



MIT

GenOn Mid-Atlantic, LLC
Morgantown Generating Station
12620 Crain Hwy.
Newburg, Maryland 20620

Certified Mail/Return Receipt Requested
7017 1450 0000 3681 5033

February 26, 2019

Mr. Ed Dexter
Maryland Department of the Environment
Land Management Administration
1800 Washington Boulevard, Suite 605
Baltimore MD 21230-1719

RECEIVED

MAR 01 2019

LAND MANAGEMENT ADMIN
SOLID WASTE PROGRAM

Re: 2018 CCB Tonnage Report for GenOn Mid-Atlantic, LLC's Morgantown
Generating Station.

Dear Mr. Dexter,

Pursuant to COMAR 26.04.10.08, enclosed please find the 2018 CCB Tonnage
Report for GenOn Mid-Atlantic, LLC's Morgantown Generating Station.

If you have any questions regarding this report, please contact me at 301-843-
4670, or at debra.knight@genon.com.

Regards,

Thomas G. Turk
General Manager

MARYLAND DEPARTMENT OF THE ENVIRONMENT

Land Management Administration • Solid Waste Program
1800 Washington Boulevard • Suite 605 • Baltimore, Maryland 21230-1719
410-537-3315 • 800-633-6101 x3315 • www.mde.maryland.gov

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MAR 01 2019

Coal Combustion Byproducts (CCBs) Annual Generator Tonnage Report Instructions for Calendar Year 2018

LAND MANAGEMENT ADMIN.
SOLID WASTE PROGRAM

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 2018. 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 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: Morgantown Generating Station

CCB Tonnage Report – 2018

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, 2019:

A. Contact information:

Facility Name: Morgantown Generating Station

Name of Permit Holder: GenOn Mid-Atlantic LLC

Facility Address: 12620 Crain Highway
Street

Facility Address: Newburg Maryland 20664
City State Zip

County: Charles

Contact Information (Person filing report or Environmental Manager)

Facility Telephone No.: 301-843-4670 Facility Fax No.: 301-843-4552

Contact Name: Debra Knight

Contact Title: Senior Environmental Specialist

Contact Address: 12620 Crain Highway
Street

Contact Address: Newburg Maryland 20664
City State Zip

Contact Email: debra.knight@genon.com

Contact Telephone No.: 301-843-4670 Contact Fax No.: 301-843-4552

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:

See Attachment A.

C. The volume and weight of CCBs generated during calendar year 2018, 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 2018: Please note that this table includes both the volume and weight of the types of CCBs your facility produces.

Volume and Weight of CCBs Generated for Calendar Year 2018			
<u>FlyAsh</u> Type of CCB	<u>BottomAsh</u> Type of CCB	<u>On-Spec Gypsum</u> Type of CCB	<u>WWTP Fines</u> Type of CCB
60,801	16,398	51,741	1,013
Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards
60,801	16,398	101,073	1,979
Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons

Additional notes:

CCB Tonnages are reported in dry short tons. CCB volumes are reported in dry Cubic Yards.

WWTP Tons represent fines from the Flue Gas Desulfurization's Waste Water Treatment

Volumes of Flyash in Dry Cubic Yards are calculated from dry short tons using a density of 1.0 Tons/Dry CY.

Volumes of Bottom Ash in Dry Cubic Yards are calculated from dry short tons using a density of 1.0 Tons/Dry CY.

Volumes of On-Spec Gypsum and WWTP Fines are calculated from dry short tons using a density of 1.95 Tons/Dry CY.

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.

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

F. A description of how you disposed of or used your CCBs in calendar year 2018, 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:

FlyAsh: A total of 60,801 tons of flyash were generated at Morgantown in 2018, and 28,563 tons were imported from the Chalk Point Generating Station for processing at the STAR facility. Ash processed at the STAR facility is reduced in weight thru combustion and the remaining product is sent to temporary storage before being sold. Of this ash 81,354 tons (54,788 tons which were generated at Morgantown) were sold to SEFA (headquartered in Columbia, SC) for beneficial use as cementitious material for concrete and concrete products in Maryland (10,964 tons total, of which 7,384 tons were generated at Morgantown) and in six other states (70,390 total tons for the other 6 states combined, of which 47,404 were generated at Morgantown). The Chalk Point tonnages of the sold flyash are addressed in the Chalk Point CCB Report.

