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August 29, 2011

Craig Hoffman
Compliance Project Manager
(09-AFC-03C)
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814

RE: Petition for Staff Approved Project Changes for the Mariposa Energy Project (09-AFC-03)

Dear Mr. Hoffman:

On behalf of Mariposa Energy, LLC (Mariposa Energy or "Project Owner"), I am writing to request Staff Approval of very minor changes in the general plant arrangement for the Mariposa Energy Project (MEP). These very minor changes will not prevent or interfere with the project's ability to comply with the conditions of certification and will not result in any significant adverse environmental impacts.

Based on a review of the air dispersion modeling and health risk assessment results for the revised general arrangement plan, the project will comply with all applicable AAQSs. Furthermore, the revised general arrangement would not alter the basis for Commission approval of the project nor require any changes to the final Conditions of Certification. Therefore, Mariposa Energy is requesting concurrence that these changes do not require an amendment to the MEP license and requests Staff approval of the revised MEP general arrangement presented in Attachment 1.

If you have any questions regarding this submittal, please do not hesitate to contact me at (916) 447-2166 or Chris Curry at (213) 346-2134.

Sincerely,

Gregg Wheatland

MARIPOSA ENERGY PROJECT APPLICATION FOR STAFF APPROVED PROJECT CHANGES

As required by Section 1769 of the CEC Siting Regulations, Project Owner hereby submits the following information in support of these staff approved project changes.

Pursuant to Section 1769 (a)(1)(A) and (B), this section provides a complete description of the proposed modifications, including new language for affected conditions, and the necessity for the modifications.

During the final design phase of MEP, Mariposa Energy's engineering contractor determined that the general arrangement drawing included in the Application for Certification (AFC) (Figure 2.3-1) required minor revisions, including the slight shifting of the location of the water storage tanks near the firewater pump, and very minor adjustments to the location, orientation, and configuration of certain other structures and equipment. The water storage tanks require moving because it was determined during the detailed tank foundation design that the footing area had to be larger than the actual tank footprint in order to reduce the soil bearing to allowable levels and prevent seismic overturning. Alternative designs of increasing the depth of the footings or combining the tank foundations did not relieve this condition, so the tank foundation centerlines had to be spaced slightly further apart.

Because the slight change in the location of these structures could potentially alter the results of the air dispersion analysis performed for project licensing, CH2M HILL conducted an air dispersion modeling analysis. This analysis confirms that the project will still comply with all applicable ambient air quality standards and will not result in any significant air quality impacts. A detailed summary of the modifications to the general arrangement, and results from the ambient air quality analysis, are presented below.

Summary of the Proposed General Arrangement Revisions

It is important to note that while Mariposa Energy is proposing to slightly move the water tanks, and slightly relocate several buildings and ancillary equipment, there are no proposed changes to the location of the combustion turbine exhaust or the firewater pump exhaust stacks identified in the Final Decision. The following is a list of the minor revisions to the locations of the buildings and equipment compared to the general arrangement equipment layout used during the licensing proceeding and the air dispersion modeling analysis used as the basis for the Commission Decision. The proposed general arrangement plan for MEP is included as Attachment 1.

- The wastewater tank move approximately 22 feet southwest.
- The demineralized water tank move approximately 31 feet southwest.
- The raw water tank move approximately 11 feet southwest.
- The fuel gas compressor skids will move approximately 30 feet northwest.
- The Warehouse and Maintenance Building move approximately 50 feet southeast.
- The gas metering station move approximately 80 feet west.
- The 230-kilovolt (kV) circuit breakers, 230-kV disconnect switch, and the generator stepup transformers will each move approximately 20 to 120 feet southwest, respectively.

• Orientation of the power distribution center, auxiliary transformers, and station transformers are rotated 90 degrees counter clockwise.

• The single-unit chiller package will be replaced with a four-unit chiller package. The chiller package will move approximately 43 feet southwest. The original chiller module arrangement depicted on the general arrangement was based on one of multiple potential manufacturers. Chiller module sizes and arrangements vary among potential suppliers, and the current arrangement was not known until final vendor selection was completed. During final bidding, the vendor retracted the design offer originally shown, and the four-unit chiller package shown is the final design selected for the project.

• The four Continuous Emissions Monitoring System (CEMS) shelters move to the southeast side of each stack 25 feet to avoid underground electrical conduit and piping runs. This placement also creates better access for the crane required to service the ECM catalyst during maintenance activities.

Significantly, these minor changes in the General Plant Arrangement do not require any changes in the text of the Commission decision or changes in any Conditions of Certification.

Pursuant to Section 1769(a)(1)(C), a discussion is required if the modification is based on information that was known by the petitioner during the certification proceeding, and an explanation of why the issue was not raised at that time.

The need for these changes is based on information that became known to the petitioner after the close of the certification proceeding – specifically, (1) final engineering drawings addressing a request from PG&E to relocate the gas metering station to provide PG&E unrestricted 24 hour access to the facility, (2) final engineering drawings which required slight adjustments in the location of tanks and other structures to ensure spacing between structures in accordance with building codes, and (3) a change in chiller packages when a vendor retracted a bid during final vendor selection.

Pursuant to Section 1769(a)(1)(D), a discussion is required on whether the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, and explanation of why the change should be permitted.

These minor changes in the General Plan Arrangement do not change or undermine the assumptions, rationale, findings, or other bases of the final decision. These changes should be permitted as there are no significant impacts resulting from these changes. Each of these changes will improve the safe and efficient operation of the Project.

Pursuant to Section 1769(a)(1)(E), an analysis of the impacts the modifications may have on the environment and proposed measures to mitigate any significant adverse impacts is required.

The proposed changes do not require changes to the environmental baseline information as described in the Application for Certification.

The additional air quality and public health analyses confirm that the project will still comply with all applicable ambient air quality standards and will not result in any significant air quality or public health impacts. The chiller package represents one of the noise sources associated with the licensed project. However, the noise from the project, as modified, will remain below all applicable noise standards and the selection of an alternate chiller package does not require a modification to the Conditions of Certification for noise. Therefore, the facility will continue to meet all existing environmental standards and there will be no significant adverse environmental impacts.

Updated Criteria Pollutant and Health Risk Analysis

As previously stated, there are no proposed changes to the permitted turbine and fire pump stack locations. Therefore, the Building Profile Input Program (BPIP) was used to determine whether or not the proposed changes to the surrounding buildings and equipment would affect the dispersion modeling results. Based on the results of the BPIP analysis, it was determined that the proposed changes would not affect the dispersion modeling results associated with the turbine emissions but that the proposed revisions had the potential to affect the results associated with the diesel fire pump emissions.

In addition to the potential impacts to the results associated with the BPIP changes, a more recent version of AERMOD has been released since the preparation of the AFC. Therefore, a turbine load analysis was conducted to verify that the new AERMOD version would result in impacts identical to those of the older version. The results of the load analysis test confirmed that results for both versions were identical for the combustion turbines.

Therefore, based on the results of the BPIP analysis and the updated AERMOD version analysis, it is concluded that the turbine commissioning impacts will not be affected by the proposed general arrangement revision. It follows that because the modeled turbine impacts are not affected by the proposed general arrangement revision, the localized cumulative impacts will also not be affected. Therefore, the operational impacts were further evaluated as part of the updated criteria pollutant and health risk analysis.

Operational and air dispersion modeling for the revised MEP general arrangement was performed using the methodology described in the AFC, with exceptions to the following:

- An updated version of the U.S. Environmental Protection Agency (EPA)-approved dispersion model, AERMOD (Version 11103), was used for the revised air dispersion modeling. The meteorological data were consistent with the previous analysis.
- The 1-hour NO_2 modeling was performed using the ozone limiting method (OLM), as outlined by the San Joaquin Valley Air Pollution Control District (SJVAPCD).[1] This methodology is consistent with EPA guidance[2] for use of AERMOD OLM and the approach presented in the Commission Decision.

[1] *Assessment of Non-Regulatory Options in AERMOD Specifically OLM and PVMRM*, SJVAPCD, 2010

[2] *Additional Clarification Regarding Application of the Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* USEPA, Research Triangle Park. March 2011.

Operational Impact Analysis

In order to evaluate the worst-case air quality impacts for the revised equipment layout, dispersion modeling was conducted at 50 percent load at 93°F ambient temperature and 100 percent load at 59°F ambient temperature for short-term and annual averaging times, respectfully. The 50 percent load and 93°F scenario for short-term averaging periods was chosen because this load resulted in the maximum impacts during the turbine load analysis. The 100 percent load and 59°F scenario was chosen because it represents average annual conditions. Parameters and emission rates for these scenarios are presented in Table 1.[3] Detailed emissions data for the turbines and fire pump engine can be found in Attachment 2.

TABLE 1
Maximum Emission Rates Used for the Refined Grid AERMOD Model Runs

	Turbine 1[a] (lb/hr)	Turbine 2[a] (lb/hr)	Turbine 3[a] (lb/hr)	Turbine 4[a] (lb/hr)	Fire Pump Engine[b] (lb/hr)
NO_2					
1-hour	18.506	18.506	18.506	18.506	0.62
Annual	2.493	2.493	2.493	2.493	0.00704
CO					
1-hour	17.319	17.319	17.319	17.319	0.29
8-hour	7.968	7.968	7.968	7.968	--
SO_2					
1-hour	0.910	0.910	0.910	0.910	0.00121
3-hour	0.910	0.910	0.910	0.910	0.000403
24-hour	0.910	0.910	0.910	0.910	0.0000504
Annual	0.1625	0.1625	0.1625	0.1625	0.0000138
PM_{10}					
24-hour	2.50	2.50	2.50	2.50	0.00112
Annual	1.206	1.206	1.206	1.206	0.000307
$PM_{2.5}$					
24-hour	2.50	2.50	2.50	2.50	0.00112
Annual	1.206	1.206	1.206	1.206	0.000307

[a] Turbine emission rates are based on the following assumptions:

- The maximum 1-hour NO_x and CO emission rate estimates based on the worst-case startup emissions.
- 1-, 3-, and 24-hour SO_2 emission rate estimates based on the worst-case fuel sulfur content of 0.66 grains/100 standard cubic feet of natural gas.
- 8-hour CO emission rate estimate based on three startups, three shutdowns, and the balance of steady state operation for each turbine.
- 24-hour PM_{10}/$PM_{2.5}$ emission rate estimates based on the worst-case 1-hour emission rate.

[b] Fire pump engine emissions are based on a 30-minute testing and maintenance time, restricted to between the hours of 8:00 and 11:00 a.m. on testing days.

