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5.1 Air Quality

5.1.1 Introduction

This section presents the methodology and results of an analysis performed to assess potential impacts of airborne emissions from the construction and operation of the Stanton Energy Reliability Center (SERC or Project) and the Project's compliance with applicable air quality requirements. Section 5.1.1 presents the introduction, applicant information, and the basic South Coast Air Quality Management District (SCAQMD or District) rules applicable to SERC. Section 5.1.2 presents data on the emissions of criteria and air toxic pollutants from SERC. Section 5.1.3 presents the SERC project description, both current and proposed. Section 5.1.4 presents emissions evaluation data. Section 5.1.5 discusses the best available control technology (BACT) evaluations for SERC. Section 5.1.6 presents the air quality impact analysis for SERC. Section 5.1.7 discusses the meteorological data selection process required in order to analyze the impacts of SERC. Section 5.1.8 presents applicable laws, ordinances, regulations, and standards (LORS). Section 5.1.8.1 presents specific LORS, Section 5.1.8.3 presents agency contacts, and Section 5.1.8.4 presents permit requirements and schedules. Section 5.1.9 contains references cited or consulted in preparing this section. Appendix 5.1A contains the support data for the emissions calculations. Appendix 5.1B presents the air quality impact analysis support data. Appendix 5.1C presents the dispersion modeling protocol. Appendix 5.1D presents the risk assessment support data. Appendix 5.1E delineates the estimated construction period emissions and impacts. Appendix 5.1F presents the BACT determination support data. Appendix 5.1G presents regional emissions inventory data. Appendix 5.1H presents the mitigation strategy support data.

Stanton Energy Reliability Center, LLC (SERC, LLC) proposes to construct, own, and operate a hybrid electrical generating and storage facility in Stanton, Orange County, California. SERC has been designed to deliver superior reliability services with a minimal carbon footprint and a low emissions profile. The project will use EGT technology. EGT refers to the LM6000 PC EGT jointly developed by General Electric International, Inc. (GE) and Wellhead Power Solutions. The EGT combines a combustion gas turbine with an integrated battery storage component operated by a proprietary software system. Using this technology, SERC is able to combine dispatchable, operationally flexible, and efficient energy generation with state-of-the-art energy storage technology to meet the need for new local capacity and reliability services specifically in the West Los Angeles Basin local reliability area of Southern California Edison's (SCE's) service territory. SERC will consist of two GE LM6000 PC-based EGTs. Each EGT will consist of a GE LM6000 PC SPRINT natural gas-fired, simple-cycle combustion turbine, a clutch to provide operational flexibility as a synchronous condenser, and an integrated 10-megawatt (MW) GE Battery Energy Storage System (BESS). In total, SERC will provide 98 MW (nominal) of EGT capacity. The EGT provides a broad array of unique reliability benefits that neither gas turbines nor batteries can provide on their own, including the following:

- GHG-free operational reserve
- Flexible capacity without start time
- Peaking energy for local contingencies
- Voltage support and primary frequency response without fuel burn
- Superior transient response due to co-location of gas turbines and battery
- Gas turbine management of battery state-of-charge in real time

Project elements include the generation equipment, battery array, and connections to natural gas, municipal water supply, and the electrical grid. There are no diesel-fueled emergency equipment or cooling towers proposed for the site.

SERC is planning to operate with an expected facility annual capacity factor at 12.3 percent or less. However, the dispatch profile may change as market conditions evolve. In order to respond to the changing market conditions, for the air quality impact analysis, we evaluated a base case operational profile (Case 1) that assumes up to 1,000 turbine starts and 1,432 turbine-hours of full load operation per year (e.g., 500 starts and 716 full load hours per turbine). In addition, we evaluated a second operational profile (Case 2) that is based on only 200 turbine-starts and 2,092 turbine-hours of full-load operation per year. (e.g., 100 turbine starts and 1,046 full load hours per turbine). For purposes of permit limits, we propose to establish a plant-wide applicability limit (PAL or bubble) based on facility-wide emission limits and fuel use.

Thus, as discussed in the sections below, the worst-case daily and annual emissions profiles will be dependent upon each pollutant and which worst-case dispatch assumption produces the maximum daily and annual potential to emit.

SERC will consist of the following:

- GE LM6000 PC SPRINT natural gas turbines (two each), which will be operated in simple-cycle mode
- Air inlet systems complete with modular filtration systems
- Weatherproof acoustic enclosures
- Inlet air fogging systems
- Lube oil systems: One synthetic for the gas turbine and one mineral for the generator/clutch assembly (two each)
- Lube oil cooling provided by air-cooled fin-fan coolers
- Electro-hydraulic start systems
- Water injection for oxides of nitrogen (NOx) control
- Compressor wash systems
- Fire detection and protection system

Combustion air for each combustion turbine generator (CTG) will be cooled using an inlet air fogging system. Fogging systems are based upon the extremely high pressurization of demineralized water being forced through nozzles to create a fine mist or fog. The fogging system will cool the inlet air to the wet bulb temperature of the inlet air. The fogging system will be in service only when the CTGs are at or near full load and will not be placed in service for ambient dry bulb conditions below 50°F.

The SERC design will incorporate air pollution emission controls designed to meet SCAQMD Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) determinations. The CTGs selected for SERC will use demineralized water injection and selective catalyst reduction (SCR) to control emissions of NO_x. One-hour (1-hr) NO_x emissions will be controlled at the stack to 2.5 parts per million by volume (ppmv), dry basis (ppmvd), corrected to 15 percent oxygen. The SCR process will use 19 percent aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the stack exhaust, will be limited to 5 ppmv. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. The project will use an ammonia delivery system, which consists of a 5,000-gallon ammonia tank, spill containment basin, and refilling station with a covered spill containment sump.

Carbon monoxide (CO) and volatile organic compound (VOC) emissions will be controlled by means of CO oxidation catalysts. Oxidation catalysts will limit 1-hour stack CO emissions to 4 ppmvd, and also limit VOC emissions to 1 ppmvd.

Particulate emissions will be controlled through the use of best combustion practices, the exclusive use of pipeline quality natural gas, which is low in sulfur, and high efficiency air inlet filtration.

The CTGs will be designed to burn only pipeline quality natural gas. The natural gas requirement during full load operation at annual average ambient temperature is approximately 936.9 million British thermal units per hour (MMBtu/hr) (higher heating value [HHV] basis, total for two CTG units).

For each CTG, a separate Continuous Emission Monitoring System (CEMS) will sample, analyze, and record NO_x and CO concentration levels and percentage of oxygen in the exhaust gas from the stacks, and fuel gas flow rates. The CEMS will transmit data to a data acquisition system (DAS) that will store the data and generate emission reports in accordance with permit requirements. The DAS will also include alarm features that will send signals to the plant supervisory control system (SCS) when the emissions approach or exceed pre-selected limits.

5.1.2 Regulatory Items Affecting New Source Review

SERC, LLC is submitting the air quality impact analyses to the California Energy Commission (CEC). Pursuant to SCAQMD Regulation XIII, Rule 1301 (b)(2) the construction of new power plants subject to PRC 25500 shall be evaluated and processed in accordance with the regulations of the California Energy Commission.

The application includes discussions of emissions calculations, control technology assessments, regulatory review and modeling analysis which include impact evaluations for criteria and hazardous air pollutants.

SERC operations are not expected to result in emissions that will exceed SCAQMD Rule 1302(s) “major polluting facility” thresholds, nor is the facility expected to have emissions which would exceed Rule 1304(d) Table A offset threshold values. BACT will be implemented for NO_x, CO, VOC, SO_2, particulate matter (PM10/2.5) and ammonia (NH_3).

The emissions impacts associated with the Project are analyzed pursuant to SCAQMD and CEC modeling requirements. The air quality analysis will be conducted to demonstrate that impacts from NO_x, CO, SO_2, PM10 and PM2.5 will comply with the California and National Ambient Air Quality Standards (CAAQS/NAAQS) for the applicable averaging periods. Impacts from nearby sources (cumulative sources located within 8 miles of the project site with emissions greater than five tons per year) will also be assessed for criteria pollutants under separate cover and upon consultation with the SCAQMD and the CEC. The cumulative source analysis will be assessed after the CEC data adequacy review.

SERC will also not trigger the Prevention of Significant Deterioration (PSD) permitting requirements, which would be required for simple cycle design with facility wide emissions equaling or exceeding 250 tons per year (tpy) for any criteria pollutant. Worst-case annual emissions are summarized in Table 5.1-1.

Table 5.1-1. Facility PTE Summary

Pollutant	SERC, tpy	SCAQMD Rule 1302 Major Polluting Facility Thresholds, tpy	SCAQMD Rule 1304 Offset Thresholds, tpy	EPA Major PSD Source Thresholds (tpy)*
NO_x	3.89	10	4	250
CO	7.88	50	29	250
VOC	1.26	10	4	250
SO_x	0.35	100	4	250
PM10	2.08	70	4	250
PM2.5	2.08	-	-	250
CO_2	58,324	-	-	75,000*

* PSD major source review would be triggered for simple cycle turbines at 250 tpy, from which the major modification thresholds are then used for the remaining pollutants. PSD review is not triggered solely based on greenhouse gas (GHG) emissions. If SERC triggered PSD for any non-GHG pollutant, then PSD would be triggered if the CO_2e emissions were equal or greater than 75,000 tpy.

PTE = potential to emit
PSD = Prevention of Significant Deterioration

Although a regulatory compliance analysis is presented in Section 5.1.7, there are several SCAQMD regulations that directly affect the application and review process. These regulations include:

- SCAQMD New Source Review (NSR) Rule 1303 requires that BACT be applied to all proposed new or modified sources which will result in any emissions increase of any nonattainment air contaminant, any ozone depleting compound, or ammonia.
- SCAQMD Rule 1303 indicates that all emission reduction credits proposed for use by the new source must be evaluated and approved prior to the issuance of the SCAQMD Authority to Construct (ATC). SERC is not expected to trigger the offset requirements.
- SCAQMD Rule 1303 requires that an air impact analysis be prepared to insure the protection of state and federal ambient air quality standards.
- SCAQMD Rule 1303 also requires that, prior to the issuance of the ATC, all major stationary sources owned or operated by the Project applicant, which are subject to emissions limitations, are either in compliance or on a schedule for compliance with all applicable emissions limitations under the Clean Air Act (CAA).
- SERC will not require a PSD permit, per SCAQMD Regulation 17 or the federal PSD regulations.

5.1.3 Project Description

5.1.3.1 SERC Site Location

SERC will be located in Orange County within the South Coast Air Basin. The SERC site is located at 10711 Dale Avenue (west side of street) in the city of Stanton, Ca. The site lies approximately 1,100 feet south of West Cerritos Avenue and 1,400 feet north of Katella Avenue. The south boundary of the site is adjacent to the UPRR right-of-way and tracks which crosses the immediate project region from east to west. The site lies directly across Dale Avenue from the SCE Barre Peaker and substation facility. Figure 5.1-1 shows the SERC site and immediate vicinity.

5.1.3.2 Project Equipment Specifications

SERC will consist of the following major equipment and operation:

- Two GE LM6000 PC SPRINT CTGs with inlet fogging
- A 20-MW/10-MWh lithium-ion battery energy storage system
- Water injection and SCR to control emissions of NO_x
- Oxidation catalyst to control emissions of CO and VOCs
- Exclusive use of pipeline quality natural gas to limit emissions of PM and SO_2

All power from the facility will be delivered to the California power grid under the control of the CAISO. As described in Section 1, Introduction, SERC has entered into two Resource Adequacy Purchase Agreements (RAPAs) with SCE which have been approved by the California Public Utilities Commission (CPUC).

The turbine equipment output specifications are summarized in Table 5.1-2.

Table 5.1-2. Combustion Turbine Equipment Specifications

Parameter	Minimum Cold Day (40°F)	Average Day (65°F)	Maximum Hot Day (102.7°F)
Operating case number	106	103	100
Heat rate per turbine, mmbtu/hr (HHV)	484.2	468.5	453.1
Fuel flow per turbine, lb/hr	21,480	20,782	20,099
Load case	Base, 100%	Base, 100%	Base, 100%

Ref: Performance Data supplied by the SERC Project Team, see Appendix 5.1A.

HHV (1,017.2 btu/scf) as per SERC's assumed fuel analysis.

Equipment specifications are summarized as follows:

- **Combustion Turbines (2)**
  - Manufacturer: GE
  - Model: LM6000 PC SPRINT
  - Fuel: Natural gas
  - Maximum heat input: 484.2 MMBtu/hr HHV per turbine (Case 106, cold day)
  - Maximum fuel consumption: 21,480 lbs per hour per turbine (Case 106, cold day)
  - Facility annual fuel consumption: 971.79 MMscf
  - Exhaust flow: ≤ 1,090,776 lbs/hr (Case 106, cold day)
  - Exhaust temperature: 662.2-847.7degrees Fahrenheit (°F) at the stack exit (dependent upon ambient temperature and turbine load)

5.1.3.2.1 Fuels

Pipeline quality natural gas will be the only fuel used by the Project to generate electricity. The typical natural gas composition is shown in Appendix 5.1A. Natural gas combustion results in the formation of NO_x, CO, VOCs, SO_2, PM10, and PM2.5. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM10, PM2.5, and SO_2.

The fuel used for SERC is similar to the fuels used on similar simple-cycle power generation facilities. Table 5.1-3 presents a fuel use summary for the facility. Fuel use values are based on the maximum heat rating of each system, average regional fuel analysis, and maximum operational scenario. Fuel analysis data for natural gas is presented in Appendix 5.1A. The natural gas will meet the CPUC grade specifications.

Table 5.1-3. Estimated Fuel Use Summary for SERC

Source	Fuel	Per Hour (mmscf)	Per Day (mmscf)	Per Year (mmscf)
CT-1	Natural gas	0.47611	11.427	485.89
CT-2	Natural gas	0.47611	11.427	485.89

Notes:

Hourly and daily fuel use based on 40°F cold day, annual fuel use based on annual average day temperature.

HHV of fuel is 1,017.2 BTU/SCF (average) based on representative fuel data in the region. Annual fuel calculations based on facility annual fuel use of 988,317 MMBtu equally split between the two CTGs.

Maximum turbine hours per day = 24.

