Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: **J11110297**

Customer Name(s): Bill Kennedy, Melonie Martin, Wayne Chapman, Tom Johnson

Customer Address: 3195 Pine Hall Rd
Mailcode: Belews Steam Station
Belews Creek, NC 28012

Lab Contact: Jason C Perkins Phone: 980-875-5348

Report Authorized By: (Signature) Digitally signed by jay perkins DN: cn=jay perkins, o=Analytical Lab, ou, email=jay.perkins@duke-energy.com, c=US Date: 2011.12.05 15:17:49 -05'00' **Date:** 12/1/2011

Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2011024796	BELEWS	13-Nov-11 8:00 AM	W. B. WORKMAN	FGD Purge Eff
2011024797	BELEWS	13-Nov-11 8:10 AM	W. B. WORKMAN	BIOREACTOR 1 INF.
2011024798	BELEWS	13-Nov-11 8:15 AM	W. B. WORKMAN	BIOREACTOR 1 INF. BLANK
2011024799	BELEWS	13-Nov-11 8:25 AM	W. B. WORKMAN	BIOREACTOR 2 EFF.
2011024800	BELEWS	13-Nov-11 8:30 AM	W. B. WORKMAN	BIOREACTOR 2 EFF. BLANK
2011024801	BELEWS	13-Nov-11 8:35 AM	W. B. WORKMAN	FILTER BLANK
2011024802	BELEWS	13-Nov-11 8:45 AM	W. B. WORKMAN	Trip Blank

7 Total Samples

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).	☑ Yes	☐ No
All Results are less than the laboratory reporting limits.	☐ Yes	☑ No
All laboratory QA/QC requirements are acceptable.	☑ Yes	☐ No
The Vendor Laboratories have been qualified by the Analytical Laboratory	Yes	

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☑ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DataBase Administrator Date: 12/1/2011

Certificate of Laboratory Analysis

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Order # J11110297

Site: FGD Purge Eff
Collection Date: 13-Nov-11 8:00 AM

Sample #: **2011024796**
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Bicarbonate (HCO3)	**Complete**				V_PRISM		
Hydroxide (OH)	**Complete**				V_PRISM		
Carbonate (CO3)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**13**	mg-N/L		0.25	EPA 353.2	16-Nov-11 14:13	BGN9034
INORGANIC IONS BY IC							
Bromide	**87**	mg/L		5	EPA 300.0	22-Nov-11 18:45	JAHERMA
Chloride	**5900**	mg/L		100	EPA 300.0	22-Nov-11 18:45	JAHERMA
Sulfate	**1300**	mg/L		100	EPA 300.0	22-Nov-11 18:45	JAHERMA
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**239**	ug/L		5	EPA 245.1	18-Nov-11 09:36	AGIBBS
Mercury Dissolved (cold vapor) in Water (Filtered)							
Mercury (Hg)	**< 2.5**	ug/L		2.5	EPA 245.1	18-Nov-11 10:51	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**174**	mg/L		0.5	EPA 200.7	29-Nov-11 11:21	MHH7131
Calcium (Ca)	**3360**	mg/L		0.1	EPA 200.7	29-Nov-11 11:21	MHH7131
Lithium (Li)	**0.132**	mg/L		0.05	EPA 200.7	29-Nov-11 11:21	MHH7131
Magnesium (Mg)	**795**	mg/L		0.05	EPA 200.7	29-Nov-11 11:21	MHH7131
Potassium (K)	**50.9**	mg/L		1	EPA 200.7	29-Nov-11 11:21	MHH7131
Sodium (Na)	**41.8**	mg/L		0.5	EPA 200.7	29-Nov-11 11:21	MHH7131
DISSOLVED METALS BY ICP-MS							
Selenium (Se)	**181**	ug/L		10	EPA 200.8	22-Nov-11 11:21	KRICHAR
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**138**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Chromium (Cr)	**187**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Copper (Cu)	**91.2**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Nickel (Ni)	**157**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Selenium (Se)	**4070**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Silver (Ag)	**11.3**	ug/L		10	EPA 200.8	22-Nov-11 10:57	KRICHAR
Zinc (Zn)	**170**	ug/L		20	EPA 200.8	22-Nov-11 10:57	KRICHAR

Certificate of Laboratory Analysis

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Order # J11110297

Site: FGD Purge Eff — **Sample #: 2011024796**

Collection Date: 13-Nov-11 8:00 AM — Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		
TOTAL DISSOLVED SOLIDS							
TDS	**18000**	mg/L		200	SM2540C	21-Nov-11 10:25	AGIBBS
TOTAL SUSPENDED SOLIDS							
TSS	**2100**	mg/L		250	SM2540D	17-Nov-11 12:11	TJA7067

