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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 MREC and the Project's compliance with applicable air quality requirements. Section 5.1.1 presents the introduction, applicant information, and the basic VCAPCD rules applicable to the MREC. Section 5.1.2 presents the MREC description, both current and proposed. Section 5.1.3 presents data on the emissions of criteria and air toxic pollutants from the MREC. Section 5.1.4 discusses the BACT evaluations for the MREC. Section 5.1.5 presents the air quality impact analysis for the MREC. Section 5.1.6 presents applicable laws, ordinances, regulations, and standards (LORS). Section 5.1.6 presents agency contacts, and Section 5.1.6 presents permit requirements and schedules. Section 5.1.7 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. 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.

The MREC is proposing to construct and operate a 275 MW (nominal) natural gas-fired simple-cycle power plant. The MREC is planning to operate as a peaking power plant and is proposed to operate up to approximately 2,500 hours per year, with an expected facility capacity factor of up to 29 percent.

The MREC will consist of the following:

- Installation of five LM6000 PG Sprint gas turbines which will be operated in simple-cycle mode
- A California Air Resources Board (CARB)-certified Tier 3 diesel-fueled fire pump
- Necessary support systems and processes

The MREC design will incorporate the air pollution emission controls designed to meet VCAPCD BACT/LAER determinations. These controls will include water injection in the turbine combustors to limit NO_x production, SCR with aqueous ammonia for additional NO_x control along with an oxidation catalyst to control carbon monoxide (CO) and reactive organic compounds (ROC) emissions. The fuels to be used will include pipeline quality natural gas in the turbines and California ultra low-sulfur diesel fuel in the fire pump engine. The ammonia slip from the SCR system will be limited to 5 parts per million (ppm).

5.1.1.1 Regulatory Items Affecting New Source Review

The applicant is submitting the air quality impact analyses to the California Energy Commission (CEC). Pursuant to VCAPCD Rule 26.9 (Equivalency of AFC to Authority to Construct), "the APCO shall consider the AFC to be equivalent to an application for an Authority to Construct during the Determination of Compliance review, and shall apply all provisions of Rule 26 and all other District rules and regulations which apply to applications for an Authority to Construct".

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

The MREC is expected to result in emissions that will exceed the VCAPCD Rule 26.2 Major Facility significance thresholds for NO_x, and ROCs. No major source thresholds for particulate matter less than 10 or 2.5 micrometers in aerodynamic diameter (PM₁₀/PM_{2.5}), sulfur oxide (SO_x), or CO are stated in the VCAPCD NSR rules. BACT will be required for NO_x, ROC, SO_x, and PM₁₀/PM_{2.5}. Although not required by VCAPCD rules, BACT for CO will also be determined and implemented.

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

The MREC will 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 below.

Table 5.1-1 Facility PTE Summary

Pollutant	MREC, tpy	VCAPCD Rule 26.1 Major		EPA Major PSD Source Thresholds (tpy)*
		Source Thresholds, tpy	VCAPCD Rule 26.2 Offsets, tpy	
NO _x	28.17	25	5	250
CO	32.32	-	-	250
ROC (VOC)	4.98	25	5	250
SO _x	1.35	-	15	250
PM10	12.52	-	15	250
PM2.5	12.52	-	15	250
CO ₂ e	410,360	-	-	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 GHG emissions. If the MREC triggered PSD for any non-GHG pollutant, then PSD would be triggered if the CO₂e emissions were equal or greater than 75,000 tpy.

PTE = potential to emit

PSD = Prevention of Significant Deterioration

Although a regulatory compliance analysis (LORS) is presented in Section 5.1.6, there are several VCAPCD regulations that directly affect the application and review process. These regulations include:

- VCAPCD New Source Review (NSR) Rule 26.2 requires that BACT be applied to all proposed new or modified sources which will result in any emissions increase of NO_x, ROC, PM10, or SO_x.
- VCAPCD Rule 26.11, indicates that all emission reduction credits proposed for use by the new source must be evaluated prior to the issuance of the district Authority to Construct (ATC).
- VCAPCD Rule 26.2 requires that an air impact analysis be prepared to insure the protection of state and federal ambient air quality standards.
- VCAPCD Rule 26.2, also requires that prior to the issuance of the ATC that all major stationary sources owned or operated by the Mission Rock, which are subject to emissions limitations, are either in compliance or on a schedule for compliance with all applicable emissions limitations under the Clean Air Act (CAA).
- The MREC will not require a PSD permit, per Rule 26.13 or the federal PSD regulations.

5.1.2 Project Description

5.1.2.1 MREC Site Location

The MREC will be located in Ventura County within the South Central Coast Air Basin. The MREC site is situated approximately 3 miles southwest of downtown Santa Paula, California, between Mission Rock Road and Shell Road. The MREC lies south of Highway 126 (Santa Paula Highway), and approximately 2.5 miles northeast of the junction of Highway 126 and Highway 118. SPZ lies approximately 3 miles to the northeast, and the Ventura County Jail lies approximately 900 feet due west of the MREC site. See Section 1.2 for detailed location maps.

5.1.2.2 Project Equipment Specifications

The MREC will consist of the following major equipment.

- Five LM6000 PG Sprint Gas Turbines with inlet chilling
- SCR to control emissions of NO_x
- Oxidation Catalyst to control emissions of CO and VOCs
- One diesel engine powered fire pump

All power from the facility will be delivered to the California power grid under the control of the CAISO.

The turbine equipment output specifications are summarized in Table 5.1-2 as follows:

Table 5.1-2 Combustion Turbine Equipment Output Specifications

Parameter	Minimum Cold Day (30°F)	ISO Day (59°F)	Maximum Hot Day (96°F)
Case Number	1	9	29
Net Power, kW (5 turbines)	281,125	276,676	272,083
Net Heat Rate, btu/kW-hour (HHV)	10,069	10,138	10,300
Gross Gas Turbine Power, kW (5 turbines)	290,445	286,680	286,510

Ref: GE Performance Data supplied by the Mission Rock, see Appendix 5.1A.

HHV (1021 btu/scf) as specified by GE in the fuel analysis.

Equipment specifications are summarized as follows:

Combustion Turbines (5)

- Manufacturer: GE
- Model: LM6000 PG Sprint
- Fuel: Natural gas
- Heat Input: 561.0 MMBtu/hr HHV (Case 9-ISO day)
- 566.1 MMBtu/hr HHV (Case 1-Cold day)
- Maximum Fuel consumption: ≤2.773 mmscf per hour (Case 1, cold day)
- Exhaust flow: ≤1,197,006 lbs/hr (Case 1, cold day)
- Exhaust temperature: 850-870 degrees Fahrenheit (°F) at the stack exit (Dependent upon ambient temperature of atmosphere and turbine load)

Fire Pump (1)

- Manufacturer: Clarke or equivalent (Tier 3)
- Fuel: Ultra low sulfur diesel
- Horsepower: 220 brake horsepower

Fuels

Natural gas will be the only fuel used by the Project to generate electricity, with the exception of the emergency diesel fire pump, which will fire ultra-low sulfur diesel fuel. The typical natural gas composition is shown in Appendix 5.1A. Natural gas combustion results in the formation of NO_x, CO, ROCs, SO₂, PM10, and PM2.5. Because natural gas is a clean-burning fuel, there will be minimal formation of combustion PM10, PM2.5, and SO₂.

The fuel used for the MREC 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, fuel specifications, and maximum operational scenario. Fuel analysis data for both natural gas and diesel fuel is presented in Appendix 5.1A.

- The natural gas will meet the CPUC grade specifications. The diesel fuel sulfur will be limited to 15 ppm, and will meet all California low sulfur diesel specifications.

Table 5.1-3 Estimated Fuel Use Summary for the MREC

Source	Fuel	Per Hour (mmscf)	Per Day (mmscf)	Per Year (mmscf)
CT-1	Natural gas	0.5545	13.307	1373.65
CT-2	Natural gas	0.5545	13.307	1373.65
CT-3	Natural gas	0.5545	13.307	1373.65
CT-4	Natural gas	0.5545	13.307	1373.65
CT-5	Natural gas	0.5545	13.307	1373.65

Source	Fuel	Per Hour, gallons	Per Day, gallons	Per Year, gallons
Diesel Fire Pump	Diesel Fuel	11.2	11.2	582.4

Notes: Hourly and daily fuel use based on Case 1 (cold day), annual fuel use based on Case 9 (ISO day).

The fire pump will be tested up to 1 hour per day and 1 day per week, or 52 hours per year, per NFPA testing requirements. Max total annual operating hours will be <=200.

HHV of fuel is 1021 BTU/SCF (average)

Max turbine hours per day = 24 (including SU/SD hours). Max turbine hours per year (see Appendix 5.1A)

The MREC will only use pipeline quality natural gas in the turbines and ultra-low sulfur diesel fuel for the fire pump.

CT – Combustion Turbine

mmscf = million standard cubic feet

5.1.2.3 Climate and Meteorology

Ventura County covers an area of 1,873 square miles, including 43 miles of shoreline. The County is located northwest of Los Angeles County, with Kern County to the north, Santa Barbara County to the west, and the Pacific Ocean on the southwest. There are 411 acres of state beach parks. The Los Padres National Forest accounts for 860 square miles of the northern portion of the county (46 percent of the county's land mass). Elevation changes within the county from sea level to the highest point on Mount Pinos at 8,831 feet. Ventura County ranks 26th in land size among California's 58 counties.

There are ten incorporated cities: Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks and San Buenaventura (Ventura), the County seat.

Ventura County offers very diverse climates. Coastal areas offer a Mediterranean climate, while the northern half of the county is mountainous with a sub-alpine climate. Interior valleys offer a mild climate moderated by the daily sea breeze that progresses through and across the county beginning in the early morning at the coast and reaching the inland valleys by early afternoon. Ventura County's

mountains, valleys, and seashore give the area six different microclimates. Ventura County does experience four different seasons. The difference between the seasons, although subtle, is the distinct weather patterns.

Ventura County's air quality is influenced by both local topography and meteorological conditions. Surface and upper-level wind flow varies both seasonally and geographically in the county and inversion conditions common to the area can affect the vertical mixing and dispersion of pollutants. The prevailing wind flow patterns in the county are not necessarily those that cause high ozone values. In fact, high ozone values are often associated with atypical wind flow patterns.

Meteorological and topographical influences that are important to air quality in Ventura County are as follows:

The semi-permanent high pressure that lies off the Pacific Coast leads to a limited average rainfall of 17.5 inches per year, with warm, dry summers and relatively damp winters. Maximum summer temperatures average about 70-75°F near the coast and in the high 80s to low 90s inland. During winter, average minimum temperatures range from the high 40s along the coast to the low 40s inland. Additionally, cool, humid, marine air causes frequent fog and low clouds along the coast, generally during the night and morning hours in the late spring and early summer. The fog and low clouds can persist for several days until broken up by a change in the weather pattern.

In the coastal and coastal valley portions of the county, the sea breeze (from sea to land) is typically west-southwesterly throughout the year except for the winter period which shows predominantly east-northeasterly winds (off shore). At night, the sea breeze weakens and is replaced by light land breezes (from land to sea). The alternation of the land-sea breeze cycle can sometimes produce a "sloshing" effect, where pollutants are swept offshore at night and subsequently carried back onshore during the day. This effect is exacerbated during periods when wind speeds are low.

The terrain around Point Conception (north of Ventura County), combined with the change in orientation of the coastline from north-south to east-west can cause counterclockwise circulation (eddies) to form east of the Point. These eddies fluctuate temporally and spatially, often leading to highly variable winds along the southern coastal strip as far south as the Ventura coastal area. Point Conception also marks the change in the prevailing surface winds from northwesterly to southwesterly as noted above.

