

**Coal Combustion Byproducts (CCBs)
Annual Generator Tonnage Report
Instructions for Calendar Year 2014**

The following is general information relating to the requirement for reporting quantities of coal combustion byproducts (CCBs) that were managed in the State of Maryland during calendar year 2014. Please answer the questions on the form provided, attaching additional information and any requested supplemental information to the back of the form. Note that the form for this year requires both volume and weight of the CCBs produced. If you know one of these parameters but not the others, for example, you have the tonnage produced but not the volume, you may calculate the other parameter; however, please provide the calculations and assumptions that you used in your estimate. Questions can be directed to the Solid Waste Program at (410) 537-3315 or via email at ed.dexter@maryland.gov.

I. Background. This requirement that generators of CCBs submit an annual report was instituted in the Code of Maryland Regulations COMAR 26.04.10.08, that was promulgated effective December 1, 2008. The regulation requires that any non-residential generator of CCBs submit a report to the Department by March 1 of each year describing the manner in which CCBs generated within the State were managed during the preceding calendar year. Additional information and specific instructions follow. For more detailed information, please refer to COMAR 26.04.10.08.

II. General Information and Applicability.

A. Definitions. CCBs are defined in COMAR 26.04.10.02B as:

*“(3) Coal Combustion Byproducts. (a) "Coal combustion byproducts" means the residue generated by or resulting from the burning of coal.
(b) "Coal combustion byproducts" includes fly ash, bottom ash, boiler slag, pozzolan, and other solid residuals removed by air pollution control devices from the flue gas and combustion chambers of coal burning furnaces and boilers, including flue gas desulfurization sludge and other solid residuals recovered from flue gas by wet or dry methods.”*

A generator of CCBs is defined in COMAR 26.04.10.02B as:

*“(9) Generator.
(a) "Generator" means a person whose operations, activities, processes, or actions create coal combustion byproducts.
(b) "Generator" does not include a person who only generates coal combustion byproducts by burning coal at a private residence.”*

Facility Name: C. P. Crane Generating Station **CCB Tonnage Report – 2013**

B. Applicability. If you or your company meets the definition of a generator of CCBs as defined above, you must provide the information as required below. For the purposes of this report, “you” shall hereinafter refer to the generator defined above. Please note that COMAR 26.04.10.08 requires generators of CCBs to submit an annual report to the Department concerning the disposition of the CCBs that they generated the previous year. **THIS INCLUDES CCBs THAT WERE NOT SEPARATELY COLLECTED BUT WERE PRODUCED BY THE BURNING OF COAL AND WERE DIRECTLY CONTRIBUTED TO A PRODUCT, such as cement.** Where the amount cannot be directly measured, estimates based on the amount of coal burned can be used. The method of determining the volume of CCBs produced must be described.

III. Required Information. The following information must be provided to the Department by March 1, 2015:

A. Contact information:

Facility Name: C. P. Crane

Name of Permit Holder: C. P. Crane LLC

Facility Address: 1001 Carroll Island Road
Street

Facility Address: Chase Maryland 21220
City State Zip

County: Baltimore County

Contact Information (Person filing report or Environmental Manager)

Facility Telephone No.: 410-682-9797 Facility Fax No.: 410-682-9805

Contact Name: Anthony Montier

Contact Title: Environmental Manager

Contact Address: 1005 Brandon Shores Road, Suite 100
Street

Contact Address: Baltimore Maryland 21226
City State Zip

Contact Email: amontier@raven-power.com

Contact Telephone No.: 410-787-5188 Contact Fax No.: 410-787-5160

*For questions on how to complete this form, please contact the Solid Waste Program at
410-537-3315*

B. A description of the process that generates the CCBs, including the type of coal or other raw material that generates the CCBs. If the space provided is insufficient, please attach additional pages:

The C. P. Crane electric generating facility has two coal fired units which produce electricity for commercial sale. Unit 1 is equipped with a Babcock & Wilcox once-through subcritical, cyclone-fired, wet bottom boiler, and Unit 2 is equipped with a Babcock & Wilcox drum-type, cyclone-fired, wet bottom boiler. Both units burn sub-bituminous coal alone, or in combination with bituminous coal. Coal is transported to the plant by rail and stored in a pile adjacent to the plant. The coal is prepared for use by two Pennsylvania hammer-mill type crushers. After crushing, a proprietary additive, Cyclean, is added to the coal to aid in slag flow and reduce mercury in the flue gas.