Bottom Ash: 16,398 tons of dry bottom ash was generated in 2018, of which 5,257 tons were disposed of at the Brandywine Ash Site, located in Brandywine Md., and 11,141 tons were disposed of at Waste Management's Amelia Landfill, located in Jesterville, Va.

On-Spec Gypsum: 101,073 tons of On-Spec Gypsum were generated at Morgantown in 2018, and 3,900 tons were stored on-site at the end of 2017. Of this total, 88,592 tons were transported by barge to Continental, located in Buchanan, NY for use in the manufacture of wallboard, and a total of 16,381 tons were stored on site at the end of 2018.

WWTP Fines produced in 2018 was 1,979 tons, all of which was disposed of at Waste Management's Amelia Landfill located in Jetersville, Va.

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

FlyAsh:

Volume: 54,788 tons of Morgantown generated flyash sold.

Uses:

1) 54,788 tons beneficially used as a Supplementary cementitious material for concrete and concrete products, 7,384 tons of which were used in Md., and 47,404 tons beneficially used in six other states.

On-Spec Gypsum:

Volume: 88,592 tons sold

Use: Wallboard

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:

FlyAsh: Approximately 61,000 dry tons to be generated at Morgantown and 29,000 dry tons to be imported from Chalk Point Generating Station, all to be sold to SEFA, headquartered in Columbia, SC.

Bottom Ash: Anticipate 16,000 tons to be generated and disposed of at the Brandywine ash site in Prince George’s County, Md. and Waste Management’s Amelia Landfill, located in Jesterville, Va.

On-Spec Gypsum: Anticipate approximately 100,000 dry tons to be generated and transported by barge to Continental, located in Buchanan, NY.

WWTP Fines: Approximately 2,000 dry tons to be generated and disposed of at Waste Management’s Amelia Landfill located in Jetersville, Va.

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

FlyAsh:

Volume: Approximately 56,000 dry tons of Morgantown generated to be sold

Uses: 1) All used as a Supplementary cementitious material for concrete and concrete products.


On-Spec Gypsum:

Volume: Approximately 100,000 tons to be sold

Use: Wallboard

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.		
<hr/> Signature 	<hr/> Thomas G. Turk, General Manager, <u>Morgantown Generating Station</u> 301-843-4521 <hr/> Name, Title, & Telephone No. (Print or Type) Thom.Turk@genon.com <hr/> Your Email Address	<hr/> Date

V: Attachments (please list):

- A)Morgantown Generating Station Process Description
- B)Microbac Report #18B1353: Analyses of Fly Ash, Bottom Ash, Gypsum, and WWTP Fines

