

**Coal Combustion Byproducts (CCBs)
Annual Generator Tonnage Report
Instructions for Calendar Year 2015**

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 2015. 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: Brandon Shores Generating Station

CCB Tonnage Report – 2015

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, 2016:

A. Contact information:

Facility Name: Brandon Shores Generating Station

Name of Permit Holder: Brandon Shores LLC

Facility Address: 2030 Brandon Shores Road

Street

Facility Address: Baltimore

City

Maryland

State

21226

Zip

County: Anne Arundel

Contact Information (Person filing report or Environmental Manager)

Facility Telephone No.: 410-787-5531

Facility Fax No.: _____

Contact Name: Anthony Montier

Contact Title: Environmental Manager

Contact Address: 1005 Brandon Shores Road, Suite 100

Street

Contact Address: Baltimore

City

Maryland

State

21226

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 Brandon Shores electrical generating station consists of two coal fired units which produce electricity for commercial sale. Both units are equipped with Babcock & Wilcox natural circulation radiant boilers. For both units, bituminous coal is delivered by barge and stored in a pile adjacent to the plant. A proprietary additive, Chem-Mod®, is added to the coal for NO_x and mercury reduction as it is conveyed by belt from the coal pile to storage bunkers in the plant. The coal is then pulverized and fed by air to the boilers where it is burned using low NO_x burners.

On both units, the heavier ash (a.k.a. bottom ash) drops to the bottom of the boilers where it is conveyed by high-pressure water to settling bins before being eventually loaded onto trucks for beneficial reuse or disposal. Lighter ash (a.k.a. fly ash) is conveyed by furnace air flow to electrostatic precipitators where the ash is collected on charged plates and falls to storage hoppers below. The fly ash from the hoppers is then conveyed pneumatically to storage silos before being loaded onto trucks and sent off site for beneficial reuse or disposal. However, before the fly ash is sent off site, a portion of the fly ash that is high in carbon is separated out and sent back to the plant to be re-burned. In 2015, 14,185 tons (19,104 CY) of this high-carbon material was transferred back to Brandon Shores for re-burning. Later in the flue gas stream, pulse jet fabric filters downstream of the precipitators remove any remaining fly ash which has been mixed with powdered activated carbon and hydrated lime injected into the flue gas stream for emissions control. This fly ash is conveyed to storage silos for eventual reuse or disposal.

Brandon Shores' wet flue gas desulfurization ("FGD") scrubbers produce CCBs which include fly ash, gypsum, and FGD sludge. These CCBs are stored under cover on site before being loaded onto trucks for eventual beneficial reuse or disposal.

Waste water fines are the product of CCB clean up or area wash downs and are sent to the settling basin at the internal waste water treatment plant for storage. This basin is periodically de-watered and the CCBs are allowed to dry before being dug out, loaded on trucks, and sent for disposal.

C. The volume and weight of CCBs generated during calendar year 2015, 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 2015: 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 2015				
<u>Fly Ash</u>	<u>Bottom Ash</u>	<u>Gypsum</u>	<u>FGD Sludge</u>	<u>Waste Water Fines</u>
Type of CCB	Type of CCB	Type of CCB	Type of CCB	Type of CCB
204,342	24,265	368,777	3,522	8,378
Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards
151,724	18,017	273,818	2,615	6,221
Weight of CCB, in Tons	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.

FGD sludge is generated from the operation of the FGD water treatment system.

Waste water fines are from the waste water settling basin and consist largely of fly ash and bottom ash.

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 performed in 2015.

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

Laboratory reports are attached.

F. A description of how you disposed of or used your CCBs in calendar year 2015, 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 - Beneficial Reuse

124,755 tons (168,020 CY) delivered to Separation Technologies, Inc. in Baltimore, MD for use in concrete.

4,454 tons (5,998 CY) delivered to Lehigh in Union Bridge, MD for use in cement manufacturing.

86 tons (116 CY) delivered to Ashworks in Wilmington, DE for use as flow-able fill.

23 tons (31 CY) delivered to MERG in Hagerstown, MD for use in cement manufacturing.

Fly Ash - Disposal

22,406 tons (30,177 CY) of fly ash was delivered to Fort Armistead Road – Lot 15 LLC landfill in Baltimore, MD for landfilling.

214 tons (288 CY) of fly ash that was stored on site at the end of 2014 was delivered to the Fort Armistead Road – Lot 15 Landfill in Baltimore, MD for landfilling. *(Note that these tons were accounted for in CY2014's Paragraph C and are not included in the Fly Ash total in Paragraph C above).*

Bottom Ash - Beneficial Reuse

202 tons (272 CY) delivered to Lehigh in Union Bridge, MD for use in cement manufacturing.

Bottom Ash - Disposal

17,815 tons (23,993 CY) of bottom ash was delivered to Fort Armistead Road – Lot 15 LLC landfill in Baltimore, MD for landfilling.

Gypsum - Beneficial Reuse

114,588 tons (154,327 CY) delivered to US Gypsum in Baltimore, MD for use in wallboard manufacturing.

63,564 tons (85,608 CY) delivered to National Gypsum in Baltimore, MD for use in wallboard manufacturing.

35,778 tons (48,185 CY) delivered to SCB International in Keystone, PA for use in cement manufacturing.

16,639 tons (22,409 CY) delivered to Lehigh in Union Bridge, MD for use in cement manufacturing.

11,229 tons (15,123 CY) delivered to Synmat in Baltimore, MD for use in cement manufacturing.

4,668 tons (6,287 CY) delivered to MERG in Martinsburg, VA for use in cement manufacturing.

634 tons (854 CY) delivered to the USDA in Crisfield, MD for use in agricultural runoff control experiments.

188 tons (253 CY) delivered to MERG in Nazareth, PA for use in cement manufacturing.

118 tons (159 CY) delivered to Sports Aggregate in Centreville, VA for use in fertilizer mix.

Gypsum - Disposal

24,994 tons (33,662 CY) of gypsum was delivered to Fort Armistead Road – Lot 15 LLC landfill in Baltimore, MD for landfilling.

1,397 tons (1,881 CY) of gypsum that was stored on site at the end of 2014 was delivered to the Fort Armistead Road – Lot 15 Landfill in Baltimore, MD for landfilling. *(Note that these tons were accounted for in CY2014's Paragraph C and are not included in the Gypsum total in Paragraph C above).*

Gypsum – Storage

1,418 tons (1,910 CY) of gypsum was stored on site at the end of 2015.

FGD Sludge - Disposal

2,615 tons (3,522 CY) of FGD sludge was delivered to Fort Armistead Road – Lot 15 LLC landfill in Baltimore, MD for landfilling.

Waste Water Fines - Disposal

6,221 tons (8,378 CY) of waste water fines delivered to Fort Armistead Road – Lot 15 LLC landfill in Baltimore, MD for landfilling.

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

Fly Ash

129,232 tons (174,049 CY) of fly ash was used in concrete and cement manufacturing.

86 tons (116 CY) of fly ash was used as flow-able fill.

Bottom Ash

202 tons (272 CY) of bottom ash was used in cement manufacturing.

Gypsum

178,152 tons (239,935 CY) of gypsum was used in wallboard manufacturing.

634 tons (854 CY) was used for use for agriculture and agricultural runoff control experiments.

68,502 tons (92,257 CY) was used in concrete and cement manufacturing.

118 tons (159 CY) was used in the making of fertilizer.

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 200,000 tons (269,360 CY) of fly ash will be generated each year for the next five years. Approximately 180,000 tons (242,424 CY) of fly ash will be beneficially used in cement and/or concrete products, and the remaining 20,000 tons (26,936 CY) will be disposed of in the Fort Armistead Road - Lot 15 LLC Landfill in Baltimore, MD.

Bottom Ash

Raven projects that approximately 20,000 tons (26,936 CY) of bottom ash will be generated each year for the next five years, of which 15,000 tons (19,700) CY of will be beneficially used in cement and/or concrete products and 5,000 tons (6,734 CY) will be disposed of in the Fort Armistead Road - Lot 15 LLC landfill in Baltimore, MD.

Gypsum

Raven projects that as much as 300,000 tons (404,040 CY) of gypsum will be generated each year for the next five years, all of which will be beneficially used in drywall, cement, or concrete products, and for agricultural uses.

FGD Sludge

Raven projects that as much as 4,000 tons (5,400 CY) of FGD Sludge will be generated each year for the next five years, all of which will be disposed of in the Fort Armistead Road - Lot 15 LLC landfill in Baltimore, MD.

Waste Water Fines

Raven projects that as much as 750 tons (1,000 CY) of waste water fines will be generated each year for the next five years, all of which will be disposed of in the Fort Armistead Road - Lot 15 LLC landfill in Baltimore, MD.

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

Fly Ash

Approximately 180,000 tons (242,424 CY) of fly ash each year will be beneficially used in the manufacturing of cement or concrete.

Bottom Ash

Approximately 15,000 tons (19,700) of bottom ash each year will be beneficially used in the manufacturing of cement or concrete.


Gypsum

Approximately 300,000 tons (404,040 CY) of gypsum each year will be beneficially used in drywall, cement and concrete products, or agricultural uses.

Facility Name: Brandon Shores Generating Station

CCB Tonnage Report – 2015

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.		
	William Butler Authorized Representative, 410-787-5489	
Signature	Name, Title, & Telephone No. (Print or Type)	Date
	wbutler@raven-power.com	2/22/16
	Your Email Address	

V: Attachments (please list):

1. Certificates of Analysis Nos. 15092904 and 15092811 – Brandon Shores Bottom Ash
2. Certificate of Analysis No. 15040802 – Brandon Flyash Broken Bag Dumpster
3. Certificate of Analysis No. 14091912 – FGD Gypsum – Agriculture
4. Laboratory Report No. PA140420150017 – Total and Respirable Crystalline Silica
5. Laboratory Report No. CUH1038844 – Total and Respirable Crystalline Silica
6. Laboratory Analysis Report No. 2015-832 – Raven FGD Gypsum October 2015

Analytical Report for

Raven Power Holdings, LLC - BS Plant

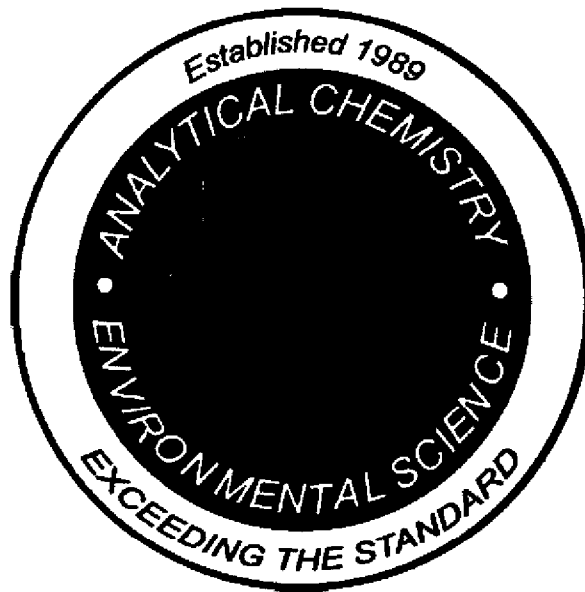
Certificate of Analysis No(s):

15092904, 15092811

Project Manager: David May

Project Name : Brandon Bottom Ash

Project Location: Brandon



October 6, 2015

Phase Separation Science, Inc.

6630 Baltimore National Pike

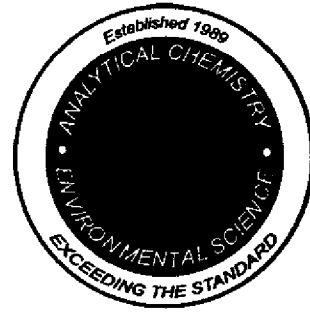
Baltimore, MD 21228

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PHASE SEPARATION SCIENCE, INC.