The CCB handling process is the same for both units. Boiler slag (a.k.a. bottom ash) created by the combustion process is recovered from the bottom of the boilers and stored in de-watering bins. Heavier fly ash particles in the flue gas stream drop into hoppers below the air heaters, are removed by vacuum truck, and transported to a temporary storage area on site. Finer particulate fly ash is captured on fabric bags in bag houses downstream of the air heaters and falls down to storage hoppers below before being pneumatically conveyed from the hoppers to storage silos. All types of CCBs are eventually loaded onto trucks and sent off site for beneficial reuse or disposal.

C. The volume and weight of CCBs generated during calendar year 2014, including an identification of the different types of CCBs generated and the volume of each type generated. If the space provided is insufficient, please attach additional pages in a similar format. If converting from volume to weight or weight to volume, please provide your calculations and assumptions.

Table I: Volume and Weight of CCBs Generated for Calendar Year 2014: Please note the change to this table from previous years, to include both the volume and weight of the types of CCBs your facility produces.

Volume and Weight of CCBs Generated for Calendar Year 2014			
Fly Ash Type of CCB	Boiler Slag Type of CCB	----	----
13,215	9,380	----	----
Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards
9,812	6,965	----	----
Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons

Additional notes:

Coal combustion byproducts (“CCB”) are reported in dry tons. Cubic yards are calculated using a conversion factor of 1 ton = 1.3468 cubic yards.

D. Descriptions of any modeling or risk assessments, or both, conducted relating to the CCBs or their use that were performed by you or your company during the reporting year. Please attach this information to the report.

No modeling or risk assessments were conducted during 2014.

E. Copies of all laboratory reports of all chemical characterizations of the CCBs. Please attach this information to the report.

F. A description of how you disposed of or used your CCBs in calendar year 2013, identifying:

(a) The types and volume of CCBs disposed of or used (if different than described in Paragraph C above) including any CCBs stored during the previous calendar year, the location of disposal, mine reclamation and use sites, and the type and volume of CCBs disposed of or used at each site:

Fly Ash – Disposal

9,812 tons (13,215 CY) of fly ash was landfilled at Fort Armistead Road – Lot 15 Landfill in Baltimore, MD.

Bottom Ash (Boiler Slag) - Beneficial Reuse

6,965 tons (9,380 CY) of boiler slag was delivered to Opta Minerals (a.k.a. Virginia Materials) in Baltimore, MD for use as abrasive material for paint removal.

and (b) The different uses by type and volume of CCBs:

See (a) above.

If the space provided is insufficient, please attach additional pages in a similar format.

G. A description of how you intend to dispose of or use CCBs in the next 5 years, identifying:

(a) The types and volume of CCBs intended to be disposed of or used, the location of intended disposal, mine reclamation and use sites, and the type and volume of CCBs intended to be disposed of or used at each site:

Fly Ash

Raven projects that as much as 13,000 tons (17,500 CY) of fly ash will be generated each year for the next five years. Unless suitable beneficial uses are identified, the fly ash will be disposed of in the company-owned Fort Armistead Road - Lot 15 LLC landfill in Baltimore, Maryland. This landfill is permitted and authorized to accept CCBs for disposal.

Boiler Slag

Raven projects that approximately 15,000 tons (20,100 CY) of boiler slag will be generated each year for the next five years, all of which will be beneficially used for blasting grit and/or roofing granules.

and (b) The different intended uses by type and volume of CCBs.

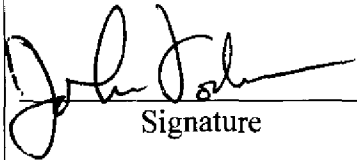
Fly Ash

While there are currently no identified beneficial uses for the projected 13,000 tons (17,500 CY) of fly ash that may be generated over the next 5 years, it is possible that all or some portion of the fly ash generated at C.P. Crane will be beneficially used. The potential exists that with proper certification as a Class C fly ash, it can be beneficially used in concrete products.

Boiler Slag

Approximately 15,000 tons (20,100 CY) each year will be beneficially used for blasting grit and/or roofing granules.