Site: BIOREACTOR 1 INF. — **Sample #: 2011024797**

Collection Date: 13-Nov-11 8:10 AM — Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Hydroxide (OH)	**Complete**				V_PRISM		
Bicarbonate (HCO3)	**Complete**				V_PRISM		
Carbonate (CO3)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**15**	mg-N/L		0.25	EPA 353.2	16-Nov-11 14:15	BGN9034
INORGANIC IONS BY IC							
Bromide	**86**	mg/L		5	EPA 300.0	22-Nov-11 19:01	JAHERMA
Chloride	**6000**	mg/L		100	EPA 300.0	22-Nov-11 19:01	JAHERMA
Sulfate	**1400**	mg/L		100	EPA 300.0	22-Nov-11 19:01	JAHERMA
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**< 2.5**	ug/L		2.5	EPA 245.1	18-Nov-11 09:38	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**159**	mg/L		0.5	EPA 200.7	29-Nov-11 11:25	MHH7131
Calcium (Ca)	**2700**	mg/L		0.1	EPA 200.7	29-Nov-11 11:25	MHH7131
Lithium (Li)	**< 0.05**	mg/L		0.05	EPA 200.7	29-Nov-11 11:25	MHH7131
Magnesium (Mg)	**730**	mg/L		0.05	EPA 200.7	29-Nov-11 11:25	MHH7131
Potassium (K)	**21.5**	mg/L		1	EPA 200.7	29-Nov-11 11:25	MHH7131
Sodium (Na)	**40.9**	mg/L		0.5	EPA 200.7	29-Nov-11 11:25	MHH7131

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Order # J11110297

Site: BIOREACTOR 1 INF. **Sample #: 2011024797**

Collection Date: 13-Nov-11 8:10 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Cadmium (Cd)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Chromium (Cr)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Copper (Cu)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Nickel (Ni)	**21.3**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Selenium (Se)	**137**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Silver (Ag)	**10.5**	ug/L		10	EPA 200.8	22-Nov-11 11:00	KRICHAR
Zinc (Zn)	**< 20**	ug/L		20	EPA 200.8	22-Nov-11 11:00	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Site: BIOREACTOR 1 INF. BLANK **Sample #: 2011024798**

Collection Date: 13-Nov-11 8:15 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

Site: BIOREACTOR 2 EFF. **Sample #: 2011024799**

Collection Date: 13-Nov-11 8:25 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5)							
Vendor Parameter	**Complete**				V_PRISM		
Carbonate, Bicarbonate, and Hydroxide Alkalinity							
Hydroxide (OH)	**Complete**				V_PRISM		
Bicarbonate (HCO3)	**Complete**				V_PRISM		
Carbonate (CO3)	**Complete**				V_PRISM		
NITRITE + NITRATE (COLORIMETRIC)							
Nitrite + Nitrate (Colorimetric)	**0.086**	mg-N/L		0.01	EPA 353.2	16-Nov-11 14:16	BGN9034
INORGANIC IONS BY IC							
Bromide	**85**	mg/L		5	EPA 300.0	22-Nov-11 19:17	JAHERMA
Chloride	**6000**	mg/L		100	EPA 300.0	22-Nov-11 19:17	JAHERMA
Sulfate	**1500**	mg/L		100	EPA 300.0	22-Nov-11 19:17	JAHERMA
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

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Order # J11110297

Site: BIOREACTOR 2 EFF. **Sample #: 2011024799**

Collection Date: 13-Nov-11 8:25 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY (COLD VAPOR) IN WATER							
Mercury (Hg)	**< 1**	ug/L		1	EPA 245.1	18-Nov-11 09:40	AGIBBS
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**158**	mg/L		0.5	EPA 200.7	29-Nov-11 11:29	MHH7131
Calcium (Ca)	**2740**	mg/L		0.1	EPA 200.7	29-Nov-11 11:29	MHH7131
Lithium (Li)	**< 0.05**	mg/L		0.05	EPA 200.7	29-Nov-11 11:29	MHH7131
Magnesium (Mg)	**712**	mg/L		0.05	EPA 200.7	29-Nov-11 11:29	MHH7131
Potassium (K)	**26.1**	mg/L		1	EPA 200.7	29-Nov-11 11:29	MHH7131
Sodium (Na)	**40.9**	mg/L		0.5	EPA 200.7	29-Nov-11 11:29	MHH7131
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Cadmium (Cd)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Chromium (Cr)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Copper (Cu)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Nickel (Ni)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Selenium (Se)	**< 5**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Silver (Ag)	**9.88**	ug/L		5	EPA 200.8	22-Nov-11 11:03	KRICHAR
Zinc (Zn)	**< 10**	ug/L		10	EPA 200.8	22-Nov-11 11:03	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Site: BIOREACTOR 2 EFF. BLANK **Sample #: 2011024800**

Collection Date: 13-Nov-11 8:30 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
MERCURY 1631							
Vendor Parameter	**Complete**				V_BRAND		

Site: FILTER BLANK **Sample #: 2011024801**

Collection Date: 13-Nov-11 8:35 AM Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
DISSOLVED METALS BY ICP-MS							
Selenium (Se)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:42	KRICHAR

