



COPRORATE EHS SERVICES

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October 14, 2008

Received

OCT 16 2008

Air Permits Section

B. Keith Overcash, Director
Division of Air Quality
Department of Environment and Natural Resources
1641 Mail Service Center
Raleigh, NC 27699-1641

Subject: Additional Information for Duke Energy's Voluntary MACT Assessment

Dear Mr. Overcash:

As a follow-up to our previous submittals of June 13, 2008, July 3, 2008, July 15, 2008, August 22, 2008 and September 4, 2008 and recent questions and suggestions from your staff, Duke Energy is providing further information regarding the voluntary MACT-like assessment for CSS6, namely: 1) additional information that your staff has recently requested on coal supplies to be used at Cliffside Station and; 2) a memo prepared by the leading U.S. technical consultant on the development of continuous emissions monitors for mercury, explaining why the current state of mercury monitoring makes it impossible to measure mercury at extremely low concentration or to base mercury limits on such information. We are providing these two items because your staff requested them and they will complete the administrative record. However, this additional information is no longer relevant because our voluntary MACT-like assessment has confirmed that the emissions from CSS6 are so low it is a minor source and thus not subject to the case-by-case MACT provisions at all. Information discussing the minor source status of CSS6 will be provided in a separate contemporaneous letter from Mr. James L Turner of Duke Energy.

We believe this demonstration further supports the efforts of DAQ to confirm that CSS6 is among the cleanest coal-fired facilities in the nation, and it is a tribute to CSS6 and its unique pollution control equipment that a coal-fired unit of its size would be so well-controlled that it is a minor source of HAPs.

1. Coal Data.

As you know, in previous submittals Duke Energy provided data on coal quality for the fuels it expects to purchase for CSS6. In response to questions from your staff, Duke Energy is providing information on the reasonably foreseeable worst-case coal quality, the scenarios under which Duke would burn such coal for a period of 12 months or more, and why such scenarios are reasonably foreseeable. (Attachment 1)

2. Santee Cooper Cross Units 1 and 2 Hg CEMs Data.

On September 4, Duke Energy also provided a report from Santee Cooper regarding problems with the mercury continuous emissions monitors ("Hg CEMs") at its Cross Units 1 and 2. Your staff asked if there was additional information on Hg CEMs. The attached letter from RMB Consultants, which worked on the installation of the Hg CEMs at Cross, explains (1) that the data from the Santee Cooper Cross 1 and 2 substantially understate actual emissions, as measured by the EPA reference method; (2) the lack of EPA and National Institute of Standards and Technology ("NIST") approved protocols for calibration; and (3) why the Hg CEMs data from Cross Units 1 and 2 cannot be used to establish MACT emission limits. (Attachment 2)

Please call me at 980-373-3225 if you have any questions.

Sincerely,



Kris W. Knudsen
Principal Environmental Scientist

copy: Dr. Donald van der Vaart, DAQ

Attachments

Attachment 1

Supplemental Information on Coal Markets and
Foreseeable Worst Case Fuel Analysis for Mercury Control

