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April 29, 2010

Mr. Brian Lusher
Senior Air Quality Engineer
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Re: Mirant Marsh Landing, LLC Comments on Preliminary Determination of Compliance for the Marsh Landing Generating Station

Dear Mr. Lusher:

Mirant Marsh Landing, LLC (Mirant) appreciates all of the Bay Area Air Quality Management District (District) staff's work on preparing the Preliminary Determination of Compliance (PDOC) for the Mirant Marsh Landing Generating Station (MLGS), and appreciates the opportunity to provide these comments on the PDOC. Our comments primarily relate to the proposed limit in the PDOC on emissions of nitrogen oxides (NOx) per start-up event. We are proposing a revision to this limit to reflect updated information provided by our vendors, along with minor corresponding revisions elsewhere in the text of the PDOC. The remainder of our comments relate to other minor and/or non-substantive issues. We would welcome the opportunity to discuss these comments with the District as it prepares its Final Determination of Compliance for the MLGS.

Start-up NOx Limit

The limit on maximum emissions of NOx per startup event proposed in the PDOC is 18.6 pounds in a 30-minute startup period (see Condition 19 (p. 83) and associated text at pp. 50-51). This figure was based on (1) information provided by Siemens, the turbine vendor, indicating that a typical gas turbine startup would be complete within 11 minutes and that estimated emissions during this 11-minute period would be 12 pounds; and (2) considerations of variability and various factors affecting startup emissions, corresponding to an allowance for an additional 6.6 pounds and an assumption that a start-up event could last as long as 30 minutes.

Since these original estimates were provided in the Application for Certification, ongoing discussions related to the engineering, procurement and construction (EPC) contract for the MLGS have led to a more detailed understanding of engineering and technical constraints related to MLGS emissions as the project has proceeded from a conceptual level to more detailed engineering specifications. Based on these more detailed specifications, our vendors have provided updated information indicating that the limit on

maximum NOx emissions per 30-minute start-up event should be revised to 36.4 pounds. The 30-minute maximum startup time remains unchanged.

This revision is based on updated information related to two critical assumptions underlying the estimated start-up emissions. First, our turbine vendor, Siemens, recently provided updated information indicating that estimated emissions for a typical 11-minute gas turbine start-up would in fact be 14 pounds of NOx rather than the originally estimated 12 pounds. The updated table of estimated emissions provided by Siemens is attached as Attachment A.[1]

Second, our EPC contractor and its SCR subcontractors have provided updated information regarding the potential performance of the SCR and the time and conditions under which it can be expected to achieve the 2.5ppm normal operating limit for NOx emissions. The proposed start-up event limit of 18.6 pounds was based on the assumption that the SCR can achieve the 2.5ppm rate at the end of or shortly after the initial 11-minute gas turbine start-up period. Initial indications from potential SCR vendors appeared to suggest that this could be technically possible, but even in those early indications vendors stated that they expected the SCR could achieve the 2.5ppm compliance rate by 11 minutes after start-up only when emissions are calculated on a rolling 1-hour average (*i.e.* the 2.5ppm level would not necessarily be met on an instantaneous basis immediately following the initial 11 minutes of gas turbine operation). Based on more detailed engineering specifications that have been developed, the selected SCR vendor has stated that the SCR should not be expected to achieve the 2.5ppm rate until towards the end of the 30-minute start-up period, and all potential vendors have agreed that the SCR could not be expected to achieve the 2.5ppm rate within 11 minutes of gas turbine startup.

Our updated information and analysis indicates that the soonest the SCR can be expected to be reliably reducing NOx emissions is at the beginning of the 28th minute after a start-up. For calculating total start-up NOx emissions, we assume that this decrease from 9ppm down to 2.5ppm occurs linearly, and entirely within the last three minutes of the 30-minute start-up period. Accordingly, the total expected emissions for the 30-minute period are 36.4 pounds.