Santa Ana winds are northeasterly winds that occur primarily during fall and winter, but occasionally in spring. These are warm, dry winds blown from the high inland desert that descend down the slopes of a mountain range. Wind speeds associated with Santa Ana's are generally 15-20 mph, though they can sometimes reach speeds in excess of 60 mph. During Santa Ana conditions, air emissions in Ventura County, and the South Coast Air Basin (the Los Angeles region) are moved out to sea. These pollutants can then be moved back onshore into Ventura County in what is called a "post-Santa Ana condition." The effects of the post-Santa Ana condition can be experienced throughout the county. Not all post-Santa Ana conditions, however, lead to high pollutant concentrations in Ventura County.

Upper-level winds (measured at Vandenberg Air Force Base once each morning and afternoon) are generally from the north or northwest throughout the year, but occurrences of southerly and easterly winds do occur in winter, especially during the morning. Upper-level winds from the south and east are infrequent during the summer. When they do occur during summer, they are usually associated with periods of high ozone levels. Surface and upper-level winds can move pollutants that originate in other areas into the county.

Surface temperature inversions (0-500 ft) are most frequent during the winter, and subsidence inversions (1000-2000 ft) are most frequent during the summer. Inversions are an increase in temperature with height and are directly related to the stability of the atmosphere. Inversions act as a cap to the pollutants that are emitted below or within them and ozone concentrations are often higher

directly below the base of elevated inversions than they are at the earth's surface. For this reason, elevated monitoring sites will occasionally record higher ozone concentrations than sites at lower elevations. Generally, the lower the inversion base height and the greater the rate of temperature increase from the base to the top, the more pronounced effect the inversion will have on inhibiting vertical dispersion. The subsidence inversion is very common during summer along the California coast, and is one of the principal causes of air stagnation.

Poor air quality is usually associated with "air stagnation" (high stability/restricted air movement). Therefore, it is reasonable to expect a higher frequency of pollution events in those portions of the county where light winds are frequently observed, as opposed to those portions of the county where the prevailing winds are usually strong and persistent. The annual average wind speed derived from the approved meteorological data used in the impact analysis was 5.6 mph, with calm winds persisting for approximately 5.04 percent of the time on an annual basis.

As on the rest of the Pacific Coast, a dominant characteristic of spring and summer is the nighttime and early morning cloudiness. Low clouds form regularly and frequently extend inland over the coastal valleys and foothills, but they usually dissipate during the morning and the afternoons are generally clear.

Considerable fog occurs along the coast, but the amount decreases with distance inland. The fall and winter months are usually the foggiest. Thunderstorms are rare, averaging about three a year in the regional area. The sunshine is plentiful for a marine location, with a marked increase toward the interior. Ventura County on average experiences 273 sunny days per year.

Additional climate and historical meteorological data are presented in Appendix 5.1B for the Ventura County regional area and for the following stations: Ojai (046399), and Santa Paula (047957) (WRCC 2014). The meteorological data supplied by the VCAPCD as representative of the site are presented in electronic form on the CD-ROM provided.

5.1.3 Emissions Evaluation

5.1.3.1 Facility Emissions and Permit Limitations

The approximately 9.8-acre MREC site is currently used as a vehicle salvage/dismantling yard. There are no current air pollution sources on the proposed site (except for motor vehicles), and there are no facilities on the current site that are permitted by the VCAPCD.

5.1.3.2 Facility Emissions

Installation and operation of the MREC will not result in emissions greater than 250 tpy for any criteria pollutants, and as such the MREC will be considered a minor NSR source for NO_x, CO, ROC, and PM₁₀/PM_{2.5} under federal rules. The MREC 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 major source under the VCAPCD NSR rules for NO_x only. 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. 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 maximum hourly emissions are based on cold day conditions assuming a startup event with the remainder of the startup hour at steady state compliant conditions. The daily operation assumes 24 hours of operation with a maximum of two starts and two shutdowns.

The worst-case annual emissions are based upon annual conditions (Case 14), the maximum projected hours of operation, including startups and shutdowns.

The applicant would propose that the facility limits be based on total short-term and annual emissions rather than operational hours or operational events. The turbines will be required to install CEMS for NO_x and CO. Hourly fuel use monitoring along with source test requirements will establish a compliance method to allow for continuous tracking of all emissions at the MREC. For example, the maximum annual emissions of NO_x at 28.13 tons per year would establish the turbines' PTE. Mission Rock would propose and accept hourly, daily and annual emission limits for this pollutant, but would propose that the permit would not contain any limit on the number of start events or hours of operation as the established emission limits would be continuously monitored. This way, the facility operational profiles would be solely based on PTE rather than hours which would allow for a flexible response to changing power market conditions. Thus, the short-term and annual emissions limits would establish the facility PTE rather than any individual operational profiles. This type of emissions and compliance strategy is not new, and has been implemented on numerous CEC approvals as well as district permits.

During the first year of operation, plant commissioning activities, which are planned to occur over an estimated 213 operating hours (per turbine) during the first year of operation, will have higher hourly and daily emission profiles than during normal operations in the subsequent years of operation. The emissions during the first year of operation are presented below and were included in the air quality modeling analysis along with subsequent post commissioning yearly emissions.

The MREC will be a major NSR source as defined by the VCAPCD Rule 26.2 and will be subject to VCAPCD requirements for emission offsets and air quality modeling analyses for criteria pollutants and toxics. Mission Rock has prepared an air quality emissions and impact analysis to comply with the VCAPCD 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 MREC 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	MREC Cumulative Increase, tpy	Federal/ State Attainment		Federal and VCAPCD Rule 26.1 Major Source Thresholds PSD/NNSR, tpy		VCAPCD Rule 26.2 Offsets, tpy	Major Source (Federal NSR/PSD)	Major Source VCAPCD Rule 26.1
		Y	Y	250	25			
NO _x	28.17	Y	Y	250	25	5	No/No	Y
SO ₂	1.35	Y	Y	250	-	15	No/No	N
CO	32.32	Y	Y	250	-	-	No/No	N
PM10	12.52	Y	N	250	-	15	No/No	N
PM2.5	12.52	Y	N	250	-	15	No/No	N
ROC (Ozone)	4.98	N	N	250	25	5	No/No	N
CO _{2e}	410,360	-	-	100,000	-	75,000	No/No	N

Installation and operation of the MREC will be considered a major source under the VCAPCD 26.1 rule for NO_x and will trigger the offset requirements under VCAPCD Rule 26.2 for NO_x and ROC. The MREC will not trigger the major new source thresholds for PSD. Criteria pollutant emissions from the new combustion turbines, and emergency equipment, are delineated in the following sections, while emissions of hazardous air pollutants are delineated in Section 4.5. 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.

The proposed mitigation, through the surrender of emission reduction credits as presented in Appendix 5.1H is based on the maximum operational profile for the MREC. There may be a lack of available ERCs for purchase from the existing and surrounding air basins to satisfy the maximum operational scenario for affected pollutants. If this case arises, then MREC is proposing to lower the operational emissions to a level based on the available emission offsets until such time that the offsets are available. Lowering the emissions would also lower the corresponding air quality impacts. The air quality impact analysis presented herein is based on the maximum proposed operational scenario.

5.1.3.3 Normal Operations

Operation of the proposed process and equipment systems will result in emissions to the atmosphere of both criteria and toxic air pollutants. Criteria pollutant emissions will consist primarily of NO_x, CO, ROCs, SO_x, total suspended particulates (TSP), PM₁₀, and PM_{2.5}. 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 the MREC.

Table 5.1-5 Potentially Emitted Criteria and Toxic Pollutants

Criteria Pollutants	Toxic Pollutants (cont'd)
NO _x	Benzene
CO	1-3 Butadiene
ROCs	Ethylbenzene
SO _x	Formaldehyde
PM ₁₀ /2.5	Hexane (n-Hexane)
GHGs	Naphthalene
CO ₂ e	Propylene
Toxic Pollutants	Propylene Oxide
Ammonia	Toluene
PAHs	Xylene
Acetaldehyde	Diesel Particulate Matter
Acrolein	

PAHs = polynuclear (or polycyclic) aromatic hydrocarbons

5.1.3.4 Criteria Pollutant Emissions

Tables 5.1-6 through 5.1-11 present data on the criteria pollutant emissions expected from the facility equipment and systems under normal operating scenarios. The maximum hourly emissions are based on Case 1 (30°F day) incorporating a startup event. A startup event is defined as a one-half hour event with the turbine stack emissions in BACT compliance at the end of the 30-minute startup, with the remainder of the startup hour at steady-state compliance conditions. The worst case day for emissions is defined as two startup events, two shutdown events, and 22.7 hours of full load operation (Case 1, cold day) for a total of 24 hours of operation.

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	Max Hour Emissions Steady State (Cold Day) lb/hr ^a	Max Hour Emissions Steady State (ISO Day) lbs/hr ^b	Max Daily Emissions lbs
NO _x	See Appendix 5.1A	11.65	5.10	4.04	136.37

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	Max Hour Emissions Steady State (Cold Day) lb/hr ^a	Max Hour Emissions Steady State (ISO Day) lbs/hr ^b	Max Daily Emissions lbs
CO	See Appendix 5.1A	7.99	4.97	4.92	127.42
ROC	See Appendix 5.1A	1.36	0.71	0.71	20.12
SO _x	See Appendix 5.1A	0.59	0.59	0.20	14.16
PM10/PM2.5	See Appendix 5.1A	2.0	2.0	2.0	48.0
Ammonia	5.0 ppmvd	1.89	3.77	3.74	90.50
CO ₂ e	116.89 lb/mmbtu			NA	

^a Cold day – Case 1

^b ISO Day-Case 9

lb/hr = pound per hour

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

Parameter	Startup	Shutdown
NO _x , lbs/event	9.1	1.2
CO, lbs/event	5.5	1.8
ROC, lbs/event	1.0	1.0
PM10/PM2.5 lbs/event	1.0	.30
SO _x , lbs/event	.13	.04
Event duration, mins	30	9
Estimated Number per year	150	150

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

Pollutant	Emission Factor	Max Hour Emissions lbs (5 Turbines)	Max Daily Emissions lbs (5 Turbines)	Max Annual Emissions tons (5 Turbines)
NO _x	N/A	58.25	681.85	28.13
CO	N/A	39.93	637.10	32.29
ROCs	N/A	6.76	100.59	4.98
SO _x	N/A	2.95	70.82	1.35
PM10/PM2.5	N/A	10.0	240.00	12.5
NH ₃	N/A	18.85	452.50	22.46

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

Pollutant	Emission Factor	Max Hour Emissions lbs (5 Turbines)	Max Daily Emissions lbs (5 Turbines)	Max Annual Emissions tons (5 Turbines)
CO ₂ e	N/A	NA	NA	410,296 (372,972 MT/yr)

See Appendix 5.1A, for detailed emissions and operational data.

Maximum hour based on five turbines in cold startup, except for PM10/PM2.5 and SO_x which is based on Case 1 operation.

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

Maximum day is based on 2 startups and shutdowns, with remaining hours at Case 1 (cold day) operation.

Maximum annual NO_x, SO_x, CO, ROC, NH₃, CO₂e and PM10/PM2.5 based on Case 9 (ISO Conditions).

Table 5.1-9 Diesel Fire Pump Engine Emissions

220 BHP Fire Pump (Tier 3)				
Pollutant	g/hp-hr	Max Hour Emissions lbs	Max Daily Emissions lbs	Max Annual Emissions tons
PM10/PM2.5	.15	0.07	0.07	0.002
NO _x	2.8	1.36	1.36	0.035
SO _x	0.0015percent by weight	0.0023	0.0023	0.00006
CO	2.6	1.26	1.26	0.033
ROC	0.2	0.10	0.10	0.003
CO ₂ e	-	-	-	6.622 (6.02 MT)

Notes:

SO_x emissions based on fuel S content of 15 ppm.