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Order # J11110297

Site: Trip Blank | **Sample #: 2011024802**

Collection Date: 13-Nov-11 8:45 AM | Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
TOTAL RECOVERABLE METALS BY ICP							
Boron (B)	**< 0.05**	mg/L		0.05	EPA 200.7	29-Nov-11 11:13	MHH7131
Calcium (Ca)	**0.022**	mg/L		0.01	EPA 200.7	29-Nov-11 11:13	MHH7131
Lithium (Li)	**< 0.005**	mg/L		0.005	EPA 200.7	29-Nov-11 11:13	MHH7131
Magnesium (Mg)	**< 0.005**	mg/L		0.005	EPA 200.7	29-Nov-11 11:13	MHH7131
Potassium (K)	**< 0.1**	mg/L		0.1	EPA 200.7	29-Nov-11 11:13	MHH7131
Sodium (Na)	**< 0.05**	mg/L		0.05	EPA 200.7	29-Nov-11 11:13	MHH7131
TOTAL RECOVERABLE METALS BY ICP-MS							
Arsenic (As)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Cadmium (Cd)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Chromium (Cr)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Copper (Cu)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Nickel (Ni)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Selenium (Se)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Silver (Ag)	**< 1**	ug/L		1	EPA 200.8	22-Nov-11 10:36	KRICHAR
Zinc (Zn)	**< 2**	ug/L		2	EPA 200.8	22-Nov-11 10:36	KRICHAR
SELENIUM SPECIATION							
Vendor Parameter	**Complete**				V_AS&C		

Duke Energy Corporation (04)
Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11110297
Lab Submittal Date: 11/14/2011
Prism Work Order: 1110365

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

PRISM LABORATORIES, INC.

VP Laboratory Services

Reviewed By

Data Qualifiers Key Reference:

HT	Sample received and analyzed outside of the hold time.
BRL	Below Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
*	Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

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Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

Sample Receipt Summary

11/16/2011

Prism Work Order: 1110365

Client Sample ID	Lab Sample ID	Matrix	Date Sampled	Date Received
2011024796/FGD Purge Eff	1110365-01	Water	11/13/11	11/14/11
2011024797/BioReactor 1 Inf	1110365-02	Water	11/13/11	11/14/11
2011024799/BioReactor 2 Eff	1110365-03	Water	11/13/11	11/14/11

Samples received in good condition at 0.5 degrees C unless otherwise noted.

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Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11110297
Sample Matrix: Water

Client Sample ID: 2011024796/FGD Purge Eff
Prism Sample ID: 1110365-01
Prism Work Order: 1110365
Time Collected: 11/13/11 08:00
Time Submitted: 11/14/11 16:20

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**7.1 HT**	**pH Units**			**1**	***SM4500-H B**	**11/15/11 11:00**	**JAB**	**P1K0309**
Total Alkalinity	**59**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0306**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	11/15/11 11:00	JAB	P1K0307
Bicarbonate Alkalinity	**59**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0308**

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Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11110297
Sample Matrix: Water

Client Sample ID: 2011024797/BioReactor 1 Inf
Prism Sample ID: 1110365-02
Prism Work Order: 1110365
Time Collected: 11/13/11 08:10
Time Submitted: 11/14/11 16:20

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**6.9 HT**	**pH Units**			**1**	***SM4500-H B**	**11/15/11 11:00**	**JAB**	**P1K0309**
Total Alkalinity	**27**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0306**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	11/15/11 11:00	JAB	P1K0307
Bicarbonate Alkalinity	**27**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0308**

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Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11110297
Sample Matrix: Water

Client Sample ID: 2011024799/BioReactor 2 Eff
Prism Sample ID: 1110365-03
Prism Work Order: 1110365
Time Collected: 11/13/11 08:25
Time Submitted: 11/14/11 16:20

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	**7.1 HT**	**pH Units**			**1**	***SM4500-H B**	**11/15/11 11:00**	**JAB**	**P1K0309**
Total Alkalinity	**130**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0306**
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	11/15/11 11:00	JAB	P1K0307
Bicarbonate Alkalinity	**130**	**mg/L**	**5.0**	**1.4**	**1**	***SM2320 B**	**11/15/11 11:00**	**JAB**	**P1K0308**

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Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No: J11110297

