August 24, 2012

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Chris Anderson
Air Quality Engineer
Mojave Desert Air Quality Management District
14306 Park Avenue
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Subject: BrightSource Energy Rio Mesa Solar Electric Generating Facility
Draft Preliminary Determination of Compliance

Dear Mr. Anderson:

On behalf of BrightSource Energy, we are pleased to provide the following comments on the District's draft Preliminary Determination of Compliance (PDOC) for the proposed Rio Mesa Solar Electric Generating Facility. The proposed changes discussed below are shown on the enclosed markup of the draft PDOC.

Page 5, Table 1A Annual HAP Emissions

The requested change to the Diesel Particulate Matter (DPM) annual emissions is to show the total emissions for the emergency generators and firepump engines in the two power blocks and the common area. The DPM emissions for the mirror washing machines were not included in this emission total because the combustion emissions from these units are not regulated under the District permitting program.

The beryllium and copper emissions were removed from the emission summary table because we inadvertently showed beryllium and copper emissions for the wet surface cooling towers in the July 3, 2012 two-power block design submittal to the District. Because the water that will be used by these cooling towers will be treated with a reverse osmosis system, the expected metal concentrations in this water will be negligible and below detection limits.

Page 6, Table 2 Daily Criteria Pollutant Emissions

The daily emission levels on this table were revised slightly to make the numbers consistent with the July 3, 2012 two-power block design submittal to the District. The reasons for these differences are slight differences in the hourly emission rates for the

boilers. This issue is discussed in more detail below.

Page 8, Table 8 Maximum Ambient Air Quality Impacts

The requested change to the annual NO_2 and 24-hour SO_2 modeled impacts is due to the removal of the combustion impacts from the mirror washing machines. The combustion impacts for the mirror washing machines were not included in these modeled results because the combustion emissions from these units are not regulated under the District permitting program.

Page 9, Section 8 Health Risk Assessment

The requested change to the modeled cancer risk impact is due to the removal of the combustion impacts from the mirror washing machines. The combustion impacts for the mirror washing machines were not included in these modeled results because the combustion emissions from these units are not regulated under the District permitting program.

Page 10, Table 9 Emission Offset Thresholds

The requested changes to the emission levels summarized in this table were made to make the numbers consistent with emission levels summarized in Table 1 of the draft PDOC.

Page 14, Section 12 Permit Conditions – Auxiliary Boilers, Condition 3

This proposed change to the regulatory citation was to clarify that, rather than a BACT requirement (which is not triggered by these boilers), this condition is a Title V recordkeeping requirement.

Page 15, Section 12 Permit Conditions – Auxiliary Boilers, Condition 4

The proposed minor changes to the NOx and VOC hourly emission rates are to make these levels consistent with the auxiliary boiler emission levels shown in the July 3, 2012/April 20, 2012 submittals to the District. The emission levels shown in these submittals to the District are based on NOx and VOC emission factors of 0.0110 lbs/MMBtu and 0.0054 lbs/MMBtu, respectively. These auxiliary boiler emission factors were provided by the engineering firm for this project.

Page 15, Section 12 Permit Conditions – Auxiliary Boilers, Conditions 5 and 6

The proposed changes to the source test methods in these conditions clarify that the continuous emission monitoring system NOx test method is preferred over the grab

sample method. In addition, the changes clarify that the PM_{10} test method is preferred, rather than the total PM test method.

Page 16, Section 12 Permit Conditions – Auxiliary Boilers, Condition 12

The proposed minor changes to the daily and annual fuel use limits were to make these limits consistent with the information included in the July 3, 2012 two-plant design submittal.[1]

Page 17, Section 12 Permit Conditions – Nighttime Preservation Boilers, Condition 4

The proposed minor changes to the NOx and VOC hourly emission rates are to make these levels consistent with the nighttime preservation boiler emission levels shown in the July 3, 2012/April 20, 2012 submittals to the District. The emission levels shown in these submittals to the District are based on NOx and VOC emission factors of 0.0110 lbs/MMBtu and 0.0053 lbs/MMBtu, respectively. These nighttime preservation boiler emission factors were provided by the engineering firm for this project. Please note that there is a typographical error in the April 20, 2012 submittal to the District regarding the VOC ppm level for the nighttime preservation boilers: the VOC level should be listed as 12.6 ppm @ 3% O_2 rather than 10 ppm @ 3% O_2. This correction to the ppm level does not impact the VOC lbs/MMBtu and lbs/hr levels in the April 20, 2012 submittal since these were all based on 12.6 ppm. This correction to the VOC ppm level is also shown on Table 4 of the enclosed markup of the draft PDOC.

Page 17, Section 12 Permit Conditions – Nighttime Preservation Boilers, Conditions 5 and 6

The proposed changes to the source test methods in these conditions clarify that the continuous emission monitoring system NOx test method is preferred over the grab sample method. In addition, the changes clarify that the PM_{10} test method is preferred over the total PM test method.

Page 18, Section 12 Permit Conditions – Emergency Generator Engines, Condition 5

The proposed change is to clarify that engine operation for purposes of compliance stack tests is not counted towards the 50 hour per year operating limit. This exemption during compliance testing is included in CARB's Air Toxic Control Measure for Stationary Compression Ignition Engines (17 CCR 93115, Table 1, Footnote 2.)

[1] 5 hours per day at 249 MMBtu/hr and 2.5 hours per day in startup at 31.1 MMBtu/hr results in 1.297 MMSCF per day (based on natural gas HHV of 1,020 Btu/scf). 1,100 hours per year at 249 MMBtu/hr and 865 hours per year in startup at 31.1 MMBtu/hr results in 294.9 MMSCF per year (based on natural gas HHV of 1,020 Btu/scf).

Page 19, Section 12 Permit Conditions – Emergency Firepump Engines, Condition 4

This condition was removed because it does not appear to be applicable to emergency firepump engines (refers to operating engines to provide electrical power).

Page 19, Section 12 Permit Conditions – Emergency Firepump Engines, Condition 5

The proposed change is to clarify that engine operation for purposes of compliance stack tests is not counted towards the 50 hour per year operating limit. This exemption during compliance testing is included in CARB's Air Toxic Control Measure for Stationary Compression Ignition Engines (17 CCR 93115, Table 1, Footnote 2.)

Miscellaneous Minor Changes

There are also several miscellaneous minor changes to the draft PDOC that were made to make the facility description and/or equipment descriptions consistent with the information included in the July 3, 2012/April 20, 2012 submittals to the District. We also changed all references to "SEGF" to "Rio Mesa SEGF".

We appreciate the District giving us an opportunity to comment on the draft PDOC. If you have any questions regarding these comments, please contact me at (916) 444-6666.

Sincerely,

Tom Andrews
Senior Engineer

Enclosure (markup of draft PDOC)

cc: Todd Stewart, BrightSource Energy, Inc.
Andrea Grenier, Grenier & Associates, Inc.
Chris Ellison, Ellison Schneider & Harris
Angela Leiba, URS
CEC Dockets Office (11-AFC-04)

Draft Preliminary Decision/Determination of Compliance

(Preliminary New Source Review Document)

Rio Mesa Solar Electric Generating Facility; located on the Palo Verde Mesa in Riverside County, CA, approximately 13 miles southwest of Blythe.

Eldon Heaston
Executive Director

Mojave Desert Air Quality Management District

August 16, 2012

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Table of Contents

List of Abbreviations

APCO	Air Pollution Control Officer
ATC	Authority To Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
CARB	California Air Resources Board
CATEF	California Air Toxics Emission Factors
CEC	California Energy Commission
CEMS	Continuous Emissions Monitoring System
CERMS	Continuous Emission Rate Monitoring System
CFR	Code of Federal Regulations

CH_4	Methane
CO	Carbon Monoxide
CTG	Combustion Turbine Generator
dscf	Dry Standard Cubic Feet
ERC	Emission Reduction Credit
°F	Degrees Fahrenheit (Temperature)
FDOC	Final Determination of Compliance
HAP	Hazardous Air Pollutant
HARP	Hot Spots Analysis and Reporting Program
HDPP	High Desert Power Project
HHV	Higher Heating Value
hp	Horsepower
hr	Hour
HRA	Health Risk Assessment
HRSG	Heat Recovery Steam Generator
HTF	Heat Transfer Fluid
LAER	Lowest Achievable Emission Rate
lb	Pound
MACT	Maximum Achievable Control Technology
$\mu g/m^3$	Micrograms per cubic meter
MDAQMD	Mojave Desert Air Quality Management District
MMBtu	Millions of British Thermal Units
n/a	Not applicable
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NSPS	New Source Performance Standard
O_2	Molecular Oxygen
OEHHA	Office of Environmental Health Hazard Assessment
OLM	Ozone Limiting Method
o/o	Owner/Operator
PAH	Polycyclic Aromatic Hydrocarbons
PDOC	Preliminary Determination of Compliance
PHPP	Palmdale Hybrid Power Project
$PM_{2.5}$	Fine Particulate, Respirable Fraction $\leq$ 2.5 microns in diameter
PM_{10}	Fine Particulate, Respirable Fraction $\leq$ 10 microns in diameter
ppmvd	Parts per million by volume, dry
PSD	Prevention of Significant Deterioration
RSP	Rapid Start Process
SCAQMD	South Coast Air Quality Management District
SCLA	Southern California Logistics Airport
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Oxides of Sulfur

STG	Steam Turbine Generator
TOG	Total Organic Gases
tpy	Tons per Year
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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1. Introduction

The Mojave Desert Air Quality Management District (MDAQMD) received an Application for New Source Review (NSR) for the Rio Mesa Electric Solar Generating Facility (Rio Mesa SEGF) on October 12, 2011 and received a Request for Agency Participation and Application for Certification for the Rio Mesa SEGF in October 2011. The MDAQMD subsequently deemed the application complete on November 14, 2011. The "Applicant", for purposes of NSR and the AFC, comprises Rio Mesa Solar I, LLC, and Rio Mesa Solar II, LLC, owners of the two separate solar plants and certain shared facilities being proposed. For clarity and consistency, the MDAQMD will herein refer to this project as the "Rio Mesa SEGF" or "Project".