Health Risk Assessment

The health risk assessment followed the same methodology as presented in the AFC. The AERMOD dispersion model was used in conjunction with the HARP program (Version 1.4d) to

[3] Emission rates for the turbines have been updated to reflect those modeled in Data Response 13 (i.e., the cumulative impact assessment). Fire pump engine emissions have been updated to reflect a 30-minute testing time, an annual operating scenario of 50 hours per year, and a restriction for testing between 8:00 and 11:00 a.m.

determine the incremental cancer risk and the chronic and acute health indices. The HARP onramp program was used to convert the AERMOD dispersion modeling files to a format compatible with the HARP program. Fire pump engine emissions have been updated to reflect a 30-minute testing time, an annual operating scenario of 50 hours per year, and a restriction for testing between 8:00 and 11:00 a.m.

Criteria Pollutant and Health Risk Analysis Modeling Results

Operational Air Quality Impacts Analysis

The highest modeled concentrations from the turbine scenarios and fire pump testing and maintenance activities were used to demonstrate compliance with the ambient air quality standards (AAQS). Table 2 presents a comparison of the maximum operational impacts associated with the revised general arrangement to the AAQS. In addition to a comparison with the federal 1-hour NO_2 standard, the results are also compared with the new federal 1-hour SO_2 standard of 75 parts per billion (ppb) (196 µg/m³), which was implemented in August 2010. This standard is based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations. However, as SO_2 impacts were not expected to exceed the standard, the maximum 1-hour impact was conservatively used to show compliance with this standard.

The operational NO_2, SO_2, and CO impacts, when added to the background concentrations, remain less than the AAQS. Therefore, MEP would not cause or contribute to the violation of a standard, and the NO_2, SO_2, and CO impacts from operation would remain less than significant for the revised general arrangement.

For PM_{10} and $PM_{2.5}$, background concentrations exceed the AAQS without the proposed project. Therefore, the predicted project impact with the revised general arrangement plus background would continue to exceed the AAQS (consistent with the similar finding in the Commission Decision). However, the project will provide adequate PM_{10} and $PM_{2.5}$ mitigation, so operation of MEP with the proposed general arrangement revision would not cause a significant PM_{10} and $PM_{2.5}$ impact. The dispersion modeling files are included as Attachment 3.

TABLE 2
MEP Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Facility Impact (µg/m^3)	Background (µg/m^3) [a]	Total Predicted Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	State 1-hour	150.0	105.7	256	339	-
	Federal 1-hour[b]	107.3	73.0	181	-	188
	annual	0.62	18.9	19.5	57	100
SO_2	State 1-hour	7.2	46.9	54.1	655	-
	Federal 1-hour[c]	7.2	46.9	54.1	-	196
	24-hour	1.1	18.3	19.4	105	365
	annual	0.007	5.2	5.2	-	80
CO	1-hour	138	5,029	5,167	23,000	40,000
	8-hour	23	2,640	2,663	10,000	10,000
PM_{10}	24-hour	2.95	126.8	129.7	50	150
	annual	0.054	24.8	24.9	20	-
$PM_{2.5}$	24-hour	2.95	81.2	84.1	-	35
	annual	0.054	14.3	14.4	12	15

TABLE 2
MEP Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

[a] **Background concentrations** are the same as those presented in Air Quality Table 3 of the Commission Decision.

[b] The predicted air quality impact for comparison to the federal 1-hour NO_2 standard is based on the highest 8th high modeled NO_2 concentration. The highest 8th high modeled NO_2 concentration also includes the predicted impacts from th fire pump even though the EPA provided additional guidance on March 1, 2011, which states "the most appropriate data t use for compliance demonstrations for the 1-hour NO_2 NAAQS are those based on emissions scenarios that are continuou enough or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations.[4] Because the fire pump is expected to operate less than 50 hours per year for maintenance and testing, the fire pump is not expected to contribute significantly to the annual distribution of daily maximum 1-hour concentrations.

[c] The predicted air quality impact for comparison to the federal 1-hour SO_2 standard is conservatively based on the maximum predicted 1-hour concentration.

Note:
$\mu g/m^3$ = microgram(s) per cubic meter

Health Risk Analysis

The potential health impacts at the maximum exposed individual resident (MEIR), the maximum exposed individual worker (MEIW), and sensitive receptors associated with the operation of the MEP with the revised general arrangement are summarized in Table 3. The predicted incremental increase in cancer risk at the MEIR, MEIW, and the maximum exposed sensitive receptor are all well below the facility significance threshold of 10.0 in 1 million. Therefore, based on Bay Area Air Quality Management District (BAAQMD) Regulation 2, Rule 5, the predicted facility-wide incremental increase in cancer risk would remain less than significant.

The predicted chronic and acute indices are also well below the BAAQMD facility-wide significance threshold of 1.0. Therefore, the predicted impact from the proposed project and revised general arrangement will be less than significant.

The HARP modeling files are included as Attachment 3.

TABLE 3
Summary of MEP Health Risk Analysis Results: All Sources

Risk	Receptor Number	Predicted Result	Universal Transverse Mercator (NAD 27)
70-year Derived Adjusted Cancer Risk at the MEIR	714	0.0639 per million	(624300, 4183600)
70-year Derived Adjusted Cancer Risk Sensitive Receptor	857	0.0176 per million	(625338.14, 4182969.67)
40-year Cancer Risk at the MEIW	972	0.0239 per million	(623300, 4183400)
Maximum Resident Chronic HI	714	0.00082	(624300, 4183600)
Maximum Worker Chronic HI	972	0.00016	(623300, 4183400)
Maximum Chronic HI at Sensitive Receptor	857	0.00035	(625338.14, 4182969.67)

[4] *Additional Clarification Regarding Application of the Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* USEPA, Research Triangle Park. March 2011.

TABLE 3
Summary of MEP Health Risk Analysis Results: All Sources

Risk	Receptor Number	Predicted Result	Universal Transverse Mercator (NAD 27)
Maximum Resident Acute HI	2024	0.0318	(622500, 4178500)
Maximum Worker Acute HI	972	0.0536	(623300, 4183400)
Maximum Acute HI Sensitive Receptor	857	0.00695	(625338.14, 4182969.67)

Note:
HI = Hazard Index

Pursuant to Section 1769(a)(1)(F), a discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards is required.

The project will comply with all applicable LORS. Some of these changes, such as the slight change in location of the tanks, are necessary to ensure that the project complies with spacing requirements in the applicable codes.

Pursuant to Section 1769(a)(1)(G), a discussion of how the modifications affect the public is required.

These minor changes to the General Arrangement do not result in significant physical changes to the environment inside or outside the fenceline of the project and do not negatively impact air quality or public health. There are no significant adverse effects on property owners that will result from the adoption of the changes proposed.

Pursuant to Section 1769(a)(1)(H), a list of property owners potentially affected by the modification is required.

The proposed minor changes in the General Plant Arrangement will have no significant environmental effects and will be in compliance with applicable LORS. Therefore, no property owners will be affected by the modifications.

Pursuant to Section 1769(a)(1)(I), a discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings is required.

The proposed minor changes in General Plant Arrangement will have no significant environmental effects and will be in compliance with applicable LORS. Therefore, the proposed changes will have no impact on property owners, the public, or any other parties.

Attachment 1
Proposed General Arrangement Drawing for MEP (09-AFC-3C)

#	EQUIP. TAGS	DESCRIPTION
1.	CTG-CTG-6/7/8/9-01	GE LM-6000PC SPRINT COMBUSTION TURBINE GENERATOR
2.	SCR-CTG-6/7/8/9-01	HOT SCR (ECM)
3.	PK-CEM-6/7/8/9-01	CONTINUOUS EMISSIONS MONITORING SYSTEM
4.	SK-AMM-6/7/8/9-01	AMMONIA VAPORIZATION SKID
5.	CLR-CTG-6/7/8/9-01	CTG LUBE OIL COOLER
6.	SK-CTG-6/7/8/9-02 A/B	CTG DM WATER INJECTION PUMP SKIDS
7.	FAN-TA-6/7/8/9-01 A/B	TEMPERING AIR FANS
8.	MCC-ELV-06/07/08/09-01	MOTOR CONTROL CENTER
9.	TURBINE REMOVAL AREA	
10.	SK-CTG-6/7/8/9-01	CTG AUXILIARY SKID
11.	SK-CTG-6/7/8/9-03	CTG SPRINT SKID
12.	SK-CTG-6/7/8/9-04	CTG FUEL GAS FINAL FILTER SKID
13.	SK-CTG-6/7/8/9-05	CTG FIRE PROTECTION SKID (CO2 BOTTLES)
14.	CTG INLET AIR FILTER	CTG INLET AIR FILTER
15.	TK-CTG-6/7/8/9-01	CTG WATER WASH DRAIN TANK
16.	GENERATOR REMOVAL AREA	
17.	SG-EMV-6/7/8/9-01	15 KV BREAKER - UNITS 6 THRU 9
18.	GSU-6/7/8/9	GENERATOR STEP-UP TRANSFORMER (GSU)
19.	DS003,004,005,006	230 KV DISCONNECT SWITCH

#	EQUIP. TAGS	DESCRIPTION
20.	S-OW-0-01	OILY WATER SUMP
21.	OWS-DOW-0-01	OILY WATER SEPARATOR
22.	POWER DISTRIBUTION CENTER (PDC)	
23.	AUX-EMV-0-01	AUX TRANSFORMERS
24.	SK-FG-0-01/A/B/C/D/E	FUEL GAS COMPRESSOR SKIDS
25.	FFC-FG-0-01	FUEL GAS FIN-FAN RECYCLE COOLER
26.	TK-FG-0-01	FUEL GAS DRAINS TANK
27.	SK-FG-0-02	FUEL GAS DISCHARGE COALESCING FILTER SKID
28.	HTR-FG-0-02	FUEL GAS DEW POINT HEATER
29.	CB230-01	230 KV CIRCUIT BREAKER
30.	OVERHEAD 230 KV TRANSMISSION LINES	
31.	TK-SW-0-01	SERVICE/FIRE WATER STORAGE TANK (45' DIA.)
32.	SK-FP-0-01	FIRE WATER PUMP SKID
33.	P-SW-0-01 A/B	SERVICE WATER PUMPS
34.	P-WW-0-02 A/B	PROCESS WASTE WATER FORWARDING PUMPS
35.	TK-WW-0-01	WASTE WATER STORAGE TANK (25' DIA.)
36.	P-DW-0-01 A/B/C	DEMIN WATER PUMPS
37.	TK-DW-0-01	DEMIN WATER STORAGE TANK (40' DIA.)
38.	VS-AMM-0-01	AQUEOUS AMMONIA STORAGE TANK

