

Facility Name: Constellation -- Brandon Shores **CCB Tonnage Report -- 2009**

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.

**III. Required Information.** The following information must be provided to the Department by March 1, 2010:

A. Contact information:

Facility Name: Brandon Shores Electric Generation Station

Name of Permit Holder: Constellation Power Source Generation

Facility Address: 2030 Brandon Shores Road  
Street

Facility Address: Baltimore Maryland 21226  
City State Zip

County: Anne Arundel

Contact Information (Person filing report or Environmental Manager)

Facility Telephone No.: 410.787.6928 Facility Fax No.: 410.787.5577

Contact Name: John E. Murosko, P.G.

Contact Title: Program Manager, Environmental Services

Contact Address: 1005 Brandon Shores Road  
Street

Contact Address: Baltimore Maryland 21226  
City State Zip

Contact Email: john.murosko@constellation.com

Contact Telephone No.: 410.787.5471 Contact Fax No.: 410.787.6637

*For questions on how to complete this form, please call Mr. Edward Dexter, Administrator, Solid Waste Program at 410-537-3318.*

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

The Brandon Shores Generation Station consists of two coal-fired generating units with a combined nominal generating capacity of approximately 1,370 megawatts (MW). Brandon Shores is co-located on a 483-acre site with the H.A. Wagner Generating Station along Fort Smallwood Road in northern Anne Arundel County. Unit #1 was placed in commercial service in 1984, and Unit #2 was placed in commercial service in 1991. Both units are natural circulation radiant boilers manufactured by Babcock and Wilcox (B&W). Coal is delivered to the Brandon Shores site by barge and stored in areas adjacent to Units 1 and 2. The coal is transferred to the plant storage bunkers via conveyor belts, after which the coal is pulverized and blown into the furnace where combustion of the coal is accomplished utilizing low NOx burners. The flue gas for each unit is passed through hot-side electrostatic precipitators (ESPs) to collect the particulate matter (PM) emissions, followed by selective catalytic reduction (SCR) to reduce the NOx emissions. Ash is collected from the ESP hoppers and conveyed pneumatically to storage silos from where it is loaded into trucks for final disposition.

In 2009, the Brandon Shores Plant burned bituminous coal from Central Appalachian and South American sources.

C. The annual volume of coal combustion byproducts generated during the last calendar year, including an identification of the different types of coal combustion byproducts generated and the volume of each type generated. If the space provided is insufficient, please attach additional pages in a similar format:

Table I: Volume of CCBs Generated for Previous Calendar Year:

Reporting Year	Volume of CCB Type: Fly Ash (dry tons)	Volume of CCB Type: Bottom Ash (dry tons)	Volume of CCB Type:
2009	360,953	18,998	

Additional notes:

In December 2009, CPSG started up the flue gas scrubber on Brandon Shores Unit 1 for testing. A small amount of gypsum was produced; however, the amount produced could not be determined or distinguished from seed gypsum brought on site for the test, and it was not removed from the site. Therefore, gypsum and other FGD products that may have been produced as a result of the startup test are not reported here.

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

Neither modeling nor risk assessments have been performed during the past year.

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

- Fly Ash Tests for MDE, Phase Separation Science, Inc., September 22, 2009

F. A description of how you disposed of or used your coal combustion byproducts in the last calendar year, identifying:

(a) The types and volume of coal combustion byproducts disposed of or used (if different than described in Paragraph C above), the location of disposal, mine reclamation and use sites, and the type and volume of coal combustion byproducts disposed of or used at each site:

Year	CCB Receiver	Fly Ash (dry tons)	Bottom Ash (dry tons)	CCBs Use
2009	STI	230,027	0	concrete
	Lehigh	61,231	1,560	concrete
	Bulk Materials, Int'l	0	3,649	cement kiln feed
	Waste Mgmt, VA	64,374	13,155	landfill, daily cover
	Mountainview LF, MD	3,204	634	landfill, daily cover
	Tri-Cities LF, VA	2,117	0	landfill, structural fill

and (b) The different uses by type and volume of coal combustion byproducts:

- CCBs delivered to Waste Management were used for daily cover in municipal solid waste (MSW) landfills located in Charles City and King George, VA.
- CCBs delivered to Mountainview Landfill in Allegany County, MD were used for daily cover in that MSW landfill, as authorized by MDE.
- CCBs delivered to Tri-Cities Landfill in Petersburg, VA will be used as structural fill to build walls and barriers in that MSW landfill.
- STI processed fly ash from Brandon Shores, distributing their product to concrete plants throughout the Mid-Atlantic region and Puerto Rico.
- CCBs delivered to Lehigh Cement in Union Bridge, MD were used in concrete production.
- CCBs delivered to Bulk Materials, Inc. were subsequently shipped by BMI to a LaFarge cement plant in New York for use as cement kiln feed

If the space provided is insufficient, please attach additional pages in a similar format. . (Please note that in subsequent years you need only provide the information in Section F for the last calendar year).

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

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

• Fly Ash: CPSG projects that approximately 382,000 tons will be generated each year for the next five years. Approximately 355,000 tons will be beneficially used in cement and/or concrete. Approximately 27,000 tons per year will be disposed of in landfills in Virginia and Maryland authorized to accept CCBs, used primarily for daily cover. Beginning in March 2011, CPSG plans to place fly ash not beneficially used in a permitted industrial waste landfill in Baltimore City.

• Bottom Ash: CPSG projects that approximately 20,000 tons will be generated each year for the next five years, all of which will be disposed of in Virginia and Maryland authorized to accept CCBs, used primarily for daily cover. Beginning in March 2011, CPSG plans to place bottom ash in a permitted industrial waste landfill in Baltimore City.

• FGD Materials: CPSG projects that approximately 220,000 tons will be generated each year for the next five years. Approximately 194,000 tons will be beneficially used in wallboard, cement and/or concrete. Approximately 26,000 tons will be disposed of in landfills in Virginia and Maryland authorized to accept CCBs. Beginning in March 2011, CPSG plans to place gypsum not beneficially used in a permitted industrial waste landfill in Baltimore City.

and (b) The different intended uses by type and volume of coal combustion byproducts.


• Fly Ash: Approximately 355,000 tons each year will be beneficially used in cement and/or concrete.

• Bottom Ash: No beneficial use other than as daily cover at landfills is projected; however, CPSG will consider any opportunities that may come up.

• FGD Materials: Approximately 194,000 tons each year will be beneficially used in wallboard, cement and/or concrete. Agricultural use opportunities may be considered.

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

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

This is to certify that, to the best of my knowledge, the information contained in this report and any attached documents are true, accurate, and complete.		
 Signature	<u>Quinn Morrison, Director-Asset Operations</u> 410.787.5399	<u>2/26/2010</u> Date
	Name, Title, & Telephone No.  <u>quinn.morrison@constellation.com</u> Your Email Address	

**Analytical Report for**  
**Constellation Energy Group**  
**Certificate of Analysis No.: 9091404**

**Project Manager: Beth Pittaway**  
**Project Name : Fly Ash Tests for MDE**  
**Project Location: Various Coal Plants**



**September 22, 2009**  
**Phase Separation Science, Inc.**  
**6630 Baltimore National Pike**  
**Baltimore, MD 21228**  
**Phone: (410) 747-8770**  
**Fax: (410) 788-8723**

OFFICES:  
6630 BALTIMORE NATIONAL  
PIKE  
ROUTE 40 WEST  
BALTIMORE, MD 21228  
410-747-8770  
800-932-9047

# PHASE SEPARATION SCIENCE, INC.



September 22, 2009

**Beth Pittaway**  
**Constellation Energy Group**  
1005 Brandon Shores Rd.  
Baltimore, MD 21226

Reference: PSS Work Order No: **9091404**  
Project Name : Fly Ash Tests for MDE  
Project Location: Various Coal Plants

Dear Beth Pittaway :

The attached Analytical and QC Summary lists 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 numbered **9091404**.