Maximum annual fuel use is based on Annual Emissions Case 2 (see Section 5.1.3.2).

SERC will only use pipeline quality natural gas in the turbines.

CT = combustion turbine
mmscf = million standard cubic feet

5.1.4 Emissions Evaluation

5.1.4.1 Facility Emissions and Permit Limitations

The approximate 3.98-acre SERC site partly currently vacant (Parcel 1), and partly used for outdoor storage (Parcel 2). There are no current air pollution sources on the proposed site, and there are no facilities currently on the site that are permitted by the SCAQMD. Figure 5.1-1 shows the SERC site and immediate vicinity.

5.1.4.2 Facility Emissions

Installation and operation of SERC will not result in emissions greater than 250 tpy for any criteria pollutants, and as such SERC will be considered a minor NSR source for NO_x, CO, VOC, and PM10/PM2.5 under federal rules. SERC will not trigger the requirements of the Federal PSD program since the emissions of one or more criteria pollutants will not exceed the 250 tpy major source applicability thresholds. The applicability determination for PSD is based on the post commissioning year emissions. The facility is expected to be a minor source under the SCAQMD NSR rules. Criteria pollutant emissions from the new combustion turbines and auxiliary equipment are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 5.9, Public Health. Backup data for both the criteria and hazardous air pollutant emission calculations are provided in Appendix 5.1A.

The hourly, daily and annual emissions for all criteria pollutants are based upon a series of worst-case assumptions for each pollutant. The intent is to envelop the project emissions based upon two dispatch profiles provided in Appendix 5.1A and below, which will be called Annual Emissions Case 1 and Case 2. The daily operation always assumes 24 hours of operation with at least six startups and six shutdowns (except for PM, SO_2, and CO_2e, which are based on 24 hours of continuous operation). The worst-case annual emissions profiles will be dependent upon pollutant and which worst-case dispatch assumption produces the maximum annual potential to emit. Thus, the following Case 1 and Case 2 assumptions were used to develop the emissions envelope for the proposed project:

- For the highest annual emissions of NO_x, CO and VOCs, up to 716 hours per turbine of operation at full load, up to 500 starts and up to 500 shutdowns per year per turbine for a total of 866 hours per year per turbine with up to 24 hours per day of operation. This is identified on the attached spreadsheet in Appendix 5.1-A as **Annual Emissions Case 1** (Table 5.1A-1A).
- For the highest annual emissions of PM10/2.5, SO_2 and CO_2e, up to 1,046 hours at full load with up to 100 starts and 100 shutdowns for a total of 1,076 hours per year with up to 24-hour per day of operation. This is identified in Appendix 5.1-A as **Annual Emissions Case 2** (Table 5.1A-1B).

In the enveloping of emissions, the goal for the Authority to Construct permit is to present two ways in which the facility may operate, but there could be other scenarios with different numbers of starts and run-time hours. Thus, SERC proposes that the facility-wide limits be based on total short-term and annual emissions rather than operational hours. The turbines will require installation of continuous emission monitoring systems (CEMS) for NO_x and CO. Hourly fuel use monitoring along with source test requirements will establish a compliance method to allow for continuous tracking of all emissions at SERC. For example, the maximum annual emissions of NO_x at 3.89 tons per year would establish the facility potential to emit (PTE). SERC would propose and accept hourly, daily and annual emission limits for this pollutant, but would propose that the permit would not contain any limit on the number of hours of operation as the established emission limits would be continuously monitored. This way, the facility operational profiles would be solely based on PTE rather than hours which would allow for a flexible response to changing power market conditions. Thus, the short-term and annual emissions limits would establish the facility PTE rather than the individual operational profiles. This type of emissions and compliance strategy is not new, and has been implemented on numerous projects the to which CEC has issued Licenses, as well as District permits.

Plant commissioning activities, which are planned to occur over an estimated 200 operating hours for both turbines during the first year of operation, will have higher hourly and daily emission profiles than during normal operations in subsequent years of operation. However, the annual emissions during the first operational year, including commissioning, will not exceed the annual limits during subsequent non-commissioning years. The emissions during the first year of operation and subsequent years are presented below and were included in the air quality modeling analysis.

The maximum hourly emissions are based on cold day conditions and include startup and shutdown events. The daily operation assumes 24 hours of operation, inclusive of startups and shutdowns. For the emissions of PM10/2.5 and SO_2, the worst-case day assumed 24-hours of operation without any startups or shutdowns as emissions of these pollutants are maximized during full load operations.

The worst-case annual emissions are based upon the highest emissions for each pollutant as derived from the two annual operating scenarios presented in Appendix 5.1A, including startups and shutdowns.

SERC will be a minor NSR source as defined by the SCAQMD Rule 1302(t) and will not be subject to SCAQMD requirements for emission offsets for criteria pollutants and toxics. SERC, LLC has prepared an air quality emissions and impact analysis to comply with the SCAQMD and the CEC regulations. The modeling analysis includes impact evaluations for those pollutants shown in Table 5.1-4 and the CEC requirements for evaluation of SERC air quality impacts. The emissions presented in Table 5.1-4 are the worst-case potential emissions on an annual basis.

Table 5.1-4. Significant Emissions Threshold Summary

Pollutant	SERC Cumulative Increase (tpy)	Federal/State Attainment		Federal and SCAQMD Rule 26.1 Major Source Thresholds (tpy)		SCAQMD Reg XIII Offsets (tpy)	Major Source (Federal NSR/PSD)	Major Source SCAQMD Rule 1302
				PSD	NNSR			
NO_x	3.89	Y	Y	250	25	5	No/No	N
SO_2	0.35	Y	Y	250	-	4	No/No	N
CO	7.88	Y	Y	250	-	29	No/No	N
PM10	2.08	Y	N	250	-	4	No/No	N
PM2.5	2.08	N	N	250	100	-	No/No	N
VOC (ozone)	1.26	N	N	250	25	4	No/No	N
CO_2	58,324	-	-	75,000	-	-	No/No	N

Installation and operation of SERC will be considered a minor source under the SCAQMD Rule 1302 and will not trigger the offset requirements under SCAQMD Rule 1304 for NO_x and VOC. SERC will not trigger the major new source thresholds for PSD. Criteria pollutant emissions from the new combustion turbines are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 5.9, Public Health. Support data for both the criteria and hazardous air pollutant emission calculations are provided in Appendix 5.1A.

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

5.1.4.3 Normal Operations

Operation of the proposed process and equipment systems will result in emissions to the atmosphere of both criteria and toxic air pollutants. Criteria pollutant emissions will consist primarily of NO_x, CO, VOCs, SO_x, PM10, PM2.5 and CO_2e. Air toxic pollutants will consist of a combination of toxic gases and toxic PM species. Table 5.1-5 lists the pollutants that may potentially be emitted from SERC.

Table 5.1-5. Potentially Emitted Criteria and Toxic Pollutants

Criteria Pollutants	GHGs	Toxic Pollutants		
NO_x	CO_2e	Ammonia	1,3-Butadiene	Propylene
CO		PAHs	Ethylbenzene	Propylene oxide
VOCs		Acetaldehyde	Formaldehyde	Toluene
SO_x		Acrolein	Hexane (n-hexane)	Xylene
PM10/2.5		Benzene	Naphthalene	

Note:

PAHs = polynuclear (or polycyclic) aromatic hydrocarbons

5.1.4.4 Criteria Pollutant Emissions

Tables 5.1-6 through 5.1-10 present data on the criteria pollutant emissions expected from the facility equipment and systems under normal operating scenarios. The maximum hourly emissions for NO_X, CO, and VOCs are based on Case 104 (40°F day) incorporating a worst-case startup event, defined as two 15-minute startup events, two 10-minute shutdown events, with the turbine stack emissions in BACT compliance for the remainder of the startup hour at steady-state compliance conditions. The maximum hourly emissions for SO_2 and PM10/2.5 are based on base load (Case 104) operation during the entire hour with no startups or shutdowns. The worst case day for NO_X, CO, and VOC emissions is defined as six startup events, six shutdown events, and 21.5 hours of full load operation (Case 104) for a total of 24 hours of operation. The worst case day for SO_2 and PM10/2.5 emissions is based on base load (Case 104) operation during for the entire 24 hours with no startups or shutdowns.

As mentioned earlier, two (2) operational profiles were examined for this application and are summarized in Appendix 5.1A. The differences between the two operational profiles are based on annual run time hours and the total annual startup/shutdown events. For NO_x, CO and VOCs, the maximum potential to emit is Annual Emissions Case 1, which has the most startup hours per year. For PM10/2.5, SO_x and CO_2e, Annual Emissions Case 2 has the highest emissions, being the case which has the largest number of base loaded hours per year. For each pollutant, the maximum potential to emit is presented in Appendix 5.1A and in the tables below.

Table 5.1-6. Combustion Turbine Emissions (Startup and Steady State Operation Per Turbine)

Pollutant	Emission Factor and Units	Max Hour Emissions at Startup (lb/hr)[a]	Max Hour Emissions Steady State (Cold Day) (lb/hr)[b]	Max Daily Emissions (Cold Day) (lbs/day)[c]	Max Annual Emissions (tons)[d]
NO_x	2.5 ppmvd @ 15% O_2[e]	6.68	4.46	115.91	1.94
CO	4.0 ppmvd @ 15% O_2	13.23	4.34	133.00	3.94
VOC	1 ppmvd @ 15% O_2	2.19	0.62	21.93	0.63
SO_x	0.75 grs S/100 scf max	1.02	1.02	24.46	-
	0.25 grs S/100 scf avg	-	-	-	0.173
PM10/PM2.5	0.00662 lb/mmbtu[f]	3.00	3.00	72.0	-
	0.00413 lb/mmbtu[f]	-	-	-	1.04
Ammonia	5.0 ppmvd @ 15% O_2	-	3.30	79.24	1.78
CO_2e	118.15 lb/mmbtu				29,117.0

[a] Startup emissions based on 2 startups at 15 minutes each, 2 shutdowns at 10 minutes each, and base load for 10 minutes on a cold day (Case 106 at 40ºF). Each startup/shutdown emission event is presented in Table 5.1-7.

[b] Cold day Case 106 at 40°F.

[c] Worst case day based on 6 startups at 15 minutes each, 6 shutdowns at 10 minutes each, and 21.5 hours at base load at 40°F for NO_x, CO, and VOCs. For PM10/2.5 and SO_x, worst case day based on 24-hour of base load cold day operation.

[d] Maximum annual emissions for NO_x, CO and VOCs based on Annual Emissions Case 1 with PM10/2.5, SO_x and CO_2e based on Annual Emissions Case 2.

[e] Maximum annual emissions for NO_X based on annual average emissions factor of 2.0 ppmvd @ 15% O_2.

[f] Short term emissions based on 3 lb/hr and 0.00662 lb/mmbtu. Annual tons based on 1.93 lb/hr and 0.00413 lb/mmbtu. All emission factors are based on HHV.

Note:

lb/hr = pound(s) per hour

Table 5.1-7. Startup and Shutdown Emissions (per event per turbine)

Parameter	Startup	Shutdown
NO_x, lbs/event	3.08	1.0
CO, lbs/event	1.79	8.90
VOC, lbs/event	0.42	1.40
PM10/PM2.5 lbs/event	0.75	0.50
SO_x, lbs/event	0.19	0.02
Event duration, mins	15	10
Estimated number per year	500	500

* Worst-case Annual Emissions Case 1 operational profile has 500 starts and 500 shutdown events.

Table 5.1-8. Two Combustion Turbine Emissions (Full Load, Startup and Shutdown, whichever is Greater) for the Non-Commissioning Year

Pollutant	Emission Factor	Max Hour Emissions (lbs)	Max Daily Emissions (lbs)	Max Annual Emissions (tons)
NO_x	N/A	13.36	231.82	3.89
CO	N/A	26.45	265.99	7.88
VOCs	N/A	4.37	43.86	1.26
SO_x	N/A	2.04	48.91	0.35
PM10/PM2.5	N/A	6.00	144.00	2.08
NH_3	N/A	6.60	158.47	3.55
CO_2	N/A	NA	NA	58,324

Notes:

See Appendix 5.1A for detailed emissions and operational data.

Maximum hour based on two turbines, cold day operations (Case 106), including SU/SDs for NO_x, CO and VOCs.

Maximum hour based on two turbines, cold day operations (Case 106), at base load for all 60 minutes for PM10/2.5 and SO_x.
Maximum day based on two turbines, cold day operations (Case 106), including SU/SDs for NO_x, CO and VOCs.

Maximum day based on two turbines, cold day operations (Case 106), at base load for all 24 hour for PM10/2.5 and SO_x

Maximum annual emissions for NO_x, CO and VOCs based on Annual Emissions Case 1 with PM10/2.5, SO_x and CO_2e based on Annual Emissions Case 2. Maximum annual emissions based on two turbines, annual average operations (Case 103) for non-SU/SD hours.

Table 5.1-9 presents a summary of the annual emissions for the worst-case primary operational scenarios.

Table 5.1-9. SERC Maximum Potential to Emit

Pollutant	TPY
NO_x	3.89
CO	7.88
VOCs	1.26
SO_x	0.35
PM10/PM2.5	2.08
NH_3	3.55
CO_2	58,324

In addition to the normal operational profiles presented above, during the first year of operation, plant commissioning activities will occur. These are planned to occur over an estimated 200 hours total for both turbines, and will have higher hourly and daily emission profiles than during normal operations in the subsequent years of operation. The commissioning activities schedule and emissions are summarized in Appendix 5.1-A. Prior to the commencement of commissioning activities, SERC will install and operate CEMS and associated digital acquisition system (DAS) for each LM6000 PC. The CEMS and DAS systems will allow NO_x and CO to be tracked for compliance with the proposed limits, and will use actual emissions in place of parametric (fuel use and emission factors) monitoring during commissioning.

Table 5.1-10 presents the maximum proposed emissions for SERC on a pollutant specific basis for commissioning activities during the first year of operations. These emissions will be accounted for (included) in the annual emissions shown in Table 5.1-9.

Therefore, first year emissions, which include commissioning activities, and all subsequent years of operations (non-commissioning) will have the same annual emissions as presented in Table 5.1-9.