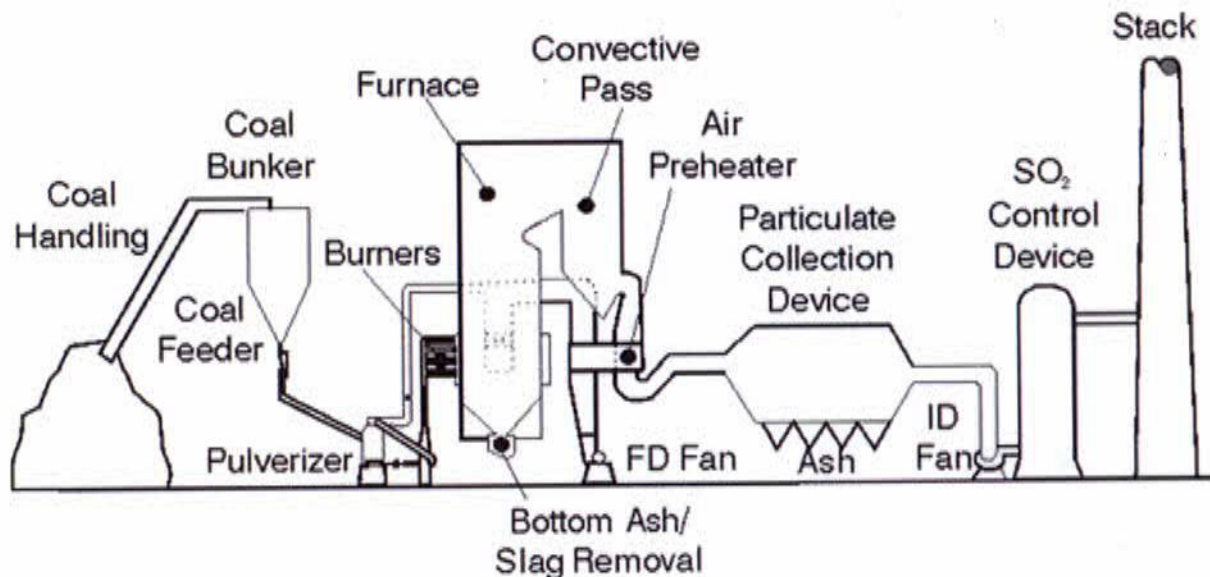
Attachment A

Morgantown Generating Station
12620 Crain Highway,
Newburg, Charles County, MD. 20664
301-843-4670

The Morgantown Generating Station is located on the Potomac River, just south of Rt. 301 at the Harry W. Nice Bridge near the town of Newburg in Charles County, MD. The facility is engaged in the generation of electrical energy for sale. The primary SIC code is 4911. There are two tangentially fired supercritical steam units each firing bituminous coal. Each unit is rated at 640 MWs (base loaded) and each is equipped with a superheater, single reheat, and economizer. Pollution control devices on both units include low NO_x burners with Separated Over-Fired Air (SOFA) and Selective Catalytic Reduction (SCR) for control of oxides of nitrogen (NO_x); and electrostatic precipitators (ESP) for the control of particulate matter. A Wet Scrubber (FGD) was installed and went in service on both units in late 2009. Units 1 & 2 exhausts through the scrubber stack or, when the FGD is not in service, through separate 700 ft. stacks.

Coal is currently delivered by both rail and by barge. The rail cars are emptied using a rotary dumper, then transferred by conveyor and dravo to either a storage pile or fed directly to the units' bunker. The barge unloading facility consists of a dock, an unloader, a transfer system, and a rail loading system and a rail loading facility. The barge unloading transfer and distribution system is integrated into Morgantown's existing coal handling system.

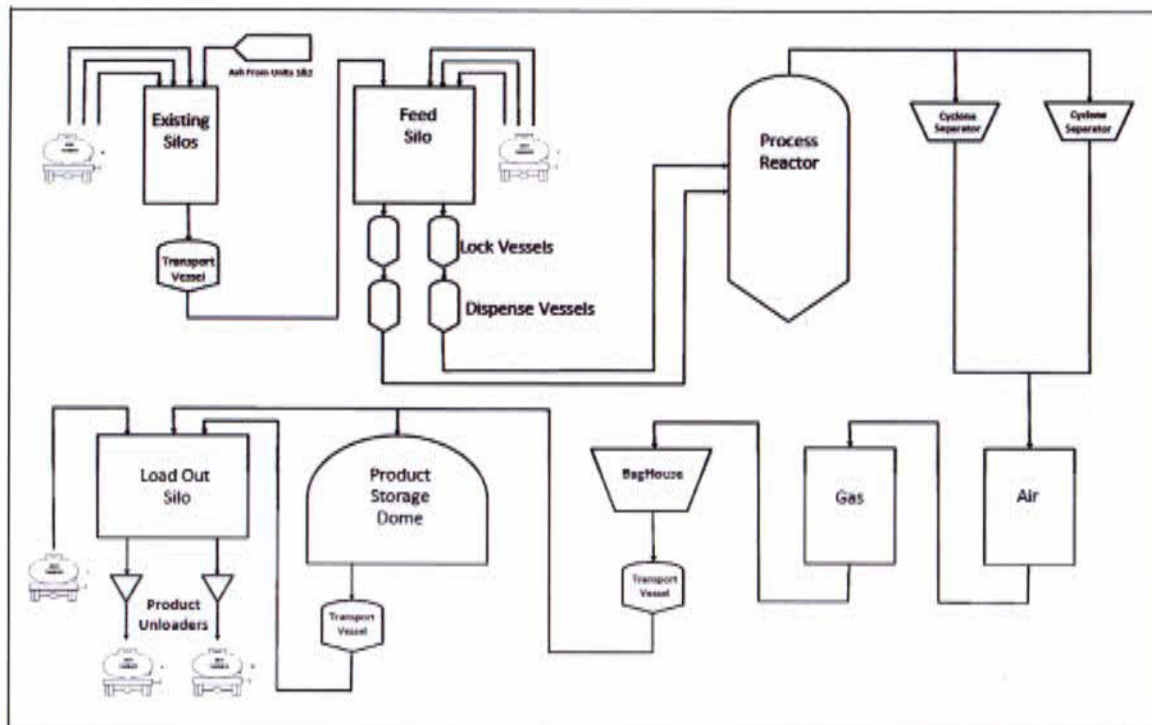
The illustration below shows a simple schematic diagram for a typical pulverized coal combustion system. The coal is prepared by grinding to a very fine consistency for combustion.