Project Permit Application History-Brief

Originally submitted as one solar electric generating facility with three separate solar plants, the original proposed facility design has been altered twice. The District received correspondence and identified changes as noted below;

- April ~~16~~20, 2012: "Boiler Optimization" proposal. This proposal included a reduction in size and type of boilers proposed for the facility. The total number of boilers at each plant were reduced from five to two. The three, large auxiliary boilers (500 MMBTU/hr) will be eliminated.

- July 3, 2012: "Environmental Enhancement" proposal. This proposal consists of a reduction in the number of solar plants at the facility, from three to two, and change in location of common area equipment. Proposed Rio Mesa Solar-III has been removed and likewise project interest by Rio Mesa Solar, LLC. The site at the facility for the common area equipment was relocated to the far northern reach of the Rio Mesa Solar-I solar field.

As required by MDAQMD Rule 1306(E)(1)(a), this PDOC reviews the proposed project, evaluating worst-case or maximum air quality impacts, and establishes control technology requirements and related air quality permit conditions. This PDOC represents MDAQMD preliminary pre-construction compliance review of the proposed project, to determine whether construction and operation of the proposed project will comply with all applicable MDAQMD rules and regulations.

2. Project Location

The Project is a solar electric generating facility comprised of two 250 MW solar plants (Rio Mesa SEGF total is 500 MW). Each 250 MW plant requires about 1,850 acres (or 2.9 square miles) of land to operate. The total area required for both plants, including the shared facilities, is approximately 3,805 acres. The proposed site is located on the Palo Verde Mesa in Riverside County, California, 13 miles southwest of Blythe. The project site has been designated non-attainment for the California ozone ambient air quality standard (CAAQS) and PM10 ambient air quality standards (CAAQS). The area is attainment or unclassified for all other standards and averaging times. The proposed site has been previously disturbed by military training operations during World War II, and investigative activities resulting from the proposed SunDesert Nuclear Power Plant by San Diego Gas and Electric (SDG&E) in the 1970s.

3. Description of Project

The proposed facility will consist of two 250 MW (nominal) solar units. The proposed project will include two solar concentrating thermal power plants and a shared common area to include shared systems. Each solar concentration thermal power plant will utilize a solar power boiler, located on top of a dedicated concrete tower, and solar field based on heliostat mirror technology. The heliostat (mirror) fields will focus solar energy on the solar power boiler, referred to as "solar receiver steam generator" (SRSG) which converts the solar energy to superheated steam. In each plant, a Rankine cycle non-reheat steam turbine receiving this superheated steam will be directly connected to a rotating generator that generates and pushes the electricity onto the transmission system steam. Each power plant will generate electricity using solar energy as its primary fuel source. However, auxiliary boilers will be used to operate in parallel with the solar field during partial load conditions and occasionally in the afternoon when power is needed after the solar energy has diminished to a level that no longer will support solar-only generation of electricity. These auxiliary boilers will also assist with daily start-up of the power generation equipment and night time preservation.

Each of the two solar units/power blocks will consist of a solar array field, ~~two~~ one auxiliary ~~low pressure~~ steam boiler~~s~~, one night-time preservation boiler that will provide overnight heat to systems, SRSG, steam turbine generator (SSG), emergency generator set, emergency fire pump system, various feed-water heaters and pumps, wet-surface air cooler (WSAC), and condensate polisher. Additionally, there will be mirror washing activities associated with each solar field. The shared facilities (located in the common area) will include a combined administration, control, maintenance and warehouse building, heliostat assembly building, evaporation ponds, groundwater wells, water treatment plant, and a common switchyard. These shared facilities will be jointly and equally owned by both project companies.

Rio Mesa SEGF is proposing to install the following equipment, to be permitted, at each power block:

- USEPA Tier ~~3~~ 2 emergency diesel generator rated at 3633 bhp
- USEPA Tier 3 fire pump rated at 200 bhp
- Auxiliary natural gas fired boilers rated at 249 MMBtu/hr
- Nighttime preservation natural gas fired boiler rated at 15 MMBtu/hr

Rio Mesa SEGF is proposing to install the following equipment, to be permitted, at the common area:

- USEPA Tier 3 emergency diesel generator rated at 398 bhp
- USEPA Tier 3 fire pump rated at ~~125~~ 200 bhp

The WSAC is exempt from District permit per Rule 219 (E)(4)(c) because it is not to be used for evaporative cooling of process water. The WSAC will be used to cool lube oils only.

The internal combustion engines will meet all applicable California Air Resources Board (CARB) and U.S. Environmental Protection Agency (USEPA) Tier emissions standards depending upon engine size, year of manufacture, and service category. Additionally, the

engines will meet the requirements of the CARB Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines and the USEPA NSPS for Diesel Engines.

Proposed equipment specifications, for emissions sources located at each power block, are summarized as follows:

Auxiliary Boiler

- Manufacturer: Rentech or equivalent
- Model: D-Type Watertube or equivalent
- Fuel: Natural Gas
- Rated Heat Input: 249 MMBtu/hr @ HHV
- Fuel consumption: ~244,118 scf/hr (Gas HHV 1020 Btu/scf)
- Exhaust flow: 72,426 acfm
- Exhaust temperature: 300 degrees Fahrenheit (°F)
- Stack diameter: 5.50 feet
- Release height: 135 feet
- Low NO_x burner/FGR (NO_x, 9 ppmv @ 3% O2)

Nighttime Preservation Boiler

- Manufacturer: Rentech or equivalent
- Model: D-Type Watertube or equivalent
- Fuel: Natural Gas
- Rated Heat Input: 15 MMBtu/hr @ HHV
- Fuel consumption: ~14,706 scf/hr (Gas HHV 1020 Btu/scf)
- Exhaust flow: 4,363 acfm
- Exhaust temperature: 300 degrees Fahrenheit (°F)
- Stack diameter: 1.50 feet
- Release height: 30 feet
- Low NO_x burner/FGR (NO_x, 9 ppmv @ 3% O2)

Fire Pump Engine

- Manufacturer: Cummins CFP7E-F30 or equivalent
- Fuel: Diesel or distillate oil (15 ppmw S)
- Rated horsepower: 200 hp
- Fuel consumption: 12 gallons per hour (gph)
- Exhaust flow: 1,650 actual cubic feet per minute (acfm)
- Exhaust temperature: 975 degrees Fahrenheit (°F)
- Stack diameter: 0.33 feet
- Release height: 15 feet

Emergency Electrical Generator

- Manufacturer: ~~John Deere~~ Caterpillar 3516C or equivalent ~~Model: 6090H~~
- Fuel: Diesel or distillate oil (15 ppmw S)

- Rated horsepower: 3633 hp
- Fuel consumption: 175 gallons per hour (gph)
- Exhaust flow: 19,600 actual cubic feet per minute (acfm)
- Exhaust temperature: 925 degrees Fahrenheit
- Stack diameter: 1.50 feet
- Release height: 26 feet

Proposed equipment specifications, for emissions sources located at *common area*, are summarized as follows:

Fire Pump Engine

- Manufacturer: Cummins CFP7E-F30 or equivalent
- Fuel: Diesel or distillate oil (15 ppmw S)
- Rated horsepower: 200 hp
- Fuel consumption: 12 gallons per hour (gph)
- Exhaust flow: 1,650 actual cubic feet per minute (acfm)
- Exhaust temperature: 975 degrees Fahrenheit (°F)
- Stack diameter: 0.33 feet
- Release height: 15 feet

Emergency Electrical Generator

- Manufacturer: Caterpillar C9 ATAAC or equivalent
- Model: 250 eKW
- Fuel: Diesel or distillate oil (15 ppmw S)
- Rated horsepower: 398
- Fuel consumption: 20 gph
- Exhaust flow: 2,250 acfm
- Exhaust temperature: 855 degrees Fahenreheit (°F)
- Stack diameter: 0.67 feet
- Release height: 18 feet

The only fuels to be combusted on-site will be California-certified low-sulfur low-aromatic diesel fuel used by the emergency fire pumps and the emergency generator engines, and pipeline- quality natural gas for the auxiliary and nighttime preservation boilers.

Overall Project Emissions

Operation of the Project will result in emissions to the atmosphere of both criteria and toxic air pollutants from the proposed auxiliary boilers, nighttime preservation boilers, fire pumps, emergency generator engines, wet surface air coolers (WSAC), and mirror washing activities. The WSAC (used only for cooling lube oils) and mirror washing activities are fugitive emission sources not permitted by the MDAQMD (exempt per Rule 219). Criteria pollutant emissions will consist primarily of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), sulfur oxides (SO_x), and sub 10-micron particulate matter (PM10). Air toxic pollutants will consist of a combination of toxic gases and toxic particulate matter species. Tables 1 and 1A list the pollutants that may potentially be emitted from the proposed Project.

For natural gas-fired equipment, emissions calculations are based on the Higher Heating Value (HHV) of the natural gas fuel.