Table 5.1-10. Summary of Commissioning Emissions

Pollutant	lbs/hour[a]	lbs/day[a]	TPY[b]
NO_x	85.62	2,054.88	2.28
CO	110.60	2,654.40	0.63
VOCs	17.92	430.08	0.41
SO_x	2.04	48.91	0.100
PM10/PM2.5	6.00	144.00	0.30

[a] Total facility emissions for two turbines, conservatively assuming commissioning of both turbines simultaneously.

[b] The first-year operational emission limits, which include the commissioning activities, will not exceed the subsequent normal (non-commissioning) yearly ton per year limits. Thus, the annual commissioning emissions would be subtracted from, rather than added to, the proposed annual limits for the first year.

Notes:

See Appendix 5.1A for commissioning emissions estimates for each phase of commissioning.

5.1.4.4.1 GHG Emissions

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

Construction emissions are presented in Appendix 5.1-E and include emission evaluations for the following source types:

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

Operational emissions of CO_2e will be primarily from the combustion of fuels in the turbine, and SF_6 emissions from the high voltage circuit breaker. CO_2e emission from the turbines are estimated to be 58,324 tons/yr (52,910.37 MT/yr). SF_6 emissions are estimated to be 2.57 tons/yr (2.33 MT/yr) CO_2e. Appendix 5.1A, contains the support data for the GHG emissions evaluation. Estimated CO_2e emissions for the SERC operational phase, based on annual average conditions, are as follows:

- $CO_2e \leq 58{,}326.6$ tons/year (= 52,912.7 metric tons/year)

The emission factors, global warming potential values (GWP's), and calculation methods are based on 40 CFR 98, Subpart A, Table A-1 and Subpart C, Tables C-1 and C-2.

NSR/PSD Review. SERC will require a SCAQMD New Source Review (NSR) permit, as specified under Regulation XIII. Currently, the SCAQMD air basin is federal and State attainment or attainment/ unclassified for NO_2, SO_2, and CO. The South Coast Air Basin (SCAB) is nonattainment (extreme) for the federal 8-hour ozone standard, as well as nonattainment for the state 1-hour and 8-hour ozone standards. SCAB is also state nonattainment for PM10 and PM2.5, federal nonattainment for PM2.5 (moderate), and attainment for the federal PM10 standards. Based on the values in Tables 5.1-4 and 5.1-9, SERC will not be a major new stationary source per SCAQMD NSR Regulation XIII.

Based upon the annual emissions presented in Tables 5.1-4 and 5.1-9, the facility will not trigger the PSD program requirements for the following pollutants: NO_x, VOC, TSP, PM10, PM2.5, CO, SO_x, and GHGs.

SERC, pursuant to the SCAQMD NSR Rule 1304, is not required to generate or acquire sufficient emission reduction credits to offset the SERC emissions due to its status as a minor NSR source. Table 5.1-11 summarizes these requirements.

Table 5.1-11. SCAQMD Emission Offsets Required by SERC

Pollutant	SCAQMD Offset Trigger Thresholds (tpy)	Facility PTE* (tpy)	SCAQMD Offset Ratio	Total Offsets Required (tpy)
PM10/PM2.5	4	2.08	1.2:1	0
VOC	4	1.26	1.2:1	0
NO_x	4	3.89	1.2:1	0
SO_2	4	0.35	1.2:1	0
CO	29	7.88	1.2:1	0

* Values derived from Section 5.1. Offset ratio per Rule1303(b)(2)(A).

5.1.4.5 Hazardous Air Pollutants

See Section 5.9, Public Health, for a detailed discussion and quantification of hazardous air pollutant (HAP) emissions from SERC and the results of the health risk assessment (HRA). See Appendix 5.1D, for the public health analysis health risk assessment support materials. Section 5.9, Public Health, also discusses the need for RMPs pursuant to 40 CFR 68 and the CalARP regulations.

5.1.4.6 Construction

Construction-related emissions are based on the following:

- SERC owns the one of the parcels and has a long term lease for the remaining parcel. The construction laydown area will be contained within the site, although construction parking may be located in the adjacent Bethel Romanian Pentecostal Church.
- Minimal site grading will be required prior to construction of the turbines, building foundations, support structures, etc.
- Construction activity is expected to last for a total of 11 months (not including startup and commissioning). Construction is anticipated to begin as early as November 2018, with pre-operational testing starting in September 2019, and full scale operations beginning in December 2019.

Construction-related issues and emissions at the SERC site are consistent with issues and emissions encountered at any construction site. Compliance with the provisions of the following permits will generally result in minimal site emissions:

- Grading permit
- Storm Water Pollution Prevention Plan (SWPPP) requirements (construction site provisions),
- The SCAQMD Permit to Construct (PTC), which will require compliance with the provisions of all applicable fugitive dust rules that pertain to the site construction phase

Construction emissions are summarized in Appendix 5.1E. These emissions were used to establish construction related impacts.

The applicant commits to the incorporation of the following mitigation measures or control strategies:

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

- All unpaved roads and disturbed areas in SERC and construction laydown and parking areas will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of three times per day during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 10 mph on unpaved areas within the SERC construction site.
- The construction site entrance(s) will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the Applicant is proposing the following:

- The Applicant will work with the general contractor to utilize to the extent feasible, EPA Air Resources Board Tier 2/Tier 3 engine compliant equipment for equipment over 100 hp.
- Ensure periodic maintenance and inspections per the manufacturers' specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (≤ 15 ppm weight sulfur).

Based on the temporary nature and the time frame for construction, SERC believes that these measures will reduce construction emissions and impacts to levels that are less than significant. Use of these mitigation measures and control strategies will ensure that the site does not cause any violations of existing air quality standards as a result of construction-related activities. Appendix 5.1E presents the evaluation of construction related emissions as well as data on the construction related ambient air quality impacts.

Table 5.1-12 presents data on the regional air quality significance thresholds currently being implemented by the SCAQMD. The specific construction and operational thresholds were derived from the SCAQMD CEQA guidance.

Table 5.1-12. SCAQMD Emissions Based CEQA Significance Thresholds

Pollutant	Construction	Operation
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
TACs	MICR ≥ 10 in 1 million, cancer burden > 0.5, acute/chronic HI ≥ 1.0	
Odors	Project creates an odor nuisance per Rule 402	
GHG	10,000 MT/yr CO_2e for industrial facilities	

Source: SCAQMD CEQA Guidance, SCAQMD Air Quality Significance Threshold Table dated March 2015, SCAQMD website.

In addition, if the project creates air quality impacts in excess of the following values, the impact would be considered significant under the SCAQMD CEQA thresholds.

Table 5.1-13. SCAQMD Air Quality Based CEQA Significance Thresholds

Pollutant	Standards for Criteria Pollutants
NO_2	1-Hour average: 0.18 ppm (state) AAM: 0.03 ppm (state) and 0.0534 ppm (federal)
Sulfate	25 µg/m^3 (state)
PM10	24-Hour average: 10.4 µg/m^3 construction and 2.5 µg/m^3 operation AAM: 1.0 µg/m^3
PM2.5	24-Hour average: 10.4 µg/m^3 construction and 2.5 µg/m^3 operation
SO_2	1-Hour average: 0.25 ppm (state) and 0.075 ppm (federal-99th percentile) 24-Hour average: 0.04 ppm (state)
CO	1-Hour average: 20 ppm (state) and 35 ppm (federal) 8-Hour average: 9.0 ppm (state and federal)
Lead	NA – SERC is not expected to emit lead.

Source: SCAQMD CEQA Guidance, SCAQMD Air Quality Significance Threshold Table dated March 2015, SCAQMD website.

Construction emissions, from onsite and offsite activities are not expected to exceed the SCAQMD CEQA thresholds on a daily basis. Mitigations typically imposed by the CEC as well as the construction modeling analysis indicates these emissions, as well as emissions from other criteria pollutants, will result in less than significant impacts to air quality.

Operational emissions from all onsite activities are expected to exceed the daily threshold values for NOx and PM2.5 only. These emissions are not required to be mitigated per the SCAQMD NSR regulations. Emissions of criteria pollutants, based on the impact analysis presented herein, are not expected to cause a violation, or worsen an existing violation, of any established air quality standard.

In addition to the local significance criteria, the following general conformity analysis thresholds (applicable to nonattainment areas) are as follows in accordance with CFR (40 CFR Parts 6 and 51), and SCAQMD Rule 220 (General Conformity-applicable to federal actions only). The SCAQMD is “extreme” nonattainment for the federal 8-hr ozone standards, and “moderate” nonattainment for federal PM2.5 standards, and as such the applicable conformity thresholds are those presented below:

- NO_x – 10 tons per year
- VOCs – 10 tons per year
- PM2.5 – 70 tons per year

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

5.1.5 Best Available Control Technology Evaluation

5.1.5.1 Current Control Technologies

To evaluate BACT for the proposed turbines, the guidelines for simple-cycle gas turbines (< 50 MW) as delineated in the District, state, and federal BACT listings were reviewed. Table 5.1-14 summarizes the proposed BACT limits on the simple cycle combustion turbines.

Table 5.1-14. BACT Values for Combustion Turbines (Peaking Mode)

Pollutant	BACT Emissions Range	Proposed BACT
NO_x	2.5 to 5 ppmvd	2.5 ppmvd
CO	4 to 6 ppmvd	4.0 ppmvd
VOCs	2 to 3 ppmvd	1 ppmvd
SO_x	Natural gas 0.25 to 0.75 gr S/100 scf	Natural gas 0.25 gr S/100 scf long term 0.75 gr S/100 scf short term
PM10/PM2.5	Natural gas and GCPs	Natural gas and GCPs

Sources: CARB, SCAQMD, SDAPCD, SJVUAPCD, and Bay Area Air Quality Management District (BAAQMD) BACT Guidelines.

Notes:

GCP = good combustion practice
gr S/100 scf = grain(s) of sulfur per 100 standard cubic feet

5.1.5.2 Proposed Best Available Control Technology

Table 5.1-15 presents the proposed BACT for the new combustion turbines. The project will utilize aqueous ammonia as the primary reactant in the SCR system.

Table 5.1-15. Proposed BACT for the Combustion Turbines

Pollutant	Proposed BACT Emissions Level	Proposed BACT System(s)	Meets Current BACT Requirements
NO_x	2.5 ppmvd short term 2.0 ppmvd long term	Water injection with SCR	Yes
CO	4.0 ppmvd	Oxidation catalyst	Yes
VOCs	1 ppmvd	Oxidation catalyst	Yes
SO_x	0.25 gr S/100 scf long term 0.75 gr S/100 scf short term	Natural gas	Yes
PM10/PM2.5	3 lb/hr	Natural gas	Yes
Ammonia	5.0 ppmvd	NH_3 reagent/SCR system	Yes

Source: SERC Team.

5.1.5.2.1 Summary

Based on the above data, the proposed emissions levels for the new combustion turbines satisfy the BACT requirements of the SCAQMD under Rule 1303. Specifics associated with the BACT determinations can be found in Appendix 5.1F.

5.1.6 Air Quality Impact Analysis

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

Potential air quality impacts were evaluated based on the SCAQMD Modeling Guidance for AERMOD[1], as described herein and presented in the Air Quality Modeling Protocol. A copy of the Air Quality Modeling Protocol is included in Appendix 5.1C. All I/O modeling files have been provided to the SCAQMD and CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as summarized in the SCAQMD guidance.

5.1.6.1 Climate and Meteorology

The climate of the South Coast Air Basin (SCAB or basin) is strongly influenced by the local terrain and geography. The basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean on the west, and relatively high mountains forming the north, south, and east perimeters. The climate is mild, tempered by cool sea breezes and is dominated by the semi-permanent high pressure of the eastern Pacific.

Across the 6,600-square-mile basin, there is little variation in the annual average temperature of 62°F. However, the eastern portion of the basin (generally described as the Inland Empire area), experiences greater variability in annual minimum and maximum temperatures as this area is farther from the coast and the moderating effect on climate from the ocean is weaker. All portions of the basin have recorded temperatures well above 100°F. January is usually the coldest month, while the months of July and August are usually the hottest.

[1] www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance

The majority of the rainfall in the basin falls during the period from November through April. Annual rainfall values range from approximately 9 inches per year in Riverside, to 14 inches per year in downtown Los Angeles. Monthly and annual rainfall totals can vary considerably from year to year. Cloud cover, in the form of fog or low stratus, is often caused by persistent low inversions and the cool coastal ocean water. Downtown Los Angeles experiences sunshine approximately 73 percent of the time during daylight hours, while the inland areas experience a slightly higher amount of sunshine, and the coastal areas a slightly lower value.

Although the basin is characterized by a semi-arid climate, the air near the surface can often have high relative humidity due to the presence of a shallow marine layer on most days. Except for infrequent periods of off-shore winds, the marine layer strongly influences the local climate. Periods of heavy fog are common, with "high fog" (low stratus clouds) a frequent and characteristic occurrence. The annual average relative humidity ranges from approximately 70 percent in the coastal areas to 57 percent in the inland parts of the basin.

The basin is characterized by light average wind speeds and poor ventilation. Wind speeds in the downtown Los Angeles area average 5.7 miles per hour (mph), with little seasonal variation. Coastal wind speeds typically average about 2 mph faster than the downtown wind speeds, with the inland areas showing wind speeds slightly slower than the downtown Los Angeles values. Summer wind speeds are typically higher than winter wind speeds. The re-circulating sea-breeze is the dominant wind pattern in the basin, characterized by a daytime on-shore flow and a nighttime land breeze. This pattern is broken by the occasional winter storm, or the strong northeasterly flows from the mountains and deserts north of the basin known as "Santa Ana winds." Annual and quarterly wind roses are presented in Appendix 5.1B, Air Quality Data.

Along the southern California coast, surface air temperatures are relatively cool. Coupled with warm, dry subsiding air from aloft, the potential for early morning inversions is high, i.e., approximately 87 percent of all days. The basin-wide average occurrence of inversions at ground level (surface) is 11 days per month, and varies from 2 days per month in June to 22 days per month in December. Upper air inversions, with bases at less than 2,500 feet above MSL occur approximately 22 days each month, while higher based inversions, up to 3,500 feet above MSL occur approximately 191 days per year.