All work reported herein has been performed in accordance with referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual. 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 19, 2009. 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 10 years, after which time it will be disposed 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](mailto:info@phaseonline.com).

**Dan Prucnal**  
Laboratory Manager



**Case Narrative Summary**  
**Client Name: Constellation Energy Group**  
**Project Name: Fly Ash Tests for MDE**

**Project ID: N/A**

**Work Order Number: 9091404**

The following samples were received under chain of custody by Phase Separation Science (PSS) on 09/14/2009 at 01:21 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
9091404-001	Brandon Shores #1	SOLID	09/14/2009 09:00
9091404-002	Brandon Shores #2	SOLID	09/14/2009 09:00
9091404-003	Crane	SOLID	09/14/2009 09:00
9091404-004	Wagner #2	SOLID	09/14/2009 09:00
9091404-005	Wagner #3	SOLID	09/14/2009 09:00
9091404-006	Brandon Shores #4 Silo	SOLID	09/14/2009 09:00
9091404-007	Wagner Bottom Ash	SOLID	09/14/2009 09:00
9091404-008	Brandon Shores Wastewater Slud	SOLID	09/14/2009 09:00
9091404-009	Brandon Shores Bottom Ash	SOLID	09/14/2009 09:00

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 the Sample Receipt Checklist.

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.

**Narrative Comments:**

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

All Sulfur results reported on an "as received" basis.

**Notes:**

1. The presence of common laboratory contaminants such as acetone, methylene chloride and phthalates, may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. The following analytical results are never reported on a dry weight basis: 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].

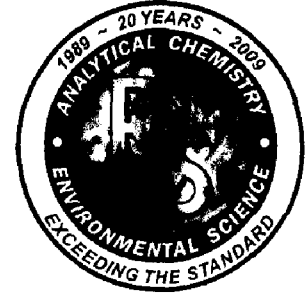
**Standard Flags/Abbreviations:**

- 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.
  - D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
  - E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
  - J The target analyte was positively identified below the reporting limit but greater than one-half of the reporting limit.
- ND Not Detected at or above the reporting limit.  
RL Reporting Limit.  
U Not detected.



OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404

Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #1  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00  
 Date/Time Received: 09/14/2009 13:21

PSS Sample ID: 9091404-001  
 % Solids: 100

Total Metals

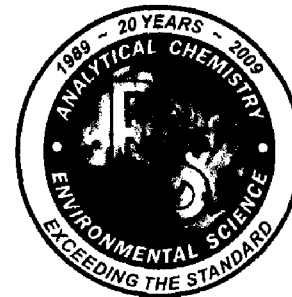
Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	Rep Limit	Flag	Dil	Prepared	Analyzed	Analyst
Aluminum	10,000	mg/kg	4,900		200	09/14/09	09/16/09 21:24	1033
Antimony	2.2	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Arsenic	30	mg/kg	0.2		1	09/14/09	09/15/09 13:40	1033
Barium	160	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Beryllium	2.4	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Boron	13	mg/kg	2.0	B	1	09/14/09	09/15/09 13:40	1033
Cadmium	ND	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Calcium	1,500	mg/kg	40		1	09/14/09	09/15/09 13:40	1033
Chromium	38	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Cobalt	10	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Copper	44	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Iron	11,000	mg/kg	4,900		100	09/14/09	09/16/09 13:14	1033
Lead	21	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Lithium	28	mg/kg	1.0		1	09/14/09	09/15/09 13:40	1033
Magnesium	680	mg/kg	40		1	09/14/09	09/15/09 13:40	1033
Manganese	33	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Mercury	ND	mg/kg	0.1		1	09/14/09	09/15/09 13:40	1033
Molybdenum	13	mg/kg	4.0		1	09/14/09	09/15/09 13:40	1033
Nickel	18	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Potassium	1,700	mg/kg	40		1	09/14/09	09/15/09 13:40	1033
Selenium	ND	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Silver	ND	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Sodium	270	mg/kg	40	B	1	09/14/09	09/15/09 13:40	1033
Thallium	0.63	mg/kg	0.4		1	09/14/09	09/15/09 13:40	1033
Vanadium	56	mg/kg	2.0		1	09/14/09	09/15/09 13:40	1033
Zinc	33	mg/kg	8.1		1	09/14/09	09/15/09 13:40	1033

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #1  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00  
 Date/Time Received: 09/14/2009 13:21

PSS Sample ID: 9091404-001

**Total Metals**

Analytical Method: SW846 6010B

	Result	Units	Rep Limit	Flag	Prepared	Analyzed	Analyst
Sulfur	529	mg/kg	33.6		09/15/09	09/15/09 14:04	4005

**TCLP Metals**

Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	5.0		1	09/14/09	09/15/09 15:37	1034
Barium	ND	mg/L	100		1	09/14/09	09/15/09 15:37	1034
Cadmium	ND	mg/L	1.0		1	09/14/09	09/15/09 15:37	1034
Chromium	ND	mg/L	5.0		1	09/14/09	09/15/09 15:37	1034
Lead	ND	mg/L	5.0		1	09/14/09	09/15/09 15:37	1034
Mercury	ND	mg/L	0.200		1	09/14/09	09/15/09 15:37	1034
Selenium	ND	mg/L	1.0		1	09/14/09	09/15/09 15:37	1034
Silver	ND	mg/L	5.0		1	09/14/09	09/15/09 15:37	1034

**TCLP Organochlorine Pesticides**

Analytical Method: SW846 8081B

Preparation Method: SW846 3510C

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Chlordane	ND	mg/L	0.030		1	09/15/09	09/16/09 12:27	1029
Endrin	ND	mg/L	0.020		1	09/15/09	09/16/09 12:27	1029
gamma-BHC (Lindane)	ND	mg/L	0.400		1	09/15/09	09/16/09 12:27	1029
Heptachlor	ND	mg/L	0.008		1	09/15/09	09/16/09 12:27	1029
Heptachlor epoxide	ND	mg/L	0.008		1	09/15/09	09/16/09 12:27	1029
Methoxychlor	ND	mg/L	10		1	09/15/09	09/16/09 12:27	1029
Toxaphene	ND	mg/L	0.500		1	09/15/09	09/16/09 12:27	1029

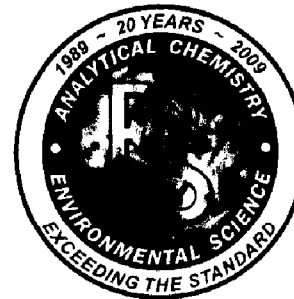
**TCLP Chlorinated Herbicides**

Analytical Method: SW846 8151A

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-D	ND	mg/L	10		1	09/15/09	09/15/09 20:24	1029
2,4,5-TP (Silvex)	ND	mg/L	1.0		1	09/15/09	09/15/09 20:24	1029