IV. Signature and Certification. An authorized official of the generator must sign the annual report, and certify as to the accuracy and completeness of the information contained in the annual report:

This is to certify that, to the best of my knowledge, the information contained in this report and any attached documents are true, accurate, and complete.		
 Signature	John Forbes Authorized Representative, C. P. Crane LLC 410-682-9701 <hr/> Name, Title, & Telephone No. (Print or Type) jforbes@raven-power.com <hr/> Your Email Address	2/19/2015 <hr/> Date

V: Attachments (please list):

1. Certificate of Analysis Report No. 231-13998-21 – Unit #2 Convection Pass Slag
2. Certificate of Analysis Report No. 231-13998-22 – Unit #2 Convection Pass Slag
3. Certificate of Analysis No. 14022812 – Fly Ash Bags TCLP
4. Certificate of Analysis Report No. 231-14020-34 – Unit #1 Convection Pass Slag
5. Certificate of Analysis No. 14073012 – Unit 2's Bag House



February 24, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample ASH
reported to us

C.P. CRANE
UNIT #2 CONVECTION PASS SLAG
2/5/14

Sample taken at C.P. Crane

Sample taken by Yourselves

Date sampled February 5, 2014

Date received February 7, 2014

Analysis Report No. 231-13998-21

<u>ANALYSIS OF ASH</u>	<u>WEIGHT %, IGNITED BASIS</u>
Silicon dioxide	35.49
Aluminum oxide	18.84
Titanium dioxide	1.58
Iron oxide	9.97
Calcium oxide	23.44
Magnesium oxide	5.56
Potassium oxide	0.65
Sodium oxide	2.01
Sulfur trioxide	0.28
Phosphorus pentoxide	0.95
Strontium oxide	0.33
Barium oxide	0.68
Manganese oxide	0.03
Undetermined	0.19
	<u>100.00</u>

Silica Value = 47.66
Base:Acid Ratio = 0.74
T250 Temperature = xxxxx °F

Type of Ash = LIGNITIC
Fouling Index = 2.01
Slagging Index = xxxxx

Respectfully submitted,
SGS NORTH AMERICA INC.

Baltimore Laboratory

SGS North America Inc. Minerals Services Division
1501-A East Patapsco Avenue, Baltimore, MD 21226 t(410) 355-1958 f(410) 355-1965 www.us.sgs.com/minerals



February 24, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample reported to us ASH

C.P. CRANE
UNIT #2 CONVECTION PASS SLAG
2/5/14

Sample taken at C.P. Crane

Sample taken by Yourselves

Date sampled February 5, 2014

Date received February 7, 2014

Analysis Report No. 231-13998-21

TRACE ELEMENTS IN COAL

Antimony	<10.0 ppm
Arsenic	15.0 ppm
Barium	6300.0 ppm
Beryllium	6.0 ppm
Cadmium	<2.0 ppm
Chromium	86.0 ppm
Cobalt	57.0 ppm
Copper	260.0 ppm
Lead	<20.0 ppm
Lithium	43.0 ppm
Manganese	240.0 ppm
Molybdenum	<10.0 ppm
Nickel	100.0 ppm
Selenium	4.0 ppm
Silver	<2.0 ppm
Strontium	3000.0 ppm
Tin	<10.0 ppm
Vanadium	220.0 ppm
Zinc	230.0 ppm
Zirconium	420.0 ppm

Respectfully submitted,
SGS NORTH AMERICA INC.


Baltimore Laboratory

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February 24, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample ASH
reported to us

C.P. CRANE
UNIT #2 CONVECTION PASS SLAG
2/6/14

Sample taken at C.P. Crane

Sample taken by Yourselves

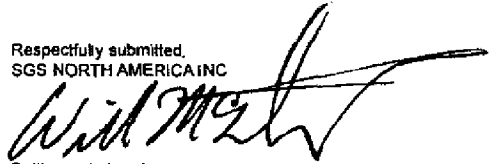
Date sampled February 6, 2014

Date received February 7, 2014

Analysis Report No. 231-13998-22

<u>ANALYSIS OF ASH</u>	<u>WEIGHT %, IGNITED BASIS</u>	
Silicon dioxide	41.98	
Aluminum oxide	20.31	
Titanium dioxide	1.39	
Iron oxide	12.54	
Calcium oxide	16.04	
Magnesium oxide	3.86	
Potassium oxide	0.93	
Sodium oxide	1.41	
Sulfur trioxide	0.08	
Phosphorus pentoxide	0.63	
Strontium oxide	0.26	
Barium oxide	0.49	
Manganese oxide	0.03	
Undetermined	<u>0.05</u>	
	100.00	
Silica Value = 56.41		Type of Ash = LIGNITIC
Base:Acid Ratio = 0.55		Fouling Index = 1.41
T250 Temperature = XXXXX °F		Slagging Index = XXXXX

