Program should neither count against a project when assessing its significance under CEQA nor require further mitigation. In its recently adopted policy, the SJVAPCD has taken the same position on the mitigation provided by the Cap-and-Trade Program:

> *[I]t is reasonable to conclude that implementation of the Cap-and-Trade program will and must fully mitigate project-specific GHG emissions for emissions that are covered by the Cap-and-Trade regulation. … [T]he District finds that, through compliance with the Cap-and-Trade regulation, project-specific GHG emissions that are covered by the regulation will be fully mitigated.*[27]

Further, the South Coast Air Quality Management District (SCAQMD) has taken this position in CEQA documents it produced as a lead agency. The SCAQMD has prepared three Negative Declarations and one Draft Environmental Impact Report that demonstrate the SCAQMD has applied its 10,000 MTCO2e/yr. significance threshold in such a way that GHG emissions covered by the Cap-and-Trade Program do not constitute emissions that must be measured against the threshold.[28]

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[24] San Joaquin Valley Air Pollution Control District, CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation, APR – 2030 (June 25, 2014).

[25] Id. at 4.

[26] Id. at 4-5.

[27] San Joaquin Valley Air Pollution Control District, CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation, APR – 2030, at 5 (June 25, 2014).

[28] SCAQMD, Final Negative Declaration for: Ultramar Inc. Wilmington Refinery Cogeneration Project, SCH No. 2012041014 (October 2014)(available at http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/ultramar_neg_dec.pdf?sfvrsn=2); SCAQMD, Final Negative Declaration for: Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project, SCH No. 2013091029 (December 2014)(available at http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf?sfvrsn=2); Final Mitigated Negative Declaration for: Toxic Air Contaminant Reduction for Compliance with SCAQMD Rules 1420.1 and 1402 at the Exide Technologies Facility in Vernon, CA, SCH No. 2014101040 (December 2014)(available at http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/exide-mnd_final.pdf?sfvrsn=2); Draft Environmental Impact Report for the Breitburn Santa Fe Springs Blocks 400/700 Upgrade Project, SCH No: 2014121014 (April 2015)(available at http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2015/deir-breitburn-chapters-1-3.pdf?sfvrsn=2).

Technical Area: Air – Biological Resources
Author: Wenjun Qian

BACKGROUND: NITROGEN DEPOSITION ANALYSIS

The applicant modeled the nitrogen deposition impacts of the project. Table C-2.17 and Table C-2.18 in Appendix C-2 of the AFC show the nitrogen emission rates for the new equipment and for the existing Units 1 and 2. Staff also checked the nitrogen deposition modeling files that the applicant provided in the docketed CDs (TN# 206014). The applicant modeled two nitrogen emissions sources, one for NO_X-based nitrogen and the other NH3-based nitrogen. The applicant used the stack parameters for the new gas turbine for both of the modeled emission sources. The nitrogen deposition modeling files provided by the applicant did not include other emission sources, such as the new emergency generator and the existing MGS Unit 3. The emission rates that the applicant used in the modeling files do not match those shown in Table C-2.17. The applicant used the nitrogen emission rate of 0.29 grams/sec (g/s) from NO_X and 0.41 g/s from NH3 in the modeling analysis. However, Table C-2.17 shows nitrogen emission rate of 0.32 grams/sec (g/s) from NO_X and 0.5 g/s from NH3 for the new gas turbine.

DATA REQUEST

68. Please remodel the nitrogen deposition impacts of the new emergency generator and the existing MGS Unit 3 or justify why they were not modeled.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to CEC Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete and the results are discussed in the enclosed Appendix 49-1. The updated air quality/public health modeling analysis includes updated nitrogen deposition modeling. As with the original nitrogen deposition modeling summarized in the AFC, the updated modeling examines the net increase in nitrogen deposition due to the project. For the analysis summarized in the AFC, this was done by subtracting the baseline nitrogen emissions for MGS Units 1 and 2 from the nitrogen emissions for the new P3 gas turbine. It is this net nitrogen emission increase approach that results in the P3 gas turbine nitrogen emission rates of 0.29 grams/sec (g/s) from NO_X and 0.41 g/s from NH3 that is discussed above in the CEC Background section. Because this analysis was examining the net increase in nitrogen deposition, the impacts for the continued operation of MGS Unit 3 were not included because the impacts for this unit are part of baseline levels. Also, because the annual average nitrogen emission rate for the new emergency generator is so small (i.e., approximately 0.0008 g/sec), the impacts were not included for this unit in the original nitrogen deposition analysis.

For the revised net nitrogen deposition modeling analysis, to account for the phased shutdown of MGS Units 1 and 2 (a project refinement discussed in Appendix 49-1) the baseline nitrogen emissions for a single MGS boiler are subtracted from the P3 gas turbine nitrogen emission rates, resulting in net nitrogen emissions rates of 0.25 g/s from NO_X and 0.35 g/s from NH_3.[29]

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[29] See Appendix 49-1, Appendix 2, revised Tables C-2.17 and C-2.18. P3 nitrogen emissions equal approximately 9.78 tpy for NOx and 15.16 tpy for NH_3. The lower of the two MGS boilers has nitrogen emissions equal to approximately 0.98 tpy for NOx and 3.06 tpy for NH3. Net nitrogen emission increases are: 9.78 – 0.98 = 8.8 tpy N for NOx; 15.16 – 3.06 = 12.1 tpy N for NH3.

Please note that these net nitrogen emission levels for the P3 gas turbine are lower than the net nitrogen emissions levels in the original analysis in the AFC due to a decrease in the expected annual capacity factor for the P3 gas turbine (a project refinement also discussed in Appendix 49-1). In addition, the nitrogen deposition impacts for the new emergency generator are also included in the updated net nitrogen deposition modeling. The MGS Unit 3 impacts are not included in the updated net nitrogen disposition analysis because the impacts for the unit are part of baseline levels. The updated net nitrogen disposition modeling results are shown in the enclosed revised Table 4.2-4 (see Appendix 68-1) with changes shown in strikethrough/underline format. As shown in the table, the revised modeling results indicate a decrease in expected nitrogen deposition levels at all modeled receptor locations compared to the results of the modeling presented in the AFC. Thus, impacts from nitrogen deposition would remain less than significant, and would in fact be less that those presented in the AFC.

In addition to the net nitrogen deposition modeling approach, the revised modeling analysis includes an analysis of the cumulative nitrogen deposition impacts that would result from the project in conjunction with continued operation of MGS Unit 3. This was done by modeling the total nitrogen emissions for the P3 gas turbine (uncorrected for the shutdown of a MGS boiler), new emergency generator engine, MGS Unit 3, and continued operation of one of the MGS boilers. These results are also shown in the enclosed revised Table 4.2-4 (see Appendix 68-1) with changes shown in strikethrough/underline format. As illustrated in the table, the combined effects of the project and MGS Unit 3 would be slightly greater than the effects of the project alone, but would nevertheless only comprise a small portion (less than one percent in most areas) of the "critical loads" that mark the onset of detectable changes in the receptor plant communities. Considering this information, the project would not result in significant impacts from nitrogen deposition, even in aggregation with projected emissions from MGS Unit 3 and continued operation of one MGS boiler.

DATA REQUEST

69. Please explain the differences of the emission rates in the modeling files and in Table C-2.17 and determine which one is correct. Remodel nitrogen deposition as needed.

RESPONSE

Please see Data Response 68.

This results in N emission rates of 0.25 g/sec for NOx and 0.35 g/sec for NH_3 based on 2000 lbs/ton, 453.6 g/lb, 8760 hrs per year, 3,600 secs/hr.

Technical Area: Public Health
Author: Huei-An Chu (Ann), Ph.D.

BACKGROUND: CANCER BURDEN

Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the project. Cancer burden is calculated as the maximum product of any potential carcinogenic risk greater than 1 in one million, and the number of individuals at that risk level. Therefore, if a predicted derived adjusted cancer risk is greater than 1 in one million, the cancer burden is calculated for each census block receptor. Cancer burden is defined as the estimated increase in the occurrence of cancer cases in a population resulting from exposure to carcinogenic air contaminants

DATA REQUEST

70. Please provide the calculations and results of the cancer burden of Puente Power Project within a 6-mile radius of the stack. The estimated cancer burden should not require additional dispersion modeling, but could use the modeling results docketed on August 17, 2015.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to CEC Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete and the results are discussed in the enclosed Appendix 49-1. The updated air quality/public health modeling analysis includes the revised screening level health risk assessment (HRA) results. As with the previous HRA performed for the project (see AFC, page 4.9-7), the updated HRA shows that the area with a carcinogenic risk above 1-in-one-million extends only for approximately 50 meters east of the project fence line within the existing transmission yard. Because are no residential receptors in this small area, the potential cancer burden is zero.

BACKGROUND: KML FILE

In HARP2, after calculating risk results, the Export option allows users to export the risk values of each grid or receptor into a KML file. Then the KML file could be imported into Google Earth to see an aerial image of the grids/receptors. However, staff couldn't generate the KML file since the air dispersion modeling was done separately in AERMOD, not in HARP2.

DATA REQUEST

72. Please provide the AERMOD exported risk data in KML format.

RESPONSE

As discussed in the Applicant's Request for Additional Time to Respond to CEC Staff Data Request Set 2, docketed on November 3, 2015, it was necessary for the Applicant to update the air quality/public health modeling for the P3 due to new information received from the gas turbine vendor. This analysis is complete, and the results are discussed in the enclosed Appendix 49-1. The updated air quality/public health modeling analysis includes the revised screening level health risk assessment (HRA) results. The updated HRA results at each modeling receptor are provided in a KML file included in the air quality/public health modeling compact disc that will be submitted separately to the CEC.

APPENDIX 49-1

REVISED AIR QUALITY/PUBLIC HEALTH MODELING ANALYSIS

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TABLES

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
ADT	average daily traffic
AFC	Application for Certification
AFY	acre-feet per year
AST	aboveground storage tanks
BMP	best management practice
Caltrans	California Department of Transportation
C&D	construction and demolition
CEC	California Energy Commission
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPM	Compliance Project Manager
CUPA	Certified Unified Program Agency
dBA	A-weighted decibels
EDD	Employment Development Department
ESA	Environmental Site Assessment
HBM	hazardous building materials
HMBP	Hazardous Materials Business Plan
HP	horsepower
HRA	health risk assessment
ID	identification
ips	inches per second
KOP	key observation point
L_{50}	noise levels equaled or exceeded during 50 percent of the measured time interval
L_{90}	noise levels equaled or exceeded during 90 percent of the measured time interval
L_{eq}	equivalent sound level
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LT	long-term
$\mu g/m^3$	microgram per cubic meter
MGS	Mandalay Generating Station
MOE	measure of effectiveness
mph	miles per hour
MW	megawatt
NH_3	ammonia
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
OSW	Oxnard Shores West
OTC	once-through cooling
P3	Puente Power Project
PCB	polychlorinated biphenyl
$PM_{2.5}$	particulates less than or equal to 2.5 microns in diameter
PM_{10}	particulates less than or equal to 10 microns in diameter
PPE	Personal Protective Equipment
PPV	peak particle velocity
RCRA	Resource Conservation and Recovery Act of 1976

ROC	reactive organic compounds
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SIL	significant impact levels
SO_2	sulfur dioxide
SOC	Standard Occupational Classification
SO_X	oxides of sulfur
SPL	sound pressure level
ST	short-term
SWPPP	Storm Water Pollution Prevention Plan
TAC	toxic air contaminant
TSCA	Toxic Substance Control Act
TSDF	treatment, storage, and disposal facility
U.S. EPA	United States Environmental Protection Agency
VAC	Visual Absorption Capability
V/C	volume-to-capacity ratio
VCAPCD	Ventura County Air Pollution Control District
VdB	decibel, vibration velocity
VOC	volatile organic compound
VSOI	Visual Sphere of Influence

APPENDIX 49-1
PUENTE POWER PROJECT
REVISED AIR QUALITY/PUBLIC HEALTH ANALYSIS DUE TO UPDATED PERFORMANCE RUNS AND LOWER PARTICULATE EMISSION RATES FOR NEW P3 CTG

Introduction/Overview

The Puente Power Project (P3 or project) Application for Certification (AFC) was filed on April 15, 2015, and was accepted as “data adequate” in June 2015. The project includes the installation of a new simple-cycle GE 7HA.01 natural gas fired combustion turbine generator (CTG). Recently the CTG vendor, GE, provided updated gas turbine performance runs and a reduction in the maximum hourly $PM_{10}/PM_{2.5}$ emission rate from 10.6 to 10.1 lbs/hr for the proposed new P3 CTG. The updated gas turbine performance runs include revised heat input and stack exhaust characteristics for the new P3 CTG and updated NOx, CO, and ROC hourly mass emission levels (due to changes in exhaust parameters) for the various gas turbine operating cases. In addition, the updated gas turbine performance runs include lowered minimum emissions compliance loads[30] (MECL) for the various ambient temperature operating cases. The changes to the P3 CTG MECLs are shown in Table 49-1.

Table 49-1

Summary of MECLs for P3 CTG

CTG Operating Cases Ambient Temp (°F)	Previous MECLs (shown in AFC GT performance runs)	Updated MECLs
38.9	30%	25%
59	30%	25%
77.8	35%	30%
82	36%	31%

Due to these changes, it was necessary to revise the P3 CTG emission estimates summarized in the AFC for the project to account for these updated CTG emission/performance characteristics. In addition, due to the changes in the exhaust parameters for the new P3 CTG, it was necessary to update the air quality ambient impact modeling and public health analysis for the project. As part of these project refinements, the annual capacity factor for the P3 CTG was reduced from the level in the AFC of approximately 28% to approximately 25% to better account for the expected future operation of this unit. When the CEC and VCAPCD staffs learned of the Applicant’s plan to revise the air quality modeling based on the new GE CTG

[30] This is the minimum CTG load where the unit is able to continue to comply with Best Available Control Technology (BACT) limits of 2.5 ppmv @ 15% O2 for NOx, 4.0 ppmv @ 15% O2 for CO, and 2.0 ppmv @ 15% O2 for ROC.

data, they asked the Applicant to also incorporate changes to the modeling procedures adopted since the initial modeling was conducted for the AFC. These requested changes are listed below.

- Use AERMOD version 15181, as opposed to the previously used AERMOD version 14134.
- Use new meteorological data processed with AERMET version 15181, as opposed to the previous modeling which used AERMET version 14134.
- Use a five-year meteorological database covering the period from 2010 to 2014, versus the previous modeling which used a 2009 to 2013 metrological database.
- Use background ambient hourly ozone/NO_2 data covering the period from 2010 to 2014, versus the previous modeling which used 2009 to 2013 hourly ozone/NO_2 background ambient data.
- Use the AERSCREEN fumigation model, versus the previous fumigation modeling which used the SCREEN3 model.

In addition to the above changes, the updated air quality ambient impact modeling and public health analysis reflects the phased shutdown of MGS Units 1 and 2, as discussed in the Project Enhancement and Refinement, Demolition of Mandalay Generating Station Units 1 and 2 docketed on November 19, 2015. (TN# 206698). The air quality/public health analysis in the AFC assumed that MGS Units 1 and 2 would be permanently shutdown following the completion of the commissioning period for the new P3 CTG. For the updated air quality/public health analysis, it is assumed that MGS Unit 2 will be permanently shutdown at the end of the commissioning period for the P3 CTG and MGS Unit 1 will continue to operate for several months and will be permanently shutdown by the applicable once through cooling (OTC) compliance deadline of December 31, 2020. [31]

The above updates are reflected in the revised emission summary tables and air quality/public health modeling summary tables included in this analysis. In addition, these updates are reflected in the revised air quality and public health analysis presented below. The section numbering below corresponds to the section numbering in the AFC.

[31] To better coordinate commissioning, retirement, decommissioning, and demolition activities, the specific sequencing of events will be retirement of MGS Unit 2 prior to completion of commissioning of P3, retirement of MGS Unit 1 by the applicable OTC compliance deadline of December 31, 2020, and decommissioning and demolition of MGS Units 1 and 2 thereafter.

4.0 Environmental Analysis

4.1 Air Quality

This section presents a discussion of the revised air quality analysis and potential impacts related to air quality from the project based on the updates described above in the Introduction/Overview section.

4.1.1 Affected Environment

The updates will not change the geography, topography, climate, meteorology, or existing air quality levels for the project area presented in the AFC.

4.1.2 Laws, Ordinances, Regulations, and Standards

The updates will not change the air quality laws, ordinances, regulations, and standards (LORS) presented in the AFC.

4.1.3 Environmental Consequences

4.1.3.1 Overview of the Analytical Approach to Estimating Facility Impacts

The overall approach for evaluating air quality impacts for the project is not impacted by the updates. In addition, with the exception of the updated CTG performance characteristics, the proposed new and existing emitting units are also not impacted by the updates. The updated P3 CTG performance runs are included in Appendix 2, revised Table C-2.1.

4.1.3.2 Emissions Calculations

As discussed in the Introduction/Overview section, emission estimates for the new P3 CTG are affected by the updated CTG performance runs, new lower maximum hourly $PM_{10}/PM_{2.5}$ emission rate, and new lower MECLs for the CTG. These changes to the emission levels for the CTG will affect the hourly, daily, and annual emission calculations for the project. In addition, the phased shutdown of the MGS Units 1 and 2 also impact the facility-wide emission calculations with the continued operation of one of the MGS boilers following the end of the commissioning period for the P3 CTG. The revisions to project emission levels are reflected in the updated AFC emission summary tables included in Appendix 1, with all changes shown in strikethrough/underline format. In addition to these tables, enclosed as Appendix 2 are updated versions of the detailed emission calculation tables in the AFC. During the emission updating process a typographic error was discovered regarding the maximum heat input used to calculate exhaust flow rates for MGS Units 1 and 2. The maximum heat input rating for MGS Units 1 and 2 was corrected to 1,990 MMBtu/hr rather than the level of 1,900 MMBtu/hr in the previous calculations. The corrected maximum heat input for MGS Units 1 and 2 are shown in revised Table C-2.12 (see Appendix 2).

4.1.3.3 Air Quality Impact Analysis

A revised air quality modeling analysis was performed for the project to reflect the updated P3 CTG exhaust parameters/emission levels and the various air dispersion modeling procedure updates discussed above in the Introduction/Overview section. Also, due to the phased shutdown of the MGS Units 1 and 2, the revised air quality modeling analysis also includes the impacts for the continued operation of one of the MGS boilers. Other than these updates, the revised modeling methodology (e.g., dispersion models used, model options, and building downwash characteristics) is identical to the methodology used for the AFC.

The revised modeled impacts during normal equipment operation, CTG startups/shutdowns, fumigation are shown in the enclosed revised Table 4.1-27 (see Appendix 1). The revised results are shown in strikethrough/underline format. As shown in this table, there are relatively minor changes to the modeling results during normal equipment operation. The largest changes occur with respect to fumigation modeling impacts due to the use of the AERSCREEN fumigation model, versus the previous fumigation modeling which used the SCREEN3 model. Also in response to CEC Data Request Number 59, the revised fumigation modeling includes the impacts for the new emergency generator engine and Unit 3. The maximum modeled impacts are combined with the maximum background ambient levels and compared with the state and federal ambient air quality standards in the enclosed revised Tables 4.1-29 and 4.1-30 (see Appendix 1). The updated detailed air quality modeling files are included in a compact disc that will be submitted separately to the CEC.