The fire pump testing is based on 60 minutes per day, 52 hours per year. Max annual runtime is 200 hours.

Table 5.1-10 presents a summary of the annual emissions for each operational scenario.

Table 5.1-10 MREC Maximum Potential to Emit

Pollutant	TPY
NO _x	28.17
CO	32.32
ROCs	4.983
SO _x	1.351
PM10/PM2.5	12.52
NH ₃	22.46
CO ₂ e	410,360

Table 5.1-11 presents the maximum proposed emissions for the MREC on a pollutant specific basis.

Table 5.1-11 Summary of Maximum Facility Emissions for the MREC

Pollutant	lbs/hour	lbs/day	TPY
NO _x	58.25	683.21	28.17
CO	39.93	638.36	32.32
ROCs	6.76	100.69	4.983
SO _x	2.95	70.822	1.351
PM10/PM2.5	10.0	240.1	12.52
NH ₃	18.85	452.50	22.46
CO _{2e}	-	-	410,360 (373,030 MT)

Total facility estimated maximum emissions (including turbine SU/SD emissions). The FP will not be tested when the turbines are running, but it may be tested on a day that the turbines run.

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 213 hours per turbine, 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.

GHG Emissions

MREC GHG Estimates

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

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 the emergency equipment along with SF₆ emissions from the circuit breakers. SF₆ emissions are estimated to be 57 tons/yr (51.7 MT/yr). Appendix 5.1A, contains the support data for the GHG emissions evaluation. Estimated CO_{2e} emissions for the MREC operational phase, based on annual average conditions, are as follows:

- CO_{2e} <= 410,360 tons/year (=373,030 metric tons/year)

The emission factors, GWPs, 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

- The MREC will require a VCAPCD New Source Review (NSR) permit, as specified under Rule 26. Currently, the VCAPCD air basin is federal and State attainment or attainment/unclassified for NO₂, SO₂, and CO. The county is nonattainment (serious) for the federal 8-hr ozone standard, as well as nonattainment for the state 1-hr and 8-hr ozone standards. It is also state nonattainment for PM10

and PM_{2.5}, but attainment for the federal standards. Based on the values in Table 5.1-11, the MREC will be a major new stationary source per VCAPCD NSR Regulation 26.

- Based upon the annual emissions presented in Table 5.1-11, the facility will not trigger the PSD program requirements for the following pollutants: NO_x, VOC, TSP, PM₁₀, PM_{2.5}, CO, SO_x, and GHGs.
- The MREC, pursuant to the VCAPCD NSR Rule 26, is required to generate or acquire sufficient emission reduction credits to offset the MREC emissions due to its status as a major NSR source. The table below summarizes these requirements.

Table 5.1-12 VCAPCD Emission Bank Credits Required By MREC

	PM ₁₀ /PM _{2.5}	ROC	NO _x	SO ₂	CO
VCAPCD Offset Trigger Thresholds, tpy	15	5	5	15	NA
Facility PTE ^a , tpy	12.52	4.98	28.17	1.351	32.32
VCAPCD Offset Ratio	1:1	1.3:1	1.3:1	1:1	1:1
Total Offsets Required, tpy	0	0	30.12	0	0

^a Values derived from Section 5.1.

The sources of emission offsets could be from any of the following strategies or combination of strategies. Any required offsets or additional mitigations pursuant to California Environmental Quality Act (CEQA) and/or the District NSR regulations, will be negotiated, acquired, and implemented per the VCAPCD regulations and CEC guidance.

Mission Rock will demonstrate to the satisfaction of the VCAPCD and the CEC and that adequate emission reduction credits have been purchased prior to issuance of the ATC. The MREC emissions of 28.17 tons per year of NO_x shall be offset at a ratio of 1.3 to 1. Appendix 5.1H (Mitigation) provides the details of the proposed use of offsets to mitigate MREC emissions.

5.1.3.5 Hazardous Air Pollutants

See Section 5.9, Public Health, for a detailed discussion and quantification of HAP emissions from the MREC 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.

5.1.3.6 Construction

Construction-related emissions are based on the following:

- Mission Rock owns the current MREC site, which is 9.79 acres in size. The construction laydown area will be contained within the 50-acre site.
- Minimal site preparation will be required prior to construction of the turbines, building foundations, support structures, etc.
- Construction activity is expected to last for a total of 23 months (not including startup and commissioning).

Construction-related issues and emissions at the MREC 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 VCAPCD 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.

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

- Mission Rock 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 the MREC 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 two times per day during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 5 mph on unpaved areas within the MREC construction site.
- The construction site entrance will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

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

- The Applicant will work with the general contractor to utilize to the extent feasible, EPA Air Resources Board Tier II/Tier III 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, Mission Rock 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 5.1-13 presents data on the regional air quality significance thresholds currently being implemented by the VCAPCD. The specific construction and operational thresholds were derived from the VCAPCD CEQA guidance.

Table 5.1-13 VCAPCD CEQA Significance Thresholds

Pollutant	Significance Level (for the MREC area)
NO _x	25 lbs/day
ROCs	25 lbs/day
Other Criteria Pollutants	Emissions that would cause a violation of an established air quality standard, or worsening of an existing violation
Hazardous or toxic pollutants	Cancer risk increase $> 10 \times 10^{-6}$ Hazard index > 1

Source: VCAPCD CEQA Guidance, October 2003.

Construction emissions, from onsite and offsite activities are expected to exceed the VCAPCD CEQA thresholds for NO_x and ROC on a daily basis. Mitigations 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 NO_x and ROC. These emissions will be mitigated to a level of “less than significant” pursuant to the VCAPCD rules and the CEC conditions of certification. Emissions of the remaining criteria pollutants, based on the impact analysis presented herein are not expected to cause a violation or, 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 VCAPCD Rule 220 (General Conformity-applicable to federal actions only). The VCAPCD is “serious” nonattainment for the federal 8-hr ozone only, and as such the applicable conformity thresholds are those presented below:

- NO_x – 50 tons per year
- VOCs – 50 tons per year (assumed the same for ROCs)

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

5.1.4 Best Available Control Technology Evaluation

5.1.4.1 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

Pollutant	BACT Emissions Range ¹	Proposed BACT
NO _x	2.5 – 5 ppmvd	2.5 ppmvd
CO	4 - 6 ppmvd	4.0 ppmvd
ROCs	2 - 3 ppmvd	1.0 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 <= 2 lbs/hr

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

GCPs = good combustion practices

gr S/100 scf = grains of sulfur per 100 standard cubic feet

5.1.4.2 Proposed Best Available Control Technology

Table 5.1-15 presents the proposed BACT for the new combustion turbines. The new combustion turbines 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	DLN combustors with SCR	Yes
CO	4.0 ppmvd	Oxidation Catalyst	Yes
ROCs	1.0 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	<= 2 lbs/hr	Natural Gas	Yes
Ammonia	5.0 ppmvd	NH ₃ Reagent/SCR System	Yes

Source: MREC Team.

Fire Pump Engine BACT

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

Summary

Based on the above data, the proposed emissions levels for the new combustion turbines and fire pump engine satisfy the BACT requirements of the VCAPCD under Rule 26. Specifics associated with the BACT determinations can be found in Appendix 5.1F.

5.1.5 Air Quality Impact Analysis

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

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described herein and presented in the 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 VCAPCD and CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the VCAPCD and CEC.

5.1.5.1 Dispersion Modeling

For modeling the potential impact of the MREC 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 preprocessors to determine surface characteristics (AERSURFACE version 13016), to process meteorological data (AERMET version 15181), and 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. These data must meet certain criteria established by the EPA and the later discussion details the proposed data and its applicability to the MREC.

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 will not be selected for use as the predominant land use around the MREC site is predominantly agriculture/undeveloped land. In accordance with the Auer land use classification methodology (EPA's "*Guideline on Air Quality Models*"), since the land use within the area circumscribed by a 3-kilometer (km) radius around the facility is greater than 50 percent rural, the urban dispersion options in AERMOD will not be used in the modeling analyses supporting the permitting of the facility.

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.

NO₂ Modeling Procedures: Most MREC-only NO₂ impacts were assessed using a conservative Tier 2 modeling analysis based on the ARM, adopted in the *Guideline on Air Quality Models*. The Guideline allows a nationwide default conversion rate of 75 percent for annual NO₂/NO_x ratios and 80 percent for 1-hour NO₂/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 and CARB Guidance, the Tier 2 analyses can be performed without justification to, or prior approval of, the permitting authority.

A Tier 3 analysis was used to assess 1-hour NO₂ impacts during commissioning activities to assess compliance with the CAAQS. The Tier 3 analysis was based on the ozone limiting method (OLM) as described in the Air Quality Modeling Protocol. The OLM analysis used ambient hourly background ozone measured at the El Rio monitoring station for the modeled years of 2009-2013. The El Rio monitoring data has been shown above to be a conservative representation of the MREC site.

The ozone data was first processed to remove missing data similar to procedures outlined in the California Air Pollution Control Officers Association (CAPCOA) guidance document “*Modeling Compliance of The Federal 1-Hour NO₂ NAAQS*” (2011). The procedures for missing data are described in detail in the Air Quality Modeling Protocol. In support of the Tier 3 OLM NAAQS analysis, the modeling methods also included:

- In-stack NO₂/NO_x ratios (ISR) for all MREC modeled sources (turbines during commissioning activities) were based on the national default of 0.5
- AERMOD-default ambient equilibrium NO₂/NO_x ratio of 0.9 was used
- The option OLMGROUP ALL was used

For the 1-hour NO₂ CAAQS cumulative assessment, OLM was used with the maximum 1-hour NO₂ background concentration added to the modeled 1-hour concentration. Due to the limited number of hours of commissioning activities, modeling analyses were not required for the 1-hour NAAQS.

5.1.5.2 Additional Model Selection

In addition to AERMOD and its pre-processors, 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.

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) will be followed for this analysis. Combined impacts for all sources under fumigation conditions will be evaluated.

For sources with plume heights not subject to inversion breakup fumigation, their contributions to fumigation impacts will be determined using AERSCREEN with all meteorological conditions and ignoring terrain at the distance of the maximum fumigation concentration. The fumigation concentration is then combined with the maximum AERSCREEN concentration from the other sources. The combined fumigation concentrations are also 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.

5.1.5.3 Good Engineering Practice Stack Height Analysis

Formula Good Engineering Practice (GEP) stack height is the greater of 65 meters or the height based on EPA formulas for the various onsite and offsite structures and their locations and orientations to the MREC stacks. Formula GEP stack height was calculated at 28.32 meters (about 93 feet) for the turbine stacks and 38.58 meters (about 126.5 feet) for the firepump stack. The GEP stack heights are due to the 37-foot, 2-inch air intake filter for the turbine stacks and the 54' high storage tank for the firepump stack. The design stack heights of 60 feet and 25 feet for the turbine and firepump stacks, respectively are all 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. Appendix 5.1, Figure 5.1-3 shows the structures included in the BPIP-PRIME downwash analysis.

5.1.5.4 Receptor Grid Selection and Coverage

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

Cartesian coordinate receptor grids are used to provide adequate spatial coverage surrounding the MREC 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 MREC fence line with a 10-meter spacing.
- Receptors extending outwards from the proposed MREC fence line in all directions at least 500 meters from the MREC 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) km from the MREC.
- The first coarse receptor grid with 200-meter spacing extended outwards from the edge of the intermediate grid to 5 km from the MREC, while the second coarse grid with 500-meter receptor spacing extended to 10 km from the MREC.
- A refined receptor grid with 20-meter resolution was modeled around any location on the coarse and intermediate grids where a maximum impact was modeled that was above the concentrations on the downwash grid. Based on the locations of the maximum modeled concentrations, a single refined receptor grid was required as a number of maximum impacts occurred on the 100-meter spaced intermediate and 200-meter spaced coarse receptor grids in a common elevated terrain area south of the MREC site. This refined receptor grid was modeled in both the turbine screening and refined modeling analyses.