Respectfully submitted,
SGS NORTH AMERICA INC


Baltimore Laboratory

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Member of the SES Group

GENERAL CONDITIONS OF SERVICE ON REVERSE



February 24, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample reported to us ASH

C.P. CRANE
UNIT #2 CONVECTION PASS SLAG
2/6/14

Sample taken at C.P. Crane

Sample taken by Yourselves

Date sampled February 6, 2014

Date received February 7, 2014

Analysis Report No. 231-13998-22

TRACE ELEMENTS IN COAL

Antimony	<11.0 ppm
Arsenic	5.0 ppm
Barium	4400.0 ppm
Beryllium	7.7 ppm
Cadmium	<2.0 ppm
Chromium	120.0 ppm
Cobalt	68.0 ppm
Copper	140.0 ppm
Lead	<20.0 ppm
Lithium	60.0 ppm
Manganese	230.0 ppm
Molybdenum	<10.0 ppm
Nickel	110.0 ppm
Selenium	3.0 ppm
Silver	<2.0 ppm
Strontium	2300.0 ppm
Tin	<10.0 ppm
Vanadium	230.0 ppm
Zinc	150.0 ppm
Zirconium	450.0 ppm

Respectfully submitted,
SGS NORTH AMERICA INC.

Baltimore Laboratory

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1501-A East Patapsco Avenue, Baltimore, MD 21276 ☎ (410) 355-1958 ☎ (410) 355-1965 www.us.sgs.com/minerals

Member of the SGS Group

Analytical Report for

Raven Power Holdings, LLC - CP Crane Plant

Certificate of Analysis No.: 14022812

Project Manager: Joshua Sawyers

Project Name : TS-FaB22614

Project Location: Carroll Island Road, MD



March 7, 2014

Phase Separation Science, Inc.

6630 Baltimore National Pike

Baltimore, MD 21228

Phone: (410) 747-8770

Fax: (410) 788-8723

OFFICES:
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ROUTE 40 WEST
BALTIMORE, MD 21228
410-747-8770
800-932-9047
FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.



March 7, 2014

Joshua Sawyers
Raven Power Holdings, LLC - CP Crane Plant
1001 Carroll Island Rd
Baltimore, MD 21220

Reference: PSS Work Order(s) No: **14022812**
Project Name: TS-FaB22614
Project Location: Carroll Island Road, MD

Dear Joshua Sawyers :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **14022812**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on April 4, 2014. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal
Laboratory Manager



Sample Summary

Client Name: Raven Power Holdings, LLC - CP Crane Plant

Project Name: TS-FaB22614

Work Order Number(s): 14022812

The following samples were received under chain of custody by Phase Separation Science (PSS) on 02/28/2014 at 02:25 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
14022812-001	Flyash Bags	SOLID	02/26/14 21:15

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].

Standard Flags/Abbreviations:

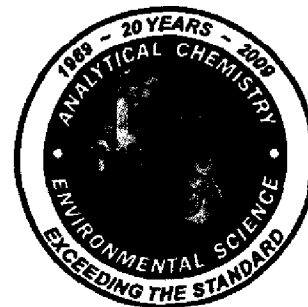
- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the LOD.
- LOD Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect.
An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
 State Certifications: MD 179, WV 303
 Regulated Soil Permit: P330-12-00268
 NSWC USCG Accepted Laboratory
 LDBA MWAA LD1997-0041-2015

OFFICES:
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ROUTE 40 WEST
BALTIMORE, MD 21228
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800-932-9047
FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 14022812

Raven Power Holdings, LLC - CP Crane Plant, Baltimore, MD

March 7, 2014

Project Name: TS-FaB22614

Project Location: Carroll Island Road, MD

Sample ID: Flyash Bags

Date/Time Sampled: 02/26/2014 21:15 PSS Sample ID: 14022812-001

Matrix: SOLID

Date/Time Received: 02/28/2014 14:25

% Solids: 100

Inorganic Anions

Analytical Method: EPA 300.0

Preparation Method: E300.0P

	<u>Result</u>	<u>Units</u>	<u>RL</u>	<u>Flag</u>	<u>Dil</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>
Sulfate	12,000	mg/kg	490		10	03/04/14	03/05/14 11:20	1044



