

Mariposa Energy Project

Application No. 20737

Index of Footnotes for Preliminary Determination of Compliance (May, 2010)

Footnote Number	Reference	Electronic Copy
1	California Energy Commission, <i>Final Commission Decision, Avenal Energy, Application for Certification</i> (08-AFC-01), Kings County (Dec. 16, 2009) p. 112, Finding of Fact no. 23 (available at: www.energy.ca.gov/2009publications/CEC-800-2009-006/CEC-800-2009-006-CMF.PDF).	See link
2	California Energy Commission (CEC), 2006. Errata to the Presiding Member's Proposed Decision, Application for Certification for the Pastoria Energy Facility 160 MW Expansion (05-AFC-1). November 15. http://www.energy.ca.gov/sitingcases/pastoria2/documents/2006-11-15_COMMITTEE_ERRATA.PDF	See link
3	<i>See AP-42, Table 1.4-2, footnote c, 7/98</i> (available at www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf).	See link
4	Cummins Model CFP7E-F40 Tier 3 emission data spec sheet	See PDF
5	Bay Area Air Quality Management District (BAAQMD) Best Available Control Technology (BACT) Workbook Policy and Implementation Procedure, Interpretation of BACT - http://hank.baaqmd.gov/pmt/bactworkbook/default.htm	See link or PDF
6	BAAQMD BACT Workbook Policy and Implementation Procedure, Interpretation of BACT.	See link or PDF
7	BAAQMD. "Preliminary Determination of Compliance for the Marsh Landing Generating Station". March, 2010. http://www.energy.ca.gov/sitingcases/marshlanding/documents/other/2010-03-24_Bay_Area_AQMD_PDOC.pdf	See link or PDF
8	Mariposa Energy to BAAQMD, January 27, 2010 Letter titled "Mariposa Energy Project – Application No. 20737 Plant No. 19730 Reductions in the Number of Hours Required for Commissioning, the Startup and Shutdown Emission Rates, and the CO and PM10/2.5 Combustion Turbine Emission Rates"	See PDF
9	Siemens Performance & Technical Information SGT-800, X2103364E, page 2.	See PDF
10	Mariposa Energy to BAAQMD, January 27, 2010 Attachment 2, pages 1-2.	See PDF
11	GE. "LM6000 SPRINT Gas Turbine Generator Set" Product Information. March 2003.	See PDF
12	GE Performance runs for LM6000 PC, PD, and PF SPRINT Gas Turbines.	See PDF
13	GE, "LM6000 Aeroderivative Gas Turbines" Product Information. http://www.gepower.com/prod_serv/products/aero_turbines/en/lm6000.htm . Website Accessed January 2010.	See PDF
14	NO _x can also be formed when a nitrogen-bound hydrocarbon fuel is combusted, resulting in the release of nitrogen atoms from the fuel (fuel NO _x) and NO _x can be formed by organic free radicals and nitrogen in the earliest stages of combustion (prompt NO _x). Natural gas does not contain significant amounts of fuel-bound nitrogen, therefore thermal NO _x is the primary formation mechanism for natural gas fired gas turbines. References to NO _x formation during combustion in this analysis refer to "thermal NO _x ", NO _x formed from nitrogen in the combustion air.	NA

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15	M. Schorr, J. Chalfin, GE Power Systems, "Gas Turbine NO _x Emissions Approaching Zero – Is it Worth the Price?", 9/99, pg. 2	See PDF
16	GE Performance Data for LM6000 PC, PD, and PF SPRINT Gas Turbines.	See PDF
17	NSCR discussion is from Institute of Clean Air Companies website: www.icac.com/i4a/pages/index.cfm?pageID=3399 .	See link or PDF
18	See BAAQMD, Draft Report, <i>Fine Particulate Matter Data Analysis and Modeling in the Bay Area</i> (Draft, Oct. 1, 2009), at p. 8 (Draft PM _{2.5} Modeling Report). The District anticipates issuing a final report in the near future.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
19	Draft PM _{2.5} Modeling Report at p. E-3 & p. 30.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
20	Draft PM _{2.5} Modeling Report at pp. E-3 - E-4.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
21	Draft PM _{2.5} Modeling Report at p. 30.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
22	Draft PM _{2.5} Modeling Report, Figure 17, p. 31.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
23	Draft PM _{2.5} Modeling Report at p. 10.	See PM-data-analysis-and-modeling-report_DRAFT.pdf
24	Letter from R. Bell, Air Quality District Manager, Shasta County Air Quality Management District, to R. Bennett, Safety & Environmental Coordinator, Redding Electric Utility, June 23, 2005.	See EMx Redding 2005 Letter.pdf
25	BASF, High Temperature SCR for simple-cycle gas turbine applications, 2007.	See BF-8642_High_Temperature_SCR[1].pdf
26	BASF, NO _x Cat™ VNX SCR Catalyst for natural gas turbines and stationary engines, 2009.	See BF-6337-030609[1].pdf
27	Please see EIT Quote C10-109, Budget CO/VOC Catalyst Matrix, supplied by Mariposa Energy.	See PDF
28	BAAQMD BACT Guideline, Policy and Implementation Procedure	See PDF
29	<i>Cf.</i> South Coast Air Quality Management District, <i>Best Available Control Technology Guidelines</i> , August 17, 2000, revised July 14, 2006, pg. 29; available at: www.aqmd.gov/bact Part A - Policy and Procedures for Major Polluting Facilities ; Memorandum, David Warner, Director of Permit Services, to Permit Services Staff, Subject: "Revised BACT Cost Effectiveness Thresholds", May 14, 2008; available at: www.valleyair.org/busind/pto/bact/bactidx.htm May 2008 updates to BACT cost effectiveness thresholds (Final Staff Report).	See SCAQMD and SJVAPCD websites
30	A limit of 4 ppm CO at 15% O ₂ was requested by Mariposa Energy in its January 27, 2010 letter to BAAQMD.	See PDF
31	Please see EIT Quote supplied by Mariposa Energy and CO Average Workbook	See PDF

