

Archived: Thursday, May 31, 2012 5:46:17 PM
From: [Eric M. Robeson](#)
Sent: Tuesday, January 03, 2012 5:04:00 PM
To: [Jim Garrett](#)
Subject: FW: SL-010881 Big Rivers Electric Corporation - Environmental Compliance Study (Final)
Response requested: No
Importance: Normal
Attachments:
[SL-010881 Big Rivers Electric Corporation - Environmental Compliance Study \(Final\).pdf](#) ;

From: ADAM.C.LANDRY@sargentlundy.com [mailto:ADAM.C.LANDRY@sargentlundy.com]
Sent: Friday, December 09, 2011 1:47 PM
To: Eric M. Robeson
Cc: TODD.M.HANSEN@sargentlundy.com; CALEB.L.KADERA@sargentlundy.com
Subject: SL-010881 Big Rivers Electric Corporation - Environmental Compliance Study (Final)

Eric,

Attached is the final report for the Environmental Compliance Study. If you have any additional comments, we can quickly make those modifications and reissue early next week.

As a summary, below are the specific responses to the comments and questions raised on the draft report:

Item 1: Section 1.1 - Not sure escalating gas price 2.5% per year is correct. What does that give us 10/20 years out?

Response 1: A sensitivity analysis was conducted on our initial price assumption and used to justify conclusions for natural gas modifications. Report has been updated accordingly.

Item 2: Section 3.2.1.1.2 - 3rd line talks about lime slurry; should also reflect limestone slurry

Response 2: Report has been updated

Item 3: Section 3.2.1.2 - Comment section for Coleman FGD: We believe we operate much higher than 93.5%

Response 3: "return to design" condition reflects an emission rate of 0.25 lb/MMBtu. These "reductions" are reflective of the differential between the reported EPA data and the 0.25lb/MMBtu rate provided by BREC

Item 4: Section 3.2.4.1.1 - Don't believe ESP upgrades will be adequate at Coleman and HMPL (see comments #2 for more details)

Response 4: Response included in detail further below in Response 16.

Item 5: Section 3.2.6.1.4 - Last line paragraph 2 - We believe cooling tower is an option at Coleman
Response 5: Paragraph adjusted to state that it is not economically justifiable for 316(b) when compared to other available options.

Item 6: Section 4.1.4 - One of only 5 still in existence? Thought Wilson and Gibson were only ones still in existence, and only 5 were ever built

Response 6: Kellogg Weir Scrubbers were built
Thomas Hill 3 - Not in operation
Gibson 5 - Being replaced
Bruce Mansfield 3 - In Operation
Coronado Units 1 & 2 - Unit 2 has been replaced and Unit 1 replacement is in construction
D B. Wilson - In Operation

Item 7: Section 4.1.5 - Doesn't really say what conclusion is i.e. Wilson FGD, HMPL upgrade

Response 7: Section was removed

Item 8: Section 4.3.5 - Doesn't really say what conclusion is

Response 8: Section was removed

Item 9: Section 4.4.2 - Coleman and HMPL issue: not adequate

Response 9: Report has been revised

Item 10: Section 4.6.1 - Can Coleman really achieve this much improvement?

Response 10: See response to Item 3 above

Item 11: Section 4.6.1 - Table 4-3 - typo Advanced Burners (hanging d)

Response 11: Report has been revised

Item 12: Section 5.1.1 - Last 2 lines - pretty broad wobble words +/- 20% in section 1.1.1

Response 12: Report has been revised

Item 13: Section 5.2.1 - Paragraph under Table 5-5: last sentence natural gas conversion ... "does not appear to be economically justifiable"

Response 13: Report has been revised

Item 14: Section 5.2.2 - Table 5-6 - Where did NPV numbers come from? What is NPV for various SO₂, NO_x, MACT options? How were they calculated? (do we need these type of tables in another appendix, or in body of report somewhere?)

Response 14: Calculation tables have been added to appendix

Item 15: Section 5.3.1 - Figure 5-4 and Table 5-8: talked to Caleb about this: signs seem backward: surplus should be positive number (at first glance I thought I was really short SO₂ in early years)

Response 15: Introductory statement and figure headings have been revised to indicate that the plot represents cumulative emissions above or below allocations. The "O" line represents BREC emitting exactly their allowance tonnage.

Item 16: Precipitator Upgrades: I do not believe that ESP upgrades will work at Coleman or HMP&L. The precipitators on these units are quite small compared to Green and Wilson having only three collecting fields compared to seven or more for the other units. The physical sizes of the precipitator boxes are quite small, and the gas velocity through the collecting fields is more than double what is recommended for effective particle collection. Without increasing the physical size of the boxes enough to reduce the gas velocity to allow sufficient time for particle charging I don't believe PM collection will improve. If we use ACI at Coleman for Mercury control I know that it takes significantly longer to charge the carbon particles than to charge fly ash for collection. We learned that while experimenting with burning pet coke in the

HMP&L units. I don't know what the resistivity is for hydrated lime if we choose it for SO3 control at HMP&L, but if it is greater than fly ash, I expect that it will pass through the precipitator to the WFGD.