Maximum Annual Emissions

Table 1 presents maximum annual facility operational emissions (including fugitive PM10 emissions from mirror washing machines). Table 1A presents maximum annual facility hazardous air pollutant (HAP) emissions.

Table 1 – Rio Mesa SEGF Maximum Annual Operational Emissions
(All emissions presented in tons per year)

	NO_x	CO	VOC	SO_x	PM_{10}	CO2e
Rio Mesa SEGF Maximum	**8.3**	**13.0**	**3.0**	**0.8**	**8.4**	**44513**

Table 1A – Rio Mesa SEGF Maximum Annual HAP Emissions
(All emissions presented in pounds per year)

Substance		Total
Acetaldehyde		0.970481471
Acrolein		0.854768333
Benzene		1.825249804
~~Beryllium~~		~~2.5E-08~~
~~Copper~~		~~1.0E-07~~
DPM	TAC	136.64~~159.355~~
Ethylbenzene		2.158201863
Formaldehyde		3.867738529
Hexane		1.419146667
Naphthalene		0.219453235
PAHs (except naphthalene) (4) speciated PAHs		0.073151078
Benzo(a)anthracene		0.006895139
Benzo(a)pyrene		0.00459676
Benzo(b)fluoranthrene		0.006895139
Benzo(k)fluoranthrene		0.006895139
Chrysene		0.006895139
Dibenz(a,h)anthracene		0.00459676
Indeno(1,2,3-cd)pyrene		0.006895139
Propylene	TAC	84.35003716
Toluene		8.358819118
Xylene		6.214804608

Total HAPS	26.0
Note: Total HAPS do not include Toxic Air Contaminants (TAC) DPM or Propylene	

Maximum Daily Emissions

Table 2 presents maximum daily facility emissions. Emissions for the auxiliary and nighttime boilers were calculated under worst case conditions. The calculations were made assuming five normal operations hours and two and one-half startup hours for the auxiliary boiler and assuming 16 normal hours and one startup hour for the nighttime boiler. Fire pump and emergency generator engines emissions were each calculated based on one-half hours per day (daily maintenance and testing hours). Daily emission calculations do not include fugitive emission sources.

Table 2 – Rio Mesa SEGF Maximum Daily Operational Emissions

	NO_x	**CO**	**VOC**	**SO_x**	**PM_{10}**
Pounds per day	~~87.8~~88.6	~~111.4~~110.6	~~23.5~~24.4	~~6.6~~6.7	~~17.8~~18.2

4. Control Technology Evaluation/BACT Determination

Best Available Control Technology (BACT) is required for any new or Modified Permit Unit which emits, or has the Potential to Emit (PTE), 25 pounds per day or more of any Nonattainment Air Pollutant or any new or Modified Facility which emits, or has the PTE 25 tpy or more of any Nonattainment Air Pollutant (MDAQMD Rule 1303(A)). The proposed project site is state non-attainment for ozone and PM_{10} and their precursors and unclassified or attainment for all other state and federal standards. Based on the maximum daily emissions from each proposed permit unit and/or facilitywide annual PTE, as calculated in Section 3 above and Appendix A, the proposed project equipment does not trigger BACT.

Proposed Limits for each 249 MMBtu/hr Natural Gas Fired Boilers

*Table 3 – Rio Mesa SEGF – Proposed Limits for Natural Gas Auxiliary Boilers**

Pollutant	Limit	Control
NO_x	9.0 ppm at 3% O_2	Ultra low-NO_x burner and Flue Gas Recirculation (FGR)
VOC	12.6 ppm at 3% O_2	PUC quality natural gas
PM	0.005 lb/MMBtu	PUC quality natural gas
SO_x	0.0021 lb/MMBtu	PUC quality natural gas
CO	25 ppm at 3% O_2	Ultra low-NO_x burner and FGR

*Operating in normal mode.

*Table 4 – Rio Mesa SEGF – Proposed Limits for Natural Gas Nighttime Preservation Boilers**

Pollutant	Limit	Control
NO_x	9.0 ppm at 3% O_2	Ultra low-NO_x burner
VOC	~~10~~ 12.6 ppm at 3% O_2	PUC quality natural gas
PM	0.005 lb/MMBtu	PUC quality natural gas

SO_x	0.0021 lb/MMBtu	PUC quality natural gas
CO	50 ppm at 3% O_2	Ultra low-NO_x burner and FGR

*Operating in normal mode.

Proposed limits for each Internal Combustion Engine – Emergency Fire Pump and Emergency Generator (total of six engines)

The proposed engines meet the requirements of the NSPS for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60, Subpart IIII) and the California State Airborne Toxic Control Measure for Stationary Compression Ignition Engines (17 CCR 93115). Note complying with the NSPS also deems the engines compliant with the RICE NESHAP. Complying with the NSPS and ATCM has been determined as BACT for the engines powering a fire pump or emergency generator.

Table 5 – Rio Mesa SEGF – Proposed Limits for Stationary Emergency Standby Direct-Drive Fire Pump Engines

Proposed Engine Size	NMHC + NO_x (g/bhp-hr)	PM (g/bhp-hr)	CO (g/bhp-hr)	SO_x
200 bhp	3.0	0.15	2.6	15 ppm S fuel

Table 6 – Rio Mesa SEGF – Proposed Limits for Stationary Emergency Standby Diesel-Fueled CI Engines

Proposed Engines	NMHC + NO_x (g/bhp-hr)	PM (g/bhp-hr)	CO (g/bhp-hr)	SO_x
3633 bhp	4.8	0.15	2.6	15 ppm S fuel
398 bhp	3.0	0.15	2.6	15 ppm S fuel

6. PSD Class I Area Protection

The Clean Air Act (CAA) established the PSD permit program to prevent areas that currently have clean air from significant deterioration. The PSD permit program limits emissions by requiring permits for major stationary air pollution sources. The Rio Mesa SEGF did not evaluate the visibility reduction potential of project emissions on Prevention of Significant Deterioration (PSD) Class I areas. The Rio Mesa SEGF application does not constitute an application for a major facility, as the criteria pollutant emissions are well below the major source threshold, and therefore is not required by Rule 1302 (B)(1)(a)(v)(a) to conduct such an evaluation. The Rio Mesa SEGF is not a major source for any pollutant (including greenhouse gas) nor is it subject to the PSD requirements of Title I, Part C of the Federal Clean Air Act (42 U.S.C. §§7470-7492) which apply to major sources only, and therefore is in compliance with the PSD requirements of Rule 1300.

7. Air Quality Impact Analysis

Rio Mesa SEGF performed the ambient air quality standard impact analyses for CO, PM_{10}, $PM_{2.5}$, SO_2 and NO_2 emissions. The MDAQMD approves of the analysis methods used in these impact analyses and the findings of these impact analyses.

Findings

The impact analysis calculated a maximum incremental increase for each pollutant for each applicable averaging period, as shown in Table 8 below. When added to the maximum recent background concentration, the Rio Mesa SEGF did not exceed the most stringent (or lowest) standard for any pollutant except PM_{10}, which is already in excess of the State standard without the project.

Table 8 – Rio Mesa SEGF – Maximum Ambient Air Quality Impacts

Pollutant	Project Impact[a]	Background	Total Impact[b]	Federal Standard	State Standard
	All values in $\mu g/m^3$				
NO_2 (1 hour-max)	165	92.4	257	n/a	339
NO_2 (1 hour-98th percentile)	160	78.0	171[c]	188	
NO_2 (annual)	~~0.20~~0.19	17.0	17	100	57
PM_{10} (24 hour)	1.57	140	142	150	50
PM_{10} (annual)	0.47	20.4	21	n/a	20
$PM_{2.5}$ (24 hour)[d]	0.27	18	18	35	n/a
$PM_{2.5}$ (annual)[e]	0.05	7.8	8	15	12
CO (1 hour)	158	1837	1995	40,000	23,000
CO (8 hour)	12	643	655	10,000	10,000
SO_2 (1 hour)	2	136.6	139	196	655
SO_2 (3 hour)	0.9	112.9	114	1300	n/a
SO_2 (24 hour)	~~0.08~~0.07	18.4	19	n/a	105
SO_2 (annual)	0.01	2.6	3	80	n/a

Table 8 Notes:

[a] Modeling results represent total impacts from boilers, emergency engines, and fugitive dust from MWMs.

[b] Total concentrations shown in this table are the sum of the maximum predicted impact and the maximum measured background concentration. Because the maximum impact will not occur at the same time as the maximum background concentration, the actual maximum combined impact will be lower.

[c] Total concentrations shown for 1-hour NO_2 are modeled impacts combined with concurrent hourly NO_2 monitoring data (Tier 4 analysis in Section 3.6 of the modeling protocol). This value represents the five-year average of the annual 1-hr NO_2 98th percentile (modeled impact plus background) for each year (2006 to 2010) as required by June 28, 2010 EPA 1-hr NO_2 NAAQS guidance document.

[d] Background concentration shown is the three-year average of the 98th percentile values, in accordance with the form of the federal standard.

[e] Background value shown is the three-year average of the annual arithmetic mean, in accordance with the form of the standard.

Inputs and Methods

Maximum emissions from both power blocks (excluding WSAC) were modeled. Emissions from the power blocks are presented above in Table 18. The meteorological data set used in this analysis combined surface meteorological data (e.g. wind speed and direction, temperature) from the Blythe Airport (2006 through 2010), surface data (cloud cover) from the McCarran Airport in Las Vegas, NV, and upper data from Tucson, AZ. Ambient air concentrations of ozone (O_3), NO_2, CO, PM_{10}, and $PM_{2.5}$ are recorded at monitoring stations in Riverside County. SO_2 data is recorded from the Victorville, CA monitoring station. For determining NO_2 impacts using a NO_x background, the hourly Ozone Limiting Method (OLM) for conversion of NO_x to NO_2 was used. The latest versions of AERMOD preprocessors were used to determine surface characteristics (AERSURFACE version 08009), process meteorological data (AERMET version 06341 11059) and determine receptor slope factors (AERMAP version 09040 11103).