As shown in revised Tables 4.1-29 and 4.1-30, the results of the analysis indicate that the project is not expected to cause or contribute to exceedances of state or federal standards for criteria pollutants, with the exception of the daily and annual state PM_{10} standards. Therefore, with respect to NO_2, CO, SO_2, and $PM_{2.5}$, the Applicant does not believe project impacts are significant. For PM_{10}, existing background 24-hour and annual concentrations already exceed the state standards. However, the maximum 24-hour and annual average PM_{10} project impacts are 1.6 microgram per cubic meter ($\mu g/m^3$) and 0.0 $\mu g/m^3$, respectively. These maximum impacts are below the PM_{10} 24-hour and annual average U.S. EPA significant impact levels (SILs) of 5 and 1 $\mu g/m^3$, respectively. The primary purpose of federal SILs is to identify a level of ambient impact that is sufficiently low relative to an ambient air quality standard that the impact can be considered de minimis. Hence, U.S. EPA considers a source whose individual impact falls below a SIL to have a de minimis impact on air quality concentrations that already exist. If a project's impacts are below a federal SIL, these impacts are not considered to cause or contribute to a violation of an ambient air quality standard and/or increment.[32] Consequently, because the project PM_{10} impacts are below federal SILs, the impacts will not cause or contribute to a violation of the 24-hour or annual PM_{10} ambient air quality standards. Therefore, the Applicant does not believe project impacts for this pollutant are significant.

4.1.3.4 Screening Health Risk Assessment

The changes to the screening health risk assessment results are discussed below in Section 4.9, Public Health.

4.1.3.5 Construction Impact Analysis

The construction/decommissioning emission estimates included in the AFC are not impacted by the updates discussed in the Introduction/Overview section. However, in CEC Data Request 51, the CEC Staff requested that the construction air quality modeling analysis be revised to include the impacts for MGS Units 1, 2, and 3 operating in parallel with construction activities. In addition, in CEC Data Request 52, the CEC Staff requested that an air quality modeling analysis be performed to examine the impacts from decommissioning activities combined with the impacts for the new P3 CTG, new emergency generator engine, and continued operation of MGS Unit 3. Furthermore, due to the phased shutdown of MGS Units 1 and 2, the revised decommissioning air quality modeling analysis also includes the impacts for the potential continued operation of one of the MGS boilers in parallel with the decommissioning of the other MGS boiler. The revised construction/ decommissioning air quality modeling analysis also uses the various updates to the modeling procedures summarized above in the

[32] 75 FR 64891: "Accordingly, a source that demonstrates that the projected ambient impact of its proposed emissions increase does not exceed the SIL for that pollutant at a location where a NAAQS or increment violation occurs is not considered to cause or contribute to that violation."

Introduction/Overview section. Finally, as discussed in the Project Enhancement and Refinement - Demolition of Mandalay Generating Station Units 1 and 2 document submitted to the CEC on November 19, 2015, the decommissioning of MGS Units 1 and 2 is expected to occur over approximately a six-month period rather than the three-month period analyzed in the AFC. Therefore, for purposes of the revised decommissioning air quality modeling, the annual emissions for decommissioning activities were conservatively increased by a factor of two to account for this increase in the decommissioning schedule. This increase in maximum annual emissions for decommissioning activities is shown on revised Table C-6-16 (see Appendix 2). The maximum 24-hour average decommissioning emissions are unaffected by this change in schedule. The results of the revised construction/ decommissioning air quality modeling analysis are summarized in Tables C-6-5 and C-6-24 (see Appendix 2). The updated detailed air quality modeling files are included in a compact disc that will be submitted separately to the CEC.

As shown in Tables C-6-5 and C-6-24, the results of the analysis indicate that construction and decommissioning activities are not expected to cause or contribute to exceedances of state or federal standards for criteria pollutants, with the exception of the daily and annual state PM_{10} standards. Therefore, with respect to NO_2, CO, SO_2, and $PM_{2.5}$, the Applicant does not believe project impacts are significant. For PM_{10}, existing background 24-hour and annual concentrations already exceed the state standards.

For decommissioning PM_{10} impacts, the maximum 24-hour and annual average PM_{10} impacts are 1 microgram per cubic meter (μg/m3) and 0.0 μg/m3, respectively. These maximum impacts are below the 24-hour and annual average PM_{10} federal SILs of 5 and 1 μg/m3, respectively. Consequently, because the decommissioning PM_{10} impacts are below federal SILs, the impacts will not cause or contribute to a violation of the 24-hour or annual PM_{10} ambient air quality standards. Therefore, the Applicant does not believe decommissioning impacts for this pollutant are significant.

For construction PM_{10} impacts, while the maximum modeled ambient impacts are above State ambient air quality standards, these impacts drop below the PM_{10} federal SILs within approximately 300 feet of the facility fenceline. Due to a combination of a very limited area exposed to ambient PM_{10} impacts above the federal SILs and the short-term nature of the construction activities, the Applicant believes the construction activities will not result in any significant unmitigated air quality impacts for PM_{10}.

4.1.3.6 Significance Criteria

The updates do not change the significance criteria presented in the AFC.

4.1.3.7 Consistency with Federal Requirements

The updates do not change the conclusions presented in the AFC regarding consistency with applicable federal LORS.

4.1.3.8 Consistency with State Requirements

The updates do not change the conclusions presented in the AFC regarding consistency with applicable State LORS.

4.1.3.9 Consistency with Local Requirements: VCAPCD

The updates do not change the conclusions presented in the AFC regarding consistency with applicable VCAPCD LORS.

4.1.3.10 Greenhouse Gases

The updates do not change the conclusions presented in the AFC regarding consistency with State GHG regulatory programs, including cap-and-trade and annual emission reporting regulations.

4.1.3.11 Attainment Status

The updates do not change the conclusions presented in the AFC regarding the attachment status of the project area.

4.1.4 Cumulative Impacts Analyses

The updates do not change the conclusions presented in the AFC regarding cumulative impacts.

4.1.5 Mitigation Measures

The updates do not change the discussion of mitigation measures presented in the AFC.

4.1.6 Involved Agencies and Agency Contacts

The updates do not change the discussion of agencies and agency contacts presented in the AFC.

4.1.7 Permits Required and Permit Schedule

The updates do not change the discussion of permits required and permit schedule presented in the AFC.

4.1.8 References

Additional references used in the preparation of the revised air quality modeling analysis are listed below.

USEPA (U.S. Environmental Protection Agency), 2015. "Addendum User's Guide for the AMS/EPA Regulatory Model - AERMOD," June, 2015. Available at http://www.epa.gov/ttn/scram/dispersion_prefrec.htm

USEPA (U.S. Environmental Protection Agency), 2015. "AERSCREEN User's Guide" July, 2015. Available at: http://www3.epa.gov/scram001/models/screen/aerscreen_userguide.pdf

4.9 Public Health

This section presents a discussion of the revised public health analysis based on the updates described above in the Introduction/Overview section.

4.9.1 Affected Environment

The updates do not change the public health setting discussion presented in the AFC.

4.9.2 Environmental Consequences

The updates will not change the public health significance criteria, risk analysis method, or characterization of risks presented in the AFC. However, a revised screening health risk assessment (HRA) was performed for the project due to the updated P3 CTG exhaust parameters/emission levels and the various air dispersion modeling procedure updates discussed above in the Introduction/Overview section. As with the original HRA performed as part of the AFC, the revised HRA was performed in accordance with Office of Environmental Health Hazard Assessment (OEHHA) guidance using the latest version of CARB's HARP2 model, the CARB July 2014 health database, and the OEHHA Hot Spots Program Guidance Manual. As part of this screening HRA, the U.S. EPA-recommended air dispersion model, AERMOD, was used along with 5 years of representative meteorological data from the Oxnard airport meteorological station. For the revised HRA the 5 years of meteorological data covers the period from 2010 to 2014 compared to the 2009 to 2013 meteorological data set used for the previous HRA in the AFC. As with the previous HRA in the AFC, the new Risk Assessment Standalone Tool that is part of the HARP2 model was also used with the air dispersion modeling output from the AERMOD model, to perform the revised HRA. The updated detailed HRA modeling files are included in a compact disc that will be submitted separately to the CEC.

For project operational impacts, the results of the revised HRA are summarized in the enclosed updated Table 4.9-4 (see Appendix 1), with revised results shown in strikethrough/underline format. As shown in this table, the revised HRA shows maximum impacts below the CEC's significance thresholds of 10-in-one-million for carcinogenic risk, below an acute non-cancer health hazard index of 1.0, and below chronic/8-hour chronic health hazard indices of 1.0. With regards to cancer burden (i.e., population exposed to a carcinogenic risk greater than 1-in-one-million), because the maximum incremental cancer risk (MICR) is above the 1-in-one-million threshold in an area extending approximately 50 meters east of the project fenceline within the existing transmission yard, and because there are no residential receptors in this small area, the potential cancer burden is zero.

For construction/decommissioning impacts, the construction/decommissioning emission estimates included in the AFC are not impacted by the updates discussed in the Introduction/ Overview section. However, in CEC Data Request 51, the CEC Staff requested that the construction air quality modeling be revised to include the impacts for MGS Units 1, 2, and 3 with the impacts for construction activities. As part of the Applicant's response to this data request, a revised construction HRA was performed to examine the combined impacts from construction activities and operation of MGS Units 1, 2, and 3. In addition, in CEC Data Request 52, the CEC Staff requested that an air quality modeling analysis be performed to examine the impacts from decommissioning activities combined with the impacts for the new P3 CTG, new emergency generator engine, and continued operation of MGS Unit 3. As part of the Applicant's response to this data request, a decommissioning HRA was performed to examine the combined impacts from decommissioning activities and the impacts for the new P3 CTG, new emergency generator engine, and continued operation of MGS Unit 3. Furthermore, due to the phased shutdown of MGS Units 1 and 2 discussed in the Introduction/Overview section, the revised decommissioning HRA analysis also includes the impacts for the continued operation of one of the MGS boilers. Finally, as discussed above in Section 4.1.3.5, the decommissioning annual emission estimates were conservatively increased by a factor of 2 to account for the increase in the decommissioning schedule from a 3-month to a 6-month period. The revised construction/decommissioning HRAs also use the various updates to the modeling procedures summarized above in the Introduction/Overview section. The revised construction/decommissioning HRAs for construction and decommissioning activities show a maximum carcinogenic risk at the point of maximum impact of 2.7-in-one-million and 0.8-in-one-million, respectively. These impacts are below the CEC's significance threshold of 10-in-one-million for carcinogenic risk. The updated detailed HRA modeling files are included in a compact disc that will be submitted separately to the CEC.

4.9.3 Cumulative Impacts Analyses

As discussed in Section 4.9.3 of the AFC, the HRA significance thresholds developed for toxic air contaminant (TACs) are set with sufficient stringency to preclude the potential for any significant cumulative impacts. Therefore, a separate cumulative impacts analysis for TACs is not required.

4.9.4 Mitigation Measures

The updates do not change the discussion of mitigation measures presented in the AFC.

4.9.5 Laws, Ordinances, Regulations, and Standards

The updates do not change the discussion of LORS presented in the AFC.

4.9.6 Involved Agencies and Agency Contacts

The updates do not change the discussion of agencies and agency contacts presented in the AFC.

4.9.7 Permits Required and Permit Schedule

The updates do not change the discussion of permits required and permit schedule presented in the AFC.

4.9.8 References

The updates do not change the references presented in the AFC.

APPENDIX 1

REVISED AIR QUALITY AND PUBLIC HEALTH TABLES IN SECTIONS 4.1 AND 4.9 OF THE P3 AFC

Table 4.1-17 (Revised November 18, 2015) Maximum Proposed Project Fuel Use – CTG (MMBtu)	
Period	**Total Fuel Use**
Per Hour	~~2,579~~ 2,572
Per Day	~~61,898~~ 61,730
Per Year	~~6,326,518~~ 5,529,942

Notes:

CTG = combustion turbine generator
MMBtu = million British thermal units

Table 4.1-18 (Revised November 18, 2015) Maximum Hourly Emission Rates[a]: CTG			
Pollutant	**ppmv, dry at 15 percent oxygen**	**lb/MMBtu**	**lb/hr**
NO_X	2.5	9.1×10^{-3}	~~23.4~~ 23.1
SO_X (short-term)	n/a	2.1×10^{-3}	5.4
SO_X (long-term)	n/a	7.0×10^{-4}	1.8
CO	4.0	8.8×10^{-3}	~~22.8~~ 22.5
ROC	2.0	2.5×10^{-3}	6.5
$PM_{10}/PM_{2.5}$[b]	n/a	~~8.9~~ 9.2 $\times 10^{-3}$	~~10.6~~ 10.1

Notes:

a. Emission rates shown reflect the highest value at any operating load during normal operation (excluding startups/ shutdowns).
b. 100 percent of PM_{10} emissions assumed to be emitted as $PM_{2.5}$.

CO = carbon monoxide
CTG = combustion turbine generator
lb/hr = pounds per hour
lb/MMBtu = pounds million British thermal units
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppmv = parts per million by volume
ROC = reactive organic compounds
SO_X = sulfur oxides

Table 4.1-19 (Revised November 18, 2015) CTG Startup and Shutdown Emission Rates			
	NO_X	**CO**	**ROC**
CTG Startup, lbs/hr	~~98.7~~ 98.6	~~178.4~~ 178.3	~~20.3~~ 20.2
CTG Shutdown, lbs/hr	~~22.7~~ 22.5	~~163.2~~ 163.0	30.2
CTG Startup/Shutdown/Restart, lbs/hr	143.2	412.2	52.2

Note:

Startup and shutdown emission rates reflect the maximum hourly emissions during an hour in which a startup, shutdown—or both—occur.

CO = carbon monoxide
CTG = combustion turbine generator
lbs = pounds/hour
NO_X = oxides of nitrogen
ROC = reactive organic compounds

Table 4.1-20 (Revised November 18, 2015) Maximum Emissions From New Equipment					
	Pollutant				
Emissions/Equipment	**NO_X**	**CO**	**ROC**	**$PM_{10}/PM_{2.5}$**	**SO_X**
Maximum Hourly Emissions[a]					
CTG[a]	143.2	412.2	52.2	~~10.6~~ 10.1	5.4
Diesel Emergency Engine[b]	n/a	n/a	n/a	n/a	n/a
Gas Compressor	—	—	0.0	—	—
Total, pounds per hour	143.2	412.2	52.2	~~10.6~~ 10.1	5.4
Maximum Daily Emissions[a]					
CTG	~~859.2~~ 853.9	~~1730.5~~ 1725.2	~~306.1~~ 304.7	~~245.5~~ 234.9	~~130.6~~ 129.9
Diesel Emergency Engine	0.9	4.5	0.2	0.0	0.0
Gas Compressor	—	—	0.3	—	—
Total, pounds per day	~~860.1~~ 854.8	~~1735.0~~ 1729.7	~~306.6~~ 305.2	~~245.6~~ 235.0	~~130.6~~ 129.9
Maximum Annual Emissions[a]					
CTG	~~36.0~~ 32.1	~~57.4~~ 53.6	~~11.7~~ 10.6	~~12.8~~ 10.7	~~2.2~~ 1.9
Diesel Emergency Engine	0.1	0.4	0.0	0.0	0.0
Gas Compressor	—	—	0.0	—	—
Total, tons per year	~~36.1~~ 32.2	~~57.9~~ 54.1	~~11.8~~ 10.7	~~12.8~~ 10.7	~~2.2~~ 1.9

Notes:

a. Maximum hourly, daily, and annual CTG emission rates include emissions during startups/shutdowns.
b. The diesel emergency generator engine will not be operated during a CTG startup and/or shutdown. Consequently, n/a is shown for all pollutants.

CO = carbon monoxide
CTG = combustion turbine generator
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROC = reactive organic compounds
SO_X = sulfur oxides

Table 4.1-21 (Revised November 18, 2015) Emissions for Existing Units 1 and 2 (Representative 2-Year Average for Period From 1/1/10 To 12/31/14)					
	Pollutant (tons/year)				
Emissions/Equipment	**NO_X**	**CO**	**ROC**	**$PM_{10}/PM_{2.5}$**	**SO_X**
Unit 1	1.9	22.0	0.8	1.4	0.3
Unit 2	3.0	25.9	0.9	1.6	0.4
Total	4.9	~~47.9~~ 48.0	1.7	3.0	0.7

Notes:

CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROC = reactive organic compounds
SO_X = sulfur oxides

Table 4.1-22 (Revised November 18, 2015) Net Emissions Change for Proposed Project (PSD and CEQA)					
	Pollutant (tons/year)				
Emissions/Equipment	**NO_X**	**CO**	**ROC**	**$PM_{10}/PM_{2.5}$**	**SO_X**
Potential to Emit for New Equipment	~~36.1~~ 32.2	~~57.9~~ 54.1	~~11.8~~ 10.7	~~12.8~~ 10.7	~~2.2~~ 1.9
Reductions from Shutdown of ~~Existing Units 1 and 2~~ one MGS Boiler	~~4.9~~ 1.9	~~47.9~~ 22.0	~~1.7~~ 0.8	~~3.0~~ 1.4	~~0.7~~ 0.3
Net Emission Change	~~31.2~~ 30.3	~~10.0~~ 32.1	~~10.1~~ 9.9	~~9.8~~ 9.3	~~1.5~~ 1.6

Notes:

CEQA = California Environmental Quality Act
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PSD = prevention of significant deterioration
ROC = reactive organic compounds
SO_X = sulfur oxides

Table 4.1-23 (Revised November 18, 2015) Net Emissions Change for Proposed Project (VCAPCD NSR)					
	Pollutant (tons/year)				
Emissions/Equipment	**NO_X**	**CO**	**ROC**	**$PM_{10}/PM_{2.5}$**	**SO_X**
Potential to Emit for New CTG	~~36.0~~ 32.1	~~57.4~~ 53.6	~~11.7~~ 10.6	~~12.8~~ 10.7	~~2.2~~ 1.9
Reductions from Shutdown of ~~Existing Units 1 and 2~~ one MGS Boiler[a]	~~4.9~~ 1.9	~~644.4~~ 322.2	~~23.2~~ 11.6	~~41.5~~ 20.8	~~10.0~~ 5.0
Net Emission Change	~~31.1~~ 30.3	~~-587.0~~ -268.6	~~-11.5~~ -1.0	~~-28.7~~ -10.1	~~-7.7~~ -3.1
Potential to Emit for New Emergency Generator Engine	0.1	0.4	0.0	0.0	0.0
Reductions from Shutdown of Existing Emergency Generator Engine	0.0	0.1	0.0	0.0	0.0
Net Emission Change	0.1	0.3	0.0	0.0	0.0
Facility-Wide Net Emission Change	~~31.2~~ 30.3	~~-586.7~~ -268.2	~~-11.5~~ -1.0	~~-28.7~~ -10.1	~~-7.7~~ -3.1

Note:

a. As allowed under emission unit replacement calculations, emission reductions for CO, ROC, PM, and SO_X are based on potential to emit of MGS Units 1 and 2.

