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March 12, 2021

Joseph Douglas
Compliance Project Manager
CA Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: Petition to Amend - Uprate Project
El Segundo Energy Center (00-AFC-14C)

Dear Mr. Douglas:

El Segundo Energy Center LLC (ESEC) is pleased to submit the Petition to Amend for the uprate of gas turbine Units 5 and 7 at El Segundo Energy Center (Facility). The uprate of these turbines will not necessitate physical modifications; rather the fuel input on an hourly basis would increase, resulting in an increase in output of the respective gas turbines. No additional output from the respective steam turbines will incur. The increase in the fuel input would allow an increase of the heat input rate to a more representative maximum heat input rating for each turbine, which will increase the corresponding output of each turbine. The maximum output of the Facility would increase from 573.4 MW to 580.4 MW, while the net output would increase to 560 MW, which is the output described in the ESEC license. The uprate project is proposed as a minor air permit modification. No changes are proposed to pollutant concentrations nor annual emissions. A daily maximum fuel input will be added to the permit conditions that will minimize daily mass emission increases of NOx, CO and VOCs.

Improvements in logic controls would enable ESEC to increase the Facility's nominal output, increasing net generation to the grid by more than 30 MW. ESEC is seeking modifications of the Facility Permit to Operate to increase the fuel input and the corresponding output of the facility in time for summer 2021. The increase in output from El Segundo Energy Center is integral in addressing the State of California's urgent need for additional capacity. Southern California Edison has contracted ESEC for the increased output starting June 1, 2021 in response to the California Public Utilities Commission's ruling (Rulemaking 20-11-003, dated December 28, 2020) directing the State's three large electric investor-owned utilities to seek contracts for additional power capacity.

The PTA filing fee has been sent to the Administrative Office. If you have any questions or need further information, please don't hesitate to contact me at (760) 707-6833.

Best Regards,

On behalf of El Segundo Energy Center LLC

George L. Piantka, PE
Senior Director, Environmental

cc: Michael Murphy, El Segundo Energy Center LLC
Ken Riesz, El Segundo Energy Center LLC
Tim Sisk, El Segundo Energy Center LLC

El Segundo Energy Center (00-AFC-14C), Petition to Amend: Increase Turbine Heat Input Rating, March 2021

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Date Submitted: March 12, 2021

Table of Contents

List of Tables

Appendices

El Segundo Energy Center (00-AFC-14) Petition to Amend: Increase Turbine Heat Input Rating

1.0 INTRODUCTION

1.1 Project Overview

The El Segundo Energy Center LLC (ESEC) is submitting this Petition to Amend (PTA) to request modifications to the Equipment Description and one Condition of Certification (COC), AQ-11, for its two (2) natural gas-fired Combined Cycle Gas Turbines (CCGT) to increase the allowable heat rate to be more representative of "maximum" heat input rating of the equipment. The turbines were described in former permit actions using a nominal heat rate rather than the maximum rate. The Facility is currently dispatched to serve peak power demand and needs to be permitted to operate at the maximum possible load to service that demand. The Equipment Description for each CCGT in the South Coast Air Quality Management District (SCAQMD) Permit to Operate (PTO) currently lists the heat rate as 2,096 million British thermal units (MMBtu) per hour with a generating capacity of 219 megawatts (MW). With this PTA, ESEC is requesting that the heat rate be updated to 2,250 MMBtu per hour with a generating capacity of 222.5 MW for each unit. This change will increase El Segundo Energy Center's (Facility) maximum generating capacity from 573.4 MW referenced in the license to 580.4 MW. The nominal net generation described in the license (i.e., 560 MW) will remain unchanged, but will be achievable with the increase in heat input rate. There are no physical modifications to the turbines proposed by this application.

The proposed Project will have the following impact on emissions from the Facility:

- The increase in hourly heat rate would result in an increase in the hourly of nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), and respirable particulate matter (PM_{10}) emissions, although the hourly emissions are not limited by COCs.
- ESEC has requested from the SCAQMD a throughput limit of 51,162 MMBtu per day in the PTO. This daily limit will result in a daily emission increase for NO_x, CO, and VOC. Daily PM_{10} and SO_x emissions will not increase. The daily emissions are specifically limited by the COCs, but ESEC is requesting that COC AQ-11 include a daily fuel limit so that the CEC license is consistent with the SCAQMD permit.
- The requested changes will result in increases in monthly NO_x, CO, and VOC emissions. Of these pollutants, COC AQ-11 limits monthly VOC emissions; monthly NO_x and CO emissions are not limited by COCs. Monthly PM_{10} and SO_x emissions will not increase. The monthly increase in NO_x emissions will be offset by Regional Clean Air Incentive Market (RECLAIM) Trading Credits (RTCs), and the VOC increase will be offset by Emission Reduction Credits (ERCs).
- The proposed Project does not alter annual emissions of criteria pollutants.
- Hourly toxic air contaminant (TAC) emissions will increase, but hourly TAC emissions are also not limited by the COCs. With the exception of ammonia, annual TAC emissions

will not increase. Annual ammonia emissions are predicted to increase, although the calculated increase is an artifact of the calculation methodology and not attributed to the proposed heat input change. Annual TAC emissions are not limited by the COCs.

Pursuant to California Code of Regulations (CCR) Title 20 Section 1769(a)(1), as revised in September 2019, ESEC, the Project Owner, is filing this PTA for to request the following two proposed amendments:

1. Changes the input heat rate and the output power of the CCGTs in the Equipment Description; and
2. A modification of COC AQ-11 (SCAQMD Condition A63.2) to allow for higher monthly VOC emissions.

The proposed amendments comply with all laws, ordinances, regulations, and standards (LORS) and do not have a significant environmental impact, as further described in this PTA. The emission changes will not cause adverse impacts to ambient air quality, as demonstrated through an Air Quality Impact Analysis (AQIA). The emission changes will not cause adverse impacts to public health, as demonstrated by a Health Risk Assessment (HRA). The proposed revisions to the COCs will not have significant impact on property owners, the public, or any other parties.

1.2 Information Requirements for Post-Certification Amendments

This Petition contains the information required under the CEC's Siting Regulations for post-certification project modifications [CCR Title 20, Section 1769(a)(1)], including the following:

A. A complete description of the proposed change, including new language for any conditions of certification that will be affected;

B. A discussion of the necessity for the proposed change and an explanation of why the change should be permitted;

C. A description of any new information or change in circumstances that necessitated the change;

D. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects;

E. An analysis of how the proposed change would affect the project's compliance with applicable laws, ordinances, regulations, and standards;

F. A discussion of how the proposed change would affect the public;

G. A list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of any affected project linears and 1,000 feet of the project site;

H. A discussion of the potential effect of the proposed change on nearby property owners, residents, and the public; and

I. A discussion of any exemptions from the California Environmental Quality Act (CEQA), of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.

2.0 REQUIRED INFORMATION FOR POST-CERTIFICATION AMENDMENTS

A. Complete description of the proposed change, including new language for any conditions of certification that will be affected.

A.1 Facility Background Information

Southern California Edison (SCE) previously owned and operated a power plant at this location. The original Permits to Operate (PTO) for the four steam boiler generators were issued for the equipment that was built in the 1950s (Units 1 and 2 at 175 MW each) and 1960s (Units 3 and 4 at 335 MWs each). A Change of Operator application was submitted to transfer ownership from SCE to NRG in 1998. In 2000, ESEC submitted applications to SCAQMD and the California Energy Commission (CEC) for permits to construct the El Segundo Power Redevelopment Project. As part of the proposed redevelopment project, Units 1 and 2 were to be demolished and replaced with two CCTGs. The CEC issued its Commission Decision in 2005 approving the El Segundo project and SCAQMD issued the Permit to Construct. The El Segundo Power Redevelopment Project was not contracted by a load serving entity at that time; therefore, demolition of Units 1 and 2 and construction of the El Segundo project did not commence following the permit approvals.

In 2007, ESEC submitted a Petition to Amend the CEC Commission Decision and an air permit application to modify the El Segundo Power Redevelopment Project from a two-on-one (2x1) CCGT that would rely on ocean cooling to two 1x1 CCGTs that incorporate fast-start capabilities and that would rely on air-cooling. The project change was necessary due to the then pending State Water Resources Control Board rulemaking to phase-out legacy steam boiler plants and newer combined cycle plants that rely on once-through cooling in the steam generation process. The El Segundo project's proposed capacity decreased from 647 MW to 573 MW and the gas turbines changed from General Electric 7FA to fast-start, air-cooled Siemens SGT6-5000 F. The air permit was modified to comply with SCAQMD Rule 1304 solely for offsetting the new generation through the retirement of Units 1-3, or approximately 685 MW of steam generation to construct the 573 MW, two 1x1 CCGTs, since the Rule 1309 was no longer available for offsetting replacement electricity generation. The project was renamed as El Segundo Energy Center in 2008 and the CEC amendment and air permit modifications were approved in 2010.

Demolition of Units 1 and 2 was completed in 2011 and the construction of the Facility was completed in 2013. Unit 3 was retired in 2013 to align with the completion of ESEC. The two 1x1 CCGT were identified as Units 5 and 6, and Units 7 and 8, respectively, with each power block including the Siemens gas turbine, heat recovery steam generator (HRSG), and steam turbine. Selective catalytic reduction (SCR) systems and oxidation catalysts are utilized for control of NOx and CO/VOC emissions, respectively. One 20,000-gallon underground storage tank storing 29% aqueous ammonia (NH_3) supplies the NOx reducing agent in the SCR.

A.2 Proposed Changes

As noted in the Introduction, the purpose of this PTA is to request changes to the Equipment Description and to COC AQ-11 applicable to each of the two CCGTs. The following specific changes are proposed:

1. Changes the input heat rate and the output power of the CCGTs in the Equipment Description from 2,096 MMBtu per hour to 2,250 MMBtu per hour, and the electrical output from 219 MW to 222.5 MW for each of the two CCGTs; and
2. A modification of COC AQ-11 (SCAQMD Condition A63.2) to allow for higher monthly VOC emissions.
3. A modification of COC AQ-11 to include a fuel use limit of 51,162 MMBtu per day.

The reasons these three changes are needed are discussed further in Section B.

A.3 Proposed Changes to the Conditions of Certification

The following specific revisions to the Equipment Description and COC AQ-11 in the CEC Final Commission Decision are proposed using **underline bold** for inserted text and ~~**strikethrough bold**~~ for deleted text. Only the Equipment Description and COC proposed for revision are included.

AQ-11: The operator shall limit emissions from this equipment as follows:

Contaminant	Emissions Limit
PM_{10}	Less than or equal to 6,935 LBS IN ANY 1 MONTH
VOC	Less than or equal to ~~4,930~~ **4,997** LBS IN ANY 1 MONTH
SO_x	Less than or equal to 1,065 LBS IN ANY 1 MONTH

The operator shall calculate the monthly emissions for VOC, PM_{10}, and SO_x using the equation below and the following emission factors: PM_{10} 4.66 lbs/MMscf, VOC 2.93 lbs/MMscf, and SO_x 0.71 lbs/MMscf.

Monthly Emissions, lb/month = X (E. F.)

Where X = monthly fuel use, MMscf/month and E. F = emission factor indicated above.

For the purposes of this condition, the limit(s) shall be based on the emissions from each individual combined cycle gas turbine Units No. 5 and No. 7.

The operator shall limit daily fuel consumption not to exceed 51,162 MMBtu per day.

Verification: The project owner shall submit the monthly fuel use data and emission calculations to the CPM in the Quarterly Operation Reports (AQ-C8).

B. A discussion of the necessity for the proposed change and an explanation of why the change should be permitted.

ESEC is seeking modifications of the SCAQMD Facility Permit to Operate (PTO) and the corresponding CEC license to increase the fuel input and the corresponding output of the Facility in time for summer 2021. The increase in output from ESEC is integral in addressing the State of California's urgent need for additional capacity. Southern California Edison (SCE) has contracted ESEC for the increased output starting June 1, 2021 in response to the California Public Utilities Commission's (CPUC) ruling (Rulemaking 20-11-003, dated December 28, 2020) directing the State's three large electric investor-owned utilities to seek contracts for additional power capacity. In response to the need for additional generation, modifications to the PTO and CEC license are

needed to enable ESEC to increase the maximum output from 573.4 MW to 580.4 MW, which should enable the Facility to achieve 560 MW nominal net as described in the ESEC license and PTO. The Facility is currently dispatched to serve peak power demand as well to support baseload needs and needs to be permitted to operate at the maximum possible load to service that demand.

C. A description of any new information or change in circumstances that necessitated the change.

The prolonged heat storm experienced in August 2020 led the California independent System Operator (CAISO) to initiate rotating outages and subsequently led to Governor directing the CEC, CAISO and California Public Utilities Commission (CPUC) to prepare a report describing the root cause of the events leading to the rotating outages. The extreme heat storm continued in September 2020 which led to the Governor to issue orders in mid-August and early- September enabling electricity generation stations to operate above permit limits, if possible, to support the electricity demand of the State. The Department of Energy issued a 202(c) Order for some electricity generating stations to operate without federal permit limits during early-September due to the extreme heat storm. The CPUC, in response to the State's energy agencies preliminary report directed the "…large electric investor-owned utilities (IOUs) to seek contracts for capacity, available for the net peak demand in summer 2021 that conforms with the parameters outlined in (Assigned Commissioner's December 28, 2020) ruling (Rulemaking 20-11-003)." The Assigned Commissioner's Rule also directed the IOUs to seek contracts for summer 2022. ESEC has been contracted by SCE to provide incremental net generation as soon as June 1, 2021. ESEC, in response to this contract for incremental generation, is seeking a change to its permit to increase the heat input rate which will increase the maximum output from 573.4 MW to 580.4 MW, which should enable the Facility to achieve 560 MW nominal net output as already described in the ESEC license.

D. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects.

D.1 Overview

The proposed amendment to air quality COC will result in an increase in hourly heat rate that in turn would result in an increase in the hourly of NO_x, SO_x, CO, VOC, and PM_{10} emissions.

In addition to the increase to the hourly heat input rating, ESEC requested that the SCAQMD impose a throughput limit of 51,162 MMBtu per day. This daily fuel use limit will result in a daily emission increase for NO_x, CO, and VOC. PM_{10} and SO_x emissions will not increase.