October 6, 2015

David May
Raven Power Holdings, LLC - BS Plant
2030 Brandon Shores Road
Baltimore, MD 21226

Reference: PSS Work Order(s) No: **15092904, 15092811**
Project Name: Brandon Bottom Ash
Project Location: Brandon

Dear David May :

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 **15092904, 15092811**.

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 November 2, 2015. 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,

A handwritten signature in black ink that reads 'Dan Prucnal'. The signature is written in a cursive style.

Dan Prucnal
Laboratory Manager



Sample Summary

Client Name: Raven Power Holdings, LLC - BS Plant

Project Name: Brandon Bottom Ash

Work Order Number(s): 15092904, 15092811

The following samples were received under chain of custody by Phase Separation Science (PSS):

Lab Sample Id	Sample Id	Matrix	Date/Time Collected	Date/Time Received
15092811-001	Brandon Bottom Ash	SOLID WASTE	09/28/15 06:00	09/28/15 14:35
15092904-001	Brandon Bottom Ash	SOLID	09/28/15 06:00	09/28/15 14:35

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(c)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

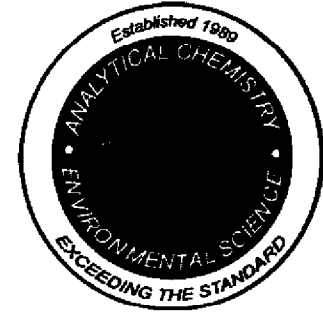
- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- 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 MDL.
- MDL This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RI 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 MWAA LD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15092904, 15092811
 Raven Power Holdings, LLC - BS Plant, Baltimore, MD
 October 6, 2015

Project Name: Brandon Bottom Ash
 Project Location: Brandon

Sample ID: Brandon Bottom Ash Date/Time Sampled: 09/28/2015 06:00 PSS Sample ID: 15092811-001
 Matrix: SOLID WASTE Date/Time Received: 09/28/2015 14:35 % Solids: 74
 Inorganic Anions: Sulfate Analytical Method: EPA 300.0 Preparation Method: E300.0P

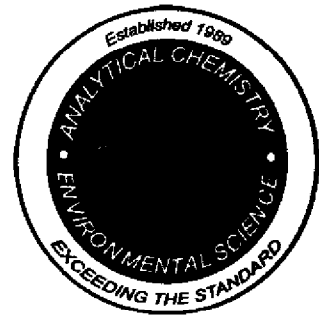
	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Sulfate	210	mg/kg	67		1	09/29/15	09/29/15 13:00	1047

Total Metals (26) Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Aluminum	16,000	mg/kg	5,500		100	09/28/15	09/29/15 23:34	1033
Antimony	ND	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Arsenic	12	mg/kg	0.55		1	09/28/15	09/29/15 15:44	1033
Barium	81	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Beryllium	ND	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Boron	49	mg/kg	28		1	09/28/15	09/29/15 15:44	1033
Cadmium	ND	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Calcium	15,000	mg/kg	5,500		100	09/28/15	09/29/15 23:34	1033
Chromium	23	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Cobalt	7.1	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Copper	13	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Iron	36,000	mg/kg	5,500		100	09/28/15	09/29/15 23:34	1033
Lead	6.6	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Lithium	13	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Magnesium	1,600	mg/kg	55		1	09/28/15	09/29/15 15:44	1033
Manganese	71	mg/kg	28		10	09/28/15	09/29/15 23:40	1033
Mercury	0.17	mg/kg	0.11		1	09/28/15	09/29/15 15:44	1033
Molybdenum	ND	mg/kg	5.5		1	09/28/15	09/29/15 15:44	1033
Nickel	21	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Potassium	840	mg/kg	55		1	09/28/15	09/29/15 15:44	1033
Selenium	ND	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Silver	ND	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Sodium	660	mg/kg	55		1	09/28/15	09/29/15 15:44	1033
Thallium	ND	mg/kg	2.2		1	09/28/15	09/29/15 15:44	1033
Vanadium	35	mg/kg	2.8		1	09/28/15	09/29/15 15:44	1033
Zinc	100	mg/kg	11		1	09/28/15	09/29/15 15:44	1033

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15092904, 15092811
 Raven Power Holdings, LLC - BS Plant, Baltimore, MD
 October 6, 2015

Project Name: Brandon Bottom Ash
 Project Location: Brandon

Sample ID: Brandon Bottom Ash Date/Time Sampled: 09/28/2015 06:00 PSS Sample ID: 15092811-001
 Matrix: SOLID WASTE Date/Time Received: 09/28/2015 14:35
 pH in Non-Aqueous Matrixes Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	8.4	SU			1	09/29/15	09/29/15 15:03	1047

Sample ID: Brandon Bottom Ash Date/Time Sampled: 09/28/2015 06:00 PSS Sample ID: 15092904-001
 Matrix: SOLID Date/Time Received: 09/28/2015 14:35
 TCLP Metals Analytical Method: SW-846 6020 A Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	0.050		1	5	10/05/15	10/05/15 22:31	1033
Barium	ND	mg/L	1.0		1	100	10/05/15	10/05/15 22:31	1033
Cadmium	ND	mg/L	0.050		1	1	10/05/15	10/05/15 22:31	1033
Chromium	ND	mg/L	0.050		1	5	10/05/15	10/05/15 22:31	1033
Lead	ND	mg/L	0.050		1	5	10/05/15	10/05/15 22:31	1033
Mercury	ND	mg/L	0.0020		1	0.2	10/05/15	10/05/15 22:31	1033
Selenium	ND	mg/L	0.050		1	1	10/05/15	10/05/15 22:31	1033
Silver	ND	mg/L	0.050		1	5	10/05/15	10/05/15 22:31	1033



Case Narrative Summary

Client Name: Raven Power Holdings, LLC - BS Plant

Project Name: Brandon Bottom Ash

Work Order Number(s): 15092904, 15092811

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.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

15092811: All sample receipt conditions were acceptable.

General Comments:

15092811: Per client; also analyze for pH and sulfate.

Sample Receipt:

15092904: Refer to previous LID15092811.

General Comments:

Analytical:

Total Metals (26)

Batch: 126420

Closing CCV had a boron recovery of 88%. Limits are 90-110%.

Closing LLCCV had a mercury recovery of 135%. Limits are 70-130%.

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

PHASE SEPARATION SCIENCE, INC.

QC Summary

Work Orders: 15092904, 15092811
 Raven Power Holdings, LLC - BS Plant
 Brandon Bottom Ash

Analytical Method: EPA 300.0

Seq Number: 126419
 MB Sample Id: 57498-1-BLK

Matrix: Solid
 LCS Sample Id: 57498-1-BKS

Prep Method: E300.0P
 Date Prep: 09/29/15
 LCSD Sample Id: 57498-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Sulfate	<49.75	497.5	542.8	109	527.4	107	90-110	3	20	mg/kg	09/29/15 12:15	

Analytical Method: EPA 300.0

Seq Number: 126419
 Parent Sample Id: 15092811-001

Matrix: Solid Waste
 MS Sample Id: 15092811-001 S

Prep Method: E300.0P
 Date Prep: 09/29/15

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Sulfate	209.7	662.4	904.7	105	53-135	mg/kg	09/29/15 13:22	

Analytical Method: SW-846 6020 A

Seq Number: 126420
 MB Sample Id: 57474-1-BLK

Matrix: Solid
 LCS Sample Id: 57474-1-BKS

Prep Method: SW3050B
 Date Prep: 09/28/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Aluminum	<41.67	83.33	90.63	109	80-120	mg/kg	09/29/15 15:07	
Antimony	<2.083	16.67	19.68	118	80-120	mg/kg	09/29/15 15:07	
Arsenic	<0.4167	16.67	17.85	107	80-120	mg/kg	09/29/15 15:07	
Barium	<2.083	16.67	18.25	109	80-120	mg/kg	09/29/15 15:07	
Beryllium	<2.083	16.67	17.78	107	80-120	mg/kg	09/29/15 15:07	
Boron	<20.83	16.67	<20.83	0	80-120	mg/kg	09/29/15 15:07	L
Cadmium	<2.083	16.67	18.23	109	80-120	mg/kg	09/29/15 15:07	
Calcium	<41.67	166.7	176.4	106	80-120	mg/kg	09/29/15 15:07	
Chromium	<2.083	16.67	17.30	104	80-120	mg/kg	09/29/15 15:07	
Cobalt	<2.083	16.67	17.76	107	80-120	mg/kg	09/29/15 15:07	
Copper	<2.083	16.67	17.75	106	80-120	mg/kg	09/29/15 15:07	
Iron	<41.67	166.7	179.6	108	80-120	mg/kg	09/29/15 15:07	
Lead	<2.083	16.67	18.02	108	80-120	mg/kg	09/29/15 15:07	
Lithium	<2.083	16.67	18.84	113	80-120	mg/kg	09/29/15 15:07	
Magnesium	<41.67	166.7	175.8	105	80-120	mg/kg	09/29/15 15:07	
Manganese	<2.083	16.67	17.50	105	80-120	mg/kg	09/29/15 15:07	
Mercury	<0.08333	0.4167	0.4333	104	80-120	mg/kg	09/29/15 15:07	
Molybdenum	<4.167	16.67	18.16	109	80-120	mg/kg	09/29/15 15:07	
Nickel	<2.083	16.67	17.58	105	80-120	mg/kg	09/29/15 15:07	
Potassium	<41.67	166.7	188.9	113	80-120	mg/kg	09/29/15 15:07	
Selenium	<2.083	16.67	16.63	100	80-120	mg/kg	09/29/15 15:07	
Silver	<2.083	16.67	18.40	110	80-120	mg/kg	09/29/15 15:07	
Sodium	<41.67	166.7	177	106	80-120	mg/kg	09/29/15 15:07	
Thallium	<1.667	16.67	16.82	101	80-120	mg/kg	09/29/15 15:07	
Vanadium	<2.083	16.67	17.31	104	80-120	mg/kg	09/29/15 15:07	
Zinc	<8.333	16.67	17.06	102	80-120	mg/kg	09/29/15 15:07	

PHASE SEPARATION SCIENCE, INC.