Several technical factors are responsible for the time needed for the SCR to achieve emissions compliance after a start-up commences. The SCR catalyst is a base metal oxide acid catalyst that requires a reagent (ammonia) to react with NOx in the turbine exhaust to produce nitrogen and water and thereby remove NOx from the exhaust gas stream. The catalyst adsorbs ammonia onto its surface to enable reaction with NOx. The SCR reaction is a function of temperature and ammonia flow for a given design. As the catalyst heats up, ammonia is introduced when the catalyst temperature reaches the minimum set temperature allowable for ammonia injection. A key factor in the time required to reach this minimum temperature is the thermal inertia of the selected catalyst. Introducing ammonia below the minimum temperature can damage the catalyst by the

[1] Note that while the updated Siemens table also reflects marginal increases in start-up emissions of other pollutants (e.g. CO and POC), Mirant intends to nonetheless comply with the currently proposed limits in the PDOC for those pollutants.

formation of sulfate and nitrate salts in the catalyst pores. Once ammonia injection begins, there is a period where ammonia is adsorbed onto the catalyst and no reaction occurs. Once the catalyst is saturated, the NOx reacts with the ammonia and NOx in the exhaust gas is reduced to the design levels. Ammonia must be continuously replenished as it reacts with NOx.

Once ammonia injection begins, the ammonia flow control valve will be positioned with a "feed forward" signal from the turbine flow meter measuring the natural gas to the turbine. An algorithm that plots NOx as a function of natural gas flow will be created and loaded into the Programmable Logic Controller or PLC. This algorithm will be utilized to calculate the amount of ammonia required to reduce the NOx level as needed. The SCR ammonia control uses the exhaust NOx level, stack NOx level and fuel firing rate to predict ammonia flow rate and simultaneously control the stack NOx value. After ammonia injection has begun, the CEMS will begin grabbing samples of treated exhaust gas; however, it will take several minutes for these samples to fill the umbilical and actually arrive at the CEMS shack for analysis. After this stream has been established, the stack data will then be utilized to "trim", or fine tune the ammonia flow control valve to ensure on-going compliance with the NOx limit. This "feedback loop" necessarily extends the time required to reduce NOx emissions.

For accurate control of NOx and to minimize ammonia slip, the CEMS analyzers must be calibrated on a schedule set by local regulations. Defined calibration accuracy criteria must also be met in order to maintain control system integrity and accuracy. When any analyzers are in calibration mode, the SCR control holds the last valid NOx/O_2 value until the calibration is completed and the analyzer returns to normal functional operation. Status indicators are generated in the CEMS and sent to the SCR controller.

Any attempt to reduce NOx emissions faster than described above would necessarily require more ammonia injection (e.g. simply commence injecting ammonia without regard to an appropriately calculated ammonia injection feedback sequence), which in turn would have the necessary effect of increasing the rate of ammonia slip above those levels proposed. Accordingly, a limit of 36.4 pounds represents the BACT limit on NOx emissions per start-up event.

Several other necessary revisions to the PDOC stem from the revision of the limit on maximum NOx emissions per start-up event from 18.6 to 36.4 pounds. First, the limit on maximum pounds of NOx emissions per day in Conditions 20 (excluding tuning) and 21 (including tuning) should be increased from 2,309 to 2,444, and from 2,783 to 2,917, respectively. The limit on cumulative combined NOx emissions in a 12-month period in Condition 22 should be revised from 71.763 to 78.571 tons. Accordingly, the requirement for offsets of annual NOx emissions should be increased from 82.527 (based on a 1.15 to 1.0 ratio applied to the 71.763 annual total) to 90.356. The table below provides a complete list of PDOC revisions stemming from the revision to the start-up NOx limit:

PDOC Revisions to Reflect Revised Start-up NOx Emissions Limit

<table>
<tr><th>Page/Condition</th><th colspan="2">Revision</th></tr>
<tr><td>Table 2, p.16</td><td colspan="2">Change "18.6" to "36.4" for the NOx start-up emission rate</td></tr>
<tr><td rowspan="7">Table 4, p. 17</td><td colspan="2">In the Nitrogen Oxides column, change the values as follows:</td></tr>
<tr><td>Current</td><td>Revised</td></tr>
<tr><td>577.31</td><td>610.93</td></tr>
<tr><td>2309.26</td><td>2443.70</td></tr>
<tr><td>2313.63</td><td>2448.09</td></tr>
<tr><td>1050.67</td><td>1084.29</td></tr>
<tr><td>2782.62</td><td>2917.06</td></tr>
<tr><td>2786.99</td><td>2921.43</td></tr>
<tr><td rowspan="5">Table 5, p. 18</td><td colspan="2">In the NO_2 column, change the values as follows:</td></tr>
<tr><td>Current</td><td>Revised</td></tr>
<tr><td>17.941</td><td>19.643</td></tr>
<tr><td>71.763</td><td>78.571</td></tr>
<tr><td>71.763</td><td>78.571</td></tr>
<tr><td>71.922</td><td>78.730</td></tr>
<tr><td>Page 50, second paragraph</td><td colspan="2">Change "Emissions during a typical startup are expected to be 12 pounds of NOx" to "Emissions during a typical startup are expected to be 14 pounds of NOx".</td></tr>
<tr><td>Table 13, p. 50</td><td colspan="2">Change "12" to "14".</td></tr>
<tr><td>Page 51, first paragraph</td><td colspan="2">Change first paragraph to "In addition, the District has conservatively estimated the emissions that would result from a 30-minute startup at 36.4 pounds of NOx, 216.2 pounds of CO, and 11.9 pounds of POC, which the District is proposing as BACT limits on the emissions from startups. With the exception of NOx, the District calculated these emission rates by taking the emissions performance that the manufacturer estimates the turbines could achieve in a typical startup as summarized in Table 13, and then assuming that emissions were within the steady-state emissions limits during the remaining 19 minutes after startup. This is a conservative limit because if a startup takes longer than the gas turbine manufacturer's estimate of 11 minutes, emissions will exceed the steady-state limits during the remaining 19 minutes. For NOx, the estimated emissions of 36.4 pounds are based on the SCR effectively reducing NOx emissions starting in the 28th minute and achieving the steady-state NOx limit by the end of the 30-minute startup period."</td></tr>
<tr><td>Table 14, p. 51</td><td colspan="2">Change "18.6" to "36.4"</td></tr>
<tr><td>P. 57, second sentence</td><td colspan="2">Change second sentence to "The facility will emit up to 78.57 tons/yr of NOx, and will therefore be required to provide NOx ERCs in the amount of 90.356 tons per year to offset these emissions.."</td></tr>
<tr><td>Condition 18, p. 83</td><td colspan="2">Change "18.6" to 36.4"</td></tr>
<tr><td>Condition 20, p. 84</td><td colspan="2">Change "(a) 2,309 pounds of NOx" to "2,444 pounds of NOx"</td></tr>
<tr><td>Condition 21, p. 84</td><td colspan="2">Change "(a) 2,783 pounds of NOx" to "2,917 pounds of NOx"</td></tr>
<tr><td>Condition 22, p. 84</td><td colspan="2">Change "(a) 71.76 tons of NOx" to "(a) 78.57 tons of NOx"</td></tr>
</table>

In all tables of the Appendices that present or use MLGS startup emissions, daily emissions and annual emissions, the relevant calculations should be revised based on the following:

- Maximum startup emission for NOx is 36.4 lb per event.
- Duration of startup event for NOx only is 30 minutes.
- Startup duration and emissions for other pollutants are unchanged from PDOC values.
- Maximum NOx daily emissions on a day with no turbine tuning should continue to be based on four turbines, each operating as follows: three startups and shutdowns with the remainder of the day at full load (extreme cold ambient temperature case).
- Maximum daily NOx emissions on a day with one turbine tuning should be based on three turbines operating as described in the previous item and one turbine with 3 startups and shutdowns, 8 hours of tuning and the remainder of the day at full load (extreme cold ambient temperature).
- Annual NOx emissions are calculated based on 167 startups and shutdowns and the remainder of the total of 1.752 operating hours (1652 hours) at full load (ISO ambient temperature case).

Regarding Appendix C, Table 5, URS has rerun the AERMOD dispersion modeling to evaluate annual average impacts of the MLGS to reflect the revised NOx startup emissions discussed above (four turbines at 78.57 tons NOx per year each and two heaters at the same emission rates used in the ATC amendment). The revised maximum annual NO2 concentration due to these sources is estimated to be 0.12 $\mu g/m^3$.

Notwithstanding the revision to the estimated start-up NOx emissions limit, we do not propose increasing the currently proposed 45.1 pounds limit on maximum NOx emissions during an hour containing a start-up. Mirant intends to comply with this limit, and will monitor compliance with the limit by using a continuous emissions monitoring system (CEMS), as required in the PDOC.

