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Fryer, Tim

From: Fuerst, Sherry
Sent: Friday, September 12, 2014 3:43 PM
To: Fryer, Tim
Subject: FW: Lon C Hill Power Station GHG PSD Permit Application Update
Attachments: 2014-08-13 LCH CCS Cost.pdf; 2014-08-13 LCH GHG BACT.pdf; 2014-08-13 LCH Updated Calcs.pdf

Here is the e-mail from 8/14/14. I think it should go on the web too as extra info received, but I don't know how. I already forwarded you the attachments.

From: Nuria de las Casas [mailto:ndelascasas@camsesparc.com]
Sent: Thursday, August 14, 2014 10:02 AM
To: Fuerst, Sherry
Cc: Mona Johnson; Gary Clark; Matthew Lindsey
Subject: Lon C Hill Power Station GHG PSD Permit Application Update

Sherry,

We are now ready to complete the application for Lon C Hill Power Station. Since our last discussions we have received additional data from the combined cycle vendors and process engineers that we request be included in our application. In addition, Global Warming Potentials were updated under 40 CFR 98 on November 29, 2013.. Consequently, attached to this email I'm sending you the following additional and/or revised documentation:

» **Revised CCS cost analysis** (2014-08-13 LCH CCS Cost.pdf)

Corrects project capital cost that was inadvertently marked as $200 million when it will actually be in the range of $750 million to $888 million.

» **Revised proposed BACT limits** (2014-08-13 LCH GHG BACT.pdf)

Incorporates newly obtained vendor heat rate data and proposes a BACT limit during MSS activities.

» **Revised annual GHG emission rate calculations** (2014-08-13 LCH GHG Updated Calcs.pdf)

We have revised our emission rate calculations to update the global warming potentials according to 40 CFR 98 update of November 29, 2013. In addition, we have incorporated the MSS purging emissions that were inadvertently not included upon initial submittal of the GHG emission rate calculations. These MSS emission events have been included as part of the combined cycle GHG emission rate calculations and account for occasional natural gas (CH_4) purging conducted to reduce the header pressure during startup, shutdown or maintenance activities. Fuel purging emissions are based on the Universal Gas Law, with the assumption that in one hour, the entire length of pipe is purged once and the purging takes place for every startup and shutdown of the units.

» **Site Map** (2014-08-13 LCH Aerial.jpeg, 2014-08-13 LCH Plot Plan.jpeg and 2014-08-13 LCH Flow Diagram.jpeg)

As requested we are providing you with jpeg copies of the aerial, plot plan and flow diagram for Lon C. Hill.

In addition, you will find below answers to the questions you have posed previously which we believe had not yet been addressed. Please let me know if you have any further questions or would like to schedule a call for us to discuss this project.

1. **Please provide the projected capital cost of the project.**
The projected capital cost of the project is dependent on a number of variable factors that have not been settled yet. As noted in our permit application, depending on the equipment selected, the output range of the project may vary between 625 MW and 740 MW. Based on an industry standard estimate of $1200 per kW, the total capital cost of the project can be

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estimated between $750 MM and $888 MM. The cost of the project may vary significantly outside this range depending on project management variables.

2. **What is the capital cost for the CCS system not just the annualized cost.**
   The attached CCS cost estimate is based on information provided in the "Report of the Interagency Task Force on Carbon Capture" (August 2010), which provides a methodology to estimate the total annualized costs for CO_2 capture and compression facilities. This methodology aligns well with our goal of developing a cost per ton of reduction. This same report also makes reference to the expected total capital cost to add CCS to a combined cycle natural gas facility. According to this report, DOE analyses indicate that for a new 550 MW net output power plant, the addition of post-combustion CO_2 capture will increase the capital cost of the project by $340 million (Section III.A.4 CO2 Capture Cost). The proposed facility will result in more than the 550 MW basis used for this estimate. Therefore, we have scaled this cost to the expected output range for the LCH project and are assuming a capital cost of $386 million to $457 million for CCS (if it were technically feasible). Additionally, the capital costs for CO_2 transportation facilities will be $9.7 million for a 10 mile pipeline with 10-inch diameter, estimated using DOE/NETL calculation methodology. Therefore, we would be looking at a total capital cost for the CCS System of about $396 million to $467 million.

3. **When is it anticipated that the turbines will be selected?**
   Final selection will occur sometime after required preconstruction air permits are issued. The exact time frame will be dependent on the outcome of negotiations with major equipment providers, ERCOT market conditions and project financing considerations. It is anticipated that final selection would occur within 6 to 12 months after air permits are received but the actual timing may vary from this significantly.

4. **What is the specific operational purpose of the project (ex. intermediate load following unit or baseload unit)?**
   The intended purpose of this plant is baseload operation with the flexibility to meet market demands with operations within permitted limits.

5. **It would be helpful to have a jpeg site map file to drop in both the Statement of Basis and the permit. If you have one I would appreciated you sending it to me.**
   Attached (2014-08-13 LCH Aerial.jpeg, 2014-08-13 LCH Plot Plan.jpeg and 2014-08-13 LCH Flow Diagram)

6. **And finally, the way I read the information that you provided in the application about the volume SF6, is that you expect approximately 75 pounds of SF_6. Most other facilities are stating that they will have between 300 and 400 pounds. Can you double check this amount?**
   Yes, we did double check. The proposed units will include totally enclosed circuit breakers. The information on the total sulfur hexafluoride (SF_6) utilized in the emission rate calculations was obtained directly from Siemens. Our Siemens representative told us that the SF_6 in the circuit breakers are part of an enclosed system and there should be no bleeding of SF_6 to the environment. Siemens specifications indicated that the total content of SF_6 in the generator circuit breaker would be approximately 11 kg per breaker (24.2 pounds) and that the steam turbine breaker is expected to be of similar size as the generator breakers. Therefore, the total pounds of SF_6 is estimated at roughly 73 pounds for the 3 circuit breakers. We have conservatively assumed that all of this SF_6 could escape, although that is an unrealistic assumption.

We appreciate all your help getting this final draft permit completed and are looking forward to the issuance of the final permit.

Thank you

Nuria de las Casas
CAMS eSPARC, LLC
ndelascasas@camsesparc.com

Cell (617) 599-0303
Office (281) 333-3339 Ext. 203

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