From:	Chacon, Roger
To:	Magee, Melanie
Cc:	Robinson, Jeffrey
Subject:	Supplemental information
Date:	Friday, January 24, 2014 3:07:22 PM
Attachments:	EPA Sierra Club Summary Table 24Jan2014.xlsx

Re: Supplemental Information to Address Comments on Permit No. PSD-TX-1290-GHG

Dear Ms. Magee,

In reviewing comments filed on the draft permit for the Montana Power Station, specifically those filed by Sierra Club in a letter from Travis Ritchie dated December 4, 2013, we note some assertions that may benefit from supplemental information. We hope you can and will consider this information in formulating your response to comments. Also, please note that our review of the comments is continuing and so we may have additional information to share as you continue your own review. And the observations we make here are certainly not the exclusive grounds for rejecting Sierra Club's comments.

1. **Technological Capabilities of Combined Cycle Configurations**

Several of Sierra Club's comments (see, for example, Comment 3 on page 6) stem from the erroneous assumption that various combined cycle configurations are technologically capable of achieving the dispatch needs identified by the extensive planning process that preceded El Paso Electric's selection of the 4 X LMS100 Montana Power Station project. That selection process and its conclusions are described in the record, including but not limited to Appendix A of the application. **Significantly, in response to the comprehensive request for proposals issued by EPE to fulfill its identified need for power, which received 38 very diverse responses (ranging from various solar photovoltaic power technologies to wind power to demand-side management to reciprocating engines, and of course multiple simple cycle turbine bids), EPE received not even one bid for a combined cycle plant.**

Putting aside the fact that the GHG permitting process is not—with all due respect—the appropriate context in which to judge EPE's decisions about what it needs to build to fulfill its obligations to its customers (a task assigned, if at all, to utility regulators, which have in this case and to date approved EPE's choices), EPE did select the most efficient, least-emitting generation system capable of meeting its requirements.[1] Further, even if it were appropriate to use combined cycle performance as the basis for dictating the GHG emission limitation for the project selected by EPE (it is not), still **the GHG limit to which EPE has committed (1100 lb/MWh) is essentially the same the emission limitation achieved by the alternative project design that Sierra Club urges.**[2]

[1] Note, for example, that a table of simple cycle turbine efficiencies provided in Sierra Club's comments (in Exhibit 6) confirms that the LMS100's are easily the most efficient (and thus least emitting) of commercially available simple cycle turbines).

[1] The 3-on-1 Mitsubishi 501D combined cycle Huntington Beach Energy Plant touted on page 11 of Sierra Club's comments is permitted for an emission limit of 1082 lb/MWh, which is within 1.6% of the 1100 lb/MWh limit to be established for the MPS.

As noted in EPE's application and elsewhere in the record, in order to meet expected future demands, EPE needs capacity that can ramp up very quickly over a range of power outputs AND that is also very efficient at both sustained AND varying loads: We are a small utility (presently under 1800 MW peak load), and the 400 MW of new capacity represented by this project is a significant fraction of it, so versatility is very important to us. Simple cycle aero-derivative turbines, such as the LMS100, uniquely offer that versatility: Such turbines provide capacity in relatively small increments, efficiently, over a wide range of loads, and in very short order. The same cannot be said of the combined cycle plants suggested by Sierra Club, specifically those in the table presented on page 5 of its comment letter. That table is recreated as an attachment to this email, with some columns added to elaborate some of the reasons why those combined cycle plants are not technologically feasible alternatives for the Montana Power Station project. Simply stated, they are too large and too slow. To elaborate:

Only a multiple aero-derivative simple cycle turbine configuration provides the appropriate capacity increments. The large size of the combined cycle plants do not provide the flexibility and redundancy of smaller simple cycle turbines needed for this application. The combined cycle plants identified by Sierra Club, even if operated during certain periods without heat recovery as Sierra Club suggests they could be, still have capacities that range from 225 MW – 339 MW for each turbine, far larger than the 100 MW capacity identified by EPE's system planning process. The over-design problem is even worse if one considers the full capacity of these plants when operated in combined cycle as they are designed (with heat recovery steam generation), which increases their capacity to a range of 305 to 664 MW. If such a plant were to fail during a period of peak demand, EPEC would not have the redundancy needed to meet power demands. In contrast, having multiple units with the proposed design configuration (i.e., 4 turbines at 100 MW capacity each), EPE can accommodate malfunctions or failures in its system (including failure of a unit at MPS), even during periods of peak demand.
The incremental capacity growth of roughly an additional 100 MW per year also matches the load and resource needs resulting from expected growth and retirements in the EPE system, while also spreading out capital requirements.