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #1  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00 PSS Sample ID: 9091404-001  
 Date/Time Received: 09/14/2009 13:21

TCLP Volatile Organic Compounds

Analytical Method: SW846 8260B

Preparation Method: SW846 5030B

	Result	Units	TCLP Limit	Flag	Dil Prepared	Analyzed	Analyst
Vinyl chloride	ND	mg/L	0.2		20 09/15/09	09/15/09 14:32	1011
1,1-Dichloroethene	ND	mg/L	0.7		20 09/15/09	09/15/09 14:32	1011
2-Butanone (MEK)	ND	mg/L	200		20 09/15/09	09/15/09 14:32	1011
Chloroform	ND	mg/L	6.0		20 09/15/09	09/15/09 14:32	1011
1,2-Dichloroethane	ND	mg/L	0.5		20 09/15/09	09/15/09 14:32	1011
Carbon tetrachloride	ND	mg/L	0.5		20 09/15/09	09/15/09 14:32	1011
Benzene	ND	mg/L	0.5		20 09/15/09	09/15/09 14:32	1011
Trichloroethene	ND	mg/L	0.5		20 09/15/09	09/15/09 14:32	1011
Tetrachloroethene	ND	mg/L	0.7		20 09/15/09	09/15/09 14:32	1011
Chlorobenzene	ND	mg/L	100		20 09/15/09	09/15/09 14:32	1011
1,4-Dichlorobenzene	ND	mg/L	7.5		20 09/15/09	09/15/09 14:32	1011

TCLP Semivolatile Organic Compounds

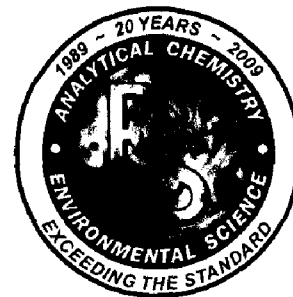
Analytical Method: SW846 8270C

Preparation Method: SW846 3550

	Result	Units	TCLP Limit	Flag	Dil Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	mg/L	0.130		1 09/15/09	09/16/09 00:27	1014
Hexachlorobenzene	ND	mg/L	0.130		1 09/15/09	09/16/09 00:27	1014
Hexachlorobutadiene	ND	mg/L	0.500		1 09/15/09	09/16/09 00:27	1014
Hexachloroethane	ND	mg/L	3.0		1 09/15/09	09/16/09 00:27	1014
2-Methyl phenol	ND	mg/L	200		1 09/15/09	09/16/09 00:27	1014
3&4-Methylphenol	ND	mg/L	200		1 09/15/09	09/16/09 00:27	1014
Nitrobenzene	ND	mg/L	2.0		1 09/15/09	09/16/09 00:27	1014
Pentachlorophenol	ND	mg/L	100		1 09/15/09	09/16/09 00:27	1014
Pyridine	ND	mg/L	5.0		1 09/15/09	09/16/09 00:27	1014
2,4,6-Trichlorophenol	ND	mg/L	2.0		1 09/15/09	09/16/09 00:27	1014
2,4,5-Trichlorophenol	ND	mg/L	400		1 09/15/09	09/16/09 00:27	1014

OFFICES:  
 8630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #2  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00  
 Date/Time Received: 09/14/2009 13:21

PSS Sample ID: 9091404-002  
 % Solids: 100

Total Metals

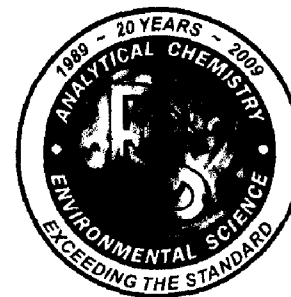
Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	Rep Limit	Flag	Dil	Prepared	Analyzed	Analyst
Aluminum	9,300	mg/kg	4,800		200	09/14/09	09/16/09 21:31	1033
Antimony	2.0	mg/kg	2.3	J	1	09/14/09	09/15/09 15:16	1033
Arsenic	20	mg/kg	0.2		1	09/14/09	09/15/09 15:16	1033
Barium	160	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Beryllium	2.8	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Boron	15	mg/kg	2.3	B	1	09/14/09	09/15/09 15:16	1033
Cadmium	ND	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Calcium	1,800	mg/kg	46		1	09/14/09	09/15/09 15:16	1033
Chromium	28	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Cobalt	12	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Copper	49	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Iron	6,400	mg/kg	2,400		50	09/14/09	09/16/09 13:20	1033
Lead	18	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Lithium	27	mg/kg	1.1		1	09/14/09	09/15/09 15:16	1033
Magnesium	760	mg/kg	46		1	09/14/09	09/15/09 15:16	1033
Manganese	35	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Mercury	ND	mg/kg	0.1		1	09/14/09	09/15/09 15:16	1033
Molybdenum	11	mg/kg	4.6		1	09/14/09	09/15/09 15:16	1033
Nickel	20	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Potassium	2,000	mg/kg	46		1	09/14/09	09/15/09 15:16	1033
Selenium	ND	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Silver	ND	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Sodium	320	mg/kg	46	B	1	09/14/09	09/15/09 15:16	1033
Thallium	0.64	mg/kg	0.5		1	09/14/09	09/15/09 15:16	1033
Vanadium	58	mg/kg	2.3		1	09/14/09	09/15/09 15:16	1033
Zinc	30	mg/kg	9.2		1	09/14/09	09/15/09 15:16	1033

OFFICES:  
 8630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #2  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00 PSS Sample ID: 9091404-002  
 Date/Time Received: 09/14/2009 13:21

Total Metals

Analytical Method: SW846 6010B

	Result	Units	Rep Limit	Flag	Prepared	Analyzed	Analyst
Sulfur	732	mg/kg	35.7		09/15/09	09/15/09 14:12	4005

TCLP Metals

Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	5.0		1	09/14/09	09/15/09 16:06	1034
Barium	ND	mg/L	100		1	09/14/09	09/15/09 16:06	1034
Cadmium	ND	mg/L	1.0		1	09/14/09	09/15/09 16:06	1034
Chromium	ND	mg/L	5.0		1	09/14/09	09/15/09 16:06	1034
Lead	ND	mg/L	5.0		1	09/14/09	09/15/09 16:06	1034
Mercury	ND	mg/L	0.200		1	09/14/09	09/15/09 16:06	1034
Selenium	ND	mg/L	1.0		1	09/14/09	09/15/09 16:06	1034
Silver	ND	mg/L	5.0		1	09/14/09	09/15/09 16:06	1034

TCLP Organochlorine Pesticides

Analytical Method: SW846 8081B

Preparation Method: SW846 3510C

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Chlordane	ND	mg/L	0.030		1	09/15/09	09/16/09 12:27	1029
Endrin	ND	mg/L	0.020		1	09/15/09	09/16/09 12:27	1029
Heptachlor	ND	mg/L	0.008		1	09/15/09	09/16/09 12:27	1029
gamma-BHC (Lindane)	ND	mg/L	0.400		1	09/15/09	09/16/09 12:27	1029
Heptachlor epoxide	ND	mg/L	0.008		1	09/15/09	09/16/09 12:27	1029
Methoxychlor	ND	mg/L	10		1	09/15/09	09/16/09 12:27	1029
Toxaphene	ND	mg/L	0.500		1	09/15/09	09/16/09 12:27	1029