The AERMOD dispersion model (version 11103 12060) was used to estimate ambient concentrations resulting from Rio Mesa SEGF emissions. The dispersion modeling was performed according to USEPA guidelines.

8. Health Risk Assessment and Toxics New Source Review

Rio Mesa SEGF performed a Health Risk Assessment (HRA) for carcinogenic, non-carcinogenic chronic, and non-carcinogenic acute toxic air contaminants. The MDAQMD approves of the HRA methods and findings. Additionally, a screening HRA was conducted after the originally proposed plant design was altered. The MDAQMD approves of the screening HRA results.

Findings

The HRA calculated a cancer risk of 3.7 3.6 per million at point of maximum impact (PMI). The calculated cancer risk at that maximally impacted residential receptor and worker is 0.1 and 0.6 per million, respectively. The maximum non-cancer chronic and acute hazard indices are both less than the significance level of 1.0 (0.0018 and 0.0007, respectively). Evaluated cancer risk from the proposed project is less than the significance level and the proposed project emits less than 10 tons per year of every single HAP and 25 tons per year of any combination of HAPs, no further toxics new source review is required for this project (Rule 1320(E)(2)(b)). Please refer to Table 1A above for a summary of project HAP emissions.

Inputs and Methods

Rio Mesa SEGF will emit toxic air contaminants as products of natural gas combustion, diesel fuel combustion, equipment wear, mirror washing activities, and WSAC emissions. Combustion emissions were estimated using emission factors from USEPA and Ventura County APCD, and a speciation profile for polycyclic aromatic hydrocarbons (PAH) were derived from USEPA. WSAC emissions were estimated using USEPA emission factors for evaporative emissions, engineering calculations for the drift rate droplets, and local anticipated water quality. Mirror washing activity emissions were not included in the risk evaluation. Reason???

The USEPA Screen 3 AERMOD dispersion model was used to estimate ambient concentrations of toxic air pollutants. Dispersion results were loaded into HARP via the HARP On-Ramp Program. The Hot Spots and Reporting Program (HARP, Version 1.4f, 2011) risk assessment

model was used to estimate health risks due to exposure to emissions. Cancer risk was calculated using the Derived OEHHA Method. The AERMET/AERMOD meteorological dataset was used for the risk analysis.

9. Offset Requirements

MDAQMD Regulation XIII – *New Source Review* requires offsets for non-attainment pollutants and their precursors emitted by large, new sources. The Rio Mesa SEGF does not have the PTE 25 tons or more per year of ozone precursors (NO_x and VOC) or SO_x, or 15 tons or more per year of PM_{10}. Offsets are not required for the Rio Mesa SEGF.

Table 9 - Comparison of Rio Mesa SEGF – Emissions with Offset Thresholds
All emissions in tons per year

	NO_x	**VOC**	**SO_x**	**PM_{10}**
Maximum Annual Potential to Emit	~~8.2~~ 8.3	3.0	0.79	~~8.5~~ 8.4
Offset Threshold	25	25	25	15

10. Applicable Regulations and Compliance Analysis

Selected MDAQMD Rules and Regulations will apply to the proposed project:

Regulation II – Permits

Rule 212 – Standards For Approving Permits establishes baseline criteria for approving permits by the MDAQMD for certain projects. In accordance with these criteria, the proposed project accomplishes all required notices and emission limits through the PDOC and complying with stringent emission limitations set forth on permits.

Regulation IV – Prohibitions

The following rules and discussions are specific to the proposed project.

Rule 401 – *Visible Emissions* limits visible emissions opacity to less than 20 percent (or Ringelmann No. 1). During start up, visible emissions may exceed 20 percent opacity. However, emissions of this opacity are not expected to last three minutes or longer. In normal operating mode, visible emissions are not expected to exceed 20 percent opacity.

Rule 402 – *Nuisance* prohibits facility emissions that cause a public nuisance. The proposed combustion equipment exhaust is not expected to generate a public nuisance due to the use of pipeline-quality natural gas as a fuel for the auxiliary boiler and nighttime boiler and low sulfur diesel fuel and limited use of the emergency IC engines. In addition, due to the location of the proposed project, no nuisance complaints are expected.

Rule 403 – *Fugitive Dust* specifies requirements for controlling fugitive dust. The proposed project includes 3,805 acres of which only a small portion will be paved. As such, the remaining acreage will have the potential to generate a significant amount of fugitive dust if left untreated. Rio Mesa SEGF will apply an approved dust suppression coating to unpaved roadways within and around the solar fields. The proposed project is not expected to violate Rule 403.

Rule 404 – *Particulate Matter – Concentration* specifies standards of emissions for particulate matter concentrations. This rule does not apply to emissions from combustion of gaseous fuels in steam generators ie boilers. The sole use of ultra-low sulfur diesel fuel and certified emission IC engines will keep proposed project emission levels in compliance with Rule 404.

Rule 407 – *Liquid and Gaseous Air Contaminants* limits carbon monoxide (CO) emissions to less than 2000 ppm measured on a dry basis, averaged over 15 minutes. The proposed project boilers will comply with this limit by permit condition resulting from this NSR action. IC engines are not subject to this rule.

Rule 408 – *Circumvention* prohibits hidden or secondary rule violations. The proposed project is not expected to violate Rule 408.

Rule 409 – *Combustion Contaminants* limits total particulate emissions on a density basis. The sole use of pipeline-quality natural gas as a fuel in the boilers and ultra-low sulfur diesel fuel in the emergency IC engines will keep proposed project emission levels in compliance with Rule 409.

Rule 430 – *Breakdown Provisions* requires the reporting of breakdowns and excess emissions. The proposed project will be required to comply with Rule 430 by permit condition.

Rule 431 – *Sulfur Content in Fuels* limits sulfur content in gaseous, liquid and solid fuels. The sole use of pipeline-quality natural gas (sulfur content equal to or less than 0.25 grains/100 dscf) as a fuel in the boilers and ultra-low sulfur diesel fuel (0.0015 percent by weight) in the emergency IC engines will keep proposed project fuels in compliance with Rule 431.

Rule 475 – *Electric Power Generating Equipment* applies to non-Mobile Electric Power Generating Equipment having a maximum Rated Heat Input of more than 50 million Btu (MMBtu) per hour. This rule only applies to the auxiliary boilers (249 MMBTtu/hr) at this project. This rule limits emissions of NO_x to 80 ppmv @ 3% O2; and PM not to exceed 0.1 gr/dscf @ 3% O2 and 11 lbs/hour. The auxiliary boilers will meet these requirements.

Rule 476 - *Steam Generating Equipment* specifies monitoring and recordkeeping requirements and limits NO_x emissions from steam generators rated above 50 MMBtu/hr to 125 ppmv @ 3% O2 and PM to less than 0.1 gr/scf and 11 lbs/hr. The auxiliary boilers are subject to and will comply with the recordkeeping/monitoring and emission limits by permit condition.

Regulation IX – Standards of Performance for New Stationary Sources

Regulation IX is enacted to adopt by reference all the applicable provisions regarding standards of performance for new stationary sources as set forth in 40 Code of Federal Regulations, Part 60

(40 CFR 60). NSPS referenced in Regulation IX for which the facility has proposed equipment are discussed below.

NSPS for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII). Permit conditions for the diesel IC engines establish an engine certification (e.g. emission limits) requirement and monitoring provisions pursuant to the requirements of Subpart IIII.

NSPS for Electric Utility Steam Generating Units (40 CFR 60 Subpart Da) is not applicable to the proposed auxiliary boilers as the boilers, rated at 249 MMbtu/hr are below the applicability threshold of 250 MMbtu/hr.

NSPS for Industrial-Commercial-Institutional Steam Generation Units (40 CFR 60 Subpart Db) applies to new boilers with a maximum heat input greater than 100 MMBtu/hr. Subpart Db applies to the proposed auxiliary boilers, each rated at 249 MMbtu/hr. Subpart Db specifies emission limits for NO_x, SO_x, and PM.

Pollutant	Emission limit (lb/MMBtu)
SOx	0.20 (§60.42b(k)(2))
PM	none (record keeping/reporting only) (60.40b(a))
NOx (as NO2)	0.20 (§60.44b(a))

Permit conditions for the proposed boilers will establish compliance with emission limits for NO_x, SO_x, and PM. The emission limits of subpart Db are streamlined out by NSR permit conditions. Initial notification requirements of §60.49b(a) are not placed on permit.

NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60 Subpart Dc) applies to boilers constructed after June 9, 1989 and has max heat input between 10 and 100 MMBtu/hr. This applies to the Nighttime Preservation Boilers at the Rio Mesa SEGF. The sole use of natural gas in the Nighttime Preservation Boilers satisfies the requirements of Dc.

Regulation XI - Source Specific Standards

Rule 1113 - *Architectural Coatings* limits VOC content of applied architectural coatings. The proposed project will comply through the purchase and use of compliant coatings.

Rule 1157 – *Boilers and Process Heaters* 1157 applies to new and existing boilers, steam generators, and process heaters located within the Federal Ozone Non-attainment Area (FONA). This rule does not apply as the Rio Mesa SEGF is located outside the FONA.