Concentrations within the facility fenceline will not be calculated. Receptor grid figures 5.1-4 and 5.1-5 in Appendix 5.1 display the receptors grids used in the modeling assessment with respect to the MREC fence line.

5.1.6 Meteorological Data Selection

The MREC, as discussed above, is located in the southwestern portion of the Santa Clara River Valley, near the mouth of the Valley. The Santa Clara River Valley has a predominant northeast and southwest orientation, with terrain rising up to over 2000 feet on each side of the valley. Based on the MREC location near the entrance to the valley, the selection of surface meteorology is an important consideration for use in assessing the MREC's impacts on regional air quality. Because the MREC location is influenced in large part by the valley orientation, surface meteorological data were reviewed to determine which data set would be considered representative of the MREC area.

The nearest representative surface meteorological data set in the general area of the MREC is the El Rio Monitoring Station, operated by the VCAPCD, located approximately 7.1 kilometers (km) south-southwest of the MREC site. This surface meteorological data set was provided by the VCAPCD for the most recent five-year period, 2009-2013, and consists of hourly-averaged measurements of wind speed, wind direction, the standard deviation of the wind direction (called sigma-theta), temperature, and relative humidity (all measured at a height of 10 meters above ground level), and solar radiation. These surface data, when processed with AERMET with the data described below, result in data recovery greater than 90 percent for every quarter in the five-year period as shown in Table 5.1-16.

Table 5.1-16 Meteorological Missing Data and Data Recovery Rates

Missing Hours (number of hours)					
Year	Quarter				Total
	Quarter 1	2	Quarter 3	Quarter 4	
2009	131	1	23	48	203
2010	58	14	10	191	273
2011	110	86	66	112	374
2012	46	73	37	18	174
2013	53	46	46	84	229
Period	n/a	n/a	n/a	n/a	1253
Data Recovery Rate (percent)					
Year	Quarter				Total
	Quarter 1	2	Quarter 3	Quarter 4	
2009	93.94	99.95	98.96	97.83	97.68
2010	97.31	99.36	99.55	91.35	96.88
2011	94.91	96.06	97.01	94.93	95.73
2012	97.89	96.66	98.32	99.18	98.02
2013	97.55	97.89	97.92	96.20	97.39
Period	n/a	n/a	n/a	n/a	97.14

The El Rio monitoring data was supplemented with concurrent Automatic Surface Observing System (ASOS) hourly measurements taken at the Camarillo Airport, located about 11 km south of the MREC site, downloaded from the National Climatic Data Center (NCDC) websites. The Camarillo ASOS data are expected to be more representative of the inland MREC location than ASOS measurements taken at Oxnard Airport, which is in closer proximity to the coastline and therefore, more influenced by the coastal marine layer. Based on a review of the recorded sky cover and temperature at both Camarillo and Oxnard airports, Oxnard had a much higher incident of marine influence. There are no other ASOS stations in the immediate MREC vicinity. Camarillo ASOS measurements of cloud cover, barometric pressure and precipitation were used by AERMET to supplement the El Rio monitoring data when creating the meteorological datasets used as AERMOD inputs. The AERMET option to substitute ASOS

wind and temperature data for missing El Rio measurements was not used as the data sets already exceeded the quarterly 90 percent data recovery requirements for use in regulatory modeling assessments. As no Camarillo ASOS derived wind speed and wind direction data were used, the use of EPA program AERMINUTE (version 15181) was not required.

In addition to the surface datasets, concurrent radiosonde upper air data from Vandenberg Air Force Base was input into AERMET to calculate wind and temperature profile data using the 12 Zulu (Z) sounding data (4 a.m. local standard time). These data were downloaded from the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory website. The AERMET option to expand the 12 Z sounding window by more than one hour was not used as the data set already exceeded the quarterly 90 percent data recovery requirements for use in regulatory modeling assessments.

AERMET also requires input summaries of the surface characteristics for the area surrounding the El Rio meteorological monitoring site. These surface characteristics were calculated with the EPA program AERSURFACE (version 13016) based on EPA guidance. AERSURFACE uses 1992 National Land Cover Data (NLCD) from the USGS to determine land use based on standardized land cover categories. For this analysis, the southern California NLCD file from the USGS website referenced in the AERSURFACE User's Manual (<http://edcftp.cr.usgs.gov/pub/data/landcover/states/>) was used. A review of historical Google Earth images shows little change in nearby land uses from the time of the 1992 NLCD to the present time.

AERSURFACE was executed in accordance with the EPA guidance documents “*AERMOD Implementation Guide*,” March 19, 2009, and “*AERSURFACE User's Guide*,” EPA-454/B-08-001, revised January 16, 2013. AERSURFACE determines the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. **Bowen ratio** is based on a simple unweighted geometric mean while **albedo** is based on a simple unweighted arithmetic mean for the 10 by 10 km square area centered on the selected location (i.e., no direction or distance dependence for either parameter). **Surface roughness length** is based on an inverse distance-weighted geometric mean for upwind distances up to 1 km from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (EPA guidance recommends that no sector be less than 30° in width).

Two sectors were used for calculating roughness lengths based on the EPA-recommended radius of 1 km: one sector for directions from 302° to 336° northwest of the El Rio monitoring site based on the concentrated residential and commercial development in this area; and a second sector for all other directions (from 336° through north then south to 302°) based on the predominate agricultural land uses in this area. These sectors are shown in Appendix 5.1, Figure 5.1. Months were assigned to the four seasons based on the seasonal assignments given by EPA for the 1-hour NO₂ NAAQS assessment for the Los Angeles area (EPA-452/P-08-001, April 2008) – namely April to June for transitional spring with short annuals, July to September for midsummer with lush vegetation, and October through March for autumn with un-harvested cropland. EPA seasonal assignments do not include late autumn after frost or winter with or without snow. Other AERSURFACE options will be selected as Airport = NO, continuous snow cover = NO, and arid = NO based on the El Rio monitoring site location and the local climatology. A summary of the AERSURFACE inputs and results are shown in Table 5.1-17.

Table 5.1-17 AERSURFACE Input and Results

AERSURFACE Results	Spring (Apr-Jun)	Summer (Jul-Sep)	Autumn (Oct-Mar)	Winter (none)
Surface Roughness (meters)				
Sector 1 (302°-336°)	0.309	0.253	0.313	N/A

Table 5.1-17 AERSURFACE Input and Results

AERSURFACE Results	Spring (Apr-Jun)	Summer (Jul-Sep)	Autumn (Oct-Mar)	Winter (none)
Sector 2 (336°-302°)	0.220	0.046	0.220	N/A
Noontime Albedo	0.19	0.16	0.19	N/A
Bowen Ratio (Average)	0.88	0.48	0.67	N/A
Bowen Ratio (Wet)	0.52	0.33	0.42	N/A
Bowen Ratio (Dry)	2.21	1.36	1.78	N/A
AERSURFACE Inputs				
Latitude	34.252	Snow Cover		NO
Longitude	-119.143	Arid Region		NO
Datum	NAD83	Airport Location		NO
Surface Roughness Radius (km)	1.0	Number of Sectors		2

The moisture used to calculate the albedo for AERMET processing was based on 30-years of precipitation climatology in accordance with EPA recommendations. For this assessment, the nearest regional cooperative monitoring location with relatively complete data for the 30-year climatological period (with complete data for the 5-year modeling period) was the Ojai cooperative monitoring site. The past 30 years of monthly precipitation amounts are sorted (1984 through 2013) and compared to the monthly precipitation amounts for the five years modeled (2009-2013). The modeled months (2009-2013) with precipitation amounts in the range of the driest 9 years by month for the 30-year climatology are given the albedo for DRY conditions. The modeled months (2009-2013) with precipitations amounts in the range of the wettest 9 years by month for the 30-year climatology are given the albedo for WET conditions. The remainder of the modeled months (2009-2013) represents the middle 22 years by month in the 30-year precipitation climatology and these months are given the albedo for AVG (average) conditions. The 30-year precipitation climatology and moisture conditions for each month of the modeling period are shown in Table 5.1-18 (the monthly albedos input to AERMET are shown in the previous table).

Table 5.1-18 30-year Precipitation Climatology Summary and Moisture Assigned to the Months in the Modeling Period

SORT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.52
2	0.05	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.58
3	0.55	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	7.67
4	0.55	0.19	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.03	7.82
5	0.63	0.34	0.22	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.25	8.17
6	0.63	0.92	0.37	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.32	9.21
7	0.86	1.25	0.48	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.38	10.62
8	0.89	1.33	0.55	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.57	11.57
9	1.17	1.88	0.68	0.09	0.00	0.00	0.00	0.00	0.00	0.04	0.35	0.94	12.51
10	1.19	1.93	0.82	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.40	0.96	12.56
11	1.21	2.10	1.22	0.14	0.02	0.00	0.00	0.00	0.00	0.15	0.67	1.10	12.94
12	1.25	2.75	1.33	0.16	0.02	0.00	0.00	0.00	0.00	0.23	0.71	1.29	13.71

Table 5.1-18 30-year Precipitation Climatology Summary and Moisture Assigned to the Months in the Modeling Period

SORT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
13	1.40	2.93	1.39	0.16	0.03	0.00	0.00	0.00	0.00	0.25	1.01	1.47	14.07
14	1.77	3.12	2.19	0.17	0.13	0.00	0.00	0.00	0.00	0.26	1.02	1.63	15.53
15	1.93	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	1.02	1.80	15.96
16	2.12	4.09	2.23	0.37	0.13	0.00	0.00	0.00	0.00	0.32	1.12	2.00	15.97
17	2.39	4.16	2.71	0.42	0.16	0.00	0.00	0.00	0.00	0.32	1.19	2.14	16.92
18	3.11	4.47	2.75	0.46	0.21	0.00	0.00	0.00	0.00	0.51	1.26	2.17	18.16
19	3.22	4.47	3.08	0.67	0.23	0.02	0.00	0.00	0.01	0.76	1.50	2.21	18.64
20	3.41	4.97	3.09	0.82	0.27	0.02	0.00	0.00	0.01	0.87	1.67	3.63	21.66
21	3.74	6.36	3.46	1.10	0.34	0.04	0.00	0.00	0.03	0.93	1.78	3.85	22.41
22	3.91	7.29	4.30	1.80	0.44	0.07	0.00	0.00	0.03	1.16	2.36	4.04	23.85
23	5.48	7.30	4.40	1.94	0.48	0.13	0.01	0.00	0.08	1.18	2.37	4.11	24.27
24	6.72	8.73	4.48	2.33	0.49	0.13	0.01	0.00	0.26	1.88	2.43	4.43	26.56
25	6.90	9.50	4.79	2.38	0.82	0.13	0.02	0.00	0.37	1.99	2.45	5.84	28.28
26	7.44	10.06	4.84	2.48	0.97	0.19	0.03	0.00	0.40	2.15	3.02	6.04	30.66
27	9.11	10.30	5.76	2.87	1.11	0.24	0.03	0.01	0.61	2.46	3.21	6.29	36.35
28	16.58	10.63	6.32	2.92	1.20	0.34	0.05	0.02	0.64	3.32	3.54	6.89	37.05
29	17.57	12.50	10.50	3.59	2.06	0.36	0.12	0.10	0.85	3.70	3.88	8.63	40.97
30	24.53	23.76	14.01	5.39	4.07	1.60	0.78	0.16	1.25	5.76	6.61	9.36	41.79
2009	0.89	4.97	0.55	0.16	0.02	0.13	0.00	0.00	0.00	3.70	0.02	3.63	14.07
2010	6.72	4.47	0.37	2.38	0.16	0.00	0.01	0.00	0.00	2.15	1.67	8.63	26.56
2011	0.55	4.09	6.32	0.16	0.97	0.24	0.00	0.00	0.01	1.16	1.78	0.25	15.53
2012	1.19	0.11	3.46	2.33	0.03	0.00	0.00	0.00	0.00	0.87	2.43	2.14	12.56
2013	1.40	0.19	1.33	0.06	0.23	0.00	0.01	0.00	0.00	0.25	0.67	0.38	4.52
2009	DRY	AVG	DRY	AVG	AVG	WET	AVG	AVG	AVG	WET	DRY	AVG	N/A
2010	WET	AVG	DRY	WET	AVG	AVG	WET	AVG	AVG	WET	AVG	WET	N/A
2011	DRY	AVG	WET	AVG	WET	WET	AVG	AVG	AVG	WET	AVG	DRY	N/A
2012	AVG	DRY	AVG	WET	AVG	AVG	AVG	AVG	AVG	AVG	WET	AVG	N/A
2013	AVG	DRY	AVG	DRY	AVG	AVG	WET	AVG	AVG	AVG	AVG	DRY	N/A

Sorted Data - The 30-years of climatology were sorted to determine dry/average/wet months. Generally, the driest and wettest 9 years were used to delineate dry/wet (average was anything in-between). The one exception was June-September where no precipitation was considered average. Orange cells represent months with more than 5-6 missing days of precipitation data, which were assigned to the middle of the sorted period if the missing data placed them in the driest half of the sorted order.