Representative climatic data for the Project Area was derived from the Fullerton Municipal Airport (Period of Record 1998-2010) located 7 kilometers north of the Project Site. A summary of data from this site indicates the following:

- Average maximum monthly mean temperature 74.9°F (August)
- Average minimum monthly mean temperature 56.2°F (December)
- Annual mean temperature 65.1°F
- Average extreme maximum temperature 102.7°F
- Average extreme minimum temperature 34.9°F
- Mean annual precipitation 13.2 inches

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

Meteorological data obtained from the SCAQMD website for Anaheim, representative of the SERC site, were used in the air quality modeling analyses and are presented in Appendix 5.1B, Air Quality Data.

5.1.6.2 Dispersion Modeling

For modeling the potential impact of SERC in terrain that is both below and above stack top (defined as simple terrain when the terrain is below stack top and complex terrain when it is above stack top) the EPA guideline model AERMOD (version 15181) was used as well as the latest versions of the AERMOD preprocessor to determine receptor elevations and slope factors (AERMAP version 11103). The purpose of the AERMOD modeling analysis was to evaluate compliance with the California state and Federal ambient air quality standards.

Hourly observations of certain meteorological parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. The later discussion details the meteorological data and its applicability to SERC.

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

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

AERMOD input data options will be set to default. The URBAN option was selected for use as the predominant land use around the SERC site with the Orange County population of 3,010,759 persons in accordance with SCAQMD Modeling Guidance for AERMOD.[2]

Default model option for temperature gradients, wind profile exponents, and calm processing, which includes final plume rise, stack-tip downwash, and elevated receptor (complex terrain) heights option.

5.1.6.2.1 NO_2 Modeling Procedures

All project-only NO_2 impacts were assessed using a conservative Tier 2 modeling analysis based on the Ambient Ratio Method (ARM), adopted in the EPA *Guideline on Air Quality Models*. The Guideline allows a nationwide default conversion rate of 75 percent for annual NO_2/NO_x ratios and 80 percent for 1-hour NO_2/NO_x ratios (not to be confused with the proposed ARM2 methodology). ARM may be performed either by using the ARM model option or by multiplying the modeled NO_x concentrations by the appropriate ratios. Based on EPA Guidance, the Tier 2 analyses can be performed without justification to, or prior approval of, the permitting authority. For these analyses, NO_X emissions were modeled and the ARM ratios were applied to the resulting NOx impacts after the AERMOD runs.

5.1.6.3 Additional Model Selection

In addition to AERMOD and its pre-processor AERMAP, several other EPA and CARB models and programs were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations. The models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274), HARP 2.03, and the AERSCREEN (version 15181) dispersion model for fumigation impacts. These models, along with options for their use and how they are used, are discussed below.

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[2] www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance

The AERSCREEN model was used to evaluate inversion breakup fumigation impacts for all short-term averaging periods (24 hours or less). The methodology outlined in EPA-454/R-92-019 (EPA, 1992a) was followed for this analysis. Combined impacts for both turbines in AERSCREEN were evaluated for one turbine stack and then by doubling the AERSCREEN impacts. The fumigation concentrations are then compared to the maximum AERSCREEN concentrations under normal dispersion for all meteorological conditions. If fumigation impacts are less than AERSCREEN maxima under normal dispersion, no further analysis is required based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019).

If fumigation impacts exceed AERSCREEN maxima, then fumigation impacts longer than 1-hour averages will be evaluated based on Section 4.5.3 of Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019) guidance on converting to 3-, 8- and 24-hour average concentrations. For the SERC fumigation analysis, fumigation impacts were less than the AERSCREEN maxima, so these additional analyses were not required.

5.1.6.4 Good Engineering Practice Stack Height Analysis

Formula Good Engineering Practice (GEP) stack height is the greater of 65 meters or the height based on EPA formulas for the various onsite and offsite structures and their locations and orientations to the SERC stacks. Formula GEP stack height was calculated at 27.2 meters (89.25 feet) for the turbine stacks. The GEP stack heights are due to the 35.7-foot turbine enclosures (35 feet above “top-of-concrete,” which is 0.7’ above the SERC grade elevation of 72 feet above sea level [asl]). The design stack heights of 70.7 feet for the turbine stacks (70 feet above “top-of-concrete,” which is 0.7’ above the SERC grade elevation of 72 feet asl) are less than their formula GEP stack heights, so downwash effects were included in the modeling analysis.

BPIP-PRIME was used to generate the wind-direction-specific building dimensions for input into AERMOD. Figure 5.1-2 shows the structures included in the BPIP-PRIME downwash analysis.

5.1.6.5 Receptor Grid Selection and Coverage

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

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

- Receptors were placed along the proposed SERC fence line with a 10-meter spacing.
- Receptors extending outwards from the proposed SERC fence line in all directions at least 500 meters from SERC with a 20-meter receptor spacing were modeled, called the downwash receptor grid.
- An intermediate receptor grid with a 100-meter resolution was modeled that extended outwards from the edge of the downwash grid to 1 kilometer (km) from SERC.
- The first coarse receptor grid with 200-meter spacing extended outwards from the edge of the intermediate grid to 5 km from SERC, while the second coarse grid with 500-meter receptor spacing extended to 10 km from SERC.

- A refined receptor grid with 20-meter resolution would have been modeled around any location on the coarse and intermediate grids if a maximum impact was modeled that was above the concentrations on the downwash grid. This was not required for the SERC modeling analyses, as all maximum impacts occurred well inside the downwash receptor grid or on the SERC fenceline grid.

Concentrations within the facility fenceline will not be calculated. Receptor grid Figures 5.1-3 and 5.1-4 display the receptor grids used in the modeling assessment.

5.1.7 Meteorological Data Selection

SERC, as discussed above, is located in the Orange County portion of the South Coast Air Quality Management District. SERC is on the coastal plain about 12.5 km from the Pacific Ocean, and can be generally characterized as a Mediterranean type climate. Terrain surrounding the SERC location is mostly flat or rolling and gradually increases toward the north and northeast. There is no significant terrain between the ocean and the project site. Land use characteristics along with terrain considerations were considered in order to determine which SCAQMD meteorological and air quality data sets would be considered representative of the project area.

The SCAQMD operates 27 meteorological and air quality monitoring stations which are located throughout the SCAQMD air basin. For the meteorological data, the SCAQMD developed these data bases by using site specific surface characteristics (i.e., surface albedo, roughness lengths, and Bowen ratios) obtained from AERSURFACE. The data was then processed by the SCAQMD with AERMET (Version 14134) with a surface threshold wind speed set to 0.5 m/s, as recommended by EPA.

Because of the lack of significant terrain in the area around the project site and the urban characteristics of the land use in the project area, the Anaheim monitoring station was chosen as the nearest and most representative meteorological data set. The site is located 5.0 kilometers (km) east-northeast from the project site. The next two nearest SCAQMD AERMOD data sets are La Habra (13.3 km to the north-northeast) and Costa Mesa (15.9 km to the south-southeast), which are located either closer to complex terrain or closer to the Pacific Ocean and were not considered any further.

Five years (2006-2009 and 2012) were used in the air quality modeling assessment described below. The Anaheim AERMOD data set processed by the SCAQMD consists of hourly-averaged measurements of wind speed and wind direction (measured at a height of 9.1 meters above ground level), temperature, and other meteorological variables required by AERMOD. This data set meets the minimum EPA requirements for data recovery rates of 90 percent. The years 2010 and 2011 were not provided by the SCAQMD as the data recovery rates for those years did not meet 90 percent.

5.1.7.1 Background Air Quality

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

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health effects. EPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of

California has also established AAQS that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both EPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated and amended over the years following adoption.

Each federal or state AAQS is comprised of two basic elements: a numerical limit expressed as an allowable concentration, and an averaging time that specifies the period over which the concentration value is to be measured. Table 5.1-16 presents the current federal and state AAQS.

Table 5.1-16. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 µg/m^3)	-
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3) (3-year average of annual 4th-highest daily maximum)
Carbon monoxide	8-hour	9.0 ppm (10,000 µg/m^3)	9 ppm (10,000 µg/m^3)
	1-hour	20 ppm (23,000 µg/m^3)	35 ppm (40,000 µg/m^3)
Nitrogen dioxide	Annual average	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
	1-hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3) (3-year average of annual 98th percentile daily maxima)
Sulfur dioxide	Annual average	-	0.030 ppm (80 µg/m^3)[a]
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)[a]
	3-hour	-	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3) (3-year average of annual 99th percentile daily maxima)
Respirable particulate matter (10 micron)	24-hour	50 µg/m^3	150 µg/m^3
	Annual arithmetic mean	20 µg/m^3	-
Fine particulate matter (2.5 micron)	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3 (3-year average)
	24-hour	-	35 µg/m^3 (3-year average of annual 98th percentiles)
Sulfates	24-hour	25 µg/m^3	-
Lead	30-day	1.5 µg/m^3	-
	3-month rolling average	-	0.15 µg/m^3

Source: CARB and EPA websites 09/2016

Notes:

The 24-hour and annual 1971 SO_2 NAAQS remain in effect until 1 year after the attainment status is designated by EPA for the 2010 NAAQS (SERC project area is still undesignated for the 2010 NAAQS, but presumed to be in attainment).

µg/m3 = micrograms per cubic meter

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

- **Ozone**—Ozone is a reactive pollutant that is not emitted directly into the atmosphere, but rather is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving volatile organic compounds (VOC) and NO_x. VOC and NO_x are therefore known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of VOC and NO_x under the influence of wind and sunlight. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. In addition to causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.
- **Carbon Monoxide**—CO is a non-reactive pollutant that is a product of incomplete combustion. Ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing. Under inversion conditions, CO concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses.
- **Particulate Matter (PM10 and PM2.5)** — Both PM10 and PM2.5 represent fractions of particulate matter, which can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local PM10 concentrations, while others, such as vehicular traffic, affect regional PM10 concentrations.

  Several studies that EPA relied on for its staff report have shown an association between exposure to particulate matter, both PM10 and PM2.5, and respiratory ailments or cardiovascular disease. Other studies have related particulate matter to increases in asthma attacks. In general, these studies have shown that short-term and long-term exposure to particulate matter can cause acute and chronic health effects. PM2.5, which can penetrate deep into the lungs, causes more serious respiratory ailments.
- **Nitrogen Dioxide and Sulfur Dioxide—**NO_2 and SO_2 are two gaseous compounds within a larger group of compounds, NO_x and SO_x, respectively, which are products of the combustion of fuel. NO_x and SO_x emission sources can elevate local NO_2 and SO_2 concentrations, and both are regional precursor compounds to particulate matter. As described above, NO_x is also an ozone precursor compound and can affect regional visibility. (NO_2 is the "whiskey brown-colored" gas readily visible during periods of heavy air pollution.) Elevated concentrations of these compounds are associated with increased risk of acute and chronic respiratory disease.

  SO_2 and NO_2 emissions can be oxidized in the atmosphere to eventually form sulfates and nitrates, which contribute to acid rain. Large power facilities with high emissions of these substances from the use of coal or oil are subject to emissions reductions under the Phase I Acid Rain Program of Title IV of the 1990 CAA Amendments. Power facilities, with individual equipment capacity of 25 MW or greater that use natural gas or other fuels with low sulfur content, are subject to the Phase II Program of Title IV. The Phase II program requires facilities to install CEMS in accordance with 40 CFR Part 75 and report annual emissions of SO_x and NO_x. The acid rain program provisions will apply to SERC. SERC will participate in the Acid Rain allowance program through the purchase of SO_2 allowances. Sufficient quantities of SO_2 allowances are available for use on SERC.

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

Table 5.1-17 presents the SCAQMD attainment/nonattainment status. The closest and most representative monitoring data to the project site are the Anaheim and Costa Mesa monitoring stations. Table 5-1.18 provides a summary of measured ambient air quality concentrations by year and site for the period 2013-2015. The maximum representative background concentrations for the most recent 3-year period (2013-2015) are summarized in Table 5.1-19, Air Quality Monitoring Data. Data from these sites are a reasonable representation of background air quality for the project area. The background values represent the highest values reported for the most representative air quality monitoring site during any single year of the most recent three-year period for the CAAQS assessments. These CAAQS maxima are conservatively used for some of the NAAQS modeling assessments (CO and SO_2), while the appropriate values for the NAAQS, according to the format of the standard, are used for the remainder of the NAAQS modeling assessments (NO_2, PM10, and PM25).

Table 5.1-17. SCAQMD Attainment Status

Pollutant	Averaging Time	Federal Status	State Status
Ozone	1-hour	Nonattainment (Extreme)	Nonattainment
	8-hour	Nonattainment (Extreme)	Nonattainment
CO	All	Attainment (Maintenance)	Attainment
NO_2	All	Unclassified/Attainment	Attainment
SO_2	All	Unclassified/Attainment	Attainment
PM10	All	Attainment (Maintenance)	Nonattainment
PM2.5	All	Nonattainment (Moderate)	Nonattainment
Sulfates	24-hour	No NAAQS	Attainment
Lead	All	Unclassified/Attainment	Attainment
H_2S	1-hour	No NAAQS	Unclassified
Visibility Reducing Particles	8-hour	No NAAQS	Unclassified/Attainment

Source: 2016 AQMP-SCAQMD.