Rule 1158 – *Electric Power Generating Facilities* applies to any electrical generating steam boilers, including auxiliary boilers, or combined-cycle turbine units used in conjunction with an electrical generating steam boiler located in the FONA. This rule does not apply as the Rio Mesa SEGF is located outside the FONA.

Rule 1160 – *Internal Combustion Engines* applies to stationary IC engines rated at 500 bhp and greater, located in the FONA. This rule will not apply as the proposed project is located outside the FONA.

Regulation XIII – New Source Review

Rule 1300 – *General* ensures that Prevention of Significant Deterioration (PSD) requirements apply to all projects. The proposed project does not have the PTE 25 tons per year or more of a criteria pollutant and therefore is not a major source of emissions. As this facility is not a major source it is not subject to the PSD requirements Title I, Part C of the Federal Clean Air Act (42 U.S.C. §§7470-7492 which apply to major sources only and therefore is in compliance with the PSD requirements of Rule 1300.

Rule 1302 – *Procedure* requires certification of compliance with the Federal Clean Air Act, applicable implementation plans, and all applicable MDAQMD rules and regulations. The ATC application package for the proposed project includes sufficient documentation to comply with Rule 1302(D)(5)(b)(iii). Permit conditions for the proposed project will require compliance with Rule 1302(D)(5)(a)(iii).

Rule 1303 – *Requirements* requires BACT at major new sources and permit units which have the PTE to emit more than 25 pounds per day of criteria pollutants or facilities which have the PTE at or above the NSR major source thresholds. As this facility is not a major source nor does the individual equipment have the PTE 25 pounds per day or more, BACT is not required.

Rule 1305 – *Emissions Offsets* this facility does not have the PTE a regulated air pollutant in an amount greater than or equal to MDAQMDs offset threshold amounts and therefore offsets are not required.

Rule 1306 – *Electric Energy Generating Facilities* places additional administrative requirements on projects involving approval by the California Energy Commission (CEC). The proposed project will not receive an ATC without CEC's approval of their Application for Certification, ensuring compliance with Rule 1306.

Regulation XII – Federal Operating Permits

Regulation XII contains requirements for sources which must have a federal operating permit (FOP) and an acid rain permit (1200 (B)(1)(d)). The proposed project is subject to the acid rain program and as a result of, will be required to obtain a FOP. (Rule 1200 (B)(1)(d)). This facility is not subject to the provisions of Rule 1211- *Greenhouse Gas Provisions of Federal Operating Permits.*

Maximum Achievable Control Technology Standards

Health & Safety Code §39658(b)(1) states that when USEPA adopts a standard for a toxic air contaminant pursuant to §112 of the Federal Clean Air Act (42 USC §7412), such standard becomes the Airborne Toxic Control Measure (ATCM) for the toxic air contaminant. Once an ATCM has been adopted it becomes enforceable by the MDAQMD 120 days after adoption or implementation (Health & Safety Code §39666(d)). The following MACT standards apply to specific emission devices at this facility;

- National Emission Standards for Reciprocating Internal Combustion Engines (40 CFR 63, Subpart ZZZZ) applies to the emergency fire pumps and generators located at the proposed facility. Compliance with this regulation for the engines proposed will be achieved through the purchase of engines complying with 40 CFR 60, Subpart IIII~~NSPS IIII~~.

- National Emission Standards for Area Sources: Industrial/Commercial/Institutional Boilers (40 CFR, Subpart JJJJJJ) does not include requirements for natural gas-fired boilers, so this regulation will not apply to the boilers at the proposed Rio Mesa SEGF.

11. Conclusion

The MDAQMD has reviewed the proposed project's Application for New Source Review and subsequent supplementary information. The MDAQMD has determined that the proposed project, after application of the permit conditions given below, will comply with all applicable MDAQMD Rules and Regulations. This PDOC will be released for public comment and publicly noticed on or after August 30, 2012. Written comments will be accepted for thirty days from the date of publication of the public notice. A Final Decision/Determination of Compliance shall be prepared no later than ten days after the end of the public comment period (approximately September 10, 2012).

Please forward any comments on this document to:

Eldon Heaston
Executive Director
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310

12. Permit Conditions

The following permit conditions will be placed on the Authorities to Construct (ATC) for the project. Separate permits will be issued for each auxiliary boiler, nighttime preservation boiler, fire pump and emergency generator. The electronic version of this document contains a set of conditions that are essentially identical for each of multiple pieces of equipment, differing only in MDAQMD permit reference numbers. The signed and printed ATCs will have printed permits (with descriptions and conditions) in place of condition language listings.

Auxiliary Boiler Authority to Construct Conditions

[Two – 249 MMBtu/hr Natural Gas Fired Auxiliary Boiler, Application Number: 00012024 and 0012031]

1. This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet. [New Source Review-Regulation XIII]

2. Prior to the expiration date each year, after the completion of construction the o/o shall have this equipment tuned, as specified by Rule 1157(I), Tuning Procedure.

3. The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the daily and calendar year fuel use for this equipment in standard cubic feet, or BTU's, and daily hours of operation. [~~1303(A)~~ Rule 1202(D) and 40 CFR 60 Subpart Db]

4. Emissions from this equipment shall not exceed the following hourly emission limits, operating at normal operating conditions and verified by fuel use and/or compliance tests:
a. NOx as NO2: ~~2.72~~ 2.74 lb/hr (0.011 lb/MMBtu) (based on 9.0 ppmvd corrected to 3% oxygen and averaged over one hour).
b. CO: 4.60 lb/hr (based on 25 ppmvd corrected to 3% oxygen and averaged over one hour).
c. VOC as CH4: ~~1.32~~ 1.34 lb/hr.
d. SOx as SO2: 0.52 lb/hr (0.0021 lb/MMBtu), based on 0.75 gr/100 dscf.
e. PM10: 1.25 lb/hr.
[New Source Review-Regulation XIII]

5. The o/o shall perform initial compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District within 180 days of initial start up. The following compliance tests are required:
a. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 7E or equivalent).
b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).
c. VOC as CH4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).
d. SOx as SO2 in ppmvd at 3% oxygen and lb/hr.
e. PM10 in mg/m3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods 201A~~5~~ and 202 or CARB Method 5).
[New Source Review-Regulation XIII, 40 CFR Subpart A - §60.8]

6. The o/o shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:
a. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method~~s~~ 7E ~~19 and 20~~).
b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).
c. VOC as CH4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).
d. SOx as SO2 in ppmvd at 3% oxygen and lb/hr.
e. PM10 in mg/m3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods ~~5~~201A and 202 or CARB Method 5).
[New Source Review-Regulation XIII]

7. This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (NSPS Db).

8. Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits. [New Source Review-Regulation XIII, 40 CFR Subsection 60.49b(r)]

9. The o/o shall continuously monitor and record fuel flow rate and flue gas oxygen level.

10. In lieu of installing CEMs to monitor NOx emissions, and pursuant to 40 CFR 60 Subpart Db, Section 60.49b(c), the owner/operator shall monitor boiler operating conditions and estimate NOx emission rates per a District approved emissions estimation plan. The plan shall be based on the initial source test and annually pursuant to condition 6. The plan shall include test results, operating parameters, analysis, conclusions and proposed NOx estimating relationship consistent with established emission chemistry and operational effects.

    This initial plan shall be submitted to the District for approval within 360 days of the initial startup. Any proposed changes to a District-approved plan shall include subsequent test results, operating parameters, analysis, and any other pertinent information to support the proposed changes. The District must approve any emissions estimation plan or revision for estimated NOx emissions to be considered valid.

11. The o/o shall comply with all applicable recordkeeping and reporting requirements of NSPS Db.

12. This boiler shall not burn more than ~~1.29~~ 1.3 MMSCF of natural gas in any single day, and no more than ~~294.8~~ 294.9 MMSCF in any calendar year.
    a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

13. This equipment shall exhaust through a stack at a minimum height of 135 feet.

14. This facility shall not emit more than 9.9 t/y of a single HAP and 24.9 t/y of all HAP's. To ensure compliance, the owner/operator shall calculate and record the annual emissions of Federal Hazardous Air Pollutants (HAP's) in tons per year (t/y) on a calendar year basis (January 1 through December 31). The list of HAP's can be found in Section 112(b)(1) of the Federal Clean Air Act or at web site: http://www.epa.gov/ttn/atw/188polls.html

15. The owner/operator shall submit a complete federal operating permit application to the District no later than 12 months from the date this facility commences operation. [Rule 1200 (B)(1)(d) and 1202 (B)(3)(c)(ii)]

16. The o/o shall submit a complete Acid Rain permit application, including a compliance plan, to the District at least 24 months prior to commencing operation. [Rule 1210(C)(1)(a) and 1210(D)(1)(a)]

Nighttime Preservation Boiler Authority to Construct Conditions

[Two – 15 MMBtu/hr Natural Gas Fired Nighttime Preservation Boiler, Application Number: 00012025 and 0012032]

1. This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS Dc).

2. This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet. [New Source Review-Regulation XIII]

3. The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum the amount of fuel combusted during each operating day. [40 CFR 60.48c(g)(1)]

4. Emissions from this equipment shall not exceed the following hourly emission limits, operating at normal operating conditions and verified by fuel use, tuneups, and/or compliance tests:
   a. NOx as NO2: ~~0.16~~ 0.17 lb/hr (based on 9.0 ppmvd corrected to 3% oxygen and averaged over one hour).
   b. CO: 0.55 lb/hr (based on 50 ppmvd corrected to 3% oxygen and averaged over one hour).
   c. VOC as CH4: ~~0.06~~ 0.08 lb/hr.
   d. SOx as SO2: 0.03 lb/hr (based on 0.75 gr/100 dscf).
   e. PM10: 0.08 lb/hr.
   [New Source Review-Regulation XIII]

5. The o/o shall perform initial compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District within 180 days of initial start up. The following compliance tests are required:
   a. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 7E or equivalent).
   b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).
   c. VOC as CH4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).
   d. SOx as SO2 in ppmvd at 3% oxygen and lb/hr.
   e. PM10 in mg/m3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods ~~5~~201A and 202 or CARB Method 5).
   [New Source Review-Regulation XIII, 40 CFR Subpart A - §60.8]

6. The o/o shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:
a. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method~~s~~7E ~~19 and 20~~).
b. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10). [New Source Review-Regulation XIII]

7. Prior to the expiration date each year, after the completion of construction the o/o shall have this equipment tuned, as specified by Rule 1157(I), Tuning Procedure.