The requested changes will result in increases in monthly NO_x, CO, and VOC emissions. Of these pollutants, COC AQ-11 limits monthly VOC emissions; monthly NO_x and CO emissions are not limited by COCs. Monthly PM_{10} and SO_x emissions will not increase. The monthly increase in NO_x emissions will be offset by RTCs, and the VOC increase will be offset by ERCs.

The proposed Project does not alter annual emissions of criteria pollutants or annual TAC emissions, except for ammonia. Annual ammonia emissions are predicted to increase, although the calculated increase is an artifact of the calculation methodology and not attributed to the proposed changes.

A summary of the expected impacts on each of the environmental resource areas is provided in Table D-1 below. More complete analyses of the potential impacts on air quality and public health are provided in Sections D-1 and D-2, respectively.

Table D-1: Environmental Impact Summary

Resource Area	Analysis
Air Quality	The air quality impact analysis is provided in Section D.2. As discussed, no significant impacts are expected from the proposed changes.
Biological Resources	No physical changes to the Project footprint are proposed and the small increase in emissions increase would not impact biological resources.
Cultural Resources	No physical changes to the Project footprint are proposed and there would be no impact to cultural resources.
Geology and Paleontology	No physical changes to the Project footprint are proposed and there would be no impact to geologic or paleontological resources.
Hazardous Materials	The proposed changes do not impact the storage or use of any hazardous material currently in use at the Facility and do not require the storage or use of any new hazardous material[1]. Therefore, the proposed Project is not expected to cause an impact related to hazardous materials.
Land Use	The proposed changes will not affect land use; hence, there will be no impact.
Noises and Vibration	No construction is needed and the change in the heat rate and power output will not cause a change in noise or vibration from the Project; hence, there will be no impact.
Public Health	The proposed changes will result in an increase in the maximum hourly emissions of TACs due to the combustion of natural gas and hourly and annual ammonia emissions due to ammonia slip from the SCR. The health risk analysis is provided in Section D.3. As discussed, no significant impacts are expected from the proposed changes.
Socioeconomic Resources	The proposed changes do not require any changes in workforce; hence, there will be no socioeconomic impact.
Soil and Water Resources	No physical changes, ground disturbance, or increased water usage are proposed; hence, there would be no impact to soil or water resources
Traffic and Transportation	The proposed changes do not require any changes in workforce; hence, there will be no traffic or transportation impact due to worker commute. The proposed changes do not affect the quantity of hazardous materials delivered to, stored, or used at the Facility[1]. Therefore, the proposed Project is not expected to have an impact related to traffic and transportation.

[1] The emission calculations indicate an increase in annual ammonia emissions which would imply that the quantity of ammonia used at the facility would increase, and thus the quantity of ammonia transported to the facility would increase. This apparent increase in ammonia emissions is an artifact of the calculation methodology and does not reflect an actual increase in ammonia use or emissions due to the proposed Project. The apparent increase in ammonia emissions is due to using a different higher heating value for the pre-project emissions (1,020 Btu/scf) compared to the post-project emissions (1,050 Btu/scf). The reason for the change is to reconcile the calculation assumptions with the SCAQMD RECLAIM program requirements which requires a HHV of 1,050 Btu/scf. It is important that the post-Project NO_x emissions are calculated in accordance with RECLAIM requirements, and the use of the RECLAIM assumptions was carried through the post-Project emission estimates for all pollutants.

Resource Area	Analysis
Visual Resources	No physical changes to the Project appearance are proposed; hence, there would be no impact to visual resources.
Waste Management	The proposed changes will not affect the level of waste production from the Facility; hence, there will be no impact.
Worker Safety and Fire Protection	No construction, physical changes to the Facility, or change in workforce are proposed; hence, there will be no impact related to worker safety or fire protection.

D.2 Air Quality

The potential for impacts to air quality and public health from the proposed COC changes are discussed in the following sections.

D.2.1 Criteria Pollutant Emissions

The Equipment Description currently lists the heat rate of each CCGT as 2,096 MMBtu per hour. With this application, ESEC is requesting that the heat rate be updated to 2,250 MMBtu per hour. The increase in hourly heat rate with a daily heat input rate cap would result in an increase in the hourly increase of NO_x, CO, VOC, SO_x, and PM_{10} and daily increase of NO_x, CO, and VOC emissions. Additionally, ESEC has requested that the SCAQMD impose a condition limiting fuel input to 51,162 MMBtu per day, per turbine.

ESEC is proposing an increase in the maximum hourly heat input rating for each of the two CCGTs. This will result in a corresponding increase in maximum hourly emissions. Each CCGT will accept a daily fuel use limit of 51,162 MMBtu, which will increase daily and monthly emissions for NO_x, CO and VOCs.

Emission Factors

The emission factors used to calculate pre-project and post-project emissions are summarized in Table D-2. Note the following changes:

- For the pre-project emission calculations, the emission factors (lb/MMscf) for NO_x, CO, and VOC are calculated using a higher heating value (HHV) of natural gas of 1,020 Btu/scf, consistent with prior permit actions; and
- For the post-project emission calculations, the emission factors (lb/MMscf) for NO_x, CO, and VOC are calculated using a HHV of natural gas of 1,050 Btu/scf, consistent with RECLAIM requirements.

Table D-2: Summary of Emission Factors

Pollutant	Unit of measure	Pre-Project	Post-Project
NO_x	ppmv @ 15% O_2	2.0	2.0
	lb/MMscf	7.57	7.74
CO	ppmv @ 15% O_2	2.0	2.0
	lb/MMscf	4.61	4.71
VOC	ppmv @ 15% O_2	2.0	2.0
	lb/MMscf	2.63	2.69
SO_x	lb/MMscf	0.71	0.71
PM_{10}	lb/MMscf	4.66	4.66

Summary of Emissions

Hourly emissions are summarized in Table D-3 (normal operations only, i.e., excluding startup and shutdowns); daily emissions are summarized in Table D-4; monthly emissions are summarized in Table D-5; and 30-day average daily emissions are summarized in Table D-6. All tables present emissions data per CCGT. Emission calculation worksheets are provided in Appendix A.

Table D-3: Summary of Normal Operating Hourly Emissions (per CCGT)

Pollutant	Pre-Project (lb/hr)	Post-Project (lb/hr)	Change (lb/hr)
NO_x	15.45	16.59	1.13
CO	9.41	10.09	0.68
VOC	5.38	5.76	0.38
SO_x	1.46	1.52	0.06
PM_{10}	9.58	9.99	0.41

Table D-4: Summary of Daily Emissions (per CCGT)

Pollutant	Operating Mode	Pre-Project (lb/day)	Post-Project (lb/day)	Change (lb/day)
NO_x	Normal Operations	309.06	310.79	1.74
	Startup	112.06	112.06	0.00
	Shutdown	71.00	71.00	0.00
	Total	**492.12**	**493.85**	**1.74**
CO	Normal Operations	188.23	189.13	0.90
	Startup	834.84	834.84	0.00
	Shutdown	442.36	442.36	0.00
	Total	**1,465.43**	**1,466.33**	**0.90**
VOC	Normal Operations	107.68	108.02	0.34
	Startup	34.60	34.60	0.00
	Shutdown	19.48	19.48	0.00
	Total	**161.76**	**162.10**	**0.34**
SO_x	Normal Operations	29.18	28.51	-0.67
	Startup	2.92	3.04	0.12
	Shutdown	2.92	3.04	0.12
	Total	**35.02**	**34.60**	**-0.42**
PM_{10}	Normal Operations	191.52	187.12	-4.40
	Startup	19.15	19.97	0.82
	Shutdown	19.15	19.97	0.82
	Total	**229.82**	**227.06**	**-2.76**

Table D-5: Summary of Monthly Emissions (per CCGT)

Pollutant	Operating Mode	Pre-Project (lb/mo)	Post-Project (lb/mo)	Change (lb/mo)
NO_x	Normal Operations	9,364.43	9,553.99	189.56
	Startup	3,473.86	3,473.86	0.00
	Shutdown	2,201.00	2,201.00	0.00
	Total	**15,039.29**	**15,228.85**	**189.56**
CO	Normal Operations	5,703.34	5,813.86	110.52
	Startup	25,880.04	25,880.04	0.00
	Shutdown	13,713.16	13,713.16	0.00
	Total	**45,296.54**	**45,407.06**	**110.52**
VOC	Normal Operations	3,262.61	3,320.44	57.83
	Startup	1,072.60	1,072.60	0.00
	Shutdown	603.88	603.88	0.00
	Total	**4,939.09**	**4,996.92**	**57.83**
SO_x	Normal Operations	884.14	876.40	-7.74
	Startup	90.46	94.33	3.87
	Shutdown	90.46	94.33	3.87
	Total	**1,065.06**	**1,065.06**	**0.00**
PM_{10}	Normal Operations	5,802.96	5,752.14	-50.82
	Startup	593.70	619.11	25.41
	Shutdown	593.70	619.11	25.41
	Total	**6,990.37**	**6,990.37**	**0.00**

Table D-6: Summary of 30-day Average Daily Emissions (per CCGT)

Pollutant	Pre-Project (lb/day)	Post-Project (lb/day)	Change (lb/day)
NO_x	501.3	507.6	6.3
CO	1509.9	1513.6	3.7
VOC	164.6	166.6	1.9
SO_x	35.5	35.5	0.0
PM_{10}	233.0	233.0	0.0

D.2.2 Air Quality Impact Analysis

The AQIA evaluates non-attainment criteria pollutant emissions over 1-hour, 8-hour, 24-hour, and annual averaging periods, as appropriate for each California Ambient Air Quality Standard (CAAQS) and National Ambient Air Quality Standard (NAAQS). The AQIA assumes that the pre-project emissions are part of background and considers only emission increases.

Dispersion modeling was conducted to predict potential impacts to ambient air. The air dispersion model used for the proposed Project is AERSCREEN, a screening dispersion model. AERSCREEN is based on AERMOD and is the screening dispersion model

currently recommended by the Environmental Protection Agency (EPA). The Lakes Environmental Software (Lakes) implementation/user interface, AERSCREEN View™, Version 2.7.0, was used for this Project. This version of AERSCREEN View™ implements the newest version of AERMOD (version 19191).

The AQIA evaluates NO_x criteria pollutant emissions over 1-hour and Annual averaging periods, as appropriate for each Significant Change in Air Quality (SCAQ) threshold from SCAQMD Rule 2005. The AQIA assumes that the pre-project emissions are part of background and considers only emission increases. The NO_x emissions used in the AQIA are summarized in Table D-7.

The Project emissions were used in conjunction with the AERSCREEN output to calculate the worst-case impacts to ambient air quality for comparison with the SCAQMD thresholds from Rule 2005. As shown in Table D-8, because the impacts are below the screening thresholds in SCAQMD Rule 2005, Table A-2, the increase in NO_x emissions does not cause or make worse an exceedance of an ambient air quality standard. As such, the proposed changes will not have significant adverse impacts on air quality or the environment, and there is no need for any mitigation measures to offset significant impacts to the environment as a result of the NO_x emission increase associated with the proposed Project. Details of the modeling assessment are shown in Appendix B.

The CO, sulfur dioxide (SO_2), and PM_{10} emissions increases evaluated for the AQIA are summarized in Table D-7. Since the South Coast Air Basin (SCAB) is in attainment for CO and SO_2, no AQIA assessment is needed for these pollutants. Additionally, the Project does not result in an increase in the daily or annual emissions of PM_{10}. Because there is no increase in PM_{10} emissions, modeling is not required for PM_{10}.

Table D-7: AQIA Emissions Increases (per CCGT)

Pollutant	Averaging Period	Emissions Increase (lb/Avg. Period)
NO_2	1-Hr	1.13
	Annual	2,013.40
CO	1-Hr	0.68
	8-Hr	0.90
SO_2	1-Hr	0.06
	24-Hr	No Increase
	Annual	No Increase
PM_{10}	24-Hr	No Increase
	Annual	No Increase

Table D-8: Significant Change in Air Quality Analysis (per CCGT)

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Significant Change in Air Quality ($\mu g/m^3$)	Exceeds Threshold?
NO_2	1-Hr	0.0401	20	No
	Annual	0.0008	1	No

D.3 Public Health

The potential impacts of the proposed Project on air quality are addressed in Section D.2 and the potential impacts on public health due to the increase in TAC emissions are addressed herein.

D.3.1 Toxic Air Contaminant Emissions

The proposed Project will result in an increase in maximum hourly emissions of TACs. TAC emissions are estimated from the pre-project and post-project heat input ratings, a HHV of 1,050 Btu/scf, consistent with RECLAIM requirements and the SCAQMD default emission factors for combustion of natural gas in a combustion turbine. Ammonia emissions are estimated based on ammonia slip of 5 parts per million by volume (ppmv), as specified in Condition A195.11 of the SCAQMD permit. TAC emissions are summarized in Table D-9. Detailed emission calculations are provided in the spreadsheets in Appendix A.

D.3.2 Health Risk Assessment

The health risk impact of an increase in hourly and annual TAC emissions is evaluated using the emissions presented in Table D-9 and the Tier 3 HRA methodology, as prescribed in the SCAQMD Risk Assessment Procedures, Version 8.1, dated September 1, 2017; Procedures, Equations, and Assumptions Effective On or After October 1, 2017. The results are summarized in Table D-10. As shown, the proposed Project complies with the risk threshold of Rule 1401. As such, the proposed changes will not have significant adverse impacts on air quality, public health, or the environment, and there is no need for any mitigation measures to offset significant impacts to the environment as a result of the TAC emission increases associated with the proposed Project. The HRA analysis worksheet is provided in Appendix B.