Prism Work Order: 1110365
Time Submitted: 11/14/2011 4:20:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P1K0306 - NO PREP										
Blank (P1K0306-BLK1)				Prepared & Analyzed: 11/15/11						
Total Alkalinity	BRL	5.0	mg/L							
LCS (P1K0306-BS1)				Prepared & Analyzed: 11/15/11						
Total Alkalinity	253	5.0	mg/L	250.0		101	90-110			
LCS Dup (P1K0306-BSD1)				Prepared & Analyzed: 11/15/11						
Total Alkalinity	256	5.0	mg/L	250.0		102	90-110	1	200	
Batch P1K0307 - NO PREP										
Blank (P1K0307-BLK1)				Prepared & Analyzed: 11/15/11						
Carbonate Alkalinity	BRL	5.0	mg/L							
LCS (P1K0307-BS1)				Prepared & Analyzed: 11/15/11						
Carbonate Alkalinity	253	5.0	mg/L				90-110			
LCS Dup (P1K0307-BSD1)				Prepared & Analyzed: 11/15/11						
Carbonate Alkalinity	256	5.0	mg/L				90-110	1	200	
Batch P1K0308 - NO PREP										
Blank (P1K0308-BLK1)				Prepared & Analyzed: 11/15/11						
Bicarbonate Alkalinity	BRL	5.0	mg/L							
LCS (P1K0308-BS1)				Prepared & Analyzed: 11/15/11						
Bicarbonate Alkalinity	253	5.0	mg/L	250.0		101	90-110			

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Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No: J11110297

Prism Work Order: 1110365
Time Submitted: 11/14/2011 4:20:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P1K0308 - NO PREP										
LCS Dup (P1K0308-BSD1)				Prepared & Analyzed: 11/15/11						
Bicarbonate Alkalinity	256	5.0	mg/L	250.0		102	90-110	1	200	
Batch P1K0309 - NO PREP										
LCS (P1K0309-BS1)				Prepared & Analyzed: 11/15/11						
pH	6.82		pH Units	6.860		99	99-101			
Duplicate (P1K0309-DUP1)		**Source: 1110365-01**		Prepared & Analyzed: 11/15/11						
pH	7.11		pH Units		7.10			0.1	10	

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CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

10

[19]Page 1 of 2

DISTRIBUTION
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Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J1110297 | Matrix: OTHER | Samples Originating From: NC___ SC___
Logged By: CPP | Date & Time: 11-14-11 0954 | SAMPLE PROGRAM: Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___
Cooler Temp (C): <1

Customer must Complete

1)Project Name	HAPS/MACT Testing Belews Creek	2)Phone No:	
2) Client:	Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson	4)Fax No:	
5)Business Unit:	20003	6)Process: 3500	Mail Code:
8)Oper. Unit:	BC00	9)Res. Type: 69400	10)Project ID: MACTCAR

Brooks Rand
ISW01.1946
AS&C
PO#133241

PRISM
PO#144725

MR

Customer to complete all appropriate non-shaded areas.

Customer to complete appropriate columns to right

Preserv.:1=HCL =H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg - 245.1 (3)	Hg Dissolved, 245.1 (3)	Metals* (3)	Se, soluble (3)	Se, Speciation, V_ASC (4)	Hg 1631, V_BRand (None)	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism (4)	Chloride, Sulfate, Bromide - Dionex (4)	Nitrate-nitrite, C_NO3/NO2 (2,4)
2011024790		FGD Purge Eff	11/13/11	8:00	W. Workman			1	1	1	1	1	1		1	1	1
										✓		✓					
97		BioReactor 1 Inf	11/13/11	8:10					1		1		1	1	1	1	1
98		BioReactor 1 Inf Hg Blk	11/13/11	8:15										1			
99		BioReactor 2 Eff	11/13/11	8:25					1		1		1	1	1	1	1
800		BioReactor 2 Eff Hg Blk	11/13/11	8:30										1			
801		Filter Blk	11/13/11	8:35								1					
02		Metals Trip Blk	11/13/11	8:45							1		1				
															28 labels		

Customer to sign & date below - fill out from left to right.

1) Relinquished By: W. Workman Date/Time: 11/14/11 7:10	2) Accepted By: [signature] Date/Time: 11-14-11 0710
3) Relinquished By: [signature] Date/Time: 11-14-11 0945	4) Accepted By: [signature] Date/Time: 11-14-11 0945
5) Relinquished By: [signature] Date/Time: 11/14/11 1110	6) Accepted By: [signature] Date/Time: 11-14-11 1110
7) Relinquished By: [signature] 11-14-11 Date/Time: 1620	8) Accepted By: [signature] Date/Time: 11-14-11 1620
9) Seal/Locked By: Date/Time:	10) Seal/Lock Opened By: Date/Time:
11) Seal/Locked By: Date/Time:	12) Seal/Lock Opened By: Date/Time:

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround
14 Days ___
*7 Days ___
*48 Hr ___
*Other ___ *
Add. Cost Will Apply

~~1110364~~ 1110365
11/15/11

November 23, 2011

Duke Energy
ATTN: Jay Perkins
Scientific Support-Laboratory
13339 Hagers Ferry Road
Huntersville NC 28078
jcperkins@duke-energy.com
labcustomer@duke-energy.com

RE: Project DUK-HV1101 Client Project: J11110297

Dear Mr. Perkins,

On November 15, 2011, Brooks Rand Labs (BRL) received two (2) wastewater samples and two (2) corresponding field blanks. Samples were logged-in for total mercury (Hg) analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