Attachment A

The CCBs currently produced and used are a result of the combustion of pulverized coal.

Ash is formed in the boiler while coal combusts. In general, pulverized coal combustion results in approximately 10% ash, of which 65%–90% is fly ash, and the remainder is coarser bottom ash. Bottom ash is a coarse material and falls to the bottom of the boiler. Fly ash is finer than bottom ash and is carried along the combustion process with flue gas. Particulate collection devices remove fly ash from the flue gas and the collected ash is transferred to one of two ash silos. Silo fly ash is either sent to the Staged Turbulent Air Reactor (STAR) facility (which is located on-site) where volatiles are burned off from the ash to make it more marketable or off-loaded for disposal at the Brandywine Ash Site located 29 miles north in Prince Georges County, or to Waste Management's Amelia Landfill, located in Jesterville, VA. Ash from the STAR facility is stored in on-site storage silos until it can be sold. A diagram of the STAR process is shown below.



The bottom ash is conveyed out of the bottom of the boiler via a drag chain conveyor. The bottom ash is then either prepared for sale, disposed of out of state, or sent to the Brandywine Ash Site, where it can be used in the construction of fly ash disposal cells.

Gypsum is a byproduct of SO₂ removal by the Flue Gas Desulfurization (FGD) system, commonly known as a scrubber. Morgantown uses wet scrubbers for SO₂ removal. Wet

scrubbing uses a slurry of limestone alkaline sorbent to remove SO₂, - as well as some mercury contaminants - from the air stream. The byproduct - gypsum - is conveyed to a storage dome temporarily and then sent via barge to Continental, located in Buchanan, New York to be made into wallboard. Gypsum that doesn't meet the specifications for wallboard production is transported for disposal to Waste Management's Amelia Landfill in Virginia. Waste Water Treatment Plant Fines (WWTP Fines) are removed from the Scrubber's WWTP as needed and transported to Waste Management's Amelia Landfill in Virginia for disposal.



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

NRG Energy - Morgantown

Project Name: Morgantown-Fly Ash

Skip Williams
Morgantown Generating Station, 12620 Crain Hwy
Newburg, MD 20664

Project / PO Number: 4501813777
Received: 02/27/2018
Reported: 03/22/2018

Case Narrative

Microbac Laboratories, Inc. - Chicagoland

H - sample received beyond the maximum allowable hold time for sulfur.

Table with 2 columns: Laboratory ID, Sample Name. Rows include 18C0594-01 (Flyash Sample), 18C0594-02 (Bottom ash Sample), 18C0594-03 (Gypsum Sample), 18C0594-04 (WWTP Filter Cake Sample).