Table D-9: Summary of TAC Emissions (per CCGT)

TAC	CAS	Pre-Project MHC (lb/hr)	Post-Project MHC (lb/hr)	Change MHC (lb/hr)	Pre-Project MAC (lb/yr)	Post-Project MAC (lb/yr)	Change MAC (lb/yr)
Benzene	71432	6.84E-03	7.14E-03	2.93E-04	3.73E+01	3.73E+01	0.00E+00
1,3-Butadiene	106990	9.02E-04	9.41E-04	3.86E-05	4.92E+00	4.92E+00	0.00E+00
Formaldehyde	50000	7.54E-01	7.86E-01	3.23E-02	4.11E+03	4.11E+03	0.00E+00
Naphthalene	91203	2.73E-03	2.85E-03	1.17E-04	1.49E+01	1.49E+01	0.00E+00
Total PAHs (excluding Naphthalene)	1151	1.89E-03	1.97E-03	8.07E-05	1.03E+01	1.03E+01	0.00E+00
Acetaldehyde	75070	8.38E-02	8.74E-02	3.59E-03	4.57E+02	4.57E+02	0.00E+00
Acrolein	107028	7.58E-03	7.91E-03	3.25E-04	4.14E+01	4.14E+01	0.00E+00
Ammonia	7664417	1.43E+01	1.53E+01	1.04E+00	7.79E+04	8.02E+04	2.24E+03
Ethylbenzene	100414	6.70E-02	6.99E-02	2.87E-03	3.65E+02	3.65E+02	0.00E+00
Propylene oxide	75569	6.08E-02	6.34E-02	2.60E-03	3.32E+02	3.32E+02	0.00E+00
Toluene	108883	2.73E-01	2.85E-01	1.17E-02	1.49E+03	1.49E+03	0.00E+00
Xylene	1330207	1.34E-0s1	1.40E-01	5.74E-03	7.32E+02	7.32E+02	0.00E+00

Table D-10: Summary of Health Risk Assessment Results

Risk Parameter	Result (Target Organ)	Significance Threshold	Exceed Threshold? (Yes/No)
HIA	1.68E-03 (EYE)	1.0	No
HIC	9.55E-06 (RESPIRATORY)	1.0	No

E. An analysis of how the proposed change would affect the project's compliance with applicable laws, ordinances, regulations, and standards.

The proposed change affects COC AQ-11 and the Equipment Description. There is no ground disturbance or other physical change to the project that would affect any other resource area. Therefore, the following discussion of compliance with LORS is only for applicable air quality rules and regulations.

E.1 South Coast Air Quality Management District Rules

E.1.1 Regulation II – Permits; Rule 212 – Standards for Approving Permits and Issuing Public Notice

Rule 212(c) requires public notice for:

- (c)(1). A project requesting installation of a new source or modification of an existing source, if the source is location within 1,000 feet of the outer boundary of a school; or
- (c)(2). A project resulting in a new or modified facility with on-site emission increases exceeding any of the daily maximums from Rule 212(g); or
- (c)(3). A project requesting installation of a new source or modification of an existing source, if the emission increases result in exposure to Maximum Individual Cancer Risk (MICR) greater than or equal to the applicable thresholds in (c)(3)(A), or substances that pose a potential risk of nuisance.

The Project sources are not located within 1,000 feet of the outer boundary of a school; therefore, Rule 212(c)(1) does not apply.

Rule 212(g) lists daily maximum emission increases for criteria pollutants. The daily emission increases are compared to the Rule 212(g) thresholds in Table E-1. As shown, the daily emission increases are less than the rule limits.

Table E-11: Rule 212(g) Threshold Comparison

Pollutant	Rule 212(g) Threshold (lb/day)	Project Increase (lb/day)	Exceed Threshold? (Yes/No)
NO_x	40	3.47	No
CO	220	1.8	No
VOC	30	0.68	No
SO_x	60	-0.84	No
PM_{10}	30	-5.52	No

As shown in Table D-9, the proposed Project does not result in an increase in annual emissions of TACs, except ammonia[2]. Therefore, this Project would not result in MICR greater than or equal to the applicable thresholds in (c)(3)(A).

Because the proposed Project does not exceed any of the criteria for public notice, public notice is not required for the Project.

E.1.2 Regulation IV – Prohibitions

Rule 401 – Visible Emissions

This rule prohibits the discharge into the atmosphere from any single source of emissions of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subparagraph (b)(1)(A) of the rule.

The CCGTs combust natural gas and will continue to combust natural gas following implementation of the Project. Visible emissions are not expected.

Rule 402 – Nuisance

Rule 402 prohibits the discharge from any source, such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

The CCGTs combust natural gas and will continue to combust natural gas following implementation of the Project. Nuisance emissions are not expected.

Rule 404 – Particulate Matter – Concentration

Rule 404 prohibits the discharge into the atmosphere from any source particulate matter in excess of the concentration at standard conditions, shown in Table 404(a) of the rule.

The provisions of this rule do not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.

Rule 407 – Liquid and Gaseous Air Contaminants

Rule 407 prohibits the discharge into the atmosphere from any equipment: 1) CO exceeding 2,000 ppmv measured on a dry basis, averaged over 15 consecutive minutes, and 2) sulfur compounds which would exist as liquid or gas at standard conditions, calculated as SO_2 exceeding 500 ppmv averaged over 15 consecutive minutes.

The CCGTs operate with oxidation catalysts that ensure compliance with the permit limit of 2.0 ppmv at 15% excess oxygen (O_2), thus ensuring compliance with the CO limits of this rule.

[2] Ammonia is acutely toxic and exhibits chronic toxicity but does not exhibit carcinogenic toxicity.

The sulfur compound limit does not apply to equipment which complies with the gaseous fuel sulfur content limits of Rule 431.1. The CCGTs described in this application combust Public Utilities Commission (PUC)-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1; therefore, the sulfur limits of Rule 407 do not apply.

Rule 409 – Combustion Contaminants

This rule prohibits the discharge into the atmosphere from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 15 consecutive minutes.

The CCGTs described in this application combust PUC-quality pipeline natural gas, which will ensure compliance with this rule.

Rule 431.1 – Sulfur Content of Gaseous Fuels

The purpose of this rule is to reduce SO_x emissions from the burning of gaseous fuels in stationary equipment requiring a permit to operate by the SCAQMD. The rule prohibits the transfer, sell, or offer for sale for use in the jurisdiction of the District natural gas containing sulfur compounds calculated as hydrogen sulfide (H_2S) in excess of 16 ppmv.

The CCGTs described in this application combust PUC-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1.

Rule 475 – Electric Power Generating Equipment

This rule limits emissions of particulate matter to the atmosphere from equipment having a maximum rating of more than 10 net MW used to produce electric power.

For new equipment, defined as equipment for which a permit is required after May 7, 1976, emissions of particulate matter may not exceed both of the limits from (a)(3)(A) [11 pounds per hour] and (a)(3)(B) [0.01 gr/scf calculated at 3% O_2 on a dry basis and averaged over 15 consecutive minutes]. Prior source test results demonstrate that neither CCGT exceeds the rule limits. The proposed modifications are not expected to change the PM_{10} emission rate from the equipment; therefore, continued compliance with the Rule 475 emission limits is expected.

E.1.3 Regulation XI – Source-Specific Standards

Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines

The purpose of this rule is to reduce emissions of NO_x from stationary gas turbines. The provisions of this rule apply to all stationary gas turbines, 0.3 MW and larger. This rule does not apply to stationary gas turbines subject to Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities; gas turbines located at petroleum refineries, landfills, or publicly owned treatment works; or gas turbines fueled by landfill gas. Because the CCGTs are subject to Rule 1135, they are not subject to Rule 1134.

Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities

The purpose of this rule is to reduce emissions of NO_x from electric generating units at electricity generating facilities. This rule applies to electric generating units at electricity generating facilities. While the Facility is currently a RECLAIM Facility and exempt from Rule 1135, Rule 1135 is the landing rule for gas turbines upon RECLAIM sunset. Thus,

on and after January 1, 2024, or when required by a permit to operate issued to effectuate the requirements in this rule, whichever occurs first, the owner or operator of an electricity generating facility may not operate a gas turbine in a manner that exceeds the NO_x and ammonia emissions limits listed in Table 1 of the rule: Emissions Limits for Boilers and Gas Turbines. For a CCGT, the NO_x limit is 2.0 ppmv and the ammonia slip concentration limit is 5 ppmv, both at 15% excess O_2. The CCGTs already comply with NO_x and ammonia slip limits pursuant to current permit conditions. Therefore, compliance is expected.

ESEC will comply with the remaining applicable provisions of the rule in a timely manner. For example, paragraph (d)(7) of the November 2, 2018, version of the rule requires that a change of conditions application must be submitted by July 1, 2022, to reconcile permit conditions with Rule 1135 requirements. Paragraph (d)(3) requires the SCAQMD permit to include "… limitations for duration, mass emissions, and number of start-ups, shutdowns, and, if applicable, tunings …" by January 1, 2024.

E.1.4 Regulation XIII – New Source Review (NSR); Rule 1303, Requirements

The purpose of this regulation is to achieve no net increases of nonattainment air contaminants or their precursors from new or modified permitted sources. Because ESEC is a RECLAIM Facility, NSR for NO_x is addressed under Regulation XX.

Best Available Control Technology (BACT)

Provided that the proposed daily fuel usage limit is imposed on the Facility, as requested, the increase in CO, VOC, SO_x, CO, and PM_{10} will not exceed 1 pound per day for any pollutant. Therefore, BACT is not triggered.

Offsets

The proposed Project would increase the hourly heat rate of each CCGT, but ESEC is proposing a new daily heat rate of 51,162 MMBtu per day. As a result of this daily fuel limit, offsets are required only for VOC emissions. ESEC will purchase 5 pounds of VOC offsets to cover the 30-day average increase of VOC emissions of 1.9 pounds per day for each CCGT and applying a 1.2 offset ratio per Rule 1303(b)(2)(A) (1.9 lb/day/CCGT x 2 CCGT x 1.2 offset ratio = 4.56 lb/day, which rounds to 5 lb/day). The increase in the 30-day average emissions of PM_{10} and SO_x do not exceed 1 pound per day; therefore, offsets are not required for these pollutants. Offsets are not required for CO emissions.

Air Quality Impacts Analysis (AQIA)

As discussed in Section D.1.2, the proposed Project does not trigger modeling for CO, SO_x, or PM_{10}. Modeling is not required for VOC.

E.1.5 Regulation XIV – Toxics and Other Non-Criteria Pollutants

Rule 1401 specifies limits for MICR, cancer burden, and non-cancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units that emit TAC listed in Table I of the rule. The rule establishes allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

As discussed in Section D.1.3, the proposed Project complies with the risk thresholds of Rule 1401. The HRA analysis worksheet is provided in Appendix B.

E.1.6 Regulation XVII – Prevention of Significant Deterioration

The purpose of this regulation is to establish preconstruction review requirements for stationary sources to ensure that air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth. As determined under the BACT analysis provided in Section E.1.4, BACT was not triggered for any attainment pollutant, such as CO.

A Major Stationary Source is a stationary source that falls under one of the listed source categories from Rule 1702(m)(1) and has the potential to emit 100 tons per year or more of any air contaminant regulated by the Clean Air Act (CAA), or a stationary source that does not fall under one of the listed source categories from Rule 1702(m)(1) and has the potential to emit 250 tons per year or more of any air contaminant regulated by the CAA. ESEC operates CCGTs. CCGTs are "fossil fuel-fired steam electric plants," as the EPA defines a fossil fuel-fired steam generating unit as a furnace or boiler used in the process of burning fossil fuel for the purpose of producing steam by heat transfer. Because the CCGTs have HRSGs, the potential to emit threshold for PSD applicability is 100 tons per year or more.

Table E-2 summarizes the annual emissions for the Facility. The emissions of CO exceed 100 TPY; therefore, ESEC is a PSD Facility. However, because this Project does not propose an increase in annual emissions, the proposed Project is not a major modification and further review of Regulation XVII is not required.

Table E-12: Potential Annual Emissions – PSD Major Stationary Source Determination

Pollutant	Annual Emissions (tons/year)	Basis
NO_x	98.45	Calculated based on 2.0 ppmv (Condition A99.7)
CO	176.49	Calculated based on 2.0 ppmv (Condition A99.8)
VOC	33.26	Condition A63.2
SO_x	7.96	Condition A63.2
PM_{10}	52.25	Condition A63.2

E.1.7 Regulation XX – RECLAIM

RECLAIM is a market-based incentive program designed to allow facilities flexibility in achieving emission reduction requirements for NO_x and SO_x under the Air Quality Management Plan using methods which include, but are not limited to, add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions.

Rule 2005 establishes the NSR Requirements for RECLAIM facilities. Rule 2005 requires that a new or modified source meet BACT, prohibits a new or modified source from causing a violation or making significantly worse an existing violation of the state or national ambient air quality standard at any receptor location in the District for NO_2 and

requires that the Facility holds sufficient RTCs to offset the total Facility emissions for the first year of operation at a 1-to-1 ratio.

BACT

ESEC NO_x emissions will have an increase of at least 1 pound a day, which will trigger BACT for NO_x for each CCGT. Currently, each unit is permitted with a NO_x limit of 2.0 ppm at 15% O_2, which is the current BACT standard for CCGTs. Therefore, the CCGTs meet NO_x BACT and are compliant with requirements under Regulation XX.

Modeling

As discussed in Section D.1.2, the proposed Project does not cause or contribute to an exceedance of any NAAQS or CAAQS. Details of the modeling assessment are shown in Appendix B.

Offsets

The proposed Project will result in a net increase in NO_x emissions on a monthly and annual basis due to the higher hourly heat rating proposed for each turbine. The annual increase for each turbine is calculated to be 2,014 pounds of NO_x per CCGT per year. As a consequence, per Rule 2005(c)(2), the Facility is required to hold at least 4,028 pounds of NO_x RECLAIM Trading Credits (RTCs) to offset the annual emissions increase for the first year of operation. Because ESEC NO_x RTC holdings are currently 65,667 per Section B of the Facility permit, it has enough RTCs to offset the NO_x emissions increase.

E.1.8 Regulation XXX – Title V Permits

The Title V Permit system implements the federal Operating Permit Program as required by Title V of the federal CAA as amended in 1990 and to implements requirements for greenhouse gases pursuant to Code of Federal Regulations (CFR) Title 40, Part 70. This regulation defines permit application and permit issuance procedures, as well as compliance requirements associated with the program.

As shown in Table E-3, the proposed change in maximum CCGT heat rate will not increase maximum daily emissions above the Title V Significant Permit Revision threshold for any pollutant. Because the Facility is a RECLAIM Facility, the NO_x increase is evaluated against the RECLAIM allocation to determine the Title V significance. Because the NO_x increase is less than ESEC starting allocation, the proposed permit actions do not constitute a Significant Permit Revision for NO_x.

Because the proposed Project is not a significant permit revision, the Project should be evaluated as a de minimis significant permit revision under Title V. Per Rule 3003, the application will be processed by SCAQMD within 180 days following submittal of a complete application.