Case Narrative Summary

Client Name: Raven Power Holdings, LLC - CP Crane Plant

Project Name: TS-FaB22614

Work Order Number(s): 14022812

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Sample Receipt:

Sample(s) received at 0 degrees but no samples were frozen.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 14022812

Report Prepared For: Raven Power Holdings, LLC - CP Crane Plant,

Project Name: TS-FaB22614

Project Manager: Joshua Sawyers

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mix	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
ASTM D2216 05	Flyash Bags	Initial	14022812-001	1050	S	112122	112122	02/26/2014	03/02/2014 11:54	03/02/2014 11:54
EPA 300.0	Flyash Bags	Reanalysis	14022812-001	1044	S	49407	112169	02/26/2014	03/04/2014 09:15	03/05/2014 11:20



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	14022812	Received By	Robyn Rhudy
Client Name	Raven Power Holdings, LLC - CP Cr	Date Received	02/28/2014 02:25:00 PM
Project Name	TS-FaB22614	Delivered By	Trans Time Express
Disposal Date	04/04/2014	Tracking No	Not Applicable
		Logged In By	Robyn Rhudy

Shipping Container(s)

No. of Coolers 1

Custody Seal(s) Intact? N/A

Seal(s) Signed / Dated? N/A

Ice Present

Temp (deg C) 0

Temp Blank Present No

Documentation

COC agrees with sample labels? Yes

Chain of Custody Yes

Sampler Name OPS

MD DW Cert. No. N/A

Sample Container

Appropriate for Specified Analysis? Yes

Intact? Yes

Labeled and Labels Legible? Yes

Custody Seal(s) Intact? Not Applicable

Seal(s) Signed / Dated Not Applicable

Total No. of Samples Received 1

Total No. of Containers Received 1

Preservation

Metals (pH<2) N/A

Cyanides (pH>12) N/A

Sulfide (pH>9) N/A

TOC, COD, Phenols (pH<2) N/A

TOX, TKN, NH3, Total Phos (pH<2) N/A

VOC, BTEX (VOA Vials Rcvd Preserved) (pH<2) N/A

Do VOA vials have zero headspace? N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Sample(s) received at 0 degrees but no samples were frozen.

Samples Inspected/Checklist Completed By:

Robyn Rhudy

Date: 02/28/2014

Robyn Rhudy

PM Review and Approval:

Lynn Jackson

Date: 02/28/2014

Lynn Jackson



March 31, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample Coal
reported to us

C.P. CRANE
Unit #1 Convection Pass Slag
3/20/14

Sample taken at C.P. Crane

Sample taken by Yourselves

Date sampled March 20, 2014

Date received March 21, 2014

Analysis Report No. 231-14020-34

<u>ANALYSIS OF ASH</u>	<u>WEIGHT %, IGNITED BASIS</u>
Silicon dioxide	38.79
Aluminum oxide	18.91
Titanium dioxide	1.38
Iron oxide	10.89
Calcium oxide	19.50
Magnesium oxide	4.80
Potassium oxide	0.78
Sodium oxide	1.79
Sulfur trioxide	1.29
Phosphorus pentoxide	0.87
Strontium oxide	0.33
Barium oxide	0.60
Manganese oxide	0.07
Undetermined	0.00
	<u>100.00</u>

Silica Value = 52.43
Base:Acid Ratio = 0.64
T₂₅₀ Temperature = 2229 °F

Type of Ash = LIGNITIC
Fouling Index = 1.79
Slagging Index = XXXXX

Respectfully submitted
SGS NORTH AMERICA INC

Baltimore Laboratory

SGS North America Inc. Minerals Services Division
1501-A East Patapsco Avenue, Baltimore, MD 21226 t(410) 355-1958 f(410) 355 1965 www.us.sgs.com/minerals



March 31, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample reported to us Coal
Sample taken at C.P. Crane
Sample taken by Yourselves
Date sampled March 20, 2014
Date received March 21, 2014