Emergency Generator Authority to Construct Conditions

[Power Blocks I and II: Two – 3,633 hp emergency IC engine each driving a generator, Application Number: 00012026 and 00012023.
Common Area: One – 398 hp emergency IC engine driving a generator, Application Number 00012035]

1. This engine, certified in accordance with 40 CFR Part 89, and after treatment control device (if any) shall be installed, operated and maintained according to the manufacturer's emission-related written instructions. Further, the owner/operator shall change only those emission-related settings that are permitted by the manufacturer. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit. [40 CFR Part 60 Subparts 60.4205, and 60.4211]

2. This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements. [17 CCR 93115; 60.4207(b)]

3. A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. [Title 17 CCR §93115.10(e)(1)]. **District and State Only**

4. This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier. [17 CCR 93115] 40 CFR 60, Subpart~~NSPS~~ IIII allowance for DRP streamlined out.

5. This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 0.5 hrs per day for a total of 50 hours per year for testing and maintenance. Time required for source testing will not count toward the 50 hour per year limit. [NSR and 17 CCR 93115] Hours allowed by 40 CFR 60.42(f) streamlined out.

6. The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:
   a. Date of each use and duration of each use (in hours);
   b. Reason for use (testing & maintenance, emergency, required emission testing, etc.);
   c. Monthly and calendar year operation in terms of fuel consumption (in gallons) and total hours [17 CCR 93115]; and,
   d. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log.) [17 CCR 93115]

7. This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR §93115) and 40 CFR Part 60, Subpart IIII (NSPS). In the event of conflict between these conditions and the ATCM or NSPS, the more stringent requirements shall govern.

Emergency Fire Suppression Water Pump Authority to Construct Conditions

[Three - 200 hp emergency IC engine each driving a fire suppression water pump, Application Number: 00012034, 00012036, and 00012027]

1. This engine, certified in accordance with 40 CFR Part 89, and after treatment control device (if any) shall be installed, operated and maintained according to the manufacturer's emission-related written instructions. Further, the owner/operator shall change only those emission-related settings that are permitted by the manufacturer. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit. [40 CFR Part 60 Subparts 60.4205 and 60.4211]

2. This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements. [17 CCR 93115; 60.4207(b)]

3. A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. [Title 17 CCR §93115.10(e)(1)]. **District and State Only**

4. ~~This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier. [17 CCR 93115] NSPS IIII allowance for DRP streamlined out.~~

5. This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 0.5 hrs per day for a total of 50 hours per year for testing and maintenance. Time required for source testing will not count toward the 50 hour per year limit. The 50 hour limit can be exceeded when the emergency fire pump assembly is driven

directly by a stationary diesel fueled CI engine operated per and in accord with the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 1998 edition. This requirement includes usage during emergencies. [NSR and 17 CCR 93115.3(n)] Hours allowed by federal regulation 40 CFR 60.42(f) "streamlined out" as these permit requirements are more stringent than the federal requirements.

6. The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:
   a. Date of each use and duration of each use (in hours);
   b. Reason for use (testing & maintenance, emergency, required emission testing, etc.);
   c. Monthly and calendar year operation in terms of fuel consumption (in gallons) and total hours [17 CCR 93115]; and,
   d. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log.) [17 CCR 93115]

7. This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR §93115) and 40 CFR Part 60, Subpart IIII (NSPS). In the event of conflict between these conditions and the ATCM or NSPS, the more stringent requirements shall govern.

Appendix – Rio Mesa SEGF Emissions Calculations

Auxilliary Boilers
Powerblocks 1 and 2 number of boilers 2
Application No.'s 12024 and 12031

	Normal Mode	Startup Mode		
*MMBtu/hr	249	31		*provided by applicant, confidential emission spreadsheet
SCFH	244,118	30,392		Hours shown are equivalent full load hours; boilers may operate more hours on some days and/or at lower loads. See text.
SCFD	1,220,588	75,980	1,296,569	
*Hours/day	5	2.5		
days/week	7	7		
weeks/yr	52	52		
*hrs/yr	1100	865		expected startup hours

Operating Mode					emission factor lb/MM cu.ft.	emission factor lb/MMBtu	Per Unit emissions lb/hr	Per Unit emissions lb/day	Per Unit emissions lb/yr	Operating Modes Combined-Per Unit emissions lb/hr	Operating Modes Combined-Per Unit emissions lb/day	Operating Modes Combined-Per Unit emissions lb/yr
Normal	NOx	9	ppm @	3% % O2	1.254	0.01092	2.72	13.60	2991.79	5.43	20.37	5334.98
	CO	25	ppm @	3% % O2	2.120	0.01847	4.60	22.99	5058.58	9.18	34.44	9020.49
	VOC (as CH4)	12.6	ppm @	3% % O2	0.611	0.00532	1.32	6.62	1456.87	2.65	9.93	2600.17
	SOx					0.00210	0.52	2.61	575.19	0.59	2.78	631.50
	PM10					0.00500	1.25	6.23	1369.50	1.56	7.00	1637.65
Startup	NOx	72	ppm @	3% % O2	10.033	0.08738	2.71	6.77	2343.19			
	CO	200	ppm @	3% % O2	16.963	0.148	4.58	11.45	3961.91			
	VOC (as CH4)	101	ppm @	3% % O2	4.895	0.043	1.32	3.30	1143.29			
	SOx	0.75	grains/100 scf			0.0021	0.07	0.16	56.31			
	PM10					0.010	0.31	0.78	268.15			

Fuel Heat Value: 1020 BTU/SCF
Fd 8710 DSCF exhaust per MMBtu in

Calculated Values (per boiler):
Fuel Usage: 1323 MMBtu/Day
300715 MMBtu/yr
1,296,569 SCFD
294.8 MMSCFY

Calculation of Noncriteria Pollutant Emissions from Auxiliary Boilers

Compound	Emission Factor, lb/MMcf (1)	Hourly Emissions, lb/hr per boiler(2)	Annual Emissions (3) lb/yr per boiler	Annual Emissions (3) lb/yr, both boilers
Propylene	1.55E-02	3.79E-03	*4.58E+00*	*9.16E+00*
Hazardous Air Pollutants				
Acetaldehyde	9.00E-04	2.20E-04	*2.65E-01*	*5.31E-01*
Acrolein	8.00E-04	1.95E-04	*2.36E-01*	*4.72E-01*
Benzene	1.70E-03	4.15E-04	*5.01E-01*	*1.00E+00*
Ethylbenzene	2.00E-03	4.88E-04	*5.90E-01*	*1.18E+00*
Formaldehyde	3.60E-03	8.79E-04	*1.06E+00*	*2.12E+00*
Hexane	1.30E-03	3.17E-04	*3.83E-01*	*7.67E-01*
Naphthalene	3.00E-04	7.32E-05	*8.84E-02*	*1.77E-01*
PAHs (except naphthalene) (4)	1.00E-04	2.44E-05	*2.95E-02*	*5.90E-02*
Toluene	7.80E-03	1.90E-03	*2.30E+00*	*4.60E+00*
Xylene	5.80E-03	1.42E-03	*1.71E+00*	*3.42E+00*
Total HAPs		5.93E-03	*7.16E+00*	*1.43E+01*

Notes:

(1) All factors from Ventura County APCD, "AB2588 Combustion Emission Factors," Natural Gas Fired External Combustion Equipment >100 MMBtu/hr. Available at http://www.vcapcd.org/pubs/Engineering/AirToxics/combem.pdf
(2) Based on maximum hourly boiler heat input of 0.2441 MMscf/hr
(3) Based on total annual heat input of 294.8 MMscf/yr
(4) Total PAHs, excluding naphthalene. See speciation below.
(5) Emission factors for individual PAHs obtained from AP-42, Table 1.4-3, then adjusted proportionally so that total of "Adjusted EF" equals Total PAH EF of 1.0 E-04 lb/MMscf per Ventura County factors.