The results were blank-corrected as described in the calculations section of the applicable SOP(s) and may be evaluated using adjusted reporting limits to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific detection limits and other details. Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Lydia Greaves

Lydia Greaves
Project Manager
lydia@brooksrand.com

Report Information

Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations /certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

BLK	method blank	**MS**	matrix spike
BRL	Brooks Rand Labs	**MSD**	matrix spike duplicate
BS	laboratory fortified blank	**ND**	non-detect
CAL	calibration standard	**NR**	non-reportable
CCV	continuing calibration verification	**PS**	post preparation spike
COC	chain of custody record	**REC**	percent recovery
CRM	certified reference material	**RPD**	relative percent difference
D	dissolved fraction	**RSD**	relative standard deviation
DUP	duplicate	**SCV**	secondary calibration verification
ICV	initial calibration verification	**SOP**	standard operating procedure
MDL	method detection limit	**SRM**	standard reference material
MRL	method reporting limit	**T**	total recoverable fraction

Definition of Data Qualifiers

(Effective 9/23/09)

B Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Result is estimated.
J Estimated value. A full explanation is presented in the narrative.
J-M Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
J-N Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
M Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
N Spike recovery was not within acceptance criteria. Result is estimated.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand, Ltd., those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses; USEPA; July 2002. These supersede all previous qualifiers ever employed by BRL.

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
BioReactor 1 Inf	1147017-01	Influent	Sample	11/13/2011	11/15/2011
BioReactor 1 Inf Hg Blk	1147017-02	DIW	Field Blank	11/13/2011	11/15/2011
BioReactor 2 Eff	1147017-03	Effluent	Sample	11/13/2011	11/15/2011
BioReactor 2 Eff Hg Blk	1147017-04	DIW	Field Blank	11/13/2011	11/15/2011

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Hg	Water	EPA 1631	11/19/2011	11/21/2011	B111907	1100820
Hg	Water	EPA 1631	11/19/2011	11/22/2011	B111908	1100822

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
BioReactor 1 Inf										
1147017-01	Hg	Influent	T	142		1.52	4.04	ng/L	B111908	1100822
BioReactor 1 Inf Hg Blk										
1147017-02	Hg	DIW	T	0.15	U	0.15	0.40	ng/L	B111907	1100820
BioReactor 2 Eff										
1147017-03	Hg	Effluent	T	84.9		1.52	4.04	ng/L	B111907	1100820
BioReactor 2 Eff Hg Blk										
1147017-04	Hg	DIW	T	0.15	U	0.15	0.40	ng/L	B111907	1100820

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Accuracy & Precision Summary

Batch: B111907
Lab Matrix: Water
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B111907-SRM1	**Certified Reference Material (1145032, NIST 1641d 1000x dilution)**								
	Hg		15.68	15.18	ng/L	97%	85-115		
B111907-MS3	**Matrix Spike (1147017-03)**								
	Hg	84.89	404.0	529.4	ng/L	110%	71-125		
B111907-MSD3	**Matrix Spike Duplicate (1147017-03)**								
	Hg	84.89	404.0	554.1	ng/L	116%	71-125	5%	24

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Accuracy & Precision Summary

Batch: B111908
Lab Matrix: Water
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits		RPD & Limits	
B111908-SRM1	**Certified Reference Material (1145032, NIST 1641d 1000x dilution)**								
	Hg		15.68	16.55	ng/L	106%	85-115		
B111908-MS2	**Matrix Spike (1147014-01)**								
	Hg	65.75	303.0	380.5	ng/L	104%	71-125		
B111908-MSD2	**Matrix Spike Duplicate (1147014-01)**								
	Hg	65.75	303.0	413.1	ng/L	115%	71-125	8%	24

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Method Blanks & Reporting Limits

Batch: B111907
Matrix: Water
Method: EPA 1631
Analyte: Hg

Sample	Result	Units
B111907-BLK1	0.03	ng/L
B111907-BLK2	0.06	ng/L
B111907-BLK3	0.05	ng/L
B111907-BLK4	0.03	ng/L

Average: 0.04 **Standard Deviation:** 0.02 **MDL:** 0.15
Limit: 0.50 **Limit:** 0.10 **MRL:** 0.40

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Method Blanks & Reporting Limits

Batch: B111908
Matrix: Water
Method: EPA 1631
Analyte: Hg

Sample	Result	Units
B111908-BLK1	0.08	ng/L
B111908-BLK2	0.10	ng/L
B111908-BLK3	0.08	ng/L
B111908-BLK4	0.04	ng/L

Average: 0.08 **Standard Deviation:** 0.03 **MDL:** 0.15
Limit: 0.50 **Limit:** 0.10 **MRL:** 0.40