QC Summary

Work Orders: 15092904, 15092811
 Raven Power Holdings, LLC - BS Plant
 Brandon Bottom Ash

Analytical Method: SW-846 6020 A

Seq Number: 126612

MB Sample Id: 57575-1-BLK

Matrix: Water

LCS Sample Id: 57575-1-BKS

Prep Method: SW3010A

Date Prep: 10/05/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.3926	98	80-120	mg/L	10/05/15 22:25	
Barium	<1.000	2.000	2.095	105	80-120	mg/L	10/05/15 22:25	
Cadmium	<0.05000	0.4000	0.3787	95	80-120	mg/L	10/05/15 22:25	
Chromium	<0.05000	0.4000	0.3948	99	80-120	mg/L	10/05/15 22:25	
Lead	<0.05000	0.4000	0.4164	104	80-120	mg/L	10/05/15 22:25	
Mercury	<0.002000	0.01000	0.01020	102	80-120	mg/L	10/05/15 22:25	
Selenium	<0.05000	0.4000	0.3766	94	80-120	mg/L	10/05/15 22:25	
Silver	<0.05000	0.4000	0.3772	94	80-120	mg/L	10/05/15 22:25	

Analytical Method: SW-846 6020 A

Seq Number: 126612

Parent Sample Id: 15092904-001

Matrix: Solid

MS Sample Id: 15092904-001 S

Prep Method: SW3010A

Date Prep: 10/05/15

MSD Sample Id: 15092904-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4119	103	0.4048	101	75-125	2	25	mg/L	10/05/15 22:37	
Barium	<1.000	2.000	2.445	122	2.368	118	75-125	3	25	mg/L	10/05/15 22:37	
Cadmium	<0.05000	0.4000	0.3834	96	0.3776	94	75-125	2	25	mg/L	10/05/15 22:37	
Chromium	<0.05000	0.4000	0.4128	103	0.4026	101	75-125	3	25	mg/L	10/05/15 22:37	
Lead	<0.05000	0.4000	0.4251	106	0.4205	105	75-125	1	25	mg/L	10/05/15 22:37	
Mercury	<0.002000	0.01000	0.01040	104	0.01020	102	75-125	2	25	mg/L	10/05/15 22:37	
Selenium	<0.05000	0.4000	0.3822	96	0.3782	95	75-125	1	25	mg/L	10/05/15 22:37	
Silver	<0.05000	0.4000	0.3804	95	0.3709	93	75-125	3	25	mg/L	10/05/15 22:37	

Analytical Method: SW-846 9045 D

Seq Number: 126417

Parent Sample Id: 15092811-001

Matrix: Solid Waste

MD Sample Id: 15092811-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
pH	8.400	8.400	0	20	SU	09/29/15 15:03	

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



Bottom ASH

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC. 15092904 www.phaseonline.com
 email: info@phaseonline.com

CLIENT: Brandon Shores LLC OFFICE LOC: Brandon PROJECT MGR: David May PHONE NO.: 443-564-6849 EMAIL: dimay@raven-power.com FAX NO.: 410-787-5577 PROJECT NAME: Brandon Bottom Ash PROJECT NO.: SITE LOCATION: Brandon P.O. NO.: 7522105 SAMPLERS: David May DW CERT NO.:		Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr C=Oil S=Sol WL=Waste Liquid WS=Waste Solid W= Wtpa No. CONTAINERS 1 G	PAGE 1 OF 1 Analysis/Method Required REMARKS Click to enter Remarks
SAMPLE IDENTIFICATION Brandon Bottom Ash	DATE 9-28-15	TIME 6A	MATRIX (See Codes) WS
Total Metals ✓			
Requested Turnaround Time <input type="checkbox"/> 5-Day <input type="checkbox"/> 3-Day <input type="checkbox"/> 2-Day <input checked="" type="checkbox"/> Next Day <input type="checkbox"/> Emergency <input type="checkbox"/> Other Data Deliverables Required: COA			
Special Instructions: Relinquished By: (1) [Signature] Date: 9-29-15 Time: [Signature] Relinquished By: (2) [Signature] Date: 9-28-15 Time: 1435 [Signature] Relinquished By: (3) [Signature] Relinquished By: (4)			

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723
 The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.
 Page 4 of 5
 Page 9 of 12
 Final 1,000



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15092811	Received By	Amber Confer
Client Name	Raven Power Holdings, LLC - BS Pla	Date Received	09/28/2015 02:35:00 PM
Project Name	Brandon Bottom Ash	Delivered By	TTE (Rush)
Disposal Date	11/02/2015	Tracking No	Not Applicable
		Logged In By	Amber Confer

Shipping Container(s)

No. of Coolers 1

		Ice	Absent
Custody Seal(s) Intact?	N/A	Temp (deg C)	21
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	<u>David May</u>
Chain of Custody	Yes	MD DW Cert. No.	<u>N/A</u>

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: Rachel Davis Date: 09/28/2015
 Rachel Davis

PM Review and Approval: Lynn Jackson Date: 09/29/2015
 Lynn Jackson



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15092904	Received By	Amber Confer
Client Name	Raven Power Holdings, LLC - BS Pla	Date Received	09/28/2015 02:35:00 PM
Project Name	Brandon Bottom Ash	Delivered By	Trans Time Express
Disposal Date	11/02/2015	Tracking No	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Absent
Custody Seal(s) Intact?	N/A	Temp (deg C)	21
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	N/A	Sampler Name	<u>David May</u>
Chain of Custody	N/A	MD DW Cert. No.	<u>N/A</u>

Sample Container

Appropriate for Specified Analysis?	N/A	Custody Seal(s) Intact?	Not Applicable
Intact?	N/A	Seal(s) Signed / Dated	Not Applicable
Labeled and Labels Legible?	N/A		

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.

Refer to previous LID15092811.

Samples Inspected/Checklist Completed By: Rachel Davis Date: 09/28/2015
 Rachel Davis

PM Review and Approval: Lynn Jackson Date: 09/29/2015
 Lynn Jackson

Analytical Report for

Raven Power Holdings, LLC - BS Plant

Certificate of Analysis No.: 15040802

Project Manager: David May

Project Name : Brandon Flyash Broken Bag Dumpster

Project Location: Brandon Shores



April 13, 2015

Phase Separation Science, Inc.

6630 Baltimore National Pike

Baltimore, MD 21228

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PHASE SEPARATION SCIENCE, INC.



April 13, 2015

David May
Raven Power Holdings, LLC - BS Plant
2030 Brandon Shores Road
Baltimore, MD 21226

Reference: PSS Work Order(s) No: **15040802**
Project Name: Brandon Flyash Broken Bag Dumpster
Project Location: Brandon Shores

Dear David May :

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 **15040802**.

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 May 13, 2015. 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 - BS Plant
Project Name: Brandon Flyash Broken Bag Dumpster

Work Order Number(s): 15040802

The following samples were received under chain of custody by Phase Separation Science (PSS) on 04/08/2015 at 12:25 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
15040802-001	Brandon Flyash Broken Bag Dumpster	SOLID WASTE	04/08/15 08:00

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)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

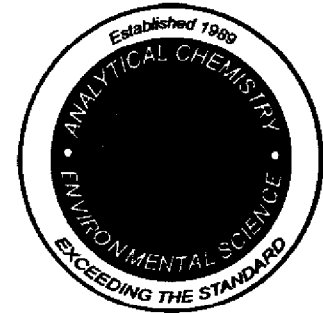
- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation
- E The data exceeds the upper calibration limit, therefore, the concentration is reported as estimated.
- 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 MDL.
- MDL This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. 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 MWAA LD1997-0041-2015

OFFICES:
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 BALTIMORE, MD 21228
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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15040802

Raven Power Holdings, LLC - BS Plant, Baltimore, MD

April 13, 2015

Project Name: Brandon Flyash Broken Bag Dumpster

Project Location: Brandon Shores

Sample ID: Brandon Flyash Broken Bag D Date/Time Sampled: 04/08/2015 08:00 PSS Sample ID: 15040802-001

Matrix: SOLID WASTE

Date/Time Received: 04/08/2015 12:25

% Solids: 97

Inorganic Anions

Analytical Method: EPA 300.0

Preparation Method: E300.0P

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Sulfate	27,000	mg/kg	1,000		20	04/08/15	04/09/15 15:19	1044

Sample ID: Brandon Flyash Broken Bag D Date/Time Sampled: 04/08/2015 08:00 PSS Sample ID: 15040802-001

Matrix: SOLID WASTE

Date/Time Received: 04/08/2015 12:25

TCLP Metals

Analytical Method: SW-846 6020 A

Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	1.2	mg/L	0.050		1	5	04/09/15	04/09/15 13:55	1034
Barium	ND	mg/L	1.0		1	100	04/09/15	04/09/15 13:55	1034
Cadmium	0.076	mg/L	0.050		1	1	04/09/15	04/09/15 13:55	1034
Chromium	ND	mg/L	0.050		1	5	04/09/15	04/09/15 13:55	1034
Lead	ND	mg/L	0.050		1	5	04/09/15	04/09/15 13:55	1034
Mercury	ND	mg/L	0.0020		1	0.2	04/09/15	04/09/15 13:55	1034
Selenium	ND	mg/L	0.050		1	1	04/09/15	04/09/15 13:55	1034
Silver	ND	mg/L	0.050		1	5	04/09/15	04/09/15 13:55	1034



Case Narrative Summary

Client Name: Raven Power Holdings, LLC - BS Plant

Project Name: Brandon Flyash Broken Bag Dumpster

Work Order Number(s): 15040802

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.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

Sample(s) received at a temperature greater than 6 degrees C and ice was not present.
Sampling time obtained from container label.

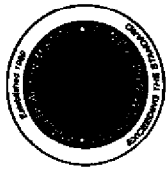
Analytical:

Inorganic Anions

Batch: 121763

The concentration of the following analyte(s) in the reference sample was greater than four times the matrix spike concentration : sulfate.

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): 15040802

Report Prepared For: Raven Power Holdings, LLC - BS Plant, Balti

Project Name: Brandon Flyash Broken Bag Dumpster

Project Manager: David May

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
ASTM D2216 05	Brandon Flyash Broken Bag Dumpster	Initial	15040802-001	1051	S	121705	121705	04/08/2015	04/08/2015 15:11	04/08/2015 15:11
EPA 300.0	54920-1-BKS	BKS	54920-1-BKS	1044	S	54920	121763	-----	04/08/2015 16:54	04/09/2015 13:27
	54920-1-BLK	BLK	54920-1-BLK	1044	S	54920	121763	-----	04/08/2015 16:54	04/09/2015 13:05
	54920-1-BSD	BSD	54920-1-BSD	1044	S	54920	121763	-----	04/08/2015 16:54	04/09/2015 13:49
	Brandon Flyash Broken Bag Dumpster S	Reanalysis	15040802-001 S	1044	S	54920	121763	04/08/2015	04/08/2015 16:54	04/09/2015 14:34
	Brandon Flyash Broken Bag Dumpster	Reanalysis	15040802-001	1044	S	54920	121763	04/08/2015	04/08/2015 16:54	04/09/2015 15:19
SW-846 6020 A	Brandon Flyash Broken Bag Dumpster	Initial	15040802-001	1034	W	54922	121751	04/08/2015	04/09/2015 09:13	04/09/2015 13:55
	54922-1-BKS	BKS	54922-1-BKS	1034	W	54922	121751	-----	04/09/2015 09:13	04/09/2015 13:18
	54922-1-BLK	BLK	54922-1-BLK	1034	W	54922	121751	-----	04/09/2015 09:13	04/09/2015 13:12
	040315-OP-W3958 S	MS	15040609-001 S	1034	W	54922	121751	04/03/2015	04/09/2015 09:13	04/09/2015 13:31
	040315-OP-W3958 SD	MSD	15040609-001 SD	1034	W	54922	121751	04/03/2015	04/09/2015 09:13	04/09/2015 13:37

PHASE SEPARATION SCIENCE, INC.