Table E-13: Title V Significant Permit Revision Threshold Evaluation

Pollutant	Project Emission Increase (lb/day)	Title V Significant Permit Revision Threshold (lb/day)
CO	0.90	220
VOC	0.34	30
SO_x	-0.42	60
PM_{10}	-2.76	30

E.2 Federal Rules

E.2.1 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBtu per hour, based on the HHV of the fuel, that commenced construction, modification, or reconstruction after February 18, 2005. The pollutants regulated by this subpart are NO_x and SO_2.

The rule limits NO_x emissions from new, modified, or reconstructed turbines firing natural gas with a heat rate greater than 850 MMBtu per hour to no more than 15 ppmv at 15%O_2 or 0.43 pound per megawatt-hour (lb/MWh) of useful output.

The rule prohibits the discharge of any gases which contain SO_2 in excess of 0.90 lb/MWh gross output and prohibits the combustion of any fuel that contains total potential sulfur emissions in excess of 0.060 pounds SO_2 per MMBtu heat input.

The CCGTs discussed in this application operate with SCR to control NO_x emissions to 2 ppmv; therefore, compliance with the NO_x limits of Subpart KKKK are satisfied. The CCGTs combust PUC-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1; therefore, compliance with the sulfur limits of Subpart KKKK are satisfied.

The rule imposes a number of other requirements on the CCGTs and Facility, including monitoring, recordkeeping, and reporting requirements. ESEC complies with these requirements. The proposed Project will not adversely impact continued compliance.

E.2.2 Subpart YYYY – National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion Turbines

Subpart YYYY – NESHAP for Stationary Combustion Turbines applies to combustion turbines at major sources of hazardous air pollutants (HAP). ESEC is not a major source of HAP; therefore, Subpart YYYY is not applicable to the Facility. There are no other NESHAP applicable to combustion turbines.

F. A discussion of how the proposed change would affect the public.

The proposed changes would affect the public in a positive way by allowing the ESEC to operate at full capacity during periods of peak energy demand. This would help to prevent power interruptions, such as rolling blackouts during hot summer months when energy demand is at its highest. The small increase in short-term (i.e., hourly, daily) criteria pollutant emissions would

not cause or contribute to an exceedance of an AAQS. The small increase in short-term (i.e., hourly) TAC emissions do not cause health risk impacts exceeding significance thresholds.

G. A list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of any affected project linears and 1,000 feet of the project site.

Nearby property owners, the Public, and Parties to the Application Proceeding will not be affected by the proposed modification since the proposed modification will have no significant environmental effects and will be in compliance with applicable LORS. Because there are no potentially affected property owners, a list of property owners is not included in this PTA.

H. A discussion of the potential effect of the proposed change on nearby property owners, residents, and the public.

See Section F – the increase in short-term emissions of criteria pollutants and TAC would have a negligible effect on nearby property owners, residents, and the public.

I. A discussion of any exemptions from the California Environmental Quality Act, of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.

None.

3.0 CONCLUSIONS

Based on the information contained in this filing, ESEC concludes that there will be no significant environmental impacts associated with the proposed modifications to the Commission Decision, including the subsequent amendments to 00-AFC-14C. Specifically, ESEC is seeking modifications of the SCAQMD Facility PTO and the CEC license to increase the fuel input and the corresponding output of the Facility in time for summer 2021. The increase in output from ESEC is integral in addressing the State of California's urgent need for additional capacity. SCE has contracted ESEC for the increased output starting June 1, 2021 in response to the CPUC ruling (Rulemaking 20-11-003, dated December 28, 2020) directing the State's three large electric IOUs to seek contracts for additional power capacity. In response to the need for additional generation, modifications to the PTO and CEC license are needed to enable ESEC to increase the maximum output from 573.4 MW to 580.4 MW, which should enable the Facility to achieve 560 MW nominal net as described in the ESEC license and PTO.

The proposed changes would have a positive impact on the public by allowing the ESEC to operate at full capacity during periods of peak energy demand. This would help to prevent power interruptions, such as rolling blackouts during hot summer months when energy demand is at its highest.

The proposed amendments comply with all LORS and do not have a significant environmental impact, as further described in this PTA. The emission changes will not cause adverse impacts to ambient air quality, as demonstrated through an AQIA. The emission changes will not cause adverse impacts to public health, as demonstrated by an HRA. The proposed revisions to the Equipment Description and COC AQ-11 will not have significant impact on property owners, the public, or any other parties.

Therefore, the proposed changes should be approved.

APPENDIX A – EMISSION ESTIMATES

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Facility: El Segundo Energy Center, LLC
Facility ID: 115663

El Segundo Energy Center, LLC
Application for Increase to Heat Input Rating

Appendix A - Emission Calculations

Table A.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

	Start-ups per Day		Shutdowns per Day		Start-ups per Month		Shutdowns per Month		Start-ups per Year		Shutdowns per Year	
Pre-/Post-	Count	Hours per Day	Count	Hours per Day	Count	Hours per Month	Count	Hours per Month	Count	Hours per Year	Count	Hours per Year
Pre-	2	2.0	2	2.0	62	62.0	62	62.0	200	200.0	200	200.0
Post-	2	2.0	2	2.0	62	62.0	62	62.0	200	200.0	200	200.0

Pre-Project

Hourly Heat Input Ratings		Maximum Daily Operations			Monthly Operations			Annual Operations		
Heat Input Rating (mmBtu/hr)	Hourly Fuel Usage (mmscf/hr)	Normal Operations Hours per Day	Total Hours per Day	Daily Fuel Usage (mmscf/day)	Normal Operations Hours per Month	Total Hours per Month	Monthly Fuel Usage (mmscf/mo)	Normal Operations Hours per Year	Total Hours per Year	Annual Fuel Usage (mmscf/yr)
2,096.0	2.0549	20.0	24.0	49.32	606.0	730.0	1500.08	5,056.0	5,456.0	11,211.55

Pre-Project hours of operation and fuel usage per A/N 470652

Post-Project

	Hourly Heat Input Ratings		Maximum Daily Operations				Monthly Operations				Annual Operations			
	Heat Input Rating (mmBtu/hr)	Hourly Fuel Usage (mmscf/hr)	Daily Heat Input (mmBtu/day)	Daily Fuel Use NO (mmscf/day)	Daily Fuel Use SU (mmscf/day)	Daily Fuel Use SD (mmscf/day)	Monthly Fuel Use (mmscf/mo)	Monthly Fuel Use NO (mmscf/mo)	Monthly Fuel Use SU (mmscf/mo)	Monthly Fuel Use SD (mmscf/mo)	Annual Fuel Use (mmscf/yr)	Annual Fuel Use NO (mmscf/yr)	Annual Fuel Use SU (mmscf/yr)	Annual Fuel Use SD (mmscf/yr)
D1	2,250	2.1429	51,162	40.1543	4.2857	4.2857	1500.08	1,234.3657	132.8571	132.8571	11,211.55	10,354.4022	428.5714	428.5714

SU/SD Fuel Use (mmscf/Time) = Total Event Hours per Time x Heat Input Rating (mmBtu/hr) / HHV
NO Fuel Use (mmscf/Time) = Fuel Use (mmscf/Time) - SU Fuel Use (mmscf/Time) - SD Fuel Use (mmscf/Time)

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Facility: El Segundo Energy Center, LLC
Facility ID: 115663

El Segundo Energy Center, LLC
Application for Increase to Heat Input Rating

Appendix A - Emission Calculations

Table A.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

Emissions

				Peak Hourly NO Emissions			Maximum Daily Emissions			Monthly Emissions			Annual Emissions		
Pollutant	**Operating Mode**	**Pre-Project Emission Factor (NO = lb/hr) (SU/SD = lb/event)**	**Post-Project Emission Factor (NO = lb/hr) or (NO = lb/mmscf) (SU/SD = lb/event)**	**Pre-Project (lb/hr)**	**Post-Project (lb/hr)**	**Change (lb/hr)**	**Pre-Project (lb/day)**	**Post-Project (lb/day)**	**Change (lb/day)**	**Pre-Project (lb/mo)**	**Post-Project (lb/mo)**	**Change (lb/mo)**	**Pre-Project (lb/yr)**	**Post-Project (lb/yr)**	**Change (lb/yr)**
NOx	Normal Operations (lb/hr)	15.45	16.59	15.45	16.59	1.13	309.06	--	1.74	9,364.43	--	189.56	78,129.67	--	2,013.40
	Normal Operations (lb/mmscf)	--	7.74	--	--	--	--	310.79		--	9,553.99		--	80,143.07	
	Startup	56.03	56.03	--	--	--	112.06	112.06	0.00	3,473.86	3,473.86	0.00	11,206.00	11,206.00	0.00
	Shutdown	35.50	35.50	--	--	--	71.00	71.00	0.00	2,201.00	2,201.00	0.00	7,100.00	7,100.00	0.00
			NOx Totals			**1.13**	492.12	493.85	**1.74**	15,039.29	15,228.85	**189.56**	96,435.67	98,449.07	**2,013.40**
CO	Normal Operations (lb/hr)	9.41	10.09	9.41	10.09	0.68	188.23	--	0.90	5,703.34	--	110.52	47,584.30	--	1,184.94
	Normal Operations (lb/mmscf)	--	4.71	--	--	--	--	189.13		--	5,813.86		--	48,769.23	
	Startup	417.42	417.42	--	--	--	834.84	834.84	0.00	25,880.04	25,880.04	0.00	83,484.00	83,484.00	0.00
	Shutdown	221.18	221.18	--	--	--	442.36	442.36	0.00	13,713.16	13,713.16	0.00	44,236.00	44,236.00	0.00
			CO Totals			**0.68**	1,465.43	1,466.33	**0.90**	45,296.54	45,407.06	**110.52**	175,304.30	176,489.23	**1,184.94**
VOC	Normal Operations (lb/hr)	5.38	5.76	5.38	5.76	0.38	107.68	--	0.34	3,262.61	--	57.83	27,220.71	--	632.63
	Normal Operations (lb/mmscf)	--	2.69	--	--	--	--	108.02		--	3,320.44		--	27,853.34	
	Startup	17.30	17.30	--	--	--	34.60	34.60	0.00	1,072.60	1,072.60	0.00	3,460.00	3,460.00	0.00
	Shutdown	9.74	9.74	--	--	--	19.48	19.48	0.00	603.88	603.88	0.00	1,948.00	1,948.00	0.00
			VOC Totals			**0.38**	161.76	162.10	**0.34**	4,939.09	4,996.92	**57.83**	32,628.71	33,261.34	**632.63**
SOx	Normal Operations (lb/hr)	1.46	1.52	1.46	1.52	0.06	29.18	--	-0.67	884.14	--	-7.74	7,376.60	--	-24.98
	Normal Operations (lb/mmscf)	0.71	0.71	--	--	--	--	28.51		--	876.40		--	7,351.63	
	Startup	1.46	1.52	--	--	--	2.92	3.04	0.12	90.46	94.33	3.87	291.80	304.29	12.49
	Shutdown	1.46	1.52	--	--	--	2.92	3.04	0.12	90.46	94.33	3.87	291.80	304.29	12.49
			SOx Totals			**0.06**	35.02	34.60	-0.42	1,065.06	1,065.06	**0.00**	7,960.20	7,960.20	0.00
PM10	Normal Operations (lb/hr)	9.58	9.99	9.58	9.99	0.41	191.52	--	-4.40	5,802.96	--	-50.82	48,415.46	--	-163.95
	Normal Operations (lb/mmscf)	4.66	4.66	--	--	--	--	187.12		--	5,752.14		--	48,251.51	
	Startup	9.58	9.99	--	--	--	19.15	19.97	0.82	593.70	619.11	25.41	1,915.17	1,997.14	81.97
	Shutdown	9.58	9.99	--	--	--	19.15	19.97	0.82	593.70	619.11	25.41	1,915.17	1,997.14	81.97
			PM10 Totals			**0.41**	229.82	227.06	-2.76	6,990.37	6,990.37	**0.01**	52,245.80	52,245.80	0.00

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El Segundo Energy Center, LLC
Application for Increase to Heat Input Rating

Appendix A - Emission Calculations

Table A.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

Constants

	Pre-Project	Post-Project	
HHV	1,020	1,050	mmBtu/mmscf
F-Factor (68)	8,710		dscf/mmBtu
Ref O2	15		
Molar Volume (68)	385		scf/lbmol
NOx MW	46		
CO MW	28		
VOC MW	16		Number of Turbines: 2
NH3 MW	17		

Emission Factors

NOx, CO, VOC

Emission Factor = ppmv @ 15% O2 x 20.9 / (20.9 - Ref O2) x HHV x F-Factor (68) x MW / Molar Volume (68) x 10^{-6}

	Pre-Project	Post-Project		
NOx ppmv	2	2	ppmv @ 15% O2	(Condition A99.7)
NOx EF	7.52	7.74	lb/mmscf	
CO ppmv	2	2	ppmv @ 15% O2	(Conditions A99.8 and A195.6)
CO EF	4.58	4.71	lb/mmscf	**(BACT may be 1.5 ppmv now)**
VOC ppmv	2	2.00	ppmv @ 15% O2	(Conditions A99.9 and A195.5)
VOC EF	2.62	2.69	lb/mmscf	**Test result under 1.0 ppmv**
SOx EF	0.71	0.71	lb/mmscf	(Condition A63.2)
PM10 EF	4.66	4.66	lb/mmscf	(Condition A6: **Test result under 4 lb/mmscf**

Start-ups

Please refer to Page 17 of 48, Table 16 (Divide by 2 per unit) for Eng. Eval for A/N 470652/6, rev. 5-14-2010.

NOx	56.03	lb/start-up
CO	417.42	lb/start-up
VOC	17.3	lb/start-up
Pre-Project	60	min
Post-Project	60	min

Shutdowns

Please refer to Page 17 of 48, Table 16 (Divide by 2 per unit) for Eng. Eval for A/N 470652/6, rev. 5-14-2010.