Table 5.1-18. Measured Ambient Air Quality Concentrations by Year

Pollutant	Units	Averaging Time	Basis	Site	2013	2014	2015
Ozone	ppm	1-hour	CAAQS-1st High	Anaheim	0.084	0.111	0.100
				Costa Mesa	0.095	0.096	0.099
		8-hour	CAAQS-1st High	Anaheim	0.070	0.082	0.081
				Costa Mesa	0.084	0.080	0.080
			NAAQS-4th High	Anaheim	0.063	0.076	0.065
				Costa Mesa	0.065	0.076	0.068

Table 5.1-18. Measured Ambient Air Quality Concentrations by Year

Pollutant	Units	Averaging Time	Basis	Site	2013	2014	2015
NO_2	ppb	1-hour	CAAQS-1st High	Anaheim	81	78	70
				Costa Mesa	75	60	52
			NAAQS-98th percentiles	Anaheim	58.7	66.0	61.4
				Costa Mesa	53.1	54.7	48.1
		Annual	CAAQS/NAAQS-AAM	Anaheim	17	27	25
				Costa Mesa	11	11	12
CO	ppm	1-hour	CAAQS/NAAQS-1st High	Anaheim	3.4	3.1	3.1
				Costa Mesa	2.4	2.7	3.0
		8-hour	CAAQS/NAAQS-1st High	Anaheim	2.6	2.1	2.3
				Costa Mesa	2.0	1.9	2.2
SO_2	ppm	1-hour	CAAQS/NAAQS-1st High	Costa Mesa	0.0041	0.0088	0.0045
		24-hour	CAAQS/NAAQS-1st High	Costa Mesa	0.0012	0.0014	0.0011
		Annual	CAAQS/NAAQS-AAM	Costa Mesa	0.00022	0.00031	0.00013
PM10	$\mu g/m^3$	24-hour	CAAQS-1st High	Anaheim	77	84	59
			NAAQS-2nd High	Anaheim	46	58	57
		Annual	CAAQS-AAM	Anaheim	25.2	26.7	25.3
PM2.5	$\mu g/m^3$	24-hour	NAAQS-98th percentiles	Anaheim	23	30	30
		Annual	CAAQS/NAAQS-AAM	Anaheim	10.1	10.5	9.4

Data sources: CARB ADAM website 9/16 and EPA AIRS website 9/16

Table 5.1-19. Background Air Quality Data

Pollutant and Averaging Time	Background Value ($\mu g/m^3$)
Ozone – 1-hour Maximum CAAQS	222
Ozone – 8-hour Maximum CAAQS/NAAQS	164.6/137.2
PM10 – 24-hour Maximum CAAQS	84
PM10 – 24-hour High, 2nd High NAAQS	58
PM10 – Annual Maximum CAAQS	26.7
PM2.5 – 3-Year Average of Annual 24-hour 98th Percentiles NAAQS	27.7
PM2.5 – Annual Maximum CAAQS	10.5
PM2.5 – 3-Year Average of Annual Values NAAQS	10.0
CO – 1-hour Maximum CAAQS/NAAQS	3,910
CO – 8-hour Maximum CAAQS/NAAQS	2,889
NO_2 – 1-hour Maximum CAAQS	152.6
NO_2 – 3-Year Average of Annual 98th Percentile 1-hour Daily Maxima NAAQS	116.6
NO_2 – Annual Maximum CAAQS/NAAQS	50.9

Table 5.1-19. Background Air Quality Data

Pollutant and Averaging Time	Background Value (µg/m³)
SO_2 – 1-hour Maximum CAAQS/NAAQS	23.1
SO_2 – 3-hour Maximum NAAQS	23.1
SO_2 – 24-hour Maximum CAAQS/NAAQS	3.7
SO_2 – Annual Maximum NAAQS	0.8

5.1.7.1.1 Air Quality Analyses

The following sections present the analyses for determining the changes to ambient air quality concentrations in the region of SERC. These analyses are comprised of a screening assessment to determine the worst-case emissions and stack parameters for the two turbines. Since the two turbines are identical and there are no other onsite emissions sources to be considered during facility operations (e.g., fire pump or emergency generator), the screening assessment results was also used to calculate the SERC changes to ambient air quality (i.e., a refined modeling assessment is not required). Cumulative multisource modeling assessments, which are used to analyze SERC plus nearby existing sources, will be performed at a later date upon consultation with the appropriate agencies.

5.1.7.1.2 Screening Analysis

Operational characteristics of the combustion turbines, such as emission rate, exit velocity, and exit temperature vary by operating loads and ambient temperatures. The SERC turbines will be operated over a variety of temperature and load conditions from 25 to 100 percent, with and without fogging. Thus, an air quality screening analysis was performed that considered these effects.

For the turbines, a range of operational characteristics over a variety of ambient temperatures was assessed using AERMOD and all five years of hourly meteorology (year 2006-2009 and 2012). This included various turbine loads for three ambient temperatures: 40°F (cold temperature day), 65°F (annual average conditions), and 102.7°F (high temperature day). The combustion turbine operating condition that resulted in the highest modeled concentration in the screening analysis for each pollutant and for each averaging time was identified as the worst-case impact. Normally, only the 65°F, 100 percent load annual average operating condition would be used to represent annual average conditions. Similarly, a representative turbine operating condition would be used for start-up/shutdown periods and commissioning activities. However, due to the relatively small modeled concentrations produced by the SERC project, the worst-case screening impact was used for comparison to all regulatory criteria.

The results of the turbine load/temperature screening analysis are listed in Appendix 5.1B. Most short-term maximum impacts during normal operating conditions were predicted to occur for the 40°F ambient temperature condition at 25 percent load (Case 108). This is also true for all annual impacts, start-up/shutdown periods, and commissioning activities. Worst-case 3-hour SO_2, 8-hour CO (normal operating conditions), and 1-hour NO_2 (normal operating conditions when assessed for compliance with the NAAQS) impacts were predicted to occur for the 40°F ambient temperature condition at 100 percent load (Case 106). The turbine operating conditions that produced these worst-case impacts are shown in Table 5.1-20.

Maximum short-term and annual impacts were used for determining compliance with all CAAQS, since these standards are never to be exceeded. The same maximum impacts were also conservatively used for assessing compliance with the NAAQS for: 1-hour and 8-hour CO (high, second-highs allowed); 1-hour SO_2 (5-year average of the 99th annual percentiles of the 1-hour daily maximum allowed); 3-hour and 24-hour SO_2 (high, second-highs allowed); and 24-hour PM10 (sixth high over five-years allowed). These same maximum impacts were also conservative used for comparison to the NAAQS Significant Impact Levels (SILs). For 1-hour NO_2, the 5-year average of the annual 1-hour maxima and 98th annual percentiles of the 1-hour daily maximum were used for assessing compliance with the SIL and NAAQS, respectively. For 24-hour PM2.5, the 5-year average of the annual 24-hour maxima and 98th annual percentiles were used for assessing compliance with the SIL and NAAQS, respectively. Finally, for annual PM2.5, the 5-year average of the annual impacts was used for assessing compliance with both the SIL and NAAQS.

Since startup emissions for SO_2 and PM10/PM2.5 would be less than during normal operations, the short-term impacts analyses for these pollutants did not include start-up conditions. Detailed emission calculations for all averaging periods for normal operating conditions, for start-up/shutdown periods, and for commissioning activities are included in Appendix 5.1A. Since commissioning activities would occur for less than 200 hours total for both turbines and only occur during a single year, it was NOT considered in the 1-hour NO_2 NAAQS modeling analyses per EPA guidance due to the statistical nature of this standard (commissioning activities were assessed for the 1-hour NO_2 CAAQS). Again, the worst-case modeling input information for each pollutant and averaging period are shown in Table 5.1-20 for normal operating conditions, for startup/shutdown periods, and for commissioning activities.

Table 5.1-20. Worst-Case Stack Parameters and Emission Rates

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s)			
					NO_x	SO_2	CO	PM10/PM2.5
Averaging Period: 1-hour for Normal Operating Conditions (Case 108 for NO_2(CAAQS)/CO/SO_2 Maxima)								
Each turbine	21.549	662.16	14.835	3.6696	0.2066	0.0484	0.2013	-
Averaging Period: 1-hour for Normal Operating Conditions (Case 106 for NO_2(NAAQS) 5-year Avg of Maxes & 98th percentiles)								
Each turbine	21.549	714.73	27.680	3.6696	0.5618	-	-	-
Averaging Period: 3-hours for Normal Operating Conditions (Case106)								
Each turbine	21.549	714.73	27.680	3.6696	-	0.1284	-	-
Averaging Period: 8-hours for Normal Operating Conditions (Case106)								
Each turbine	21.549	714.73	27.680	3.6696	-	-	0.5473	-
Averaging Period: 24-hours for Normal Operating Conditions (Case 108)								
Each turbine	21.549	623.24	14.835	3.6696	-	0.0484	-	0.3780
Averaging Period: Annual (Case 108)								
Each turbine	21.549	623.24	14.835	3.6696	0.0560	0.0050	-	0.0299
Averaging Period: 1-hour for Start-up/Shutdown Periods (Case 108)								
Each turbine	21.549	623.24	14.835	3.6696	0.8417	-	1.6670	-
Averaging Period: 8-hours for Start-up/Shutdown Periods (Case 108)								
Each turbine	21.549	623.24	14.835	3.6696	-	-	0.9677	-
Averaging Period: 1-hour for Commissioning Activities (Case 108)								
Two turbines(each)	21.549	623.24	14.835	3.6696	5.3941	-	6.9678	-
Averaging Period: 8-hours for Commissioning Activities (Case 108)								
Two turbines(each)	21.549	623.24	14.835	3.6696	-	-	6.9678	-

Notes:

g/s = gram(s) per second
m/s = meter(s) per second
m = meter(s)

5.1.7.2 Operations Impact Analysis

Based on the results of the screening analyses, modeled impacts were compared with the Significant Impact Levels (SILs) in Table 5.1-21 and the CAAQS/NAAQS in Table 5.1-22. To determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used with all 5 years of meteorology. NO_2 concentrations were computed using the ARM following EPA guidance, namely using national default values of 0.80 (80 percent) and 0.75 (75 percent) for 1-hour and annual average NO_2/NO_x ratios, respectively. All maximum facility impacts occurred well inside the 20-meter downwash grid or on the 10-meter fenceline grid. Therefore, additional 20-meter refined receptor grids were not required. Figure 5.1-5 shows the location of the maximum SERC impacts for both the SILs and AAQS assessments.

As can be seen on Table 5.1-21, facility impacts are less than the EPA SILs for all pollutants, averaging times, and operating conditions.

Table 5.1-21. Air Quality Impact Results– Significant Impact Levels

Pollutant	Averaging Period	Maximum Concentration (µg/m³)	Class II SIL (µg/m³)
Normal Operating Conditions			
NO_2 [a]	1-hour maximum (CAAQS)	1.51	-
	5-year average of 1-hour yearly maxima (NAAQS)	1.09	7.5
	Annual maximum	0.019	1.0
CO	1-hour maximum	1.84	2,000
	8-hour maximum	0.83	500
SO_2	1-hour maximum	0.44	7.8
	3-hour maximum	0.30	25
	24-hour maximum	0.07	5
	Annual maximum	0.002	1
PM10	24-hour maximum	0.51	5
	Annual maximum	0.013	1
PM2.5	5-year average of 24-hour yearly maxima (NAAQS)	0.40	1.2
	Annual maximum (CAAQS)	0.013	-
	5-year average of annual concentrations (NAAQS)	0.012	0.3
Start-up/Shutdown Periods			
NO_2 [a]	1-hour maximum (CAAQS)	6.17	-
	5-year average of 1-hour yearly maxima (NAAQS)	3.32	7.5
CO	1-hour maximum	15.26	2,000
	8-hour maximum	2.96	500
Commissioning Activities			
NO_2 [a]	1-hour maximum (CAAQS)	39.51	-
	5-year average of 1-hour yearly maxima (NAAQS)	N/A[b]	7.5
CO	1-hour maximum	63.79	2,000
	8-hour maximum	21.30	500

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

[b] Since commissioning activities occur for less than 200 hours total per both turbines during a single year, impacts were not assessed for the 1-hour NO_2 NAAQS SIL per EPA guidance.

Maximum SERC concentrations are compared in Table 5.1-22 to the CAAQS and NAAQS. As can be seen, maximum combined impacts (modeled + background) are less than all the CAAQS and NAAQS except for the PM10 CAAQS. The modeled exceedances of the CAAQS for PM10 are due to high background concentrations, which already exceed the CAAQS (the area is already designated as State nonattainment for the PM10 CAAQS). As noted above, the facility is already projected to have maximum impacts less than the SILs for both 24-hour and annual PM10 (the only pollutant with background concentrations above the AAQS). Thus, SERC would not significantly contribute to current exceedances of the PM10 CAAQS.

Table 5.1-22. Air Quality Impact Results– Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	Ambient Air Quality Standards (µg/m³)	
					CAAQS	NAAQS
Normal Operating Conditions						
NO_2*	1-hour maximum	1.51	152.6	154.1	339	-
	5-year average of 1-hour yearly 98th % (NAAQS)	0.77	116.6	117.4	-	188
	Annual maximum	0.019	50.9	50.9	57	100
CO	1-hour maximum	1.84	3910	3912	23,000	40,000
	8-hour maximum	0.83	2889	2890	10,000	10,000
SO_2	1-hour maximum	0.44	23.1	23.5	655	196
	3-hour maximum	0.30	23.1	23.4	-	1,300
	24-hour maximum	0.07	3.7	3.8	105	365
	Annual maximum	0.002	0.8	0.8	-	80
PM10	24-hour maximum	0.51	84	85	50	150
	Annual maximum	0.013	26.7	26.7	20	-
PM2.5	5-year average of 24-hour yearly 98th % (NAAQS)	0.40	27.7	28.1	-	35
	Annual maximum (CAAQS)	0.013	10.5	10.5	12	-
	5-year average of annual concentrations (NAAQS)	0.012	10.0	10.0	-	12.0
Start-up/Shutdown Periods						
NO_2*	1-hour maximum (CAAQS)	6.17	152.6	158.8	339	-
	5-year average of 1-hour yearly 98th % (NAAQS)	2.47	116.6	119.1	-	188
CO	1-hour maximum	15.26	3,910	3,925	23,000	40,000
	8-hour maximum	2.96	2,889	2,892	10,000	10,000

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

5.1.7.3 SERC Commissioning Impact Analysis

The commissioning activities for the combustion turbine are expected to consist of six general phases. The applicant has provided estimates of the emissions and hours for each phase of the commissioning process and are presented in Appendix 5.1A. The worst-case short-term NO_X and CO commissioning emissions are 42.81 lbs/hr/turbine and 55.30 lbs/hr/turbine, respectively and would occur prior to the installation of the catalyst. Short-term SO_2 and PM10/2.5 emissions during commissioning activities will be the same as for normal operations. Commissioning activities will occur for no more than 200 hours total for both turbines during the first year of operation, resulting in total (annual) commissioning emissions as reflected in Table 5.1-10. Total commissioning emissions are included in the proposed first year and subsequent year annual potential to emit limits shown in Table 5.1-9 (i.e., the first year permitted annual emissions which include commissioning activities is the same as the permitted annual emissions for subsequent years). Therefore, no modeling of annual emissions is required for commissioning activities (i.e., the annual impacts would be the same as for normal operations).