Speciated PAHs (except naphthalene)

	Mean EF (Note 1)	Adjusted EF (Note 5)	Emissions lb/hr	Emissions lb/yr, both boilers
Benzo(a)anthracene	1.80E-06	1.58E-05	3.85E-06	9.31E-03
Benzo(a)pyrene	1.20E-06	1.05E-05	2.57E-06	6.21E-03
Benzo(b)fluoranthrene	1.80E-06	1.58E-05	3.85E-06	9.31E-03
Benzo(k)fluoranthrene	1.80E-06	1.58E-05	3.85E-06	9.31E-03
Chrysene	1.80E-06	1.58E-05	3.85E-06	9.31E-03
Dibenz(a,h)anthracene	1.20E-06	1.05E-05	2.57E-06	6.21E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	1.58E-05	3.85E-06	9.31E-03
Total	1.14E-05	1.00E-04	2.44E-05	5.90E-02

Nighttime Preservation Boilers
Powerblocks 1 and number of boilers 2
Application No.'s 12025 and 12032

	Normal Mode	Startup Mode	
MMBtu/hr	15	1.9	Hours shown are equivalent full load hours; boilers may operate more hours on some days and/or at lower loads. See text.
SCFH	14,706	1,863	
SCFD	235,294	1,863	
Hours/day	16	1	
days/week	7	7	
weeks/yr	52	52	
hrs/yr	4780	345	expected start-up hours

				emission factor		Per Unit emissions			Operating Modes Combined-Per Unit emissions		
Operating Mode				lb/MM cu.ft.	lb/MMBtu	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
Normal	NOx	9 ppm @	3% % O2	1.254	0.01092	0.16	2.62	783.17	0.33	2.79	840.45
	CO	50 ppm @	3% % O2	4.241	0.03694	0.55	8.86	2648.41	1.12	9.43	2842.11
	VOC (as CH4)	10 ppm @	3% % O2	0.485	0.00422	0.06	1.01	302.68	0.13	1.08	324.81
	SOx				0.00210	0.03	0.50	150.57	0.04	0.51	151.95
	PM10				0.00500	0.08	1.20	358.50	0.09	1.22	365.06
Startup	NOx	72 ppm @	3% % O2	10.033	0.08738	0.17	0.17	57.28			
	CO	400 ppm @	3% % O2	33.926	0.295	0.56	0.56	193.70			
	VOC (as CH4)	80 ppm @	3% % O2	3.877	0.034	0.06	0.06	22.14			
	SOx	0.75 grains/100 scf			0.0021	0.00	0.00	1.38			
	PM10				0.010	0.02	0.02	6.56			

Fuel Heat Value: 1020 BTU/SCF
Fd 8710 DSCF exhaust per MMBtu in

Calculated Values:

Fuel Usage: 240 MMBtu/Day
72,356 MMBtu/yr
237,157 SCFD
71 MMSCFY

Calculation of Noncriteria Pollutant Emissions from Nighttime Boilers

Compound	Emission Factor, lb/MMcf (1)	Maximum Hourly Emissions, lb/hr per boiler(2)	Annual Emissions (3) lb/yr per boiler	Annual Emissions (3) lb/yr, both boilers
Propylene	5.30E-01	7.79E-03	*3.76E+01*	*7.52E+01*
Hazardous Air Pollutants				
Acetaldehyde	3.10E-03	4.56E-05	*2.20E-01*	*4.40E-01*
Acrolein	2.70E-03	3.97E-05	*1.92E-01*	*3.83E-01*
Benzene	5.80E-03	8.53E-05	*4.11E-01*	*8.23E-01*
Ethylbenzene	6.90E-03	1.01E-04	*4.89E-01*	*9.79E-01*
Formaldehyde	1.23E-02	1.81E-04	*8.73E-01*	*1.75E+00*
Hexane	4.60E-03	6.76E-05	*3.26E-01*	*6.53E-01*
Naphthalene	3.00E-04	4.41E-06	*2.13E-02*	*4.26E-02*
PAHs (except naphthalene) (4)	1.00E-04	1.47E-06	*7.09E-03*	*1.42E-02*
Toluene	2.65E-02	3.90E-04	*1.88E+00*	*3.76E+00*
Xylene	1.97E-02	2.90E-04	*1.40E+00*	*2.79E+00*
Total HAPs		1.21E-03	*5.82E+00*	*1.16E+01*

Notes:

(1) All factors from Ventura County APCD, "AB2588 Combustion Emission Factors," Natural Gas Fired External Combustion Equipment >100 MMBtu/hr. Available at http://www.vcapcd.org/pubs/Engineering/AirToxics/combem.pdf
(2) Based on maximum hourly boiler heat input o 0.015 MMscf/hr
(3) Based on total annual heat input of 70.9 MMscf/yr
(4) Total PAHs, excluding naphthalene. See speciation below.
(5) Emission factors for individual PAHs obtained from AP-42, Table 1.4-3, then adjusted proportionally so that total of "Adjusted EF" equals Total PAH EF of 1.0 E-04 lb/MMscf per Ventura County factors.

Speciated PAHs (except naphthalene)

	Mean EF (Note 1)	Adjusted EF (Note 5)	Emissions lb/hr	Emissions lb/yr, both boilers
Benzo(a)anthracene	1.80E-06	1.58E-05	2.32E-07	2.24E-03
Benzo(a)pyrene	1.20E-06	1.05E-05	1.55E-07	1.49E-03
Benzo(b)fluoranthrene	1.80E-06	1.58E-05	2.32E-07	2.24E-03
Benzo(k)fluoranthrene	1.80E-06	1.58E-05	2.32E-07	2.24E-03
Chrysene	1.80E-06	1.58E-05	2.32E-07	2.24E-03
Dibenz(a,h)anthracene	1.20E-06	1.05E-05	1.55E-07	1.49E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	1.58E-05	2.32E-07	2.24E-03
Total	1.14E-05	1.00E-04	1.47E-06	1.42E-02

Diesel Fire Pump
Power Blocks 1, 2, and Common Area

Area	App No.	*Equipment	Fuel Use Rate (gph)	bhp	Max Day Hours	Annual Hours	EmFac pounds/hour NOx	CO	VOC	SO2	PM10	Max Daily (pounds) NOx	CO	VOC	SO2	PM10	Max Annual (pounds) NOx	CO	VOC	SO2	PM10
Power Block 1	12027	Cummins CFP7E-F30	12	200	*0.5*	*50*	1.32	1.15	0.08	0.003	0.07	0.7	0.6	0.0	0.0	0.0	66.1	57.3	4.0	0.1	3.3
Power Block 2	12034	Cummins CFP7E-F30	12	200	*0.5*	*50*	1.32	1.15	0.08	0.003	0.07	0.7	0.6	0.0	0.0	0.0	66.1	57.3	4.0	0.1	3.3
Common Area	12036	Cummins CFP7E-F30	12	200	*0.5*	*50*	1.32	1.15	0.08	0.003	0.07	0.7	0.6	0.0	0.0	0.0	66.1	57.3	4.0	0.1	3.3
*or equivalent															Total Pounds		66.1	57.3	4.0	0.1	3.3
															Total Tons		***0.033***	***0.029***	***0.002***	***0.000***	***0.002***

Substance		EmFac gm/bhp-hr
NOx		3
CO		2.6
VOC		0.18
SO2		0.006
PM10		0.15

		EmFac lb/1000 gals	Totals lb/yr
DPM		7.85E+00	1.41E+01

Notes:

Criteria emissions data except SOx from manufacturer, toxics from MDAQMD. Diesel PM equal to PM10
Estimated SOX emission factor calculated from estimated max fuel consumption rate, calculated below:
gal/hr X 7.21 lbs/gal X 453.59 g/lb X 0.0015/100 (sulfur) X 1/ bhp X 64.06 gSO2/32.06gS = g/bhp-hr

Emergency Genset
Power Blocks 1 and 2, and Common Area

Area	App No.	*Equipment	Fuel Use Rate (gph)	bhp	Max Day Hours	Annual Hours	EmFac pounds/hour NOx	CO	VOC	SO2	PM10	Max Daily (pounds) NOx	CO	VOC	SO2	PM10	Max Annual (pounds) NOx	CO	VOC	SO2	PM10
Power Block 1	12026	Caterpillar 3516C	175	3633	*0.5*	*50*	38.45	20.82	1.34	0.038	1.20	19.2	10.4	0.7	0.0	0.6	1922.3	1041.2	66.8	1.9	60.1
Power Block 2	12033	Caterpillar 3516C	175	3633	*0.5*	*50*	38.45	20.82	1.34	0.038	1.20	19.2	10.4	0.7	0.0	0.6	1922.3	1041.2	66.8	1.9	60.1
Common Area	12035	Caterpillar C9 ATAAC	20.0	398	*0.5*	*50*	2.63	2.28	0.15	0.00	0.13	1.3	1.1	0.1	0.0	0.1	131.6	114.1	7.5	0.2	6.6
*or equivalent															Total Pounds		1922.3	1041.2	66.8	1.9	60.1
															Total Tons		***0.961***	***0.521***	***0.033***	***0.001***	***0.030***

Substance		EmFac gm/bhp-hr Power Block 1 and 2	Common
NOx		4.8	3
CO		2.6	2.6
VOC		0.17	0.17
SO2		0.005	0.005
PM10		0.15	0.15

		EmFac lb/1000 gals	Totals lb/yr
DPM		7.85E+00	1.45E+02

Notes:

Criteria emissions data except SOx from manufacturer, toxics from MDAQMD. Diesel PM equal to PM10
Estimated SOX emission factor calculated from estimated max fuel consumption rate, calculated below:
gal/hr X 7.21 lbs/gal X 453.59 g/lb X 0.0015/100 (sulfur) X 1/ bhp X 64.06 gSO2/32.06gS = g/bhp-hr

Fugitive Emissions from Mirror Cleaning Activities (stationary emission sources)
Rio Mesa Solar Electric Generating Facility
Revised June 2012

Pollutant	Emission Factor	Emissions Per Plant (lb/year)	
Larger vehicles:	VMT/yr	18,900	
PM10 (road dust)	0.30	5,632	
PM2.5 (road dust) (lb/VMT	0.03	563	
Smaller vehicles:	VMT/yr	4,000	
PM10 (road dust)	0.17	684	
Total, all activities		Per Power Block, lb/yr	Total Both Power Blocks, lb/yr
PM10 (road dust)		6,316	12,632

Notes:

Unpaved road dust factors from construction emissions calculations; 90% control.