QC Summary 15040802

Raven Power Holdings, LLC - BS Plant
Brandon Flyash Broken Bag Dumpster

Analytical Method: EPA 300.0

Seq Number: 121763
MB Sample Id: 54920-1-BLK

Matrix: Solid
LCS Sample Id: 54920-1-BKS

Prep Method: E300.0P
Date Prep: 04/08/15
LCSD Sample Id: 54920-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Sulfate	<47.85	478.5	465.1	97	507.4	98	90-110	9	20	mg/kg	04/09/15 13:27	

Analytical Method: EPA 300.0

Seq Number: 121763
Parent Sample Id: 15040802-001

Matrix: Solid Waste
MS Sample Id: 15040802-001 S

Prep Method: E300.0P
Date Prep: 04/08/15

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Sulfate	<52.87	528.7	9224	1745	53-135	mg/kg	04/09/15 14:34	EX

Analytical Method: SW-846 6020 A

Seq Number: 121751
MB Sample Id: 54922-1-BLK

Matrix: Water
LCS Sample Id: 54922-1-BKS

Prep Method: SW3010A
Date Prep: 04/09/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4116	103	80-120	mg/L	04/09/15 13:18	
Barium	<1.000	2.000	2.175	109	80-120	mg/L	04/09/15 13:18	
Cadmium	<0.05000	0.4000	0.3764	94	80-120	mg/L	04/09/15 13:18	
Chromium	<0.05000	0.4000	0.3543	89	80-120	mg/L	04/09/15 13:18	
Lead	<0.05000	0.4000	0.4023	101	80-120	mg/L	04/09/15 13:18	
Mercury	<0.002000	0.01000	0.01030	103	80-120	mg/L	04/09/15 13:18	
Selenium	<0.05000	0.4000	0.3870	97	80-120	mg/L	04/09/15 13:18	
Silver	<0.05000	0.4000	0.3804	95	80-120	mg/L	04/09/15 13:18	

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



SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

www.phaseonline.com
email: info@phaseonline.com

PHASE SEPARATION SCIENCE, INC.

1 CLIENT: raven power ft. smallwood llc. OFFICE LOC. brandon shores PROJECT MGR: david may PHONE NO.: 4435646849 EMAIL: dimay@raven-power.com FAX NO.: 4107875577 PROJECT NAME: Brandon Flyash Brokew #16 PROJECT NO.: SITE LOCATION: brandon shores P.O. NO.: SAMPLERS: david may DW CERT NO.:		PSS Work Order #: 15040802 PAGE ____ OF ____ Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil WL=Waste Liquid WS=Waste Solid W= W/Pre- No. C O S WL W WS W
2 LAB NO. SAMPLE IDENTIFICATION DATE TIME MATRIX (See Codes)		SAMPLE TYPE: C = COMP G = GRAB CONTAINERS 1 C
Brandon Flyash Brokew 4-8-15 4:50-15 WS #16 DUMASTER		
3 Relinquished By: (1) <i>David May</i> Date: 4-8-15 Time: 10:00 Received By: <i>[Signature]</i> Time: <i>[Signature]</i>		Requested Turnaround Time: <input checked="" type="checkbox"/> 3-Day <input type="checkbox"/> 2-Day <input type="checkbox"/> Other <input type="checkbox"/> Next Day <input type="checkbox"/> Emergency <input type="checkbox"/> Other Data Deliverables Required: COA
Relinquished By: (2) <i>[Signature]</i> Date: 4/8/15 Time: 12:00 Received By: <i>D. K. [Signature]</i>		
Relinquished By: (3) <i>[Signature]</i> Date: Time: Received By:		
Relinquished By: (4) Date: Time: Received By:		
4		# of Coolers: <i>8</i> Custody Seal: <i>AD</i> Ice Present: <i>AD</i> Shipping Carrier: <i>TRE</i>
5		REMARKS: Click to enter Remarks Analysis Method Required



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order # 15040802 **Received By** Shirley Rivera
Client Name Raven Power Holdings, LLC - BS Pla **Date Received** 04/08/2015 12:25:00 PM
Project Name Brandon Flyash Broken Bag Dumpst **Delivered By** Trans Time Express
Disposal Date 05/13/2015 **Tracking No** Not Applicable
Logged In By Shirley Rivera

Shipping Container(s)

No. of Coolers 1

	Ice	N/A
Custody Seal(s) Intact?	Temp (deg C)	12
Seal(s) Signed / Dated?	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	david may
Chain of Custody	Yes	MD DW Cert. No.	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.

Sample(s) received at a temperature greater than 6 degrees C and ice was not present.
 Sampling time obtained from container label.

Samples Inspected/Checklist Completed By: Shirley Rivera Date: 04/08/2015
 Shirley Rivera

PM Review and Approval: Simon Crisp Date: 04/08/2015
 Simon Crisp

Analytical Report for

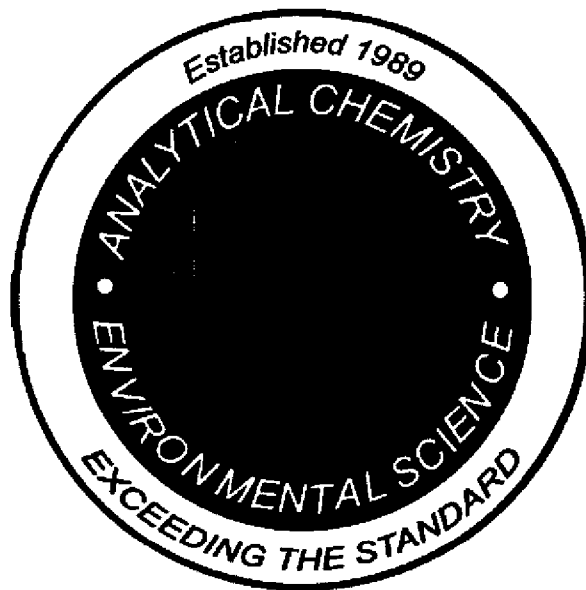
Raven Power Holdings, LLC - HA Wagner

Certificate of Analysis No.: 14091912

Project Manager: Ann Couwenhoven

Project Name : FGD Gypsum-Agriculture

Project Location: Brandon Shores



October 7, 2014

Phase Separation Science, Inc.

6630 Baltimore National Pike

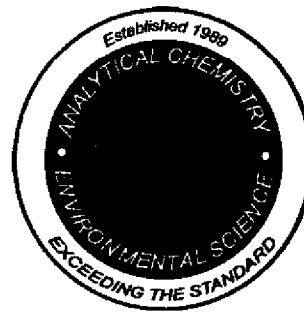
Baltimore, MD 21228

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Fax: (410) 788-8723

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BALTIMORE, MD 21228
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800-932-9047
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PHASE SEPARATION SCIENCE, INC.



October 7, 2014

Ann Couwenhoven
Raven Power Holdings, LLC - HA Wagner
1005 Brandon Shores Road
Baltimore, MD 21226

Reference: PSS Work Order(s) No: **14091912**
Project Name: FGD Gypsum-Agriculture
Project Location: Brandon Shores

Dear Ann Couwenhoven :

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 **14091912**.

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 October 24, 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 - HA Wagner

Project Name: FGD Gypsum-Agriculture

Work Order Number(s): 14091912

The following samples were received under chain of custody by Phase Separation Science (PSS) on 09/19/2014 at 12:32 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
14091912-001	FGD Gypsum (Raven)	SOIL	09/19/14 09:30
14091912-002	FGD Gypsum (Raven)	SOIL	09/19/14 09:30
14091912-003	FGD Gypsum (Raven)	SOIL	09/19/14 09:30
14091912-004	FGD Gypsum (Raven)	SOIL	09/19/14 09:30

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 MWAA LD1997-0041-2015

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 800-932-9047
 FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 14091912
 Raven Power Holdings, LLC - HA Wagner, Baltimore, MD
 October 7, 2014

Project Name: FGD Gypsum-Agriculture
 Project Location: Brandon Shores

Sample ID: FGD Gypsum (Raven) **Date/Time Sampled: 09/19/2014 09:30** **PSS Sample ID: 14091912-001**
Matrix: SOIL **Date/Time Received: 09/19/2014 12:32**
 Total Mercury Analytical Method: SW-846 7471

Result	Units	RL	Flag	Prepared	Analyzed	Analyst
See Attached Results				10/02/14	10/02/14 12:11	4005

Total Metals Analytical Method: SW6010C

Result	Units	RL	Flag	Prepared	Analyzed	Analyst
See Attached Results				10/02/14	10/02/14 10:20	4005

Sample ID: FGD Gypsum (Raven) **Date/Time Sampled: 09/19/2014 09:30** **PSS Sample ID: 14091912-002**
Matrix: SOIL **Date/Time Received: 09/19/2014 12:32**
 Total Metals Analytical Method: SW-846 6020 A

Result	Units	RL	Flag	Prepared	Analyzed	Analyst
See Attached Results				10/01/14	10/01/14 12:40	4005

Mercury Analytical Method: SW7470

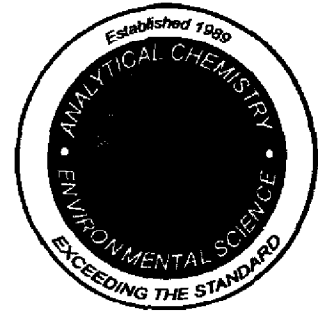
Result	Units	RL	Flag	Prepared	Analyzed	Analyst
See Attached Results				09/29/14	09/29/14 15:32	4005

Sample ID: FGD Gypsum (Raven) **Date/Time Sampled: 09/19/2014 09:30** **PSS Sample ID: 14091912-003**
Matrix: SOIL **Date/Time Received: 09/19/2014 12:32**
 TCLP Metals Analytical Method: SW-846 6020 A Preparation Method: 3010A

Result	Units	RL	Flag	Dil	TCLP Limit	Prepared	Analyzed	Analyst
Arsenic	ND mg/L	0.050		1	5	09/24/14	09/24/14 16:24	1034
Barium	ND mg/L	1.0		1	100	09/24/14	09/24/14 16:24	1034
Cadmium	ND mg/L	0.050		1	1	09/24/14	09/24/14 16:24	1034
Chromium	ND mg/L	0.050		1	5	09/24/14	09/24/14 16:24	1034
Lead	ND mg/L	0.050		1	5	09/24/14	09/24/14 16:24	1034
Mercury	ND mg/L	0.0020		1	0.2	09/24/14	09/24/14 16:24	1034
Selenium	ND mg/L	0.050		1	1	09/24/14	09/24/14 16:24	1034
Silver	ND mg/L	0.050		1	5	09/24/14	09/24/14 16:24	1034

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 14091912

Raven Power Holdings, LLC - HA Wagner, Baltimore, MD

October 7, 2014

Project Name: FGD Gypsum-Agriculture

Project Location: Brandon Shores

Sample ID: FGD Gypsum (Raven)

Date/Time Sampled: 09/19/2014 09:30 PSS Sample ID: 14091912-004

Matrix: SOIL

Date/Time Received: 09/19/2014 12:32

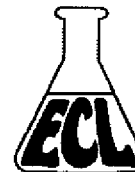
Inorganic Anions

Analytical Method: EPA 300.0

Preparation Method: E300.0P

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Bromide	ND	mg/L	5.0		1	09/26/14	09/26/14 14:00	1053
Chloride	ND	mg/L	5.0		1	09/26/14	09/26/14 14:00	1053
Fluoride	0.27	mg/L	0.10		1	09/26/14	09/26/14 14:00	1053
Nitrate (as N)	ND	mg/L	0.10		1	09/26/14	09/26/14 14:00	1053
Nitrite (as N)	ND	mg/L	0.10		1	09/26/14	09/26/14 14:00	1053
Sulfate	1,300	mg/L	50		10	09/26/14	09/26/14 14:28	1053

ENVIRO-CHEM LABORATORIES, INC.



47 Loveton Circle, Suite K • Sparks, Maryland 21152

410-472-1112

FINAL REPORT OF ANALYSIS

Phase Separation Science
6630 Baltimore Nat. Pike
Baltimore, MD 21228

PROJECT NAME: [none]
REPORT DATE: 10/07/2014
REPORT NBR: 141007105159

LAB#: E037082-01

SAMPLE ID: 14091912-001

LOCATION:

DATE SAMPLED: 09/19/2014

TIME SAMPLED: 9:30AM

SAMPLER-

DATE RECEIVED: 09/26/2014

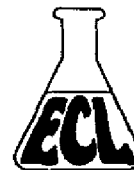
TIME RECEIVED: 12:35PM

DELIVERED BY: Courier

RECEIVED BY: Ginny Shelley

COMMENTS:

ENVIRO-CHEM LABORATORIES, INC.