Analytical Testing Parameters

Table with 4 columns: Client Sample ID, Sample Matrix, Lab Sample ID, Collected By, Collection Date. Values include Flyash Sample, Solid, 18B1353-01, Customer, 02/02/2018 10:00.

Wet Chemistry

Table with 9 columns: Method, Result, Limit(s), RL, Units, Note, Prepared, Analyzed, Analyst. Rows include % Solids, pH, Chloride, Sulfate as SO4.

Mercury, Total by EPA 7000 Series Methods

Table with 9 columns: Method, Result, Limit(s), RL, Units, Note, Prepared, Analyzed, Analyst. Row includes Mercury.

Metals, Total by EPA 6000/7000 Series Methods

Table with 9 columns: Method, Result, Limit(s), RL, Units, Note, Prepared, Analyzed, Analyst. Rows include Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron.

Microbac Laboratories, Inc.



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Flyash Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 10:00
Lab Sample ID: 18B1353-01	

Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Cadmium	<5.0		5.0	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Calcium	10000		100	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Chromium	53		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Cobalt	14		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Copper	39		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Iron	58000		50	mg/kg dry		03/09/18 1358	03/12/18 1426	APS
Lead	26		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Lithium	33		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Magnesium	1000		100	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Manganese	82		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Molybdenum	<20		20	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Nickel	24		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Potassium	2000		100	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Silver	<2.0		2.0	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Sodium	840		100	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Thallium	<10		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Vanadium	110		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS
Zinc	54		10	mg/kg dry		03/09/18 1358	03/12/18 1342	APS

TCLP Extraction by EPA 1311	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 1311								
TCLP Extraction	COMPLETE D			N/A		03/11/18 1540	03/12/18 1000	APS

TCLP Metals by 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 6010B								
Arsenic	0.98		0.20	mg/L		03/13/18 1558	03/14/18 1510	APS
Barium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1510	APS
Cadmium	<0.10		0.10	mg/L		03/13/18 1558	03/14/18 1510	APS
Chromium	0.42		0.20	mg/L		03/13/18 1558	03/14/18 1510	APS
Lead	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1510	APS
Selenium	<0.40		0.40	mg/L		03/13/18 1558	03/14/18 1510	APS
Silver	<0.040		0.040	mg/L		03/13/18 1558	03/14/18 1510	APS

Method: EPA 7470A	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Mercury	<0.0020	0.20	0.0020	mg/L		03/16/18 1457	03/18/18 1528	APS

Analyses Subcontracted to: Microbac Laboratories, Inc. - Chicagoland

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Microbac Laboratories, Inc.

2101 Van Deman Street | Baltimore, MD 21224 | 410.633.1800 p | www.microbac.com



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Flyash Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 10:00
Lab Sample ID: 18B1353-01	

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: ASTM D129 MOD								
Sulfur (from SO4)	4400		330	mg/Kg wet	H	03/14/18 1709	03/15/18 1510	GRI



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Bottom ash Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 11:00
Lab Sample ID: 18B1353-02	

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 2540 G-11								
% Solids	88.73		0.05	% by Weight		03/01/18 1816	03/02/18 1353	RDM
Method: SW-846 9045D								
pH	7.99		0.100	pH Units	H6	03/13/18 0936	03/13/18 1158	RDM
Method: SW-846 9056A								
Chloride	130		11	mg/kg dry		03/08/18 1409	03/08/18 1506	ANC
Sulfate as SO4	400		11	mg/kg dry		03/08/18 1409	03/08/18 1506	ANC
Mercury, Total by EPA 7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 7471A								
Mercury	<0.027		0.027	mg/kg dry		03/02/18 0941	03/04/18 1708	APS
Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 3050B/EPA 6010B								
Aluminum	21000		54	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Antimony	<22		22	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Arsenic	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Barium	110		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Beryllium	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Boron	47		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Cadmium	<5.4		5.4	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Calcium	4800		110	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Chromium	17		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Cobalt	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Copper	12		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Iron	68000		54	mg/kg dry		03/09/18 1358	03/12/18 1429	APS
Lead	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Lithium	24		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Magnesium	710		110	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Manganese	67		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Molybdenum	<22		22	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Nickel	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Potassium	2000		110	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Silver	<2.2		2.2	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Sodium	630		110	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Thallium	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Vanadium	44		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS
Zinc	<11		11	mg/kg dry		03/09/18 1358	03/12/18 1346	APS

Microbac Laboratories, Inc.