#	EQUIP. TAGS	DESCRIPTION
39.	DEMIN WATER TRAILERS (PORTABLE)	
40.	WAREHOUSE & MAINT. BUILDING	
41.	SK-FG-0-03	FUEL GAS LETDOWN STATION
42.	SK-CHW-0-01/02/03/04	CHILLER PACKAGE
43.	HTR-CHW-0-01	ANTI-ICING HEATER
44.	CONTROL/ADMIN. BUILDING	
45.	CTG POWER CONTROL MODULE	
46.	XR-CTG-6/7/8/9-01	PCM TRANSFORMER
47.	DETENTION POND	
48.	TK-PW-0-01	7500 GAL. UNTREATED POTABLE WATER STORAGE TANK
49.	SK-DW-0-01	MULTIMEDIA FILTER SKID
50.	COMPRESSED AIR SYSTEM SHED	
51.	TK-SWW-0-01/02	SANITARY WASTE HOLDING TANKS (PUMP OUT)
52.	CHEMICAL STORAGE TOTE	
53.	S-WW-0-01	PROCESS WASTE WATER SUMP
54.	SK-PW-0-01	POTABLE WATER SKID
55.	SST-ELV-0-01	STATION SERVICE TRANSFORMERS
56.	SK-CF-0-01	SODIUM HYPOCHLORITE SKID
57.	DS001, DS002	230 KV PRIMARY DISCONNECT SWITCHES
58.	XR-CHW-0-01	ANTI-ICING SYSTEM TRANSFORMER
59.	XR-FG-0-01	FUEL GAS HEATER TRANSFORMER

NOTES:

1. ALL COORDINATES SHOWN ARE PLANT GRID COORDINATES UNLESS NOTED OTHERWISE. SEE CIVIL DRAWING NUMBERS: C-N0001 & C-S0001 FOR ADDITIONAL INFORMATION.

GE DATUM (B.O.S. LM6000) 0'-0" = EL. 126'-0"
GRADE EL. 125'-6"

40 0 40 80
Scale: 1 INCH = 40 FEET

NO.	DATE	REVISION	BY	CHK
A	03/24/11	ISSUED FOR REVIEW	EFC	SR
B	04/15/11	ISSUED FOR REVIEW	EFC	TBJ
0	06/01/11	ISSUED FOR CONSTRUCTION	EFC	TBJ

RESPONSIBLE ENGINEER
PE #

REVISION APPROVAL — REV 0 — DATE 06/01/11

DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL	JP	ELECTRICAL	KM
STRUCTURAL	MI	INST & CONT.	MS
MECHANICAL	AJ	ARCH.	LB
PROCESS	AJ	GEN. ARRANG.	EC
PIPING	YS		

STATUS

ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY	P1	01/14/11			
FOR REVIEW AND APPROVAL	B	04/15/11	RP	RP	JN
APPROVED FOR CONSTRUCTION	0	6/2/11	[illegible]	[illegible]	[illegible]
REVISED & APPROVED FOR CONSTRUCTION					

SCALE 1" = 40'

Diamond Generating Corporation
A Subsidiary of Mitsubishi Corporation

Mariposa Energy Project

PROJECT NO. 415059

CH2MHILL
CH2MHILL Engineers, Inc.

GENERAL ARRANGEMENT

EQUIPMENT LOCATION PLAN

DWG. NO. G-PE001 REV. 0

FILENAME: mepgpe001.dgn PLOT DATE:

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

Attachment 2
Turbine and Fire Pump Emission Spreadsheets

Mariposa Energy Project
Table 5.1B.7R
Summary of Emergency Fire Pump Emissions - Criteria, HAPS, and Greenhouse Gas Pollutants
Revised October 2010 (Operating Hours Revised Per Discussion with BAAQMD/PDOC)

Assume: Cummins Model CFP7E-F40 (or equivalent) fire pump to be driven by 220 bhp diesel engine, Tier 3 engine
Engine operates a maximum of 0.5 hours per day / 50 hours per year for maintenance and reliability testing.

Rated Horsepower	220	Maximum rated capacity of the Cummins Model CFP7E-F40
Maximum Test Time:	0.5	(30 minutes per hour)
Tests/Day	1	
Hours/Year	50	
Max Fuel usage is	11.4	Gal/hr (at 220 bhp, 1,760 RPM)
	5.70	Gal/day (assumes a maximum of 30 minutes per hour)
	570	Gal/yr

Engine Data Source - Cummins California ATCM Tier 3 Emissions Data Spec Sheet (15 ppm sulfur diesel fuel) - December 22, 2008

Pollutant	Emission Factor[1]	Emissions			
	Grams/Brake-Horsepower-Hour	lb/hr	lb/day	lb/yr	Annual lb/hr (used for modeling)
Hydrocarbons	0.062	0.0150	0.0150	1.50	0.000172
Oxides of Nitrogen	2.544	0.62	0.62	61.7	0.00704
Carbon Monoxide	1.193	0.29	0.29	28.9	0.00330
Particulates	0.111	0.027	0.027	2.69	0.000307
Sulfur Dioxide[2]	-	0.00121	0.00121	0.1206	0.0000138
	kg/gal	**lb/hr**	**lb/day**	**metric tons/yr**	
Carbon Dioxide[3]	10.15	128	128	5.79	
Methane[4]	0.0003	0.0038	0.0038	0.000171	
Nitrous Oxide[4]	0.0001	0.00126	0.00126	0.0000570	

1. Emission factors from the Cummins California ATCM Tier 3 Emissions Data Spec Sheet (15 ppm sulfur diesel fuel) - December 22, 2008.
2. Calculated from maximum fuel use of 11.4 gal/hr, fuel density of 7.05 lb/gal and 15 ppmw of sulfur.
3. Based on CCAR General Reporting Protocol (version 3.0, April 2008) Table C.6 emission factor for distillate oil of 10.15 kg/gal.
4. Based on CCAR General Reporting Protocol (version 3.0, April 2008) Table C.7 emission factor for distillate oil of 0.0003 kg CH_4 /gal and 0.0001 kg N_2O/gal.

Maximum Fuel usage is	11.4	Gal/hr	0.0114	1000 Gal/hr
	5.70	Gal/day	0.005700	1000 Gal/day
	570	Gal/yr	0.57	1000 Gal/yr

Pollutant	Emission Factor	Emissions		
	lb/1000 gallons	lb/hr	lb/day	lb/yr
Benzene	0.1863	0.00106	0.00106	0.1062
Formaldehyde	1.7261	0.0098	0.0098	0.984
Total PAHs (minus Naphthalene)	0.0362	0.00021	0.00021	0.0206
Naphthalene	0.0197	0.000112	0.000112	0.01123
Acetaldehyde	0.7833	0.0045	0.0045	0.446
Acrolein	0.0339	0.00019	0.00019	0.0193
1,3 Butadiene	0.2174	0.00124	0.00124	0.124
Chlorobenzene	0.0002	0.00000114	0.00000114	0.0001140
Dioxins	ND	ND	ND	ND
Furans	ND	ND	ND	ND
Propylene	0.467	0.0027	0.0027	0.266
Hexane	0.0269	0.00015	0.00015	0.0153
Toluene	0.1054	0.00060	0.00060	0.0601
Xylenes	0.0424	0.00024	0.00024	0.0242
Ethyl Benzene	0.0109	0.000062	0.000062	0.00621
Hydrogen Chloride	0.1863	0.00106	0.00106	0.1062
Arsenic	0.0016	0.0000091	0.0000091	0.000912
Beryllium	ND	ND	ND	ND
Cadmium	0.0015	0.0000086	0.0000086	0.000855
Hexavalent Chromium	0.0001	0.00000057	0.00000057	0.0000570
Copper	0.0041	0.000023	0.000023	0.00234
Lead	0.0083	0.000047	0.000047	0.00473
Manganese	0.0031	0.000018	0.000018	0.00177
Mercury	0.0020	0.000011	0.0000114	0.001140
Nickel	0.0039	0.000022	0.000022	0.00222
Selenium	0.0022	0.000013	0.0000125	0.00125
Zinc	0.0224	0.00013	0.000128	0.0128
			Total (lb/yr)	2.22

Emission Factor Source - Ventura County APCD AB-2588 Combustion Emission Factors, dated May 17, 2001

Mariposa Energy Project
Table 5.1B.4R
Turbine Criteria Pollutant Emission Estimates
March 2011

Daily Emissions based on Maximum daily operation of 24 hours/day
Annual Emissions based on Maximum annual operation of 4000 hours/year

Normal Operation Scenario(1)				Fuel Input[1,3]		Emissions[1,3] (Per Turbine) NOx			CO			VOC			Particulates			SO_2[2]			
Ambient	GE	RH	Load	Per CT	Per CT	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	Max lb/hr	lb/day	Avg lb/hr	lb/yr
Temp F	Date	%	%	MMBtu/hr (HHV)	lb/hr																
17	1/29/2009	80	100	465	22,108	4.24	102	16,960	2.06	50	8,260	0.58	14	2,316	2.5	60	10,000	0.88	21.1	0.33	1,302
46	1/27/2009	95	100	481	22,891	4.40	105	17,580	2.14	51	8,574	0.60	14	2,383	2.5	60	10,000	0.91	21.8	0.34	1,348
59	1/27/2009	60	100	465	22,117	4.25	102	16,988	2.07	50	8,267	0.58	14	2,313	2.5	60	10,000	0.88	21.1	0.33	1,302
59	12/9/2008	60	50	282	12,364	2.60	62	10,400	1.22	29	4,895	0.39	9	1,560	2.5	60	10,000	0.53	12.8	0.20	790
93	1/27/2009	26	100	391	18,591	3.57	86	14,276	1.74	42	6,973	0.49	12	1,948	2.5	60	10,000	0.74	17.7	0.27	1,095
93	12/9/2008	26	50	270	11,842	2.40	58	9,600	1.17	28	4,662	0.36	9	1,420	2.5	60	10,000	0.51	12.3	0.19	757
112	1/29/2009	15	100	338	16,092	3.09	74	12,348	1.51	36	6,021	0.42	10	1,687	2.5	60	10,000	0.64	15.3	0.24	947

50% load

(1) Source: GE Gas Turbine Performance Sheets for 17, 46, 59, 93 and 112F.
Data for 17 and 112F (Base Load) are based on January 29, 2009 data.
Data for 46, 59, and 93F (Base Load) are based on January 27, 2009 data.
Data for 59 and 93F (50% Load) are based on December 9, 2008 data
(2) Maximum SO2 Emissions based on a emission factor of 0.00189 lb SO2 per MMbtu natural gas - Source: 0.66 gr sulfur/100 cf natural gas, using method in AP-42 ch.1 table 1.4-2 and natural gas heat value of 1047 btu/scf.
(3) Per CTG, assuming BACT levels of 2.5 ppm NOx, 2 ppm CO, and 1 ppm VOC. Daily emissions represent 24 hours per day per CTG. Annual emissions represent 4000 hours per CTG per year.