Cliffside Unit 6 Coal Supply, Mercury Content and Emission Limits

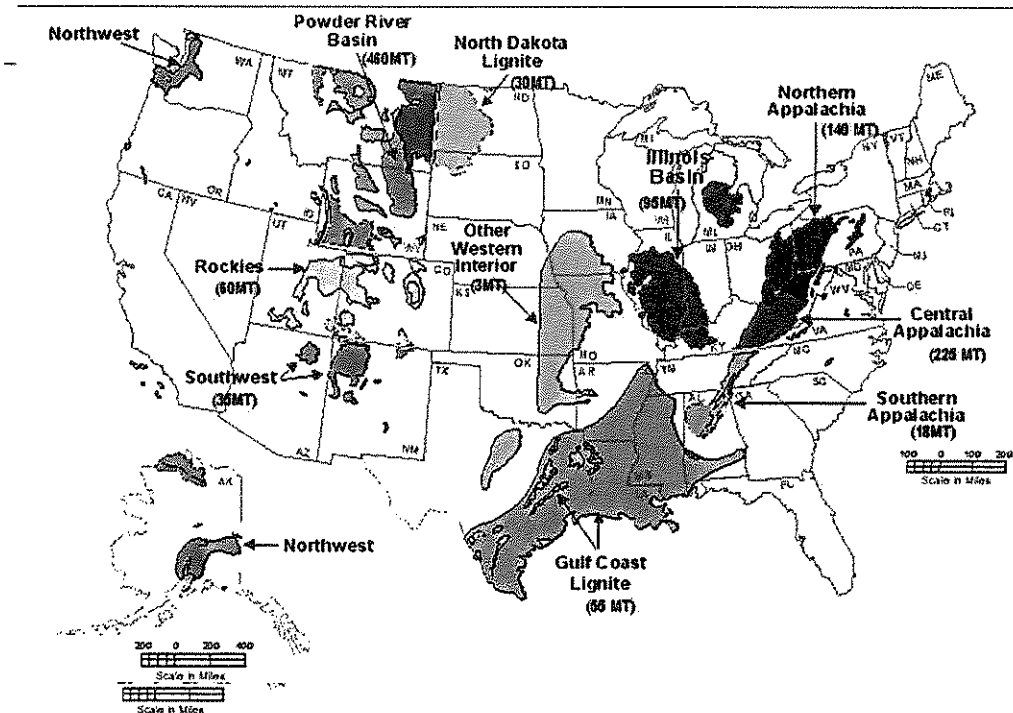
Overview

Cliffside Unit 6 is designed to burn coal from domestic and international sources. The characteristics of this coal vary depending on the coal rank and the region, mine and seam of coal supplied. The characteristics include heat value, slagging properties, ash content, and concentration of constituents such as sulfur, chlorine, mercury and etc.

The supply of coal to Duke Carolinas plants is affected by coal availability and, to a lesser extent, by transportation resources. Duke generally purchases coal through longer term contracts of 1-3 years and, in the past has purchased primarily Central Appalachian bituminous coal. However, declining Central Appalachian supplies and the relative close proximity of Northern Appalachian coal make it an attractive alternative. As described in the information below, it is reasonably foreseeable if not highly likely that Cliffside Unit 6 will burn Northern Appalachian coal, and specifically Ohio and Pennsylvania coal on a longer term basis, i.e., over at least a 12 month period over its projected lifetime. As a result, any proposed Unit 6 mercury emission limit should be based on the higher mercury concentrations in Ohio and Pennsylvania coal.

Summary of Coal Markets

The US coal market consists of four primary producing regions: the Powder River Basin located in Wyoming and Montana; the Central Appalachian region located in eastern Kentucky and Southern West Virginia; Northern Appalachia located in northern West Virginia, Pennsylvania and Ohio; and the Illinois Basin located in Illinois, Indiana and western Kentucky. A summary of these regions and their current production levels is as follows:

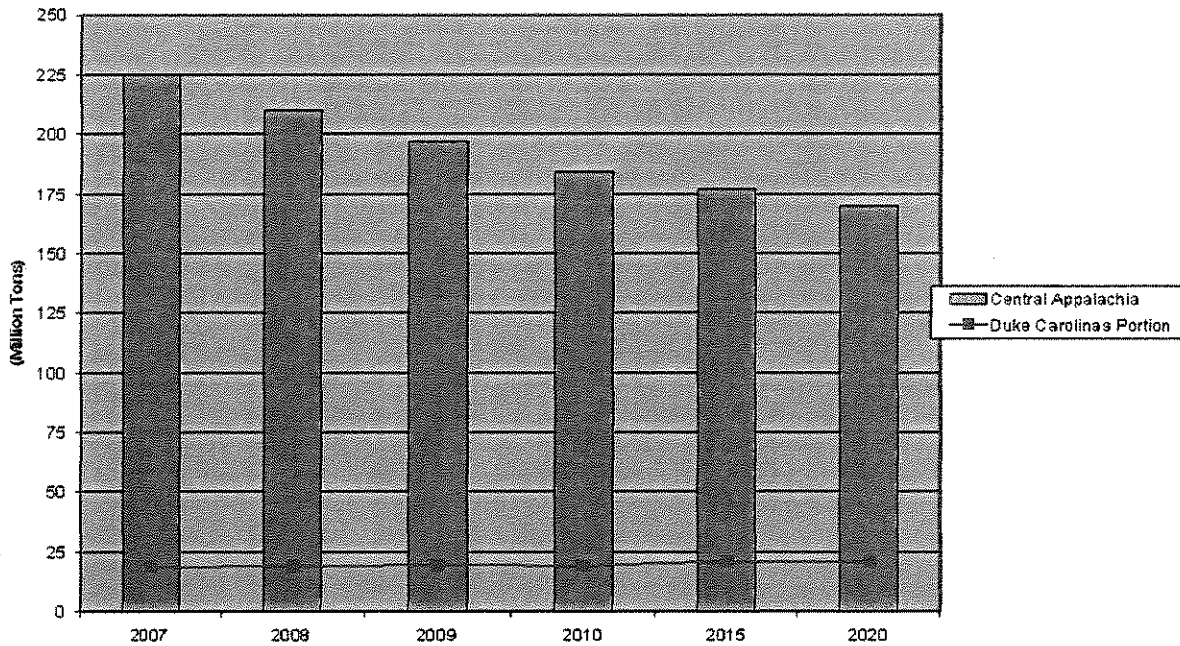


2008 has brought significant change to coal markets. Explosive growth in international coal demand underscores the shortage of energy around the world. Coal has become a global commodity in the past year driven by significant increases in Asian coal demand brought on by strong economic growth. Coal production declines in Europe have led eastern European countries to switch from domestic to imported coal. These issues have led to a substantial increase in eastern US exports causing coal supply and sourcing uncertainty for US coal consumers including Duke Carolinas. It is very difficult to determine how long these factors and issues will continue due to all of the uncertainties in world economic conditions and world supply and demand for coal.

Central Appalachia Market Fundamentals

Central Appalachia is the 2nd largest coal producing region in the US. Although the vast majority of coal produced in the US is for domestic use, due to its proximity to east coast ports and the high quality of coal it produces, the Central Appalachian region is a primary source for US export coal. Due to power plant design and transportation logistics associated with delivering coal, this region is Duke Carolinas primary coal source. However, the Central Appalachian coal production is expected to significantly decline over time due to a deteriorating coal reserve base, deteriorating coal geology and intense pressure on surface mining causing mine project delays and cancellations. A summary of the regions projected production as developed by Energy Ventures Analysis, Inc. (EVA) follows:

Total Central App Production - EVA Projection



Although Central Appalachian supply exceeds Duke Carolinas projected demand over the next 12 years, the projected approximate 25% supply decline is significant considering the total demand for Central Appalachian coal from both domestic and international markets. As a result, Duke Carolinas has determined limitations on the supply of Central

Appalachian coal in the future will result in some shift away from its current primary coal supply source. It has been Duke's goal for several years to develop sourcing flexibility to take advantages of changes in coal market conditions and to ensure greater security of coal supply availability. The design of Cliffside Unit 6 and the wet flue gas desulfurization (WFGD) systems installed as a result of the Clean Smokestacks law is consistent with this goal.

Northern Appalachia Market Fundamentals

Northern Appalachia is the 3rd largest coal producing region in the US. The region's production is projected by most industry consultants, including EVA, to be relatively flat over the next several years, as opposed to the projected decline in Central Appalachian production. Northern Appalachia is mostly an underground mining region, therefore, it does not receive as much environmental pressure as surface mining. The geology of coal reserves in this region is much better compared to Central Appalachia. Duke Carolinas will receive 1.5 to 2.0 million tons per year of Northern Appalachia coal over the next couple of years under an existing longer term coal supply agreement. This coal will be delivered primarily to plant Marshall via the CSX railroad.

Transportation

Duke Carolinas is totally reliant upon rail delivery for its coal supply. Trucking and barge deliveries of coal are not available or practical due to the distance from coal producing mines and lack of navigable rivers into the Carolinas. The current rail infrastructure in the eastern US provides Duke Carolinas access to sources in Central and Northern Appalachia, the only two major coal producing regions in the east. It is important to note as coal consumers seek alternative coal sources, their options can be limited. Transportation complexities associated with moving coal over new, longer and more expensive routes make sourcing coal outside the east more difficult. Cliffside, like Marshall, is a CSX-served plant, demonstrating that the needed rail infrastructure to deliver coal from Northern Appalachia is currently in place since Marshall already receives significant volumes being delivered into the Carolinas via CSX.