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Bottom ash Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 11:00
Lab Sample ID: 18B1353-02	

Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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TCLP Extraction by EPA 1311	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 1311 TCLP Extraction	COMPLETE D			N/A		03/11/18 1540	03/12/18 1000	APS

TCLP Metals by 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
---	--------	----------	----	-------	------	----------	----------	---------

Method: EPA 6010B								
Arsenic	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1513	APS
Barium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1513	APS
Cadmium	<0.10		0.10	mg/L		03/13/18 1558	03/14/18 1513	APS
Chromium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1513	APS
Lead	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1513	APS
Selenium	<0.40		0.40	mg/L		03/13/18 1558	03/14/18 1513	APS
Silver	<0.040		0.040	mg/L		03/13/18 1558	03/14/18 1513	APS

Method: EPA 7470A								
Mercury	<0.0020	0.20	0.0020	mg/L		03/16/18 1457	03/18/18 1530	APS

Analyses Subcontracted to: Microbac Laboratories, Inc. - Chicagoland

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: ASTM D129 MOD								
Sulfur (from SO4)	480		330	mg/Kg wet	H	03/14/18 1709	03/15/18 1512	GRI



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Gypsum Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 13:00
Lab Sample ID: 18B1353-03	

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: SM 2540 G-11								
% Solids	77.79		0.05	% by Weight		03/01/18 1816	03/02/18 1353	RDM
Method: SW-846 9045D								
pH	6.38		0.100	pH Units	H6	03/13/18 0938	03/13/18 1158	RDM
Method: SW-846 9056A								
Chloride	56		13	mg/kg dry		03/08/18 1409	03/08/18 1516	ANC
Sulfate as SO4	99000		1300	mg/kg dry		03/08/18 1409	03/09/18 1112	ANC
Mercury, Total by EPA 7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 7471A								
Mercury	0.73		0.031	mg/kg dry		03/02/18 0941	03/04/18 1711	APS
Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 3050B/EPA 6010B								
Aluminum	600		290	mg/kg dry		03/09/18 1358	03/13/18 1300	APS
Antimony	<24		24	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Arsenic	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Barium	50		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Beryllium	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Boron	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Cadmium	<5.9		5.9	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Calcium	280000		590	mg/kg dry		03/09/18 1358	03/13/18 1300	APS
Chromium	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Cobalt	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Copper	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Iron	1700		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Lead	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Lithium	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Magnesium	<590		590	mg/kg dry		03/09/18 1358	03/13/18 1300	APS
Manganese	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Molybdenum	<24		24	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Nickel	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Potassium	250		120	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Silver	<2.4		2.4	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Sodium	<120		120	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Thallium	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Vanadium	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS
Zinc	<12		12	mg/kg dry		03/09/18 1358	03/12/18 1357	APS

Microbac Laboratories, Inc.



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: Gypsum Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 13:00
Lab Sample ID: 18B1353-03	

Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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TCLP Extraction by EPA 1311	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: EPA 1311								
TCLP Extraction	COMPLETE D			N/A		03/11/18 1540	03/12/18 1000	APS

TCLP Metals by 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: EPA 6010B								
Arsenic	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1517	APS
Barium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1517	APS
Cadmium	<0.10		0.10	mg/L		03/13/18 1558	03/14/18 1517	APS
Chromium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1517	APS
Lead	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1517	APS
Selenium	<0.40		0.40	mg/L		03/13/18 1558	03/14/18 1517	APS
Silver	<0.040		0.040	mg/L		03/13/18 1558	03/14/18 1517	APS

Method: EPA 7470A								
Mercury	<0.0020	0.20	0.0020	mg/L		03/16/18 1457	03/18/18 1532	APS