Footnote Number	Reference	Electronic Copy
32	Please see EIT Quote supplied by Mariposa Energy and CO Incremental Workbook	See PDF
33	BAAQMD. "Preliminary Determination of Compliance for the Marsh Landing Generating Station". March, 2010.	See link.
34	Please see EIT Email Dated May 18, 2010 supplied by Mariposa Energy and POC Average Workbook.	See PDF
35	See Mariposa Energy contact report for conversation with Pinellas County Department of Environmental Management Air Division.	See PDF
36	General Electric, "VOC Emissions from LM6000 for Mariposa Energy, LLC", page 2.	See PDF
37	General Electric, "VOC Emissions from LM6000 for Mariposa Energy, LLC", page 2.	See PDF
38	BAAQMD BACT Workbook Policy and Implementation Procedure, Interpretation of BACT.	See PDF
39	This facility is subject to BACT requirements for PM ₁₀ only. PM _{2.5} , a subset of PM ₁₀ , is regulated under federal requirements in 40 C.F.R. Section 52.21 (PSD) and 40 C.F.R. Part 51, Appendix S (Non-Attainment NSR). The facility is not subject to PSD or PM _{2.5} Non-Attainment NSR permit requirements under Section 52.21 or Appendix S because the facility is not a "major facility" for the purposes of these regulations. The District is therefore not conducting a PSD permitting analysis or an Appendix S permitting analysis for PM _{2.5} . For a detailed discussion of the applicability of these federal requirements for PM _{2.5} , see Section 7 below. The District notes, however, that for combustion turbines essentially all of the PM emissions are less than one micron in diameter, so it is both PM ₁₀ and PM _{2.5} . (See AP-42, Table 1.4-2, footnote c, 7/98 (available at www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf). Moreover, the same emissions control technologies that will be effective for PM ₁₀ for this facility will also be similarly effective for PM _{2.5} . The District's BACT analysis and emissions limit for PM ₁₀ will also therefore effectively be a BACT limit on PM _{2.5} emissions as well, even though the facility is not subject to the federal PM _{2.5} BACT requirements as discussed in Section 7.	NA
40	General Electric, "PM10 Emissions from LM6000 for Mariposa Energy, LLC", page 2.	See PDF
41	General Electric, "PM10 Emissions from LM6000 for Mariposa Energy, LLC", Appendix A.	See PDF
42	General Electric Global Projects Operation, Particulate Matter, PM10 and PM2.5: What is it, How is it Regulated, How is it Measured, and What is GE's Position on PM emission from Gas Turbines? September 3, 2009, page 6.	See PDF
43	General Electric Power Generation, Gas Turbine Inlet Treatment (GER-3419A), page 1.	See PDF
44	General Electric Power Generation, Gas Turbine Inlet Treatment (GER-3419A), page 7 and Figure 7.	See PDF
45	GE Energy, Requirements for Water and Steam Purity for Injection in Aero Derivative Gas Turbines (MID-TD-0000-3), June 2004.	See PDF
46	Preamble to the March 25, 2009 Proposal to Revise EPA Reference Method 202.	See PDF
47	General Electric, "PM10 Emissions from LM6000 for Mariposa Energy, LLC", page 7.	See PDF
48	For example, if a baghouse were installed on the turbines, the turbine exhaust at the <i>inlet</i> to the baghouse would contain less PM than is normally seen in baghouse <i>output</i> , after abatement. PM emissions from a baghouse are normally in the range 0.0013 to 0.01 grains per standard cubic foot (see BAAQMD BACT/TBACT Workbook, Section 11: Miscellaneous Sources), whereas	See District website