CO = carbon monoxide
CTG = combustion turbine generator
NO_X = oxides of nitrogen
NSR = new source review
PM = particulate matter
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ROC = reactive organic compounds
SO_X = sulfur oxides
VCAPCD = Ventura County Air Pollution Control District

Table 4.1-24 (Revised November 18, 2015) Non-Criteria Pollutant Emissions for New Equipment	
Compound	**Emissions (tons/year)**
CTG	
Ammonia (not an HAP)	~~21.06~~ 18.41[a]
Propylene (not an HAP)	~~2.56~~ 2.43
Acetaldehyde	~~0.14~~ 0.13
Acrolein	0.02
Benzene	0.04
1,3-Butadiene	0.00
Ethylbenzene	~~0.11~~ 0.10
Formaldehyde	~~3.05~~ 2.89
Hexane	~~0.86~~ 0.81
Naphthalene	0.00
PAHs (other)	0.00
Propylene Oxide	~~0.10~~ 0.09
Toluene	~~0.44~~ 0.42
Xylene	~~0.22~~ 0.21
Subtotal HAPs	~~4.98~~ 4.72
Subtotal All	~~28.61~~ 25.55
Emergency Engine	
Diesel PM (not a HAP)	0.00
Acrolein	0.00
Subtotal HAPs	0.00
Subtotal All	0.00
Total HAPs (Proposed Project)	~~4.98~~ 4.72
Total All Proposed Project)	~~28.61~~ 25.55

Note:

a. Based on the proposed ammonia slip level of 5 ppm, corrected.

CTG = combustion turbine generator
HAP = hazardous air pollutants
PAH = polycyclic aromatic hydrocarbon
PM = particulate matter

Table 4.1-25 (Revised November 18, 2015) Non-Criteria Pollutant Emissions for Existing Units 1, 2, and 3 (Maximum Potential to Emit)	
Compound	**Emissions (tons/year)**
Ammonia (not an HAP)	78.05
Benzene	0.03
<u>Propylene (Not a HAP)</u>	<u>0.34</u>
<u>Propylene oxide</u>	<u>0.00</u>
Formaldehyde	0.15
Hexane	0.05
Naphthalene	0.01
Dichlorobenzene	0.00
Toluene	~~0.14~~ <u>0.15</u>
1,3-Butadiene	0.00
Acetaldehyde	0.02
Acrolein	0.01
Ethyl Benzene	0.04
PAHs (other)	0.00
Xylene	~~0.10~~ <u>0.11</u>
Total HAPs (Existing Facility)	~~0.54~~ <u>0.56</u>
Total All (Existing Facility)	~~78.93~~ <u>78.96</u>

Notes:

HAP = hazardous air pollutants
PAH = polycyclic aromatic hydrocarbon

Table 4.1-26 (Revised November 18, 2015) New Equipment Greenhouse Gas Emissions						
Unit	**CO_2, metric tons/year**	**CH_4, metric tons/ year**	**N_2O, metric tons/ year**	**SF_6, metric tons/year**	**CO_2e, metric tons/year[a]**	**CO_2, metric tons/ MWh**
New CTG	~~335,685~~ 291,148	~~6~~ 5	1	n/a	—	—
New Emergency Engine	72	0	0	n/a	—	—
Existing Unit 3 Gas Turbine	~~4,799~~ 4,783	0	0	n/a	—	—
New Circuit Breakers	n/a	n/a	n/a	4.20×10^{-4}	—	—
Total	~~340,557~~ 296,003	6	1	0	~~340,918~~ 296,318	0.49

Notes:

a. Includes CH_4, N_2O, and SF_6.

CH_4= methane
CO_2= carbon dioxide
CO_2e = carbon dioxide equivalent
CTG = combustion turbine generator
MWh = megawatt hour
n/a = not applicable
N_2O = nitrous oxide
SF_6= sulfur hexafluoride

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3					
Pollutant	Averaging Time	Modeled Maximum Concentrations (μg/m³)			
		Normal Operations AERMOD	Startup/ Shutdown AERMOD	Fumigation ~~SCREEN3~~ AERSCREEN	Shoreline Fumigation ~~SCREEN3~~ AERSCREEN
New CTG					
NO_2	1-hour	~~1.2~~ **1.5**	~~9.7~~ **12.9**	~~6.1~~ **15.1**	~~37.3~~ **63.1**
	98th Percentile	~~0.7~~ **1.1**	~~5.8~~ **8.6**	-	-
	Annual	0.0	N/A[a]	N/A[c]	N/A[c]
SO_2	1-hour	~~0.3~~ **0.4**	N/A[a]	~~0.2~~ **0.4**	~~1.4~~ **1.3**
	3-hour	0.2	N/A[a]	~~0.2~~ **0.4**	~~0.7~~ **0.8**
	24-hour	0.0	N/A[a]	~~0.0~~ **0.2**	~~0.1~~ **0.2**
	Annual	0.0	N/A[a]	N/A[c]	N/A[c]
CO	1-hour	~~1.4~~ **1.7**	~~33.2~~ **41.7**	~~17.6~~ **43.4**	~~107.3~~ **181.6**
	8-hour	0.4	~~10.4~~ **11.1**	~~10.7~~ **24.0**	~~22.5~~ **42.1**
$PM_{2.5}/PM_{10}$	24-hour	0.1	N/A[b]	~~0.2~~ **0.3**	~~0.2~~ **0.4**
	Annual	0.0	N/A[b]	N/A[c]	N/A[c]
New Emergency Generator Engine					
NO_2	1-hour	~~28.2~~ **30.4**	N/A[d]	~~N/A[e]~~ **14.0**	N/A[e]
	98th percentile	~~23.9~~ **23.8**	N/A[d]	~~N/A[e]~~ -	N/A[e]
	Annual	0.0	N/A[d]	~~N/A[e]~~ **N/A[c]**	N/A[e]
SO_2	1-hour	0.3	N/A[d]	~~N/A[e]~~ **0.1**	N/A[e]

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3					
Pollutant	**Averaging Time**	**Modeled Maximum Concentrations (µg/m³)**			
		Normal Operations AERMOD	**Startup/ Shutdown AERMOD**	**Fumigation ~~SCREEN3~~ AERSCREEN**	**Shoreline Fumigation ~~SCREEN3~~ AERSCREEN**
	3-hour	~~0.2~~ **0.1**	N/A[d]	~~N/A[e]~~ **0.1**	N/A[e]
	24-hour	0.0	N/A[d]	~~N/A[e]~~ **0.0**	N/A[e]
	Annual	0.0	N/A[d]	~~N/A[e]~~ N/A[c]	N/A[e]
CO	1-hour	~~179.9~~ **176.7**	N/A[d]	~~N/A[e]~~ **73.0**	N/A[e]
	8-hour	~~8.7~~ **9.1**	N/A[d]	~~N/A[e]~~ **20.3**	N/A[e]
$PM_{2.5}/PM_{10}$	24-hour	0.0	N/A[d]	~~N/A[e]~~ **0.0**	N/A[e]
	Annual	0.0	N/A[d]	~~N/A[e]~~ **N/A[c]**	N/A[e]
Existing Unit 3					
NO_2	1-hour	~~116.6~~ **162.5**	N/A	~~N/A[e]~~ **177.0**	~~N/A[e]~~ **211.4**
	98th percentile	~~67.6~~ **102.3**	N/A	~~N/A[e]~~ -	~~N/A[e]~~ -
	Annual	0.0	N/A	~~N/A[e]~~ **N/A[c]**	~~N/A[e]~~ **N/A[c]**
SO_2	1-hour	0.4	N/A	~~N/A[e]~~ **0.3**	~~N/A[e]~~ **0.4**
	3-hour	0.2	N/A	~~N/A[e]~~ **0.2**	~~N/A[e]~~ **0.3**
	24-hour	0.0	N/A	~~N/A[e]~~ **0.1**	~~N/A[e]~~ **0.1**
	Annual	0.0	N/A	~~N/A[e]~~ **N/A[c]**	~~N/A[e]~~ **N/A[c]**
CO	1-hour	~~86.1~~ **72.8**	N/A	~~N/A[e]~~ **53.5**	~~N/A[e]~~ **82.1**

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3					
Pollutant	**Averaging Time**	**Modeled Maximum Concentrations (µg/m^3)**			
		Normal Operations AERMOD	**Startup/ Shutdown AERMOD**	**Fumigation ~~SCREEN3~~ AERSCREEN**	**Shoreline Fumigation ~~SCREEN3~~ AERSCREEN**
	8-hour	~~21.9~~ **21.0**	N/A	~~N/A[e]~~ **37.4**	~~N/A[e]~~ **41.2**
$PM_{2.5}/PM_{10}$	24-hour	0.7	N/A	~~N/A[e]~~ **1.6**	~~N/A[e]~~ **1.6**
	Annual	0.0	N/A	~~N/A[e]~~ **N/A[c]**	~~N/A[e]~~ **N/A[c]**

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3 (Continued)					
Pollutant	**Averaging Time**	**Modeled Maximum Concentrations (µg/m^3)**			
		Normal Operations AERMOD	**Startup/ Shutdown AERMOD**	**Fumigation ~~SCREEN3~~ AERSCREEN**	**Shoreline Fumigation ~~SCREEN3~~ AERSCREEN**
One Existing MGS Boiler					
NO_2	**1-hour**	**3.2**	**N/A**	**4.5**	**19.8**
	98th percentil e	**1.7**	**N/A**	**-**	**-**
	Annual	**0.0**	**N/A**	**N/A[c]**	**N/A[c]**
SO_2	**1-hour**	**0.5**	**N/A**	**0.6**	**2.5**
	3-hour	**0.2**	**N/A**	**0.4**	**1.3**
	24-hour	**0.1**	**N/A**	**0.2**	**0.2**
	Annual	**0.0**	**N/A**	**N/A[c]**	**N/A[c]**
CO	**1-hour**	**30.1**	**N/A**	**37.2**	**163.8**
	8-hour	**9.9**	**N/A**	**20.7**	**37.3**
$PM_{2.5}/PM_{10}$	**24-hour**	**0.4**	**N/A**	**0.7**	**0.9**

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3 (Continued)					
Pollutant	**Averaging Time**	**Modeled Maximum Concentrations (µg/m³)**			
		Normal Operations AERMOD	**Startup/ Shutdown AERMOD**	**Fumigation ~~SCREEN3~~ AERSCREEN**	**Shoreline Fumigation ~~SCREEN3~~ AERSCREEN**
	Annual	**0.0**	**N/A**	**N/A[c]**	**N/A[c]**
Combined Impacts New Equipment					
NO_2	1-hour	~~28.2~~ **30.5**	N/A[f]	~~N/A[f]~~ **15.1[g]**	~~N/A[f]~~ **63.1[g]**
	98th percentile	~~23.9~~ **23.8**	N/A[f]	N/A[f]	N/A[f]
	Annual	0.0	N/A[f]	~~N/A[f]~~ **N/A[c]**	~~N/A[f]~~ **N/A[c]**
SO_2	1-hour	~~0.3~~ **0.4**	N/A[f]	~~N/A[f]~~ **0.4[g]**	~~N/A[f]~~ **1.3[g]**
	3-hour	0.2	N/A[f]	~~N/A[f]~~ **0.4[g]**	~~N/A[f]~~ **0.8[g]**
	24-hour	0.0	N/A[f]	~~N/A[f]~~ **0.2[g]**	~~N/A[f]~~ **0.2[g]**
	Annual	0.0	N/A[f]	~~N/A[f]~~ **N/A[c]**	~~N/A[f]~~ **N/A[c]**
CO	1-hour	~~179.9~~ **176.7**	N/A[f]	~~N/A[f]~~ **73.0[g]**	~~N/A[f]~~ **181.6[g]**
	8-hour	~~8.7~~ **9.1**	N/A[f]	~~N/A[f]~~ **24.0[g]**	~~N/A[f]~~ **42.1[g]**
$PM_{2.5}/PM_{10}$	24-hour	0.1	N/A[f]	~~N/A[f]~~ **0.3[g]**	~~N/A[f]~~ **0.4[g]**
	Annual	0.0	N/A[f]	~~N/A[f]~~ **N/A[c]**	~~N/A[f]~~ **N/A[c]**
Combined Impacts New Equipment, Unit 3, and One MGS Boiler					
NO_2	1-hour	~~116.7~~ **162.5**	~~116.7~~ **162.5**	~~6.1~~ **177.0[g]**	~~37.3~~ **211.4[g]**

Table 4.1-27 (Revised November 18, 2015) Normal Operation Air Quality Modeling Results for P3 (Continued)					
		Modeled Maximum Concentrations (µg/m^3)			
Pollutant	**Averaging Time**	**Normal Operations AERMOD**	**Startup/ Shutdown AERMOD**	**Fumigation ~~SCREEN3~~ AERSCREEN**	**Shoreline Fumigation ~~SCREEN3~~ AERSCREEN**
	98th percentile	~~67.6~~ **103.5**	~~67.6~~ **106.3**	-	-
	Annual	0.0	N/A[a]	N/A[c]	N/A[c]
SO_2	1-hour	~~0.4~~ **0.7**	N/A[b]	~~0.2~~ **0.6[g]**	~~1.4~~ **2.5[g]**
	3-hour	~~0.3~~ **0.4**	N/A[b]	~~0.2~~ **0.4[g]**	~~0.7~~ **1.3[g]**
	24-hour	~~0.0~~ **0.1**	N/A[b]	~~0.0~~ **0.2[g]**	~~0.1~~ **0.2[g]**
	Annual	0.0	N/A[a]	N/A[c]	N/A[c]
CO	1-hour	~~179.9~~ **176.7**	~~86.1~~ **72.8**	~~17.6~~ **73.0[g]**	~~107.3~~ **181.6[g]**
	8-hour	~~22.0~~ **25.8**	~~22.0~~ **21.1**	~~10.7~~ **37.4[g]**	~~22.5~~ **42.1[g]**
$PM_{2.5}$/PM_{10}	24-hour	~~0.7~~ **1.0**	N/A[b]	~~0.2~~ **1.6[g]**	~~0.2~~ **1.6[g]**
	Annual	0.0	N/A[b]	N/A[c]	N/A[c]

Notes:

a. Not applicable, because startup/shutdown emissions are included in the modeling for annual average.
b. Not applicable, because emissions are not elevated above normal operation levels during startups/shutdowns.
c. Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.
d. Not applicable, because engine will not operate during CTG startups/shutdowns.
e. Not applicable, ~~this type of modeling is not performed for small combustion sources with relatively short stacks~~ the AERSCREEN model does not provide a result for this stack because the plume height is below the TIBL Height.
f. Impacts are the same as shown for CTG.
g. The AERSCREEN model is a single stack model that is not capable of modeling combined impacts from multiple stacks. Therefore, the results shown are the maximum from the various individual sources modeled.

AERMOD = AMS/USEPA Regulatory Model
CO = carbon monoxide
CTG = combustion turbine generator
µg/m^3 = micrograms per cubic meter
N/A = not available
NO_2= nitrogen dioxide
P3 = Puente Power Project
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Table 4.1-28 (Revised November 18, 2015) **Maximum Background Concentrations** **Project Area, 2012 ~~1~~– 2014 ~~3~~ (μg/m³)**				
Pollutant	**Averaging Time**	**201~~1~~2**	**201~~2~~3**	**201~~3~~4**
NO_2 (Oxnard)	1-hour	~~**169.5**~~ **107.4**	~~107.4~~ 75.3	~~75.3~~ 73.4
	Fed. 1-hour[a]	~~**67.8**~~ **67.8**	~~**67.8**~~ 64.0	~~64.0~~ 60.2
	Annual	~~**13.2**~~ **13.2**	~~**13.2**~~ **13.2**	~~**13.2**~~ 11.6
SO_2 (Santa Barbara – UCSB)	1-hour	~~**7.9**~~ 5.2	~~5.2~~ 5.2	~~5.2~~ **10.5**
	Fed. 1-hour[b]	~~**7.9**~~ **7.9**	~~**7.9**~~ 5.2	~~5.2~~ 4.4
	24-hour	~~**2.6**~~ 2.6	~~**2.6**~~ **5.2**	~~**2.6**~~ 0.8
	Annual	~~0.0~~ —[c]	~~—[c]~~ —[c]	~~—[c]~~ —[c]
CO (Santa Barbara – East Canon Perdido)	1-hour	~~**2,875**~~ 2,415	~~2,415~~ 2,875	~~**2,875**~~ **4,582**
	8-hour	~~**2,185**~~ 1,035	~~1,035~~ **1,265**	~~1,265~~ **1,265**
PM_{10} (Oxnard)	24-hour	~~51.7~~ **56.9**	~~**56.9**~~ 46.7	~~46.7~~ 51.3
	Annual	~~21.6~~ 20.4	~~20.4~~ 23.6	~~**23.6**~~ **25.0**
$PM_{2.5}$ (Oxnard)	24-hour[d]	~~**18.3**~~ 15.9	~~15.9~~ 16.6	~~16.6~~ **18.1**
	Annual	~~8.9~~ 9.0	~~**9.0**~~ 9.0	~~**9.0**~~ **9.1**

Source: California Air Quality Data, CARB, n.d.; and USEPA AIRData website *www.epa.gov/air/data/*. Reported values have been rounded to the nearest tenth of a μg/m³ except for PM_{10} which were already rounded to the nearest integer.

Notes: With the exception of federal 1-hour NO_2, federal 1-hr SO_2, and 24-hr $PM_{2.5}$, **bolded** values are the highest during the 3 years and are used to represent background concentrations.

a. Federal 1-hour NO_2 is shown as the 3-year average 98th percentile, because that is the basis of the federal standard.
b. Federal 1-hour SO_2 is shown as the 3-year average 99th percentile, because that is the basis of the federal standard.

c. There were insufficient data to determine annual SO_2 for 2012, 2013 and 2014.
d. 24-hour average $PM_{2.5}$ concentrations shown are 3-year average 98th percentile values, rather than highest values, because compliance with the ambient air quality standards is based on 98th percentile readings.