47 Loveton Circle, Suite K • Sparks, Maryland 21152

410-472-1112

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
Metals by Enviro-Chem						
\$ Lithium	EPA 6010C	10/07/14 09:10	CHK	< 1.85 mg/kg dry		1.85
\$ Silicon	EPA 6010C	10/06/14 16:28	CHK	294 mg/kg dry		44.6
\$ Strontium	EPA 6020A	10/02/14 11:19	CHK	43.1 mg/kg dry		1.92
\$ Aluminum	EPA 6010C	10/02/14 14:30	MAP	324 mg/kg dry		23.9
*! Antimony	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
*! Arsenic	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
*! Barium	EPA 6020A	10/02/14 11:19	CHK	8.67 mg/kg dry		0.478
*! Beryllium	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
\$ Boron	EPA 6010C	10/06/14 14:55	CHK	< 11.5 mg/kg dry		11.5
*! Cadmium	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
\$ Calcium	EPA 6010C	10/02/14 12:56	MAP	234000 mg/kg dry		239
*! Chromium	EPA 6020A	10/02/14 11:19	CHK	1.51 mg/kg dry		0.478
\$ Cobalt	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
*! Copper	EPA 6020A	10/02/14 11:19	CHK	< 1.19 mg/kg dry		1.19
\$ Iron	EPA 6010C	10/02/14 10:20	MAP	352 mg/kg dry		11.9
*! Lead	EPA 6020A	10/02/14 11:19	CHK	3.12 mg/kg dry		0.478
\$ Magnesium	EPA 6010C	10/02/14 12:09	MAP	215 mg/kg dry		23.9
\$ Manganese	EPA 6010C	10/02/14 10:20	MAP	10.7 mg/kg dry		2.39
*! Mercury	EPA 7471	10/02/14 12:11	CHK	0.365 mg/kg dry		0.0573
\$ Molybdenum	EPA 6020A	10/02/14 11:19	CHK	< 2.39 mg/kg dry		2.39
*! Nickel	EPA 6020A	10/02/14 11:19	CHK	< 2.39 mg/kg dry		2.39
\$ Phosphorus	EPA 6010C	10/03/14 11:24	CHK	< 99.3 mg/kg dry		99.3
\$ Potassium	EPA 6010C	10/02/14 12:09	MAP	< 239 mg/kg dry		239
*! Selenium	EPA 6020A	10/02/14 11:19	CHK	6.13 mg/kg dry		0.478
\$ Sodium	EPA 6010C	10/02/14 12:09	MAP	< 478 mg/kg dry		478
\$ Sulfur (as S)	EPA 6010C	10/03/14 14:18	CHK	146000 mg/kg dry		6210
*! Thallium	EPA 6020A	10/02/14 11:19	CHK	< 0.478 mg/kg dry		0.478
\$ Vanadium	EPA 6020A	10/02/14 11:19	CHK	0.789 mg/kg dry		0.478
*! Zinc	EPA 6020A	10/02/14 11:19	CHK	5.03 mg/kg dry		2.39
Wet Chemistry by Enviro-Chem						
\$ % Solids	SM 2540G	09/29/14 11:19	CMA	80.5 %		1.00

ENVIRO-CHEM LABORATORIES, INC.



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410-472-1112

FINAL REPORT OF ANALYSIS

Phase Separation Science
6630 Baltimore Nat. Pike
Baltimore, MD 21228

PROJECT NAME: [none]
REPORT DATE: 10/07/2014
REPORT NBR: 141007105159

LAB#: E037082-02

SAMPLE ID: 14091912-002

LOCATION:

DATE SAMPLED: 09/19/2014

TIME SAMPLED: 9:30AM

SAMPLER-

DATE RECEIVED: 09/26/2014

TIME RECEIVED: 12:35PM

DELIVERED BY: Courier

RECEIVED BY: Ginny Shelley

COMMENTS:

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
Metals by Enviro-Chem						
\$ Aluminum	EPA 6010C	10/02/14 14:15	MAP	0.482 mg/L		0.200
*! Antimony	EPA 6010C	10/01/14 12:40	MAP	< 0.100 mg/L		0.100
*! Arsenic	EPA 6010C	10/01/14 12:40	MAP	< 0.050 mg/L		0.050
*! Barium	EPA 6010C	10/01/14 12:40	MAP	0.020 mg/L		0.020
*! Beryllium	EPA 6010C	10/01/14 12:40	MAP	< 0.002 mg/L		0.002
\$ Boron	EPA 200.7	10/06/14 14:42	CHK	0.019 mg/L		0.010
*! Cadmium	EPA 6010C	10/01/14 13:44	MAP	< 0.005 mg/L		0.005
\$ Calcium	EPA 6010C	10/02/14 12:47	MAP	634 mg/L		1.00
*! Chromium	EPA 6010C	10/01/14 12:40	MAP	< 0.010 mg/L		0.010
\$ Cobalt	EPA 6010C	10/01/14 14:50	MAP	< 0.010 mg/L		0.010
*! Copper	EPA 6010C	10/01/14 12:40	MAP	< 0.020 mg/L		0.020
\$ Iron	EPA 6010C	10/02/14 10:07	MAP	0.262 mg/L		0.050
*! Lead	EPA 6010C	10/01/14 13:44	MAP	< 0.050 mg/L		0.050
\$ Magnesium	EPA 6010C	10/02/14 11:48	MAP	5.38 mg/L		0.100
\$ Manganese	EPA 6010C	10/02/14 10:07	MAP	0.035 mg/L		0.010
*! Mercury	EPA 7470	09/29/14 15:32	CHK	< 0.0010 mg/L		0.0010
\$ Molybdenum	EPA 6010C	10/06/14 14:06	MAP	< 0.050 mg/L		0.050
*! Nickel	EPA 6010C	10/01/14 12:40	MAP	< 0.020 mg/L		0.020
\$ Phosphorus, as P	EPA 6010C	10/03/14 11:01	CHK	< 0.200 mg/L		0.200
\$ Potassium	EPA 6010C	10/02/14 11:48	MAP	2.56 mg/L		1.00
*! Selenium	EPA 6010C	10/01/14 12:40	MAP	< 0.050 mg/L		0.050
\$ Sodium	EPA 6010C	10/02/14 11:48	MAP	20.5 mg/L		1.00
\$ Strontium	EPA 200.7	10/06/14 15:53	CHK	0.228 mg/L		0.010
\$ Sulfur (as S)	EPA 6010C	10/03/14 12:48	CHK	509 mg/L		5.00
*! Thallium	EPA 6010C	10/02/14 09:19	MAP	< 0.020 mg/L		0.020
\$ Vanadium	EPA 6010C	10/01/14 14:50	MAP	< 0.010 mg/L		0.010
*! Zinc	EPA 6010C	10/01/14 12:40	MAP	0.045 mg/L		0.020

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410-472-1112

FINAL REPORT OF ANALYSIS

Phase Separation Science
6630 Baltimore Nat. Pike
Baltimore, MD 21228

PROJECT NAME: [none]
REPORT DATE: 10/07/2014
REPORT NBR: 141007105159

LAB#: F037082-03

SAMPLE ID: 14091912-004

LOCATION:

DATE SAMPLED: 09/26/2014

TIME SAMPLED: 9:30AM

SAMPLER-

DATE RECEIVED: 09/26/2014

TIME RECEIVED: 12:35PM

DELIVERED BY: Courier

RECEIVED BY: Ginny Shelley

COMMENTS:

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
Wet Chemistry by Enviro-Chem						
\$ Phosphorus, Ortho	EPA 365.1	10/02/14 12:01	SES	< 0.050 mg/L		0.050

Stephen Shelley
Laboratory Director

ENVIRO-CHEM LABORATORIES, INC.



47 Loveton Circle, Suite K • Sparks, Maryland 21152

410-472-1112

Certifications

Qualifier(s)

#192 # - State of Maryland Certification
68-04873 * - NELAP Certification
2797 ! - VELAP Certification

Indicates a MD certified Analyte
* Indicates a NELAP certified Analyte
! Indicates a VELAP certified Analyte
\$ Not a certified Analyte

QUALITY CONTROL SUMMARY

REPORT NBR: 141007105159

Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRL	Units	Spike Level	Source Result	% REC Limits	RPD	RPD Limit
Batch B4I0265											
Mercury											
Blank		09/29/2014	09/29/2014	<0.0010	0.0010	mg/L					
Duplicate	E037063-03	09/29/2014	09/29/2014	<0.0010	0.0010	mg/L		ND			20
LCS		09/29/2014	09/29/2014	0.0036	0.0010	mg/L	0.00400		89.1	85-115	
Matrix Spike	E037063-03	09/29/2014	09/29/2014	0.0040	0.0010	mg/L	0.00400	ND	100	70-130	
Batch B4I0270											
% Solids											
Duplicate	E037092-01	09/29/2014	09/29/2014	81.4	1.00	%		81.1		0.334	20
Duplicate	E037090-01	09/29/2014	09/29/2014	86.6	1.00	%		86.5		0.0811	20
Batch B4I0276											
Phosphorus, as P											
Blank		09/30/2014	10/03/2014	<0.200	0.200	mg/L					
Duplicate	E037082-02	09/30/2014	10/03/2014	<0.200	0.200	mg/L		ND			20
LCS		09/30/2014	10/03/2014	10.0	0.200	mg/L	10.0		100	80-120	
Matrix Spike	E037083-01	09/30/2014	10/03/2014	11.0	0.200	mg/L	10.0	ND	110	75-125	
Sulfur (as S)											
Blank		09/30/2014	10/03/2014	<0.100	0.100	mg/L					
Duplicate	E037082-02	09/30/2014	10/03/2014	501	5.00	mg/L		509		1.48	20
LCS		09/30/2014	10/03/2014	17.1	0.100	mg/L	16.6		103	80-120	
Matrix Spike	E037083-01	09/30/2014	10/03/2014	204	1.00	mg/L	16.6	183	124	75-125	
Batch B4I0277											
Boron											
Blank		09/30/2014	10/06/2014	<0.010	0.010	mg/L					
Duplicate	E037082-02	09/30/2014	10/06/2014	0.017	0.010	mg/L		0.019			NC 20
LCS		09/30/2014	10/06/2014	0.864	0.010	mg/L	1.00		86.4	85-115	
Matrix Spike	E037082-02	09/30/2014	10/06/2014	0.861	0.010	mg/L	1.00	0.019	84.2	70-130	
Molybdenum											
Blank		09/30/2014	10/06/2014	<0.050	0.050	mg/L					
Duplicate	E037082-02	09/30/2014	10/06/2014	<0.050	0.050	mg/L		ND			20
LCS		09/30/2014	10/06/2014	1.01	0.050	mg/L	1.00		101	80-120	
Matrix Spike	E037082-02	09/30/2014	10/06/2014	1.01	0.050	mg/L	1.00	ND	101	75-125	
Strontium											
Blank		09/30/2014	10/06/2014	<0.010	0.010	mg/L					
Duplicate	E037082-02	09/30/2014	10/06/2014	0.239	0.010	mg/L		0.228			4.71 20
LCS		09/30/2014	10/06/2014	1.03	0.010	mg/L	1.00		103	85-115	
Matrix Spike	E037082-02	09/30/2014	10/06/2014	1.21	0.010	mg/L	1.00	0.228	98.4	70-130	
Batch B4I0278											
Aluminum											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/L					
Duplicate	E037082-02	09/30/2014	10/02/2014	0.238	0.200	mg/L		0.482			NC 20
LCS		09/30/2014	10/02/2014	2.04	0.200	mg/L	2.00		102	80-120	
Matrix Spike	E037082-02	09/30/2014	10/02/2014	2.22	0.200	mg/L	2.00	0.482	86.8	75-125	