Modeling Scenarios

Normal Operation Scenario(1)				Exhaust Stack Conditions Stack Temp	Flow		Stack Height	Stack Diameter	Velocity	Maximum Exhaust Emissions Rates (pound per hour)(per turbine) NOx		CO		SOx				PM10		PM2.5	
Ambient	GE	RH	Load	F	lb/hr	ACFM[a]	Feet	Feet	ft/s	1-Hour[b]	Annual[c]	1-Hour[b]	8-Hour[d]	1-Hour[b]	3-Hour[e]	24-Hour[f]	Annual[c]	24-Hour[f]	Annual[c]	24-Hour[f]	Annual[c]
Temp F	Date	%	%																		
17	1/29/2009	80	100	780	1127562	607693	79.5	12.0	89.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
46	1/27/2009	95	100	840	1083789	612224	79.5	12.0	90.2	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
59	1/27/2009	60	100	848	1051375	597341	79.5	12.0	88.0	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
59	12/9/2008	60	50	743	842305	440226	79.5	12.0	64.9	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
93	1/27/2009	26	100	861	930219	533924	79.5	12.0	78.7	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
93	12/9/2008	26	50	781	787723	424813	79.5	12.0	62.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
112	1/29/2009	15	100	863	845007	485749	79.5	12.0	71.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206

50% load

[a] Assumes exhaust gases have an average molecular weight of 28.0 lb/lbmol, pressure of 1 atm, and gas constant equal to 0.7302 atm ft^3/(lbmol R).
[b]Maximum 1-hr scenario assumes one startup lasting 30 minutes, 15 minutes of steady state operation, and one shutdown lasting 15 minutes.
[c]Annual emission rate for NOx, SOx, PM10, and PM2.5 were conservatively based on 4,000 hours of turbine operation at full capacity with air inlet chiller operating, plus 300 startup and shutdown events. The annual SO2 emission rate is based on
[d]8-Hour Scenario assumes 3 startups, 3 shutdowns, and the balance of steady-state
[e]3-Hour Scenario assumes 3 hours of steady-state operation
[f]24-hour PM10/PM2.5 emission rate estimate based on the worst-case 1-hour emission rate (full capacity with air inlet chiller operating).

Attachment 3
AERMOD and HARP Modeling Files
(CD-ROM)

Additional copies of the AERMOD and HARP modeling files are available upon request.

Dispersion Modeling Approach for the Revised MEP General Arrangement Drawing – August 2011

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DATE: September 14, 2011

During the final design phase of the Mariposa Energy Project (MEP), Mariposa Energy's engineering contractor determined that the general arrangement drawing included in the Application for Certification (AFC) (Figure 2.3-1) required minor revisions, including the slight shifting of the location of the water storage tanks near the firewater pump, and very minor adjustments to the location, orientation, and configuration of certain other structures and equipment. The water storage tanks require moving because it was determined during the detailed tank foundation design that the footing area had to be significantly larger than the actual tank footprint in order to reduce the soil bearing to allowable levels and prevent seismic overturning. Alternative designs of increasing the depth of the footings or combining the tank foundations did not relieve this condition, so the tank foundation centerlines had to be spaced slightly farther apart.

Because the slight change in the location of these structures could potentially alter the results of the air dispersion analysis performed for project licensing, CH2M HILL conducted an air dispersion modeling analysis for the proposed general arrangement drawing. This analysis confirmed that the project will still comply with all applicable ambient air quality standards and will not result in any significant air quality impacts. A summary of the modeling approach is presented below.

Modeling Methodology for Evaluating Impacts on Ambient Air Quality

Model Selection

A more recent version of the U.S. Environmental Protection Agency (EPA)-approved dispersion model AERMOD was released since the dispersion modeling analysis was conducted for the Final Decision. Therefore, the air dispersion modeling for the proposed general arrangement revisions was conducted based on the updated version of the EPA-approved dispersion model, AERMOD (version 11103).

Model Options

The following technical options were selected for the AERMOD model:

- Regulatory default control options for all pollutants except hourly NO_2, which was run with non-regulatory default options (i.e., the ozone limiting method).
- Rural dispersion mode or the “no-urban” mode in AERMOD (land use within 3 kilometers of the facility is primarily classified as rural based on the Auer Method, therefore, AERMOD will be run in the “no-urban” dispersion mode)
- Receptor elevations and controlling hill heights were obtained from AERMAP (Version 09040) output.

Background Data

To replicate the analysis presented in the Final Decision, the background concentrations used for the revised general arrangement analysis were the same as those presented in the Final Decision, Air Quality - Table 3.[1] See excerpted table below.

Air Quality Table 3
MEP, Highest Local Background Concentrations
Used in Staff Assessment (μg/m^3)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM10	24 hour	**126.8**	50	**254**
	Annual	**24.8**	20	**124**
PM2.5	24 hour	**81.2**	35	**232**
	Annual	**14.3**	12	**119**
CO	1 hour	5,029	23,000	22
	8 hour	2,640	10,000	26
NO_2	1 hour	105.7	339	31
	1 hour Federal	73.0	188	39
	Annual	18.9	57	33
SO_2	1 hour	46.9	655	7
	1 hour Federal	46.9	196	24
	24 hour	18.3	105	17
	Annual	5.2	80	7

Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment. (Ex. 301, p. 4.1-15.)

Coordinate System and Receptor Grid Spacing

The Cartesian coordinate system used for the revised analyses is the Universal Transverse Mercator Projection (UTM), 1927 North American Datum (NAD 27), which is the same as the coordinate system used in the AFC. It is important to note that while Mariposa Energy is proposing to move the water tanks slightly, as well as, several buildings and ancillary

[1] CEC Final Commission Decision , Publication #CEC-800-2011-001-CMF, May 2011

equipment, no changes are proposed to the location of the combustion turbine exhaust or the firewater pump exhaust stacks identified in the Final Decision.

Receptor and source base elevations were determined from U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data using the 7½-minute format (i.e., 30-meter spacing between grid nodes). All coordinates were referenced to UTM NAD27, Zone 10.

Similar to the AFC and Final Decision modeling analysis, Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. To minimize model run times and control file size, a coarse- and fine-grid approach was used for the impact analysis. The following coarse grid was used to identify the areas of maximum concentration:

- 25-meter spacing at the fence line
- 100-meter spacing from property boundary to 1 kilometer from the origin
- 500-meter spacing from beyond 1 to 10 kilometers from the origin
- No receptors within the facility fence line.

The selection of the refined receptor grid was then developed based on the location of the maximum impacts for each pollutant, averaging period, and year for all scenarios. The following refined receptor grid spacing was used to estimate the predicted maximum impacts:

- 25-meter spacing surrounding areas of maximum impact within 1 kilometer of the facility extending 100 meters from the maximum location.
- 50-meter spacing surrounding areas of maximum impact beyond 1 kilometer of the facility extending 500 meters from the maximum location.

Meteorological Data

As described in the AFC, it was determined that the use of 4 years of meteorological data from the San Joaquin Valley Air Pollution Control District (SJVAPCD) Patterson Pass monitoring station, the Stockton Airport, and the Oakland, California, upper air sounding station were used for the dispersion modeling analysis was appropriate for the MEP dispersion modeling analysis.

The surface data collected at the Patterson Pass monitoring station for calendar years 1997 through 1999 were obtained from the Bay Area Air Quality Management District (BAAQMD) and the 2003 data were obtained from SJVAPCD. The Patterson Pass meteorological data contain hourly wind speed, wind direction, and ambient temperature data at 10 meters above ground level. The Patterson Pass station was located approximately 5 miles southeast of the MEP site and less than 0.5 mile south of the Mountain House Community Services District (MHCSD) Local Agency Formation Commission (LAFCO) boundary. Corresponding hourly cloud cover data from the Stockton Airport, California, were also obtained along with the Patterson Pass wind and temperature data in order to determine stability and boundary layer conditions.

Upper air sounding data collected at Oakland, California, were obtained from the National Climatic Data Center. The twice-daily sounding data were provided in forecast systems laboratory format for midnight and noon Greenwich Mean Time.

A complete discussion of the AERMET data file preparation and the representativeness evaluation are included in the modeling protocol (AFC, Appendix 5.1D).

Building Downwash and Good Engineering Practice Assessment

For the analysis of the potential impacts associated with the revised general arrangement, EPA's BPIP-Prime (Building Profile Input Program – Plume Rise Model Enhancement, dated 04274) was used to compare the projected building dimensions for the previous arrangement to those of the new arrangement. The result of this comparison demonstrated that the new general arrangement would not affect the building downwash parameters for any of the four combustion turbines but would affect the downwash characteristics of the fire pump engine.

A turbine load analysis was conducted to verify that the updated BPIP file, combined with the new version of AERMOD, would result in turbine impacts identical to those of the previous analysis. For example, it was determined that the short-term and annual dispersion modeling results for the turbines operating at 50 percent load at 93°F ambient temperature and 100 percent load at 59°F ambient temperature were the same for both general arrangement drawings using either version of AERMOD.

Therefore, based on the results of the BPIP analysis and the updated AERMOD version analysis, it is concluded that the modeled turbine impacts are not affected by the proposed general arrangement revisions and the resulting predicted concentration differences would only result from BPIP differences associated with the fire pump. It is also concluded that, because the revised changes do not affect the predicted turbine impacts, neither the turbine commissioning impacts nor the localized cumulative impacts will be affected by the proposed general arrangement revisions. Therefore, only the operational impacts were evaluated as part of the updated criteria pollutant and health risk analysis.