TCLP Chlorinated Herbicides

Analytical Method: SW846 8151A

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-D	ND	mg/L	10		1	09/15/09	09/16/09 01:16	1029
2,4,5-TP (Silvex)	ND	mg/L	1.0		1	09/15/09	09/16/09 01:16	1029

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404

Constellation Energy Group, Baltimore, MD

September 22, 2009

Project Name: Fly Ash Tests for MDE

Project Location: Various Coal Plants

Sample ID: Brandon Shores #2

Date/Time Sampled: 09/14/2009 09:00

PSS Sample ID: 9091404-002

Matrix: SOLID

Date/Time Received: 09/14/2009 13:21

TCLP Volatile Organic Compounds

Analytical Method: SW846 8260B

Preparation Method: SW846 5030B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Vinyl chloride	ND	mg/L	0.2		20	09/15/09	09/15/09 15:00	1011
1,1-Dichloroethene	ND	mg/L	0.7		20	09/15/09	09/15/09 15:00	1011
2-Butanone (MEK)	ND	mg/L	200		20	09/15/09	09/15/09 15:00	1011
Chloroform	ND	mg/L	6.0		20	09/15/09	09/15/09 15:00	1011
1,2-Dichloroethane	ND	mg/L	0.5		20	09/15/09	09/15/09 15:00	1011
Carbon tetrachloride	ND	mg/L	0.5		20	09/15/09	09/15/09 15:00	1011
Benzene	ND	mg/L	0.5		20	09/15/09	09/15/09 15:00	1011
Trichloroethene	ND	mg/L	0.5		20	09/15/09	09/15/09 15:00	1011
Tetrachloroethene	ND	mg/L	0.7		20	09/15/09	09/15/09 15:00	1011
Chlorobenzene	ND	mg/L	100		20	09/15/09	09/15/09 15:00	1011
1,4-Dichlorobenzene	ND	mg/L	7.5		20	09/15/09	09/15/09 15:00	1011

TCLP Semivolatile Organic Compounds

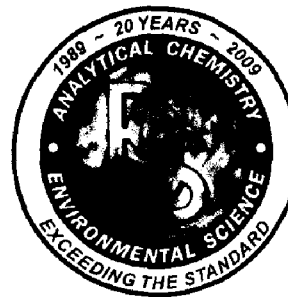
Analytical Method: SW846 8270C

Preparation Method: SW846 3550

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	mg/L	0.130		1	09/15/09	09/15/09 23:56	1014
Hexachlorobenzene	ND	mg/L	0.130		1	09/15/09	09/15/09 23:56	1014
Hexachlorobutadiene	ND	mg/L	0.500		1	09/15/09	09/15/09 23:56	1014
Hexachloroethane	ND	mg/L	3.0		1	09/15/09	09/15/09 23:56	1014
2-Methyl phenol	ND	mg/L	200		1	09/15/09	09/15/09 23:56	1014
3&4-Methylphenol	ND	mg/L	200		1	09/15/09	09/15/09 23:56	1014
Nitrobenzene	ND	mg/L	2.0		1	09/15/09	09/15/09 23:56	1014
Pentachlorophenol	ND	mg/L	100		1	09/15/09	09/15/09 23:56	1014
Pyridine	ND	mg/L	5.0		1	09/15/09	09/15/09 23:56	1014
2,4,6-Trichlorophenol	ND	mg/L	2.0		1	09/15/09	09/15/09 23:56	1014
2,4,5-Trichlorophenol	ND	mg/L	400		1	09/15/09	09/15/09 23:56	1014

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404

Constellation Energy Group, Baltimore, MD

September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #4 Silo  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00

PSS Sample ID: 9091404-006

Date/Time Received: 09/14/2009 13:21

% Solids: 100

Total Metals

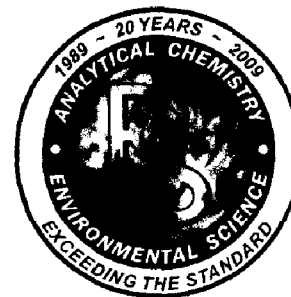
Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	Rep Limit	Flag	Dil	Prepared	Analyzed	Analyst
Aluminum	9,400	mg/kg	4,800		200	09/14/09	09/16/09 21:53	1033
Antimony	1.9	mg/kg	2.4	J	1	09/14/09	09/15/09 15:42	1033
Arsenic	23	mg/kg	0.2		1	09/14/09	09/15/09 15:42	1033
Barium	210	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Beryllium	2.7	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Boron	21	mg/kg	2.4	B	1	09/14/09	09/15/09 15:42	1033
Cadmium	ND	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Calcium	2,100	mg/kg	48		1	09/14/09	09/15/09 15:42	1033
Chromium	53	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Cobalt	13	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Copper	47	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Iron	15,000	mg/kg	4,800		100	09/14/09	09/16/09 13:46	1033
Lead	16	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Lithium	20	mg/kg	1.2		1	09/14/09	09/15/09 15:42	1033
Magnesium	730	mg/kg	48		1	09/14/09	09/15/09 15:42	1033
Manganese	45	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Mercury	ND	mg/kg	0.1		1	09/14/09	09/15/09 15:42	1033
Molybdenum	37	mg/kg	4.8		1	09/14/09	09/15/09 15:42	1033
Nickel	21	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Potassium	1,600	mg/kg	48		1	09/14/09	09/15/09 15:42	1033
Selenium	2.0	mg/kg	2.4	J	1	09/14/09	09/15/09 15:42	1033
Silver	ND	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Sodium	260	mg/kg	48	B	1	09/14/09	09/15/09 15:42	1033
Thallium	1.2	mg/kg	0.5		1	09/14/09	09/15/09 15:42	1033
Vanadium	75	mg/kg	2.4		1	09/14/09	09/15/09 15:42	1033
Zinc	23	mg/kg	9.6		1	09/14/09	09/15/09 15:42	1033

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #4 Silo      Date/Time Sampled: 09/14/2009 09:00      PSS Sample ID: 9091404-006  
 Matrix: SOLID      Date/Time Received: 09/14/2009 13:21

Total Metals      Analytical Method: SW846 6010B

Result	Units	Rep Limit	Flag	Prepared	Analyzed	Analyst
724	mg/kg	35.7		09/15/09	09/15/09 14:23	4005

TCLP Metals      Analytical Method: SW846 6020A      Preparation Method: SW846 3050B

Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	5.0	1	09/14/09	09/16/09 11:09	1034
Barium	ND	mg/L	100	1	09/14/09	09/16/09 11:09	1034
Cadmium	ND	mg/L	1.0	1	09/14/09	09/16/09 11:09	1034
Chromium	ND	mg/L	5.0	1	09/14/09	09/16/09 11:09	1034
Lead	ND	mg/L	5.0	1	09/14/09	09/16/09 11:09	1034
Mercury	ND	mg/L	0.200	1	09/14/09	09/16/09 11:09	1034
Selenium	ND	mg/L	1.0	1	09/14/09	09/16/09 11:09	1034
Silver	ND	mg/L	5.0	1	09/14/09	09/16/09 11:09	1034