C.P. CRANE
Unit #1 Convection Pass Slag
3/20/14

Analysis Report No. 231-14020-34

TRACE ELEMENTS IN COAL

Antimony	<2.0 ppm
Arsenic	<2.0 ppm
Barium	2160.0 ppm
Beryllium	3.0 ppm
Cadmium	<2.0 ppm
Chromium	563.0 ppm
Cobalt	58.0 ppm
Copper	172.0 ppm
Lead	<2.0 ppm
Lithium	61.0 ppm
Manganese	331.0 ppm
Molybdenum	135.0 ppm
Nickel	622.0 ppm
Selenium	<2.0 ppm
Silver	<2.0 ppm
Strontium	<2.0 ppm
Tin	<2.0 ppm
Vanadium	233.0 ppm
Zinc	151.0 ppm
Zirconium	207.0 ppm

Respectfully submitted,
SGS NORTH AMERICA INC

Baltimore Laboratory

SGS North America Inc. Minerals Services Division
1501-A East Patapsco Avenue, Baltimore, MD 21226 t (410) 355-1958 f (410) 355-1965 www.us.sgs.com/minerals



March 31, 2014

RAVEN POWER HOLDINGS LLC
C.P. CRANE GENERATING STATION
1001 CARROLL ISLAND ROAD
BALTIMORE MARYLAND 21220

Sample identification by
SGS

Kind of sample reported to us Coal

C.P. CRANE
Unit #1 Convection Pass Slag
3/20/14

Sample taken at C.P. Crane

Sample taken by Yourselves

Date sampled March 20, 2014

Date received March 21, 2014


Analysis report no. 231-14020-34

MERCURY, Hg 0.03 ug/g
THALLIUM, Tl <2 ug/g

Procedure: ASTM D-6722 - Hg, ASTM D-3683 (Mod) - Tl

Results: Results are reported in parts per million (ppm), on a dry basis.

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Analytical Report for
Raven Power Holdings, LLC - CP Crane Plant
Certificate of Analysis No.: 14073012

Project Manager: Brian Hoover

Project Name : TCLP

Project Location: CP Crane



August 6, 2014

Phase Separation Science, Inc.

6630 Baltimore National Pike

Baltimore, MD 21228

Phone: (410) 747-8770

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**PHASE
SEPARATION
SCIENCE,
INC.**



August 6, 2014

Brian Hoover
Raven Power Holdings, LLC - CP Crane Plant
1001 Carroll Island Rd
Baltimore, MD 21220

Reference: PSS Work Order(s) No: **14073012**
Project Name: TCLP
Project Location: CP Crane

Dear Brian Hoover :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **14073012**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on September 3, 2014. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Cathy Thompson
QA Officer



Sample Summary

Client Name: Raven Power Holdings, LLC - CP Crane Plant

Project Name: TCLP

Work Order Number(s): 14073012

The following samples were received under chain of custody by Phase Separation Science (PSS) on 07/30/2014 at 11:30 am

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
14073012-001	UNIT 2" BH	SOIL	07/23/14 23:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].

Standard Flags/Abbreviations:

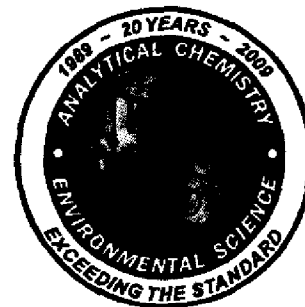
- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the LOD.
- LOD Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAALD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 14073012

Raven Power Holdings, LLC - CP Crane Plant, Baltimore, MD

August 6, 2014

Project Name: TCLP
 Project Location: CP Crane

Sample ID: UNIT 2" BH

Date/Time Sampled: 07/23/2014 23:00 PSS Sample ID: 14073012-001

Matrix: SOIL

Date/Time Received: 07/30/2014 11:30

TCLP Metals

Analytical Method: SW-846 6020 A

Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	0.18	mg/L	0.050		1	5	07/31/14	08/01/14 13:04	1033
Barium	1.4	mg/L	1.0		1	100	07/31/14	07/31/14 16:35	1033
Cadmium	ND	mg/L	0.050		1	1	07/31/14	07/31/14 16:35	1033
Chromium	0.18	mg/L	0.050		1	5	07/31/14	07/31/14 16:35	1033
Lead	ND	mg/L	0.050		1	5	07/31/14	07/31/14 16:35	1033
Mercury	ND	mg/L	0.0020		1	0.2	07/31/14	07/31/14 16:35	1033
Selenium	0.29	mg/L	0.050		1	1	07/31/14	07/31/14 16:35	1033
Silver	ND	mg/L	0.050		1	5	07/31/14	07/31/14 16:35	1033



Case Narrative Summary

Client Name: Raven Power Holdings, LLC - CP Crane Plant

Project Name: TCLP

Work Order Number(s): 14073012

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Sample Receipt:

All sample receipt conditions were acceptable.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 14073012

Report Prepared For: Raven Power Holdings, LLC - CP Crane Plant.