Ozone Limiting Method Modeling Approach

The NO_2 1-hour modeling was performed using the AERMOD ozone limiting method (OLM) model selection and the SJVAPCD's guidance document "Assessment of Non-Regulatory Options in AERMOD Specifically OLM and PVMRM". Although this methodology differs from the original AFC in that all project sources are combined into one OLM group under the assumption that project sources will compete for available ozone in the atmosphere in the conversion of nitrogen oxide to NO_2, this methodology is consistent with the approach presented in the Final Decision.

OLM offers a more realistic method of calculating concentrations of NO_2. During the combustion of natural gas, approximately 10 percent of the stack emissions are NO_2. The remaining stack gas is released as nitrogen oxide. In the atmosphere, nitrogen oxide chemically reacts with ambient concentrations of ozone to form NO_2. The OLM model calculates NO_2 concentrations based on the ambient ozone concentrations using this principle. As described in the South Coast Air Quality Management District Localized

Significance Threshold guidance document[2] the conversion of NO_x to NO_2 is also a function of distance from the source to the receptor. Because the OLM model assumes instantaneous conversion from NO_x to NO_2 in the presence of ozone, the maximum predicted 1-hour NO_2 impacts near the MEP boundary would represent a conservative estimate of the 1-hour NO_2 concentrations.

The hourly ozone data used for the MEP OLM modeling was collected at the Patterson Pass monitoring station. The 2003 hourly OLM data were preprocessed and formatted for use with OLM by SJVAPCD. However, the 1997 through 1999 hourly ozone data was obtained from SJVAPCD prior to preprocessing. Although each of the 3 years of data were greater than 90 percent complete, there were missing data in each year. Therefore, missing data were filled using the following approach. For missing periods that were two sequential hours or less, the maximum concentration for the hour before or the hour after the missing period were used to fill the missing data. For missing periods that were more than two sequential hours, the maximum ozone concentration for the respective month with missing data was used to the fill the missing data.

Dispersion Model Inputs

The turbine load analysis determined that the worst-case short-term and annual dispersion modeling impacts are expected for the turbine operating conditions of 50 percent load at 93°F ambient temperature and 100 percent load at 59°F ambient temperature. Therefore, these operating conditions were modeled to determine the maximum predicted impacts for comparison to the short-term and annual averaging times, respectfully.

Emission rates for the turbines were updated to reflect those modeled in Data Response 13[3] (i.e., the cumulative impact assessment). The maximum 1-hour NO_x and CO emission rates were based on the conservative assumption that all four GE LM6000 units would start up and shut down within the same hour. The maximum 1-hour SO_2 concentration was estimated based on a fuel sulfur concentration of 0.66 grains of sulfur per 100 dscf of natural gas.

The hourly emission rate for the 3-hour and 24-hour SO_2 averaging period were also estimated based on the maximum 1-hour emission rate. The hourly emission rate for 8-hour CO averaging period was based on the conservative assumption that all four GE LM6000 units would start up and shut down three times within 8 hours, and the emission rate for the remaining 5 hours was calculated based on the maximum emission rate at base load with air inlet chiller operating. The hourly emission rates for the 24-hour PM_{10} and $PM_{2.5}$ were based on the base load with air inlet chiller operating.

The annualized hourly NO_x, SO_x, PM_{10}, and $PM_{2.5}$ emission rates for the annual impact assessment were based on 4,000 hours of operation at full turbine capacity with air inlet chiller operating and 300 hours of startup and shutdown events per turbine. The annual SO_2 emission rate was based on an average fuel sulfur content of 0.25 grains/per 100 dscf of natural gas.

[2] South Coast Air Quality Management District (SCAQMD). 2008. *Localized Significance Threshold Methodology*. July.

[3] MEP Data Response Set 1A & 1B, Responses to CEC Staff Data Requests 1 through 68, December 2009.

The Tier III fire pump engine emissions were updated to reflect the operating scenario identified in the Final Decision (i.e., a 30-minute testing time requirement, an annual operating scenario of 50 hours per year, and a restriction for testing between 8:00 and 11:00 a.m.). For example, the maximum 1-hour NO_x emission rate used in the revised dispersion modeling analysis for the fire pump was based on the following equation:

(220 horsepower) x (2.544 grams/horsepower-hour) x (0.5 hour/1 hour) x (1 lb/453.59 g) = 0.62 lb/hr

The average annual hourly NO_x emission rate used in the dispersion model for the fire pump is based on the following equation:

(220 horsepower) x (2.544 grams/horsepower-hour) x (50 hours/year) x (1 lb/453.59 g) x (1 year/8760 hours) = 0.0070 lb/hr

The turbine and fire pump emission rates are presented in Table 1. Detailed emissions data for the turbines and fire pump engine can be found in Attachment 1.

TABLE 1
Maximum Emission Rates Used for the Refined Grid AERMOD Model Runs

	Turbine 1[a] (lb/hr)	Turbine 2[a] (lb/hr)	Turbine 3[a] (lb/hr)	Turbine 4[a] (lb/hr)	Fire Pump Engine[b] (lb/hr)
NO_2					
1-hour	18.506	18.506	18.506	18.506	0.62
Annual	2.493	2.493	2.493	2.493	0.00704
CO					
1-hour	17.319	17.319	17.319	17.319	0.29
8-hour	7.968	7.968	7.968	7.968	--
SO_2					
1-hour	0.910	0.910	0.910	0.910	0.00121
3-hour	0.910	0.910	0.910	0.910	0.000403
24-hour	0.910	0.910	0.910	0.910	0.0000504
Annual	0.1625	0.1625	0.1625	0.1625	0.0000138
PM_{10}					
24-hour	2.50	2.50	2.50	2.50	0.00112
Annual	1.206	1.206	1.206	1.206	0.000307
$PM_{2.5}$					
24-hour	2.50	2.50	2.50	2.50	0.00112
Annual	1.206	1.206	1.206	1.206	0.000307

[a] Turbine emission rates are based on the following assumptions:

- The maximum 1-hour NO_x and CO emission rate estimates based on the worst-case startup emissions.
- 1-, 3-, and 24-hour SO_2 emission rate estimates based on the worst-case fuel sulfur content of 0.66 grains/100 standard cubic feet of natural gas.
- 8-hour CO emission rate estimate based on three startups, three shutdowns, and the balance of steady state operation for each turbine.
- 24-hour PM_{10}/$PM_{2.5}$ emission rate estimates based on the worst-case 1-hour emission rate.

[b] Fire pump engine emissions are based on a 30-minute testing and maintenance time, restricted to between the hours of 8:00 and 11:00 a.m. on testing days.

Operational Impacts Analysis

The maximum predicted short- and long-term CO, SO_2, PM_{10}, and $PM_{2.5}$ concentrations were combined with the background concentrations described above and compared to the short-term and annual ambient air quality standards (AAQS). The maximum 1-hour and annual NO_2 concentrations were also combined with the background concentrations described above and compared to the state 1-hour and annual NO_2 AAQS. The federal 1-hour NO_2 AAQS is based on the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations. Therefore, the assessment of the 1-hour NO_2 impacts and comparison to the federal 1-hour standards was evaluated based on the 8th highest predicted impact combined with the background concentration described above and then compared to the federal 1-hour NO_2 standard.

Health Risk Analysis

The toxic air contaminant (TAC) emission rates were updated to reflect the 30-minute testing time requirement and an annual operating scenario of 50 hours per year for the fire pump. The turbine TAC emission rates were the same as those included in the Final Decision. The health risk assessment followed the same methodology as presented in the AFC application. The AERMOD dispersion model was used in conjunction with the HARP program (version 1.4d) to determine the incremental cancer risk and the chronic and acute health indices. The HARP onramp program was used to convert the AERMOD dispersion modeling files to a format compatible with the HARP program.

Mariposa Energy Project
Table 5.1B.4R
Turbine Criteria Pollutant Emission Estimates
March 2011

Daily Emissions based on Maximum daily operation of 24 hours/day
Annual Emissions based on Maximum annual operation of 4000 hours/year

Normal Operation Scenario(1)				Fuel Input[1,3]		Emissions[1,3] (Per Turbine) NOx			CO			VOC			Particulates			SO_2[2]			
Ambient	GE	RH	Load	Per CT	Per CT	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	Max lb/hr	lb/day	Avg lb/hr	lb/yr
Temp F	Date	%	%	MMBtu/hr (HHV)	lb/hr																
17	1/29/2009	80	100	465	22,108	4.24	102	16,960	2.06	50	8,260	0.58	14	2,316	2.5	60	10,000	0.88	21.1	0.33	1,302
46	1/27/2009	95	100	481	22,891	4.40	105	17,580	2.14	51	8,574	0.60	14	2,383	2.5	60	10,000	0.91	21.8	0.34	1,348
59	1/27/2009	60	100	465	22,117	4.25	102	16,988	2.07	50	8,267	0.58	14	2,313	2.5	60	10,000	0.88	21.1	0.33	1,302
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93	12/9/2008	26	50	270	11,842	2.40	58	9,600	1.17	28	4,662	0.36	9	1,420	2.5	60	10,000	0.51	12.3	0.19	757
112	1/29/2009	15	100	338	16,092	3.09	74	12,348	1.51	36	6,021	0.42	10	1,687	2.5	60	10,000	0.64	15.3	0.24	947

50% load

(1) Source: GE Gas Turbine Performance Sheets for 17, 46, 59, 93 and 112F.
Data for 17 and 112F (Base Load) are based on January 29, 2009 data.
Data for 46, 59, and 93F (Base Load) are based on January 27, 2009 data.
Data for 59 and 93F (50% Load) are based on December 9, 2008 data
(2) Maximum SO2 Emissions based on a emission factor of 0.00189 lb SO2 per MMbtu natural gas - Source: 0.66 gr sulfur/100 cf natural gas, using method in AP-42 ch.1 table 1.4-2 and natural gas heat value of 1047 btu/scf.
(3) Per CTG, assuming BACT levels of 2.5 ppm NOx, 2 ppm CO, and 1 ppm VOC. Daily emissions represent 24 hours per day per CTG. Annual emissions represent 4000 hours per CTG per year.