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Instrument Calibration

Sequence: 1100820
Instrument: THG-10
Date: 11/21/2011
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1100820-IBL1		6.34	pg of Hg		
1100820-IBL2		5.63	pg of Hg		
1100820-IBL3		6.04	pg of Hg		
1100820-IBL4		7.90	pg of Hg		
1100820-CAL1	25.00	27.03	pg of Hg	108%	
1100820-CAL2	100.0	88.78	pg of Hg	89%	
1100820-CAL3	500.0	498.8	pg of Hg	100%	
1100820-CAL4	2500	2706	pg of Hg	108%	
1100820-CAL5	10000	9779	pg of Hg	98%	
1100820-ICV1	1568	1518	pg of Hg	97%	85-115
1100820-CCB1		16.8	pg of Hg		
1100820-CCV1	500.0	481.9	pg of Hg	96%	77-123
1100820-CCV2	500.0	513.2	pg of Hg	103%	77-123
1100820-CCV3	500.0	545.4	pg of Hg	109%	77-123
1100820-CCV4	500.0	527.3	pg of Hg	105%	77-123
1100820-CCV5	500.0	475.7	pg of Hg	95%	77-123

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Instrument Calibration

Sequence: 1100822
Instrument: THG-05
Date: 11/22/2011
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1100822-IBL1		8.42	pg of Hg		
1100822-IBL2		8.57	pg of Hg		
1100822-IBL3		6.58	pg of Hg		
1100822-IBL4		7.97	pg of Hg		
1100822-CAL1	25.00	22.70	pg of Hg	91%	
1100822-CAL2	100.0	103.2	pg of Hg	103%	
1100822-CAL3	500.0	514.4	pg of Hg	103%	
1100822-CAL4	2500	2444	pg of Hg	98%	
1100822-CAL5	10000	10690	pg of Hg	107%	
1100822-ICV1	1568	1655	pg of Hg	106%	85-115
1100822-CCB1		13.0	pg of Hg		
1100822-CCV1	500.0	478.7	pg of Hg	96%	77-123
1100822-CCV2	500.0	524.0	pg of Hg	105%	77-123
1100822-CCV3	500.0	532.8	pg of Hg	107%	77-123

Project ID: DUK-HV1101
PM: Tiffany Stilwater

Client PM: Jay Perkins
Client PO: 141391

Sample Containers

Lab ID: 1147017-01
Sample: BioReactor 1 Inf
Report Matrix: Influent
Sample Type: Sample
Collected: 11/13/2011
Received: 11/15/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	500 mL	7149015070	none	n/a		Cooler

Lab ID: 1147017-02
Sample: BioReactor 1 Inf Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/13/2011
Received: 11/15/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	7147016010	none	n/a		Cooler

Lab ID: 1147017-03
Sample: BioReactor 2 Eff
Report Matrix: Effluent
Sample Type: Sample
Collected: 11/13/2011
Received: 11/15/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	7147016010	none	n/a		Cooler

Lab ID: 1147017-04
Sample: BioReactor 2 Eff Hg Blk
Report Matrix: DIW
Sample Type: Field Blank
Collected: 11/13/2011
Received: 11/15/2011

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250 mL	7147016010	none	n/a		Cooler

Shipping Containers

Cooler

Received: November 15, 2011 8:30
Tracking No: 4726 7966 5861 via FedEx
Coolant Type: Ice
Temperature: 3.5 °C

Description: Cooler
Damaged in transit? No
Returned to client? No

Custody seals present? No
Custody seals intact? No
COC present? Yes

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

1147017 10

DISTRIBUTION
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Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J1110297 | Matrix: OTHER | Samples Originating From NC___ SC___
Logged By cpb | Date & Time 11-14-11 0954 | SAMPLE PROGRAM ___ Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___
Cooler Temp (C) <1

Customer must Complete

1)Project Name: HAPS/MACT Testing Belews Creek
2)Phone No:
2) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson
4)Fax No:
5)Business Unit: 20003
6)Process: 3500
Mail Code:
8)Oper. Unit: BC00
9)Res. Type: 69400
10)Project ID: MACTCAR

Brooks Rand
ISW01.1946
AS&C PO#133241
MR PRISM PO#144725

Customer to complete all appropriate non-shaded areas.

Preserv.:1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

LAB USE ONLY

Customer to complete appropriate columns to right

11Lab ID	Se Speciation Bottle ID	13Sample Description or ID	Date	Time	Signature	17Comp.	18Grab	TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, soluble	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2
								4	3	3	3	3	4	None	4	4	2,4
201102479		FGD Purge Eff	11/13/11	8:00	W. Workman			1	1	1	1	1	1		1	1	1
97										✓							
98		BioReactor 1 Inf	11/13/11	8:10					1		1		1	1	1	1	1
99		BioReactor 1 Inf Hg Blk	11/13/11	8:15										1			
800		BioReactor 2 Eff	11/13/11	8:25					1		1		1	1	1	1	1
		BioReactor 2 Eff Hg Blk	11/13/11	8:30										1			
801		Filter Blk	11/13/11	8:35								1					
02		Metals Trip Blk	11/13/11	8:45							1		1				
															28 labels		

Customer to sign & date below - fill out from left to right.