CARB = California Air Resources Board
CO = carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2= nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
UCSB = University of California, Santa Barbara
USEPA = U.S. Environmental Protection Agency

Table 4.1-29 (Revised November 18, 2015) Modeled Maximum Proposed Project Impacts (Normal Operation)						
Pollutant	**Averaging Time**	**Maximum Project Impact (μg/m^3)**	**Background (μg/m^3)**	**Total Impact (μg/m^3)**	**State Standard (μg/m^3)**	**Federal Standard (μg/m^3)**
Impacts for New Equipment						
NO_2	1-hour	~~37.3~~ **63.1**	~~169.5~~ **107.4**	~~207~~ **171**	339	—
	98th percentile	~~23.9~~ **23.8**	~~67.8[a]~~ **67.1[a]**	~~69.3~~ **72.6[d]**	—	188
	Annual	0.0	13.2	13	57	100
SO_2	1-hour	~~1.4~~ **1.3**	~~7.9~~ **10.5**	~~9~~ **12**	655	—
	99th percentile	~~1.4~~ **1.3**	~~7.9[c]~~ **10.5[c]**	~~9~~ **12**	—	196
	24-hour	~~0.1~~ **0.2**	5.2	5	105	
CO	1-hour	~~179.9~~ **181.6**	~~2,875.0~~ **4,582.0**	~~3,055~~ **4,764**	23,000	40,000
	8-hour	~~22.5~~ **42.1**	~~2,185.0~~ **1,265.0**	~~2,208~~ **1,307**	10,000	10,000
PM_{10}	24-hour	~~0.2~~ **0.4**	56.9	57	50	150
	Annual	0.0	~~23.6~~ **25.0**	~~24~~ **25**	20	—
$PM_{2.5}$	24-hour	~~0.2~~ **0.4**	~~18.3[b]~~ **18.1[b]**	19	—	35
	Annual	0.0	~~9.0~~ **9.1**	9	12	12
Impacts for New Equipment, Unit 3 and One MGS Boiler						
NO_2	1-hour	~~116.7~~ **211.4**	~~169.5~~ **107.4**	~~286~~ **319**	339	—
	98th percentile	~~67.6~~ **106.3**	~~67.8[a]~~ **67.1[a]**	~~92~~ **137[d]**	—	188
	Annual	0.0	13.2	13	57	100
SO_2	1-hour	~~1.4~~ **2.5**	~~7.9~~ **10.5**	~~9~~ **13**	655	—

Table 4.1-29 (Revised November 18, 2015) Modeled Maximum Proposed Project Impacts (Normal Operation)						
Pollutant	**Averaging Time**	**Maximum Project Impact ($\mu g/m^3$)**	**Background ($\mu g/m^3$)**	**Total Impact ($\mu g/m^3$)**	**State Standard ($\mu g/m^3$)**	**Federal Standard ($\mu g/m^3$)**
	99th percentile	~~1.4~~ **2.5**	~~7.9[c]~~ **10.5[c]**	~~9~~ **13**	—	196
	24-hour	~~0.1~~ **0.2**	5.2	5	105	
CO	1-hour	~~179.9~~ **181.6**	~~2,875.0~~ **4,582.0**	~~3,055~~ **4,764**	23,000	40,000
	8-hour	~~22.5~~ **42.1**	~~2,185.0~~ **1,265.0**	~~2,208~~ **1,307**	10,000	10,000
PM_{10}	24-hour	~~0.7~~ **1.6**	56.9	~~58~~ **59**	50	150
	Annual	0.0	~~23.6~~ **25.0**	~~24~~ **25**	20	—
$PM_{2.5}$	24-hour	~~0.7~~ **1.6**	~~18.3[b]~~ **18.1[b]**	~~19~~ **20**	—	35
	Annual	0.0	~~9.0~~ **9.1**	9	12	12

Notes:

a. 1-hour NO_2 background concentration is shown as the 3-year average of the 98th percentile, because that is the basis of the federal standard.
b. 24-hour $PM_{2.5}$ background concentration reflects 3-year average of the 98th percentile values, based on form of standard.
c. 1-hour SO_2 background concentration reflects 3-year average of the 99th percentile values, based on form of standard.

d. Based on AERMOD results which includes the ambient background NO_2 levels.

CO = carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2= nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Table 4.1-30 (Revised November 18, 2015) Modeled Maximum Proposed Project Impacts (Commissioning Period)						
Pollutant	**Averaging Time**	**Maximum Project Impact[a] (µg/m³)**	**Background (µg/m³)**	**Total Impact (µg/m³)**	**State Standard (µg/m³)**	**Federal Standard (µg/m³)**
NO_2	1-hour	~~116.8~~ **162.5**	~~169.5~~ **107.4**	~~286~~ **270**	339	—
	98th percentile	~~70.5~~ **108.5**	~~67.8[b]~~ **67.1[b]**	~~95~~ **141[e]**	—	188
SO_2	1-hour	1.0	~~7.9~~ **10.5**	~~9~~ **12**	655	—
	99th percentile	1.0	~~7.9[c]~~ **10.5[c]**	~~9~~ **12**	—	196
	24-hour	0.2	5.2	5	105	—
CO	1-hour	~~198.6~~ **226.6**	~~2,875~~ **4,582**	~~3,094~~ **4,809**	23,000	40,000
	8-hour	~~67.0~~ **64.4**	~~2,185~~ **1,265**	~~2,252~~ **1329**	10,000	10,000
PM_{10}	24-hour	1.0	56.9	58	50	150
$PM_{2.5}$	24-hour	1.0	~~18.3[d]~~ **18.1[d]**	19	—	35

Notes:

a. Includes impacts from existing MGS Units 1, 2, and 3.
b. One-hour NO_2 background concentration is shown as the 98th percentile, because that is the basis of the federal standard.
c. One-hour SO_2 background concentration reflects 3-year average of the 99th percentile values based on form of standard.
d. 24-hr $PM_{2.5}$ background concentration reflects 3-year average of the 98th percentile values based on form of standard.
e. Based on AERMOD results which includes the ambient background NO_2 levels.

CO = carbon monoxide
µg/m³ = micrograms per cubic meter
MGS = Mandalay Generating Station
NO_2= nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Table 4.1-31 (Revised November 18, 2015) Comparison of Maximum Modeled Impacts and PSD Significant Impact Levels				
Pollutant	**Averaging Time**	**Significant Impact Level, μg/m^3**	**Maximum Modeled Impact for P3, μg/m^3**	**Exceed Significant Impact Level?**
NO_2	1-Hour	7.5[a]	~~28.2~~ **30.5**	Yes
	Annual	1	0.0	No
SO_2	1-Hour	7.8[b]	~~0.3~~ **0.4**	No
	3-Hour	25	0.2	No
	24-Hour	5	0.0	No
	Annual	1	0.0	No
CO	1-Hour	2000	~~179.9~~ **176.7**	No
	8-Hour	500	~~8.7~~ **9.1**	No
PM_{10}	24-Hour	5	0.1	No
	Annual	1	0.0	No
$PM_{2.5}$[c]	24-Hour	1.2	0.1	No
	Annual	0.3	0.0	No

Notes:

a. USEPA has not yet defined SILs for 1-hour NO_2 and SO_2 impacts. However, USEPA has suggested that, until SILs have been promulgated, interim values of 4 ppb (7.5 μg/m^3) for NO_2 and 3 ppb (7.8 μg/m^3) for SO_2 may be used (USEPA [2010c]; USEPA [2010d]). These values will be used in this analysis as interim SILs.

b. USEPA (2010e), p. 64891.

c. In January 2013, the D.C. Circuit Court of Appeals ruled that the $PM_{2.5}$ SILs could not be used as a definitive exemption from the requirements to perform $PM_{2.5}$ preconstruction monitoring or a $PM_{2.5}$ increments analysis or AQIA. However, USEPA's March 2013 interpretation of the Court's decision indicated that the SILs can be used as guidance.

AQIA = air quality impact analysis
CO = carbon monoxide
μg/m^3 = micrograms per cubic meter
NO_2= nitrogen dioxide
P3 = Puente Power Project
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppb = parts per billion
PSD = prevention of significant deterioration
SIL = significance impact level
SO_2 = sulfur dioxide
USEPA = U.S. Environmental Protection Agency

Table 4.1-32 (Revised November 18, 2015) Net Emission Change and PSD Applicability			
Pollutant	**Facility Net Increase (TPY)**	**PSD Significance Levels (TPY)**	**Are Increases Significant?**
NO_X	~~31.2~~ 30.3	40	No
SO_2	~~1.5~~ 1.6	40	No
ROC	~~10.1~~ 9.9	N/A[a]	N/A
CO	~~10.0~~ 32.1	100	No
PM_{10}	~~9.8~~ 9.3	15	No
$PM_{2.5}$	~~9.8~~ 9.3	10	No

Notes:

a. Because the project area is classified as a federal nonattainment for ozone, this pollutant is not subject to PSD review.

CO = carbon monoxide
NO_X = oxides of nitrogen
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide
ROC = reactive organic compounds
N/A = not available
PSD = prevention of significant deterioration
TPY = tons per year

Table 4.1-35 (Revised November 18, 2015) Comparison of the P3 Emissions to Regional Precursor Emissions in 2020: Annual Basis[a]	
Ozone Precursors – Annual Basis	
Total Ventura County Ozone Precursors, TPY	50,293
Total P3 Ozone Precursor Emissions, TPY	~~48~~ <u>43</u>
P3 Ozone Precursor Emissions as Percent of Regional Total	~~0.10~~ <u>0.09</u> percent
Reductions from Shutdown of Existing Units (5-Year Lookback), TPY[b]	4
Reductions from Shutdown of Existing Units (10-Year Lookback), TPY[c]	8
P3 Net Ozone Precursor Emissions with Shutdown of Existing Units (5-Year Lookback), TPY	~~44~~ <u>39</u>
P3 Net Ozone Precursor Emissions with Shutdown of Existing Units (10-Year Lookback), TPY	~~40~~ <u>35</u>
P3 Net Ozone Precursor Emissions as Percent of Regional Total, with Shutdown of Existing Units	~~0.09~~ <u>0.08</u> percent
PM_{10} Precursors – Annual Basis	
Total Ventura County PM_{10} Precursors, TPY	63,484
Total P3 PM_{10} Precursor Emissions, TPY	~~63~~ <u>56</u>
P3 PM_{10} Precursor Emissions as Percent of Regional Total	~~0.10~~ <u>0.09</u> percent
Reductions from Shutdown of Existing Units (5-Year Lookback), TPY[b]	7
Reductions from Shutdown of Existing Units (10-Year Lookback), TPY[c]	12
P3 Net PM_{10} Precursor Emissions with Existing Units (5-Year Lookback), TPY	~~56~~ <u>49</u>
P3 Net PM_{10} Precursor Emissions with Existing Units (10-Year Lookback), TPY	~~51~~ <u>43</u>
P3 Net PM_{10} Precursor Emissions as Percent of Regional Total, with Shutdown of Existing Units	~~0.09~~ <u>0.08</u> percent
PM_{10}/$PM_{2.5}$ Precursors – Annual Basis	
Total Ventura County $PM_{2.5}$ Precursors, TPY	58,130
Total P3 $PM_{2.5}$ Precursor Emissions, TPY	~~63~~ <u>56</u>
P3 $PM_{2.5}$ Precursor Emissions as Percent of Regional Total	~~0.11~~ <u>0.10</u> percent
Reductions from Shutdown of Existing Units (5-Year Lookback), TPY[b]	7
Reductions from Shutdown of Existing Units (10-Year Lookback), TPY[c]	12
P3 Net $PM_{2.5}$ Precursor Emissions with Existing Units (5-Year Lookback), TPY	~~56~~ <u>49</u>
P3 Net $PM_{2.5}$ Precursor Emissions with Existing Units (10-Year Lookback), TPY	~~51~~ <u>43</u>
P3 Net $PM_{2.5}$ Precursor Emissions as Percent of Regional Total, with Shutdown of Existing Units	~~0.10~~ <u>0.08</u> percent

Table 4.1-35 (Revised November 18, 2015) Comparison of the P3 Emissions to Regional Precursor Emissions in 2020: Annual Basis[a]
Notes: a. Countywide emissions calculated as 365 times daily emissions. b. Based on average emissions during past 5 years (2010 through 2014). c, Base on average emissions during past 10 years (2005 through 2014). P3 = Puente Power Project PM_{10} = particulate matter less than 10 microns in diameter $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter TPY = tons per year

Table 4.1-36 (Revised November 18, 2015)
Net GHG Emissions Change for Proposed Project

Equipment	Total MT CO_2e [a]
P3 vs. Shutdown of Existing Units	
Reductions from Shutdown of Existing Units	
Units 1 and 2 (5-Year Lookback)[b]	~~88,531~~ 88,231
Units 1 and 2 (10-Year Lookback)[c]	~~156,099~~ 155,570
New Equipment (P3)	
CTG and Emergency Engine[d]	~~340,918~~ 296,318
Net Emission Change (5-Year Lookback)	~~252,387~~ 208,087
Net Emission Change (10-Year Lookback)	~~184,819~~ 140,748

Notes:
a. Metric tons of carbon dioxide equivalent.
b. Based on average emissions during past 5 years (2010 to 2014).
c. Base on average emissions during past 10 years (2005 to 2015).
d. Includes SF_6 from circuit breakers.

CTG = combustion turbine generator
GHG =greenhouse gas
MT CO_2e = metric tons of carbon dioxide equivalent
P3 = Puente Power Project
SF_6= sulfur hexafluoride

Table 4.1-37 (Revised November 18, 2015) Net Nitrogen Emissions Change for Proposed Project	
Equipment	**Total Nitrogen Emissions (tons/year)[a]**
Reductions from Shutdown of Existing Units	
Units 1 and 2 (5-Year Lookback)[b]	4
Units 1 and 2 (10-Year Lookback)[c]	7
New Equipment (P3)	
CTG and Emergency Engine[d]	~~28~~ 25
Net Emission Change (5-Year Lookback)	~~24~~ 21
Net Emission Change (10-Year Lookback)	~~21~~ 18

Notes:

a. Includes nitrogen associated with NO_X and ammonia emissions.
b. Based on average emissions during past 5 years (2010 through 2014).
c. Based on average emissions during past 10 years (2005 through 2014).
d. Excludes existing MGS Unit 3.

CTG = combustion turbine generator
MGS = Mandalay Generating Station
NO_X = oxides of nitrogen
P3 = Puente Power Project

Table 4.9-4 (Revised November 18, 2015) Summary of Potential Health Risks				
Receptor	**Carcinogenic Risk (per million)**	**Cancer Burden**	**Acute Health Hazard Index**	**Chronic/8-hr Chronic Health Hazard Indices**
New Equipment Normal Operation (CTG/emergency engine) and Unit 3 and One MGS Boiler				
Maximally Exposed Individual (MEI) at PMI	~~1.2×10^{-6}[a]~~ **1.3×10^{-6}[a]**	0[c]	~~1.6×10^{-2}~~ **1.3×10^{-2}**	~~$2.1 \times 10^{-4}/8.5 \times 10^{-5}$~~ **$2.2 \times 10^{-4}/8.8 \times 10^{-5}$**
Maximally Exposed Individual Resident (MEIR)	~~2.3×10^{-7}[a]~~ **3.3×10^{-7}[a]**		~~6.1×10^{-3}~~ **6.2×10^{-3}**	~~$8.9 \times 10^{-5}/6.3 \times 10^{-5}$~~ **$9.8 \times 10^{-5}/6.4 \times 10^{-5}$**
Maximally Exposed Individual Worker (MEIW)	1.0×10^{-7}[b]		~~1.6×10^{-2}~~ **1.3×10^{-2}**	~~N/A[d]/8.5×10^{-5}~~ **N/A[d]/8.9×10^{-5}**
New CTG Startups/Shutdowns				
MEI (acute impact only)	N/A	N/A	~~2.1×10^{-2}~~ **2.4×10^{-2}**	N/A
New CTG Commissioning Period (includes impacts for existing MGS Units 1 through 3)				
MEI (acute impact only)	N/A	N/A	~~1.6×10^{-2}~~ **1.3×10^{-2}**	N/A
Significance Level	10	1.0	1.0	1.0

Notes:

a. Based on High Point Method, which results in the maximum cancer risk.
b. The worker is assumed to be exposed at the work location 8 hours per day, instead of 24; 245 days per year, instead of 365; and for 40 years, instead of 70.
c. Cancer burden is zero because offsite cancer risk above 1.0 per million only occurs in receptors located within existing transmission yard (a small area with no residential receptors).
d. Because of the exposure correction discussed in footnote b, a 70-year-based chronic health hazard index is not applicable to a worker.

CTG = combustion turbine generator
MEI = maximum exposed individual
MEIR = maximum exposed individual resident
MEIW = maximum exposed individual worker
MGS = Mandalay Generating Station
N/A = not applicable

APPENDIX 2

REVISED DETAILED EMISSION AND MODELING INPUT TABLES IN APPENDIX C OF THE P3 AFC

Table C-2.1 (Revised November 18, 2015)
Puente Power Project
Performance Runs for Gas Turbine

Ambient Condition	Winter	Winter	ISO	ISO	Summer	Summer	Summer	Summer	Summer	Summer
Ambient Temperature (deg. F)	38.9	38.9	59	59	77.8	77.8	77.8	82	82	82
Relative Humidity, %	26%	26%	60%	60%	50%	50%	50%	31%	31%	31%
Load	Maximum	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Maximum	Maximum	Minimum
Evap Cooling?	Off	Off	Off	Off	On	Off	Off	On	Off	Off
Output Summary										
Gross Output, MW	280	70	276	69	270	258	76	272	254	77
HHV Fuel Input, MMBtu/hr	2,572.07	1,080.07	2,552.16	1,057.38	2,507.74	2,417.99	1,093.67	2,521.81	2,384.57	1,101.53
Fuel Flow, scf/hr	2,523,252	1,059,268	2,502,903	1,037,111	2,459,944	2,371,766	1,072,608	2,473,510	2,337,851	1,080,295
Stack Parameters										
Stack Exhaust Flow, 1000s lb/hr	6,109.00	3,316.00	6,197.00	3,297.00	6,158.00	6,039.00	3,398.00	6,193.00	6,012.00	3,433.00
Stack Exhaust Temperature, Deg.F	900	900	900	900	900	900	900	900	900	900
Exhaust Composition, Vol %										
N_2	75.50%	76.04%	74.94%	75.46%	74.31%	74.58%	75.02%	74.53%	74.93%	75.36%
O_2	14.03%	15.57%	14.04%	15.50%	13.95%	14.11%	15.38%	14.00%	14.26%	15.48%
CO_2	3.19%	2.48%	3.12%	2.44%	3.07%	3.02%	2.44%	3.07%	3.01%	2.44%
H_2O	6.38%	4.99%	7.00%	5.69%	7.77%	7.39%	6.27%	7.50%	6.91%	5.82%
Ar	0.91%	0.91%	0.91%	0.90%	0.89%	0.89%	0.89%	0.89%	0.89%	0.91%
Molecular Weight	28.56	28.64	28.48	28.56	28.39	28.43	28.5	28.42	28.48	28.55
Stack Exhaust Flow, 1000s ACFM	3,530.67	1,922.03	3,587.69	1,915.87	3,576.29	3,485.05	1,977.90	3,592.25	3,482.77	1,995.01
Stack Emission Rates										
NOx, ppmvd@15% O_2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CO, ppmvd@15% O_2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
ROC as CH_4, ppmvd@15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NH_3, ppmvd@15% O_2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Particulates, lb/hr	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
NOx, lb/hr	23.1	9.7	22.9	9.5	22.5	21.7	9.8	22.6	21.4	9.9
CO, lb/hr	22.5	9.4	22.3	9.2	21.9	21.2	9.5	22.1	20.9	9.6
ROC as CH_4, lb/hr	6.4	2.7	6.4	2.6	6.3	6.1	2.7	6.3	6.0	2.8
NH_3 Slip, lb/hr	17.1	7.2	17.0	7.0	16.7	16.1	7.3	16.8	15.9	7.3

Table C-2.2 (Revised November 18, 2015)
Puente Power Project
Gas Turbine Hourly Emissions - Startup/Shutdown Emissions

Gas Turbine - Hourly Startup Emissions											
	Time (minutes)	NOx Emissions (lbs/hr)	CO Emissions (lbs/hr)	ROC Emissions (lbs/hr)	PM10 Emissions (lbs/hr)	SOx Emissions (lbs/hr)	NOx Emissions (lbs)	CO Emissions (lbs)	ROC Emissions (lbs)	PM10 Emissions (lbs)	SOx Emissions (lbs)
Maximum Startup Emissions	30	N/A	N/A	N/A	N/A	5.4	87.0	167.0	17.0	3.7	2.7
Maximum Normal Operation Emissions	30	23.1	22.5	6.4	10.1	5.4	11.6	11.3	3.2	5.1	2.7
Total =	60						98.6	178.3	20.2	8.8	5.4

Gas Turbine - Hourly Shutdown Emissions											
	Time (minutes)	NOx Emissions (lbs/hr)	CO Emissions (lbs/hr)	ROC Emissions (lbs/hr)	PM10 Emissions (lbs/hr)	SOx Emissions (lbs/hr)	NOx Emissions (lbs)	CO Emissions (lbs)	ROC Emissions (lbs)	PM10 Emissions (lbs)	SOx Emissions (lbs)
Maximum Shutdown Emissions	12	N/A	N/A	N/A	N/A	5.4	4.0	145.0	25.0	1.5	1.1
Maximum Normal Operation Emissions	48	23.1	22.5	6.4	10.1	5.4	18.5	18.0	5.2	8.1	4.3
Total =	60						22.5	163.0	30.2	9.6	5.4

Gas Turbine - Hourly Startup/Shutdown/Restart Emissions											
	Time (minutes)	NOx Emissions (lbs/hr)	CO Emissions (lbs/hr)	ROC Emissions (lbs/hr)	PM10 Emissions (lbs/hr)	SOx Emissions (lbs/hr)	NOx Emissions (lbs)	CO Emissions (lbs)	ROC Emissions (lbs)	PM10 Emissions (lbs)	SOx Emissions (lbs)
Maximum Startup Emissions	30	N/A	N/A	N/A	N/A	5.4	87.0	167.0	17.0	3.7	2.7
Maximum Shutdown Emissions	12	N/A	N/A	N/A	N/A	5.4	4.0	145.0	25.0	1.5	1.1
Maximum Restart Emissions*	18	N/A	N/A	N/A	N/A	5.4	52.2	100.2	10.2	2.2	1.6
Total =	60						143.2	412.2	52.2	7.4	5.4

Note: * Calculated based on maximum startup emissions reduced for 18 minute period.