Response 16: The testing that BREC performed at the Coleman and HMP&L systems showed that the PM emissions were above the proposed MACT limits primarily due to condensible PM emissions as can be seen in the table below.

Proposed MACT Emission Limits		HMP&L 1	HMP&L 2	Coleman
a. Total particulate matter (PM)	0.030 lb/MMBtu or 0.30 lb/MWh	0.0319	0.0324	0.0398
Filterable PM		0.0177	0.0120	0.0220
Condensible PM		0.0142	0.0204	0.0178

The recommended use of dry sorbent (hydrated lime) injection to reduce the condensible PM emissions with only a slight increase in inlet dust loading to the ESP. S&L is working with another Utility client to upgrade their older, existing, ESPs. The upgrade plans involve replacement of the discharge electrodes (DE) with newer advanced designs with more discharge points and also replacement of the existing T/R sets with high frequency T/R sets permitting more power to charge the fly ash in the ESP. Coupled with replacement of the conventional T/R sets will be some increased sectionalization of the existing precipitators for both power (less plate area be "served" by a single T/R set) and reliability reasons (loss of a T/R set has less of an effect on overall ESP performance). These upgrades are on ESP's that are over 30 years old which are the same age range as the ESP's at HMP&L and Coleman.

Additionally, S&L has recently participated in a number of activated carbon injection tests where PM was measured both baseline and during the tests. With carbon injection rates as high as 9 lb activated carbon/million acf there was minimal increases in the outlet PM loading. Testing with hydrated lime has also shown minimal increases in the particulate loading. As was pointed out by BREC, any lime that penetrates the ESP will pass through to the wet FGD systems at HMP&L and Coleman and will aid in SO2 removal. Under the proposed Utility MACT particulate monitoring will be performed in the chimney (as is done now by the PM monitors operating at HMP&L 1 & 2). Report has been updated.

Item 17: Reid/HMP&L Fly Ash Collection - Just a reminder that the fly ash transport system from the dry ash collectors to the HMP&L storage silo is also pressure pneumatic. I did not notice that mentioned in table 2-8.

Response 17: Report has been revised

Item 18: Sebree Intake Structure 316(b) Compliance -If the Reid 1 Unit is retired the Circulating Water Pumps at the intake structure could be downsized for make up to the HMP&L cooling towers, HMP&L units sluice water make up, and to supply HWU's South Water Treatment facility. As stated in the paragraph following Table 4.4 on page 4-13, a study would need to be conducted to determine the pump size required, and if the reduced requirement would bring the overall intake flow velocity below the 0.5 fps limit.

Response 18: Report has been revised

Item 19: Reid/HMP&L Waste Water Streams - The entire Reid/HMP&L plant foot print drains to a sump adjacent to the HMP&L fly ash silo and is pumped to the ash pond for disposal. As mentioned in the last paragraph on page 4-14 a waste water treatment facility would need to be added or the site sump redirected to the Green Station waste water treatment facility before the existing ash pond could be closed.

Response 19: Report has been revised

Item 20: Page 2-10 Table 2-8 - Wilson Pyrites Handling "Sluiced to Bottom Ash SSC" should read "Handled Dry"; Modifications Required "Eliminate Ash Storage Ponds and install Dewatering Equipment" should read "Dewatering Equipment in Place, Ash Handled Dry"

Response 20: Report has been revised

Item 21: Page 3-4 Table 3-1 Wilson Increase L/G - This is the premise for URS proposed modifications for Kellogg scrubbers; however, field experience at other utilities does not support their theoretical removal rates; therefore I question the validity of offering this as a viable control strategy. Past experimentation leads me to believe that changes in L/G do not produce results of the anticipated magnitude primarily due to inherent inefficiencies in the cross current design. Additives - "*Either DBA or Sodium Formate could be used*" should read "Currently using both DBA and Sodium Bisulfite"

Response 21: Report has been revised

Item 22: Page 3-18 Section 3.2.7.2 CCR Strategies - Wilson Station does not have an ash pond.

Response 21: Report has been revised

Item 23: Page 4-3 Section 4.1.3 Additives - "*In the past, this organic acid*" should read "Wilson Station currently uses organic acid to enhance FGD performance."

Response 21: Report has been revised

Item 24: Page 4-8 Section 4.4.3 Sorbent Injection - Wilson Station currently has a DSI system, are we already obtaining some amount of CPM reduction? If so is the estimated 50% reduction realistic? - report has been revised to indicate

Response 24: Wilson has a DSI system in place accounts for slight improvement in reduction with increased hydrated lime injection. 50% reduction can be expected for Coleman and HMP&L. (see Response 16)

Regards,

Adam C. Landry
Professional Engineer of Indiana, Illinois, Alberta
Project Manager

Sargent & Lundy, LLC
55 East Monroe Street
Chicago, Illinois 60603

Phone: 312-269-7292
Cell: 312-656-2464
Fax: 312-269-9602