TCLP Organochlorine Pesticides      Analytical Method: SW846 8081B      Preparation Method: SW846 3510C

Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Chlordane	ND	mg/L	0.030	1	09/15/09	09/16/09 13:23	1029
Endrin	ND	mg/L	0.020	1	09/15/09	09/16/09 13:23	1029
Heptachlor	ND	mg/L	0.008	1	09/15/09	09/16/09 13:23	1029
gamma-BHC (Lindane)	ND	mg/L	0.400	1	09/15/09	09/16/09 13:23	1029
Heptachlor epoxide	ND	mg/L	0.008	1	09/15/09	09/16/09 13:23	1029
Methoxychlor	ND	mg/L	10	1	09/15/09	09/16/09 13:23	1029
Toxaphene	ND	mg/L	0.500	1	09/15/09	09/16/09 13:23	1029

TCLP Chlorinated Herbicides      Analytical Method: SW846 8151A

Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-D	ND	mg/L	10	1	09/15/09	09/16/09 02:21	1029
2,4,5-TP (Silvex)	ND	mg/L	1.0	1	09/15/09	09/16/09 02:21	1029



OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores #4 Silo  
 Matrix: SOLID

Date/Time Sampled: 09/14/2009 09:00 PSS Sample ID: 9091404-006  
 Date/Time Received: 09/14/2009 13:21

TCLP Volatile Organic Compounds

Analytical Method: SW846 8260B

Preparation Method: SW846 5030B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Vinyl chloride	ND	mg/L	0.2		20	09/15/09	09/15/09 16:51	1011
1,1-Dichloroethene	ND	mg/L	0.7		20	09/15/09	09/15/09 16:51	1011
2-Butanone (MEK)	ND	mg/L	200		20	09/15/09	09/15/09 16:51	1011
Chloroform	ND	mg/L	6.0		20	09/15/09	09/15/09 16:51	1011
1,2-Dichloroethane	ND	mg/L	0.5		20	09/15/09	09/15/09 16:51	1011
Carbon tetrachloride	ND	mg/L	0.5		20	09/15/09	09/15/09 16:51	1011
Benzene	ND	mg/L	0.5		20	09/15/09	09/15/09 16:51	1011
Trichloroethene	ND	mg/L	0.5		20	09/15/09	09/15/09 16:51	1011
Tetrachloroethene	ND	mg/L	0.7		20	09/15/09	09/15/09 16:51	1011
Chlorobenzene	ND	mg/L	100		20	09/15/09	09/15/09 16:51	1011
1,4-Dichlorobenzene	ND	mg/L	7.5		20	09/15/09	09/15/09 16:51	1011

TCLP Semivolatile Organic Compounds

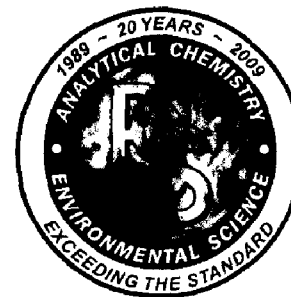
Analytical Method: SW846 8270C

Preparation Method: SW846 3550

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	mg/L	0.130		1	09/15/09	09/16/09 02:31	1014
Hexachlorobenzene	ND	mg/L	0.130		1	09/15/09	09/16/09 02:31	1014
Hexachlorobutadiene	ND	mg/L	0.500		1	09/15/09	09/16/09 02:31	1014
Hexachloroethane	ND	mg/L	3.0		1	09/15/09	09/16/09 02:31	1014
2-Methyl phenol	ND	mg/L	200		1	09/15/09	09/16/09 02:31	1014
3&4-Methylphenol	ND	mg/L	200		1	09/15/09	09/16/09 02:31	1014
Nitrobenzene	ND	mg/L	2.0		1	09/15/09	09/16/09 02:31	1014
Pentachlorophenol	ND	mg/L	100		1	09/15/09	09/16/09 02:31	1014
Pyridine	ND	mg/L	5.0		1	09/15/09	09/16/09 02:31	1014
2,4,6-Trichlorophenol	ND	mg/L	2.0		1	09/15/09	09/16/09 02:31	1014
2,4,5-Trichlorophenol	ND	mg/L	400		1	09/15/09	09/16/09 02:31	1014

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404

Constellation Energy Group, Baltimore, MD

September 22, 2009

Project Name: Fly Ash Tests for MDE

Project Location: Various Coal Plants

Sample ID: **Brandon Shores Bottom Ash** Date/Time Sampled: **09/14/2009 09:00** PSS Sample ID: **9091404-009**  
 Matrix: **SOLID** Date/Time Received: **09/14/2009 13:21** % Solids: **64**

Total Metals

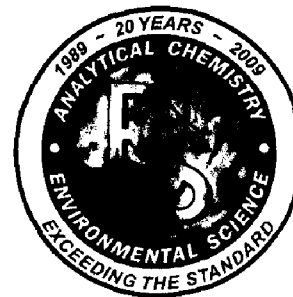
Analytical Method: SW846 6020A

Preparation Method: SW846 3050B

	Result	Units	Rep Limit	Flag	Dil	Prepared	Analyzed	Analyst
Aluminum	980	mg/kg	380		10	09/14/09	09/16/09 14:24	1033
Antimony	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Arsenic	0.78	mg/kg	0.4		1	09/14/09	09/15/09 16:01	1033
Barium	34	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Beryllium	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Boron	3.9	mg/kg	3.8	B	1	09/14/09	09/15/09 16:01	1033
Cadmium	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Calcium	960	mg/kg	76		1	09/14/09	09/15/09 16:01	1033
Chromium	3.3	mg/kg	3.8	J	1	09/14/09	09/15/09 16:01	1033
Cobalt	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Copper	3.3	mg/kg	3.8	J	1	09/14/09	09/15/09 16:01	1033
Iron	2,500	mg/kg	76		1	09/14/09	09/15/09 16:01	1033
Lead	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Lithium	2.0	mg/kg	1.9		1	09/14/09	09/15/09 16:01	1033
Magnesium	250	mg/kg	76		1	09/14/09	09/15/09 16:01	1033
Manganese	22	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Mercury	ND	mg/kg	0.2		1	09/14/09	09/15/09 16:01	1033
Molybdenum	ND	mg/kg	7.6		1	09/14/09	09/15/09 16:01	1033
Nickel	4.8	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Potassium	170	mg/kg	76		1	09/14/09	09/15/09 16:01	1033
Selenium	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Silver	ND	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Sodium	110	mg/kg	76	B	1	09/14/09	09/15/09 16:01	1033
Thallium	ND	mg/kg	0.8		1	09/14/09	09/15/09 16:01	1033
Vanadium	4.6	mg/kg	3.8		1	09/14/09	09/15/09 16:01	1033
Zinc	ND	mg/kg	15		1	09/14/09	09/15/09 16:01	1033