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	PM emissions from the proposed MEP turbines would be 0.001 gr/dscf (@ 15% O ₂).	
49	The 1.0 grain per 100 scf PUC standard is the maximum sulfur content of the gas at any point in time. The actual average content is expected to be less than 0.25 grains per 100 scf. The District has based its calculations of annual emissions on this 0.25 grain per 100 scf average sulfur content. Note that a portion of the sulfur contained in natural gas is intentionally added as an odorant to allow for the detection of leaks which would be a safety concern.	NA
50	Guidance for Power Plant Siting and Best Available Control Technology, California Air Resources Board, Stationary Source Division, September 1999, pg. 34.	See guidocfi.pdf
51	General Electric, "PM10 Emissions from LM6000 for Mariposa Energy, LLC".	See PDF
52	http://www.energy.ca.gov/sitingcases/hanford_amendment/index.html and http://www.energy.ca.gov/sitingcases/henrietta_amendment/index.html	See links
53	General Electric, "PM10 Emissions from LM6000 for Mariposa Energy, LLC", page 3a and Figures 1 and 3a.	See PDF
54	CH2MHILL Statistical Analysis Technical Memorandum, April 19, 2010.	See PDF
55	General Electric Energy, PM10 Emissions from LM6000 for Mariposa Energy, LLC, page 7.	See PDF
56	Note that emission rates of particulate matter and sulfur oxide emissions are not affected by startups and shutdowns and are conservatively estimated to be the same as for full load operation (2.5 lb/hour for particulate matter, 1.35 lb/hour for SO _x maximum, 0.34 lb/hour SO _x annual average).	NA
57	The lack of additional control technologies for simple-cycle turbines is different than with combined-cycle turbines. For combined-cycle turbines, there have been several technological advances that have recently been developed, or are currently under development, that will allow those types of turbines to start up more quickly and with fewer emissions. These include startup procedures that heat up the additional steam-generating equipment used in combined-cycle turbines more quickly, allowing them to reach their optimal operating temperature more quickly; and advances that reduce emissions at lower loads where combined-cycle turbines must operate for extended periods while waiting for the equipment to heat up. These types of advances are not applicable to simple-cycle turbines. Simple-cycle turbines do not have any additional steam generating equipment that needs to be warmed up; and they ramp up very quickly to full load at rates as high as 10 MW per minute and do not spend any significant time operating at lower loads during startups.	NA
58	General Electric, GE LM6000PC "Estimated NO _x , CO, and VOC Concentrations During a 10 Minute Start-up at ISO Conditions" ..	See PDF
59	Mariposa Energy to BAAQMD. January 27, 2010. See Attachment Table 5.1B.3R.	See PDF
60	General Electric, GE LM6000PC "Estimated NO _x , CO, and VOC Concentrations During a 8 Minute Shutdown at ISO Conditions" ..	See PDF
61	Mariposa Energy to BAAQMD. January 27, 2010. See Attachment Table 5.1B.1R	See PDF
62	See 40 C.F.R. § 52.21(b)(1)(i)(b). Note that for 28 specific types of sources, a lower PSD applicability threshold of 100 tons applies pursuant to 40 C.F.R. § 52.21(b)(1)(i)(a). Simple-cycle combustion turbines of the type proposed for the Mariposa Energy Project are not in any of the categories subject to the 100 ton threshold specified in Section 52.21(b)(1)(i)(a).	NA
63	The District also has incorporated PSD requirements from the federal PSD regulations into its NSR Rule in Regulation 2, Rule 2. The substance of these requirements in Regulation 2, Rule 2 track the federal requirements.	NA

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64	However, the Applicant's AFC does provide a screening level analysis of potential visibility, soils, and vegetation impacts and concluded the project impacts would be less than significant.	NA
65	EPA promulgated National Ambient Air Quality Standards (NAAQS) for PM _{2.5} in 1997 (with an update in 2006), and began designating certain regions of the country as non-attainment with those Standards starting in 2005. EPA made a determination as to the region's attainment status with respect to PM _{2.5} , which it published on November 13, 2009. EPA determined that the Bay Area is in attainment of the PM _{2.5} NAAQS for the annual standard, and is non-attainment for the 24-hour standard. The EPA's non-attainment determination for the PM _{2.5} 24-hour standard became effective on December 14, 2009 (See Federal Register Friday November 13, 2009, Air Quality Designations for the 2006 24-Hour Fine Particle (PM _{2.5}) National Ambient Air Quality Standards).	NA
66	Letter dated 10/28/09 from Jack Broadbent of BAAQMD to Deborah Jordan U.S. EPA Region IX, Re: Guidance on "Appendix S" Non-Attainment NSR Permitting for PM _{2.5} Source during PM _{2.5} Transition Period.	See PDF
67	Letter dated 12/9/09 from Deborah Jordan U.S. EPA Region IX to Jack Broadbent of BAAQMD, Re: Guidance on "Appendix S" Non-Attainment NSR Permitting for PM _{2.5} Source during PM _{2.5} Transition Period.	See PDF
68	The facility will emit less than 100 tons per year of direct PM _{2.5} emissions and less than 100 tons per year of any PM _{2.5} precursors, as defined in Appendix S II.A.31(iii). (See Table 5)	NA
69	See AFC Section 2.4.3.	See CEC website
70	Letter dated February 22, 2010 from Lisa Jackson to Senator Rockefeller, Letter summarizes EPA proposals on regulating green house gases.	See PDF