Cleaning operations occur 365 days/yr
20 hrs/day average

FFT MWM operation:

2,700	VMT/yr per FFT MWM
18,900	VMT/yr (total per plant)

NT MWM operation:

145	HP
1	NT vehicle per plant
64,240	gal/yr of fuel (total per plant, NT MWMs)
4,000	VMT/yr (total per plant)

Calculation of Wet Surface Air Cooler Emissions
Rio Mesa Solar Electric Generating Facility
Revised April 2012

Typical Worst-Case Design Parameters	
Water Flow Rate, 10E6 lbr	2.00
Water Flow Rate, gal/min	*4,000*
Drift Rate, %	0.0005
Drift, lbm water/hr	10.00
PM10 Emissions based on TDS Level	
TDS level, ppm	*1500*
PM10, lb/hr	*0.015*
PM10, lb/day	*0.18*
PM10, lb/yr	*29.99*
PM10, tpy	*0.015*
Exhaust Parameters	
Exhaust Temp, deg F	*80.0*
Volumetric flow rate (total)	*590,000.0*
Fan diameter, ft	*9*
No. of fans	*4*

Based on 2,000 hrs/yr
12 hrs/day

Constituent	Concentration in Cooling Tower Return Water (2)	Emissions (1) Emissions, lb/hr	Emissions, ton/yr	Emissions, lbs/year
Ammonia	0 ppm	0.0E+00	0.0E+00	0.0
Copper	0.01 ppm	*1.0E-07*	*1.0E-07*	0.0
Silver	0 ppm	0.0E+00	0.0E+00	0.0
Zinc	0 ppm	0.0E+00	0.0E+00	0.0
Hazardous Air Pollutants				
Arsenic	0 ppm	0.0E+00	0.0E+00	0.0
Beryllium	0.0025 ppm	*2.5E-08*	*2.5E-08*	0.0
Cadmium	0 ppm	0.0E+00	0.0E+00	0.0
Chromium (II	0 ppm	0.0E+00	0.0E+00	0.0
Lead	0 ppm	0.0E+00	0.0E+00	0.0
Mercury	0 ppm	0.0E+00	0.0E+00	0.0
Nickel	0 ppm	0.0E+00	0.0E+00	0.0
Dioxins/furan	-- ppm	--	--	--
PAHs	--	--	--	--
Total HAPs			*2.5E-08*	*5.0E-05*

Notes:
1. Emissions calculated from maximum drift rate of *10.00* lb/hr and 2,000 hrs/yr of operation.
2. Based on assumed 20 cycles of concentration

	Stack Diam, m	Release Height m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s				Stack Diam, ft	Release Height ft	Exh Temp, Deg F	Exh Flow Rate, ft3/m	Exhaust Velocity, ft/s
						NOx	SO2	CO	PM10					
Averaging Period: One hour														
Auxiliary Boilers	1.676	41.148	421.89	34.181	15.486	0.3452	6.591E-02	0.5736	n/a	5.50	135	300	72,426	50.8
Nighttime Preservation Boilers	0.457	9.144	421.89	2.059	12.543	2.142E-02	3.971E-03	6.911E-02	n/a	1.50	30	300	4,363	41.1
PB emergency generators (each)	0.457	8.000	769.11	9.250	56.344	2.422	2.316E-03	1.3119	n/a	1.50	26	925	19,600	184.9
PB fire pump engines (each)	0.102	4.572	796.89	0.779	96.051	8.333E-02	1.588E-04	7.222E-02	n/a	0.33	15	975	1,650	315.1
Common Area em generator	0.203	5.486	730.22	1.062	32.745	1.658E-01	2.646E-04	1.437E-01	n/a	0.67	18	855	2,250	107.4
Common Area fire pump engine	0.102	4.572	796.89	0.779	96.051	8.333E-02	1.588E-04	7.222E-02	n/a	0.33	15	975	1,650	315.1

Table 5.1B-12R2
Greenhouse Gas Emissions Calculations
Rio Mesa Solar Electric Generating Facility
Revised June 2012

Unit	Total Number of Units (1)	Rated Heat Input, MMBtu/hr	Rated Capacity, MW (Note 1)	Operating Hours per year	Startup Hours per year	Fuel Use, MMBtu/yr (1)	Estimated Gross MWh	Maximum Emissions, metric tonnes/yr CO2	CH4	N2O	SF6	Max. Emissions, tons/yr CO2e	CO2 lb/MWh
Auxiliary Boilers	2	249.00444	n/a	1100	865	601656.98	n/a	31899.853	0.601657	0.0601657	--		
Nighttime Preservation Boilers	2	15.000426	n/a	4780	345	144697.86	n/a	7671.8805	0.1446979	0.0144698	--		
Power Block Emergency Generators	2	23.8	n/a	200	n/a	9520	n/a	704.0992	0.02856	0.005712	--		
Common Area Emergency Generator	1	2.72	n/a	200	n/a	544	n/a	40.23424	0.001632	0.0003264	--		
Power Block Fire Pump Engines	2	1.632	n/a	200	n/a	652.8	n/a	48.281088	0.0019584	0.0003917	--		
Common Area Fire Pump Engine	1	1.632	n/a	200	n/a	326.4	n/a	24.140544	0.0009792	0.0001958	--		
WSACs	2	--	n/a	2000	n/a	0	n/a	0	0	0	--		
Circuit breakers	5	--	n/a	8760	n/a	0	n/a	--	--	--	0.0015282		
Total			--	--		757398.04	1374000	40388.489	0.7794844	0.0812614	0.0015282		
CO2-Equivalent								40388.49	16.37	25.19	36.52	44513.23	64.79

Natural Gas GHG Emission Rates (2)

Fuel	Emission Factors, kg/MMBtu CO2 (3)	CH4 (3)	N2O (3)	Emission Factor SF6 (5)
Natural Gas	53.02	0.001	0.0001	n/a
Diesel Fuel	73.96	0.003	0.0006	n/a
Global Warming Potential (4)	1	21	310	23900

Notes:
1. Rated capacity and heat input from heat balance at annual average conditions, annual fuel use and gross generation based on 100% capacity factor.
2. Calculation methods and emission factors from ARB, "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions," December 5, 2007 (Staff's Suggested Modifications to the Originally Proposed Regulation Order Released October 19, 2007). http://www.arb.ca.gov/cc/ccei/reporting/GHGReportRegUpdate12_05_07.pdf
3. 40 CFR 98, Table C-1
4. 40 CFR 98, Table A-1.
5. Sulfur hexafluoride (SF6) will be used as an insulating medium in three 230 kV breakers in the common area and in one generator circuit breaker (GCB) at each power block. Estimates of the SF6 contained in a 230 kV breaker range from 161 to 208 lbs, depending on the manufacturer. The GCBs will each contain 24.2 lb of SF6. The IEC standard for SF6 leakage is less than 0.5%; the NEMA leakage standard for new circuit breakers is 0.1%. A maximum leakage rate of 0.5% per year is assumed.

Rio Mesa Solar Project	NOx	CO	VOC	SOx	PM10/2.5	CO2e
Max Annual (tons)	8.3	13.0	3.0	0.8	2.1	44513.2
Max Daily (pounds)	99.6	132.0	29.1	7.9	21.1	

CAS Number	Chemical Name	HAP	lbs/yr
75070	Acetaldehyde		0.97
107028	Acrolein		0.85
71432	Benzene		1.83
7440417	Berrylium		2.5E-08
7440508	Copper		1.0E-07
9901	DPM	TAC	159.36
100414	Ethylbenzene		2.158202
50000	Formaldehyde		3.8677
110543	Hexane		1.42
91203	Naphthalene		0.22
1150	PAHs (except naphthalene) (4)		0.07
	speciated PAHs		
	Benzo(a)anthracene		0.01
50328	Benzo(a)pyrene		0.01
205992	Benzo(b)fluoranthrene		0.01
207089	Benzo(k)fluoranthrene		0.01
218019	Chrysene		0.01
53703	Dibenz(a,h)anthracene		0.01
193395	Indeno(1,2,3-cd)pyrene		0.01
115071	Propylene	TAC	84.35
108883	Toluene		8.36
1330207	Xylene		6.21E+00

Table 1A – SEGF Maximum Annual HAP Emissions
(All emissions presented in pounds per year)

Substance		**Total**
Acetaldehyde		0.970481471
Acrolein		0.854768333
Benzene		1.825249804
Beryllium		2.5E-08
Copper		1.0E-07
DPM	TAC	159.355
Ethylbenzene		2.158201863
Formaldehyde		3.867738529
Hexane		1.419146667
Naphthalene		0.219453235
PAHs (except naphthalene) (4)		0.073151078
speciated PAHs		
Benzo(a)anthracene		0.006895139
Benzo(a)pyrene		0.00459676
Benzo(b)fluoranthrene		0.006895139
Benzo(k)fluoranthrene		0.006895139
Chrysene		0.006895139
Dibenz(a,h)anthracene		0.00459676
Indeno(1,2,3-cd)pyrene		0.006895139
Propylene	TAC	84.35003716
Toluene		8.358819118
Xylene		6.214804608
Total HAPS		26.0

Note: Total HAPS do not include Toxic Air Contaminants (TAC) DPM or Propylene