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404

Constellation Energy Group, Baltimore, MD

September 22, 2009

Project Name: Fly Ash Tests for MDE

Project Location: Various Coal Plants

Sample ID: Brandon Shores Bottom Ash Date/Time Sampled: 09/14/2009 09:00 PSS Sample ID: 9091404-009  
 Matrix: SOLID Date/Time Received: 09/14/2009 13:21

Total Metals Analytical Method: SW846 6010B

	Result	Units	Rep Limit	Flag	Prepared	Analyzed	Analyst
Sulfur	49.1	mg/kg	35.5		09/15/09	09/15/09 14:29	4005

TCLP Metals Analytical Method: SW846 6020A Preparation Method: SW846 3050B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Arsenic	ND	mg/L	5.0		1	09/14/09	09/16/09 11:27	1034
Barium	ND	mg/L	100		1	09/14/09	09/16/09 11:27	1034
Cadmium	ND	mg/L	1.0		1	09/14/09	09/16/09 11:27	1034
Chromium	ND	mg/L	5.0		1	09/14/09	09/16/09 11:27	1034
Lead	ND	mg/L	5.0		1	09/14/09	09/16/09 11:27	1034
Mercury	ND	mg/L	0.200		1	09/14/09	09/16/09 11:27	1034
Selenium	ND	mg/L	1.0		1	09/14/09	09/16/09 11:27	1034
Silver	ND	mg/L	5.0		1	09/14/09	09/16/09 11:27	1034

TCLP Organochlorine Pesticides Analytical Method: SW846 8081B Preparation Method: SW846 3510C

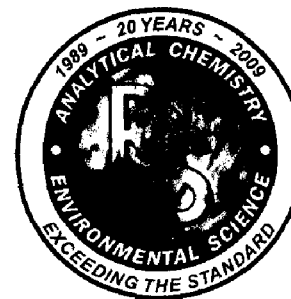
	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Chlordane	ND	mg/L	0.030		1	09/15/09	09/16/09 14:19	1029
Endrin	ND	mg/L	0.020		1	09/15/09	09/16/09 14:19	1029
gamma-BHC (Lindane)	ND	mg/L	0.400		1	09/15/09	09/16/09 14:19	1029
Heptachlor	ND	mg/L	0.008		1	09/15/09	09/16/09 14:19	1029
Heptachlor epoxide	ND	mg/L	0.008		1	09/15/09	09/16/09 14:19	1029
Methoxychlor	ND	mg/L	10		1	09/15/09	09/16/09 14:19	1029
Toxaphene	ND	mg/L	0.500		1	09/15/09	09/16/09 14:19	1029

TCLP Chlorinated Herbicides Analytical Method: SW846 8151A

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-D	ND	mg/L	10		1	09/15/09	09/15/09 22:34	1029
2,4,5-TP (Silvex)	ND	mg/L	1.0		1	09/15/09	09/15/09 22:34	1029

OFFICES:  
 6630 BALTIMORE NATIONAL PIKE  
 ROUTE 40 WEST  
 BALTIMORE, MD 21228  
 410-747-8770  
 800-932-9047  
 FAX 410-788-8723

# PHASE SEPARATION SCIENCE, INC.



## CERTIFICATE OF ANALYSIS

No: 9091404  
 Constellation Energy Group, Baltimore, MD  
 September 22, 2009

Project Name: Fly Ash Tests for MDE  
 Project Location: Various Coal Plants

Sample ID: Brandon Shores Bottom Ash Date/Time Sampled: 09/14/2009 09:00 PSS Sample ID: 9091404-009  
 Matrix: SOLID Date/Time Received: 09/14/2009 13:21

TCLP Volatile Organic Compounds Analytical Method: SW846 8260B Preparation Method: SW846 5030B

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
Vinyl chloride	ND	mg/L	0.2		20	09/15/09	09/15/09 18:14	1011
1,1-Dichloroethane	ND	mg/L	0.7		20	09/15/09	09/15/09 18:14	1011
2-Butanone (MEK)	ND	mg/L	200		20	09/15/09	09/15/09 18:14	1011
Chloroform	ND	mg/L	6.0		20	09/15/09	09/15/09 18:14	1011
1,2-Dichloroethane	ND	mg/L	0.5		20	09/15/09	09/15/09 18:14	1011
Carbon tetrachloride	ND	mg/L	0.5		20	09/15/09	09/15/09 18:14	1011
Benzene	ND	mg/L	0.5		20	09/15/09	09/15/09 18:14	1011
Trichloroethane	ND	mg/L	0.5		20	09/15/09	09/15/09 18:14	1011
Tetrachloroethane	ND	mg/L	0.7		20	09/15/09	09/15/09 18:14	1011
Chlorobenzene	ND	mg/L	100		20	09/15/09	09/15/09 18:14	1011
1,4-Dichlorobenzene	ND	mg/L	7.5		20	09/15/09	09/15/09 18:14	1011

TCLP Semivolatile Organic Compounds Analytical Method: SW846 8270C Preparation Method: SW846 3550

	Result	Units	TCLP Limit	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dinitrotoluene	ND	mg/L	0.130		1	09/15/09	09/16/09 04:04	1014
Hexachlorobenzene	ND	mg/L	0.130		1	09/15/09	09/16/09 04:04	1014
Hexachlorobutadiene	ND	mg/L	0.500		1	09/15/09	09/16/09 04:04	1014
Hexachloroethane	ND	mg/L	3.0		1	09/15/09	09/16/09 04:04	1014
2-Methyl phenol	ND	mg/L	200		1	09/15/09	09/16/09 04:04	1014
3&4-Methylphenol	ND	mg/L	200		1	09/15/09	09/16/09 04:04	1014
Nitrobenzene	ND	mg/L	2.0		1	09/15/09	09/16/09 04:04	1014
Pentachlorophenol	ND	mg/L	100		1	09/15/09	09/16/09 04:04	1014
Pyridine	ND	mg/L	5.0		1	09/15/09	09/16/09 04:04	1014
2,4,6-Trichlorophenol	ND	mg/L	2.0		1	09/15/09	09/16/09 04:04	1014
2,4,5-Trichlorophenol	ND	mg/L	400		1	09/15/09	09/16/09 04:04	1014



# SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

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

## PHASE SEPARATION SCIENCE, INC.

<b>1</b> CLIENT: CPSC OFFICE LOC. Coal Yard		PAGE 1 OF 1										
PROJECT MGR: Beth Pittaway PHONE NO.: 410-787-5320		Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil VM=Waste Liquid WS=Waste Solid W= Wipe										
EMAIL: beth.pittaway@constellation.com FAX NO.: 410-787-5424		PROSPECTIVE Used ←										
PROJECT NAME: Fly Ash Tests for MDE PROJECT NO.:		Analysis/ Method Required										
SITE LOCATION: various coal plants P.O. NO.:		REMARKS ↓ Click to enter Remarks										
SAMPLERS: DW CERT NO.:												
2	LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX (See Codes)	SAMPLE TYPE	C= COMP	G= GRAB	No. CONTAINER	SAMPLER	REMARKS	
	1	Brandon Shores # 1	9/14/09	9am	Fly Ash	G			1	G	Attached Comar	
	2	Brandon Shores # 2	9/14/09	9am	Fly Ash	G			1	G	✓	
	3	Crane	9/14/09	9am	Fly Ash	G			1	G	✓	
	4	Wagner # 2	9/14/09	9am	Fly Ash	G			1	G	✓	
	5	Wagner # 3	9/14/09	9am	Fly Ash	G			1	G	✓	
	6	Brandon Shores # 4 Site	9/14/09	9am	Fly Ash	G			1	G	✓	
	7	Wagner Bottom Ash	9/14/09	9am	Btm Ash	G			1	G	✓	
	8	Brandon Shores Waste Water Sludge	9/14/09	9am	Sludge	G			1	G	✓	
	9	Brandon Shores Bottom Ash	9/14/09	9am	Btm Ash	G			1	G	✓	
5	Relinquished By: (1) <i>F. Kees Blom</i> Date: 9/14/09 Time: 1321		Received By: <i>[Signature]</i>		Requested Turnaround Time: <input type="checkbox"/> 5-Day <input type="checkbox"/> 3-Day <input type="checkbox"/> 2-Day <input type="checkbox"/> Next Day <input type="checkbox"/> Emergency <input type="checkbox"/> Other		# of Coolers: 0 Custody Seal: ABS		Ice Present: ABS Temp: 30°C Shipping Container: OVENT		Data Deliverables Required:	
	Relinquished By: (2)		Received By:		Special Instructions: Please test samples per attached Comar 26.21.04.05B 12 PM							
	Relinquished By: (3)		Received By:									
	Relinquished By: (4)		Received By:									

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.

9091404

Amy

---

**From:** Pittaway, Beth [Beth.Pittaway@constellation.com]  
**Sent:** Monday, September 14, 2009 2:17 PM  
**To:** 'amyf@phaseonline.com'  
**Cc:** despinoza@Geosyntec.com; mlloyd1@a-oenv.com  
**Subject:** CCB analyses  
**Attachments:** Document.pdf

Amy,

Nine samples were just dropped off to you for analysis labeled as:

1. Brandon Shores Unit 1
2. Brandon Shores Unit 2
3. Brandon Shores #4 Silo
4. Brandon Shores Bottom Ash
5. Brandon Wastewater sludge
6. Wagner Unit 2
7. Wagner Unit 3
8. Wagner Bottom Ash
9. Crane Ash

We require a Total analysis for the elements detailed in the attached COMAR 26.21.04.05 B. We also need a full TCLP on the samples as required in COMAR 26.21.04.03A(3) which references 40 CFR Section 261.24.

Thanks for your help and the quick turn around.

Beth Pittaway  
Assistant General Supervisor  
Fuel and Ash Handling  
410-787-5320  
410-733-2165 (cell)

>>> This e-mail and any attachments are confidential, may contain legal, professional or other privileged information, and are intended solely for the addressee. If you are not the intended recipient, do not use the information in this e-mail in any way, delete this e-mail and notify the sender. CEG-IP2

9/14/2009

[Try Another Page](#) | [Return to Main COMAR Search Page](#)

410-747-8770

26.21.04.05

Amy f@

phase@trac.com

### .05 Initial and Ongoing Characterization.

A. A person who uses or intends to use, or gives, sells, or otherwise provides for use, coal combustion byproducts for noncoal surface mine reclamation shall develop and implement a sampling plan, using a methodology acceptable to the Department for the initial characterization of the coal combustion byproducts.

B. The sampling plan shall include the following:

(1) A list of the parameters to be analyzed and their detection limits (Practical Quantitation Limits—PQL), which shall include, at a minimum, the following:

#### ELEMENTS AND INDICATOR PARAMETERS PQL(mg/kg)

Total Aluminum	40
Total Antimony	1
Total Arsenic	1
Total Barium	1
Total Beryllium	1
Total Boron	20
Total Cadmium	1
Total Chromium	1
Total Calcium	1
Total Cobalt	1
Total Copper	2
Total Iron	500
Total Lead	1
Total Magnesium	100
Total Lithium	1
Total Manganese	1
Total Mercury	0.2
Total Molybdenum	10
Total Nickel	5
Total Potassium	100
Total Selenium	4
Total Silver	1
Total Sodium	100
Total Sulfur	10
Total Thallium	50.0
Total Vanadium	4
Total Zinc	10

(2) A description of analytical methods to be used in the characterization, which is subject to the approval of the Department; and

(3) Other information as may be required by the Department.

C. Coal combustion byproducts shall be characterized in accordance with the sampling plan developed under §A of this regulation at least one time per calendar year.

D. Laboratory results from the initial and ongoing characterizations of the coal combustion byproducts shall be submitted to the Department and to any recipients of the coal combustion byproducts.

E. If there is a change in the raw materials or processes that generate the coal combustion byproducts, the generator of the coal combustion byproducts shall characterize the byproducts in accordance with the sampling plan and submit the results to the Department. All subsequent characterizations shall include any additional parameters found in the coal combustion byproducts.



[Try Another Page](#) | [Return to Main COMAR Search Page](#)

26.21.04.03

### **.03 Authorization of Use and General Requirements.**

#### **A. Authorization of Use.**

(1) Coal combustion byproducts may be used in the reclamation of a permitted noncoal surface mine only when approved by the Department.

(2) The Department shall review and approve the use as part of a permit review or permit modification in accordance with this chapter and in accordance with the applicable provisions of Environment Article, Title 15, Subtitle 8, Annotated Code of Maryland, and COMAR 26.21.

#### **B. General Requirements.**

(1) Flue gas desulfurization sludge and other solid residuals recovered from flue gas by wet or dry methods that are generated by the combustion of coal may not be used in the reclamation of a noncoal surface mine.

(2) The use of coal combustion byproducts in the reclamation of a noncoal surface mine shall be designed to prevent the degradation of water quality.

(3) Coal combustion byproducts containing a constituent at a level exceeding the TCLP toxicity limits defined in 40 CFR §261.24 may not be used in the reclamation of a noncoal surface mine.

(4) To minimize leachate generation, coal combustion byproducts used in noncoal surface mine reclamation shall be placed in layers and compacted to at least 90 percent of its maximum dry density based on ASTM D698 (Standard Proctor), or to a permeability of less than 10<sup>-5</sup> centimeters/second. Thickness of each layer may not be greater than 12 inches.

(5) Final grade of a site after reclamation may not exceed approximate pre-mining contours at the site, except where post-mining land use requires minimal variation and is approved by the Department.

(6) Coal combustion byproducts may not be placed in ground or surface waters and may not be placed within 3 feet of the maximum expected ground water elevation at the site, unless the Department approves otherwise upon a demonstration that ground water contamination will not occur.

(7) The area of exposed coal combustion byproducts at a site shall be minimized and may not exceed 5 acres unless approved by the Department.

(8) Coal combustion byproducts at a site shall be immediately placed and compacted and may not be stockpiled.

(9) If placement of coal combustion byproducts is halted for more than 15 days, the coal combustion byproducts shall be covered to prevent infiltration of ground or surface water.

(10) Adequate measures shall be taken to minimize dust at a site as follows:

(a) A person shall control dust by moisture-conditioning the coal combustion byproducts before they leave the coal combustion byproducts generating facility, or by handling them in sealed containers designed for transportation of powdery solids and moisture-conditioning them prior to off-loading them to the ground;

(b) A person shall control dust by spreading and compacting the coal combustion byproducts upon arrival at a site;

(c) A person may not store uncompacted coal combustion byproducts at a site;

(d) A water truck shall be available to add water at a site as needed for fugitive dust control; and

(e) The Department may require other measures it considers necessary to protect public health and the environment.