The area surrounding the MREC site, within 3 km, can be characterized as rural, made up mostly of agricultural uses (grasslands, pasture, and crops totally 65.5 percent) and undeveloped rural areas (shrub-lands, grasslands, forest, and wetlands totally 26.2 percent). Urban areas (high intensity residential and commercial and industrial uses) are only 2.3 percent of the area within three kilometers based on review of land use/land cover data as well as recent aerial photographic data. Some industrial land use is located immediately adjacent to the MREC site, however, based on a the radial range of three kilometers, the area surrounding the MREC site is rural In accordance with the Auer land use classification methodology (EPA's "Guideline on Air Quality Models"), since land use within the area circumscribed by a 3-km radius around the facility is greater than 50 percent rural, the urban dispersion option in AERMOD will not be used in the modeling analyses supporting the permitting of the facility.

The use of the 5 years of VCAPCD supplied surface meteorological data collected at the El Rio monitoring location would satisfy the definition of on-site data. EPA defines the term “on-site data” to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the CAA in Section 165(e)(1), which requires an analysis “of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility.” This requirement and EPA’s guidance on the use of onsite monitoring data are also outlined in the Onsite Meteorological Program Guidance for Regulatory Modeling Applications (EPA, 1987). The representativeness of meteorological data is dependent upon the following criteria:

- Proximity of the meteorological monitoring site to the area under consideration
- Complexity of the topography of the area
- Exposure of the meteorological sensors
- Period of time during which the data are collected

First, the El Rio meteorological monitoring site and MREC location are in close proximity to each other (the El Rio monitoring site is 7.1 km SSW of the MREC site), are at similar elevations (117’ and 185’ above mean sea level), and are both located near the Santa Clara River. The El Rio monitoring site and MREC location are located more than 10 km and 15 km, respectively, from the Pacific Ocean. Therefore, the strong westerly wind data that is evident at the Oxnard and Camarillo airports are not identified on the El Rio data sets. Rather, the El Rio monitoring appears to be influenced by the overall Santa Clara River valley topography. The El Rio monitor is located near the southern entrance to the Santa Clara River valley in which the MREC will be located. Thus, both locations will experience similar up-valley and down-valley flows under certain synoptic conditions. Third, the surface characteristics of land uses, roughness lengths, Bowen ratios, and albedos are very similar for the two locations as shown in Table 5.1-19. Most of the land use in the general region consists of agricultural classifications.

Table 5.1-19 Surface Characteristics for Monitoring Site and MREC Location

Standardized Land Use Category (for area within a 1-km radius)	El Rio Monitoring Site	MREC Location
Open Water	0.1%	-
Low Intensity Residential	5.0%	2.8%
High Intensity Residential	1.0%	-
Commercial/Industrial/Transportation	6.9%	3.9%
Bare Rock/Sand/Clay	1.6%	7.9%
Deciduous Forest	0.2%	0.2%
Evergreen Forest	0.5%	1.1%
Mixed Forest	1.0%	1.6%
Shrubland	1.7%	10.9%
Orchards/Vineyard/Other	0.5%	0.9%
Grasslands/Herbaceous	1.8%	12.1%
Pasture/Hay	7.5%	14.2%
Row Crops	69.1%	37.9%
Small Grains	2.2%	5.6%

Table 5.1-19 Surface Characteristics for Monitoring Site and MREC Location

Standardized Land Use Category (for area within a 1-km radius)		El Rio Monitoring Site	MREC Location
Urban/Recreational Grasses		0.9%	0.2%
Woody Wetlands		-	0.5%
Emergent Herbaceous Wetlands		-	0.2%
Surface	Spring (Apr-Jun)	0.227	0.196
Roughness	Summer (Jul-Sep)	0.054	0.061
(meters)	Autumn (Oct-Mar)	0.228	0.196
Noontime	Spring (Apr-Jun)	0.19	0.19
Albedo	Summer (Jul-Sep)	0.15	0.16
	Autumn (Oct-Mar)	0.19	0.19
Bowen Ratio	Spring (Apr-Jun)	0.88	0.92
Average	Summer (Jul-Sep)	0.48	0.48
Moisture	Autumn (Oct-Mar)	0.67	0.67

AERSURFACE was executed at both the meteorological monitoring and proposed site locations using the seasons and model options described earlier for one single sector, average moisture conditions, and a surface roughness area circumscribed by a 1-km radius. Land use categories at the two site locations are similar with agriculture and grasslands/shrub-lands both comprising over 80 percent of the total land use types. The ratio of urban uses between the two sites are similar with the monitoring site location having a 6-percent greater ratio of residential and commercial use. There were some small variations in roughness lengths between the two locations based on a 1-km radius, but based on roughness length, both areas are predominately rural and agricultural. These runs also produced almost identical results for both Bowen ratio and Albedo for the two locations, based on the 10-km area around each location.

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

For these reasons, the El Rio meteorological data selected for use on the MREC are expected to satisfy the definition of representative meteorological data. Thus, it is CH2M’s assessment that these meteorological data are similar to the dispersion conditions at the MREC site and to the regional area.

All of these data (hourly surface data from the El Rio Monitoring Station/Camarillo Airport and appropriate upper air data) were processed with the EPA programs described above (AERSURFACE and AERMET) to generate meteorological datasets to be input to AERMOD.

5.1.6.1 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: SO₂, CO, ozone, NO₂, PM₁₀, PM_{2.5}, 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 5.1-20 presents the current federal and state AAQS.

Table 5.1-20 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 98 th percentile daily max's)
Sulfur dioxide	Annual Average	-	-
	24-hour	0.04 ppm (105 µg/m ³)	-
	3-hour	-	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	0.075 ppm (196 µg/m ³) (3-year average of annual 99 th percentile daily max's)

Table 5.1-20 State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
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 98 th percentiles)
Sulfates	24-hour	25 µg/m ³	-
Lead	30-day	1.5 µg/m ³	-
	3 Month Rolling Average	-	0.15 µg/m ³

Source: CARB website 10/2015

Notes:

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 precursor organic compounds (POC) and NO_x. POC and NO_x are therefore known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of POC and NO_x under the influence of wind and sunlight. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. In addition to causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

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

Particulate Matter (PM₁₀ and PM_{2.5}) — Both PM₁₀ and PM_{2.5} 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 PM_{2.5}, 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. PM_{2.5}, which can penetrate deep into the lungs, causes more serious respiratory ailments.

Nitrogen Dioxide and Sulfur Dioxide—NO₂ and SO₂ 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 NO₂ and SO₂ 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. (NO₂ 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.

SO₂ and NO₂ 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 the MREC. The MREC will participate in the Acid Rain allowance program through the purchase of SO₂ allowances. Sufficient quantities of SO₂ allowances are available for use on the MREC.

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 5.1-21 presents the VCAPCD attainment/nonattainment status. Figure 5.1-3 and Table 5.1-2 (Appendix 5.1B) show the locations of monitoring stations in Ventura County (and the South Central Coast Air Basin) and the summary of background air quality values for the period 2012-2014 respectively.

Ambient monitoring data for these sites for the most recent 3-year period (2012-2014) are summarized in Table 5.1-22, Air Quality Monitoring Data. Data from these sites are a reasonable representation of background air quality for the MREC site and impact area.

Table 5.1-21 VCAPCD Attainment Status

Pollutant	Averaging Time	Federal Status	State Status
Ozone	1-hour	No NAAQS	Nonattainment
Ozone	8-hour	Nonattainment (serious)	Nonattainment
CO	All	Unclassified/Attainment	Attainment
NO ₂	All	Unclassified/Attainment	Attainment
SO ₂	All	Attainment	Attainment
PM10	All	Unclassified/Attainment	Nonattainment
PM2.5	All	Unclassified/Attainment	Nonattainment
Sulfates	24-hour	No NAAQS	Attainment
Lead	All	Unclassified/Attainment	Attainment
H ₂ S	1-hour	No NAAQS	Unclassified/Attainment
Visibility Reducing Particles	8-hour	No NAAQS	Unclassified/Attainment

Source: CARB and VCAPCD website data, 10/2015.

Table 5.1-22 shows the background air quality values based upon the data presented in Appendix 5.1B. 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 and the appropriate values for the NAAQS according to the format of the standard as noted below. Appendix 5.1B presents the detailed background air quality data summaries.

Table 5.1-22 Background Air Quality Data

Pollutant and Averaging Time	Background Value
Ozone – 1-hour Maximum CAAQS	0.112 ppm (219.9 µg/m ³)
Ozone – 8-hour Maximum CAAQS/NAAQS	0.077 ppm (151.2 µg/m ³)
PM10 – 24-hour Maximum CAAQS/NAAQS	57 µg/m ³
PM10 – Annual Maximum CAAQS	24.3 µg/m ³
PM2.5 – 3-Year Average of Annual 24-hour 98th Percentiles NAAQS	18 µg/m ³
PM2.5 – Annual Maximum CAAQS	9.4 µg/m ³
PM2.5 – 3-Year Average of Annual Values NAAQS	9.1 µg/m ³
CO – 1-hour Maximum CAAQS/NAAQS	4.0 ppm (4,581 µg/m ³)
CO – 8-hour Maximum CAAQS/NAAQS	1.1 ppm (1,260 µg/m ³)
NO ₂ – 1-hour Maximum CAAQS	0.057 ppm (107.2 µg/m ³)
NO ₂ – 3-Year Average of Annual 1-hour 98th Percentile Daily Maxima NAAQS	0.032 ppm (60.2 µg/m ³)
NO ₂ – Annual Maximum CAAQS/NAAQS	0.007 ppm (13.2 µg/m ³)
SO ₂ – 1-hour Maximum CAAQS	0.004 ppm (10.5 µg/m ³)
SO ₂ – 1-hour Maximum NAAQS	0.004 ppm (10.5 µg/m ³)
SO ₂ – 24-hour	0.002 ppm (5.2 µg/m ³)

For conversion from the ppm measurements to µg/m³ concentrations typically required for the modeling analyses, used: µg/m³ = ppm x 40.9 x MW where MW = 48, 28, 46, and 64 for ozone, CO, NO₂, and SO₂, respectively.