	Date/Time		Date/Time
1) Relinquished By: W. Workman	11/14/11 7:10	2) Accepted By: Wayne Chapman	11-14-11 0710
3) Relinquished By: Wayne Chapman	11-14-11 0945	4) Accepted By: Linda Knox	11-14-11 0945
5) Relinquished By: L. Laws	11/14/11 1110	6) Accepted By: Dave Moon	11-14-11 1110
7) Relinquished By: L. Laws	11/14/11 1300	8) Accepted By: Tyler Rab	11/15/11 0830
9) Seal/Locked By: L. Laws	11/14/11 1300	10) Seal/Lock Opened By	
11) Seal/Locked By		12) Seal/Lock Opened By	

Comments
* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

22Requested Turnaround
14 Days ___
*7 Days ___
*48 Hr ___
*Other ___ *
Add. Cost Will Apply

11-21-11

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

November 20, 2011

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: HAPS/MACT Testing Belews Creek (LIMS # J11110297)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation analysis on November 14, 2011. The samples were received in a sealed cooler at -0.1°C on November 15, 2011. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek (LIMS # J11110297)

November 20, 2011

1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis on November 14, 2011. The samples were received on November 15, 2011 in a sealed container at -0.1°C.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and designated a discrete sample identifier. An aliquot of each sample was filtered (0.45µm) and each filtrate was stored in a secure, monitored cryofreezer (maintained at a temperature of -80°C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS).

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Selenium Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of a sample may shift the equilibrium of the system, resulting in changes in speciation ratios.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of

each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Selenium Speciation Analysis by IC-ICP-DRC-MS Each sample for selenium speciation analysis was analyzed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS) on November 15, 2011. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic (pH > 7) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with this sample were within acceptance limits.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy
Project Name: HAPS/MACT Testing Belews Creek
Contact: Jay Perkins
LIMS #J11110297

Date: November 20, 2011
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	103	59.9	ND (<3.9)	ND (<4.6)	ND (<4.6)	0 (0)
BioReactor 1 Inf	49.0	57.0	ND (<1.0)	2.3	ND (<1.1)	0 (0)
BioRector 2 Eff	ND (<1.1)	ND (<1.4)	ND (<1.0)	ND (<1.1)	ND (<1.1)	0 (0)
Metals Trip Blk	ND (<0.21)	ND (<0.28)	ND (<0.20)	ND (<0.23)	ND (<0.23)	0 (0)

All results reflect the applied dilution and are reported in µg/L
ND = Not detected at the applied dilution
SeCN = Selenocyanate
MeSe(IV) = Methylseleninic acid
SeMe = Selenomethionine
Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS
n = number of unknown Se species observed

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Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 10x	eMDL 50x	eMDL 200x
Se(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.21	1.1	4.3
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.028	0.28	1.4	5.5
SeCN	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.20	1.0	3.9
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.23	1.1	4.6
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.23	1.1	4.6

eMDL = Estimated Method Detection Limit
*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
Se(IV)	LCS	9.57	9.80	102.4
Se(VI)	LCS	9.48	10.00	105.5
SeCN	LCS	8.92	9.66	108.3
MeSe(IV)	LCS	6.47	6.55	101.3
SeMe	LCS	9.32	9.76	104.7

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Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Se(IV)	BioRector 2 Eff	ND (<1.1)	ND (<1.1)	NC	NC
Se(VI)	BioRector 2 Eff	ND (<1.4)	ND (<1.4)	NC	NC
SeCN	BioRector 2 Eff	ND (<1.0)	ND (<1.0)	NC	NC
MeSe(IV)	BioRector 2 Eff	ND (<1.1)	ND (<1.1)	NC	NC
SeMe	BioRector 2 Eff	ND (<1.1)	ND (<1.1)	NC	NC

ND = Not detected at the applied dilution
NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Se(IV)	BioRector 2 Eff	278.0	259.2	93.2	278.0	251.5	90.5	3.0
Se(VI)	BioRector 2 Eff	252.3	245.1	97.1	252.3	241.5	95.7	1.5
SeCN	BioRector 2 Eff	228.8	212.2	92.8	228.8	211.3	92.4	0.4

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

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Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J111 0297 | Matrix: OTHER | Samples Originating From: NC___ SC___

Logged By: CPK | Date & Time: 11-14-11 0954 | SAMPLE PROGRAM: Ground Water ___ NPDES ___ UST ___ Drinking Water ___ RCRA ___ Waste ___

Cooler Temp (C): <1

[redacted] AS&C PO#133241

[redacted] PRISM PO#144725

Customer to complete all appropriate non-shaded areas.