Project Name: TCLP

Project Manager: Brian Hoover

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 6020 A	UNIT 2" BH	Initial	14073012-001	1033	W	51460	115667	07/23/2014	07/31/2014 09:17	07/31/2014 16:35
	51460-1-BKS	BKS	51460-1-BKS	1033	W	51460	115667	-----	07/31/2014 09:17	07/31/2014 14:08
	51460-1-BLK	BLK	51460-1-BLK	1033	W	51460	115667	-----	07/31/2014 09:17	07/31/2014 14:02
	920 Bladensburg UST Disposal S	MS	14072518-001 S	1033	W	51460	115667	07/23/2014	07/31/2014 09:17	07/31/2014 14:20
	920 Bladensburg UST Disposal SD	MSD	14072518-001 SD	1033	W	51460	115667	07/23/2014	07/31/2014 09:17	07/31/2014 14:26
	UNIT 2" BH	Reanalysis	14073012-001	1033	W	51460	115697	07/23/2014	07/31/2014 09:17	08/01/2014 13:04

PHASE SEPARATION SCIENCE, INC.

QC Summary 14073012

Raven Power Holdings, LLC - CP Crane Plant
TCLP

Analytical Method: SW-846 6020 A

Seq Number: 115667

MB Sample Id: 51460-1-BLK

Matrix: Water

LCS Sample Id: 51460-1-BKS

Prep Method: SW3010A

Date Prep: 07/31/14

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4112	103	80-120	mg/L	07/31/14 14:08	
Barium	<1.000	2.000	2.302	115	80-120	mg/L	07/31/14 14:08	
Cadmium	<0.05000	0.4000	0.3952	99	80-120	mg/L	07/31/14 14:08	
Chromium	<0.05000	0.4000	0.4076	102	80-120	mg/L	07/31/14 14:08	
Lead	<0.05000	0.4000	0.4284	107	80-120	mg/L	07/31/14 14:08	
Mercury	<0.002000	0.01000	0.01150	115	80-120	mg/L	07/31/14 14:08	
Selenium	<0.05000	0.4000	0.3834	96	80-120	mg/L	07/31/14 14:08	
Silver	<0.05000	0.4000	0.3993	100	80-120	mg/L	07/31/14 14:08	

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H = Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	14073012	Received By	Jacob Prucnal
Client Name	Raven Power Holdings, LLC - CP Cr:	Date Received	07/30/2014 11:30:00 AM
Project Name	TCLP	Delivered By	Trans Time Express
Disposal Date	09/03/2014	Tracking No	Not Applicable
		Logged In By	Jacob Prucnal

Shipping Container(s)

No. of Coolers 1

Custody Seal(s) Intact?

N/A

Ice

Present

Seal(s) Signed / Dated?

N/A

Temp (deg C)

3

Temp Blank Present No

Documentation

COC agrees with sample labels?

Yes

Sampler Name

Not Provided

Chain of Custody

Yes

N/A

Sample Container

Appropriate for Specified Analysis?

Yes

Custody Seal(s) Intact?

Not Applicable

Intact?

Yes

Seal(s) Signed / Dated

Not Applicable

Labeled and Labels Legible?

Yes

Total No. of Samples Received 1

Total No. of Containers Received 1

Preservation

Metals

(pH<2)

N/A

Cyanides

(pH>12)

N/A

Sulfide

(pH>9)

N/A

TOC, COD, Phenols

(pH<2)

N/A

TOX, TKN, NH3, Total Phos

(pH<2)

N/A

VOC, BTEX (VOA Vials Rcvd Preserved)

(pH<2)

N/A

Do VOA vials have zero headspace?

N/A

624 VOC (Rcvd at least one unpreserved VOA vial)

N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By:

Jacob Prucnal

Date: 07/30/2014

Jacob Prucnal

PM Review and Approval:

Lynn Jackson

Date: 07/31/2014

Lynn Jackson