The worst case short-term modeled concentrations during the commissioning process are summarized in Table 5.1-23. Both the emissions and modeling scenarios were conservatively assumed to be for the simultaneous commissioning of both turbines at the same time. As previously noted, the commissioning impacts are less [than] the SILs and will comply with both the CAAQS and NAAQS. Since the commissioning activities will occur for less than 200 hours total for both turbines, commissioning impacts were not assessed for the 1-hour NO_2 NAAQS per EPA guidance.

Table 5.1-23. Commissioning Air Quality Impact Results

Pollutant	Averaging Period	Maximum Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	Ambient Air Quality Standards (µg/m³)	
					CAAQS	NAAQS
NO_2 [a]	1-hour Maximum (CAAQS)	39.51	152.6	192.1	339	-
	5-year Average of 1-hour Yearly 98th % (NAAQS)	N/A[b]	116.6	N/A[b]	-	188
CO	1-hour Maximum	63.79	3,910	3,974	23,000	40,000
	8-hour Maximum	21.30	2,889	2,910	10,000	10,000

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

[b] Since commissioning activities occur for less than 200 hours total for both turbines during a single year, impacts were not assessed for the 1-hour NO_2 NAAQS per EPA guidance.

5.1.7.3.1 Fumigation Analysis

Fumigation analyses with the EPA Model AERSCREEN (version 15181) were conducted for inversion breakup conditions based on EPA guidance given in EPA-454/R-92-019 (EPA, 1992). The annual average stack parameters (Case 103 for 100 percent load at 65°F) were modeled. Shoreline fumigation impacts were not assessed since the nearest distance to the shoreline of any large bodies of water is greater than 3 kilometers. Since AERSCREEN is a single point source model, only one of the two turbine stacks were modeled. Other AERSCREEN inputs were the BPIP-PRIME values used for the facility analyses for the eastern turbine stack, the AERSURFACE values used by the SCAQMD for generating the Anaheim meteorological data (i.e., 0.17 noontime surface albedo, 0.453 meter surface roughness, and 1.0 Bowen ratio), the range of ambient temperatures analyses in the facility screening analyses (40 to 102.7°F), a minimum fenceline distance of 16.73 meters, URBAN dispersion conditions (fumigation results default to RURAL dispersion), no flagpole receptors, a minimum wind speed of 0.5 m/s with a 10-meter anemometer height, and flat terrain. Impacts were initially evaluated for unitized emission rates (1.0 g/s). Since there is currently a coding bug in AERSCREEN (version 15181), fumigation and normal maximum impacts were calculated in separate AERSCREEN runs per EPA guidance (March 29, 2016 e-mail message from James Thurman to George Bridgers, et. al.).

An inversion breakup fumigation impact was predicted to occur at 7,850 meters from the turbine stacks. Only short-term averaging times were evaluated (fumigation impacts are generally expected to occur for 90-minutes or less). These unitized fumigation impacts are shown in Table 5.1-24 and were compared to the maximum AERSCREEN impacts for flat terrain (predicted to occur 213 meters) and the maximum AERMOD impacts from the screening analysis (that includes terrain elevations and predicts maximum impacts in the elevated terrain areas 1.4 to 2.0 km south of the proposed facility). All of the fumigation impacts are less than the AERSCREEN maxima predicted to occur under normal dispersion conditions anywhere offsite. Since fumigation impacts are less than the maximum overall AERSCREEN impacts, no further analysis of additional short-term averaging times is required as described in Section 4.5.3 of EPA-454/R-92-019 (EPA, 1992a). The fumigation results are summarized in Table 5.1-24. Thus, the overall modeling analysis impacts are conservative with respect to fumigation impacts, so no pollutant-specific fumigation results are presented.

Table 5.1-24. Fumigation Impact Summary

Averaging Time (Unitized Impacts for 1 g/s)	Fumigation Impacts (µg/m³)	AERSCREEN Flat Terrain Impacts (µg/m³)
1-hour	2.465	5.032
3-hour	2.465	5.032
8-hour	2.219	4.529
24-Hour	1.479	3.019
Distance (m)	7,850	213

5.1.8 Laws, Ordinances, Regulations, and Statutes

Table 5.1-25 presents a summary of local, state, and federal air quality LORS deemed applicable to SERC. Specific LORS are discussed in greater detail in Section 5.1.8.1, with Agency Jurisdiction and Contacts provided in Section 5.1.8.2.

Table 5.1-25. Summary of LORS - Air Quality

LORS	Applicability	Conformance (AFC Section)
Federal Regulations		
CAAA of 1990, 40 CFR 50	Project operations will not cause violations of state or federal AAQS.	5.1.7
40 CFR 52.21 (PSD)	Impact analysis shows compliance with NAAQS, Project is not subject to PSD.	5.1.7
40 CFR 72-75 (Acid Rain)	Project will submit all required applications for inclusion to the Acid Rain program and allowance system, CEMS will be installed as required. The Project is subject to Title IV.	5.1.7
40 CFR 60 (NSPS)	Project will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements. 40 CFR 60, Subpart KKKK will apply to the turbines.	5.1.7
40 CFR 70 (Title V)	Title V application will be submitted as part of the AQMD PTC package within 10 working days of the AFC submittal.	5.1.7
40 CFR 68 (RMP)	Project will evaluate substances and amounts stored, determine applicability, and comply with all program level requirements. An RMP will be prepared and submitted to the local AA.	5.1.7
40 CFR 64 (CAM Rule)	Facility will be exempt from CAM Rule provisions.	5.1.7
40 CFR 63 (HAPs, MACT)	Project will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements. Subpart YYYY applies to stationary combustion turbines constructed after 1-14-03 located at a major HAPs source. Emissions limits in the rule are currently stayed.	5.1.7

Table 5.1-25. Summary of LORS - Air Quality

LORS	Applicability	Conformance (AFC Section)
40 CFR 60, Subpart KKKK	Subpart KKKK-NOx and SOx performance emissions standards for gas turbines. The proposed facility will comply with the standards through the use of water injection, SCR and the exclusive use of natural gas.	5.1.7
40 CFR 60, Subpart TTTT	Subpart TTTT – GHG performance standards for gas turbines. The proposed facility will be subject to only the non-base load standards based upon use of clean fuels.	5.1.7
State Regulations (CARB)		
CHSC 44300 et seq.	Project will determine applicability, and prepare inventory plans and reports as required.	5.1.7
CHSC 41700	SCAQMD Permit to Construct (PTC) will ensure that no public nuisance results from operation of facility.	5.1.7
Gov. Code 65920 et seq.	Pursuant to the Permit Streamlining Act, the Applicant believes the Project is a "development project" as defined, and is seeking approvals as applicable under the Act.	5.1.7
Local Regulations (South Coast AQMD)		
Rule 53A	Limits SO_x and PM emissions from stationary sources. BACT will insure compliance with these provisions.	5.1.7
Rule 201	Permitting procedures defined. Project will comply with all required permitting application requirements.	5.1.7
Rule 401	Limits visible emissions. Project will comply with all limits per BACT and clean fuel use.	5.1.7
Rule 402	Prohibits public nuisances. Project is not expected to cause or create any type of public nuisance.	5.1.7
Rule 403	Fugitive dust limits and mitigation measures. Project will comply with all rule provisions during construction and operation. See Appendices, Air Quality Data, for construction data and mitigation criteria.	5.1.7
Rule 407	Limits CO and SO_x emissions from stationary sources. Also covered in Rule 431.1. BACT and clean fuel use will insure compliance.	5.1.7
Rule 409	Limits PM emissions from fuel combustion. BACT and clean fuel use will insure compliance.	5.1.7
Rule 474	Limits NO_x emissions from fuel combustion. BACT and clean fuel use will insure compliance.	5.1.7
Rule 475	Limits PM emissions from fuel combustion. BACT and clean fuel use will insure compliance.	5.1.7
Rule 476	Limits NO_x and combustion contaminant emissions from fuel combustion. BACT and clean fuel use will insure compliance.	5.1.7
Rule 431.1	Limits fuel sulfur content of gaseous fuels. Use of PUC grade natural gas insures compliance.	5.1.7
Rule 1109	Limits NOx and CO from Boilers and Heaters. NOx pre-empted by Regulation XX, Rule 2012. CO BACT will insure compliance with Rule 1109 CO limits.	5.1.7
Rule 1134	Limits NO_x emissions from stationary combustion turbines. Pre-empted by Rule XX. CO limits per Rule 1134 will be complied with via CO BACT (use of CO Catalyst).	5.1.7
Rule XIII (1301-1313)	NSR provisions. Project will meet all NSR rule requirements (BACT, offsets, AQ impact analysis, etc.)	5.1.7
Rule XIV (1401 and 1470)	NSR for Toxics (Project will comply with all provisions of Rule 1401-New Sources) See Appendix 5.1D, Public Health, and Section 5.9, Public Health, for analysis and compliance data.	5.1.7

Table 5.1-25. Summary of LORS - Air Quality

LORS	Applicability	Conformance (AFC Section)
Rule XVII (PSD)	Project is not expected to trigger PSD program requirements.	5.1.7
Rule XX (RECLAIM)	Project as proposed would not be subject to RECLAIM for NO_x and SO_x.	5.1.7
Rule XXX (Title V)	Project will submit the required Title V application as an integral part of the SCAQMD PTC application within 10 days of AFC submittal.	5.1.7
Rule XXXI (Acid Rain)	Project will comply with all provisions of the acid rain program as adopted by the SCAQMD (monitoring, reporting, recordkeeping, testing, allowance use and tracking, notifications, etc.) The Project is subject to Title IV.	5.1.7

Source: SERC Project Team, 2016.

5.1.8.1 Specific LORS Discussion

5.1.8.1.1 Federal LORS

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

- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Prevention of Significant Deterioration (PSD)
- New Source Review (NSR)
- Title IV: Acid Rain/Deposition Program
- Title V: Operating Permits Program
- CAM Rule

National Standards of Performance for New Stationary Sources –40 CFR Part 60, Subpart KKKK.
The NSPS program provisions limit the emission of criteria pollutants from new or modified facilities in specific source categories. The applicability of these regulations depends on the equipment size or rating; material or fuel process rate; and/or the date of construction, or modification. Reconstructed sources can be affected by NSPS as well.

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

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

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

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

As described in the BACT section, SERC will use a SCR system to reduce NO_x emissions to 2.5 ppm and pipeline natural gas to limit SO_2 emissions to 0.002 pounds per MMBtu to meet BACT requirements, which ensures that SERC will satisfy the requirements of Subpart KKKK.

NSPS Part 60 (Subpart TTTT) GHG Standards of Performance for GHG Emissions for New Stationary Sources: Electric Utility Generating Units. In January, 2014, EPA re-proposed the standards of performance regulating CO_2 emissions from new affected fossil-fuel-fired generating units, pursuant to Section 111(b) of the CAA. These standards were adopted in final form by EPA on August 3, 2015. The new standards would be 1,100 lbs CO_2/MWh (gross energy output on a 12-operating-month rolling average basis for base loaded units), while non-base load units would have to meet a clean fuels input-based standard. The determination of base versus non-base load would be on a sliding scale that considers design efficiency and power sales.

Within Subpart TTTT, base load rating is defined as maximum amount of heat input that an Electrical Generating Unit (EGU) can combust on a steady state basis at ISO conditions. For stationary combustion turbines, base load rating includes the heat input from duct burners. Each EGU is subject to the standard if it burns more than 90 percent natural gas on a 12-month rolling basis, and if the EGU supplies more than the design efficiency times the potential electric output as net-electric sales on a 3 year rolling average basis. Affected EGUs supplying equal to or less than the design efficiency times the potential electric output as net electric sales on a 3-year rolling average basis are considered non-base load units and are subject to a heat input limit of 120 lbs CO_2/MMBtu. Each affected 'base load' EGU is subject to the gross energy output standard of 1,000 lbs of CO_2/MWh unless the Administrator approves the EGU being subject to a net energy output standard of 1,030 lbs CO_2/MWh. The SERC turbines are not considered base load units, but rather non-base load units, and as such they must meet and will meet the heat input limit of 120 lbs CO_2/mmbtu as specified in 40 CFR 60.5508-60.5580, Subpart TTTT, Table 2.

National Emission Standards for Hazardous Air Pollutants –40 CFR Part 63. The NESHAPs program provisions limits hazardous air pollutant emissions from existing major sources of HAP emissions in specific source categories. The NESHAPs program also requires the application of maximum achievable control technology (MACT) to any new or reconstructed major source of HAP emissions to minimize those emissions. Subpart YYYY will apply to the proposed turbine. The emissions provisions of Subpart YYYY are currently subject to "stay" by EPA. Notwithstanding the foregoing, the proposed turbine is expected to comply with the emissions provisions.

Prevention of Significant Deterioration Program –40 CFR Parts 51 and 52. The PSD program requires the review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. PSD applies only to pollutants for which ambient concentrations do not exceed the corresponding NAAQS. The PSD program allows new sources of air pollution to be constructed, and existing sources to be modified, while maintaining the existing ambient air quality levels in the Project region and protecting Class I areas from air quality degradation. SERC is not expected to trigger the PSD requirements.

New Source Review –40 CFR Parts 51 and 52. The NSR program requires the review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment of AAQS. NSR applies to pollutants for which ambient concentrations exceed the corresponding NAAQS. The AFC air quality analysis complies with all applicable NSR provisions.

Title IV –Acid Rain Program –40 CFR Parts 72-75. The Title IV program requires the monitoring and reduction of emissions of acid rain compounds and their precursors. The primary source of these compounds is the combustion of fossil fuels. Title IV establishes national standards to limit SO_x and NO_x emissions from electrical power generating facilities. The proposed turbines will be subject to Title IV, and will submit the appropriate applications to the air District as part of the PTC application process. The Project will participate in the Acid Rain allowance program through the purchase of SO_2 allowances. Sufficient quantities of SO2 allowances are available for use on this Project.

Title V – Operating Permits Program – 40 CFR Part 70. The Title V program requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities, acid rain facilities, subject solid waste incinerator facilities, and any facility listed by EPA as requiring a Title V permit. The proposed facility is subject to Title V. Title V application forms applicable to the proposed new turbines will be included in the SCAQMD PTC application.