NOx	35.5	lb/start-up
CO	221.18	lb/start-up
VOC	9.74	lb/start-up
Pre-Project	60	min
Post-Project	60	min

Equations

Pre-Project

NO (lb/hr)	Heat Input Rating / HHV x Emission Factor
NO (lb/Time)	NO (lb/hr) x NO Hours per Time
SU (lb/Event)	Assumed to be one hour for each event with 12 minutes of uncontrolled emissions and 48 minutes of controlled emissions per EE for A/N 470652/6, pg 16 of 48, Table 16, for NOx, CO, and VOC. Same emission factor for controlled and uncontrolled for PM and SOx.
SU (lb/Time)	SU (lb/Event) x SU Events per Time
SD (lb/Event)	Assumed to be one hour for each event with 7 minutes of uncontrolled emissions and 53 minutes of controlled emissions per EE for A/N 470652/6, pg 16 of 48, Table 16, for Nox, CO, and VOC. Same emission factor for controlled and uncontrolled for PM and SOx.
SD (lb/Time)	SD (lb/Event) x SD Events per Time

Post-Project

NO (lb/mmscf)	Per 'Emission Factors' Calculations
NO (lb/Time)	NO (lb/mmscf) x Fuel Use (mmscf/Time)
SU (lb/Event)	Assumed to be one hour for each event with 12 minutes of uncontrolled emissions and 48 minutes of controlled emissions per EE for A/N 470652/6, pg 16 of 48, Table 16, for Nox, CO, and VOC. Same emission factor for controlled and uncontrolled for PM and SOx.
SU (lb/Time)	SU (lb/Event) x SU Events per Time
SD (lb/Event)	Assumed to be one hour for each event with 7 minutes of uncontrolled emissions and 53 minutes of controlled emissions per EE for A/N 470652/6, pg 16 of 48, Table 16, for Nox, CO, and VOC. Same emission factor for controlled and uncontrolled for PM and SOx.
SD (lb/Time)	SD (lb/Event) x SD Events per Time

Rule 212(g) - Public Notice

Pollutant	Project (lb/day)	Threshold (lb/day)
NOx	3.47	40
CO	1.8	220
VOC	0.68	30
SOx	-0.84	60
PM10	-5.52	30

Project Exceeds Thresholds? No

30-Day Average Emissions

Pollutant	Pre-Project	Post-Project	Change
NOx	501.3	507.6	6.3
CO	1509.9	1513.6	3.7
VOC	164.6	166.6	1.9
SOx	35.5	35.5	0.0
PM10	233.0	233.0	0.0

Offsets (lb/day)

Pollutant	30DA Increase
VOC	1.93
PM10	0.00

30DA VOC x 2 x 1.2 --> **4.63**
30DA PM10 x 2 x 1.2 --> 0.00

Facility PTE (tpy)

Pollutant	Pre-Project	Post-Project
NOx	96.44	98.45
CO	175.30	176.49
VOC	32.63	33.26
SOx	7.96	7.96
PM10	52.25	52.25

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Facility: El Segundo Energy Center, LLC
Facility ID: 115663

Appendix A - Emission Calculations

Table A.2 - Toxic Air Contaminant (TAC) Emission Calculations (per Turbine)

			Maximum Hourly TAC Emissions			Annual TAC Emissions		
Pollutant	**CAS No.**	**Emission Factor (lb/mmscf)**	**Pre-Project[1] (lb/hr)**	**Post-Project[2] (lb/hr)**	**Increase (lb/hr)**	**Pre-Project[1] (lb/yr)**	**Post-Project[2] (lb/yr)**	**Increase (lb/yr)**
Benzene[b] (1.22e-2)	71432	3.33E-03	6.84E-03	7.14E-03	2.93E-04	3.73E+01	3.73E+01	0.00E+00
1,3-Butadiene[a]	106990	0.000439	9.02E-04	9.41E-04	3.86E-05	4.92E+00	4.92E+00	0.00E+00
Formaldehyde[b] (0.724)	50000	3.67E-01	7.54E-01	7.86E-01	3.23E-02	4.11E+03	4.11E+03	0.00E+00
Naphthalene[a]	91203	0.00133	2.73E-03	2.85E-03	1.17E-04	1.49E+01	1.49E+01	0.00E+00
Total PAHs (excluding Naphthalene)[a]	1151	0.000918	1.89E-03	1.97E-03	8.07E-05	1.03E+01	1.03E+01	0.00E+00
Acetaldehyde[a]	75070	0.0408	8.38E-02	8.74E-02	3.59E-03	4.57E+02	4.57E+02	0.00E+00
Acrolein[b] (0.00653)	107028	3.69E-03	7.58E-03	7.91E-03	3.25E-04	4.14E+01	4.14E+01	0.00E+00
Ammonia[c]	7664417	--	1.43E+01	1.53E+01	1.04E+00	7.79E+04	8.02E+04	2.24E+03
Ethylbenzene[a]	100414	0.0326	6.70E-02	6.99E-02	2.87E-03	3.65E+02	3.65E+02	0.00E+00
Propylene oxide[a]	75569	0.0296	6.08E-02	6.34E-02	2.60E-03	3.32E+02	3.32E+02	0.00E+00
Toluene[a]	108883	0.133	2.73E-01	2.85E-01	1.17E-02	1.49E+03	1.49E+03	0.00E+00
Xylene[a]	1330207	0.0653	1.34E-01	1.40E-01	5.74E-03	7.32E+02	7.32E+02	0.00E+00

Constants

	Pre-Project	Post-Project	
HHV	1,020	1,050	mmBtu/mmscf
F-Factor (68)	8,710	dscf/mmBtu	
Ref O2	15		
Molar Volume (68)	385		
Ammonia MW	17		

Emission Factors

[a] Emission Factors from: SCAQMD Supplemental Instructions - Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emission Inventory, December 2016
Table B-1 - Source: Turbine
https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/supplemental-instructions-for-ab2588-facilities.pdf?sfvrsn=12

[b] Emission Factors from: USEPA - Emission Factor Documentation for AP-42 Section 3.1 Stationary Gas Turbines, April 2000
Table 3.4-1 - Control Method: CO Catalyst
https://www3.epa.gov/ttn/chief/ap42/ch03/bgdocs/b03s01.pdf

[c] Ammonia Slip Pre-Project Post-Project

Facility: El Segundo Energy Center, LLC
Facility ID: 115663

El Segundo Energy Center, LLC
Application for Increase to Heat Input Rating

Appendix A - Emission Calculations

	5	5	ppmv @ 15% O2

Ammonia EF = Ammonia Slip x 20.9 / (20.9 - Ref O2) x HHV x F-Factor (68) x Ammonia MW / Molar Volume (68) x 10^{-6}

Ammonia EF	6.95	7.15	lb/mmscf

Calculations

[1] Pre-Project (lb/hr) = Heat Input Rating / HHV x Emission Factor
Pre-Project (lb/yr) = Annual Fuel Use x Emission Factor

Heat Input Rating	2096	mmBtu/hr
Annual Fuel Use	11,211.55	mmscf/yr

[2] Post-Project (lb/hr) = Heat Input Rating / HHV x Emission Factor
Post-Project (lb/yr) = Annual Fuel Use x Emission Factor

Heat Input Rating	2,250.0	mmBtu/hr
Annual Fuel Use	11,211.55	mmscf/yr

Rule 1401 Tier 1 Sreening Emission Level for Ammonia	
7.20E+03	lb/yr, @ 25m
Estimated Increase in Annual Ammonia Emissions	
2.24E+03	lb/yr
Ammonia Emission Increase Less than Conservative Tier 1 Screening Emission Level?	
Yes	

APPENDIX B – AIR QUALITY IMPACT ANALYSIS AND HEALTH RISK ASSESSMENT

Appendix B: Health Risk Assessment & Air Quality Impact Analysis

Prepared in Support of Petition to Amend to Increase Turbine Heat Input Rating

Prepared for:

El Segundo Energy Center LLC
301 Vista Del Mar
El Segundo, CA 90245
SCAQMD Facility ID: 115663

February 2021

Table of Contents

List of Tables

List of Figures

Attachments

Appendix B:
Health Risk Assessment & Air Quality Impact Analysis

1.0 INTRODUCTION

Yorke Engineering, LLC (Yorke) has prepared this Health Risk Assessment (HRA) and Air Quality Impact Analysis (AQIA) support of the Petition to Amend (PTA) the California Energy Commission (CEC) license for the El Segundo Energy Center (ESEC) for the proposed Project.

1.1 Project Overview

ESEC is submitting a PTA to request modifications to two (2) natural gas-fired Combined Cycle Gas Turbines (CCGT) to increase the allowable heat rate to be more representative of 'maximum' heat input rating of the equipment. The turbines were described in former permit actions using a nominal heat rate rather than the maximum rate. The facility is currently dispatched to serve peak power demand and needs to be able to operate at the maximum possible load to service the peak demand. The Equipment Description for each turbine currently lists the heat rate as 2,096 million British thermal units (MMBtu) per hour with a generating capacity of 219 megawatts (MW). ESEC is requesting that the heat rate be updated to 2,250 MMBtu per hour with a generating capacity of 222.5 MW for each unit. There are no physical modifications to the turbines proposed.

The proposed increase to the maximum hourly heat input rating for each of the CCGTs will result in an increase in the maximum hourly emission rate for all criteria pollutants. There will be an increase in the maximum daily emissions of NOx, CO, and VOC. The increase in heat rate also results in an increase in the maximum hourly emissions of Toxic Air Contaminants (TAC).

Appendix B contains emission data (Section 2.0), a discussion of dispersion modeling methodology (Section 3.0), a summary of the HRA (Section 4.0), and a summary of the AQIA (Section 5.0). Attachment 1 contains detailed calculation tables; Attachment 2 contains reference materials.

1.2 Facility Location

ESEC is located at 301 Vista Del Mar in the city of El Segundo. The facility occupies a total of approximately 32.8 acres and is bordered by industrial facilities on the east and north, the Pacific Ocean to the west, and by residential properties to the south. The nearest residential property is a home approximately 20 meters south-southeast of the facility property boundary, and approximately 670 meters from the nearest CCGT stack. The nearest school to the facility is the Richmond Street Elementary School at 615 Richmond St., El Segundo, approximately 1,400 meters to the northeast of the facility. An aerial photograph depicting the facility and the surrounding properties is provided as Figure 1-1.

Figure 1-1 also shows the approximate facility boundary and the locations of the two exhaust stacks.

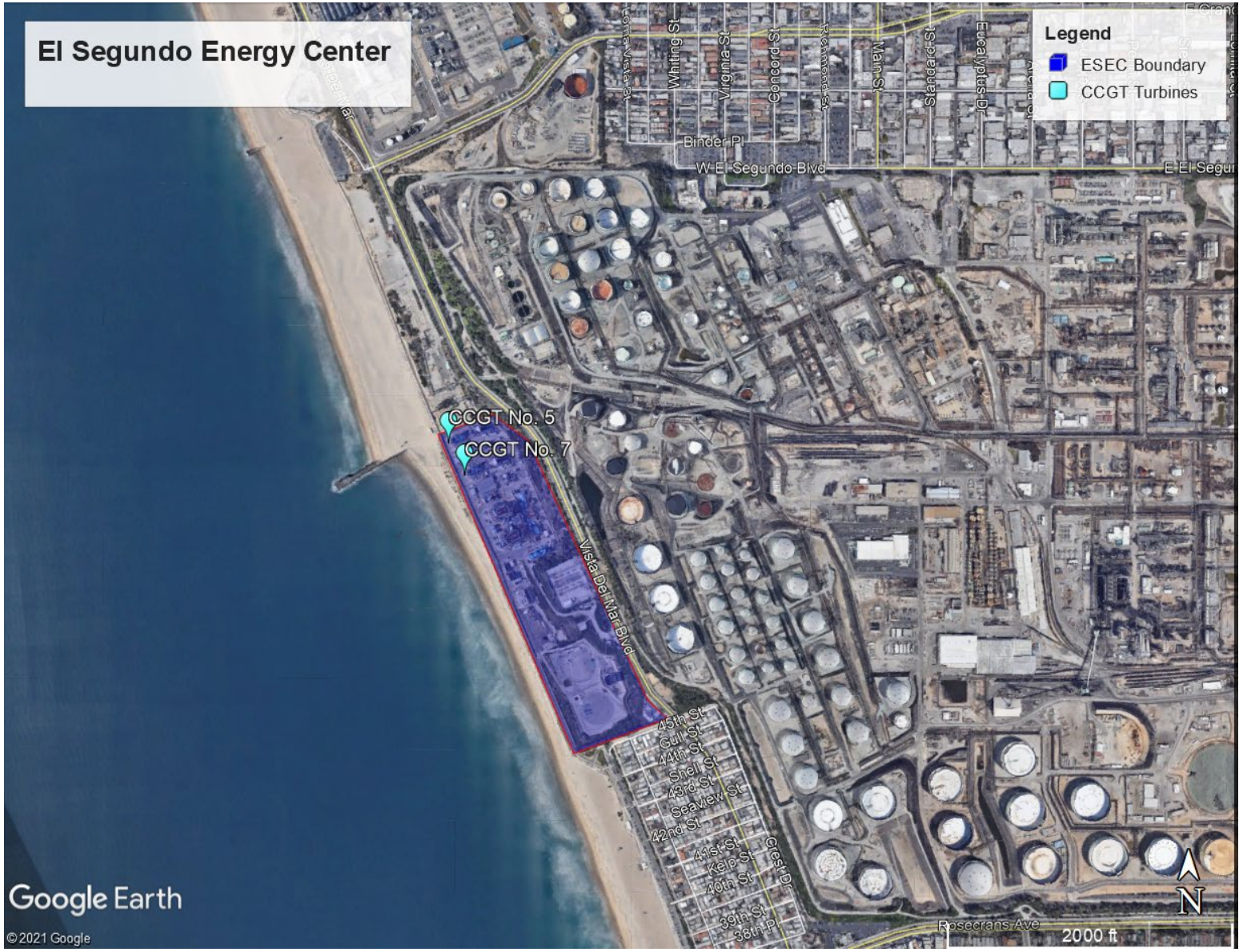

Figure 1-1: Aerial Photograph of Facility and Surrounding Area

2.0 EQUIPMENT AND EMISSION INFORMATION

2.1 Equipment

The emission sources associated with the Project are the two CCGT's described in Table 2-1. Note that the heat input listed in the equipment description is the current heat input, not the heat input requested by this PTA.