TABLE C-2.3

GE 7HA.01 SIMPLE CYCLE CTG

OPERATION EMISSIONS

(Revised November 18, 2015)

GE Power and Water

October 28, 2015

To: NRG Puente Power Team

Subject: NRG Puente Power
GE IPS: 976085
GE PM10 Emission Guarantee

The NRG Puente Power Plant, will utilize the 7HA.01 gas turbine technology installed in a simple cycle configuration equipped with an air attemperated simple cycle SCR and CO catalyst. For this installation, GE is offering a Particulate Matter emission guarantee of 10.1 lbs/hr as measured at the emission sampling ports located at the turbine stack exit. This guarantee shall apply for the entire load range from minimum emission compliant load (MECL) through base load operation and across the guarantee ambient temperature range of 38.9 to 82 deg F.

Regards,

Andrew Dicke
GE Power and Water
Emissions and Permitting Application Engineer

Table C-2.4 (Revised November 18, 2015)
Puente Power Project
Gas Turbine Commissioning Schedule

							Total Emissions						Calculated Hourly Emissions (lbs/hr)				
Day	Activity	Duration (hr)	GT Load (%)	No. of GT Shutdowns	Daily Fuel Consumption (MMSCF-HHV)	Daily Energy Production (MWh)	NOx (lbs)	CO (lbs)	ROC (lbs)	PM10 (lbs)	SOx (lbs)	SCR (Y/N)	Nox	CO	ROC	PM10*	SOx*
1	GT Testing (1st Fire, FSNL)	8	0	1	4.8	0.0	1076.5	15783.7	1312.9	85.2	9.9	N	134.6	1,973.0	164.1	10.1	5.4
2	GT Testing (FSNL, Excitation Test, Dummy Synch Checks)	8	0	1	4.8	0.0	1076.5	15783.7	1312.9	85.2	9.9	N	134.6	1,973.0	164.1	10.1	5.4
3	GT Testing / Initial 4 Hour Run / Overspeed Testing	8	0-50	1.0	13.9	1,091.3	1560.2	6163.1	544.6	86.9	28.5	N	195.0	770.4	68.1	10.1	5.4
4	Base Load Run-In Lean-Lean for Strainer Cleaniliness	10	100	1.0	27.6	2,750.0	2443.7	830.2	107.8	111.2	56.6	N	244.4	83.0	10.8	10.1	5.4
5	GT Testing / DLN Tuning	8	0-50	1.0	13.9	1,091.3	1560.2	6163.1	544.6	86.9	28.5	N	195.0	770.4	68.1	10.1	5.4
6	GT Testing / DLN Tuning	8	0-50	1.0	13.9	1,091.3	1560.2	6163.1	544.6	86.9	28.5	N	195.0	770.4	68.1	10.1	5.4
7	GT Testing / DLN Tuning	8	50-75	1.0	18.3	1,652.2	1174.0	498.5	58.0	88.3	37.4	N	146.8	62.3	7.3	10.1	5.4
8	GT Testing / DLN Tuning	8	50-75	1.0	18.3	1,652.2	1174.0	498.5	58.0	88.3	37.4	N	146.8	62.3	7.3	10.1	5.4
9	GT Testing / DLN Tuning	8	75-100	1.0	22.4	2,214.8	1970.8	726.5	94.6	90.0	45.9	N	246.3	90.8	11.8	10.1	5.4
10	GT Testing / DLN Tuning	8	75-100	1.0	22.4	2,214.8	1970.8	726.5	94.6	90.0	45.9	N	246.3	90.8	11.8	10.1	5.4
11	No Operation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N					
12	Load Catalyst	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N					
13	Load Catalyst	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N					
14	Load Catalyst	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N					
15	Load Catalyst	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N					
16	GT Base Load / Commissioning of Ammonia system	16	50-100	1.0	43.3	4,355.6	457.4	680.5	147.3	174.8	88.7	Y	28.6	42.5	9.2	10.1	5.4
17	GT Load Test	12	100	1.0	32.9	3,285.2	362.8	588.4	121.0	132.4	67.3	Y	30.2	49.0	10.1	10.1	5.4
18	No Operation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
19	Install Emissions Test Equipment	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
20	Emissions Tuning / Drift Test	12	50-100	1.0	32.9	3,285.2	362.8	588.4	121.0	132.4	67.3	Y	30.2	49.0	10.1	10.1	5.4
21	Emissions Tuning / Drift Test	12	50-100	1.0	32.9	3,285.2	362.8	588.4	121.0	132.4	67.3	Y	30.2	49.0	10.1	10.1	5.4
22	Pre-performance Testing / Drift Test	16	100	1.0	43.3	4,355.6	457.4	680.5	147.3	174.8	88.7	Y	28.6	42.5	9.2	10.1	5.4
23	Pre-performance Testing / Drift Test	16	100	1.0	43.5	4,386.6	469.4	616.5	140.3	174.8	89.2	Y	29.3	38.5	8.8	10.1	5.4
24	Pre-performance Testing / Drift Test	16	100	1.0	43.5	4,386.6	469.4	616.5	140.3	174.8	89.2	Y	29.3	38.5	8.8	10.1	5.4
25	RATA / Pre-performance Testing / Source Testing	16	100	1.0	43.3	4,355.6	457.4	680.5	147.3	174.8	88.7	Y	28.6	42.5	9.2	10.1	5.4
26	RATA / Pre-performance Testing / Source Testing	16	100	1.0	43.5	4,386.6	469.4	616.5	140.3	174.8	89.2	Y	29.3	38.5	8.8	10.1	5.4
27	Pre-performance Testing / Source Testing	16	100	1.0	43.5	4,386.6	469.4	616.5	140.3	174.8	89.2	Y	29.3	38.5	8.8	10.1	5.4
28	Pre-performance Testing / Source Testing	16	50-100	1.0	43.5	4,386.6	469.4	616.5	140.3	174.8	89.2	Y	29.3	38.5	8.8	10.1	5.4
29	Remove Emissions Test Equipment	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
30	Torque Exhaust Bolts & Remove A179 Strainers	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
31	Torque Exhaust Bolts & Remove A179 Strainers	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
32	Torque Exhaust Bolts & Remove A179 Strainers	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
33	Water Wash & Performance preparation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
34	Water Wash & Performance preparation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
35	Water Wash & Performance preparation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
36	Performance/Reliability Testing	24	100	0.0	64.4	6,525.3	654.5	655.7	167.9	258.1	131.8	Y	27.3	27.3	7.0	10.1	5.4
37	Performance/Reliability Testing	24	100	1.0	62.7	6,424.3	571.5	697.7	182.9	255.9	128.3	Y	23.8	29.1	7.6	10.1	5.4
38	No Operation	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y					
39	SCE 72 Hour Test - Day 1	24	50-100	0.0	64.4	6,525.3	654.5	655.7	167.9	258.1	131.8	Y	27.3	27.3	7.0	10.1	5.4
40	SCE 72 Hour Test - Day 2	24	50-100	0.0	62.6	6,422.3	567.5	552.7	157.9	254.4	128.2	Y	23.6	23.0	6.6	10.1	5.4
41	SCE 72 Hour Test - Day 3	24	50-100	1.0	62.7	6,424.3	571.5	697.7	182.9	255.9	128.3	Y	23.8	29.1	7.6	10.1	5.4
	Total GT operation hours =	366					23,393.9	63,485.9	7,038.4	3,976.9	1,890.8	max =	246.3	1,973.0	164.1	10.1	5.4
							11.7	31.7	3.5	2.0	0.9						

Table C-2.8 (Revised November 18, 2015)
Puente Power Project
Hourly Emissions

Hourly Mass Emission Rates, lbs/hr (Commissioning Period)	NOx	CO	ROC	PM10	SOx	NH3(1)
New GT Normal Operation	23.11	22.51	6.45	10.10	5.41	17.12
New GT Startups	98.56	178.26	20.22	8.75	5.41	17.12
New GT Shutdowns	22.49	163.01	30.16	9.58	5.41	17.12
New GT Startup/Shutdown/Restart	143.20	412.20	52.20	7.42	5.41	17.12
New GT Commissioning	246.35	1972.96	164.12	10.10	5.41	17.12
New GT Maximum =	246.35	1972.96	164.12	10.10	5.41	17.12
New Emergency Generator Engine	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A
New Natural Gas Compressor	N/A	N/A	0.01	N/A	N/A	N/A
Existing Unit 3(3)	1104.41	276.10	18.07	48.53	1.43	
Existing Boiler (one unit)(3)	9.15	75.81	2.66	4.74	1.14	8.91
Total New Equipment =	**246.35**	**1972.96**	**164.13**	**10.10**	**5.41**	**17.12**
Total Emergency Engine =	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A
Total Entire Facility =	**1359.91**	**2324.87**	**184.85**	**63.37**	**7.98**	**26.03**

Hourly Mass Emission Rates, lbs/hr (Non-Commissioning Period)	NOx	CO	ROC	PM10	SOx	NH3(1)
New GT Normal Operation	23.11	22.51	6.45	10.10	5.41	17.12
New GT Startups	98.56	178.26	20.22	8.75	5.41	17.12
New GT Shutdowns	22.49	163.01	30.16	9.58	5.41	17.12
New GT Startup/Shutdown/Restart	143.20	412.20	52.20	7.42	5.41	17.12
New GT Maximum =	143.20	412.20	52.20	10.10	5.41	17.12
New Emergency Generator Engine	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A
New Natural Gas Compressor	N/A	N/A	0.01	N/A	N/A	N/A
Existing Unit 3(3)	1104.41	276.10	18.07	48.53	1.43	
Existing Boiler (one unit)(3)	9.15	75.81	2.66	4.74	1.14	8.91
Total New Equipment =	**143.20**	**412.20**	**52.21**	**10.10**	**5.41**	**17.12**
Total Emergency Engine =	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A(2)	N/A
Total Entire Facility =	1256.76	764.11	72.94	63.37	7.98	26.03

Notes:
(1) Set startup/shutdown hourly emission rate to 100% load normal emission level to determine worst case hourly emissions for AQ modeling purposes.
(2) Emergency engine will not be operated during commissioning testing of new gas turbine and/or during startups/shutdowns of new gas turbine.
(3) Based on hourly emission limits in Title V permit for this unit.

Table C-2.9 (Revised November 18, 2015)
Puente Power Project
Daily Emissions

Daily Emission Rates, lbs/day (Commissioning Period)													
	Operating	Hourly Emission Rate (lbs/hr)						Daily Emissions (lbs/day)					
	Hours	NOx	CO	ROC	PM10	SOx	NH3	NOx	CO	ROC	PM10	SOx	NH3
New GT Normal Operation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New GT Startups	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New GT Shutdowns	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New GT Commissioning	various	various	various	various	various	various	various	2,443.7	15,783.7	1,312.9	258.1	129.9	411.0
New GT Total =								**2,443.7**	**15,783.7**	**1,312.9**	**258.1**	**129.9**	**411.0**
New Emergency Generator Engine	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Natural Gas Compressor	24									0.3			
Existing Unit 3(2)	10	1104.41	276.10	18.07	48.53	1.43	0.00	11044.1	2761.0	180.7	485.3	14.3	0.0
Existing Boiler (one unit)(3)	24	9.15	75.81	2.66	4.74	1.14	8.91	219.6	1819.4	63.7	113.8	27.2	213.8
Total New Equipment =								**2,443.7**	**15,783.7**	**1,313.2**	**258.1**	**129.9**	**411.0**
Total Emergency Engine =								N/A	N/A	N/A	N/A	N/A	N/A
Total Entire Facility =								**13,707.4**	**20,364.1**	**1,557.6**	**857.2**	**171.5**	**624.8**

Daily Emission Rates, lbs/day (Non-Commissioning Period)													
	Operating	Hourly Emission Rate (lbs/hr)						Daily Emissions (lbs/day)					
	Hours	NOx	CO	ROC	PM10	SOx(1)	NH3(1)	NOx	CO	ROC	PM10	SOx	NH3
New GT Normal Operation	16	23.11	22.51	6.45	10.10	5.41	17.12	369.8	360.2	103.1	161.6	86.6	274.0
New GT Startups	4	98.56	178.26	20.22	8.75	5.41	17.12	394.2	713.0	80.9	35.0	21.7	68.5
New GT Shutdowns	4	22.49	163.01	30.16	9.58	5.41	17.12	90.0	652.0	120.6	38.3	21.7	68.5
New GT Total =								**853.9**	**1725.2**	**304.7**	**234.9**	**129.9**	**411.0**
New Emergency Generator Engine	1	0.86	4.48	0.24	0.04	0.01		0.9	4.5	0.2	0.0	0.0	
New Natural Gas Compressor	24									0.3			
Existing Unit 3(2)	10	1104.41	276.10	18.07	48.53	1.43		11044.1	2761.0	180.7	485.3	14.3	
Existing Boiler (one unit)(3)	24	9.15	75.81	2.66	4.74	1.14	8.91	219.6	1819.4	63.7	113.8	27.2	213.8
Total New Equipment =								**854.8**	**1,729.7**	**305.2**	**235.0**	**129.9**	**411.0**
Total Emergency Engine =								**0.9**	**4.5**	**0.2**	**0.0**	**0.0**	
Total Entire Facility =								**12,118.5**	**6,310.1**	**549.6**	**834.0**	**171.5**	**624.8**

Notes:

(1) Set startup/shutdown hourly emission rate to 100% load normal emission level to determine worst case daily emissions for AQ modeling purposes.

(2) Based on maximum number of actual hours of operation per day during period from 2010 to 2014 and Title V hourly emission limits for this unit.

(3) Based on Title V hourly emission limits for this unit.

Table C-2.10 (Revised November 18, 2015)
Puente Power Project
Annual Emissions - Commissioning Year

	Hours per Year	NOx (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	SOx(1) (lbs/hr)	NH3(1) (lbs/hr)	NOx (lbs/year)	CO (lbs/year)	ROC (lbs/year)	PM10 (lbs/year)	SOx (lbs/year)	NH3 (lbs/year)
New GT Commissioning	366	various	various	various	various	various	17.12	23,394	63,486	7,038	3,977	1,891	6,267
New GT Start-Up	200	98.56	178.26	20.22	8.75	1.79	17.12	19,711	35,651	4,045	1,750	358	3,425
New GT Normal Operation	725	22.90	22.31	6.39	10.10	1.79	17.12	16,603	16,175	4,630	7,323	1,298	12,414
New GT Shutdown	200	22.49	163.01	30.16	9.58	1.79	17.12	4,498	32,602	6,031	1,916	358	3,425
New GT Total =	**1,491**							**64,205**	**147,913**	**21,744**	**14,965**	**3,905**	**25,531**
New Emergency Generator Engine	200	0.86	4.48	0.24	0.04	0.01	0.00	172	896	49	8	2	
New Natural Gas Compressor										96			
Existing Unit 3(2)								4,119	10,228	669	1,798	53	n/a
Existing Boiler (one unit)(2)								6,073	51,890	1,816	3,243	778	5,913
Total New Equipment Annual Emissions (lb/year) =								**64,377**	**148,810**	**21,889**	**14,973**	**3,907**	**25,531**
Total New Equipment Annual Emissions (tons/year) =								**32.2**	**74.4**	**10.9**	**7.5**	**2.0**	**12.8**
Total New Gas Turbine Annual Emissions (tons/year) =								**32.1**	**74.0**	**10.9**	**7.5**	**2.0**	**12.8**
Total New Emergency Engine Annual Emissions (tons/year) =								**0.1**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**
Total New Gas Compressor Annual Emissions (tons/year) =										**0.0**			
Total Entire Facility Annual Emissions (tons/year) =								**37.3**	**105.5**	**12.2**	**10.0**	**2.4**	**15.7**

Notes:

(1) Set hourly startup/shutdown emission rate to 100% load normal emission level to determine worst case annual emissions for AQ modeling purposes.

(2) Based on 2-year average of actual annual emissions during 2012 and 2013.

Table C-2.11 (Revised November 18, 2015)
Puente Power Project
Annual Emissions - Non-Commissioning Year

	Hours per Year	NOx (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	SOx(1) (lbs/hr)	NH3(1) (lbs/hr)	NOx (lbs/year)	CO (lbs/year)	ROC (lbs/year)	PM10 (lbs/year)	SOx (lbs/year)	NH3 (lbs/year)
New GT Start-Up	200	98.56	178.26	20.22	8.75	1.79	17.12	19,711	35,651	4,045	1,750	358	3,425
New GT Normal Operation	1,750	22.90	22.31	6.39	10.10	1.79	17.12	40,075	39,043	11,176	17,675	3,134	29,966
New GT Shutdown	200	22.49	163.01	30.16	9.58	1.79	17.12	4,498	32,602	6,031	1,916	358	3,425
New GT Total =	**2,150**							**64,284**	**107,295**	**21,251**	**21,341**	**3,850**	**36,815**
New Emergency Generator Engine	200	0.86	4.48	0.24	0.04	0.01		172	896	49	8	2	
New Natural Gas Compressor										96			
Existing Unit 3(2)								4,119	10,228	669	1,798	53	n/a
Existing Boiler (one unit)(2)								6,073	51,890	1,816	3,243	778	5,913
Total New Equipment Annual Emissions (lb/year) =								**64,455**	**108,192**	**21,396**	**21,349**	**3,852**	**36,815**
Total New Equipment Annual Emissions (tons/year) =								**32.2**	**54.1**	**10.7**	**10.7**	**1.9**	**18.4**
Total New Gas Turbine Annual Emissions (tons/year) =								**32.1**	**53.6**	**10.6**	**10.7**	**1.9**	**18.4**
Total New Emergency Engine Annual Emissions (tons/year) =								**0.1**	**0.4**	**0.0**	**0.0**	**0.0**	
Total New Gas Compressor Annual Emissions (tons/year) =										**0.0**			
Total Entire Facility Annual Emissions (tons/year) =								**37.3**	**85.2**	**11.9**	**13.2**	**2.3**	**21.4**

Notes:

(1) Set hourly startup/shutdown emission rate to 100% load normal emission level to determine worst case annual emissions for AQ modeling purposes.

(2) Based on 2-year average of actual annual emissions during 2012 and 2013.