QUALITY CONTROL SUMMARY

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Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRL	Units	Spike Level	Source Result	% REC	% REC Limits	RPD	RPD Limit
Batch B4I0278 (Continued)												
Antimony												
Blank		09/30/2014	10/01/2014	<0.100	0.100	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.100	0.100	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.505	0.100	mg/L	0.500		101	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.547	0.100	mg/L	0.500	ND	109	75-125		
Arsenic												
Blank		09/30/2014	10/01/2014	<0.050	0.050	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.050	0.050	mg/L		ND				20
LCS		09/30/2014	10/01/2014	1.99	0.050	mg/L	2.00		99.3	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	2.19	0.050	mg/L	2.00	ND	110	75-125		
Barium												
Blank		09/30/2014	10/01/2014	<0.020	0.020	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	0.021	0.020	mg/L		ND				20
LCS		09/30/2014	10/01/2014	1.98	0.020	mg/L	2.00		99.2	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	2.04	0.020	mg/L	2.00	ND	102	75-125		
Beryllium												
Blank		09/30/2014	10/01/2014	<0.002	0.002	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.002	0.002	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.049	0.002	mg/L	0.0500		98.0	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.046	0.002	mg/L	0.0500	ND	92.0	75-125		
Cadmium												
Blank		09/30/2014	10/01/2014	<0.005	0.005	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.005	0.005	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.049	0.005	mg/L	0.0500		98.0	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.047	0.005	mg/L	0.0500	ND	94.0	75-125		
Calcium												
Blank		09/30/2014	10/02/2014	<0.100	0.100	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	639	1.00	mg/L		634			0.691	20
LCS		09/30/2014	10/02/2014	5.27	0.100	mg/L	5.00		105	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	625	1.00	mg/L	5.00	634	NR	75-125		
Chromium												
Blank		09/30/2014	10/01/2014	<0.010	0.010	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.010	0.010	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.199	0.010	mg/L	0.200		99.5	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.205	0.010	mg/L	0.200	ND	102	75-125		
Cobalt												
Blank		09/30/2014	10/01/2014	<0.010	0.010	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.010	0.010	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.486	0.010	mg/L	0.500		97.2	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.484	0.010	mg/L	0.500	ND	96.8	75-125		
Copper												
Blank		09/30/2014	10/01/2014	<0.020	0.020	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.020	0.020	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.254	0.020	mg/L	0.250		102	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.247	0.020	mg/L	0.250	ND	98.8	75-125		

QUALITY CONTROL SUMMARY

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Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRI	Units	Spike Level	Source Result	% REC	% REC Limits	RPD	RPD Limit
Batch B4I0278 (Continued)												
Iron												
Blank		09/30/2014	10/02/2014	<0.050	0.050	mg/l						
Duplicate	E037082-02	09/30/2014	10/02/2014	0.247	0.050	mg/L		0.262			5.89	20
LCS		09/30/2014	10/02/2014	0.993	0.050	mg/L	1.00		99.3	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	1.18	0.050	mg/L	1.00	0.262	91.3	75-125		
Lead												
Blank		09/30/2014	10/01/2014	<0.050	0.050	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.050	0.050	mg/l		ND				20
LCS		09/30/2014	10/01/2014	0.485	0.050	mg/l	0.500		97.0	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.493	0.050	mg/L	0.500	ND	98.6	75-125		
Magnesium												
Blank		09/30/2014	10/02/2014	<0.100	0.100	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	5.50	0.100	mg/L		5.38			2.39	20
LCS		09/30/2014	10/02/2014	5.02	0.100	mg/L	5.00		100	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	10.3	0.100	mg/l	5.00	5.38	98.3	75-125		
Manganese												
Blank		09/30/2014	10/02/2014	<0.010	0.010	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	0.035	0.010	mg/L		0.035			NC	20
LCS		09/30/2014	10/02/2014	0.482	0.010	mg/L	0.500		96.4	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	0.503	0.010	mg/l	0.500	0.035	93.6	75-125		
Nickel												
Blank		09/30/2014	10/01/2014	<0.020	0.020	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.020	0.020	mg/L		ND				20
LCS		09/30/2014	10/01/2014	0.493	0.020	mg/L	0.500		98.6	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.526	0.020	mg/L	0.500	ND	105	75-125		
Potassium												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	2.57	1.00	mg/L		2.56			NC	20
LCS		09/30/2014	10/02/2014	4.94	1.00	mg/L	5.00		98.8	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	7.39	1.00	mg/L	5.00	2.56	96.6	75-125		
Selenium												
Blank		09/30/2014	10/01/2014	<0.050	0.050	mg/L						
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.050	0.050	mg/L		ND				20
LCS		09/30/2014	10/01/2014	2.01	0.050	mg/l	2.00		101	80-120		
Matrix Spike	E037082-02	09/30/2014	10/01/2014	2.26	0.050	mg/L	2.00	ND	113	75-125		
Sodium												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	21.1	1.00	mg/L		20.5			2.57	20
LCS		09/30/2014	10/02/2014	5.46	1.00	mg/L	5.00		109	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	24.8	1.00	mg/L	5.00	20.5	85.7	75-125		
Thallium												
Blank		09/30/2014	10/02/2014	<0.020	0.020	mg/L						
Duplicate	E037082-02	09/30/2014	10/02/2014	<0.020	0.020	mg/L		ND				20
LCS		09/30/2014	10/02/2014	1.87	0.020	mg/L	2.00		93.4	80-120		
Matrix Spike	E037082-02	09/30/2014	10/02/2014	1.96	0.020	mg/l	2.00	ND	98.1	75-125		

QUALITY CONTROL SUMMARY

REPORT NBR: 141007105159

Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRL	Units	Spike Level	Source Result	% REC Limits	RPD	RPD Limit
Batch B4I0278 (Continued)											
Vanadium											
Blank		09/30/2014	10/01/2014	<0.010	0.010	mg/L					
Duplicate	E037082-02	09/30/2014	10/01/2014	<0.010	0.010	mg/L		ND			20
LCS		09/30/2014	10/01/2014	0.502	0.010	mg/L	0.500		100	80-120	
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.507	0.010	mg/L	0.500	ND	101	75-125	
Zinc											
Blank		09/30/2014	10/01/2014	<0.020	0.020	mg/L					
Duplicate	E037082-02	09/30/2014	10/01/2014	0.047	0.020	mg/L		0.045			NC 20
LCS		09/30/2014	10/01/2014	0.507	0.020	mg/L	0.500		101	80-120	
Matrix Spike	E037082-02	09/30/2014	10/01/2014	0.577	0.020	mg/L	0.500	0.045	106	75-125	
Batch B4I0280											
Antimony											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	<0.478	0.478	mg/kg dry		ND			20
LCS		09/30/2014	10/02/2014	18.8	0.400	mg/kg wet	20.0		93.9	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	22.6	0.497	mg/kg dry	24.8	ND	90.9	75-125	
Arsenic											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Barium											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	8.26	0.478	mg/kg dry		8.67		4.91	20
LCS		09/30/2014	10/02/2014	18.2	0.400	mg/kg wet	20.0		91.1	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	28.2	0.497	mg/kg dry	24.8	8.67	78.7	75-125	
Beryllium											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	<0.478	0.478	mg/kg dry		ND			20
LCS		09/30/2014	10/02/2014	18.4	0.400	mg/kg wet	20.0		92.0	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	21.2	0.497	mg/kg dry	24.8	ND	85.5	75-125	
Cadmium											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	<0.478	0.478	mg/kg dry		ND			20
LCS		09/30/2014	10/02/2014	18.6	0.400	mg/kg wet	20.0		93.0	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	22.3	0.497	mg/kg dry	24.8	ND	89.6	75-125	
Chromium											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	1.47	0.478	mg/kg dry		1.51			NC 20
LCS		09/30/2014	10/02/2014	17.8	0.400	mg/kg wet	20.0		89.2	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	23.2	0.497	mg/kg dry	24.8	1.51	87.4	75-125	
Cobalt											
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet					
Duplicate	E037082-01	09/30/2014	10/02/2014	<0.478	0.478	mg/kg dry		ND			20
LCS		09/30/2014	10/02/2014	17.1	0.400	mg/kg wet	20.0		85.6	80-120	
Matrix Spike	E037082-01	09/30/2014	10/02/2014	20.3	0.497	mg/kg dry	24.8	ND	81.6	75-125	

QUALITY CONTROL SUMMARY

REPORT NBR: 141007105159

Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRL	Units	Spike Level	Source Result	% REC	REC Limits	RPD	RPD Limit
Batch B4I0280 (Continued)												
Copper												
Blank		09/30/2014	10/02/2014	<0.500	0.500	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<1.19	1.19	mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	18.2	1.00	mg/kg wet	20.0		91.1	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	20.6	1.24	mg/kg dry	24.8	ND	82.8	75-125		
Lead												
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	3.23	0.478	mg/kg dry		3.12			3.26	20
LCS		09/30/2014	10/02/2014	18.7	0.400	mg/kg wet	20.0		93.3	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	26.4	0.497	mg/kg dry	24.8	3.12	93.6	75-125		
Molybdenum												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<2.39	2.39	mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	18.5	2.00	mg/kg wet	20.0		92.7	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	23.7	2.48	mg/kg dry	24.8	ND	95.4	75-125		
Nickel												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<2.39	2.39	mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	18.9	2.00	mg/kg wet	20.0		94.7	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	22.0	2.48	mg/kg dry	24.8	ND	88.4	75-125		
Selenium												
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	6.63	0.478	mg/kg dry		6.13			7.79	20
LCS		09/30/2014	10/02/2014	18.8	0.400	mg/kg wet	20.0		94.2	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	28.3	0.497	mg/kg dry	24.8	6.13	89.4	75-125		
Strontium												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	38.7	1.92	mg/kg dry		43.1			10.7	200
Thallium												
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<0.478	0.478	mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	19.5	0.400	mg/kg wet	20.0		97.4	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	25.4	0.497	mg/kg dry	24.8	ND	102	75-125		
Vanadium												
Blank		09/30/2014	10/02/2014	<0.200	0.200	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	0.749	0.478	mg/kg dry		0.789			NC	20
LCS		09/30/2014	10/02/2014	18.0	0.400	mg/kg wet	20.0		90.2	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	23.8	0.497	mg/kg dry	24.8	0.789	92.8	75-125		
Zinc												
Blank		09/30/2014	10/02/2014	<1.00	1.00	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	5.65	2.39	mg/kg dry		5.03			NC	20
LCS		09/30/2014	10/02/2014	18.9	2.00	mg/kg wet	20.0		94.4	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	25.1	2.48	mg/kg dry	24.8	5.03	80.9	75-125		