Table 2-1: Equipment Summary

Basic Equipment	NOx Control Equipment	CO/VOC Control Equipment
Gas Turbine, Unit No. 5, Natural Gas, Siemens, Model SGT6-5000F, Rapid-Response, combined cycle, 2,096 MMBtu/hr at 78 Degrees F, with dry low-NOx Combustors with Generator, Heat Recovery Steam, Unfired Turbine, Steam, 67.7 MW, Generator, 219 MW.	Selective Catalytic Reduction, Unit No. 5, Cormetech, Model CM21HT, with 2,050 cubic feet of total catalyst volume, width: 25 ft; Height: 70 ft; Length: 24 ft 3 in with ammonia injection grid.	CO oxidation catalyst, Unit No. 5, BASF, 290 cubic feet of total catalyst volume
Gas Turbine, Unit No. 7, Natural Gas, Siemens, Model SGT6-5000F, Rapid-Response, combined cycle, 2,096 MMBtu/hr at 78 Degrees F, with dry low-NOx Combustors with Generator, Heat Recovery Steam, Unfired Turbine, Steam, 67.7 MW, Generator, 219 MW.	Selective Catalytic Reduction, Unit No. 7, Cormetech, Model CM21HT, with 2,050 cubic feet of total catalyst volume, width: 25 ft; Height: 70 ft; Length: 24 ft 3 in with ammonia injection grid.	CO oxidation catalyst, Unit No. 7, BASF, 290 cubic feet of total catalyst volume

2.2 Emissions

2.2.1 Criteria Pollutants

The AQIA requires the evaluation of criteria pollutant emissions over 1-Hour, 8-Hour, 24-Hour, and Annual averaging periods, as appropriate for each California Ambient Air Quality Standard (CAAQS) and National Ambient Air Quality Standard (NAAQS). The AQIA assumes that the pre-project emissions are part of background and considers only emission increases.

The methodologies used to estimate emissions from the Project sources are presented in Section D.1 of the PTA. Additionally, since there is a permit condition that limits daily emissions, the daily maximum emission rate for CO is lower than operating at the 1-hour emission rate for 8 hours; thus, the daily CO emissions were used for the 8-hour averaging period. The criteria pollutant emissions used in the AQIA are summarized in Table 2-2. Emission calculation details are provided in Tables C.5, C.6, and C.7 in Attachment 1.

Table 2-2: Criteria Pollutant Emissions Increases (per CCGT)

Pollutant	Averaging Period	Emissions Increase (lb/Avg. Period)
NO_2	1-Hr	1.13
	Annual	2,013.40
CO	1-Hr	0.68
	8-Hr	0.90
SO_2	1-Hr	0.06
	24-Hr	No Increase
	Annual	No Increase
PM_{10}	24-Hr	No Increase
	Annual	No Increase

2.2.2 Toxic Air Contaminants

Rule 1401(f)(3) allows long-term health risks [Maximum Individual Cancer Risk (MICR) and noncancer chronic health index (HIC)] to be evaluated based on the difference between post-project emissions and permitted pre-project emissions when pre-project emissions are limited by permit condition. A permit condition is proposed to limit the daily fuel usage to 51,162 MMBtu per day, thus limiting the annual fuel use and TAC emissions. As such, the Project will not result in a change in annual TAC emissions for combustion contaminants. However, annual emissions of ammonia are expected to increase due to the proposed modification due to ammonia slip from the SCR.

Rule 1401(f)(4) requires the noncancer acute health index (HIA) to be estimated from post-project emissions for a permit unit rather than the project increase (i.e., post-project minus pre-project).

The TAC emission estimates used in the HRA are summarized Table 2-3.

Table 2-3: Rule 1401 HRA - Hourly TAC Emissions (per CCGT)

Pollutant	CAS No.	Post-Project Emissions (lb/hr)	Project Change in Emissions (lb/yr)
Benzene	71432	7.14E-03	0.00E+00
1,3-Butadiene	106990	9.41E-04	0.00E+00
Formaldehyde	50000	7.86E-01	0.00E+00
Naphthalene	91203	2.85E-03	0.00E+00
Total PAHs (excluding Naphthalene)	1151	1.97E-03	0.00E+00
Acetaldehyde	75070	8.74E-02	0.00E+00
Acrolein	107028	7.91E-03	0.00E+00
Ammonia	7664417	1.53E+01	2.24E+03

Pollutant	CAS No.	Post-Project Emissions (lb/hr)	Project Change in Emissions (lb/yr)
Ethylbenzene	100414	6.99E-02	0.00E+00
Propylene oxide	75569	6.34E-02	0.00E+00
Toluene	108883	2.85E-01	0.00E+00
Xylene	1330207	1.40E-01	0.00E+00

3.0 DISPERSION MODELING

Dispersion modeling was conducted to estimate project impacts to ambient air. Dispersion modeling methodology is discussed in this section. Electronic files can be provided upon request.

3.1 Dispersion Model Input

The air dispersion model used for this Project is AERSCREEN, a screening dispersion model. AERSCREEN is based on AERMOD and is the screening dispersion model currently recommended by EPA.

The Lakes Environmental Software (Lakes) implementation/user interface, AERSCREEN View™, Version 2.7.0, was used for this project. This version of AERSCREEN View™ implements the newest version of AERMOD (version 19191).

AERSCREEN was run with a single source emitting unit emissions [1 gram per second (g/s)] to obtain the "Chi/Q" (*X*/Q) values that are necessary for subsequent calculations.

3.1.1 Scenario Options

The "Urban" option was used for modeling. The facility is located in the County of Los Angeles. The population of the County of Los Angeles as of the 2010 census was 9,818,605. This value was used as the population of the urban area.

3.1.2 Terrain Data

Digital elevation data was imported into AERSCREEN and elevations were assigned to receptors, buildings, and emission sources, as necessary. Shuttle Radar Topography Mission 1 (SRTM1) elevation data was obtained through the AERSCREEN View™ WebGIS import feature. This dataset has a resolution of approximately 30 meters.

3.1.3 Source Parameters

The CCGT's are subject to triennial source testing. The last triennial tests were conducted in 2019. Source parameters are based on data from the 2019 triennial tests.

An AERSCREEN scenario can only be run using a single emission source. EPA guidance allows for more than one stack to be "combined" into a single stack for modeling purposes, as long as the worst-case stack parameters are used. For this analysis, the representative stack used stack parameter from CCGT No. 7; since the stack heights are the same and the exit temperatures are very similar, the lower exit velocity of CCGT No. 7 makes it the more conservative dispersion release. The source parameter calculations are shown in detail in Table C.1 in Attachment 1 and summarized in Table 3-1. The coordinates are the approximate midpoint between the two stacks.

Table 3-1: Source Parameters (CCGT No. 7)

UTM E (m)	UTM N (m)	Stack Diameter (ft)	Release Height (ft)	Stack Temperature (Deg F)	Exit Velocity (fps)
368,234	3,753,206	21.325	210	337.4	68.00

3.1.4 Building Downwash

Nearby buildings can affect the dispersion of point sources by inducing aerodynamic turbulence on pollutant emissions, causing emissions to mix rapidly towards the ground and resulting in higher localized ground-level concentrations. EPA recommends analyzing building downwash effects from a local building on a stack if the stack height is less than the General Engineering Practice (GEP) height recommended by EPA; the GEP stack height can be calculated using Equation 1.

$$GEP\ Height = H + 1.5 * L \quad \text{(Eq. 1)}$$

Where:

GEP Height	=	Recommended minimum stack height for point sources (ft.)
H	=	Height of building, from stack elevation (ft.)
L	=	Width of building (ft.)

On-site buildings at ESEC were included in the AERSCREEN analysis for building downwash. Additionally, since the base elevation of the nearby Chevron Products facility is much higher than the base elevation of the CCGT stacks, tanks located on the western end of the Chevron site were included in this analysis.

3.1.5 Meteorology

AERSCREEN View™ requires the user to input a set of Meteorology Parameters and select from one of three Surface Characteristic options. Meteorology Parameters are shown in Table 3-2. Temperature data from the Los Angeles International Airport (LAX) meteorological station was obtained from the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service website.

Table 3-2: Meteorology Parameters

Parameter	Value	Reference
Minimum Temperature (Deg F)	27	Record Low for LAX
Maximum Temperature (Deg F)	110	Record High for LAX
Minimum Wind Speed (m/s)	0.5	Default
Anemometer Height (m)	10	Default
Adjust Surface Friction Velocity (ADJ_U*)	Yes	

User-specified Surface Characteristics were applied for this modeling effort. The District provides values for these parameters (Albedo, Bowen Ratio, and Surface Roughness) for each of its meteorological stations. SCAQMD parameters for the Los Angeles International Airport MET station were used as the Surface Characteristics for this Project. Surface Characteristics are shown in Table 3-3.

Table 3-3: Surface Characteristics

Parameter	Value
Albedo	0.18
Bowen Ratio	1.25
Surface Roughness (m)	0.099

3.1.6 Receptors

The facility boundary is within a hundred meters of Chevron Products, and the CCGT stacks are located approximately two hundred feet from the Chevron site boundary. Impacts were evaluated every 25 meters from the emission source out to a maximum of 3,000 meters, to account for all downwind receptors.

3.1.7 Fumigation Options

The District recommends evaluation of the effects of Inversion Break-up Fumigation and Shoreline Fumigation for projects located on the Pacific Coast shoreline. The minimum distance to the shoreline in the Shoreline Fumigation scenario was entered as 100 meters, the shortest distance from the emission source to the ocean.

3.1.8 AERSCREEN Scenarios

AERSCREEN Scenarios are summarized in Table 3-4.

Table 3-4: AERSCREEN Scenarios

Scenario No.	Receptors	Fumigation Options
1	Ground-Level	Inversion Break-up and Shoreline Fumigation

3.2 Dispersion Model Output

Results from Scenario 1 were used in the Rule 1401 HRA and the AQIA. The results comparison is shown in detail in Table C.2 in Attachment 1 and summarized in Table 3-5.

Table 3-5: AERSCREEN Output

Averaging Period	Maximum Impact ($\mu g/m^3$ per g/s)
1-Hour	2.804E-01
8-Hour	2.524E-01
Annual	2.804E-02

4.0 AIR QUALITY IMPACT ANALYSIS

ESEC is a NOx RECLAIM facility. Rule 2005 requires an AQIA when a project results in an increase in the maximum emissions for a RECLAIM pollutant; since the Project is expected to result in an increase of the maximum hourly NOx emissions, an AQIA assessment is required.

Modeling for the AQIA is not required if the hourly emissions are below screening thresholds in Rule 2005, Appendix A, Table A-1. Although the Project emissions meet the emissions limit for the largest MMBtu per hour category in Table A-1, the table only shows screening limits for equipment up to 40 MMBtu per hour. For a conservative approach, a screening modeling assessment was performed to compare against the Significant Change in Air Quality (SCAQ) standard in Table A-2 of Rule 2005, Appendix A. The analysis was performed assuming 100% conversion of NOx into NO_2.

Per Rule 1303(b), an AQIA is required when a project results in an increase of any nonattainment pollutant emissions from a permit unit. Since the South Coast Air Basin (SCAB) is in attainment for CO and SO_2, no AQIA assessment is needed for these pollutants. Additionally, since Clearway is proposing a daily fuel limit, there will be no increase in daily or annual PM_{10} emissions. The Project is not requesting an increase in the daily or annual PTE for PM_{10}, and all other pollutants subject to Rule 1303 are in attainment, so no modeling is required for Rule 1303.

4.1 Significant Change in Air Quality Analysis (per CCGT)

The emissions from Table 2-2 were combined with the AERSCREEN output from Table 3-5 to calculate the worst-case impacts to ambient air quality for comparison with the SCAQ thresholds from Rule 2005. This calculation is shown in detail in Table C.8 in Attachment 1 and summarized in Table 5-1.

As shown in Table 5-1, the proposed Project is not expected to cause a significant change in air quality for any of the listed pollutants over their respective averaging periods.

Table 5-1: Significant Change in Air Quality Analysis (per CCGT)

Pollutant	Averaging Period	Project Impact (ug/m^3)	Significant Change in Air Quality (ug/m^3)	Exceeds Standard?
NO_2	1-Hr	0.0401	20	No
	Annual	0.0008	1	No

5.0 RULE 1401 HEALTH RISK ASSESSMENT

Rule 1401 specifies limits for maximum individual cancer risk (MICR), cancer burden, and non-cancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units which emit TAC listed in Table I of the rule. The rule establishes allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

Health risk estimates were calculated in accordance with the BAAQMD's Air Toxics NSR Program HRA Guidelines, dated December 2016. Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 350 days per year, for 30 years. In addition, residential risk estimates assume a 95th percentile breathing rate for age groups younger than two years old, and 80th percentile breathing rate for age groups that are older than or equal to two years of age. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 250 days per year, for 25 years. For offsite workers, the 95th percentile 8-hour breathing rate based on moderate activity was assumed. For students at school sites, exposure is assumed to occur 180 days per year (or 36 weeks/year) for 9 years. In addition, the 95th percentile 8-hour breathing rate based on moderate activity (for age 2<16 years; 520 L/kg-8 hours) was assumed. Residential and student cancer risk estimates include age sensitivity factors (ASFs) and fraction of time at home (FAH) adjustments. The ASFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. The estimated health risks for this PTA are presented in the table below.

As discussed in Section 2.0, the proposed Project is expected to result in an increase in maximum hourly TAC emissions. The total post-Project hourly TAC emissions from Table 2-3 and the 1-Hour AERSCREEN output from Table 3-5 were used to calculate the HIA.

The proposed Project is also expected to result in an increase in maximum annual ammonia emissions. The Project change in annual ammonia emissions from Table 2-3 and the annual AERSCREEN output from Table 3-5 were used to calculate the HIC. A conversion factor of 0.1 was used to convert the 1-hour concentration to an annual concentration, per SCAQMD screening guidance. HIC is typically estimated at the location of the maximum residential and worker receptors (MICR and MEIW); however, for this assessment, the HIC was calculated at the receptor distance with the highest predicted concentration and is an overly conservative estimate of health impacts.

As shown in Table 5-1, the chronic and acute HI's are less than the Rule 1401 limits of 1.0. The proposed Project complies with Rule 1401. The HIC and HIA calculations for all organs are shown in Tables C.3 and C.4 in Attachment 1.