Procurement of Coal

Since Cliffside 6 is designed to consume a much wider range of coal qualities than any of the other Duke Carolinas coal generation units, it is reasonable to assume it will receive various quantities of coal from different supply basins, including Northern Appalachia, to optimize the efficiency of coal generation across the Duke Carolinas coal fleet. This is the logical result of the reduction in longer term coal availability from Central Appalachia and the complex logistics of transporting coal from sources outside the eastern US.

Duke Carolinas is currently forecasting the purchase and use of Northern Appalachian coals at Cliffside in its Long Term Fundamental Forecast updated this year. This comprehensive forecast factors in consultant projections as well as Dukes own internal analysis. Given the nature of coal procurement, in that the majority of coal is purchased under term contracts from 1 to 3 years in term, it is reasonable to assume Northern Appalachian coal will be delivered into Cliffside for an extended period of time, not just

on a month to month basis. This is consistent with the current Agreement for coal supplied from Northern Appalachia into plant Marshall. Given changes in coal market dynamics, specifically the supply and demand of coals in different regions at any point in time, Northern Appalachian coals could represent a substantial percentage of the total coal that is being delivered into Cliffside.

As can be seen from the map on page 1 of this document, Ohio and Pennsylvania make up 2/3 of the states that supply Northern Appalachian coal. The US Environmental Protection Agency (EPA) found in its 1999 Information Collection Request (ICR) that Ohio and Pennsylvania coals were higher in mercury than many other states' coals. Given that Duke purchases coal using longer term contracts of 1-3 years, and since Northern Appalachian coal, including Ohio and Pennsylvania coal, is forecasted for use at Cliffside Unit 6, it is reasonably foreseeable to expect that Cliffside Unit 6 will burn higher mercury Northern Appalachian coal for over one year. Therefore it is critical to calculate any Cliffside Unit 6 mercury emission limit using Ohio and Pennsylvania coals.

The attached spreadsheet shows the mercury and chlorine contents for various coal sources and from Ohio and Pennsylvania as found in the ICR database. This shows a worst case coal at 15.6 lb/TBtu and 697 ppm chlorine. That is consistent with our August 22 supplemental report but this provides a more specific analysis. In the supplement, we simply said that the Ohio and Pennsylvania data demonstrated that our assumption of 14.3 lb/TBtu was conservative.

Cliffside Unit 6 is designed with an innovative arrangement of proven emission control technologies specifically to remove mercury. Even when basing emissions on the Ohio and Pennsylvania coals, once the Cliffside Modernization Project is online, the modernized plant will emit only 60% of the mercury currently emitted by Units 1-5.

Cliffside Unit 6 Parent Coals, Including Worst-Case Coal for Mercury Control Based on Ohio and Pennsylvania 1999 ICR Fuel Supply Data

Duke Energy - Carolinas
New Generation Design Basis Coal Specification - Parent Coals

6. Parent Coals are individual coals that may be received at Cliffside Station for use in Unit 6. With the exception of the sub-bituminous coals (PRB_3 and PRB_4), each coal may be burned directly in the boiler or may be blended with other coals. The sub-bituminous coals will not be burned individually but must be blended with other bituminous coals at a ratio of no more than 50% sub-bituminous. Actual fuel burned in Unit 6 will depend on fuel supply market conditions.

STATISTICAL ANALYSIS:

Description	HHV_Dry (Btu/lb)	Mercury_Dry (ppm)	Chlorine_Dry (ppm)	Mercury in coal (lbm Hg/Tbtu)
Mean ±	12,777	0.103	1,102	8.036
Standard Deviation ±	1,023	0.050	935	3.736
Maximum ±	13,905	0.203	3,209	15.527
Minimum ±	10,484	0.040	100	3.025
Mean ± 2 x Standard Deviation (98% of population) ±	14,822	0.202 < 5 (Note 4)	15,511	15.511
Mean ± 1.65 x Standard Deviation (95% of population) ±	14,484	0.185 < 5 (Note 4)	14,203	14,203