Only a multiple aero-derivative simple cycle turbine configuration provides the requisite ability to vary load while maintaining high efficiency. By building a plant with four GE LMS100 turbines, which have a capacity of 100 MW each, EPE can deploy power over the range of loads needed to meet the project objectives while still meeting emission limitations (from 50-400 MW). In contrast, the project designs proposed by Sierra Club cannot simultaneously provide 50 MW increments of power while also meeting emission limitations: At 50% load, the minimum capacity of the combined cycle plants cited by the Sierra Club range from 112.5 MW – 169.5 MW, which is significantly greater than the lower range of power output needed for this project. In order to provide the lower increments needed by EPE (50 MW), these combustion turbines would need to be operated outside of their design range, which means that they won't meet emission limitations and can lead to damage of the units. And if EPE were to operate a unit above the level dictated by demand so as to run within emission limits (contrary to prudent and accepted practice by a regulated utility), still that would lead to wasted fuel and higher emissions (criteria and GHG pollutants). Further, even when over-producing power at 50% load, the Sierra Club-recommended plants would be at higher heat rate (lower efficiency) than the LMS100s at full load. In short, the low heat rates of the plants that Sierra Club touts in its comment letter do

not apply. In addition, the GHG emissions (lb/MWh) and the heat rate (Btu/kWh) will be very high when these plants are operated at 50% capacity for longer periods. The proposed simple cycle LMS100s can be operated very efficiently at low loads (i.e., 50 MW) without damaging the equipment and with increased efficiency and lower emissions relative to the combined cycle plants.

Only a multiple aero-derivative simple cycle turbine configuration provides the requisite ability to provide immediate power. The LMS100 can achieve a ramp rate of 50 MW per turbine per minute, meaning that the plant can produce up to 200 MW per minute. (That ramp time is distinct from "start-up time," which is a reflection of how quickly the unit and its associated emission control systems can produce the power and achieve permit limits based on steady-state operations.) In contrast, none of the combined cycle designs proffered by Sierra Club achieve a ramp rate that high.

2. The Montana Power Station is a Singular and Continuous Construction Project

Sierra Club avers (on page 19 of its letter) that the Montana Power Station is a phased construction project, but it is not. All common facilities are being built and sized to accommodate a 4 X LMS100 power plant, including

- Land acquisition
- Site grading
- Perimeter fencing
- Transmission and interconnection lines
- Evaporation ponds
- Service water tank and pumps
- Demineralized water tank and pumps
- Cooling tower power fire protection pump skid
- Distribution Center
- Administrative building
- Sewer line
- City water line
- Gas compressors
- Air compressors

Construction of several of the permitted emission units sized to accommodate the plant at its fully constructed capacity will be initiated at the start of any construction, including

- Substations
- Circuit breakers
- Natural gas pipelines

The turbines will be added continuously as they are assembled and delivered, a process that necessarily takes time, with no interruption of the plant construction process lasting more than 18 months.

Thank you,

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[2] The 3-on-1 Mitsubishi 501D combined cycle Huntington Beach Energy Plant touted on page 11 of Sierra Club's comments is permitted for an emission limit of 1082 lb/MWh, which is within 1.6% of the 1100 lb/MWh limit to be established for the MPS.

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For further information, please contact the EPA Call Center at (866) 411-4EPA (4372). The TDD number is (866) 489-4900.

********** ATTACHMENT NOT DELIVERED **********

Summary of Units Provided by Sierra Club

Unit	MW (net)	CT/HRSG (MW)	Efficiency (%)	Heat Rate (Btu/kWh) LHV	Heat Rate (Btu/kWh) HHV	Part Load	Overnight	Capacity of each CT (MW)	Capacity @50% Load (MW)	Comments
Alstom KA24, 2x1	664	450/214	59.5	5739	6370	>98% of full load efficiency to 80% load; 95% to 50% load	450 MW in 10 minutes	225	112.5	These combustion turbines are too large to meet the expected dispatch scenarios. These units cannot be operated between 50 - 100 MW.
Mitsubishi M501GAC	404	264/132	59.2	5763	6397	---	264 MW in 10 minutes	264	132	
Mitsubishi M701G	498	334/164	59.3	5755	6388	---	---	334	167	
Mitsubishi M501J	470	320/140	61.5	5551	6162	---	320 MW in 10 minutes; 460 MW in 30 minutes	320	160	
GE Flex 60	512	339/181	>61	<5584	6487	>60% efficiency to 87% load	28 minute start-up	339	169.5	
Siemens SCC6-8000-1S	410	274/136	>60	<5687	6313	---	<30 minutes	274	137	
Siemens SCC6-5000F (Lodi)	305	232/73	>57	<5989	6648	---	70 MW in 10 minutes; hot/warm start 200 MW in <30 minutes	232	116	
Proposed 4xLMS100	**392**	**392/0**	**45**	**7580**	**8413.8**	**~35.5% efficiency (80% of full load eff.) at 50% load**	**50 MW/min per turbine**	**100**	**50**	**LMS100s can be operated between 50 MW -100 MW more efficiently than large combined cycle units.**