Analyses Subcontracted to: Microbac Laboratories, Inc. - Chicagoland

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: ASTM D129 MOD								
Sulfur (from SO4)	30000		6700	mg/Kg wet	H	03/14/18 1709	03/15/18 1543	GRI



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: WWTP Filter Cake Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 14:00
Lab Sample ID: 18B1353-04	

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: SM 2540 G-11

% Solids	54.60		0.05	% by Weight		03/01/18 1816	03/02/18 1353	RDM
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Method: SW-846 9045D

pH	8.54		0.100	pH Units	H6	03/13/18 0936	03/13/18 1158	RDM
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Method: SW-846 9056A

Chloride	2100		180	mg/kg dry		03/08/18 1409	03/09/18 1124	ANC
Sulfate as SO4	90000		1800	mg/kg dry		03/08/18 1409	03/09/18 1136	ANC

Mercury, Total by EPA 7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: EPA 7471A

Mercury	32		0.86	mg/kg dry		03/02/18 0941	03/04/18 1723	APS
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Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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Method: EPA 3050B/EPA 6010B

Aluminum	16000		87	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Antimony	<35		35	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Arsenic	120		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Barium	580		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Beryllium	<17		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Boron	1300		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Cadmium	<8.7		8.7	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Calcium	170000		870	mg/kg dry		03/09/18 1358	03/13/18 1304	APS
Chromium	120		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Cobalt	<17		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Copper	45		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Iron	26000		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Lead	27		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Lithium	<17		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Magnesium	15000		870	mg/kg dry		03/09/18 1358	03/13/18 1304	APS
Manganese	970		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Molybdenum	<35		35	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Nickel	200		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Potassium	4400		170	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Silver	<3.5		3.5	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Sodium	760		170	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Thallium	<17		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Vanadium	81		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS
Zinc	130		17	mg/kg dry		03/09/18 1358	03/12/18 1401	APS

Microbac Laboratories, Inc.



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Client Sample ID: WWTP Filter Cake Sample	Collected By: Customer
Sample Matrix: Solid	Collection Date: 02/02/2018 14:00
Lab Sample ID: 18B1353-04	

Metals, Total by EPA 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
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TCLP Extraction by EPA 1311	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 1311 TCLP Extraction	COMPLETE D			N/A		03/11/18 1540	03/12/18 1000	APS

TCLP Metals by 6000/7000 Series Methods	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
---	--------	----------	----	-------	------	----------	----------	---------

Method: EPA 6010B								
Arsenic	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1520	APS
Barium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1520	APS
Cadmium	<0.10		0.10	mg/L		03/13/18 1558	03/14/18 1520	APS
Chromium	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1520	APS
Lead	<0.20		0.20	mg/L		03/13/18 1558	03/14/18 1520	APS
Selenium	<0.40		0.40	mg/L		03/13/18 1558	03/14/18 1520	APS
Silver	<0.040		0.040	mg/L		03/13/18 1558	03/14/18 1520	APS

Method: EPA 7470A								
Mercury	<0.0020	0.20	0.0020	mg/L		03/16/18 1457	03/18/18 1535	APS

Analyses Subcontracted to: Microbac Laboratories, Inc. - Chicagoland

Wet Chemistry	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: ASTM D129 MOD								
Sulfur (from SO4)	30000		3300	mg/Kg wet	H	03/14/18 1709	03/15/18 1545	GRI

Results in bold have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.

Definitions

- H: Sample was analyzed past holding time
- H6: Sample received past holding time; analysis best performed at time of collection.
- RL: Reporting Limit



Microbac Laboratories, Inc. - Baltimore

CERTIFICATE OF ANALYSIS

18B1353

Project Requested Certification(s)

Microbac Laboratories, Inc. - Baltimore

E871126

Florida - NELAC

Microbac Laboratories, Inc. - Chicagoland

3045.01

A2LA (Biology)

3045.02

A2LA (Chemistry)

460280

VA NELAP

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Melanie C. Duszynski

Project Manager

melanie.duszynski@microbac.com

03/22/2018 07:20

Microbac Laboratories, Inc.