Modeling Scenarios

Normal Operation Scenario(1)				Exhaust Stack Conditions Stack Temp	Flow		Stack Height	Stack Diameter	Velocity	Maximum Exhaust Emissions Rates (pound per hour)(per turbine) NOx		CO		SOx				PM10		PM2.5	
Ambient	GE	RH	Load	F	lb/hr	ACFM[a]	Feet	Feet	ft/s	1-Hour[b]	Annual[c]	1-Hour[b]	8-Hour[d]	1-Hour[b]	3-Hour[e]	24-Hour[f]	Annual[c]	24-Hour[f]	Annual[c]	24-Hour[f]	Annual[c]
Temp F	Date	%	%																		
17	1/29/2009	80	100	780	1127562	607693	79.5	12.0	89.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
46	1/27/2009	95	100	840	1083789	612224	79.5	12.0	90.2	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
59	1/27/2009	60	100	848	1051375	597341	79.5	12.0	88.0	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
59	12/9/2008	60	50	743	842305	440226	79.5	12.0	64.9	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
93	1/27/2009	26	100	861	930219	533924	79.5	12.0	78.7	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
93	12/9/2008	26	50	781	787723	424813	79.5	12.0	62.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206
112	1/29/2009	15	100	863	845007	485749	79.5	12.0	71.6	18.506	2.493	17.319	7.968	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206

50% load

[a] Assumes exhaust gases have an average molecular weight of 28.0 lb/lbmol, pressure of 1 atm, and gas constant equal to 0.7302 atm ft^3/(lbmol R).
[b]Maximum 1-hr scenario assumes one startup lasting 30 minutes, 15 minutes of steady state operation, and one shutdown lasting 15 minutes.
[c]Annual emission rate for NOx, SOx, PM10, and PM2.5 were conservatively based on 4,000 hours of turbine operation at full capacity with air inlet chiller operating, plus 300 startup and shutdown events. The annual SO2 emission rate is based on
[d]8-Hour Scenario assumes 3 startups, 3 shutdowns, and the balance of steady-state
[e]3-Hour Scenario assumes 3 hours of steady-state operation
[f]24-hour PM10/PM2.5 emission rate estimate based on the worst-case 1-hour emission rate (full capacity with air inlet chiller operating).

Mariposa Energy Project
Table 5.1B.7R
Summary of Emergency Fire Pump Emissions - Criteria, HAPS, and Greenhouse Gas Pollutants
Revised October 2010 (Operating Hours Revised Per Discussion with BAAQMD/PDOC)

Assume: Cummins Model CFP7E-F40 (or equivalent) fire pump to be driven by 220 bhp diesel engine, Tier 3 engine
Engine operates a maximum of 0.5 hours per day / 50 hours per year for maintenance and reliability testing.

Rated Horsepower	220	Maximum rated capacity of the Cummins Model CFP7E-F40
Maximum Test Time:	0.5	(30 minutes per hour)
Tests/Day	1	
Hours/Year	50	
Max Fuel usage is	11.4 Gal/hr	(at 220 bhp, 1,760 RPM)
	5.70 Gal/day	(assumes a maximum of 30 minutes per hour)
	570 Gal/yr	

Engine Data Source - Cummins California ATCM Tier 3 Emissions Data Spec Sheet (15 ppm sulfur diesel fuel) - December 22, 2008

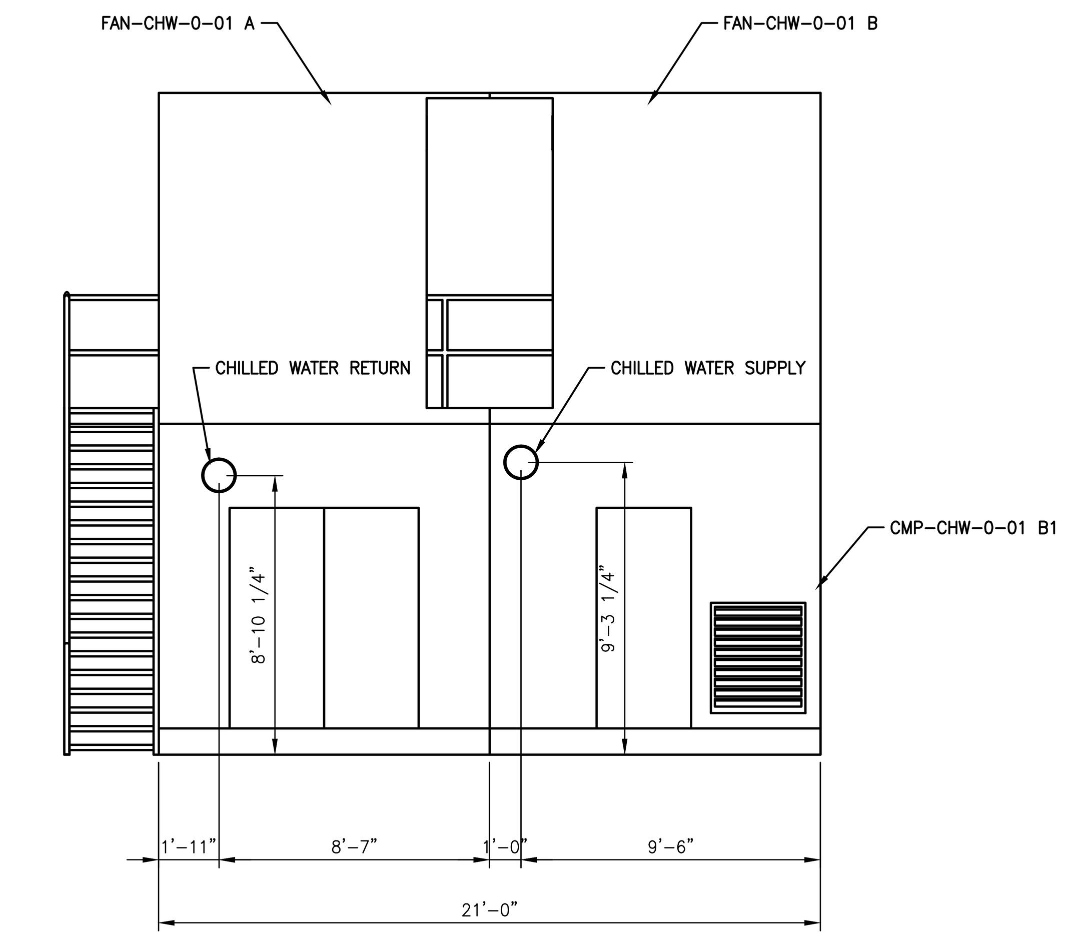
Pollutant	Emission Factor[1] Grams/Brake-Horsepower-Hour	Emissions lb/hr	lb/day	lb/yr	Annual lb/hr (used for modeling)
Hydrocarbons	0.062	0.0150	0.0150	1.50	0.000172
Oxides of Nitrogen	2.544	0.62	0.62	61.7	0.00704
Carbon Monoxide	1.193	0.29	0.29	28.9	0.00330
Particulates	0.111	0.027	0.027	2.69	0.000307
Sulfur Dioxide[2]	-	0.00121	0.00121	0.1206	0.0000138
	kg/gal	**lb/hr**	**lb/day**	**metric tons/yr**	
Carbon Dioxide[3]	10.15	128	128	5.79	
Methane[4]	0.0003	0.0038	0.0038	0.000171	
Nitrous Oxide[4]	0.0001	0.00126	0.00126	0.0000570	

1. Emission factors from the Cummins California ATCM Tier 3 Emissions Data Spec Sheet (15 ppm sulfur diesel fuel) - December 22, 2008.
2. Calculated from maximum fuel use of 11.4 gal/hr, fuel density of 7.05 lb/gal and 15 ppmw of sulfur.
3. Based on CCAR General Reporting Protocol (version 3.0, April 2008) Table C.6 emission factor for distillate oil of 10.15 kg/gal.
4. Based on CCAR General Reporting Protocol (version 3.0, April 2008) Table C.7 emission factor for distillate oil of 0.0003 kg CH4 /gal and 0.0001 kg N2O/gal.

Maximum Fuel usage is	11.4 Gal/hr	0.0114 1000 Gal/hr
	5.70 Gal/day	0.005700 1000 Gal/day
	570 Gal/yr	0.57 1000 Gal/yr

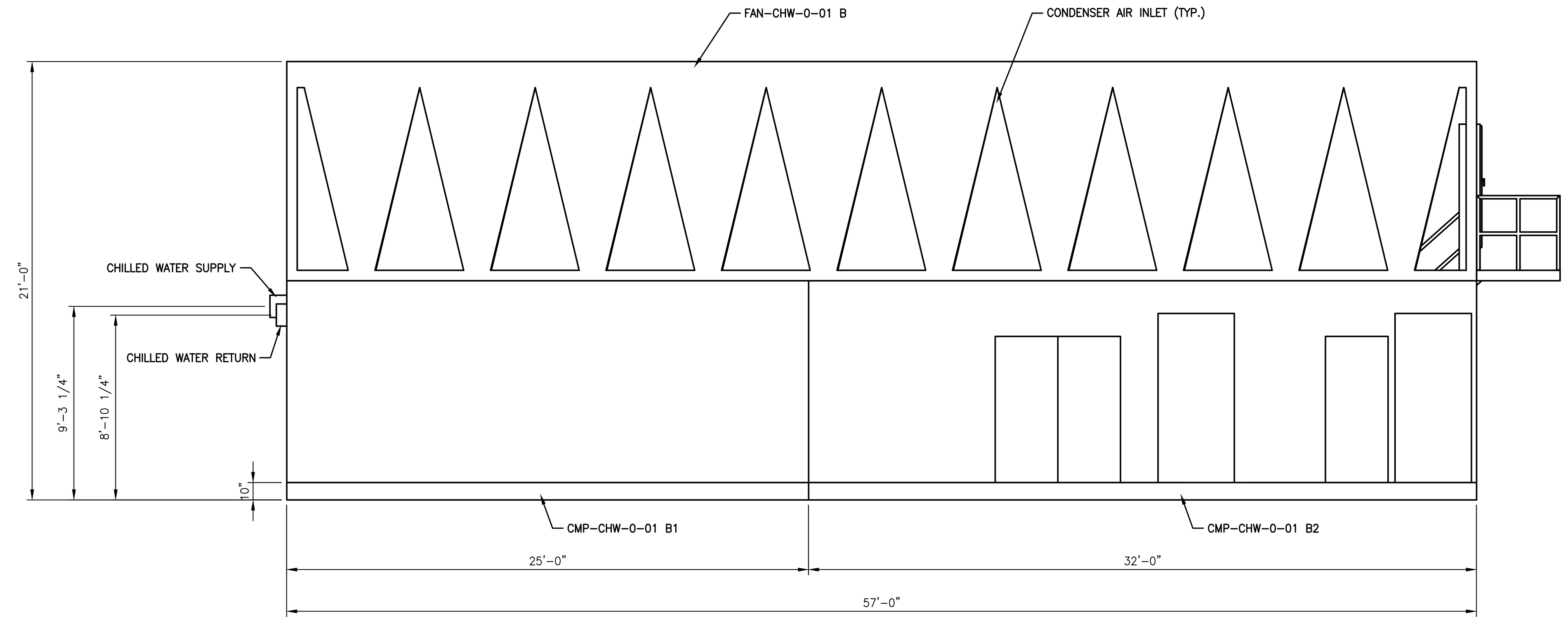
Pollutant	Emission Factor lb/1000 gallons	Emissions lb/hr	lb/day	lb/yr
Benzene	0.1863	0.00106	0.00106	0.1062
Formaldehyde	1.7261	0.0098	0.0098	0.984
Total PAHs (minus Naphthalene)	0.0362	0.00021	0.00021	0.0206
Naphthalene	0.0197	0.000112	0.000112	0.01123
Acetaldehyde	0.7833	0.0045	0.0045	0.446
Acrolein	0.0339	0.00019	0.00019	0.0193
1,3 Butadiene	0.2174	0.00124	0.00124	0.124
Chlorobenzene	0.0002	0.00000114	0.00000114	0.0001140
Dioxins	ND	ND	ND	ND
Furans	ND	ND	ND	ND
Propylene	0.467	0.0027	0.0027	0.266
Hexane	0.0269	0.00015	0.00015	0.0153
Toluene	0.1054	0.00060	0.00060	0.0601
Xylenes	0.0424	0.00024	0.00024	0.0242
Ethyl Benzene	0.0109	0.000062	0.000062	0.00621
Hydrogen Chloride	0.1863	0.00106	0.00106	0.1062
Arsenic	0.0016	0.0000091	0.0000091	0.000912
Beryllium	ND	ND	ND	ND
Cadmium	0.0015	0.0000086	0.0000086	0.000855
Hexavalent Chromium	0.0001	0.00000057	0.00000057	0.0000570
Copper	0.0041	0.000023	0.000023	0.00234
Lead	0.0083	0.000047	0.000047	0.00473
Manganese	0.0031	0.000018	0.000018	0.00177
Mercury	0.0020	0.000011	0.0000114	0.001140
Nickel	0.0039	0.000022	0.000022	0.00222
Selenium	0.0022	0.000013	0.0000125	0.00125
Zinc	0.0224	0.00013	0.000128	0.0128
			Total (lb/yr)	2.22