Table 5-1: Rule 1401 HRA Summary (per CCGT)

Health Risk	HI	Target Organ	SCAQMD Rule 1401 Threshold	HI < Limit?
Chronic Hazard Index (unitless)	4.53E-06	Respiratory System	1.0	Yes
Acute Hazard Index (unitless)	7.96E-04	Eye	1.0	Yes

ATTACHMENT 1 - CALCULATION TABLES

Table No.	Title
C.1	AERSCREEN Stack Parameters
C.2	AERSCREEN Output
C.3	Rule 1401 HIA Calculation
C.4	Rule 1401 HIC Calculation
C.5	AQIA Emission Rates - 1-Hour (per CCGT)
C.6	AQIA Emission Rates - 24-Hour (per CCGT)
C.7	AQIA Emission Rates - Annual (per CCGT)
C.8	Rule 2005/1303 Significant Change in Air Quality Analysis (per CCGT)

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Appendix C - HRA & AQIA

Table C.1 - AERSCREEN Stack Parameters

Unit	Device ID	Stack Area (ft^2)[1]	Stack Temperature (Deg F)	Exit Velocity (fps)[2]	Stack Diameter[1] (ft)	Release Height from Permit (ft)	Triennial Source Test Report 2018[3] (acfm)	Avg Fuel Use During 2018 Triennial Test[4] (mscfh)	Avg Heat Input During 2019 Triennial Test[5] (mmBtu/hr)	Scaled Exhaust Flow[6] (acfm)	Scaled Exit Velocity[7] (fps)	Merged Stack Parameter[8] M
CCGT No. 5	D67	357.16	334.5	71.6902322	21.32487364	210	1,536,293	2,036.9	2,138.7	1,616,209	75.42	113,530,612,119
CCGT No. 7	D68	357.16	337.4	68.00168925	21.32487364	210	1,457,249	1,979.3	2,078.3	1,577,667	73.62	111,784,022,468

[1] Stack Diameter (ft) = Sqrt(Stack Area x 4/pi)

[3] Exit Velocity (fps) = Exhaust Flow (acfm) / Stack Area (ft2) / 60

[4] From 1-hr average CEMS data

[5] Avg Heat Input During Test (mmBtu/hr) = Avg Fuel Use During Test (mscfh) / 1,000 x HHV

HHV 1,050 mmBtu/mmscf

[6] Scaled Exhaust Flow (acfm) = Exhaust Flow During Test (acfm) x Post-Project Heat Input Rating (mmBtu/hr) / Avg Heat Input During Test (mmBtu/hr)

Post-Project HI Rating 2,250

[7] Scaled Exit Velocity (fps) = Scaled Exhaust Flow (acfm) / 60 / Stack Area (ft^2)

[8] M = Release Height x Scaled Exhaust Flow x Stack Temperature / Emission Rate

The stacks have identical pollutant emission rates and will be modeled using unitized emission rates.

M = Release Height x Scaled Exhaust Flow x Stack Temperature

CCGT No. 7 has the lowest value of M and is therefore the worst-case stack. AERSCREEN will use the stack parameters for CCGT. 7

Stack Diameter (ft)	Release Height (ft)	Stack Temperature (Deg F)	Exit Velocity (fps)
21.325	210	334.5	71.69

Table C.2 - AERSCREEN Output

Averaging Period	Ground-Level Receptors Impact[1] (ug/m^3 per g/s)	Modeled Receptor Impact[2] (ug/m^3 per g/s)
1-Hr	2.804E-01	2.804E-01
24-Hr	1.683E-01	1.683E-01
Annual	2.804E-02	2.804E-02

Scalars

24-Hr	0.60
Annual	0.10

[1] AERSCREEN Scnarios 1. All receptors are at ground-level elevation.

[2] The modeled receptor is the receptor with the highest impact.

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Appendix C - HRA & AQIA

Table C.3 - Rule 1401 HIA Calculation

Rule 1401(f)(4) requires acute health risk for modifications to be based on the total emissions from a permit unit.

						Target Organ									
Pollutant	CAS No.	Post-Project (lb/hr)	Post-Project [1] (g/s)	Acute REL (ug/m^3)	HIA [2] (ug/m^3)	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Benzene	71432	7.14E-03	9.00E-04	2.70E+01	9.35E-06			x			x	x	x		
1,3-Butadiene	106990	9.41E-04	1.19E-04	6.60E+02	5.04E-08			x					x		
Formaldehyde	50000	7.86E-01	9.92E-02	5.50E+01	5.06E-04				x						
Naphthalene	91203	2.85E-03	3.59E-04	--	--										
Total PAHs (excluding Naphthalene)	1151	1.97E-03	2.48E-04	--	--										
Acetaldehyde	75070	8.74E-02	1.10E-02	4.70E+02	6.58E-06				x					x	
Acrolein	107028	7.91E-03	9.97E-04	2.50E+00	1.12E-04				x					x	
Ammonia	7664417	1.53E+01	1.93E+00	3.20E+03	1.69E-04				x					x	
Ethylbenzene	100414	6.99E-02	8.81E-03	--	--										
Propylene oxide	75569	6.34E-02	8.00E-03	3.10E+03	7.24E-07			x	x				x	x	
Toluene	108883	2.85E-01	3.59E-02	5.00E+03	2.02E-06				x			x		x	
Xylene	1330207	1.40E-01	1.76E-02	2.20E+04	2.25E-07				x			x		x	

[1] Post-Project (g/s) = Post-Project (lb/hr) x 454 / 3,600

[2] Post-Project (g/s) x Unitized GLC (ug/m^3) / Acute REL (ug/m^3)

Unitized GLC 0.28043 ug/m^3

		Target Organ									
Pollutant	CAS No.	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Benzene	71432			9.35E-06			9.35E-06	9.35E-06	9.35E-06		
1,3-Butadiene	106990			5.04E-08					5.04E-08		
Formaldehyde	50000				5.06E-04						
Naphthalene	91203										
Total PAHs (excluding	1151										
Acetaldehyde	75070				6.58E-06					6.58E-06	
Acrolein	107028				1.12E-04					1.12E-04	
Ammonia	7664417				1.69E-04					1.69E-04	
Ethylbenzene	100414										
Propylene oxide	75569			7.24E-07	7.24E-07				7.24E-07	7.24E-07	
Toluene	108883				2.02E-06			2.02E-06		2.02E-06	
Xylene	1330207				2.25E-07			2.25E-07		2.25E-07	
		0.00E+00	0.00E+00	1.01E-05	7.96E-04	0.00E+00	9.35E-06	1.16E-05	1.01E-05	2.91E-04	0.00E+00

Acute Reference Exposure Levels are from OEHHA's Consolidated Table, Last Updated October 2, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/contable.pdf
Target Organs are from OEHHA's Target Organs Tables, Last Updated August 21, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/totables.pdf

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Appendix C - HRA & AQIA

Table C.4 - Rule 1401 HIC Calculation

Rule 1401(f)(3) requires chronic health risk for modifications to be based on the total emissions increase from a permit unit.

						Target Organ									
Pollutant	CAS No.	Post-Project (lb/yr)	Post-Project [1] (g/s)	Chronic REL (ug/m^3)	HIC [2] (ug/m^3)	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Ammonia	7664417	2.24E+03	3.23E-02	2.00E+02	4.53E-06									x	

[1] Post-Project (g/s) = Post-Project (lb/hr) x 454 / 3,600

[2] Post-Project (g/s) x Unitized GLC (ug/m^3) / Acute REL (ug/m^3)

Unitized GLC 2.80E-02 ug/m^3

		Target Organ									
Pollutant	CAS No.	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Ammonia	7664417									4.53E-06	
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-06	0.00E+00

Chronic Reference Exposure Levels are from OEHHA's Consolidated Table, Last Updated October 2, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/contable.pdf
Target Organs are from OEHHA's Target Organs Tables, Last Updated August 21, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/totables.pdf

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Appendix C - HRA & AQIA

Table C.5 - AQIA Emission Rates - 1-Hour (per CCGT)

Pollutant	Pre-Project (lb/hr)	Post-Project (lb/hr)	Increase (lb/hr)	Increase[1] (g/s)
NO2	15.45	16.59	1.13	1.43E-01

[1] Increase (g/s) = Increase (lb/hr) x 454 / 3,600

Table C.6 - AQIA Emission Rates - 24-Hour (per CCGT)

Pollutant	Pre-Project[1] (lb/24-hr)	Post-Project[2] (lb/24-hr)	Increase (lb/24-hr)	Increase[3] (g/s)
PM 10	--	--	No Increase	No Increase

[1] Calculated in Table B.1

[2] Calculated in Table B.1

[3] No daily emissions increase due to a permit limit.

Table C.7 - AQIA Emission Rates - Annual (per CCGT)

Pollutant	Pre-Project (lb/yr)	Post-Project (lb/yr)	Increase (lb/yr)	Increase[1] (g/s)
NO2	96,435.67	98,449.07	2,013.40	2.90E-02
PM 10	--	--	No Increase	No Increase

[1] Increase (g/s) = Increase (lb/yr) / 8760 x 454 / 3,600

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Appendix C - HRA & AQIA

Table C.8 - Rule 2005 Significant Change in Air Quality Analysis (per SCGT)

Pollutant	Averaging Period	Increase (g/s)	Unitized Ground-Level Concentration (ug/m^3)	Ground-Level Impact[1] (ug/m^3)	Significant Change in Air Quality (ug/m^3)	Exceeds Standard?
NO2	1-Hr	1.43E-01	2.804E-01	0.0401	20	No
NO2	Annual	2.90E-02	2.804E-02	0.0008	1	No
PM 10	24-Hr	No Increase	--	No Increase	2.5	No Increase
PM 10	Annual	No Increase	--	No Increase	1	No Increase

[1] Ground-Level Impact (ug/m^3) = Increase (g/s) x Unitized Ground-Level Concentration (ug/m^3)

ATTACHMENT 2 - REFERENCES

Page Nos.	Contains	Used For
1-4 of 42	2019 Triennial Test Data	Stack Parameters Table C.1
5-6 of 42	LAX Temperature Data	AERSCREEN
7 of 42	Surface Characteristics for Los Angeles International Airport Population of County of Los Angeles	AERSCREEN
8-23 of 42	OEHHA's Consolidated Table	Tables C.3/C.4
24-42 of 42	OEHHA's Target Organ Tables	Tables C.3/C.4

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Appendix C - HRA & AQIA

Table C.1 - AERSCREEN Stack Parameters

Unit	Device ID	Stack Area (ft^2)[1]	Stack Temperature (Deg F)	Exit Velocity (fps)[2]	Stack Diameter[1] (ft)	Release Height from Permit (ft)	Triennial Source Test Report 2018[3] (acfm)	Avg Fuel Use During 2018 Triennial Test[4] (mscfh)	Avg Heat Input During 2019 Triennial Test[5] (mmBtu/hr)	Scaled Exhaust Flow[6] (acfm)	Scaled Exit Velocity[7] (fps)	Merged Stack Parameter[8] M
CCGT No. 5	D67	357.16	334.5	71.6902322	21.32487364	210	1,536,293	2,036.9	2,138.7	1,616,209	75.42	113,530,612,119
CCGT No. 7	D68	357.16	337.4	68.00168925	21.32487364	210	1,457,249	1,979.3	2,078.3	1,577,667	73.62	111,784,022,468

[1] Stack Diameter (ft) = Sqrt(Stack Area x 4/pi)

[3] Exit Velocity (fps) = Exhaust Flow (acfm) / Stack Area (ft2) / 60

[4] From 1-hr average CEMS data

[5] Avg Heat Input During Test (mmBtu/hr) = Avg Fuel Use During Test (mscfh) / 1,000 x HHV

HHV 1,050 mmBtu/mmscf

[6] Scaled Exhaust Flow (acfm) = Exhaust Flow During Test (acfm) x Post-Project Heat Input Rating (mmBtu/hr) / Avg Heat Input During Test (mmBtu/hr)

Post-Project HI Rating 2,250

[7] Scaled Exit Velocity (fps) = Scaled Exhaust Flow (acfm) / 60 / Stack Area (ft^2)

[8] M = Release Height x Scaled Exhaust Flow x Stack Temperature / Emission Rate

The stacks have identical pollutant emission rates and will be modeled using unitized emission rates.

M = Release Height x Scaled Exhaust Flow x Stack Temperature

CCGT No. 7 has the lowest value of M and is therefore the worst-case stack. AERSCREEN will use the stack parameters for CCGT. 7

Stack Diameter (ft)	Release Height (ft)	Stack Temperature (Deg F)	Exit Velocity (fps)
21.325	210	334.5	71.69

Table C.2 - AERSCREEN Output

Averaging Period	Ground-Level Receptors Impact[1] (ug/m^3 per g/s)	Modeled Receptor Impact[2] (ug/m^3 per g/s)
1-Hr	2.804E-01	2.804E-01
24-Hr	1.683E-01	1.683E-01
Annual	2.804E-02	2.804E-02

Scalars

24-Hr	0.60
Annual	0.10

[1] AERSCREEN Scnarios 1. All receptors are at ground-level elevation.

[2] The modeled receptor is the receptor with the highest impact.