SUMMARY AND CALCULATED COAL QUALITY DATA:

HHV Dry (Btu/lb)	Mercury Dry (ppm)	Chlorine Dry (ppm)	Mercury in coal (lbm Hg/Tbtu)	CA1	CA2	CA3	CA4	COL	PRB_3	PRB_4	ILBS_5	ILBS_6	ILBS_8	ILBS_9	OH-ICR	PA-ICR
13,905	13,061	12,746	12,649	13,003	10,529	10,484	13,223	12,153	12,122	13,395	13,467	13,493	13,680	12,887	13,635	13,635
0.080	0.100	0.060	0.130	0.180	0.100	0.070	0.040	0.060	0.050	0.100	0.080	0.110	0.070	0.201	0.193	0.193
921	500	1,316	1,940	1,152	503	563	1,833	100	100	1,000	1,000	1,800	3,209	687	1,050	1,050
5,754	7,556	4,708	10,276	13,843	9,491	6,677	3,023	6,563	4,123	7,465	5,940	8,153	5,117	15,597	14,155	14,155

COAL QUALITY DATA:

Coal case	Blacksville	NA New	ILBS_3	CA1	CA2	CA3	CA4	COL	PRB_3	PRB_4	ILBS_5	ILBS_6	ILBS_8	ILBS_9	OH-ICR	PA-ICR
Proximate Analysis (As Received)																
HHV (Btu/lb)	13,162	12,173	11,132	11,676	12,289	10,048	9,772	11,517	8,861	8,810	12,026	12,289	12,339	12,722		
Moisture (%)	5.34	6.80	12.66	7.69	5.49	4.57	6.79	12.91	27.09	27.32	10.22	8.76	8.55	7.00		
Ash (%)	7.28	12.66	8.45	12.74	27.36	27.36	26.76	5.26	5.24	4.45	7.82	7.98	8.34	8.60		
Sulfur (%)	2.47	3.29	3.06	1.16	0.80	0.87	0.81	0.52	0.50	0.17	2.46	2.82	2.83	2.48		
Volatiles Water (%)	35.93	36.30	32.87	32.15	32.15	25.7	25.64	35.90	31.45	31.17	34.28	35.12	36.46	36.40		
Fixed Carbon (%)	51.45	43.66	42.58	47.03	49.62	42.37	40.81	45.84	36.22	37.06	47.68	49.17	46.65	48.00		
Ash Loading (lbm/Mbtu)	5.53	10.40	7.59	10.60	10.37	27.23	27.36	4.56	5.91	5.05	6.50	6.48	6.76	6.76		
Calculated SO ₂	3.75	5.41	5.50	1.99	1.30	1.33	1.25	0.91	0.68	0.39	4.09	4.26	4.59	3.50		
Ultimate Analysis (Dry)																
Carbon (%)	79.56	71.34	71.05	73.57	73.98	62.62	60.72	73.57	69.26	69.88	74.13	74.23	74.42	75.50		
Hydrogen (%)	5.02	4.71	5.05	4.76	4.77	4.10	3.79	4.98	4.99	4.85	5.09	5.03	5.29	5.20		
Nitrogen (%)	1.41	1.30	1.29	1.41	1.39	1.04	1.09	1.53	0.94	0.92	1.52	1.55	1.57	1.60		
Ash Mineral Analysis																
Silica (SiO ₂) - %	44.22	48.09	51.88	56.33	56.19	62.66	61.84	56.4	37.8	35.45	48.42	49.47	47.97	49.00		
Alumina (Al ₂ O ₃) - %	21.96	19.76	19.3	26.54	30.76	28.43	24.62	22.17	15.83	17.49	20.49	20.39	18.83	20.60		
Titania (TiO ₂) - %	0.97	0.84	0.96	1.54	1.82	1.59	1.67	0.90	1.26	1.38	1.06	1.11	1.00	1.10		
Iron Oxide (Fe ₂ O ₃) - %	18.87	18.07	16.33	6.68	4.36	2.57	2.76	8.04	5.64	5.26	19.64	18.66	21.89	20.30		
Magnesia (MgO) - %	0.82	1.23	0.91	0.83	0.77	0.84	0.93	1.61	3.74	5.09	0.92	1.22	0.90	1.20		
Lime (CaO) - %	4.8	4.23	3.83	1.17	0.87	0.26	0.4	3.85	19.58	21.11	3.54	4.19	3.83	2.70		