Air Quality Analyses

The following sections present the analyses for determining the changes to ambient air quality concentrations in the region of the MREC. These analyses are comprised of a MREC-only screening assessment to determine the worst-case emissions and stack parameters and a refined modeling assessment used to calculate the MREC changes to ambient air quality. Cumulative multisource modeling assessments, which are used to analyze the MREC plus nearby existing sources, will be performed at a later date upon consultation with the appropriate agencies.

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 MREC turbines will be operated over a variety of temperature and load conditions from 25 to 100 percent, with and without inlet chilling. 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 2009-2013). This included various turbine loads for seven ambient temperatures: 30°F, 39°F, 59°F, 61°F (annual average conditions), 76°F, 79°F and 96°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 averaging periods of 24 hours or less were used in the refined impact analyses. The 61°F condition was assumed to represent annual average conditions. As such, no screening analyses were performed for annual average

concentrations (the annual refined analyses were modeled with the stack parameters for the 61°F case at 100 percent load with inlet chilling, which is the worst-case operating condition).

The results of the turbine load/temperature screening analysis are listed in Appendix 5.1B. Most short-term maximum impacts were predicted to occur for the 30°F ambient temperature conditions. For NO_x and CO emissions, the worst-case turbine condition is 30°F and 100 percent load (Case 1) and for SO₂, the worst-case turbine condition is 30°F and 25 percent load (Case 4). This is because SO₂ emissions are the same for all operating conditions, so the lowest load represents the smallest plume rise and the highest impacts when emissions are equal. However, for PM10/PM2.5, the worst-case turbine condition is 96°F and 75 percent load (Case 31). The worst-case 50 percent load condition (30°F, Case 3) was used for modeling startup operations and commissioning activities. Finally, annual impacts were only summarized for the turbine condition of 100 percent load with the chiller at 61°F (Case 14) since this is expected to be the most representative condition of annual operations.

5.1.6.2 Refined Analysis

Based on the results of the screening analyses, all MREC sources were modeled in the refined analysis for comparisons with Significant Impact Levels (SILs) and CAAQS/ NAAQS.

Impacts during normal operations were based on continuous turbine operations at the worst-case screening condition. Testing of the firepump (30 minutes in any one day) will not take place during startup of the turbines, so 1-hour NO₂, CO, and SO₂ impacts included the firepump only for normal operations. The refined modeling analyses did consider operation of the firepump for 8-hour CO startup conditions. Since the firepump would be tested far less than 100 hours/year, it included in 1-hour NO₂ and SO₂ NAAQS modeling analyses at the annual average emission rates per EPA guidance due to the statistical nature of these standards (it was modeled at the maximum 1-hour emission rate for the CAAQS).

For startup operations, the MREC will start with time periods of 30 minutes or less. Since Gaussian modeling is based on 1 hour steady state conditions, the startup/shutdown emission rates used for refined modeling assumed the worst-case combined hourly emission rate for startup, shutdown, and normal operations at the worst-case 50 percent load condition. Detailed emission calculations for all averaging periods are included in Appendix 5.1A. The refined modeling assessment included the following assumptions and conditions for both normal and startup/shutdown conditions:

- All turbines can start during any hour
- Fire pump testing occurs up to 30 minutes per day, 52 hours per year, but will not occur during a turbine start or shutdown hour
- Inlet Chiller operates 24 hours per day and 2,500 hours per year
- Turbines can operate 24 hours per day
- Worst-case annual modeled emissions for NO_x, PM10 and PM2.5: 2,402 hours at base load, 150 starts, 150 shutdowns = 2,500 hours, with stack characteristics based on the annual operating condition (Case 14)
- Startup stack parameters are based on 50 percent load
- For all the CAAQS, start emissions/conditions were assessed based on the deterministic nature of all California state standards (maximum concentration over the five years modeled for one (1) hour CO, NO₂ and SO₂ standards, etc.)
- Startup CO 8-hour impacts calculated as two starts + two shutdowns + four hours base load with chillers on. The fire pump is assumed to be tested during the eight-hour period.
- For any one-hour time period, all five turbines could be in startup or shutdown.

- Fire pump will not be tested during 1-hour turbine start cycle but is included in the 8-hour start case
- PM10 and PM2.5 24-hour modeled concentrations were based on the worst-case screening condition. The firepump was also assumed to be tested during this time frame.
- The 20-meter spaced refined receptor grid for the elevated terrain area south of the MREC site was included in both the screening and refined modeling analyses as discussed above.

Also, since startup emissions for SO₂ 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 are included in Appendix 5.1A.

The worst-case modeling input information for each pollutant and averaging period are shown in Table 5.1-23 for normal operating conditions and combustion turbine startup/shutdown conditions. As discussed above, the combustion turbine stack parameters used in modeling the impacts for each pollutant and averaging period reflected the worst-case operating condition for that pollutant and averaging period identified in the load screening analysis.

Table 5.1-23 Stack Parameters and Emission Rates for Each of the Modeled Sources

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO _x	SO ₂	CO	PM10/PM2.5
Averaging Period: 1-hour for Normal Operating Conditions (Case 1 for NO_x/CO and Case 4 for SO₂)								
Each Turbine (NO _x /CO)	18.29	736.9	31.28	3.6576	0.643	-	0.626	-
Each Turbine (SO ₂)	18.29	676.1	16.14	3.6576	-	0.074	-	-
Fire Pump - CAAQS	7.62	803.2	44.30	0.1270	0.086	1.454E-4	0.079	-
Fire Pump - NAAQS	7.62	803.2	44.30	0.1270	1.016E-3	1.726E-6	-	-
Averaging Period: 3-hours for Normal Operating Conditions (Case 4)								
Each Turbine	18.29	676.1	16.14	3.6576	-	0.074	-	-
Fire Pump	7.62	803.2	44.30	0.1270	-	4.847E-5	-	-
Averaging Period: 8-hours for Normal Operating Conditions (Case 1)								
Each Turbine	18.29	736.9	31.28	3.6576	-	-	0.626	-
Fire Pump	7.62	803.2	44.30	0.1270	-	-	9.931E-3	-
Averaging Period: 24-hours for Normal Operating Conditions (Case 4 for SO₂ and Case 31 for PM)								
Each Turbine (SO ₂)	18.29	676.1	16.14	3.6576	-	0.074	-	-
Each Turbine (PM)	18.29	738.4	24.08	3.6576	-	-	-	0.252
Fire Pump	7.62	803.2	44.30	0.1270	-	6.059E-6	-	1.910E-4
Averaging Period: Annual (Case 14 with Chiller)								
Each Turbine	18.29	738.7	31.42	3.6576	0.161	-	-	0.072
Fire Pump	7.62	803.2	44.30	0.1270	1.016E-3	-	-	5.441E-4
Averaging Period: 1-hour for Start-up/Shutdown Periods (Case 3)								
Each Turbine	18.29	704.3	20.83	3.6576	1.468	-	1.007	-
Averaging Period: 8-hours for Start-up/Shutdown Periods (Case 3)								
Each Turbine	18.29	704.3	20.83	3.6576	-	-	0.755	-
Fire Pump	7.62	803.2	44.30	0.1270	-	-	9.931E-3	-

Table 5.1-23 Stack Parameters and Emission Rates for Each of the Modeled Sources

	Stack Height (m)	Stack Temp. (Kelvin)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rates (g/s)			
					NO _x	SO ₂	CO	PM10/PM2.5
Averaging Period: 1-hour for Part 1 of Commissioning Activities (Case 3)								
Two Turbines(each)	18.29	704.3	20.83	3.6576	8.568	-	14.774	-
Averaging Period: 8-hours for Part 1 of Commissioning Activities (Case 3)								
Two Turbines(each)	18.29	704.3	20.83	3.6576	-	-	14.364	-
Averaging Period: 1-hour for Part 2 of Commissioning Activities (Case 3)								
Two Turbines(each)	18.29	704.3	20.83	3.6576	1.680	-	2.961	-
Averaging Period: 8-hours for Part 2 of Commissioning Activities (Case 3)								
Two Turbines(each)	18.29	704.3	20.83	3.6576	-	-	2.751	-
Averaging Period: 24-hours for Part 2 of Commissioning Activities (Case 3)								
Two Turbines(each)	18.29	704.3	20.83	3.6576	-	-	-	0.504

m/s = meters per second

m = meter

g/s = grams per second

5.1.6.3 Normal Operations Impact Analysis

In order to determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used with all 5 years of meteorology. Table 5.1-24 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods. The annual average concentrations of NO₂ 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 NO₂/NO_x ratios, respectively. For the refined modeling analyses of the 1-hour CO and the 1-hour NO₂ CAAQS concentrations, AERMOD demonstrated that facility base load operations produced higher concentrations than startup conditions because of the routine testing of the fire pump. Other maximum facility impacts occurred in the elevated terrain south of the MREC site. These 200-meter spaced coarse receptor grid and 100-meter spaced intermediate receptor grid areas were remodeled with a 20-meter spaced refined grid. The refined grid was included in both the screening and refined modeling analyses.

The maximum impacts for normal and startup/shutdown facility operating conditions are compared on Table 5.1-24 to the EPA SILs for all applicable pollutants. As applicable, the maximum modeled impacts for all five years of meteorological data were used for comparisons to the SILs for all CAAQS and NAAQS, in keeping with the form of the standards. The 5-year averages of the daily maximum or annual impacts were used for the 1-hour NO₂, 1-hour SO₂, 24-hour PM2.5, and annual PM2.5 SILs in accordance with EPA guidance. Most pollutant impacts will be less than the SILs (CO, SO₂, and PM10 for all averaging times and NO₂ and PM2.5 for annual averages). The maximum MREC concentrations of 1-hour NO₂ (both normal conditions and startup periods) and 24-hour PM2.5 are predicted to be greater than the EPA SILs.

Table 5.1-24 Air Quality Impact Results for Refined Modeling Analysis of the MREC – Significant Impact Levels

Pollutant	Avg. Period	Maximum Concentration ($\mu\text{g}/\text{m}^3$)	Class II SIL ($\mu\text{g}/\text{m}^3$)
Normal Operating Conditions			
NO ₂ ^a	1-hour Maximum (CAAQS)	80.1	-
	1-hour 3-year Average of Maximums	39.4	7.5
	Annual Maximum	0.20	1.0
CO	1-hour Maximum	91.9	2,000
	8-hour Maximum	20.9	500
SO ₂	1-hour Maximum	9.5	-
	1-hour 3-year Average of Maximums	7.7	7.8
	3-hour Maximum	5.5	25
	24-hour Maximum	1.2	5
PM10	24-hour Maximum	3.46	5
	Annual Maximum	0.12	1
PM2.5	24-hour 5-year Average of Maximums	2.29	1.2
	Annual Maximum	0.12	-
	5-year Average of Annual Concentrations	0.11	0.3
Start-up/Shutdown Periods			
NO ₂ ^a	1-hour Maximum	118.0	-
	1-hour 5-year Average of Maximums	107.3	7.5
CO	1-hour Maximum	101.2	2,000
	8-hour Maximum	33.5	500

^a NO₂ 1-hour and annual impacts evaluated using the Ambient Ratio Method with 0.80 (80 percent) and 0.75 (75 percent) ratios, respectively.