TITLE: SCENARIO 1

********** STACK PARAMETERS **********

SOURCE EMISSION RATE:	1.0000	g/s	7.937	lb/hr
STACK HEIGHT:	64.01	meters	210.00	feet
STACK INNER DIAMETER:	6.498	meters	255.84	inches
PLUME EXIT TEMPERATURE:	442.8	K	337.4	Deg F
PLUME EXIT VELOCITY:	68.000	m/s	223.10	ft/s
STACK AIR FLOW RATE:	4778662	ACFM		
STACK BASE LONGITUDE:	-118.4253	deg	368234.	Easting
STACK BASE LATITUDE:	33.9110	deg	3753206.	Northing
STACK BASE UTM ZONE:			11	
REFERENCE DATUM (NADA):			4	
STACK BASE ELEVATION:	0.15	meters	0.49	feet
RURAL OR URBAN:	URBAN			
POPULATION:	9818605			

DIGITAL ELEVATION MAP(S) "long_beach-e.dem"

"los_angeles-e.dem"

INITIAL PROBE DISTANCE = 3000. meters 9843. feet

********** BUILDING DOWNWASH PARAMETERS **********

USER DEFINED BPIPPRM INPUT FILE: AERSCREEN.BPI

MAXIMUM BUILDING HEIGHT:	36.6	meters	120.0	feet
MAXIMUM BUILDING LENGTH:	110.2	meters	361.6	feet
MINIMUM BUILDING WIDTH:	68.7	meters	225.3	feet

********** FLOW SECTOR ANALYSIS **********

25 meter receptor spacing: 40. meters - 3000. meters

FLOW SECTOR	BUILD WIDTH	BUILD LENGTH	XBADJ	YBADJ	MAXIMUM 1-HR CONC (ug/m3)	IMPACT DIST (m)	RECEPTOR HEIGHT (m)	TEMPORAL PERIOD
10	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
20	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
30	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
40	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
50	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
60	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
70	0.00	0.00	0.00	0.00	0.2163	900.0	30.96	ANN
80	0.00	0.00	0.00	0.00	0.2168	900.0	31.85	ANN
90	0.00	0.00	0.00	0.00	0.2169	875.0	31.83	ANN
100	0.00	0.00	0.00	0.00	0.2168	900.0	31.85	ANN
110	0.00	0.00	0.00	0.00	0.2164	900.0	31.18	ANN
120	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
130	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
140	0.00	0.00	0.00	0.00	0.2158	875.0	29.85	ANN
150	0.00	0.00	0.00	0.00	0.2129	925.0	22.83	ANN
160	0.00	0.00	0.00	0.00	0.2130	950.0	-0.11	ANN
170	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
180	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
190	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
200	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
210	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
220	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
230	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
240	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
250	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
260	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
270	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
280	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
290	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
300	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
310	0.00	0.00	0.00	0.00	0.2130	950.0	-0.15	ANN
320	91.91	110.23	-229.98	44.24	0.2673	1100.0	-0.15	ANN
330	78.00	102.83	-231.53	13.13	0.2573	1075.0	-0.15	ANN
340	68.66	99.15	-229.41	-17.01	0.2575	1025.0	7.10	ANN
350*	83.65	108.36	-228.09	-47.99	0.2804	1050.0	21.58	ANN
360	0.00	0.00	0.00	0.00	0.2158	900.0	29.83	ANN

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 270.4 / 316.5 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: USER ENTERED

ALBEDO: 0.18
BOWEN RATIO: 1.25
ROUGHNESS LENGTH: 0.099 (meters)

SURFACE FRICTION VELOCITY (U*) ADJUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	03	05	5	13

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
98.89	0.877	1.200	0.020	679.	1890.	-663.6	0.099	1.25	0.18	10.00

HT	REF TA	HT
10.0	316.5	2.0

WIND SPEED AT STACK HEIGHT (non-downwash):   13.6 m/s
STACK-TIP DOWNWASH ADJUSTED STACK HEIGHT: 64.0 meters
ESTIMATED FINAL PLUME RISE (non-downwash):   296.0 meters
ESTIMATED FINAL PLUME HEIGHT (non-downwash):   360.0 meters

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR	MO	DY	JDY	HR
10	03	04	5	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
237.91	0.102	1.800	0.020	2174.	75.	-1.0	0.099	1.25	0.18	0.50

HT	REF TA	HT
10.0	316.5	2.0

WIND SPEED AT STACK HEIGHT (non-downwash): 0.7 m/s
STACK-TIP DOWNWASH ADJUSTED STACK HEIGHT: 64.0 meters
ESTIMATED FINAL PLUME RISE (non-downwash): 1880.4 meters
ESTIMATED FINAL PLUME HEIGHT (non-downwash): 1944.4 meters

********** AERSCREEN AUTOMATED DISTANCES **********
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	RECEPTOR HEIGHT (m)	DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	RECEPTOR HEIGHT (m)
40.00	0.4215E-01	1.37	1525.00	0.2008	-0.15
50.00	0.4398E-01	2.47	1550.00	0.1960	-0.15
75.00	0.4507E-01	5.34	1575.00	0.1913	-0.15
100.00	0.4407E-01	8.52	1600.00	0.1868	-0.15
125.00	0.4241E-01	12.00	1625.00	0.1824	-0.15
150.00	0.4055E-01	15.56	1650.00	0.1781	-0.15
175.00	0.3871E-01	19.05	1675.00	0.1740	-0.15
200.00	0.3696E-01	22.36	1700.00	0.1701	-0.15
225.00	0.3728E-01	24.96	1725.00	0.1664	-0.15
250.00	0.5001E-01	27.39	1750.00	0.1629	-0.15
275.00	0.6400E-01	29.65	1775.00	0.1593	-0.15
300.00	0.7789E-01	29.85	1800.00	0.1557	-0.15
325.00	0.9095E-01	29.85	1825.00	0.1523	51.18
350.00	0.1027	29.85	1850.00	0.1533	51.60
375.00	0.1130	29.85	1875.00	0.1541	52.01
400.00	0.1218	29.85	1900.00	0.1549	52.43
425.00	0.1293	29.85	1925.00	0.1553	52.65
450.00	0.1358	29.85	1950.00	0.1553	52.67
475.00	0.1413	29.85	1975.00	0.1559	53.09
500.00	0.1461	29.85	2000.00	0.1565	53.51
525.00	0.1502	29.85	2025.00	0.1570	53.94
550.00	0.1622	29.85	2050.00	0.1574	54.36
575.00	0.1731	29.85	2075.00	0.1577	54.78
600.00	0.1809	29.85	2100.00	0.1580	55.20

625.00	0.1878	29.85	2125.00	0.1583	55.63
650.00	0.1939	29.85	2150.00	0.1584	56.05
675.00	0.1992	29.85	2175.00	0.1586	56.46
700.00	0.2035	29.85	2200.00	0.1581	56.44
725.00	0.2069	29.85	2225.00	0.1576	56.34
750.00	0.2096	29.85	2250.00	0.1572	56.38
775.00	0.2118	29.85	2275.00	0.1579	57.42
800.00	0.2241	20.04	2300.00	0.1583	58.28
825.00	0.2362	20.64	2325.00	0.1583	58.81
850.00	0.2463	20.77	2350.00	0.1582	59.37
875.00	0.2550	20.97	2375.00	0.1581	59.85
900.00	0.2625	21.23	2400.00	0.1575	59.85
925.00	0.2686	21.46	2425.00	0.1569	59.85
950.00	0.2732	21.49	2450.00	0.1562	59.84
975.00	0.2767	21.51	2475.00	0.1556	59.85
1000.00	0.2789	21.53	2500.00	0.1554	59.65
1025.00	0.2801	21.56	2525.00	0.1557	59.58
1050.00	0.2804	21.58	2550.00	0.1559	59.60
1075.00	0.2797	21.60	2575.00	0.1562	59.68
1100.00	0.2783	21.54	2600.00	0.1564	59.82
1125.00	0.2762	21.64	2625.00	0.1565	59.85
1150.00	0.2736	21.81	2650.00	0.1567	59.85
1175.00	0.2704	21.98	2675.00	0.1568	59.85
1200.00	0.2667	22.14	2700.00	0.1569	59.85
1225.00	0.2623	21.62	2725.00	0.1570	59.85
1250.00	0.2577	21.11	2750.00	0.1570	59.85
1275.00	0.2526	20.64	2775.00	0.1570	59.85
1300.00	0.2473	20.28	2800.00	0.1571	59.85
1325.00	0.2419	20.24	2825.00	0.1571	59.85
1350.00	0.2364	20.20	2850.00	0.1571	59.85
1375.00	0.2308	20.16	2875.00	0.1570	59.85
1400.00	0.2258	-0.15	2900.00	0.1570	59.85
1425.00	0.2207	-0.15	2925.00	0.1570	59.85
1450.00	0.2157	-0.15	2950.00	0.1569	59.85
1475.00	0.2107	-0.15	2975.00	0.1568	59.85
1500.00	0.2057	-0.15	3000.00	0.1568	59.84

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
ELEVATED TERRAIN	0.2804	0.2804	0.2524	0.1683	0.2804E-01

DISTANCE FROM SOURCE   1045.00 meters directed toward 350 degrees
RECEPTOR HEIGHT   21.57 meters

IMPACT AT THE
AMBIENT BOUNDARY   0.4215E-01 0.4215E-01 0.3794E-01 0.2529E-01 0.4215E-02

DISTANCE FROM SOURCE   40.00 meters directed toward 80 degrees
RECEPTOR HEIGHT   1.37 meters

**********   AERSCREEN FUMIGATION SUMMARY   **********

NO METEOROLOGICAL HOURS FITTING FUMIGATION CRITERIA...
NO FUMIGATION CALCULATIONS MADE

Facility: El Segundo Energy Center, LLC
Facility ID: 115663

El Segundo Energy Center, LLC
Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.3 - Rule 1401 HIA Calculation

Rule 1401(f)(4) requires acute health risk for modifications to be based on the total emissions from a permit unit.

						Target Organ									
Pollutant	CAS No.	Post-Project (lb/hr)	Post-Project [1] (g/s)	Acute REL (ug/m^3)	HIA [2] (ug/m^3)	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Benzene	71432	7.14E-03	9.00E-04	2.70E+01	9.35E-06			x			x	x	x		
1,3-Butadiene	106990	9.41E-04	1.19E-04	6.60E+02	5.04E-08			x					x		
Formaldehyde	50000	7.86E-01	9.92E-02	5.50E+01	5.06E-04				x						
Naphthalene	91203	2.85E-03	3.59E-04	--	--										
Total PAHs (excluding Naphthalene)	1151	1.97E-03	2.48E-04	--	--										
Acetaldehyde	75070	8.74E-02	1.10E-02	4.70E+02	6.58E-06				x					x	
Acrolein	107028	7.91E-03	9.97E-04	2.50E+00	1.12E-04				x					x	
Ammonia	7664417	1.53E+01	1.93E+00	3.20E+03	1.69E-04				x					x	
Ethylbenzene	100414	6.99E-02	8.81E-03	--	--										
Propylene oxide	75569	6.34E-02	8.00E-03	3.10E+03	7.24E-07			x	x				x	x	
Toluene	108883	2.85E-01	3.59E-02	5.00E+03	2.02E-06				x			x		x	
Xylene	1330207	1.40E-01	1.76E-02	2.20E+04	2.25E-07				x			x		x	

[1] Post-Project (g/s) = Post-Project (lb/hr) x 454 / 3,600

[2] Post-Project (g/s) x Unitized GLC (ug/m^3) / Acute REL (ug/m^3)

Unitized GLC 0.28043 ug/m^3

		Target Organ									
Pollutant	CAS No.	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Benzene	71432			9.35E-06			9.35E-06	9.35E-06	9.35E-06		
1,3-Butadiene	106990			5.04E-08					5.04E-08		
Formaldehyde	50000				5.06E-04						
Naphthalene	91203										
Total PAHs (excluding	1151										
Acetaldehyde	75070				6.58E-06					6.58E-06	
Acrolein	107028				1.12E-04					1.12E-04	
Ammonia	7664417				1.69E-04					1.69E-04	
Ethylbenzene	100414										
Propylene oxide	75569			7.24E-07	7.24E-07				7.24E-07	7.24E-07	
Toluene	108883				2.02E-06			2.02E-06		2.02E-06	
Xylene	1330207				2.25E-07			2.25E-07		2.25E-07	
		0.00E+00	0.00E+00	1.01E-05	7.96E-04	0.00E+00	9.35E-06	1.16E-05	1.01E-05	2.91E-04	0.00E+00

Acute Reference Exposure Levels are from OEHHA's Consolidated Table, Last Updated October 2, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/contable.pdf
Target Organs are from OEHHA's Target Organs Tables, Last Updated August 21, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/totables.pdf

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El Segundo Energy Center, LLC
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Appendix C - HRA & AQIA

Table C.4 - Rule 1401 HIC Calculation

Rule 1401(f)(3) requires chronic health risk for modifications to be based on the total emissions increase from a permit unit.

						Target Organ									
Pollutant	CAS No.	Post-Project (lb/yr)	Post-Project [1] (g/s)	Chronic REL (ug/m^3)	HIC [2] (ug/m^3)	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Ammonia	7664417	2.24E+03	3.23E-02	2.00E+02	4.53E-06									x	

[1] Post-Project (g/s) = Post-Project (lb/hr) x 454 / 3,600

[2] Post-Project (g/s) x Unitized GLC (ug/m^3) / Acute REL (ug/m^3)

Unitized GLC 2.80E-02 ug/m^3

		Target Organ									
Pollutant	CAS No.	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Ammonia	7664417									4.53E-06	
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-06	0.00E+00

Chronic Reference Exposure Levels are from OEHHA's Consolidated Table, Last Updated October 2, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/contable.pdf
Target Organs are from OEHHA's Target Organs Tables, Last Updated August 21, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/totables.pdf

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Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.5 - AQIA Emission Rates - 1-Hour (per CCGT)

Pollutant	Pre-Project (lb/hr)	Post-Project (lb/hr)	Increase (lb/hr)	Increase[1] (g/s)
NO2	15.45	16.59	1.13	1.43E-01

[1] Increase (g/s) = Increase (lb/hr) x 454 / 3,600

Table C.6 - AQIA Emission Rates - 24-Hour (per CCGT)

Pollutant	Pre-Project[1] (lb/24-hr)	Post-Project[2] (lb/24-hr)	Increase (lb/24-hr)	Increase[3] (g/s)
PM 10	--	--	No Increase	No Increase

[1] Calculated in Table B.1

[2] Calculated in Table B.1

[3] No daily emissions increase due to a permit limit.

Table C.7 - AQIA Emission Rates - Annual (per CCGT)

Pollutant	Pre-Project (lb/yr)	Post-Project (lb/yr)	Increase (lb/yr)	Increase[1] (g/s)
NO2	96,435.67	98,449.07	2,013.40	2.90E-02
PM 10	--	--	No Increase	No Increase

[1] Increase (g/s) = Increase (lb/yr) / 8760 x 454 / 3,600

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Appendix C - HRA & AQIA

Table C.8 - Rule 2005 Significant Change in Air Quality Analysis (per SCGT)

Pollutant	Averaging Period	Increase (g/s)	Unitized Ground-Level Concentration (ug/m^3)	Ground-Level Impact[1] (ug/m^3)	Significant Change in Air Quality (ug/m^3)	Exceeds Standard?
NO2	1-Hr	1.43E-01	2.804E-01	0.0401	20	No
NO2	Annual	2.90E-02	2.804E-02	0.0008	1	No
PM 10	24-Hr	No Increase	--	No Increase	2.5	No Increase
PM 10	Annual	No Increase	--	No Increase	1	No Increase

[1] Ground-Level Impact (ug/m^3) = Increase (g/s) x Unitized Ground-Level Concentration (ug/m^3)