Compliance Assurance Monitoring (CAM) Rule – 40 CFR Part 64. The CAM rules require facilities to monitor the operation and maintenance of emissions control systems and report malfunctions of any control system to the appropriate regulatory agency. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. However, emission control systems governed by Title V operating permits requiring continuous compliance determination methods are exempt from the CAM rule. Since the project will be issued a Title V permit requiring the installation and operation of continuous emissions monitoring systems, the project will qualify for this exemption from the requirements of the CAM rule.

Toxic Release Inventory Program (TRI) – Emergency Planning and Community Right-to-Know Act. The TRI program as applied to electric utilities, affects only those facilities in Standard Industrial Classification (SIC) Codes 4911, 4931, and 4939 that combust coal and/or oil for the purpose of generating electricity for distribution in commerce. The proposed project SIC Code is 4911. However, the proposed Project will not combust coal and/or oil for the purpose of generating electricity for distribution in commerce. Therefore, this program does not apply to the proposed Project.

5.1.8.1.2 State LORS

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

Air Toxic "Hot Spots" Act – H&SC Section 44300-44384. The Air Toxics "Hot Spots" Information and Assessment Act requires the development of a statewide inventory of Toxic Air Contaminants (TAC) emissions from stationary sources. The program requires affected facilities to; (1) prepare an emissions inventory plan that identifies relevant TACs and sources of TAC emissions; (2) prepare an emissions inventory report quantifying TAC emissions; and (3) prepare an HRA, if necessary, to quantify the health risks to the exposed public. Facilities with significant health risks must notify the exposed population, and in some instances must implement risk management plans to reduce the associated health risks.

Public Nuisance – H&SC Section 41700. Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or which endanger the comfort, repose, health, or safety of the public, or that damage business or property.

5.1.8.1.3 Local Air District LORS-South Coast AQMD

AQMD Regulation II – Permits. AQMD Regulation II establishes the basic framework for acquiring permits to construct and operate from the air district. The AFC will be the basis for the District's Determination of Compliance. A separate PTC application will be submitted to the AQMD. The PTC application, for the purposes of maintaining consistency with the AFC, will be similar in scope and detail, and will contain the District permit application forms.

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

- **Regulation XIII (New Source Review) –** Regulation XIII provides for review of non-attainment pollutants and their precursors, and requires the following analyses to be conducted; (1) BACT, (2) mitigation analysis (offsets), (3) air quality impact analysis, (4) Class I Area impact analysis, (5) visibility, soils, and vegetation impact analysis, and (6) pre-construction monitoring. The AFC air quality analysis and the PTC application comply with the Regulation XIII requirements.

- **Regulation XVII (Prevention of Significant Deterioration) –** Regulation XVII provides for review of attainment pollutants, and requires the following analyses to be conducted; (1) BACT, (2) air quality impact analysis, (3) Class I Area impact analysis, (4) visibility, soils, and vegetation impact analysis, and (5) pre-construction monitoring. SERC is not subject to PSD.
- **Rule 2005 (New Source Review for RECLAIM) –** Regulation XX, Rule 2005 provides for NSR review for sources subject to the District's RECLAIM program. SERC is not subject to RECLAIM.

AQMD Rule 1401 – New Source Review of Toxic Air Contaminants. Rule 1401 (NSR for Toxic Air Contaminants) establishes risk thresholds for new or modified sources of TAC emissions. Rule 1401 establishes limits for maximum individual cancer risk, cancer burden, and non-carcinogenic acute and chronic hazard indices for new or modified sources of TAC emissions. The public health analysis contained in Section 5.9 and Appendix 5.1D, Public Health, shows compliance with all Rule 1401 requirements.

AQMD Regulation XXX – Federal Operating Permit Program. Regulation XXX (Title V Permits) implements the federal operating permit program at the local District level. Regulation XXX requires major emitting facilities and acid rain facilities undergoing modifications to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the CAA of 1990. The PTC application to be filed with the AQMD per Section 5.1.7.3 will contain all the required District Title V application forms.

AQMD Regulation XXXI – Acid Rain Program. Regulation XXXI (Title IV – Acid Rain Permit Program) establishes the issuance of acid rain permits in accordance with Title IV of the Clean Air Act of 1990. Regulation XXXI requires a facility subject to Title IV to obtain emissions allowances for SOx and to monitor SOx, NOx, and CO2 emissions and exhaust gas flow rates. Acid rain facilities, such as the proposed Project, must also obtain an acid rain permit as mandated by Title IV of the CAA. A permit application must be submitted to the AQMD well in advance of operation of the new unit. The PTC application to be filed with the AQMD per Section 5.1.7.3 will contain all the required District Title IV application forms. The Project will participate in the Acid Rain allowance program through the purchase of SO2 allowances. Sufficient quantities of SO2 allowances are available for use on this Project.

AQMD Regulation IX – NSPS. Regulation IX (NSPS) incorporates by reference the provisions of 40 CFR 60, Chapter 1. See Table 5.1-25 and the Federal LORS discussion above.

AQMD Prohibitory or Source Specific Rules. Relevant AQMD prohibitory or source specific rules include the following:

- **Rule 401 – Visible Emissions:** Establishes limits for visible emissions from stationary sources. Rule 401 prohibits visible emissions as dark or darker than Ringelmann No. 1 for periods greater than three minutes in any hour. Use of gaseous fuels is expected to insure compliance with Rule 401.
- **Rule 402 – Nuisance:** Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property. Proper operation of the new unit and support systems is not expected to cause a nuisance.
- **Rule 403 – Fugitive Dust:** Implements requirements to reduce the amount of fugitive PM emitted into the ambient air as a result of man-made fugitive dust sources. Rule 403 requires the implementation of best available control measures (BACMs) to minimize fugitive dust emissions and prohibits visible dust emissions beyond the property line. Use of BACMs to control dust during construction and operation is expected to insure compliance with Rule 403. See Appendix 5.1E.
- **Rule 407 – Liquid and Gaseous Air Contaminants:** Rule 407 prohibits CO and SO_x emissions in excess of 2,000 ppm and 500 ppm, respectively, from any source. In addition, equipment that complies with the requirements of Rule 431.1 is exempt from the SO_x limit. SERC will comply with Rule 431.1.

- **Rule 409 – Combustion Contaminants:** Rule 409 prohibits particulate emissions in excess of 0.1 grain per cubic foot of gas at 12 percent CO_2 at standard conditions. Use of clean fuels will insure compliance with this rule.
- **Rule 431.1 – Sulfur Content of Gaseous Fuels:** Establishes limits for the sulfur content of gaseous fuels to reduce SO_x emissions from stationary combustion sources. Rule 431.1 limits the sulfur content of natural gas to 16 ppmv. Gas supplied by SoCal Gas has sulfur contents well below this rule value.
- **Rule 431.2 – Sulfur Content of Liquid Fuels:** Establishes limits for the sulfur content of liquid fuels to reduce SO_x emissions from stationary combustion sources. Rule 431.2 limits the sulfur content of Diesel fuel to 0.05 percent by weight. Liquid fuels are not proposed for use in the SERC turbines.
- **Rule 474 – Fuel Burning Equipment - Oxides of Nitrogen:** Implements limits on emissions of NO_x from stationary combustion sources. NO_x RECLAIM sources/facilities are exempt from the provisions of Rule 474. Since the proposed Project will not be a NO_x RECLAIM facility, Rule 474 may will be applicable to the Project.
- **Rule 475 – Electric Power Generating Equipment:** Implements limits for combustion contaminant (particulate matter) emissions from affected equipment. Rule 475 prohibits PM emissions in excess of 11 lbs/hr (per emission unit) or 0.01 grains per dry standard cubic foot (gr/dscf) at 3 percent O_2. Use of clean fuels will insure compliance.
- **Rule 476 – Steam Generating Equipment:** Implements limits for emissions of NO_x and combustion contaminants (PM) from affected equipment. However, NO_x RECLAIM facilities are exempt from the NO_x provisions of Rule 476. The PM provisions of Rule 476 are superseded by those of Rule 475. Rule 476 is therefore not applicable to the proposed Project.
- **Rule 53A – Specific Contaminants:** Implements limits for emissions of sulfur compounds (oxides of sulfur) and combustion contaminants (PM) from stationary sources. Rule 53A prohibits SO_x and PM emissions in excess of 500 ppm and 0.1 gr/dscf at 12 percent CO_2, respectively. Use of clean fuels will insure compliance.
- **Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines:** Implements limits for emissions of NO_x from the stationary gas turbines. Rule 1134 is therefore applicable to the proposed Project. The CO provisions of the rule will be complied with via the BACT requirements for CO, i.e., the use of a CO catalyst.

5.1.8.2 GHG-Climate Change and Global Warming

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth.

Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming. According to the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment, it is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations.

State law defines GHG to include the following: CO_2, methane, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (Health and Safety Code Section 38505[g]). The most common GHG that results from human activity is CO_2, followed by methane and N_2O.

5.1.8.2.1 Legislative Action

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

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

- Reduce GHG emissions to 2000 emission levels by 2010;
- Reduce GHG emissions to 1990 emission levels by 2020; and,
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

Global Warming Solutions Act of 2006 (AB 32). In August 2006, the California legislature passed AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires the state to reduce statewide greenhouse gas emissions to 1990 levels by 2020 and authorizes California resource agencies to establish a comprehensive program of regulatory and market mechanisms to achieve reductions in GHG emissions (ARB, 2006). ARB has promulgated a Cap-and-Trade Regulation, which requires covered entities, including electricity generators, petroleum refiners, large manufacturers and importers of electricity, to hold and surrender compliance instruments in an amount equivalent to their GHG emissions. Compliance instruments include allowances issued by ARB and linked jurisdictions, which currently include Québec, and offset credits.

Currently, the Cap-and-Trade Regulation requires reductions through 2020, although the ARB is considering adoption of amendments that would continue implementation of the Cap-and-Trade Program as an element of the State's plan that will be submitted to the U.S. Environmental Protection Agency pursuant to its Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64662 (Oct. 23, 2015) (Clean Power Plan). SERC is anticipated to be subject to the Cap-and-Trade Regulation and will comply with it.

Legislation failed to pass in the first year of the two-year legislative session that would have set long--and mid-term targets for the State to achieve GHG reductions consistent with Governor Schwarzenegger's and Governor Brown's goals established by executive order (80 percent below 1990 levels by 2050 and 40 percent below 1990 levels by 2030, respectively). However, Governor Brown's executive order (B-30-15) charges ARB with updating the Scoping Plan developed pursuant to AB 32 to express the 2030 goal and directed all state agencies with jurisdiction over GHG emissions to implement measures to reduce emissions and thereby achieve the 2030 and 2050 targets. ARB has begun the Scoping Plan update process and is anticipated to continue implementation of the Cap-and-Trade Program to achieve these targets.

Senate Bill (SB) 97 (August 2007). In addition to AB 32, Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006) was signed into law on August 2007. The law limits long-term investments in and procurement of electricity from base load generation by the state's utilities to power plants that meet an emissions performance standard jointly established by the CEC and the CPUC. In response, the CEC has designed regulations that establish a standard for base load generation owned by, or under long-term contract to publicly owned utilities, of 1,100 lb CO_2/MWh. Base load generation is defined as electricity generation from a power plant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60 percent. The permitted capacity factor for SERC will be approximately 12 percent and the expected capacity factor is significantly lower. Therefore, as a non-baseload facility, procurement of electricity from SERC pursuant to a long-term contract would not be subject to the emissions performance standard.

5.1.8.3 Agency Jurisdiction and Contacts

Table 5.1-26 presents data on the following:

- Air quality agencies that may or will exercise jurisdiction over air quality issues resulting from the power facility
- The most appropriate agency contact for SERC
- Contact address and phone information
- The agency involvement in required permits or approvals

Table 5.1-26. Agencies, Contacts, Jurisdictional Involvement, Required Permits for Air Quality

Agency	Contact	Jurisdictional Area	Permit Status
CEC	CEC-TBD 1516 Ninth Street Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the facility under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
SCAQMD	Mohsen Nazemi, Dep. EO Permitting/Compliance 21865 E. Copley Drive Diamond Bar, CA 91765 (909) 396-2662	Prepares DOC for CEC, Issues SCAQMD ATC and Permit to Operate, Primary air regulatory and enforcement agency.	DOC will be prepared subsequent to AFC submittal.
CARB	Mike Tollstrup Chief, Project Assessment Branch 1001 I Street, 6th Floor Sacramento, CA 95814 (916) 322-6026	Oversight of AQMD stationary source permitting and enforcement program	CARB staff will provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on draft ATC.
EPA Region 9	Gerardo Rios Chief, Permits Section EPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974	Oversight of all AQMD programs, including permitting and enforcement programs. PSD permitting authority for SCAQMD.	EPA Region 9 staff will receive a copy of the DOC. EPA Region 9 staff will have opportunity to comment on draft ATC.

Note:

DOC = Determination of Compliance

5.1.8.4 Permit Requirements and Schedules

An ATC application is required in accordance with the SCAQMD rules. The application submitted to the SCAQMD will consist of the Project Description, Air Quality, and Public Health sections of the AFC and the appropriate Appendices, plus the AQMD application forms. In addition, the AQMD Title V forms will also be included in the application package.