Maximum MREC concentrations are compared in Table 5.1-25 to the CAAQS and NAAQS. The maximum concentrations for all five years of meteorological data modeled were used for comparison to all the CAAQS, the annual NO₂ NAAQS and the 1-hour and 8-hour NAAQS for CO. For the other NAAQS, the MREC concentrations in the table were based on the form of the NAAQS, namely: High Second-High (H2H) values for the 3-hour SO₂ NAAQS and 24-hour PM10; the 5-year average of the annual 98th and 99th percentile 1-hour daily maxima for 1-hour NO₂ and SO₂ NAAQS, respectively; for PM2.5, the 5-year average of the annual 98th percentile 24-hour impacts and the 5-year average of the annual impacts. Compliance with the NAAQS and CAAQS were calculated for all pollutants other than the CAAQS for PM10, which because of high background concentrations, already exceed the CAAQS (the area is already designated as State nonattainment for the PM10 CAAQS). 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, the MREC would not significantly contribute to current exceedances of the CAAQS.

Table 5.1-25 Air Quality Impact Results for Refined Modeling Analysis of MREC – Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Concentration ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total ($\mu\text{g}/\text{m}^3$)	Ambient Air Quality Standards CAAQS/NAAQS ($\mu\text{g}/\text{m}^3$)	
Normal Operating Conditions						
NO ₂ ^a	1-hour Maximum	80.1	107.2	187.3	339	-
	1-hour 3-year Average of 98 th percent	26.1	60.2	86.3	-	188
	Annual Maximum	0.20	13.2	13.4	57	100
CO	1-hour Maximum	91.9	4,581	4,673	23,000	40,000
	8-hour Maximum	23.5	1,260	1,284	10,000	10,000
SO ₂	1-hour Maximum	9.8	10.5	20.3	655	-
	1-hour 3-year Average of 99 th percent	6.3	5.2	11.5	-	196
	3-hour Maximum	4.7	10.5	15.2	-	1300
	24-hour Maximum	1.4	5.2	6.6	105	-
PM10	24-hour Maximum	3.81	57	61	50	-
	24-hour H2H	3.30	57	60	-	150
	Annual Maximum	0.12	24.3	24.4	20	-
	24-hour 3-year Average of 98 th percent	1.42	18	19.4	-	35
PM2.5	Annual Maximum	0.12	9.4	9.5	12	-
	3-year Average Annual Concentrations	0.11	9.1	9.2	-	12.0
Start-up/Shutdown Periods						
NO ₂ ^a	1-hour Maximum	133.0	107.2	240.2	339	-
	1-hour 3-year Average of 98 th percent	74.9	60.2	135.1	-	188
CO	1-hour Maximum	114.0	4,581	4,695	23,000	40,000
	8-hour Maximum	37.3	1,260	1,290	10,000	10,000

5.1.6.4 MREC Commissioning Impact Analysis

The commissioning activities for the combustion turbine are expected to consist of four general phases. GE, the turbine vendor, has provided estimates of emissions and hours for each phase of the commissioning process. This schedule is summarized in Table 5.1-26 with additional details in Appendix 5.1A. The worst case short-term emissions profile during expected commissioning-period operating loads are summarized in Table 5.1-27.

Table 5.1-26 Commissioning Schedule

Commissioning Phase	1 First Fire and Synch Checks	2 Break In Dynamic Commissioning	3 AVR and ECS Tuning	4 Performance Testing
SCR Installed	No	No	No	Yes
CO Catalyst Installed	No	No	No	Yes
Hours per Unit	48	38	34.5	88
Number of Units Operating Simultaneously	2	2	2	2
Total NO _x lbs (5 Turbines)	5,885	8,440	3,945	2,390
Total CO lbs (5 Turbines)	14,950	17,915	9,220	2,200
Total ROC lbs (5 Turbines)	265	370	360	635
Total PM10/PM2.5 (5 Turbines)	600	570	600	1,760
Total SO _x (5 Turbines)				

Notes: per GE, see Appendix 5.1A

Table 5.1-27 Maximum Hourly Emissions Rates During Each Phase of Commissioning (Per Turbine)

Commissioning Stage	Emission Rate	NO _x	CO	ROC	PM10/PM2.5	SO _x
1	lb/hr	55.5	83.55	1.5	3.0	
2	lb/hr	68.0	117.33	3.00	3.0	
3	lb/hr	51.25	117.25	2.92	3.0	
4	lb/hr	5.50	5.00	2.67	4.0	

Notes: per GE, see Appendix 5.1A for commissioning schedule.

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

The modeling assumed each turbine would be in the commissioning activity that produced the maximum emissions.

The total emissions from the turbines during the 213 hours per turbine are expected to be as follows:

- NO_x – 4,132 lbs or 2.07 tons
- CO - 8,858 lbs or 4.43 tons
- ROC - 327 lbs or 0.164 tons
- PM10/PM2.5 - 706 lbs or 0.353 tons
- SO_x – 213 lbs or 0.107 tons

During the first year of operation, plant commissioning activities, which is planned to occur over an estimated 213 hours per turbine, will have higher hourly and daily emissions profiles than during normal operations in the subsequent years of operation. There are several phases during commissioning that result in NO_x, CO, ROC, and PM10/PM2.5 emissions that are greater than during normal operations. (During commissioning, SO₂ emissions are expected to be no greater than during normal full load operations.) Typically, some of these commissioning activities occur prior to the installation of the pollution control equipment, e.g., SCR and oxidation catalyst, while the combustion turbines are being tuned to achieve optimum performance. During the initial combustion turbine tuning, NO_x and CO emission control systems would not be functioning.

For the purposes of air quality modeling, commissioning activities are divided into two parts. During the first half of the commissioning process, expected to last up to 90 hours per turbine, NO₂, and CO emissions could be considerably higher during commissioning than under other operating conditions already evaluated. Only two turbines would be commissioned during this first part of the commissioning process, with the other turbines in non-operation. During the final and second part of the commissioning lasting up to 123 hours per turbine, NO₂ and CO emissions, while still greater than normal or startup emissions at times, would be considerably less than the first part of commissioning. In addition, long term PM emissions (for the additional five days of commissioning) could exceed normal startup emissions. Therefore, five turbines were assumed to be operational during this second part of commissioning. These commissioning emissions are shown in Table 5.1-23 and 5.1-27 above. Like modeling analyses for the startup periods, the worst-case 50 percent load condition (Case 3) was evaluated for commissioning activities. The refined receptor grids from the operational modeling were also included as it produced larger impacts than the normal receptor grids. Since the duration of commissioning is extremely limited, assessment of the 1-hour NO₂, 1-hour SO₂, and 24-hour PM_{2.5} NAAQS are not required according to EPA guidance documents (i.e., NAAQS based on 5-year averages of the eighth, fourth, and eighth highest daily maximum concentrations, respectively). Further testing of the firepump would not be expected to occur during the commissioning period. Finally, the ozone limiting method (OLM) as described in the Air Quality Modeling Protocol was used to assess compliance with the 1-hour NO₂ CAAQS. Concurrent background ozone concentrations for the El Rio air quality monitoring site (the same location as the modeled meteorological data) were used, along with EPA-default value of 0.5 for the NO₂/NO_x in-stack ratio and the OLMGROUP ALL option. Additional descriptions of the commissioning phases and the associated emissions are contained below and in Appendix 5.1A.

Appendix 5.1A lists the specific emissions during each phase of the commissioning activity, and the proposed detailed commissioning schedule. The modeling presented in Table 5.1-28 summarizes the results of the commissioning assessment. As can be seen, the modeling demonstrates that commissioning activities will comply with all applicable National and California state ambient air quality standards (NAAQS/CAAQS) for which the MREC area is already in attainment. Like the facility modeling analyses for normal operations and start-up periods, the background PM₁₀ concentrations already exceed the CAAQS, so combined impacts with the comparatively smaller facility impacts would also exceed the CAAQS.

Table 5.1-28 Air Quality Impact Results for Commissioning Modeling Analysis – Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Concentration (µg/m ³)	Background (µg/m ³)	Total (µg/m ³)	Ambient Air Quality Standards CAAQS/NAAQS (µg/m ³)	
Commissioning Activities – Part 1 (Phases 2-7)						
NO ₂	1-hour Maximum	207.0	107.2	314.2	339	N/A
CO	1-hour Maximum	714	4,581	5,295	23,000	40,000
	8-hour Maximum	296	1,260	1,556	10,000	10,000
Commissioning Activities – Part 2 (Phases 8-11)						
NO ₂	1-hour Maximum	95.1	107.2	202.3	339	N/A
CO	1-hour Maximum	335	4,581	4,916	23,000	40,000
	8-hour Maximum	136	1,260	1,396	10,000	10,000
PM ₁₀	24-hour Maximum	8.4	57	65.4	50	150

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, 1002a). The worst-case stack parameters identified in the screening analysis for the turbine stacks for 1-hour averaging times were modeled (Case 1, or 100 percent load with chiller on at an ambient temperature of 30°F). Shoreline fumigation impacts were not assessed since the nearest distance to the shoreline of any large bodies of water is greater than 3 kilometers. Since AERSCREEN is a single point source model, the middle turbine stack (Turbine 3) was modeled. Other AERSCREEN inputs were the BPIP-PRIME values used for the facility analyses, the average moisture AERSURFACE output used for the AERMET runs, the range of ambient temperatures analyses in the facility screening analyses (30-96°F), a minimum fence line distance of 25 meters, RURAL dispersion conditions, 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 for turbine stack T3).

An inversion breakup fumigation impact was predicted to occur at 6,594 meters from the turbine stacks. No inversion breakup fumigation impacts are predicted by AERSCREEN for the shorter firepump stack. Since the site vicinity is rural in nature, there was no need to adjust fumigation impacts for urban dispersion conditions. 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 5.1-29 and were compared to the maximum AERSCREEN impacts for the middle turbine for flat terrain (predicted to occur 251 meters from the stack) 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). As can be seen, all of these maximum 1-hour fumigation impacts are less than the AERSCREEN maxima predicted to occur under normal dispersion conditions anywhere offsite. The fumigation impacts are even smaller when compared to the AERMOD screening analysis impacts for turbine stack T3, which consider terrain effects for all the sources combined (shown in the modeling documents). Since all short-term fumigation impacts are less than the maximum overall AERSCREEN and AERMOD screening 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). Thus, the overall refined modeling analysis impacts are conservative with respect to fumigation impacts, so no pollutant-specific fumigation results are presented.

Table 5.1-29 Fumigation Impact Summary

Averaging Time (Unitized Impacts for 1 g/s)	Fumigation Impacts ($\mu\text{g}/\text{m}^3$)	AERSCREEN Flat Terrain Impacts ($\mu\text{g}/\text{m}^3$)	AERMOD Screening Impacts ($\mu\text{g}/\text{m}^3$)
1-hour	3.232	4.885	18.897
3-hour	3.232	4.885	11.077
8-hour	2.909	4.396	7.709
24-Hour	1.939	2.931	2.592
Distance (m)	6,594	251	1,417-1,964

5.1.7 Laws, Ordinances, Regulations, and Statutes

Table 5.1-30 presents a summary of local, state, and federal air quality LORS deemed applicable to the MREC. Specific LORS are discussed in greater detail in Section 5.1.6.1.