Emission Factor Source - Ventura County APCD AB-2588 Combustion Emission Factors, dated May 17, 2001



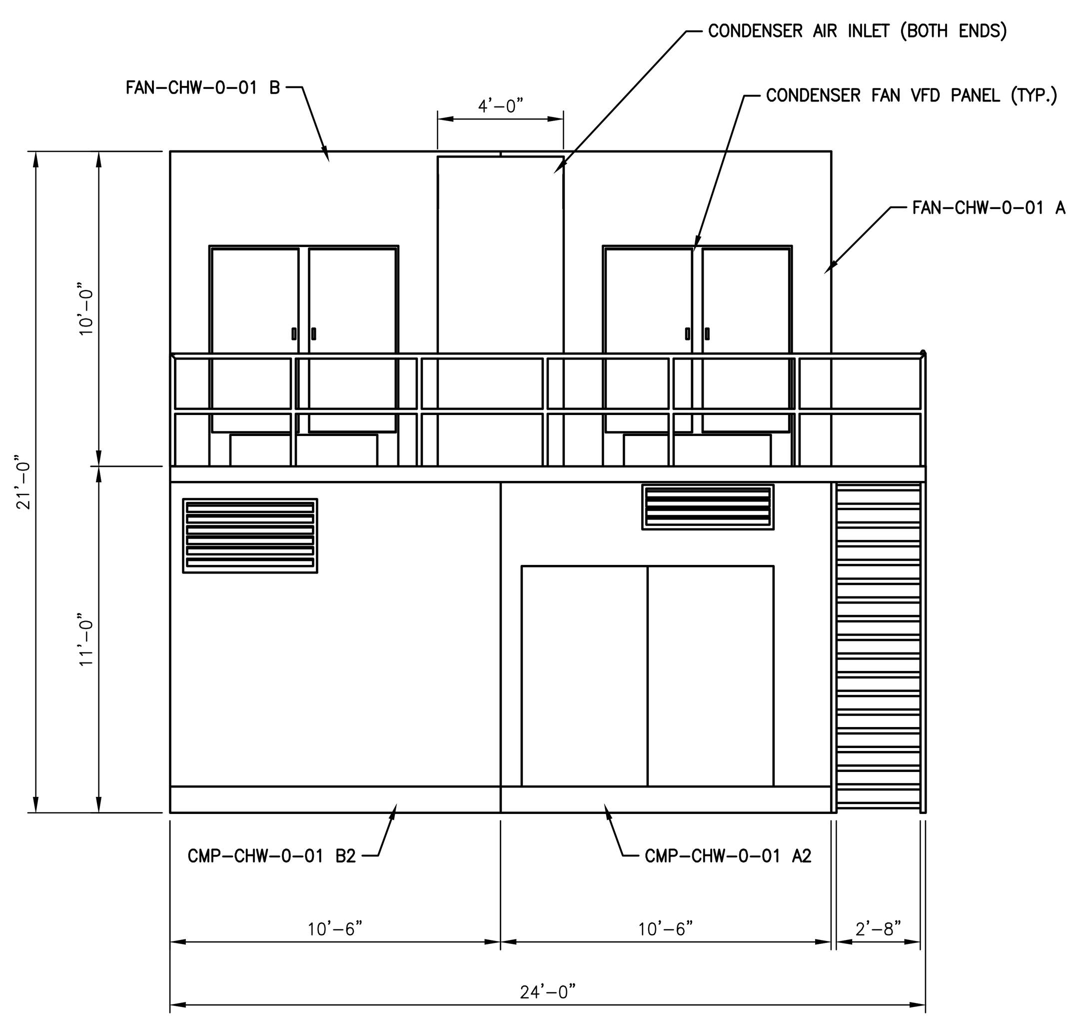
END VIEW

SCALE: 1/4" = 1'-0"
0 1' 2' 4' 8'



ELEVATION VIEW

SCALE: 1/4" = 1'-0"
0 1' 2' 4' 8'



END VIEW

SCALE: 1/4" = 1'-0"
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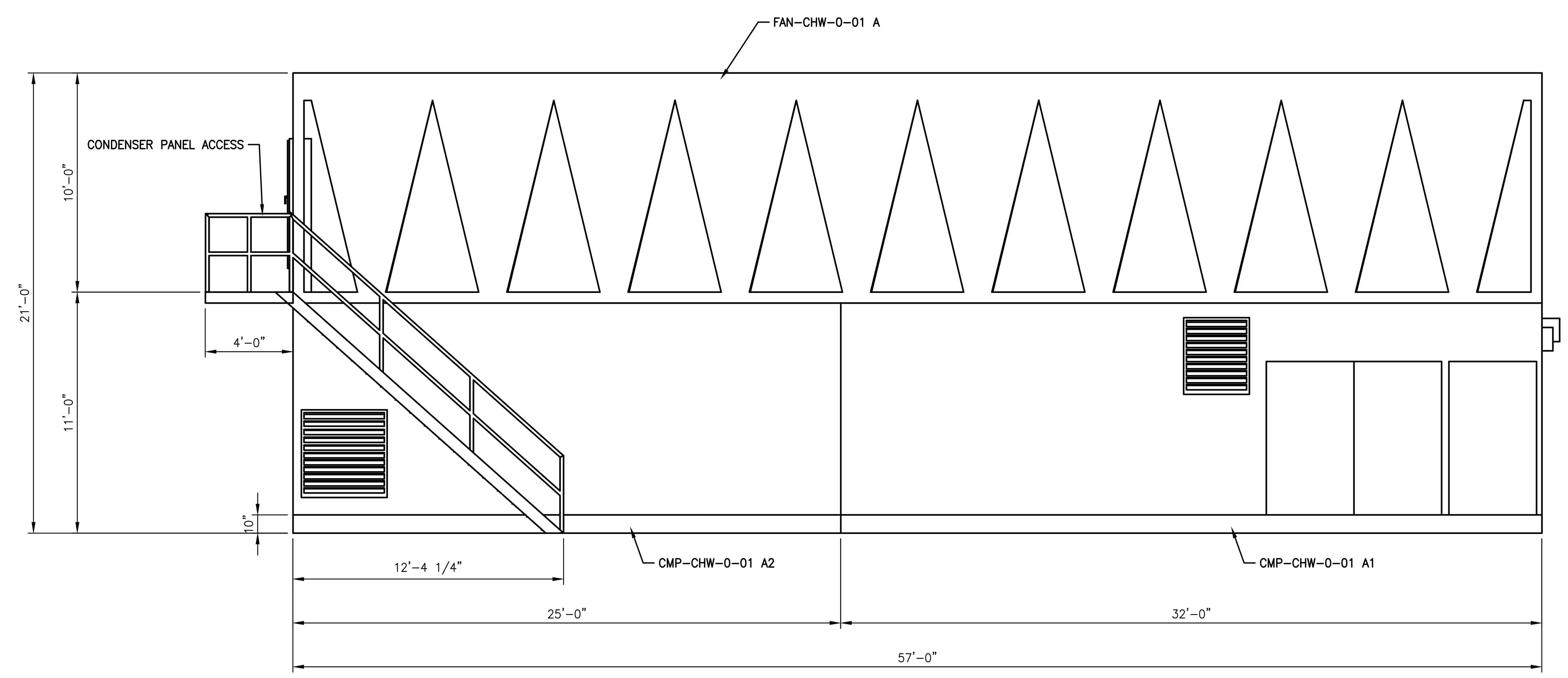


ELEVATION VIEW

SCALE: 1/4" = 1'-0"
0 1' 2' 4' 8'

NOTE:
1. SEE DRAWING MC03 FOR DRAINS AND CHILLED WATER SUPPLY AND CHILLED WATER RETURN LOCATIONS.

NOTE:
MODULE 1 IS SHOWN. DRAWING IS TYPICAL FOR ALL FOUR MODULES.