Table C-2.12 (Revised November 18, 2015)
Puente Power Project
Hourly Emissions for Existing Units 1-3

Device	Unit 1	Unit 2	Unit 3 Gas Turbine
Fuel	Natural Gas	Natural Gas	Natural Gas
Maximum Power Rating (MW)	215	215	130
Maximum Heat Input (MMBtu/hr)	1990	1990	2510
Natural Gas F-factor (dscf/MMBtu)	8710	8710	8710
Natural Gas F-factor (wscf/MMBtu)	10610	10610	10610
Reference O2	3.0%	3.0%	15.0%
Actual O2	8.0%	6.6%	16.9%
Exhaust Temperature (F)	194	181	712
Exhaust Rate (dscfm @ ref. O2)	337,298	337,298	1,290,729
Exhaust Rate (wacfm @ actual O2)	705,090	623,512	5,122,144

	Emission Factors					
Pollutant	NOx (lb/MMscf)	CO (lb/MMscf)	ROC (lb/MMscf)	PM10 (lb/MMscf)	SOx (lb/MMscf)	NH3 (lb/MMscf)
Unit 1[1]	3.42	40.00	1.40	2.50	0.60	--
Unit 2[1]	4.68	40.00	1.40	2.50	0.60	--
Unit 3 Gas Turbine[2]	462.00	115.50	7.56	20.30	0.60	n/a

	Hourly Emissions[3]					
Unit	NOx (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	SOx (lbs/hr)	NH3 (lbs/hr)[4]
Unit 1	6.68	75.81	2.66	4.74	1.14	8.91
Unit 2	9.15	75.81	2.66	4.74	1.14	8.91
Unit 3 Gas Turbine	1104.41	276.10	18.07	48.53	1.43	n/a

Notes:
1. For NOx , based on a 2-Year average of CEMS data 2012 to 2013. CO, ROC, Sox, PM10 emission factors based on VCAPCD inventory factors.
2. Nox, CO, ROC, Sox, and PM10 emissions factors based on VCAPCD inventory factors.
3. Hourly emissions based on emission factors and maximum hourly heat input.
4. NH3 emissions based on Title V emission limits.

Table C-2.14 (Revised November 18, 2015)
Puente Power Project
Net Emission Changes For PSD Applicability Purposes
Based on Representative 2-year Average during Past 5 Years

	Emissions (tons/year)					
	NOx Emissions	CO Emissions	ROC Emissions	PM10 Emissions	PM2.5 Emissions	SOx Emissions
Emissions New Equipment =	32.2	54.1	10.7	10.7	10.7	1.9
Emission Reductions Shutdown one MGS Boiler[1] =	1.9	22.0	0.8	1.4	1.4	0.3
Net Emission Change =	30.3	32.1	9.9	9.3	9.3	1.6
Major Modification Thresholds[1] =	40	100	40	15	10	40
Major Modification?	no	no	no	no	no	no
Triggers PSD?	no	no	no	no	no	no

Notes:

1. Based on representative two-year average (2012 to 2013) emissions during the past 5-years (see 40 CFR 52.21.b.21.i).
2. Based on 40 CFR 52.21.b.2.i and 40 CFR 52.21.b.23.i.

Table C-2.15 (Revised November 18, 2015)
Puente Power Project
Net Emission Changes For NSR Applicability Purposes

	Emissions (tons/year)					
	NOx Emissions	CO Emissions	ROC Emissions	PM10 Emissions	PM2.5 Emissions	SOx Emissions
To Determine If Project is a Major Modification Under NSR Regulations						
Emissions New Equipment =	32.2	54.1	10.7	10.7	N/A	1.9
Emission Reductions Shutdown of one MGS Boiler	1.9	22.0	0.8	1.4	N/A	0.3
Net Emission Change =	30.3	32.1	9.9	9.3	N/A	1.6
Major Modification Thresholds[2] =	25	N/A	25	N/A	N/A	N/A
Major Modification?	Yes	N/A	No	N/A	N/A	N/A
To Determine ERC Requirements Under NSR Regulations (Using Replacement Emission Unit Approach)						
Emissions New GT =	32.1	53.6	10.6	10.7	N/A	1.9
Emission Reductions one MGS Boiler[3] =	1.9	322.2	11.6	20.8	N/A	5.0
Net Emission Change GT[4] =	30.3	-268.6	-1.0	-10.1	N/A	-3.1
Emissions New Emergency Generator Engine =	0.09	0.45	0.02	0.00	N/A	0.00
Emission Reductions Existing Generator Engine[5] =	0.00	0.12	0.01	0.00	N/A	0.00
Net Emission Change Engine[4] =	0.08	0.33	0.02	0.00	N/A	0.00
Facility-Wide Net Emission Change =	30.3	-268.2	-1.0	-10.1	N/A	-3.1
Is There An Emissions Increase?	Yes	N/A	No	No	N/A	No
ERC Requirement Triggered?	Yes	N/A	No	No	N/A	No
Offset Ratio[6] =	1.3	N/A	N/A	N/A	N/A	N/A
ERCs Required =	39.4	N/A	N/A	N/A	N/A	N/A
ERCs Controlled by Applicant =	52.7	N/A	N/A	N/A	N/A	N/A
Surplus/Shortfall =	-13.3	N/A	N/A	N/A	N/A	N/A

Notes:
1. Based on representative two-year average (2012 to 2013) emissions during the past 5-years.
2. Based on VCAPCD Rule 26.1.
3. For NOx, based on representative two-year average (2012 to 2013) emissions during the past 5-years. For CO, ROC, SOx, PM10 based on PTE levels using Title V permit annual emission limits with CO PTE corrected to a BACT level of 50 ppm @ 3% O2 (other pollutants meet current BACT levels).
4. VCAPCD Rule 26.6(D)(2) -for CO, SOx, and PM 10 emission increases for a replacement emissions unit calculated as the emissions unit's post-project potential to emit (adjusted to reflect current BACT) minus the emissions unit's pre-project potential to emit (adjusted to reflect current BACT). Because the project is a major modification for NOx, the NOx emission increase is calculated as the emissions unit's post-project potential to emit minus the unit pre-project actual emissions (per VCAPCD Rule 26.6(D)(7)(a)).
5. For NOx based on representative two-year average (2012 to 2013) emissions during the past 5-years. For CO, ROC, SOx, PM10 based on PTE corrected to current BACT levels assuming 200 hrs/year of operation (all types of operating including testing).
6. Per VCAPCD Rule 26.2(B)(2)(a).

Table C-2.16 (Revised November 18, 2015)
Puente Power Project
Greenhouse Gas Emissions Calculations

Unit	Total Number of Units	Per Unit Heat Input (MMBtu/hr)	Per Unit Gross Output (MW)	Operating Hours per year	Annual Fuel Use (MMBtu/yr)	Estimated Annual Gross MWh	Maximum Emissions, metric tonnes/yr				Facility-Wide Emissions, MT/yr CO2e	Facility-Wide Emissions, tons/yr CO2e	New GT CO2 MT/MWh	New GT CO2 lbs/MWh
							CO2	CH4	N2O	SF6				
New Gas Turbine	1	2,552	275.9	2,150	5,487,140	593,101	291,148	5	1	--				
New Emergency Generator Engine	1	4.9		200	976	n/a	72	0	0	--				
Existing Unit 3 Gas Turbine	1	2,510			90,144	n/a	4,783	0	0	--				
New circuit breakers	2	--		8760	0	n/a	--	--	--	4.2E-04				
Total =				--	5,578,260	593,101	296,003	6	1	4.2E-04				
CO2-Equivalent =							296,003	140	166	10	296,318	326,632	0.49	1,082

Fuel	Emission Factors, kg/MMBtu			Emission Factor
	CO2 (1)	CH4 (2)	N2O (2)	SF6 (4)
Natural Gas	*53.060*	*1.00E-03*	1.00E-04	n/a
Diesel Fuel	*73.960*	3.00E-03	6.00E-04	n/a
Global Warming Potential (3)	1	25	298	22,800

Notes:
1. 40 CFR 98, Table C-1 (revised 11/29/13).
2. 40 CFR 98, Table C-2 (revised 11/29/13).
3. 40 CFR 98, Table A-1 (revised 11/29/13).
4. Sulfur hexafluoride (SF6) will be used as an insulating medium in two circuit breakers. The SF6 contained in one of the circuit breakers is approximately 24 lbs and the remaining breaker will contain approximately 161 lbs. The IEC standard for SF6 leakage is less than 0.5%; the NEMA leakage standard for new circuit breakers is 0.1%. A maximum leakage rate of 0.5% per year is assumed.

Table C-2.17 (Revised November 18, 2015)
Puente Power Project
Nitrogen Emission Rates - New Equipment

New Gas Turbine			
NOx emission rate =	32.14	tpy	
N/NO2 molecular weight ratio (14/46) =			0.3043478
N emission rate from NOx =	9.78	tpy	
	0.28	g/s	
NH3 emission rate =	18.41	tpy	
N/NH3 molecular weight ratio (14/17) =			0.8235294
N emission rate from NH3 =	15.16	tpy	
	0.44	g/s	
Total N emission rate (N from NOx plus N from ammonia) =	24.94	tpy	
Total N emission rate (N from NOx plus N from ammonia) =	0.72	g/s	
Emergency Engine			
NOx emission rate =	0.09	tpy	
N/NO2 molecular weight ratio (14/46) =			0.3043478
N emission rate from NOx =	0.03	tpy	
	0.00	g/s	
Total N emission rate for new GT, new engine (N from NOx plus N from ammonia) =	24.97	tpy	

Table C-2.18 (Revised November 18, 2015)
Puente Power Project
Nitrogen Emission Rates - Existing Units 1 and 2

NOx emission rate for Units 1 and 2, 5-year avg. (tpy)=	3.21	tpy
NOx emission rate for Units 1 and 2, 10-year avg. (tpy)=	5.88	tpy
N/NO2 molecular weight ratio (14/46) =		0.304348
N emission rate from NOx, 5-year avg. (tpy) =	0.98	tpy
N emission rate from NOx, 10-year avg. (tpy) =	1.79	tpy
NH3 emission rate for Units 1 and 2, 5-year avg. (tpy) =	3.72	tpy
NH3 emission rate for Units 1 and 2, 10-year avg. (tpy) =	6.56	tpy
N/NH3 molecular weight ratio (14/17) =		0.823529
N emission rate from NH3, 5-year avg. (tpy) =	3.06	tpy
N emission rate from NH3, 10-year avg. (tpy) =	5.40	tpy
Total N emission rate for Units 1 and 2 (N from NOx plus N from ammonia), 5-yr avg. =	4.04	tpy
Total N emission rate for Units 1 and 2 (N from NOx plus N from ammonia), 10-yr avg. =	7.19	tpy

Table C-5.2 (Revised November 18, 2015)
Puente Power Project
Screening Modeling Inputs

Case	Amb Temp deg F	Stack height feet	Stack Height meters	Stack Diam feet	Stack Diam meters	Stack flow wacfm	Stack flow m3/sec	Stack Vel ft/sec	Stack Vel m/sec	Stack Temp deg F	Stack Temp deg K
Winter/Maximum	38.9	188.0	57.30	22.0	6.71	3,530,670	1666.51	154.80	47.18	900.0	755.37
Winter/Minimum	38.9	188.0	57.30	22.0	6.71	1,922,025	907.21	84.27	25.69	900.0	755.37
ISO/Maximum	59.0	188.0	57.30	22.0	6.71	3,587,689	1693.42	157.30	47.95	900.0	755.37
ISO/Minimum	59.0	188.0	57.30	22.0	6.71	1,915,867	904.31	84.00	25.60	900.0	755.37
Summer Avg. Temp./Maximum w/cooling	77.8	188.0	57.30	22.0	6.71	3,576,286	1688.04	156.80	47.79	900.0	755.37
Summer Avg. Temp./Maximum w/o cooling	77.8	188.0	57.30	22.0	6.71	3,485,054	1644.98	152.80	46.57	900.0	755.37
Summer Avg. Temp./Minimum	77.8	188.0	57.30	22.0	6.71	1,977,905	933.59	86.72	26.43	900.0	755.37
Summer High Temp./Maximum w/cooling	82.0	188.0	57.30	22.0	6.71	3,592,251	1695.58	157.50	48.01	900.0	755.37
Summer High Temp./Maximum w/o cooling	82.0	188.0	57.30	22.0	6.71	3,482,773	1643.90	152.70	46.54	900.0	755.37
Summer High Temp./Minimum	82.0	188.0	57.30	22.0	6.71	1,995,011	941.66	87.47	26.66	900.0	755.37

	NOx lb/hr	CO lb/hr	PM10 lb/hr	SOx lb/hr	NOx g/sec	CO g/sec	PM10 g/sec	SOx g/sec
Winter/Maximum	23.11	22.51	10.10	5.41	2.912	2.836	1.273	0.682
Winter/Minimum	9.67	9.42	10.10	2.27	1.218	1.186	1.273	0.286
ISO/Maximum	22.90	22.31	10.10	5.37	2.885	2.811	1.273	0.677
ISO/Minimum	9.47	9.22	10.10	2.23	1.193	1.162	1.273	0.280
Summer Avg. Temp./Maximum w/cooling	22.51	21.93	10.10	5.28	2.836	2.763	1.273	0.665
Summer Avg. Temp./Maximum w/o cooling	21.71	21.15	10.10	5.09	2.735	2.665	1.273	0.641
Summer Avg. Temp./Minimum	9.79	9.54	10.10	2.30	1.234	1.202	1.273	0.290
Summer High Temp./Maximum w/cooling	22.64	22.06	10.10	5.31	2.853	2.780	1.273	0.669
Summer High Temp./Maximum w/o cooling	21.40	20.85	10.10	5.02	2.696	2.627	1.273	0.632
Summer High Temp./Minimum	9.87	9.61	10.10	2.32	1.243	1.211	1.273	0.292

Table C-5.3 (Revised November 18, 2015)
Puente Power Project
Screening Level Modeling Impacts

Operating Mode	Conc. (ug/m3) NO2 1-hr	Conc. (ug/m3) SO2 1-hr	Conc. (ug/m3) CO 1-hr	Conc. (ug/m3) SO2 3-hr	Conc. (ug/m3) CO 8-hr	Conc. (ug/m3) SO2 24-hr	Conc. (ug/m3) PM10 24-hr	Conc. (ug/m3) NO2 Annual	Conc. (ug/m3) SO2 Annual	Conc. (ug/m3) PM10 Annual
Winter/Maximum	1.620	0.380	1.578	0.202	0.391	0.037	0.069	0.022	0.005	0.010
Winter/Minimum	0.922	0.217	0.898	0.128	0.254	0.024	0.106	0.020	0.005	0.021
ISO/Maximum	1.588	0.373	1.547	0.197	0.387	0.036	0.068	0.022	0.005	0.010
ISO/Minimum	0.904	0.213	0.881	0.125	0.249	0.023	0.106	0.019	0.005	0.021
Summer Avg. Temp./Maximum w/cooling	1.564	0.367	1.523	0.194	0.380	0.036	0.068	0.021	0.005	0.010
Summer Avg. Temp./Maximum w/o cooling	1.536	0.360	1.497	0.192	0.369	0.035	0.070	0.021	0.005	0.010
Summer Avg. Temp./Minimum	0.919	0.216	0.895	0.128	0.255	0.024	0.103	0.019	0.005	0.020
Summer High Temp./Maximum w/cooling	1.569	0.368	1.529	0.194	0.382	0.036	0.068	0.021	0.005	0.010
Summer High Temp./Maximum w/o cooling	1.515	0.355	1.476	0.190	0.363	0.035	0.070	0.021	0.005	0.010
Summer High Temp./Minimum	0.921	0.217	0.898	0.128	0.256	0.024	0.102	0.019	0.005	0.020

Table C-5.4 (Revised November 18, 2015)
Puente Power Project
Emission Rates and Stack Parameters for Refined Modeling

	Stack Diam, m	Stack Height, m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s NOx	Emission Rates, g/s SO2	Emission Rates, g/s CO	Emission Rates, g/s PM10	Stack Diam, ft	Stack Height, ft	Exh Temp, Deg F	Exh Flow Rate, ft3/m	Exhaust Velocity, ft/s	Emission Rates, lb/hr NOx	Emission Rates, lb/hr SO2	Emission Rates, lb/hr CO	Emission Rates, lb/hr PM10
Averaging Period: One hour NOx																		
New GT	6.7	57.3	755	1666.3	47.2	2.9119	n/a	n/a	n/a	22	188	900	3,530,670	155	23.11	n/a	n/a	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	0.1081	n/a	n/a	n/a	0.5	70	1263	3,185	270	0.86	n/a	n/a	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	34.7889	n/a	n/a	n/a	12.9	54	712	1,280,536	164	276.10	n/a	n/a	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	34.7889	n/a	n/a	n/a	12.9	54	712	1,280,536	164	276.10	n/a	n/a	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	34.7889	n/a	n/a	n/a	12.9	54	712	1,280,536	164	276.10	n/a	n/a	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	34.7889	n/a	n/a	n/a	12.9	54	712	1,280,536	164	276.10	n/a	n/a	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	1.1530	n/a	n/a	n/a	17.3	200	181	623,512	44	9.15	n/a	n/a	n/a
Averaging Period: One hour CO and SOx																		
New GT	6.7	57.3	755	1666.3	47.2	n/a	0.6822	2.8363	n/a	22	188	900	3,530,670	155	n/a	5.41	22.51	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	0.0011	0.5648	n/a	0.5	70	1263	3,185	270	n/a	0.01	4.48	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	0.0450	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	0.36	69.03	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	0.0450	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	0.36	69.03	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	0.0450	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	0.36	69.03	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	0.0450	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	0.36	69.03	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	0.1430	9.5521	n/a	17.3	200	181	623,512	44	n/a	1.14	75.81	n/a
Averaging Period: Three hours SOx																		
New GT	6.7	57.3	755	1666.3	47.2	n/a	0.6822	n/a	n/a	22	188	900	3,530,670	155	n/a	5.41	n/a	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	0.0004	n/a	n/a	0.5	70	1,263	3,185	270	n/a	2.81E-03	n/a	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	0.0450	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.36	n/a	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	0.0450	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.36	n/a	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	0.0450	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.36	n/a	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	0.0450	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.36	n/a	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	0.1430	n/a	n/a	17.3	200	181	623,512	44	n/a	1.14	n/a	n/a

Table C-5.4 (Revised November 18, 2015)
Emission Rates and Stack Parameters for Refined Modeling (cont.)