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Figure 5.1-1. SERC Site Vicinity

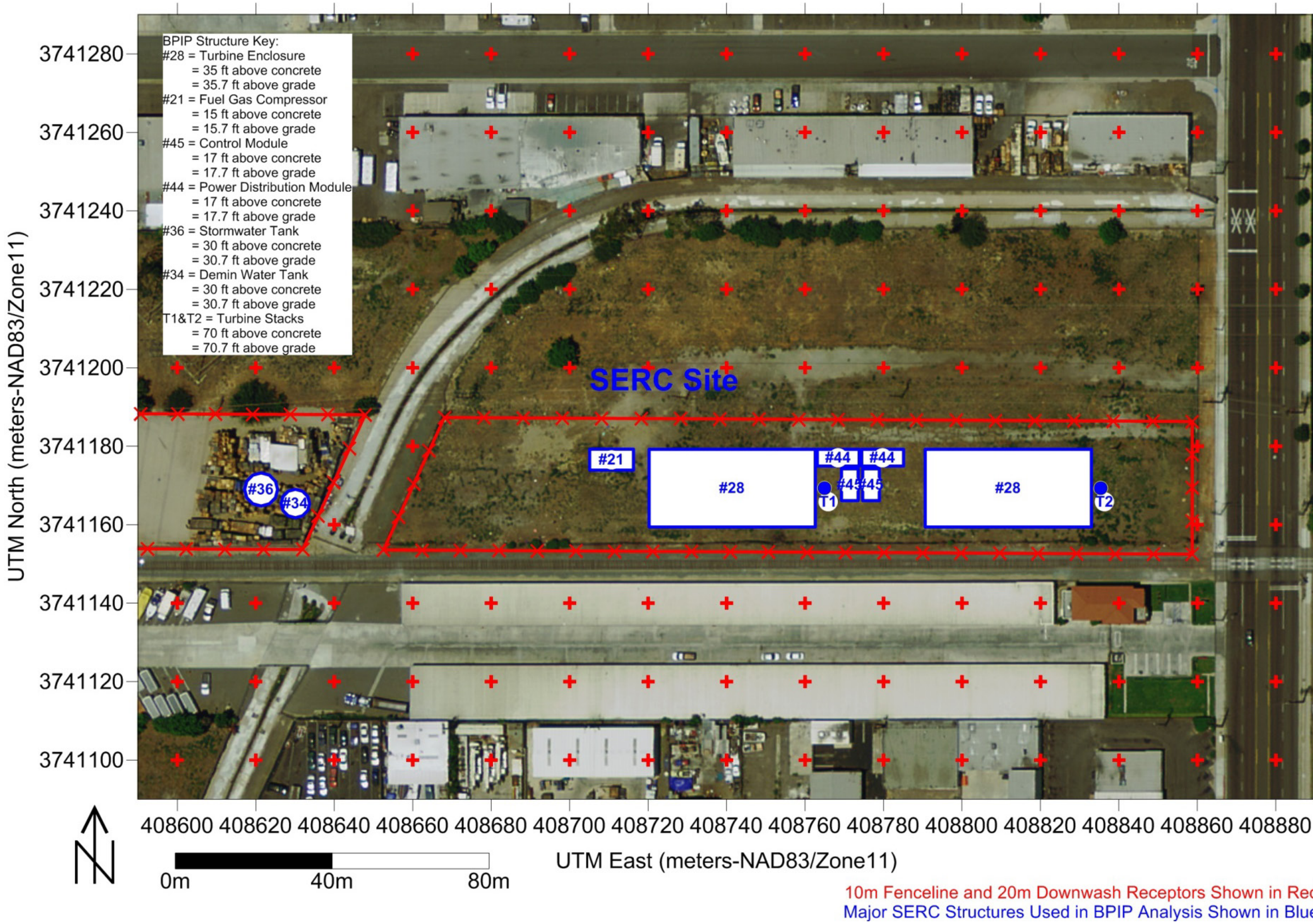

Figure 5.1-2. SERC Structures Used in BPIP Analysis

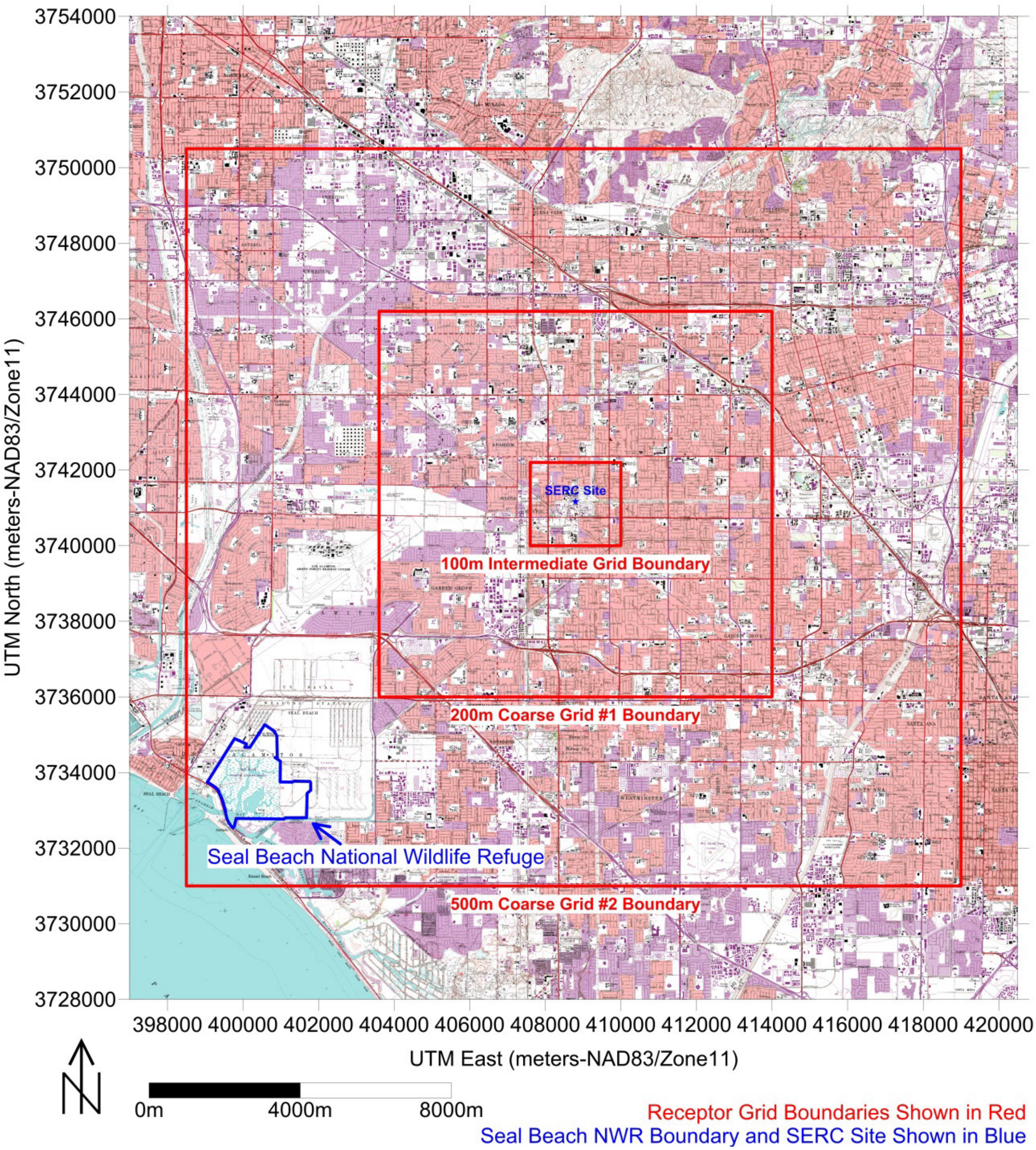

Figure 5.1-3. SERC Coarse Receptor Grids

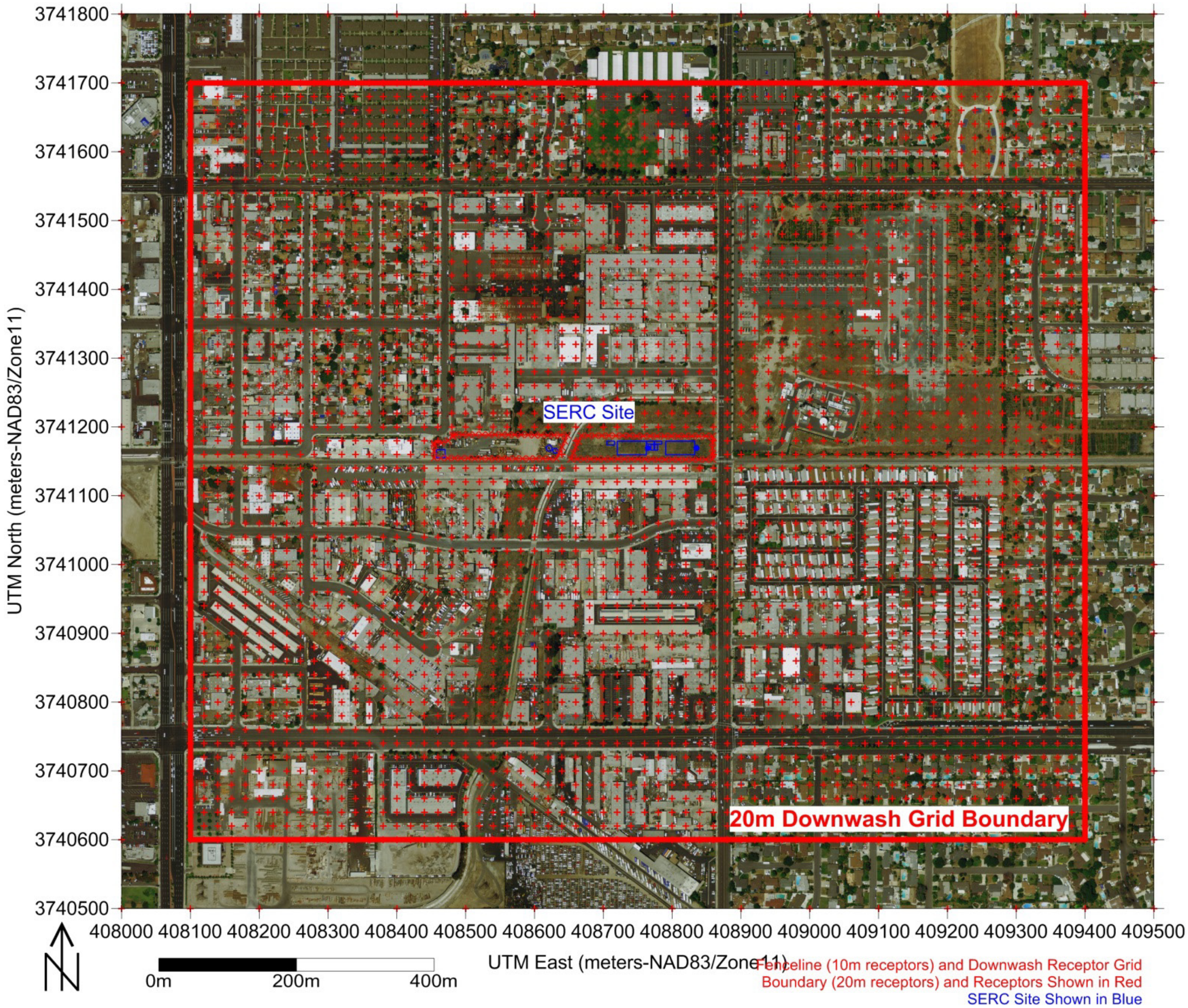

Figure 5.1-4. SERC Downwash Receptor Grid

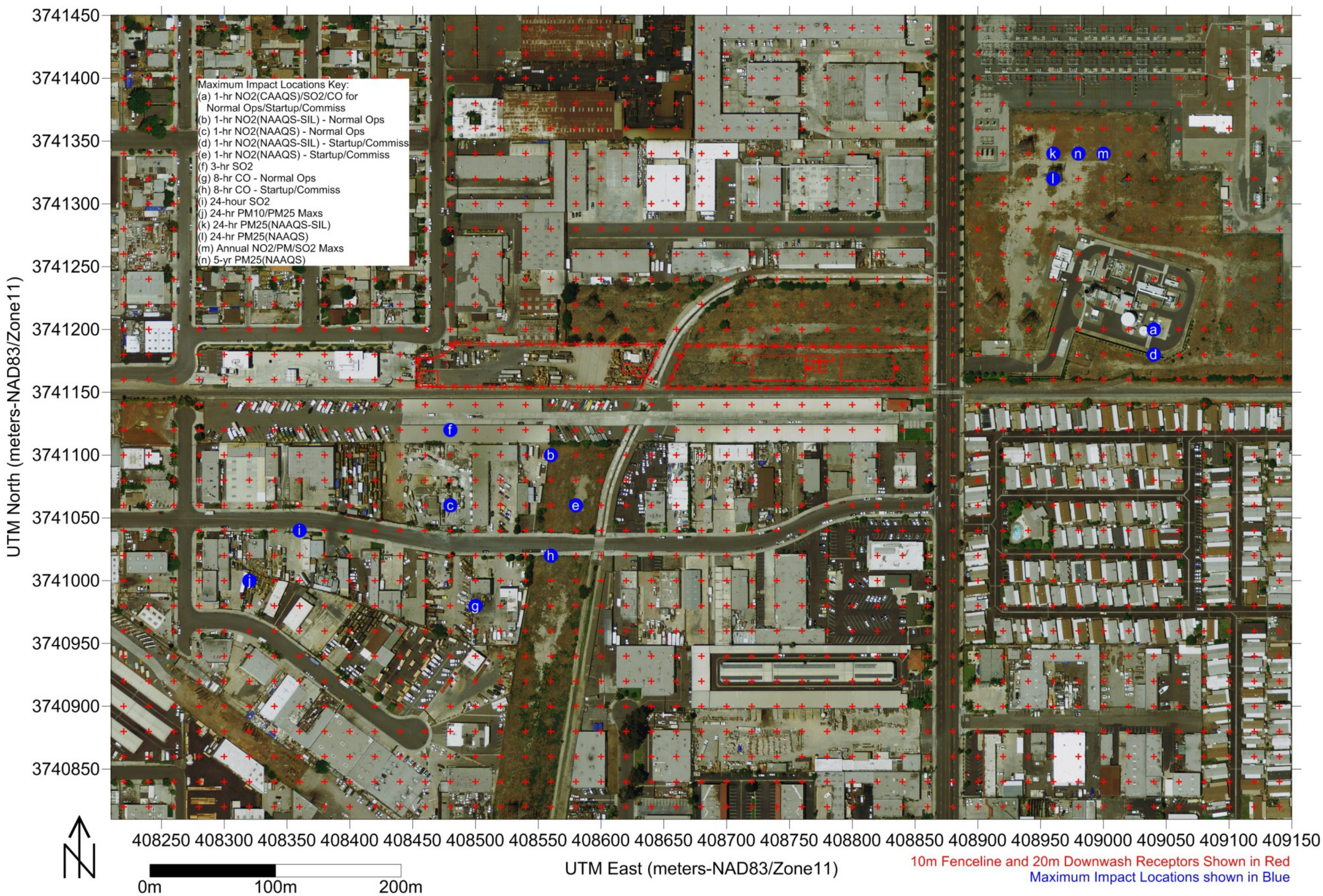

Figure 5.1-5. SERC Maximum Impact Locations