Potassium Oxide (K ₂ O) - %	1.46	2.37	2.09	2.19	2.2	2.79	3.03	1.37	0.63	0.42	2.26	2.20	2.25	2.30		
Sodium Oxide (Na ₂ O) - %	0.96	0.91	1.37	0.23	0.25	0.19	0.17	1.53	1.21	1.65	1.00	0.59	0.55	0.50		
Phosphorous Pentoxide (P ₂ O ₅) - %	0.47	0.38	0.11	0.23	0.18	0.04	0.11	0.19	0.87	1.00	0.12	0.28	0.09	0.20		
Sulfur Trioxide (SO ₃) - %	4.53	3.53	2.65	0.76	0.53	0.2	0.34	5.07	13.58	10.49	2.43	1.70	2.54	2.10		
Ash Fusion Temperature																
ID @ Oxidizing - F	2,409	2,349	2,293	2,700	2,700	2,800	2,700	2,847	2,173	2,135	2,410	1,990	2,345	2,430		
Softening @ Oxidizing - F	2,461	2,409	2,381	2,700	2,700	2,800	2,700	2,702	2,188	2,188	2,510	2,040	2,440	2,470		
Hemifusional @ Oxidizing - F	2,486	2,486	2,447	2,700	2,700	2,800	2,700	2,732	2,198	2,205	2,540	2,110	2,490	2,500		
Fluid @ Oxidizing - F	2,531	2,543	2,547	2,700	2,700	2,800	2,700	2,761	2,265	2,261	2,560	2,525	2,525	2,530		
ID @ Reducing - F	2,017	2,067	1,984	2,689	2,700	2,800	2,700	2,516	2,077	2,090	2,020	1,980	1,995	2,040		
Softening @ Reducing - F	2,148	2,143	2,097	2,700	2,700	2,800	2,700	2,578	2,140	2,105	2,070	2,040	2,035	2,130		
Hemifusional @ Reducing - F	2,179	2,281	2,176	2,700	2,700	2,800	2,700	2,655	2,113	2,113	2,190	2,165	2,165	2,220		
Fluid @ Reducing - F	2,352	2,344	2,309	2,700	2,700	2,800	2,700	2,704	2,173	2,152	2,420	2,390	2,345	2,280		
Miscellaneous:																
Grind (HG)	56	55	52	39	41	42	42	45	51	52	56	54	50	57		
Equilibrium Moisture (%)	8.5	7	3.00	3.80	4.30	2.50	1.50	1.50	0.10	0.10	5.50	6.00	6.00	7.00		
Free Swelling Index	5.75	7.66	4.71	10.28	13.84	9.50	6.88	3.02	6.58	4.12	7.47	5.94	8.15	5.12		
Calculated H ₂ (lbm/Tbtu)																
Trace Metals - dry whole coal basis																
Chlor - Ppm	921	500	1316	1040	1152	503	563	1834	100	100	3106	1400	1800	3209		
Mercury Ppm	0.08	0.1	0.06	0.13	0.18	0.1	0.07	0.04	0.08	0.05	0.11	0.08	0.11	0.07		

Attachment 2

Consultant Report on Issues with Use of Mercury CEMS Data

RMB Consulting & Research, Inc.

5104 Bur Oak Circle
Raleigh, North Carolina 27612

Phone (919) 510-5102
FAX (919) 510-5104

October 13, 2008

Mr. Kris Knudsen
Principal Environmental Specialist
Duke Energy
P.O. Box 1006
Charlotte, NC. 28201-1006

Dear Kris:

INTRODUCTION

Duke Energy asked RMB Consulting & Research, Inc (RMB) to review and to comment on mercury emission data collected from the South Carolina Public Service Authority ("Santee Cooper") Cross Generating Station. Specifically, RMB was asked to review data from the Cross Station mercury (Hg) continuous emission monitoring systems (CEMS) installed on Units 1 and 2.