						Emission Rates, g/s									Emission Rates, lb/hr			
	Stack Diam, m	Stack Height, m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	NOx	SO2	CO	PM10	Stack Diam, ft	Stack Height, ft	Exh Temp, Deg F	Exh Flow Rate, ft3/m	Exhaust Velocity, ft/s	NOx	SO2	CO	PM10
Averaging Period: Eight hours CO																		
New GT	6.7	57.3	755	1666.3	47.2	n/a	n/a	2.8363	n/a	22	188	900	3,530,670	155	n/a	n/a	22.51	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	n/a	0.0706	n/a	0.5	70	1,263	3,185	270	n/a	n/a	0.56	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	n/a	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	n/a	69.03	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	n/a	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	n/a	69.03	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	n/a	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	n/a	69.03	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	n/a	8.6972	n/a	12.9	54	712	1,280,536	164	n/a	n/a	69.03	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	n/a	9.5521	n/a	17.3	200	181	623,512	44	n/a	n/a	75.81	n/a
Averaging Period: 24-hour SOx																		
New GT	6.7	57.3	755	1666.3	47.2	n/a	0.6822	n/a	n/a	22	188	900	3,530,670	155	n/a	5.41	n/a	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	0.0000	n/a	n/a	0.5	70	1,263	3,185	270	n/a	3.51E-04	n/a	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	0.0188	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.15	n/a	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	0.0188	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.15	n/a	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	0.0188	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.15	n/a	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	0.0188	n/a	n/a	12.9	54	712	1,280,536	164	n/a	0.15	n/a	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	0.1430	n/a	n/a	17.3	200	181	623,512	44	n/a	1.14	n/a	n/a
Averaging Period: 24-hour PM10																		
New GT	6.7	57.3	755	904.2	25.6	n/a	n/a	n/a	1.2726	22	188	900	1,915,867	84	n/a	n/a	n/a	10.10
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	n/a	n/a	0.0002	0.5	70	1,263	3,185	270	n/a	n/a	n/a	1.60E-03
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.6370	12.9	54	712	1,280,536	164	n/a	n/a	n/a	5.06
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.6370	12.9	54	712	1,280,536	164	n/a	n/a	n/a	5.06
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.6370	12.9	54	712	1,280,536	164	n/a	n/a	n/a	5.06
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.6370	12.9	54	712	1,280,536	164	n/a	n/a	n/a	5.06
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	n/a	n/a	0.5972	17.3	200	181	623,512	44	n/a	n/a	n/a	4.74

Table C-5.4 (Revised November 18, 2015)
Emission Rates and Stack Parameters for Refined Modeling (cont.)

	Stack Diam, m		Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s NOx	SO2	CO	PM10	Stack Diam, ft	Stack Height, ft	Exh Temp, Deg F	Exh Flow Rate, ft3/m	Exhaust Velocity, ft/s	Emission Rates, lb/hr NOx	SO2	CO	PM10
Averaging Period: Annual NOx and SOx																		
New GT	6.7	57.3	755	1666.3	47.2	0.9246	0.0554	n/a	n/a	22	188	900	3,530,670	155	7.34	0.44	n/a	n/a
New Generator Engine	0.2	21.3	957	1.5	82.4	0.0025	0.0000	n/a	n/a	0.5	70	1,263	3,185	270	0.02	1.92E-04	n/a	n/a
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	0.0148	0.0002	n/a	n/a	12.9	54	712	1,280,536	164	0.12	0.00	n/a	n/a
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	0.0148	0.0002	n/a	n/a	12.9	54	712	1,280,536	164	0.12	0.00	n/a	n/a
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	0.0148	0.0002	n/a	n/a	12.9	54	712	1,280,536	164	0.12	0.00	n/a	n/a
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	0.0148	0.0002	n/a	n/a	12.9	54	712	1,280,536	164	0.12	0.00	n/a	n/a
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	0.0873	0.0112	n/a	n/a	17.3	200	181	623,512	44	0.69	0.09	n/a	n/a
Averaging Period: Annual PM10																		
New GT	6.7	57.3	755	904.2	25.6	n/a	n/a	n/a	0.3070	22	188	900	1,915,867	84	n/a	n/a	n/a	2.44
New Generator Engine	0.2	21.3	957	1.5	82.4	n/a	n/a	n/a	0.0001	0.5	70	1,263	3,185	270	n/a	n/a	n/a	8.77E-04
Existing Unit 3 - Stack 1	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.0065	12.9	54	712	1,280,536	164	n/a	n/a	n/a	0.05
Existing Unit 3 - Stack 2	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.0065	12.9	54	712	1,280,536	164	n/a	n/a	n/a	0.05
Existing Unit 3 - Stack 3	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.0065	12.9	54	712	1,280,536	164	n/a	n/a	n/a	0.05
Existing Unit 3 - Stack 4	3.9	16.5	651	604.3	50.0	n/a	n/a	n/a	0.0065	12.9	54	712	1,280,536	164	n/a	n/a	n/a	0.05
Existing Boiler Stack - only one boiler operating	5.3	61.0	356	294.3	13.6	n/a	n/a	n/a	0.0466	17.3	200	181	623,512	44	n/a	n/a	n/a	0.37

Table C-5.5 (Revised November 18, 2015)
Puente Power Project
Startup/Shutdown Modeling Inputs

Operating Case	Stack Ht. feet	Stack Dia. ft	Stack flow wacfm	Stack flow m3/sec	Stack Vel ft/sec	Stack Vel m/sec	Stack Temp deg F	Stack Temp deg K	NOx lb/hr	CO lb/hr	NOx g/sec	CO g/sec
New GT - Startup/Shutdown/Restart	188	22	1,915,867	904.31	84.00	25.60	900.00	755.37	143.20	412.20	18.04	51.94
Existing Unit 3 - Stack 1	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	34.79	8.70
Existing Unit 3 - Stack 2	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	34.79	8.70
Existing Unit 3 - Stack 3	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	34.79	8.70
Existing Unit 3 - Stack 4	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	34.79	8.70
Existing Boiler Stack - only one boiler operating	200	17.3	623,512	294	44	14	181	356	9.15	75.81	1.15	9.55

Table C-5.6 (Revised November 18, 2015)
Puente Power Project
Commissioning Modeling Inputs

Operating Case	Stack Ht. feet	Stack Dia. ft	Stack flow wacfm	Stack flow m3/sec	Stack Vel ft/sec	Stack Vel m/sec	Stack Temp deg F	Stack Temp deg K	NOx lb/hr	CO lb/hr	PM10 lb/hr	SOx lb/hr	NOx g/sec	CO g/sec	PM10 g/sec	SOx g/sec
New GT - Commissioning	188	22	1,915,867	904	84	26	900	755	246.35	1972.96	10.10	5.41	31.04	248.59	1.27	0.68
Existing Unit 1 - normal operation			705,090						6.68	75.81	4.74	1.14	0.84	9.55	0.60	0.14
Existing Unit 2 - normal operation			623,512						9.15	75.81	4.74	1.14	1.15	9.55	0.60	0.14
Existing Units 1 and 2 - combined stack =	200	17.25	1,328,602	627	95	29	181	356	15.83	151.62	9.48	2.27	1.99	19.10	1.19	0.29
Existing Unit 3 - Stack 1	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	5.06	0.36	34.79	8.70	0.64	0.05
Existing Unit 3 - Stack 2	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	5.06	0.36	34.79	8.70	0.64	0.05
Existing Unit 3 - Stack 3	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	5.06	0.36	34.79	8.70	0.64	0.05
Existing Unit 3 - Stack 4	54	12.9	1,280,536	604	164	50	712	651	276.10	69.03	5.06	0.36	34.79	8.70	0.64	0.05

Table C-6-5 (Revised 11/18/2015)
Modeled Maximum Impacts During the Construction Period

Pollutant	Averaging Time	Maximum Project Impact (µg/m³)	Background (µg/m³)	Total Impact (µg/m³)	State Standard (µg/m³)	Federal Standard (µg/m³)
NO_2	1-hour	~~170.5~~ **<u>188.7</u>**	~~169.5~~ **<u>107.4</u>**	~~340.0[d]~~ **<u>296.1</u>**	339	--
	~~98th percentile~~	~~145.7~~	~~67.8[a]~~	~~178.0~~	~~--~~	~~188~~
	Annual	9.9	13.2	23.1	57	100
SO_2	1-hour	3.3	~~7.9~~ **<u>10.5</u>**	~~11.2~~ **<u>13.8</u>**	655	--
	~~99th percentile~~	~~3.3~~	~~7.9[c]~~	~~11.2~~	~~--~~	~~196~~
	24-hour	0.4	5.2	5.6	105	--
CO	1-hour	~~1,981~~ **<u>1,985</u>**	~~2,875~~ **<u>4,582</u>**	~~4,856~~ **<u>6,567</u>**	23,000	40,000
	8-hour	~~452~~ **<u>448</u>**	~~2,185~~ **<u>1,265</u>**	~~2,637~~ **<u>1,713</u>**	10,000	10,000
PM_{10}	24-hour	~~15.8~~ **<u>14.0</u>**	56.9	~~72.7~~ **<u>70.9</u>**	50	150
	Annual	1.0	~~23.6~~ **<u>25.0</u>**	~~24.6~~ **<u>26.0</u>**	20	--
$PM_{2.5}$	24-hour	~~5.4~~ **<u>4.8</u>**	~~18.3[b]~~ **<u>18.1[b]</u>**	~~23.7~~ **<u>22.9</u>**	--	35
	Annual	0.2	~~9.0~~ **<u>9.1</u>**	~~9.2~~ **<u>9.3</u>**	12	12

a. ~~1-hour NO_2 background concentration is shown as the 3-year average of the 98th percentile as that is the basis of the federal standard~~ **<u>Because the basis of this standard is a 3-year average and given the limited length of the construction period, it is not necessary to perform modeling for this standard.</u>**

b. 24-hour $PM_{2.5}$ background concentration reflects 3-year average of the 98th percentile values based on form of standard.

~~c. 1-hour SO_2 background concentration reflects 3-year average of the 99th percentile values based on form of standard.~~ **<u>Because the basis of this standard is a 3-year average and given the limited length of the construction period, it is not necessary to perform modeling for this standard.</u>**

~~d. There is no expected exceedance of the standard because the maximum 1-hr avg. background level shown (during 2011) is nearly twice the maximum level during the past 10 years. Therefore, it is unlikely that the maximum modeled impact would occur at the same time this high background level would occur.~~

TABLE C-6-16 (REVISED 11/18/2015)
Decommissioning of the MGS Units 1 and 2 – Daily and Annual Emissions

	NOx	CO	VOC	SOx	PM10	PM2.5
Maximum Daily Emissions (lbs/day)						
Onsite						
Off-Road Equipment (combustion)	11.29	21.71	0.60	0.04	0.06	0.06
Off-Road Equipment and Onsite Vehicle (combustion)	11.29	21.71	0.60	0.04	0.06	0.06
Onsite Vehicle - Fugitive Dust					4.2E-04	1.1E-04
Subtotal (Fugitive Dust)					4.2E-04	1.1E-04
Subtotal (Onsite)	11.29	21.71	0.60	0.04	0.06	0.06
Offsite						
Worker Travel (combustion)	0.15	1.50	0.05	0.01	0.003	0.003
Delivery and Haul Truck Emissions (combustion)	0	0	0	0	0	0
Worker Travel - Fugitive Dust					0.42	0.11
Delivery and Haul Truck - Fugitive Dust					0	0
Subtotal (Fugitive Dust)					0.42	0.11
Subtotal (Offsite)	0.15	1.50	0.05	0.01	0.42	0.11
Total	11.44	23.21	0.65	0.04	0.49	0.18
Peak Annual Emissions (tons, ~~3~~ **6-month Total)**						
	NOx	CO	VOC	SOx	PM10	PM2.5
Onsite						
Off-Road Equipment (combustion)	~~0.44~~ **0.88**	~~0.85~~ **1.70**	~~0.02~~ **0.04**	~~0.001~~ **0.002**	~~0.002~~ **0.004**	~~0.002~~ **0.004**
Off-Road Equipment and Onsite Vehicle (combustion)	~~0.44~~ **0.88**	~~0.85~~ **1.70**	~~0.02~~ **0.04**	~~0.001~~ **0.002**	~~0.002~~ **0.004**	~~0.002~~ **0.004**
Onsite Vehicle - Fugitive Dust					~~1.6E-05~~ **3.2E-05**	~~4.3E-06~~ **8.6E-06**
Subtotal (Fugitive Dust)					~~1.6E-05~~ **3.2E-05**	~~4.3E-06~~ **8.6E-06**
Subtotal (Onsite)	~~0.44~~ **0.88**	~~0.85~~ **1.70**	~~0.02~~ **0.04**	~~0.001~~ **0.002**	~~0.002~~ **0.004**	~~0.0024~~ **0.0048**
Offsite						
Worker Travel (combustion)	~~0.01~~ **0.02**	~~0.05~~ **0.10**	~~0.002~~ **0.004**	~~2.1E-04~~ **4.2E-04**	~~1.2E-04~~ **2.4E-04**	~~1.2E-04~~ **2.4E-04**
Delivery and Haul Truck Emissions (combustion)	0	0	0	0	0	0
Worker Travel - Fugitive Dust					~~0.02~~ **0.04**	~~0.004~~ **0.008**
Delivery and Haul Truck - Fugitive Dust					0	0
Subtotal (Fugitive Dust)					~~0.02~~ **0.04**	~~0.004~~ **0.008**
Subtotal (Offsite)	~~0.01~~ **0.02**	~~0.05~~ **0.10**	~~0.002~~ **0.004**	~~0.0002~~ **0.0004**	~~0.02~~ **0.04**	~~0.004~~ **0.008**
Total	~~0.45~~ **0.90**	~~0.90~~ **1.80**	~~0.03~~ **0.06**	~~0.002~~ **0.004**	~~0.02~~ **0.04**	~~0.01~~ **0.02**

Table C-6-24 (new table created 11/18/15)
Modeled Maximum Impacts During the Decommissioning Period

Pollutant	Averaging Time	Maximum Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	162.3	107.4	269.7	339	--
	Annual	1.1	13.2	14.3	57	100
SO_2	1-hour	0.7	10.5	11.2	655	--
	24-hour	0.4	5.2	5.6	105	--
CO	1-hour	294	4,582	4,876	23,000	40,000
	8-hour	75	1,265	1,340	10,000	10,000
PM_{10}	24-hour	1.0	56.9	57.9	50	150
	Annual	0.0	25.0	25.0	20	--
$PM_{2.5}$	24-hour	1.0	18.1[a]	19.1	--	35
	Annual	0.0	9.1	9.1	12	12

a. 24-hour $PM_{2.5}$ background concentration reflects 3-year average of the 98th percentile values based on form of standard.

Table C-8.1 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Emission Calculations New Gas Turbine (Hourly Emissions)

Pollutant	Uncontrolled Emission Factor (lbs/MMBtu)	Basis	Normal Oper. Controlled Emission Factor (lbs/MMBtu)	Worst Case Startup/Shutdown VOC Emiss. Vs. Normal Operation VOC Emiss.(4) (lbs/hr)/(lbs/hr)	Startup/Shutdown Emission Factor(4) (lbs/MMBtu)	Commissioning Emission Factor(5) (lbs/MMBtu)	New GT Max. Firing Rate (MMBtu/hr)	New GT Normal Oper. Emissions (lbs/hr)	New GT Startup/Shutdown Emissions (lbs/hr)	New GT Commissioning Emissions (lbs/hr)
Ammonia	6.66E-03	Permit Limit(3)	6.66E-03	8.10	6.66E-03	6.66E-03	2,572	1.71E+01	1.71E+01	1.71E+01
Propylene	7.56E-04	0.5*CATEF(2)	3.78E-04	8.10	3.06E-03	7.56E-04	2,572	9.72E-01	7.87E+00	1.94E+00
Hazardous Air Pollutants (HAPs) - Federal										
Acetaldehyde	4.00E-05	0.5*AP-42(1)	2.00E-05	8.10	1.62E-04	4.00E-05	2,572	5.14E-02	4.17E-01	1.03E-01
Acrolein	6.42E-06	0.5*AP-42(1)	3.21E-06	8.10	2.60E-05	6.42E-06	2,572	8.26E-03	6.69E-02	1.65E-02
Benzene	1.20E-05	0.5*AP-42(1)	5.99E-06	8.10	4.85E-05	1.20E-05	2,572	1.54E-02	1.25E-01	3.08E-02
1,3-Butadiene	4.30E-07	0.5*AP-42(1)	2.15E-07	8.10	1.74E-06	4.30E-07	2,572	5.53E-04	4.48E-03	1.11E-03
Ethylbenzene	3.20E-05	0.5*AP-42(1)	1.60E-05	8.10	1.30E-04	3.20E-05	2,572	4.12E-02	3.33E-01	8.23E-02
Formaldehyde	9.00E-04	0.5*CATEF(2)	4.50E-04	8.10	3.64E-03	9.00E-04	2,572	1.16E+00	9.37E+00	2.31E+00
Hexane, n-	2.54E-04	0.5*CATEF(2)	1.27E-04	8.10	1.03E-03	2.54E-04	2,572	3.27E-01	2.65E+00	6.53E-01
Naphthalene	1.31E-06	0.5*AP-42(1)	6.53E-07	8.10	5.29E-06	1.31E-06	2,572	1.68E-03	1.36E-02	3.36E-03
Total PAHs (listed individually below)	6.43E-07	SUM	3.22E-07	8.10	2.60E-06	6.43E-07	2,572	8.27E-04	6.70E-03	1.65E-03
Acenaphthene	1.86E-08	0.5*CATEF(2)	9.32E-09	8.10	7.55E-08	1.86E-08	2,572	2.40E-05	1.94E-04	4.79E-05
Acenapthyene	1.44E-08	0.5*CATEF(2)	7.21E-09	8.10	5.84E-08	1.44E-08	2,572	1.85E-05	1.50E-04	3.71E-05
Anthracene	3.32E-08	0.5*CATEF(2)	1.66E-08	8.10	1.34E-07	3.32E-08	2,572	4.27E-05	3.46E-04	8.54E-05
Benzo(a)anthracene	2.22E-08	0.5*CATEF(2)	1.11E-08	8.10	8.99E-08	2.22E-08	2,572	2.85E-05	2.31E-04	5.71E-05
Benzo(a)pyrene	1.36E-08	0.5*CATEF(2)	6.82E-09	8.10	5.52E-08	1.36E-08	2,572	1.75E-05	1.42E-04	3.51E-05
Benzo(e)pyrene	5.34E-10	0.5*CATEF(2)	2.67E-10	8.10	2.16E-09	5.34E-10	2,572	6.87E-07	5.56E-06	1.37E-06
Benzo(b)fluoranthrene	1.11E-08	0.5*CATEF(2)	5.54E-09	8.10	4.49E-08	1.11E-08	2,572	1.42E-05	1.15E-04	2.85E-05
Benzo(k)fluoranthrene	1.08E-08	0.5*CATEF(2)	5.40E-09	8.10	4.37E-08	1.08E-08	2,572	1.39E-05	1.12E-04	2.78E-05
Benzo(g,h,i)perylene	1.34E-08	0.5*CATEF(2)	6.72E-09	8.10	5.44E-08	1.34E-08	2,572	1.73E-05	1.40E-04	3.46E-05
Chrysene	2.48E-08	0.5*CATEF(2)	1.24E-08	8.10	1.00E-07	2.48E-08	2,572	3.19E-05	2.58E-04	6.38E-05
Dibenz(a,h)anthracene	2.30E-08	0.5*CATEF(2)	1.15E-08	8.10	9.31E-08	2.30E-08	2,572	2.96E-05	2.40E-04	5.92E-05
Fluoranthene	4.24E-08	0.5*CATEF(2)	2.12E-08	8.10	1.72E-07	4.24E-08	2,572	5.45E-05	4.42E-04	1.09E-04
Fluorene	5.70E-08	0.5*CATEF(2)	2.85E-08	8.10	2.31E-07	5.70E-08	2,572	7.33E-05	5.94E-04	1.47E-04
Indeno(1,2,3-cd)pyrene	2.30E-08	0.5*CATEF(2)	1.15E-08	8.10	9.31E-08	2.30E-08	2,572	2.96E-05	2.40E-04	5.92E-05
Phenanthrene	3.08E-07	0.5*CATEF(2)	1.54E-07	8.10	1.25E-06	3.08E-07	2,572	3.96E-04	3.21E-03	7.92E-04
Pyrene	2.72E-08	0.5*CATEF(2)	1.36E-08	8.10	1.10E-07	2.72E-08	2,572	3.50E-05	2.83E-04	7.00E-05
Propylene oxide	2.90E-05	0.5*AP-42(1)	1.45E-05	8.10	1.17E-04	2.90E-05	2,572	3.73E-02	3.02E-01	7.46E-02
Toluene	1.31E-04	0.5*AP-42(1)	6.53E-05	8.10	5.29E-04	1.31E-04	2,572	1.68E-01	1.36E+00	3.36E-01
Xylene	6.40E-05	0.5*AP-42(1)	3.20E-05	8.10	2.59E-04	6.40E-05	2,572	8.23E-02	6.67E-01	1.65E-01

Notes:
(1) AP-42, Table 3.1-3, 4/00.
(2) From CARB CATEF database (converted from lbs/MMscf to lbs/MMBtu based on site natural gas HHV).
(3) Based on 5 ppm ammonia slip from SCR system.
(4) Controlled emission factor adjusted upward based on VOC emission ratio - as required by SDAPCD for the Pio Pico Energy Center and the Amended Carlsbad Energy Center Project.
(5) Based on uncontrolled emission factors - as required by SDAPCD for the Pio Pico Energy Center and the Amended Carlsbad Energy Center Project.