- (11) Only coal combustion byproducts obtained from sources approved by the Department may be used at a site
- (12) Coal combustion byproducts may not be placed within 200 feet of any lands not owned by the permittee or owner
- (13) A permittee shall implement an erosion and sediment control plan that satisfies the requirements of Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland, and COMAR 26.17.01
- (14) A permittee shall provide a minimum of two upgradient and two downgradient monitoring wells at a site. The Department may require additional monitoring wells based upon site conditions. Monitoring wells shall be constructed and installed by a State-licensed well driller in accordance with COMAR 26.04.04. The well screen or slotted casing shall extend from the seasonally high water table downward a minimum of 15 feet.
- (15) A permittee shall comply with all other permits and approvals required by the Department

in ASTM Standard D-3278-73 (incorporated by reference, see § 260.11), or as determined by an equivalent test method approved by the Administrator under procedures set forth in §§ 260.20 and 260.21.

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and when ignited, burns so vigorously and persistently that it creates a hazard.

(3) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Administrator under §§ 260.20 and 260.21.

(4) It is an oxidizer as defined in 49 CFR 173.151.

(b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D061

[45 FR 33118, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 53 FR 22684, June 1, 1988]

#### § 261.22 Characteristic of corrosivity.

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2, or greater than or equal to 12.5, as determined by a pH meter using Method 8940 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 260.11 of this chapter.

(2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55°C (130°F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-68 as standardized in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 260.11 of this chapter.

(b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002

[45 FR 33118, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 53 FR 22684, June 1, 1988; 58 FR 46049, Aug. 31, 1993]

#### § 261.23 Characteristic of reactivity.

(a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

(1) It is normally unstable and readily undergoes violent change without detonating.

(2) It reacts violently with water.

(3) It forms potentially explosive mixtures with water.

(4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive, as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.56.

(b) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003

[45 FR 33118, May 19, 1980, as amended at 55 FR 22684, June 1, 1990]

#### § 261.24 Toxicity characteristic.

(a) A solid waste (except manufactured gas plant waste) exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 260.11 of this chapter, the extract from a representative sample of the waste contains any of the contaminants listed in table 1 at the concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste

itself, after filtering, using the methodology outlined in Method 1311, is considered to be the extract for the purpose of this section.

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

TABLE I—HAZARDOUS CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC

EPA HW No. 1	Contaminant	CAS No. 2	Regulatory Level (mg/L)
D004	Arsenic	7440-88-2	5.0
D006	Berlium	7440-89-3	100.0
D016	Benzene	71-43-2	0.6
D008	Cadmium	7440-43-8	1.0
D019	Carbon tetrachloride	55-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-68-3	8.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-49-7	*200.0
D024	m-Cresol	108-39-4	*200.0
D025	p-Cresol	109-44-8	*200.0
D026	Cresol		*200.0
D010	2,4-D	94-76-7	10.0
D027	1,4-Dichlorobenzene	106-48-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.6
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrochlorobenzene	121-14-2	50.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	*0.13
D033	Hexachlorocyclopentadiene	97-69-0	0.5
D034	Hexachlorocyclopentadiene	97-72-1	5.0
D009	Lead	7439-92-1	5.0
D013	Lindane	58-99-9	0.4
D009	Marsily	7439-97-8	0.2
D014	Methoxychlor	72-43-5	10.0
D036	Methyl ethyl ketone	78-93-5	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Perchloroethylene	67-65-3	100.0
D038	Cyfluthrin	119-99-1	50.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrahydrothiophene	127-18-4	0.7
D015	Toluene	9091-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	58-90-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,6-TP (Silver)	88-76-1	1.0
D043	Vinyl chloride	75-01-4	0.2

1 Hazardous waste number.  
 2 Chemical abstracts service number.  
 \*Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.  
 \*If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

[55 FR 11862, Mar. 28, 1990, as amended at 55 FR 22584, June 1, 1990; 55 FR 26887, June 28, 1990; 55 FR 46049, Aug. 31, 1990; 67 FR 11254, Mar. 13, 2002]

**Subpart D—Lists of Hazardous Wastes**

**§261.30 General.**

(a) A solid waste is a hazardous waste if it is listed in this subpart, unless it has been excluded from this list under §§260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this subpart by employing one or more of the following Hazard Codes:

- Ignitable Waste (I)
- Corrosive Waste (C)
- Reactive Waste (R)
- Toxicity Characteristic Waste (E)
- Acute Hazardous Waste (H)
- Toxic Waste (T)

Appendix VII identifies the constituent which caused the Administrator to list the waste as a Toxicity Characteristic Waste (E) or Toxic Waste (T) in §§261.31 and 261.32.

(c) Each hazardous waste listed in this subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under parts 262 through 266, 268, and part 270 of this chapter.

(d) The following hazardous wastes listed in §261.31 or §261.32 are subject to the exclusion limits for acutely hazardous wastes established in §261.5: EPA Hazardous Wastes Nos. F020, F021, F022, F023, F026, and F027.

[45 FR 33119, May 19, 1980, as amended at 48 FR 14294, Apr. 1, 1983; 50 FR 2000, Jan. 14, 1985; 51 FR 40826, Nov. 7, 1986; 53 FR 11863, Mar. 29, 1989]

**§261.31 Hazardous wastes from non-specific sources.**

(a) The following solid wastes are listed hazardous wastes from non-specific sources unless they are excluded under §§260.20 and 260.22 and listed in appendix IX



Phase Separation Science, Inc  
Sample Receipt Checklist

Wo Number 9091404 Received By Rachel Davis  
Client Name Constellation Energy Group Date Received 09/14/2009 01:21:00 PM  
Project Name Fly Ash Tests for MDE Delivered By Client  
Project Number N/A Tracking No Not Applicable  
Disposal Date: 10/19/2009 Logged In By Rachel Davis

Shipping Container(s)

No. of Coolers	1	Ice	Absent
Custody Seals	Absent	Temp (deg C)	30
Seal Condition	Not Applicable	Temp Blank Present	No

Documentation

COC agrees with sample labels?  Yes or  No Sampler Name: Not Provided  
Chain of Custody (COC)  Yes or  No

Sample Container

Appropriate for Specified Analysis? Yes  No  Custody Seal(s) Absent  
Intact?   Custody Seal(s) Intact? Not Applicable  
Labeled and Labels Legible   Seal(s) Signed / Dated Not Applicable  
Total No. of Samples Received 9 Total No. of Containers Received 18

Preservation

	Yes	No	N/A
Metals (pH<2)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cyanides (pH>12)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sulfide (pH>9)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TOC, COD, Phenols (pH<2)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TOX, TKN, NH3, Total Phos (pH<2)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VOC, BTEX (VOA Vials Rcvd Preserved) (pH<2)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Do VOA vials have zero headspace?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 Inspected/Checklist Completed By: R. Davis  
PM Review and Approval: [Signature]

Date: 9/15/09  
Date: 9/15/09

Printed: 09/15/2009 10:27 AM