BACKGROUND

Santee Cooper signed a consent decree (CD) with the United States and the South Carolina Department of Health and Environmental Control to settle issues arising from alleged violations of new source review requirements (NSR) and/or prevention of significant deterioration (PSD) requirements. Among other things, the CD required Santee Cooper to install, operate and certify two Hg CEMS at the Cross Station – one on Unit 1 and the second on Unit 2. Under Purchase Order No. 155740, Santee Cooper retained RMB to assist in specifying and selecting Hg CEMS for installation at the Cross Station. To the best of our knowledge, this was the first commercial application of Hg CEMS technology, at least in the utility industry, pursuant to any legal obligations. Suffice it to say that RMB is very familiar with the Hg CEMS application at the Cross Station.

TECHNICAL ISSUES

We understand the North Carolina Department of Environment and Natural Resources (DENR) has reviewed the Hg CEMS data from the Cross Station and may be assuming that the data are accurate, precise and suitable for quantifying the Hg emission rate from "best performing similar source." A review of all available information shows that such an assumption would not be correct. There are at least three fundamental flaws in DENR's purported use of the Hg CEMS emission data from the Cross Station

1. Consistent bias between the Hg CEMS data and independent reference method test.

2. Lack of NIST-traceable¹ calibration material for either elemental mercury (Hg^0) or oxidized mercury (Hg^{+2}).
3. Inherent uncertainty in the measurement of Hg at very low concentrations.

Consistent Bias between CEMS Data and Reference Method Tests

Pursuant to terms of the CD, Santee Cooper conducted relative accuracy test audits (RATA) on the two Cross Unit 1 and Unit 2 Hg CEMS during September 2007. At the time, the only available EPA reference method for Hg CEMS was the Ontario Hydro Mercury² (OHM) measurement method. The initial RATA results for Units 1 and 2 were 72.7 and 5.1 percent respectively. While the Unit 1 Hg CEMS achieved EPA's alternative relative accuracy specification of a mean difference less than $1.0 \mu\text{g}/\text{m}^3$ between the Hg CEMS readings and the reference method results, the Hg CEMS data read systematically low relative to the EPA reference method results.³ The differences are not only statistically significant at a very high confidence level, but the differences are also relatively significant. For Unit 1, for example, the average difference between the Hg CEMS and the reference method results is $0.17 \mu\text{g}/\text{m}^3$, but the average of the CEMS readings is only $0.09 \mu\text{g}/\text{m}^3$. In other words, the mean difference is 189 percent of the average Hg CEMS readings. Granted, this percentage calculation is affected by the low Hg CEMS readings – but that is precisely the point of this letter. There is no doubt that Hg emissions from Cross Units 1 and 2 are low. The question is just how low. The answer is we really do not know, and probably will not know until additional work is done to calibrate the Hg CEMS and to improve measurement accuracy at low mercury concentrations.

Lack of NIST-Traceable Calibration Standards

For conventional CEMS (e.g., SO_2 , NO_x , etc.), we have always depended on NIST-traceable cylinder gases to ensure precision and accuracy. Hg CEMS are more complicated systems, and commercially available Hg CEMS rely on what are called head-space calibrator systems. An Hg head-space calibrator is actually an integral part of the monitoring system (i.e., the manufacturer of the analyzer typically is the manufacturer of the head-space calibrator).

As of today, RMB does not believe that there is a single NIST-traceable calibrator in service or part of an installed operating Hg CEMS. The primary Hg CEMS suppliers (Thermo-Fisher and Tekran) have a few NIST-traceable calibrators but they remain at their respective manufacturing facilities. These calibrator units are designated by EPA to be “vendor primes.” In EPA's original plan to get NIST-traceable calibrators in the field, Thermo and Tekran were supposed to use an EPA-developed protocol to transfer NIST traceability from the vendor primes to the

¹ The National Institutes of Standards and Technologies (NIST) is the government entity that EPA relies on to certify gas calibration standards.

² The Ontario Hydro Method has been approved by the American Society for Testing and Material (ASTM) as ASTM D-6784-02.