Table C-8.2 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Emissions New Gas Turbine (Annual Emissions)

Pollutant	New Gas Turbine Normal Operating Hours (hrs/yr)	New Gas Turbine Startup/Shutdown Hours (hrs/yr)	New Gas Turbine Commissioning Hours (hrs/yr)	New Gas Turbine(1) Annual Emissions (tons/yr)	New Gas Turbine Annual Commissioning Emissions (tons/yr)
Ammonia	1,750	400	366	18.41	3.13
Propylene	1,750	400	366	2.43	0.36
Hazardous Air Pollutants (HAPs) - Federal					
Acetaldehyde	1,750	400	366	0.128	0.019
Acrolein	1,750	400	366	0.021	0.003
Benzene	1,750	400	366	0.038	0.006
1,3-Butadiene	1,750	400	366	0.001	0.000
Ethylbenzene	1,750	400	366	0.103	0.015
Formaldehyde	1,750	400	366	2.887	0.424
Hexane, n-	1,750	400	366	0.815	0.120
Naphthalene	1,750	400	366	0.004	0.001
Total PAHs (listed individually below)	1,750	400	366	0.002	0.000
Acenaphthene	1,750	400	366	0.000	0.000
Acenapthyene	1,750	400	366	0.000	0.000
Anthracene	1,750	400	366	0.000	0.000
Benzo(a)anthracene	1,750	400	366	0.000	0.000
Benzo(a)pyrene	1,750	400	366	0.000	0.000
Benzo(e)pyrene	1,750	400	366	0.000	0.000
Benzo(b)fluoranthrene	1,750	400	366	0.000	0.000
Benzo(k)fluoranthrene	1,750	400	366	0.000	0.000
Benzo(g,h,i)perylene	1,750	400	366	0.000	0.000
Chrysene	1,750	400	366	0.000	0.000
Dibenz(a,h)anthracene	1,750	400	366	0.000	0.000
Fluoranthene	1,750	400	366	0.000	0.000
Fluorene	1,750	400	366	0.000	0.000
Indeno(1,2,3-cd)pyrene	1,750	400	366	0.000	0.000
Phenanthrene	1,750	400	366	0.001	0.000
Pyrene	1,750	400	366	0.000	0.000
Propylene oxide	1,750	400	366	0.093	0.014
Toluene	1,750	400	366	0.419	0.061
Xylene	1,750	400	366	0.205	0.030
Total (HAPs) =				4.72	0.69
Total (All) =				25.55	4.18

Notes:
(1) Includes startup/shutdown emissions.

Table C-8.4 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Emission Factors
MGS Existing Units 1 - 3

Pollutant	Boiler Emission Factors(1) lb/MMscf	Unit 3 GT Emission Factors(2) lb/MMscf	Unit 1 Max Firing Rate MMBtu/hr	Unit 2 Max Firing Rate MMBtu/hr	Unit 3 GT Max Firing Rate MMBtu/hr
Ammonia (not a HAP)	4.56E+00	0.00E+00	1990	1990	2510
Propylene (Not a HAP)	1.55E-02	7.70E-01	1990	1990	2510
Propylene oxide		2.95E-02	1990	1990	2510
Benzene	1.70E-03	1.22E-02	1990	1990	2510
Formaldehyde	3.60E-03	9.16E-01	1990	1990	2510
Hexane	1.30E-03	2.59E-01	1990	1990	2510
Naphthalene	3.00E-04	1.33E-03	1990	1990	2510
Dichlorobenzene			1990	1990	2510
Toluene	7.80E-03	1.33E-01	1990	1990	2510
1,3-Butadiene		4.38E-04	1990	1990	2510
Acetaldehyde	9.00E-04	4.07E-02	1990	1990	2510
Acrolein	8.00E-04	6.54E-03	1990	1990	2510
Ethyl Benzene	2.00E-03	3.26E-02	1990	1990	2510
PAHs (other)	1.00E-04	6.55E-04	1990	1990	2510
Xylene	5.80E-03	6.52E-02	1990	1990	2510

Notes:
(1) All boiler factors except ammonia from Ventura County APCD AB2588 emission factors for natural gas external combustion (greater than 100 MMBtu/hr), May 17, 2001.
Ammonia based on Title V permit NH_3 hourly emission limit.
(2) A combination of AP-42 (Table 3.1-3, 4/00) and CARB CATEF database emission factors.

Table C-8.5 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Hourly Emissions
MGS Existing Units 1 - 3

Pollutant	Unit 1 Emissions lb/hr	Unit 2 Emissions lb/hr	Unit 3 GT Emissions lb/hr
Ammonia (not a HAP)	8.91E+00	8.91E+00	0.00E+00
Propylene (Not a HAP)	3.04E-02	3.04E-02	1.90E+00
Propylene oxide	0.00E+00	0.00E+00	7.28E-02
Benzene	3.32E-03	3.32E-03	3.01E-02
Formaldehyde	7.04E-03	7.04E-03	2.26E+00
Hexane	2.54E-03	2.54E-03	6.38E-01
Naphthalene	5.86E-04	5.86E-04	3.28E-03
Dichlorobenzene	0.00E+00	0.00E+00	0.00E+00
Toluene	1.52E-02	1.52E-02	3.28E-01
1,3-Butadiene	0.00E+00	0.00E+00	1.08E-03
Acetaldehyde	1.76E-03	1.76E-03	1.00E-01
Acrolein	1.56E-03	1.56E-03	1.61E-02
Ethyl Benzene	3.91E-03	3.91E-03	8.03E-02
PAHs (other)	1.95E-04	1.95E-04	1.61E-03
Xylene	1.13E-02	1.13E-02	1.61E-01

Table C-8.6 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Annual Emissions (maximum 2-year avg. over past 5-years)
MGS Existing Units 1 - 3

Pollutant	Unit 1 Annual Avg Firing Rate MMscf/yr	Unit 2 Annual Avg Firing Rate MMscf/yr	Unit 3 GT Annual Avg Firing Rate MMscf/yr	Unit 1 Annual Emissions tons/yr	Unit 2 Annual Emissions tons/yr	Unit 3 GT Annual Emissions tons/yr	Subtotal tons/yr
Ammonia (not a HAP)	1,102	1,297	89	2.511	2.956	0.000	5.467
Propylene (Not a HAP)	1,102	1,297	89	0.009	0.010	0.034	0.053
Propylene oxide	1,102	1,297	89	0.000	0.000	0.001	0.001
Benzene	1,102	1,297	89	0.001	0.001	0.001	0.003
Formaldehyde	1,102	1,297	89	0.002	0.002	0.041	0.045
Hexane	1,102	1,297	89	0.001	0.001	0.011	0.013
Naphthalene	1,102	1,297	89	0.000	0.000	0.000	0.000
Dichlorobenzene	1,102	1,297	89	0.000	0.000	0.000	0.000
Toluene	1,102	1,297	89	0.004	0.005	0.006	0.015
1,3-Butadiene	1,102	1,297	89	0.000	0.000	0.000	0.000
Acetaldehyde	1,102	1,297	89	0.000	0.001	0.002	0.003
Acrolein	1,102	1,297	89	0.000	0.001	0.000	0.001
Ethyl Benzene	1,102	1,297	89	0.001	0.001	0.001	0.004
PAHs (other)	1,102	1,297	89	0.000	0.000	0.000	0.000
Xylene	1,102	1,297	89	0.003	0.004	0.003	0.010
						Total (HAPs) =	0.095
						Total (All) =	5.615

Table C-8.7 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Emissions New Gas Turbine (Modeling Inputs)

Pollutant	For Acute Modeling Hourly Normal Oper. Emission Rate (g/sec)	For Acute Modeling Hourly Startup/Shutdown Emission Rate (g/sec)	For Acute Modeling Hourly Commissioning Emission Rate (g/sec)	For Chronic/Cancer Risk Modeling Annual Normal Oper. Emission Rate(1) (g/sec)	For Chronic/Cancer Risk Modeling Annual Commissioning Emission Rate(1) (g/sec)
Ammonia	2.16E+00	2.16E+00	2.16E+00	5.30E-01	9.01E-02
Propylene	1.23E-01	9.92E-01	2.45E-01	6.98E-02	1.02E-02
Hazardous Air Pollutants (HAPs) - Federal					
Acetaldehyde	6.48E-03	5.25E-02	1.30E-02	3.69E-03	5.42E-04
Acrolein	1.04E-03	8.42E-03	2.08E-03	5.92E-04	8.69E-05
Benzene	1.94E-03	1.57E-02	3.88E-03	1.11E-03	1.62E-04
1,3-Butadiene	6.97E-05	5.64E-04	1.39E-04	3.97E-05	5.82E-06
Ethylbenzene	5.19E-03	4.20E-02	1.04E-02	2.95E-03	4.33E-04
Formaldehyde	1.46E-01	1.18E+00	2.92E-01	8.31E-02	1.22E-02
Hexane, n-	4.12E-02	3.33E-01	8.23E-02	2.34E-02	3.44E-03
Naphthalene	2.12E-04	1.71E-03	4.23E-04	1.21E-04	1.77E-05
Total PAHs (listed individually below)	1.04E-04	8.44E-04	2.08E-04	5.94E-05	8.71E-06
Acenaphthene	3.02E-06	2.45E-05	6.04E-06	1.72E-06	2.52E-07
Acenapthyene	2.34E-06	1.89E-05	4.67E-06	1.33E-06	1.95E-07
Anthracene	5.38E-06	4.36E-05	1.08E-05	3.06E-06	4.50E-07
Benzo(a)anthracene	3.60E-06	2.91E-05	7.19E-06	2.05E-06	3.01E-07
Benzo(a)pyrene	2.21E-06	1.79E-05	4.42E-06	1.26E-06	1.85E-07
Benzo(e)pyrene	8.65E-08	7.01E-07	1.73E-07	4.93E-08	7.23E-09
Benzo(b)fluoranthrene	1.80E-06	1.45E-05	3.59E-06	1.02E-06	1.50E-07
Benzo(k)fluoranthrene	1.75E-06	1.42E-05	3.50E-06	9.97E-07	1.46E-07
Benzo(g,h,i)perylene	2.18E-06	1.76E-05	4.36E-06	1.24E-06	1.82E-07
Chrysene	4.02E-06	3.25E-05	8.04E-06	2.29E-06	3.36E-07
Dibenz(a,h)anthracene	3.73E-06	3.02E-05	7.45E-06	2.12E-06	3.11E-07
Fluoranthene	6.87E-06	5.56E-05	1.37E-05	3.91E-06	5.74E-07
Fluorene	9.24E-06	7.48E-05	1.85E-05	5.26E-06	7.72E-07
Indeno(1,2,3-cd)pyrene	3.73E-06	3.02E-05	7.45E-06	2.12E-06	3.11E-07
Phenanthrene	4.99E-05	4.04E-04	9.98E-05	2.84E-05	4.17E-06
Pyrene	4.41E-06	3.57E-05	8.81E-06	2.51E-06	3.68E-07
Propylene oxide	4.70E-03	3.81E-02	9.40E-03	2.68E-03	3.93E-04
Toluene	2.12E-02	1.71E-01	4.23E-02	1.21E-02	1.77E-03
Xylene	1.04E-02	8.40E-02	2.07E-02	5.91E-03	8.67E-04

Notes:
(1) Includes startup/shutdown emissions.

Table C-8.8 (Revised November 18, 2015)
Puente Power Project
Non-Criteria Pollutant Modeling Inputs
MGS Existing Units 1 - 3

Pollutant	Unit 1 Hourly Emiss. (g/sec)	Unit 2 Hourly Emiss. (g/sec)	Unit 3 GT Hourly Emiss. (g/sec)	Unit 1 Annual Emiss. (g/sec)	Unit 2 Annual Emiss. (g/sec)	Unit 3 GT Annual Emiss. (g/sec)
Ammonia (not a HAP)	1.12E+00	1.12E+00	0.00E+00	7.22E-02	8.50E-02	0.00E+00
Propylene (Not a HAP)	3.83E-03	3.83E-03	2.39E-01	2.46E-04	2.90E-04	9.80E-04
Propylene oxide	0.00E+00	0.00E+00	9.17E-03	0.00E+00	0.00E+00	3.76E-05
Benzene	4.19E-04	4.19E-04	3.79E-03	2.69E-05	3.17E-05	1.55E-05
Formaldehyde	8.87E-04	8.87E-04	2.85E-01	5.70E-05	6.72E-05	1.17E-03
Hexane	3.20E-04	3.20E-04	8.03E-02	2.06E-05	2.43E-05	3.29E-04
Naphthalene	7.39E-05	7.39E-05	4.13E-04	4.75E-06	5.60E-06	1.69E-06
Dichlorobenzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	1.92E-03	1.92E-03	4.13E-02	1.24E-04	1.46E-04	1.69E-04
1,3-Butadiene	0.00E+00	0.00E+00	1.36E-04	0.00E+00	0.00E+00	5.58E-07
Acetaldehyde	2.22E-04	2.22E-04	1.27E-02	1.43E-05	1.68E-05	5.19E-05
Acrolein	1.97E-04	1.97E-04	2.03E-03	1.27E-05	1.49E-05	8.32E-06
Ethyl Benzene	4.93E-04	4.93E-04	1.01E-02	3.17E-05	3.73E-05	4.15E-05
PAHs (other)	2.46E-05	2.46E-05	2.03E-04	1.58E-06	1.87E-06	8.34E-07
Xylene	1.43E-03	1.43E-03	2.02E-02	9.19E-05	1.08E-04	8.30E-05

APPENDIX 68-1

REVISED NITROGEN DEPOSITION MODELING ANALYSIS

Table 4.2-4 (Revised 11/18/15)
Impacts from Nitrogen Deposition of the New Equipment at Ecologically Sensitive Receptor Sites

Receptor Location	Modeled Project-Related Nitrogen Deposition Using Past Meteorological Conditions (kg N·ha-1·yr-1)					Deposition Using Worst Modeled Scenario ~~2009-2013~~ 2010-2014 (kg N·ha-1·yr-1)	Receptor Vegetation Type	Critical Load (kg N·ha-1·yr-1, from Pardo et al., 2011)	Project Impact Under Worst-Case Modeled Scenario as a Percentage of Critical Load
	~~2009~~ 2010 Conditions	~~2010~~ 2011 Conditions	~~2011~~ 2012 Conditions	~~2012~~ 2013 Conditions	~~2013~~ 2014 Conditions				
Impacts for the new gas turbine and new emergency generator engine – accounts for emissions reductions for shutdown of one MGS boiler									
Mugu Lagoon	~~0.00236~~ **0.00190**	~~0.00213~~ **0.00166**	~~0.00187~~ **0.00190**	~~0.00214~~ **0.00170**	~~0.00189~~ **0.00138**	~~0.00236~~ **0.00190**	Intertidal Wetlands	2.7	~~0.09%~~ **0.07%**
Ormond Beach Wetlands	~~0.00241~~ **0.00209**	~~0.00238~~ **0.00167**	~~0.00191~~ **0.00178**	~~0.00201~~ **0.00191**	~~0.00217~~ **0.00191**	~~0.00241~~ **0.00209**	Intertidal Wetlands	2.7	~~0.09%~~ **0.08%**
Oxnard Dunes	~~0.0079~~ **0.00561**	~~0.0062~~ **0.00318**	~~0.00336~~ **0.00347**	~~0.00369~~ **0.00413**	~~0.0048~~ **0.00313**	~~0.0079~~ **0.00561**	Herbaceous	6	~~0.13%~~ **0.09%**
Beach due west of site	~~0.06123~~ **0.16527**	~~0.18192~~ **0.06223**	~~0.06131~~ **0.08345**	~~0.08865~~ **0.03333**	~~0.03013~~ **0.07559**	~~0.18192~~ **0.16527**	Herbaceous	6	~~3.03%~~ **2.75%**
McGrath Lake/ McGrath State Beach	~~0.0119~~ **0.01718**	~~0.01924~~ **0.01127**	~~0.01184~~ **0.01121**	~~0.01194~~ **0.00531**	~~0.00574~~ **0.00593**	~~0.01924~~ **0.01718**	Freshwater Wetlands	6.8	~~0.28%~~ **0.25%**
Santa Clara River Mouth	~~0.00786~~ **0.00660**	~~0.00751~~ **0.00497**	~~0.00576~~ **0.00383**	~~0.00445~~ **0.00487**	~~0.00569~~ **0.00431**	~~0.00786~~ **0.00660**	Herbaceous	6	~~0.13%~~ **0.11%**
Impacts for the new gas turbine, the new emergency generator engine, MGS Unit 3, and one MGS boiler									
Mugu Lagoon	**0.00224**	**0.00195**	**0.00223**	**0.00197**	**0.00162**	**0.00224**	**Intertidal Wetlands**	**2.7**	**0.08%**
Ormond Beach Wetlands	**0.00248**	**0.00197**	**0.00207**	**0.00221**	**0.00221**	**0.00248**	**Intertidal Wetlands**	**2.7**	**0.09%**
Oxnard Dunes	**0.00782**	**0.00481**	**0.00517**	**0.00622**	**0.00451**	**0.00782**	**Herbaceous**	**6**	**0.13%**

Table 4.2-4 (Revised 11/18/15) Impacts from Nitrogen Deposition of the New Equipment at Ecologically Sensitive Receptor Sites									
Receptor Location	Modeled Project-Related Nitrogen Deposition Using Past Meteorological Conditions (kg N·ha-1·yr-1)					Deposition Using Worst Modeled Scenario ~~2009-2013~~ 2010-2014 (kg N·ha-1·yr-1)	Receptor Vegetation Type	Critical Load (kg N·ha-1·yr-1, from Pardo et al., 2011)	Project Impact Under Worst-Case Modeled Scenario as a Percentage of Critical Load
	~~2009~~ 2010 Conditions	~~2010~~ 2011 Conditions	~~2011~~ 2012 Conditions	~~2012~~ 2013 Conditions	~~2013~~ 2014 Conditions				
Beach due west of site	0.17079	0.06574	0.08487	0.03499	0.07793	0.17079	Herbaceous	6	2.85%
McGrath Lake/ McGrath State Beach	0.02024	0.01442	0.01361	0.00819	0.00867	0.02024	Freshwater Wetlands	6.8	0.30%
Santa Clara River Mouth	0.00829	0.00664	0.00508	0.00632	0.00589	0.00829	Herbaceous	6	0.14%