Batch B4I0281

QUALITY CONTROL SUMMARY

REPORT NBR: 141007105159

Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRI	Units	Spike Level	Source Result	% REC	% REC Limits	RPD	RPD Limit
Batch B4I0281 (Continued)												
Aluminum												
Blank		09/30/2014	10/02/2014	<20.0		20.0 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	466		23.9 mg/kg dry		324			36.1*	20
LCS		09/30/2014	10/02/2014	379		20.0 mg/kg wet	400		94.8	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	716		22.6 mg/kg dry	452	324	86.9	75-125		
Calcium												
Blank		09/30/2014	10/02/2014	<20.0		20.0 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	118000		239 mg/kg dry		234000			66.0*	20
LCS		09/30/2014	10/02/2014	1890		20.0 mg/kg wet	2000		94.7	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	256000		226 mg/kg dry	2260	234000	940*	75-125		
Iron												
Blank		09/30/2014	10/02/2014	<10.0		10.0 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	385		11.9 mg/kg dry		352			9.01	20
LCS		09/30/2014	10/02/2014	185		10.0 mg/kg wet	200		92.5	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	519		11.3 mg/kg dry	226	352	73.9*	75-125		
Magnesium												
Blank		09/30/2014	10/02/2014	<20.0		20.0 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	244		23.9 mg/kg dry		215			12.6	20
LCS		09/30/2014	10/02/2014	1880		20.0 mg/kg wet	2000		94.0	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	2200		22.6 mg/kg dry	2260	215	88.1	75-125		
Manganese												
Blank		09/30/2014	10/02/2014	<2.00		2.00 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	10.5		2.39 mg/kg dry		10.7			2.25	20
LCS		09/30/2014	10/02/2014	90.0		2.00 mg/kg wet	100		90.0	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	103		2.26 mg/kg dry	113	10.7	81.7	75-125		
Potassium												
Blank		09/30/2014	10/02/2014	<200		200 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<239		239 mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	1780		200 mg/kg wet	2000		89.1	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	2320		226 mg/kg dry	2260	ND	103	75-125		
Sodium												
Blank		09/30/2014	10/02/2014	<400		400 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/02/2014	<478		478 mg/kg dry		ND				20
LCS		09/30/2014	10/02/2014	1900		400 mg/kg wet	2000		95.1	80-120		
Matrix Spike	E037082-01	09/30/2014	10/02/2014	2310		452 mg/kg dry	2260	ND	102	75-125		
Batch B4I0282												
Boron												
Blank		09/30/2014	10/06/2014	<10.0		10.0 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/06/2014	<12.4		12.4 mg/kg dry		ND				200
LCS		09/30/2014	10/06/2014	159		10.0 mg/kg wet	200		79.6*	80-120		
Matrix Spike	E037082-01	09/30/2014	10/06/2014	189		12.4 mg/kg dry	248	ND	76.1	75-125		
Lithium												
Blank		09/30/2014	10/07/2014	<2.00		2.00 mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/07/2014	<2.00		2.00 mg/kg dry		ND				200
LCS		09/30/2014	10/07/2014	193		2.00 mg/kg wet	200		96.6	0-200		
Matrix Spike	E037082-01	09/30/2014	10/07/2014	256		2.00 mg/kg dry	248	ND	103	0-200		

Batch B4I0283

QUALITY CONTROL SUMMARY

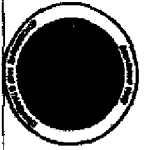
REPORT NBR: 141007105159

Enviro-Chem

Analyte QC Type	Sample Source	Date Prep'd	Date Analyzed	Result	MRL	Units	Spike Level	Source Result	% REC	% REC Limits	RPD	RPD Limit
Batch B4I0283 (Continued)												
Phosphorus												
Blank		09/30/2014	10/03/2014	<80.0	80.0	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/03/2014	<93.7	93.7	mg/kg dry		ND				20
LCS		09/30/2014	10/03/2014	1830	80.0	mg/kg wet	2000		91.7	80-120		
Matrix Spike	E037082-01	09/30/2014	10/03/2014	1890	78.8	mg/kg dry	1970	ND	95.7	75-125		
Sulfur (as S)												
Blank		09/30/2014	10/03/2014	<100	100	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/03/2014	117000	5860	mg/kg dry		146000			22.1*	20
LCS		09/30/2014	10/03/2014	3150	100	mg/kg wet	3330		94.5	80-120		
Matrix Spike	E037082-01	09/30/2014	10/03/2014	141000	4930	mg/kg dry	3280	146000	NR	75-125		
Batch B4I0284												
Silicon												
Blank		09/30/2014	10/06/2014	<50.0	50.0	mg/kg wet						
Duplicate	E037082-01	09/30/2014	10/06/2014	274	48.1	mg/kg dry		294			6.84	200
LCS		09/30/2014	10/06/2014	788	50.0	mg/kg wet	1000		78.8	0-200		
Matrix Spike	E037082-01	09/30/2014	10/06/2014	435	42.4	mg/kg dry	1050	294	13.4	0-200		
Batch B4J0017												
Mercury												
Blank		10/02/2014	10/02/2014	<0.0500	0.0500	mg/kg wet						
Duplicate	E037082-01	10/02/2014	10/02/2014	0.396	0.0601	mg/kg dry		0.365			8.11	20
LCS		10/02/2014	10/02/2014	0.209	0.0500	mg/kg wet	0.200		104	80-120		
Matrix Spike	E037082-01	10/02/2014	10/02/2014	0.596	0.110	mg/kg dry	0.219	0.365	105	70-130		
Batch B4J0020												
Phosphorus, Ortho												
Duplicate	E037082-03	10/02/2014	10/02/2014	<0.050	0.050	mg/L		ND				20
LCS		10/02/2014	10/02/2014	0.414	0.050	mg/L	0.400		104	90-110		
Matrix Spike	E037082-03	10/02/2014	10/02/2014	0.395	0.050	mg/L	0.400	ND	98.6	90-110		

* - Indicates Recovery/RPD failed Criteria.

NC - Indicates Duplicate Result or Sample Duplicate Result < 4 * Method reporting limit



Chain of Custody Form for Subcontracted Analyses

37082

Page 1 of 1

Phase Separation Science, Inc
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

For Questions or issues please contact: Lynn Jackson

W.O. No.: 14091912
P.O. No.:
Project Number: N/A
Report To LOD: No
Report Due On ^{10/3} 09/25/14 05:00

Samples Transferred To:
Enviro-Chem Laboratories, Inc.
47 Loveton Cir., Ste. K
Sparks, MD 21152
Contact: Steve Shelley
Phone: 410-472-1112

Lab Sample ID	Field Sample ID	Date Sampled	Time Sampled	Matrix	Analyses Required	Method	Type of Container	Preservative
14091912-001	FGD Gypsum (Raven)	09/19/14	09:30	Solid	Total Mercury	SW7471A	2 OZ WMG	COOL
14091912-001	FGD Gypsum (Raven)	09/19/14	09:30	Solid	Total Metals	SW6020	2 OZ WMG	COOL
14091912-001	FGD Gypsum (Raven)	09/19/14	09:30	Solid	Total Metals	SW6010B	2 OZ WMG	COOL
14091912-002	FGD Gypsum (Raven)	09/19/14	09:30	Water	Total Metals	SW6010B	2 OZ WMG	COOL
14091912-002	FGD Gypsum (Raven)	09/19/14	09:30	Water	Total Metals	SW6020	2 OZ WMG	COOL
14091912-002	FGD Gypsum (Raven)	09/19/14	09:30	Water	Mercury	SW7470A	2 OZ WMG	COOL
14091912-004	FGD Gypsum (Raven)	09/19/14	09:30	Water	Specific Inorganic Anions	E300.0	2 OZ WMG	COOL

Data Deliverables Required: COA

Perform Q.C. on Sample:

Send Report Attn: reporting@phasesonline.com

Send Invoice Attn: invoicing@phasesonline.com

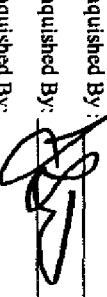
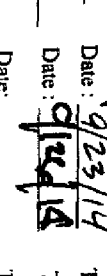

Airbill No.:

Carrier: TRE

Condition Upon Receipt:

Comments:

Please do sample COA by IC.

Samples Relinquished By:  Date: 9/23/14 Time: 12:25
 Samples Relinquished By:  Date: 9/24/14 Time: 12:25
 Samples Relinquished By: _____ Date: _____ Time: _____
 Samples Received By:  Date: _____ Time: _____
 Samples Received By: _____ Date: _____ Time: _____

Sub-Contractor
Enviro-Chem Laboratories, Inc.

Method
E300.0 Spec

Matrix
Water

Analyte Name
Orthophosphate (as PO4)

7.5

14091912

Materials and Methods

Table 3-2
Constituents Analyzed in FGD and Mined Gypsum Samples

Constituent	Total Composition by Method 3051a	Total Composition by Method 7473	SPLP, Method SW-846 1312	TCLP, Method SW-846 1311	Deionized Water Leach Test
Ag				X	
Al					
As				X	
B					
Ba				X	
Be					
Br					X
Ca					
Cd				X	
Cl					X
Co					
Cr				X	
Cu					
F					X
Fe					
Hg				X	
K					
Li					
Mg					
Mn					
Mo					
Na					
Ni					
NO ₂					X
NO ₃					X
P					
Pb				X	
PO ₄					
S					
Sb					
Se				X	
Si					
SO ₄					X
Sr					
Ti					
V					
Zn					

SW6010 or SW6020

E300



Case Narrative Summary

Client Name: Raven Power Holdings, LLC - HA Wagner

Project Name: FGD Gypsum-Agriculture

Work Order Number(s): 14091912

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.

Analyses associated with analyst code 4005 were performed by Enviro-Chem Laboratories, Inc. - PA 68-04873

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

SW-846 7471, SW7470



Analytical Data Package Information Summary

Work Order(s): 14091912

Report Prepared For: Raven Power Holdings, LLC - HA Wagner, B.

Project Name: FGD Gypsum-Agriculture

Project Manager: Ann Couwenhoven

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
EPA 300.0	FGD Gypsum (Raven)	Initial	14091912-004	1053	W	52258	117051	09/19/2014	09/26/2014 09:28	09/26/2014 14:00
	52258-1-BKS	BKS	52258-1-BKS	1053	W	52258	117051	-----	09/26/2014 09:28	09/26/2014 12:10
	52258-1-BLK	BLK	52258-1-BLK	1053	W	52258	117051	-----	09/26/2014 09:28	09/26/2014 11:43
	52258-1-BSD	BSD	52258-1-BSD	1053	W	52258	117051	-----	09/26/2014 09:28	09/26/2014 12:38
	RW-3 (Dowd) S	MS	14092601-001 S	1053	W	52258	117051	09/24/2014	09/26/2014 09:28	09/26/2014 13:33
	FGD Gypsum (Raven)	Reanalysis	14091912-004	1053	W	52258	117051	09/19/2014	09/26/2014 09:28	09/26/2014 14:28
SW-846 6020 A	FGD Gypsum (Raven)	Initial	14091912-002	4005	W	117272	117272	09/19/2014	10/01/2014 12:40	10/01/2014 12:40
	FGD Gypsum (Raven)	Initial	14091912-003	1034	W	52218	116960	09/19/2014	09/24/2014 08:52	09/24/2014 16:24
SW-846 6020 A	52218-1-BKS	BKS	52218-1-BKS	1034	W	52218	116960	-----	09/24/2014 08:52	09/24/2014 15:49
	52218-1-BLK	BLK	52218-1-BLK	1034	W	52218	116960	-----	09/24/2014 08:52	09/24/2014 15:43
	B/B 9/18/14 S	MS	14091811-001 S	1034	W	52218	116960	09/18/2014	09/24/2014 08:52	09/24/2014 16:00
	B/B 9/18/14 SD	MSD	14091811-001 SD	1034	W	52218	116960	09/18/2014	09/24/2014 08:52	09/24/2014 16:06
SW-846 7471	FGD Gypsum (Raven)	Initial	14091912-001	4005	S	117272	117272	09/19/2014	10/02/2014 12:11	10/02/2014 12:11
SW6010C	FGD Gypsum (Raven)	Initial	14091912-001	4005	S	117272	117272	09/19/2014	10/02/2014 10:20	10/02/2014 10:20
	FGD Gypsum (Raven)	Initial	14091912-002	4005	W	117272	117272	09/19/2014	09/29/2014 15:32	09/29/2014 15:32

PHASE SEPARATION SCIENCE, INC.