³ According to the Quality Assurance/Quality Control Plan that Santee Cooper developed for the Cross Hg CEMS, RATA results are acceptable if the relative accuracy is less than or equal to 20.0 percent. Alternatively, if the average reference method mercury concentration is less than $5.0 \mu\text{g}/\text{m}^3$, the results are acceptable if the absolute value of the difference between the mean reference method and Hg CEMS values does not exceed $1.0 \mu\text{g}/\text{m}^3$.

calibrator units manufactured for the power plant Hg CEMS. To date, no such protocol exists. In fact, in a January 2008 rulemaking EPA amended §5.1.9 of Appendix A Part 75 to state that NIST-traceable mercury calibration standards are not required *until January 1, 2010*.⁴ EPA also stated in the preamble of the rulemaking, the required NIST traceability protocols have not been finalized so it is unrealistic to expect companies to be able to acquire or use NIST-traceable calibration standards at this time. Thus, the absolute accuracy of the Cross Hg CEMS data is clearly uncertain, given that Santee Cooper is unable to obtain NIST-traceable calibration standards.

Inherent Uncertainty in Measuring Low Hg Concentrations

The plain truth is that none of the parties involved (i.e., EPA, NIST, EPRI and the utility industry) expected to be measuring mercury at the levels evidenced by Cross Unit 1. Based on Phase I of the Clean Air Mercury Rule (CAMR), EPA expected to see the majority of plants measuring between 1 to 3 $\mu\text{g}/\text{m}^3$. In support of this belief, EPA specified to NIST a nominal low mercury concentration of 2 $\mu\text{g}/\text{m}^3$ for the vendor prime units. Thus, a mercury flue gas concentration of 0.1 $\mu\text{g}/\text{m}^3$ is 20 times lower than the lowest calibration point (and that point is not NIST traceable). In fact, RMB is certain that both the Thermo and Tekran head-space calibrators will have to undergo design changes in order to provide accurate calibration standards at concentrations below 1 $\mu\text{g}/\text{m}^3$.

Santee Cooper conducted a second RATA on the two Cross Hg CEMS during August 2008. Relative accuracy for Units 1 and 2 were 42.0 and 33.5 percent, respectively – considerably higher than EPA's 20 percent specification. Since the mean differences were 0.12 and 0.02 $\mu\text{g}/\text{m}^3$, both Hg CEMS achieved the alternative criterion (i.e., mean difference less than 1.0 $\mu\text{g}/\text{m}^3$). An important point is the fact that Santee Cooper used a different reference method (i.e., EPA Method 30B) for the second RATA. EPA Method 30B, which collects mercury in sorbent traps, is a fundamentally different from the Ontario Hydro Method, which collects mercury in impingers charged with chemical solutions such as acidified potassium permanganate. For Unit 1, the second RATA indicated that the Hg CEMS was 50 percent low compared to Method 30B. Remember that for the initial RATA, the Hg CEMS was 189 percent low compared to the Ontario Hydro results. Also note that the Unit 2 Hg CEMS went from a relative accuracy of 5.1 percent to 33.5 percent. All of these seemingly confusing results are actually easy to understand. That is, measuring mercury in flue at concentrations less than 0.5 $\mu\text{g}/\text{m}^3$ produces values with high uncertainty.

CONCLUSIONS

The Cross Hg CEMS data appear to understate mercury emissions and thus are not reliable for the purpose of setting enforceable mercury emission limits. Attempting to quantify mercury at concentrations less than 0.5 $\mu\text{g}/\text{m}^3$, regardless of measurement methodology (Hg CEMS, Ontario Hydro or Method 30B), is guaranteed to produce highly uncertain results. The bottom line is that

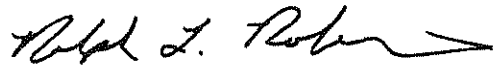
⁴ 73 Fed. Reg., 4312 (January 24, 2008).

Letter – Kris Knudsen
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with today's technologies, we simply cannot accurately quantify flue gas mercury concentrations below $0.5 \mu\text{g}/\text{m}^3$.

If you have any questions concerning the information presented in this letter or require additional information, please do not hesitate to call me at (919) 510-0376.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Ralph L. Roberson", with a long horizontal flourish extending to the right.

Ralph L. Roberson, P.E.
President