EXTERNAL ELEVATIONS

NOT FOR CONSTRUCTION – FOR OWNER REVIEW ONLY

stellar
OPERATING AS STELLAR ENERGY SYSTEMS
2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 260-2900
WWW.STELLAR.NET

RUSH AIR™
ADVANCED CLIMATE CONTROL PRODUCTS

MARIPOSA ENERGY PROJECT 1 #415059
AIR COOLED CHILLER – PO# 415059-2200-036
BYRON, CA

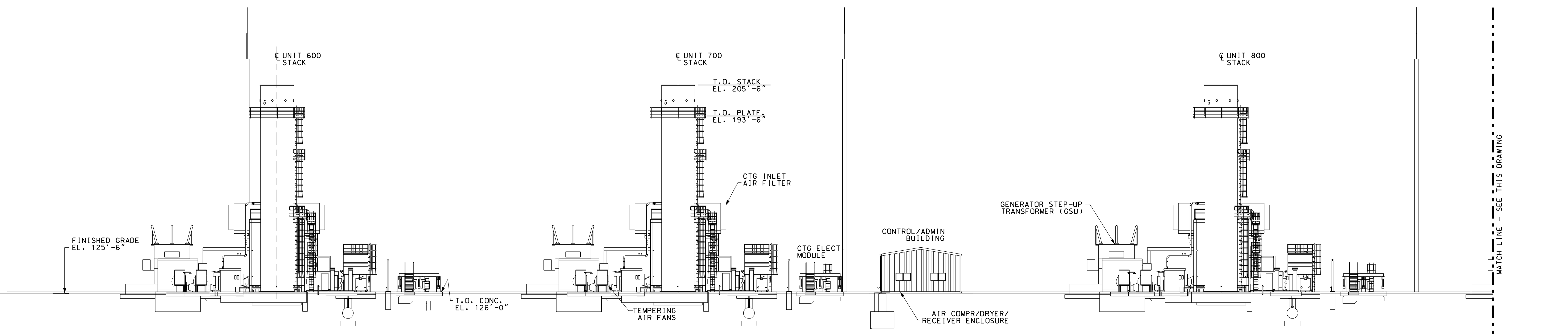
EXTERNAL ELEVATIONS

REV.	DATE	BY	DESCRIPTION
2	8/31/11	TFC	OWNER REVIEW
1	4/18/11	BMW	OWNER REVIEW

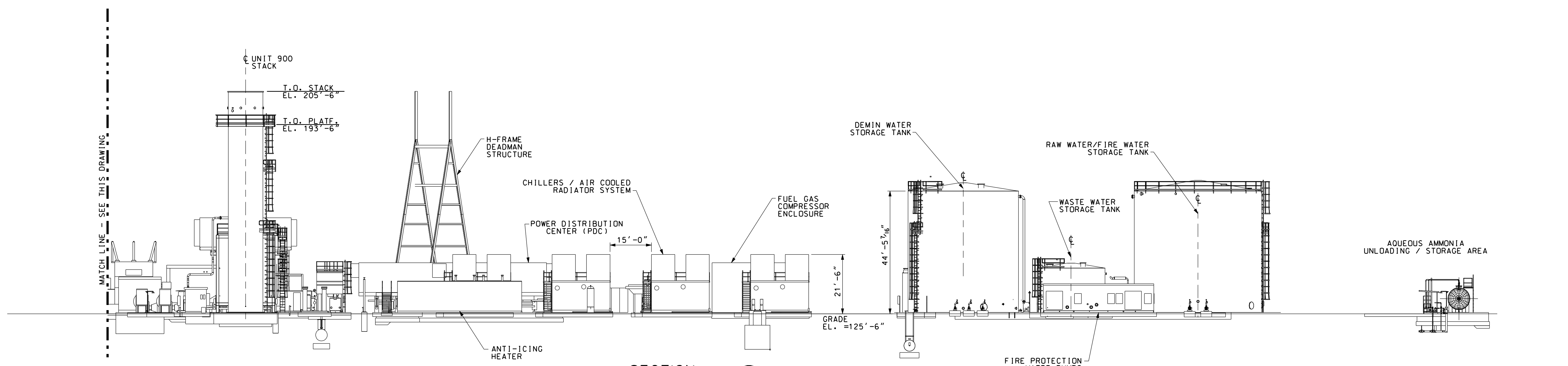
JOB NO.	03933
DRAWN:	BMW
CHECKED:	MB
SCALE:	AS NOTED

M201
DRAWING NO.

Filename: T:\Jobs\03900-03999\03933 Mariposa Energy_CA\Design\Active\Mech\03933M201.dwg Last Saved By: TCARANGAN Date: 8/31/2011 1:39:52 PM Plotted: 8/31/2011 1:39:58 PM



SECTION D-D
SCALE: 1" = 20' G-000-Z-0-0001
LOOKING WEST



SECTION D-D
SCALE: 1" = 20' G-000-Z-0-0001
LOOKING WEST

PRELIMINARY
IN PROGRESS FOR REVIEW ONLY
09-12-2011

NOTE:
ELEVATION OF GE LM-6000PC
BOTTOM OF BASE PLATE (B.O.S.) EL. 126'-0"
HIGH POINT FINISHED GRADE EL. = 125'-6"

20 0 20 40
Scale: 1 INCH = 20 FEET

NO.	DATE	REVISION	BY	CHK
0	09/12/11		EFC	TBG

RESPONSIBLE ENGINEER
PE #

REVISION APPROVAL		REV 0	DATE 09/12/11
DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL	.	ELECTRICAL	.
STRUCTURAL	.	INST & CONT.	.
MECHANICAL	.	ARCH.	.
PROCESS	.	GEN. ARRANG.	.
PIPING	.		

STATUS					
ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY					
FOR REVIEW AND APPROVAL					
APPROVED FOR CONSTRUCTION					
REVISED & APPROVED FOR CONSTRUCTION					

SCALE X" = X'

Diamond Generating Corporation
A Subsidiary of Mitsubishi Corporation

Mariposa Energy Project

PROJECT NO. 415059

CH2MHILL
CH2MHILL Engineers, Inc.

GENERAL ARRANGEMENT

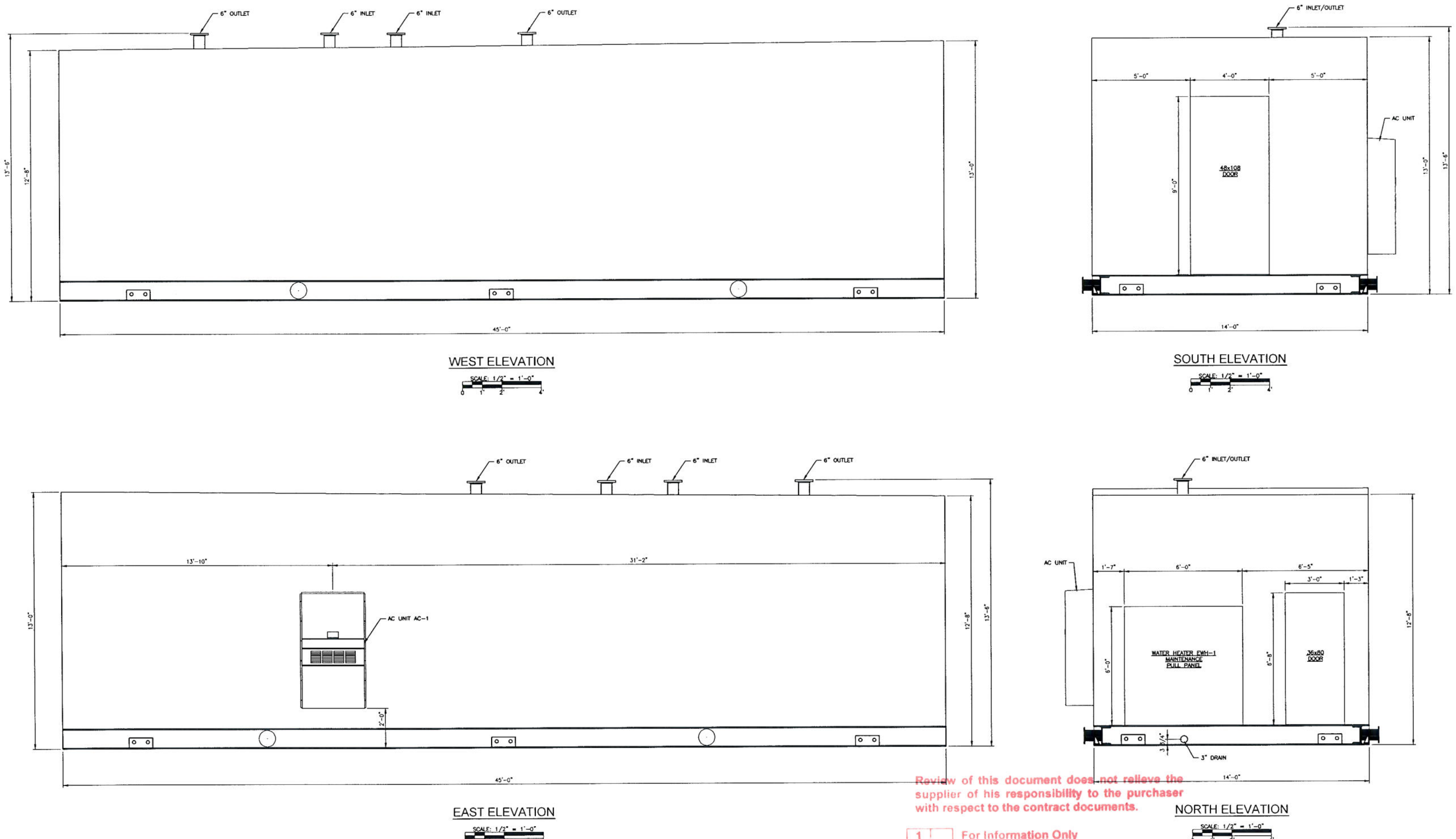
SECTION D-D
LOOKING WEST

DWG. NO. G-SS004

REV. 0

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

FILENAME:
PLOT DATE:



PLANT EXTERNAL ELEVATIONS

Review of this document does not relieve the supplier of his responsibility to the purchaser with respect to the contract documents.

1		For Information Only
2	X	Proceed
3		Revise & proceed as noted
4		Revise & resubmit, do not proceed

By: CJ

Date: 9/6/11

Contract/PO #

S/C Package #

Tag #

stellar

MARIPOSA ENERGY PROJECT #415059
AIR COOLED CHILLER – PO# 415059-2200-036
BYRON, CA

PLANT EXTERNAL ELEVATIONS

REV.	DATE	BY	DESCRIPTION
A	17 AUG 11	TFC	OWNER REVIEW

JOB NO.	03933
DRAWN:	TFC
CHECKED:	RWR
SCALE:	NONE

HM202
DRAWING NO.

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