Table 5.1-30 Summary of LORS - Air Quality

LORS	Applicability	Conformance (AFC Section)
Federal Regulations		
CAAA of 1990, 40 CFR 50	MREC operations will not cause violations of state or federal AAQS.	5.1.5.1–5.1.5.9
40 CFR 52.21 (PSD)	Impact analysis shows compliance with NAAQS, the MREC will not be subject to PSD.	5.1.5.1-5.1.5.9, 5.1.3.4, Appendix 5.1B, Appendix 5.1C
40 CFR 72-75 (Acid Rain)	The MREC will submit all required applications for inclusion to the acid rain program and allowance system, CEMS will be installed as required. The MREC is subject to Title IV.	5.1.6.1, 5.1.6.2
40 CFR 60 (NSPS)	The MREC will determine subpart applicability and comply with all emissions, monitoring, and reporting requirements. 40 CFR 60, Subpart KKKK will apply to the turbines. Subpart IIII will apply to the fire pump engine.	5.1.6, 5.1.6.1
40 CFR 70 (Title V)	Title V application will be submitted pursuant to the timeframes noted in VCAPCD Regulation XXX.	5.1.6.1, 5.1.6.3
40 CFR 68 (RMP)	The MREC will evaluate substances and amounts stored, determine applicability, and comply with all program level requirements.	5.9
40 CFR 64 (CAM Rule)	Facility will be exempt from CAM Rule provisions.	5.1.6, 5.1.6.1
40 CFR 63 (HAPs, MACT)	Subpart YYYY applies to stationary combustion turbines constructed after 1-14-03 located at a major HAPs source. Emissions limits in the rule are currently stayed.	5.1.6.1
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.	5.1.6.1
State Regulations (CARB)		
CHSC 44300 et seq.	The MREC will determine applicability, and prepare inventory plans and reports as required.	5.1.6, 5.1.6.1
CHSC 41700	The VCAPCD PTC will ensure that no public nuisance results from operation of facility.	5.1.6.1, 5.1.6.2
Gov. Code 65920 et seq.	Pursuant to the Permit Streamlining Act, the Mission Rock believes the MREC is a “development project” as defined, and is seeking approvals as applicable under the Act.	n/a
Local Regulations (VCAPCD)		
Rule 50 -Visible Emissions	Limits visible emissions to Ringelmann 1 for periods greater than 3 minutes in any hour.	5.1.6.1
Rule 51-Nuisance	Prohibits the discharge of pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage businesses or property.	5.1.6.1
Rule 54-Sulfur Compounds	Prohibits sulfur emissions as SO ₂ in excess of 300 ppmv (15 percent O ₂), and prohibits offsite impacts of SO ₂ above 0.25 ppm (1 hr avg) and 0.04 ppmv (24 hr avg).	5.1.6.1

Table 5.1-30 Summary of LORS - Air Quality

LORS	Applicability	Conformance (AFC Section)
Rule 55-Fugitive Dust Control	Requires control of fugitive dust from construction activities including track-out emissions, also prohibits visible dust emissions beyond the property line.	5.1.6.1
Rule 57.1-PM Emissions from Fuel Burning Eq.	Limits PM emissions from fuel combustion to ≤ 0.12 lbs/mmbtu.	5.1.6.1
Rule 64-Sulfur Content of Fuels	Limits gaseous fuel sulfur to ≤ 50 gr S/100scf, and liquid fuel sulfur content to ≤ 0.5 percent weight.	5.1.6.1
Rule 72-NSPS	See Federal LORS Section of table.	5.1.6.1
Rule 73-NESHAPs	See Federal LORS Section of table.	5.1.6.1
Rule 79.4-Stationary IC Engines	Limits NO_x , CO, and ROC emissions from stationary IC engines greater than 50 bhp. Emergency IC engines operating ≤ 50 hours/year for testing and maintenance, and ≤ 200 hours/year for any purpose is exempt from the rule emissions limits.	5.1.6.1
Rule 74.23-Stationary Gas Turbines	Limits NO_x from turbines ≥ 10 MW, firing gas fuels and using SCR to a ppm value calculated by (9XEFF/25). The proposed turbines will meet these NO_x requirements. In addition the rule requires compliance with an NH_3 slip limit of 20 ppmv. The proposed ammonia slip limit for the turbines is 5 ppmv.	5.1.6.1

5.1.7.1 Specific LORS Discussion

Federal LORS

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)
- PSD
- New Source Review (NSR)
- Title IV: Acid Rain/Deposition Program
- Title V: Operating Permits Program
- CAM Rule

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

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

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

The NESHAPs program provisions limits hazardous air pollutant emissions from existing major sources of HAP emissions in specific source categories. The NESHAPs program also requires the application of maximum achievable control technology (MACT) to any new or reconstructed major source of HAP emissions to minimize those emissions. Subpart YYYYY will apply to the proposed turbine. The emissions provisions of Subpart YYYYY are currently subject to “stay” by EPA. Notwithstanding the foregoing, the proposed turbine is expected to comply with the emissions provisions.

PSD 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 MREC region and protecting Class I areas from air quality degradation. The facility will *not* trigger the PSD program requirements.

NSR - 40 CFR Parts 51 and 52

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

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

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

Title V - Operating Permits Program - 40 CFR Part 70

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

CAM Rule - 40 CFR Part 64

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

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

The TRI program as applied to electric utilities, affects only those facilities in Standard Industrial Classification (SIC) Codes 4911, 4931, and 4939 that combust coal and/or oil for the purpose of generating electricity for distribution in commerce must report under this regulation. The MREC SIC

Code is 4911. However, the MREC 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 MREC.

NSPS

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

Subpart A General Provisions

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

Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion

Engines

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

- (i) Non-fire, water pump engines manufactured after April 1, 2006;
- (ii) Fire water pump engines with less than 30 liters per cylinder manufactured after 2009;

Or

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

For the purpose of this rule, “manufactured” means the date the owner places the order for the equipment. Based on the timeline projected for obtaining approval of the MREC, the applicant expects that the engines will be ordered (and thus manufactured) in 2016.

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

Subpart KKKK Standards of Performance for Stationary Combustion Turbines.

Subpart KKKK places emission limits of NO_x and SO₂ 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 O₂ 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 SO₂ 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 SO₂/MMBtu heat input. If the turbine simultaneously fires multiple fuels, each fuel must meet this requirement.

As described in the BACT section, the MREC will use a SCR system to reduce NO_x emissions to 2.0 ppm and pipeline natural gas to limit SO₂ emissions to 0.0006 pounds per MMBtu to meet BACT requirements, which ensures that the MREC 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 CO₂ 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 CO₂/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 CO₂/MMBtu. Each affected 'base load' EGU is subject to the gross energy output standard of 1,000 lbs of CO₂/MWh unless the Administrator approves the EGU being subject to a net energy output standard of 1,030 lbs CO₂/MWh. The MREC 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 CO₂/mmbtu as specified in 40 CFR 60.5508-60.5580, Subpart TTTT, Table 2.

State LORS

CARB's jurisdiction and responsibilities fall into the following five areas;

- Implement the state's motor vehicle pollution control program
- Administer and coordinate the state's air pollution research program
- Adopt and update the state's AAQS
- Review the operations of the local air pollution control districts (VCAPCDs) to insure compliance with state laws
- Review and coordinate preparation of the State Implementation Plan

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

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

Public Nuisance – H&SC § 41700

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

Local Air District LORS-VCAPCD

VCAPCD Prohibitory Rules – General and Source Specific Regulations

The general prohibitory rules of the VCAPCD applicable to the MREC are summarized below.

Rule 50 – Visible Emissions.

Prohibits visible emissions as dark as, or darker than, Ringelmann No. 1 for periods greater than 3 minutes in any hour. The use of natural gas in the turbines and low sulfur diesel fuel in the emergency engines is expected to establish compliance with the rule provisions.

Rule 51 – Nuisance.

Prohibits a facility from discharging air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property. Use of natural gas in the turbines and low sulfur diesel fuel in the emergency engines is expected to establish compliance with the rule provisions.

Rule 54 – Sulfur Compounds.

Prohibits sulfur emissions, calculated as SO₂, in excess of 300 ppmv at 15 percent oxygen, and prohibits offsite ambient SO₂ impacts above 0.25 ppmv (1-hour average) and 0.04 ppmv (24-hour average). Use of natural gas in the turbines and low sulfur diesel fuel in the emergency engines is expected to establish compliance with the rule provisions.

Rule 55 – Fugitive Dust Control.

Requires the control of dust emissions during construction activities and prohibits visible dust emissions beyond the property line; also requires mitigation of track-out onto public roadways and includes other dust mitigation requirements.

Rule 57.1 – Particulate Matter Emissions from Fuel Burning Equipment.

Prohibits PM emissions above 0.12 pound per million British thermal units (lb/MMBtu) for fuel burning equipment. Use of natural gas in the turbines and low sulfur diesel fuel in the emergency engines is expected to establish compliance with the rule provisions.

Rule 64 – Sulfur Content of Fuels.

Prohibits the burning of gaseous fuel with a sulfur content of more than 50 gr/100 scf and liquid fuel with a sulfur content of more than 0.5 percent sulfur by weight. Use of natural gas in the turbines and low sulfur diesel fuel in the emergency engines is expected to establish compliance with the rule provisions.

Rule 72 – New Source Performance Standards.

Requires units to comply with the applicable sections of the federal NSPS. See subpart KKKK analysis.

Rule 73 – National Emission Standards for Hazardous Air Pollutants.

Requires units to comply with the applicable sections of the federal NESHAP program.

Rule 74.9 – Stationary Internal Combustion Engines.

Rule limits CO, NO_x, and ROC emissions from stationary reciprocating internal combustion engines rated greater than or equal to 50 bhp. Emergency equipment operating less than or equal to

50 hours per year for testing or maintenance purposes and less than or equal to 200 hours per year for any purpose is exempt from the emission limits of Rule 74.9.

Rule 74.23 – Stationary Gas Turbine.

Limits NO_x emissions from stationary gas turbines rated greater than or equal to 10 megawatts (MW) with post-combustion controls to 9 ppmv (at 15 percent oxygen, corrected for efficiency). The NO_x emissions from the proposed turbines will be limited to 2.5 parts per million (ppmvc), and thus complies with this rule. Use of natural gas, low-NO_x burner technology, and SCR in the turbines is expected to establish compliance with the rule provisions.

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 and other anthropogenic forcings together.

State law defines GHG to include the following: CO₂, methane, N₂O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (Health and Safety Code §38505[g]). The most common GHG that results from human activity is CO₂, followed by methane and N₂O.

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). The MREC 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% below 1990 levels by 2050 and 40% 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 CO₂/MWh. A 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 the MREC will be approximately 29 percent. Therefore, as a non-baseload facility, procurement of electricity from the MREC pursuant to a long-term contract would not be subject to the emissions performance standard.

5.1.7.2 Agency Jurisdiction and Contacts

Table 5.1-31 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 the MREC,
- Contact address and phone information
- The agency involvement in required permits or approvals

Table 5.1-31 Agencies, Contacts, Jurisdictional Involvement, Required Permits For Air Quality

Agency	Contact	Jurisdictional Area	Permit Status
CEC	Chris Davis 1516 Ninth St. Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the facility under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
VCAPCD	Kerby Zozula Manager, Eng. Division VCAPCD 669 County Square Dr. Ventura, CA. 93003 (805) 645-1421	Prepares DOC for CEC, Issues VCAPCD ATC and Permit to Operate, Primary air regulatory and enforcement agency.	DOC will be prepared subsequent to AFC submittal. AFC serves as the ATC application per Rule 26.9.
CARB	Mike Tollstrup Chief, Project Assessment Branch 1001 I St., 6th Floor Sacramento, CA 95814 (916) 322-6026	Oversight of AQMD stationary source permitting and enforcement program	CARB staff will provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on draft ATC.
EPA Region 9	Gerardo Rios Chief, Permits Section EPA Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974	Oversight of all AQMD programs, including permitting and enforcement programs. PSD permitting authority for VCAPCD.	EPA Region 9 staff will receive a copy of the DOC. EPA Region 9 staff will have opportunity to comment on draft ATC.

DOC = Determination of Compliance

5.1.7.3 Permit Requirements and Schedules

An ATC application is required in accordance with the VCAPCD rules. Pursuant to VCAPCD Rule 26.9, the AFC is considered to be equivalent to the AQMD ATC permitting application. The required district permitting forms have been submitted separately to the VAPCD. These application forms in conjunction with the AFC comprise the required AQMD permitting application package. The required Title V application will be submitted within 12 months of the commencement of facility operations per the VCAPCD rules.

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