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB, COPY to CLIENT

Page 1 of 5

Customer must Complete

1)Project Name: HAPS/MACT Testing Belews Creek		2)Phone No:	
3) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:	
5)Business Unit: 20003	6)Process: 3500	Mail Code:	
8)Oper. Unit: BC00	9)Res. Type: 69400	10)Project ID: MACTCAR	

Preserv.:1=HCL =H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY [11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg - 245.1 (3)	Hg Dissolved, 245.1 (3)	Metals* (3)	Se, soluble (3)	Se, Speciation, V_ASC (4)	Hg 1631, V_BRand (None)	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism (4)	Chloride, Sulfate, Bromide - Dionex (4)	Nitrate-nitrite, C_NO3/NO2 (2,4)
2011 00 [illegible]		FOD Purge Eff	11/13/11	8:00	W. W[illegible]			1	1	1	1	1			1	1	1
97		BioReactor 1 Inf	11/13/11	8:10					1		1		1	1	1	1	1
98		BioReactor 1 Inf Hg Blk	11/13/11	8:15										1			
99		BioReactor 2 Eff	11/13/11	8:25					1		1			1	1	1	1
800		BioReactor 2 Eff Hg Blk	11/13/11	8:30										1			
801		Filter Blk	11/13/11	8:35								1					
802		Metals Trip Blk	11/13/11	8:45													

28 labels

Customer to complete appropriate columns to right

Customer to sign & date below - fill out from left to right.

1) Relinquished By: W. Workman — Date/Time: 11/14/11 7:10	2) Accepted By: [illegible] — Date/Time: 11-14-11 0710
3) Relinquished By: [illegible] — Date/Time: 11-14-11 0945	4) Accepted By: Cindy Knox — Date/Time: 11-14-11 0945
5) Relinquished By: P L Davis — Date/Time: 11/14/11 1110	6) Accepted By: [illegible] — Date/Time: 11-14-11 1110
7) Relinquished By: A+B L Davis — Date/Time: 11/14/11 1300	8) Accepted By: Nancy Cullen — Date/Time: 11/15/11 9:20 Temp -0.1°C
9) Seal/Locked By: L. Davis — Date/Time: 11/14/11 1300	10) Seal/Lock Opened By: — Date/Time:
11) Seal/Locked By: — Date/Time:	12) Seal/Lock Opened By: — Date/Time:

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

14 Days ___

*7 Days ___

*48 Hr ___

*Other ___ *

Add. Cost Will Apply

11-21-11

10

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J1110297 | Matrix: OTHER | Samples Originating From NC___ SC___

Logged By cpk | Date & Time 11-14-11 0954 | Cooler Temp (C) <1

SAMPLE PROGRAM: Ground Water ___ NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___

[19]Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB, COPY to CLIENT

Brooks Rand
ISW01.1946

AS&C
PO#133241

PRISM
PO#144725

Customer must Complete

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2) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:
5)Business Unit: 20003	6)Process: 3500	Mail Code:
8)Oper. Unit: BC00	9)Res. Type: 69400	10)Project ID: MACTCAR

Customer to complete all appropriate non-shaded areas.

Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

[16]Analyses Required

LAB USE ONLY

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[11]Lab ID	Se Speciation Bottle ID	[13]Sample Description or ID	Date	Time	Signature	[17]Comp.	[18]Grab	TDS, TSS (4)	Hg - 245.1 (3)	Hg Dissolved, 245.1 (3)	Metals* (3)	Se, soluble (3)	Se, Speciation, V_ASC (4)	Hg 1631, V_BRand (None)	Carbonate alkalinity, bicarbonate alkalinity, total (4.5), pH - V_Prism (4)	Chloride, Sulfate, Bromide - Dionex (4)	Nitrate-nitrite, C_NO3/NO2 (2,4)
20110247 96		FGD Purge Eff	11/13/11	8:00	W. Workman			1	1	1	✓	1	1		1	1	1
97		BioReactor 1 Inf	11/13/11	8:10					1		1		1	1	1	1	1
98		BioReactor 1 Inf Hg Blk	11/13/11	8:15										1			
99		BioReactor 2 Eff	11/13/11	8:25					1		1		1	1	1	1	1
800		BioReactor 2 Eff Hg Blk	11/13/11	8:30										1			
801		Filter Blk	11/13/11	8:35								1					
02		Metals Trip Blk	11/13/11	8:45							1		1				

28 labels

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3) Relinquished By: [illegible]	Date/Time: 11-14-11 0945	4) Accepted By: Cindy Knox	Date/Time: 11-14-11 0945
5)Relinquished By: L. Harris	Date/Time: 11/14/11 1110	6)Accepted By: [illegible]	Date/Time: 11-14-11 1110
7)Relinquished By: AHB L. Harris	Date/Time: 11/14/11 1300	8)Accepted By:	Date/Time:
9)Seal/Locked By: AHB L. Harris	Date/Time: 11/14/11 1300	10) Seal/Lock Opened By	Date/Time:
11)Seal/Locked By	Date/Time:	12)Seal/Lock Opened By	Date/Time:

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround
14 Days ___
*7 Days ___
*48 Hr ___
*Other ___
Add. Cost Will Apply
11-21-11

Comments
* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn. TRM/ICP = B, Ca, K, Li, Mg, Na.