QC Summary 14091912

Raven Power Holdings, LLC - HA Wagner
FGD Gypsum-Agriculture

Analytical Method: EPA 300.0

Seq Number: 117051
MB Sample Id: 52258-1-BLK

Matrix: Water
LCS Sample Id: 52258-1-BKS

Prep Method: E300.0P
Date Prep: 09/26/14
LCSD Sample Id: 52258-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Bromide	<5.000	50.00	48.39	97	47.94	96	80-120	1	20	mg/L	09/26/14 12:10	
Chloride	<5.000	50.00	48.45	97	48.01	96	90-110	1	20	mg/L	09/26/14 12:10	
Fluoride	<0.1000	5.000	4.856	97	4.769	95	90-110	2	20	mg/L	09/26/14 12:10	
Nitrate (as N)	<0.1000	5.000	4.875	98	4.836	97	90-110	1	20	mg/L	09/26/14 12:10	
Nitrite (as N)	<0.1000	5.000	4.798	96	4.750	95	90-110	1	20	mg/L	09/26/14 12:10	
Sulfate	<5.000	50.00	49.48	99	48.80	98	90-110	1	20	mg/L	09/26/14 12:10	

Analytical Method: SW-846 6020 A

Seq Number: 116960
MB Sample Id: 52218-1-BLK

Matrix: Water
LCS Sample Id: 52218-1-BKS

Prep Method: SW3010A
Date Prep: 09/24/14

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.05000	0.4000	0.4144	104	80-120	mg/L	09/24/14 15:49	
Barium	<1.000	2.000	2.261	113	80-120	mg/L	09/24/14 15:49	
Cadmium	<0.05000	0.4000	0.3989	100	80-120	mg/L	09/24/14 15:49	
Chromium	<0.05000	0.4000	0.3991	100	80-120	mg/L	09/24/14 15:49	
Lead	<0.05000	0.4000	0.4179	104	80-120	mg/L	09/24/14 15:49	
Mercury	<0.002000	0.01000	0.01000	100	80-120	mg/L	09/24/14 15:49	
Selenium	<0.05000	0.4000	0.4019	100	80-120	mg/L	09/24/14 15:49	
Silver	<0.05000	0.4000	0.4103	103	80-120	mg/L	09/24/14 15:49	

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 # 14091912 **Received By** Lynn Jackson
Client Name Raven Power Holdings, LLC - HA W: **Date Received** 09/19/2014 12:32:00 PM
Project Name FGD Gypsum-Agriculture **Delivered By** Client
Disposal Date 10/24/2014 **Tracking No** Not Applicable
Logged In By Rachel Davis

Shipping Container(s)

No. of Coolers 1

Custody Seal(s) Intact?	N/A	Ice	Absent
Seal(s) Signed / Dated?	N/A	Temp (deg C)	24
		Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	<u>Not Provided</u>
Chain of Custody	Yes		<u>N/A</u>

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 4

Total No. of Containers Received 8

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: Rachel Davis Date: 09/22/2014
 Rachel Davis

PM Review and Approval: Lynn Jackson Date: 09/22/2014
 Lynn Jackson

LABORATORY REPORT

US Gypsum Corp.
 5500 Quarantine Rd
 Baltimore, MD 21226
 ATTENTION: Eben Via
 Telephone: 847-970-5150

Report Date: May 1, 2015
 Samples Received: April 14, 2015
 RJ Lee Group Job No.: PA140420150017
 Client Project No.: Baltimore, MD
 Purchase Order No.: 920621

ANALYSIS: Total and Respirable Crystalline Silica

METHODS: X-Ray Diffraction (XRD) and Computer-Controlled Scanning Electron Microscopy (CCSEM)

A portion of the sample was digested with HCl. The resulting residue was mixed with calcium fluoride (CaF₂) as an internal standard, ground further, and backloaded into a standard XRD holder. The sample was scanned using standard run parameters on a PANalytical X'Pert Pro diffractometer equipped with copper radiation. The weight percentage of silica was calculated through the use of the internal standard and calibration coefficients derived from standards NBS - 1878a quartz, NBS - 1879a cristobalite, and NIOSH/IITRI TY 27 tridymite mixed with CaF₂. A portion of the unground material was examined by CCSEM to determine particle sizing. The percentage respirable quartz is determined by multiplying the appropriate size fraction by the percentage quartz determined by XRD.



81067 Brandon Shores synthetic gypsum	-002	<0.1	0.01	<0.01
--	------	------	------	-------

*no cristobalite or tridymite detected

Authorized Signature Heather L. Adamson Date 05/01/15
 Heather L. Adamson
 Scientist, X-ray Diffraction Group

This laboratory operates in accord with ISO 17025:2005 guidelines, and holds a limited scope of accreditations under different accrediting agencies; refer to <http://www.rjlg.com/about-us/accreditations/> for more information and current status.

LABORATORY REPORT-Does Not Meet USG Targets

US Gypsum Corp.
700 North Highway 45
Libertyville, IL 60048
ATTENTION: Fred Boehnert
Telephone: 847-970-5089

Report Date: November 17, 2015
Samples Received: November 2, 2015
RJ Lee Group Job No.: CUH1038844
Client Project No.: N/A
Purchase Order No.: 922023

ANALYSIS: Total and Respirable Crystalline Silica

METHODS: X-Ray Diffraction (XRD) and Computer-Controlled Scanning Electron Microscopy (CCSEM)

A portion of the sample was digested with HCl. The resulting residue was mixed with calcium fluoride (CaF₂) as an internal standard, ground further, and backloaded into a standard XRD holder. The sample was scanned using standard run parameters on a PANalytical X'Pert Pro diffractometer equipped with copper radiation. The weight percentage of silica was calculated through the use of the internal standard and calibration coefficients derived from standards NBS - 1878a quartz, NBS - 1879a cristobalite, and NIOSH/IITRI TY 27 tridymite mixed with CaF₂. A portion of the unground material was examined by CCSEM to determine particle sizing. The percentage respirable quartz is determined by multiplying the appropriate size fraction by the percentage quartz determined by XRD.

Sample Identification		Total Crystalline Silica*	Respirable Silica in Bulk	
Client	RJ Lee Group	(weight %)	<10µm (weight %)	<5µm (weight %)
RM 81067 Oct. 28, 2015	10347794	1.7	0.72	0.22

*no cristobalite or tridymite detected

Authorized Signature Heather L. Adamson Date 11/17/2015
Heather L. Adamson
Scientist, X-ray Diffraction Group

This laboratory operates in accord with ISO 17025:2005 guidelines, and holds a limited scope of accreditations under different accrediting agencies; refer to <http://www.rjlg.com/about-us/accreditations/> for more information and current status.

Date: October 30, 2015

Log #: 2015-382

TO: Fred Boehnert

FROM: Denise Nutt

SUBJECT: Raven FGD Gypsum October 2015



Corporate Innovation
Center

Distribution:

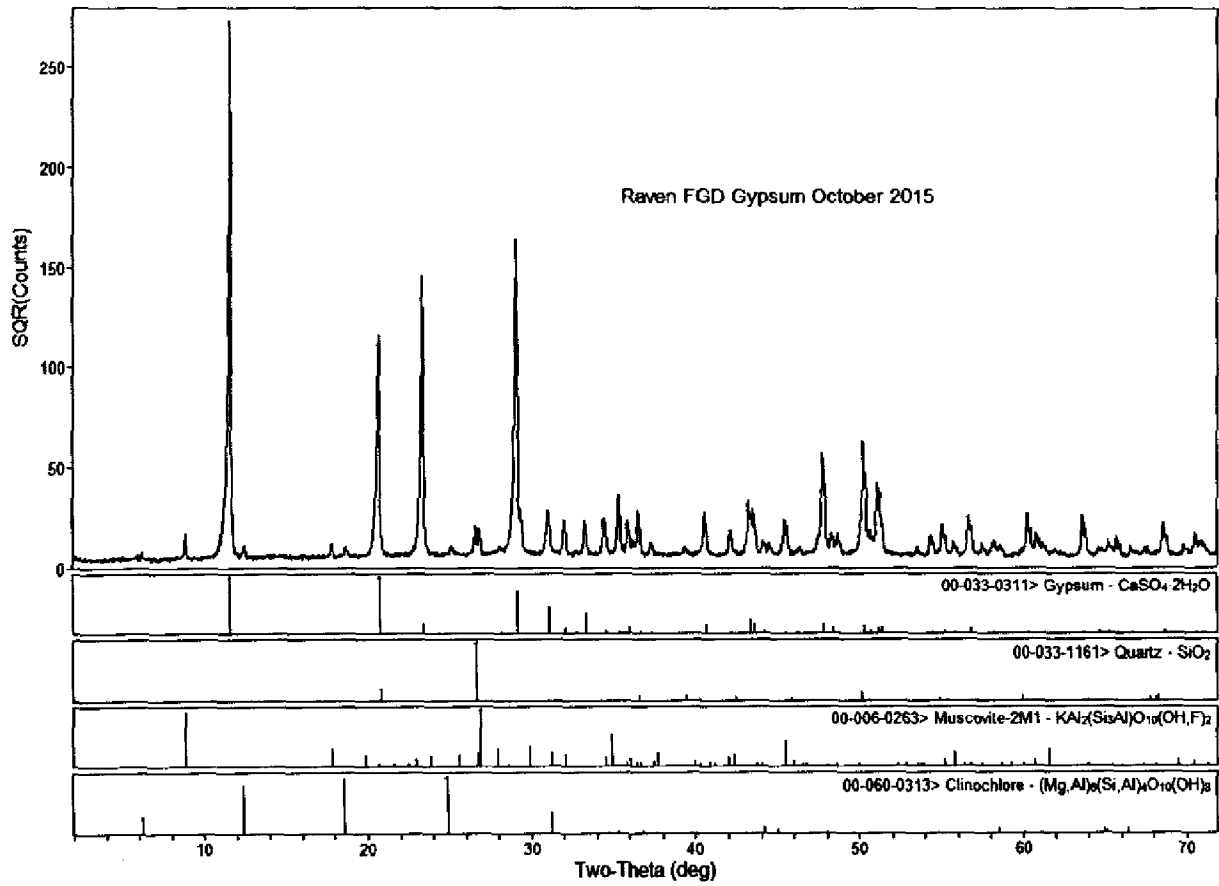
COMPANY CONFIDENTIAL

File D. Song

A sample of Raven FGD Gypsum October 2015 was brought to the laboratory for analysis. The sample was fused for XRF oxide analysis using 0.75g sample (LOI free 1000° C) and 9.0g sodium tetraborate flux. Thermal analysis was used for LOI.

XRD was run and the sample is mostly Gypsum with a trace amount of Quartz, Mica and Chlorite.

	Raven FGD Gypsum October 2015		Raven FGD Gypsum October 2015
Oxides	Wt%	Reconstruction	Wt%
CaO	32.35	Gypsum	94.82
SO ₃	44.53	Calcite	1.32
MgO	0.17	Celestine	0.03
SrO	0.02		
Al ₂ O ₃	0.23		
Fe ₂ O ₃	0.15		
SiO ₂	1.68		
P ₂ O ₅	0.05		
K ₂ O	0.06		
LOI (45-1000° C)	20.76		
Total	100.00		



USG

ILGNU3518JRX(druffl)-q:WALVRD Data>Data 2015> Friday, October 30, 2015 03:29p (MDI/JADE9)