It is important to note that this requested revision to the start-up NOx emission limit does not undermine the fast-start capability of the MLGS, nor does it affect any other proposed conditions in the PDOC related to other pollutants. We expect normal operating emissions limits for all other pollutants to be achieved within the first 11 minutes of a start-up event. As discussed above, the proposed revision reflects technical constraints on how quickly the SCR can achieve compliance with the NOx emission limit for normal operation, but this change does not affect the ability of the MLGS to achieve the 2.5ppm limit under normal operating conditions.

Minor and/or Non-Substantive Comments

The remainder of our comments relate to minor clarifications and corrections to the PDOC:

1. On p. 2, change the first word of the third paragraph from "This" to "The".

2. In footnote 4 (p. 22), clarify first sentence by revising to the following: "NOx can also be formed (1) when a nitrogen-bound hydrocarbon fuel is combusted, resulting in the release of nitrogen atoms from the fuel (fuel NOx), and (2) by organic free radicals and nitrogen in the earliest stages of combustion (prompt NOx)."
3. In Table 15 (p. 51), delete reference to footnote "b".
4. In Table 21 (p. 58), footnote b is missing.
5. In Condition 7, at the end of the first sentence, change "for more than 232 hours during the commissioning period" to "for more than 232 hours each during the commissioning period".
6. In Condition 10, in the first sentence, change "Within 90 days after startup, the Owner/Operator shall conduct District and CEC approved source tests..." to "Within 90 days after startup of each turbine, the Owner/Operator shall conduct District and CEC approved source tests for that turbine…."
7. In Condition 17, change "(a) through (j)" in the first sentence to "(a) through (i)".
8. In Condition 24, in the first line on p. 86, change "For each source, exhaust point, the owner/operator…" to "For each source and exhaust point, the owner/operator…"
9. In Condition 25, delete "17(j)" in the first sentence.
10. In Condition 27, in the first sentence, change "the owner/operator shall conduct a District-approved source test on exhaust point P-1, P-2, P-3, or P-4" to "the owner/operator shall conduct a District-approved source test on each corresponding exhaust point P-1, P-2, P-3 or P-4".
11. In Condition 28, in the first sentence, delete "17(j)" and change "Within 90 days of start-up of each of the MLGS SGT6-5000F units, the owner/operator shall conduct a District-approved source test on each corresponding exhaust point P-1, P-2, P-3 and P-4.
12. In Condition 30, change "Within 90 days of start-up of each of the MLGS SGT6-5000F gas turbines…" to "Within 90 days of the start-up of the last of the MLGS SGT6-5000F gas turbines…".
13. In Condition 32, change "Within 90 days of start-up of each of the MLGS SGT6-5000F gas turbines…" to "Within 90 days of the start-up of the last of the MLGS SGT6-5000F gas turbines…"

Again, we appreciate the opportunity to submit our comments on the PDOC. Please contact me at peter.landreth@mirant.com or (925) 427-3567 with any questions.

Sincerely,

Peter Landreth

SIEMENS

Estimated Startup and Shutdown Emissions
SGT6-5000F(4) in Simple Cycle Operation at 59 °F for a "Fast" Startup and Shutdown on Natural Gas

Mode	~ Time (minutes)	Emissions (Total Pounds per Event)			
		NO_X	CO	VOC	PM
Startup on Natural Gas	11	14	232	12	2
Shutdown on Natural Gas	6	12	128	6	1

General Notes

1.) All data is ESTIMATED, NOT guaranteed and is for ONE unit.
2.) Gas fuel must be in compliance with Siemens fuel specifications.
3.) Emissions are at the exhaust stack outlet and exclude ambient air contributions.
4.) Emissions are based on new and clean conditions.
5.) Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement is strictly the customer's responsibility. Siemens is available to review permit application data upon request.

Startup Emissions Notes

1.) Estimated startup (SU) data are from gas turbine (GT) ignition through 100% load.
2.) Estimated SU and shutdown (SD) data are based on the assumed times noted above and will be higher for longer times.
3.) Estimated SU and SD data are based on the ambient temperature noted in the table and will be higher at lower ambient temperatures.
4.) "Fast" SU assumes 5 minutes from turning gear to synchronization.
5.) SD assumes 100% load to FSNL with no cooldown at FSNL.
6.) Continuous Emissions Monitoring System (CEMS) may calculate emissions differently.
7.) Operator actions do not extend startup or shutdown.
8.) It is assumed that there is no restriction from the interconnected utility for loading the GT from synchronization to 100% load within the SU times considered.