2101 Van Deman Street | Baltimore, MD 21224 | 410.633.1800 p | www.microbac.com

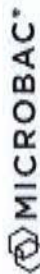
Microbac Laboratories Inc., Baltimore Division

2101 Van Deman St, Baltimore, MD 21224

Tel: 410-633-1800

Fax: 410-633-6553

www.microbac.com



Chain of Custody Record

Work Order Number: _____

Page 1 of 1

Instructions for completing the Chain of Custody Record on back.

Client Name Genon Morgantown Plant	Project	Turnaround Time	QC and EDD Type (Required)
Address 12020 Crain Highway	Location	[X] Standard (7 Business Days)	[] Level I (NAC)
City, State, Zip Newburg, MD 20664	PO #	[] RUSH* Needed By: _____	[] Level II**
Contact John Williams	Compliance Monitoring? [] Yes [X] No	* Please notify lab prior to drop off.	Format: _____
Telephone # 301-843-4560	(1) Agency Program		Comments: _____
Sampled by (PRINT) EHLIM	Sampler Signature <i>[Signature]</i>	Sampler Phone # 301-843-4560	Sampler (DW)/Cert# _____

Send Report via [] e-mail (address) [] Mail [] Telephone [] Fax (fax #)

Matrix Types: Air(A), Childrens Product(CP), Food(F), Paint(P), Soil/Solid (S), Oil(O), Wiper(W), Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

Client Sample ID	Matrix**	Grab	Composite	Filtered	Date Collected	Time Collected	No. of Containers	Requested Analysis								Comments
								PH	TCLP metals	Chloride	Sulfate	Barium	Lithium	Sulfur	Total metals	
Flyash sample	S				2-2-18	1000	1	X	X	X	X	X	X	X	X	
Bottom ash sample	S				}	1100	1	X	X	X	X	X	X	X	X	
Gypsum sample	S					1300	1	X	X	X	X	X	X	X	X	
WWTP Filter cake sample	S				}	1400	1	X	X	X	X	X	X	X	X	



18B1353

Possible Hazard Identification	[] Hazardous [] Non-Hazardous	[] Radioactive	Sample Disposition	[] Dispose as appropriate [] Return [] Archive
Number of Containers: 3	Relinquished By (signature) <i>[Signature]</i>	Printed Name/Affiliation Denzon	Date/Time 2-27-18 0800	Received By (signature) <i>[Signature]</i>
Cooler Number: Temp upon receipt (°C): 3.2	Relinquished By (signature) <i>[Signature]</i>	Printed Name/Affiliation Denzon	Date/Time 2/27/18 1550	Received By (signature) <i>[Signature]</i>
Sample Received on Ice or Refrigerated from Client: (Yes/No) (Yes)	Relinquished By (signature) <i>[Signature]</i>	Printed Name/Affiliation Denzon	Date/Time	Received for Lab By (signature) <i>[Signature]</i>

Cooler Receipt Form / Sample Acceptance & Noncompliance Form

Microbac Laboratories, Inc., Baltimore Division
Control # 606-03
Effective Date: 11/30/2016
Page 1 of 1

Number of Coolers Received: 1
Client: NRC - Morgan for DM
Form Completed By: [Signature]
Shipper: [Signature]
Custody Tape Intact: [Signature]
Containers Intact:
Sample Received on Ice or refrigerated:

Receipt Date / Time: 02/22/18 1530
Work Order # 18B0091 / 0089 / 0087 / 1352 / 1353

Microbac Client UPS FedEx
YES / NO / NA
YES / NO
YES / NO / NA
Infrared (IR) Temperature: 3.2 °C
YES / NO
YES / NO
YES / NO / Not Checked
YES / NO (if No, contact client immediately)
YES / NO / NA
Water Soil Wipes Oil Filter Solid
Sludge Food Swab Other

Chain of Custody Present with shipment:
Sample Bottle IDs agree with COC:
Preservation requirements met:
Correct Number of Containers / Sample Volume:
Headspace in container:
Type of Sample:

Container Type / Quantity:

A -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid:	If preserved pH <2, pH >10
B -	Unpreserved	3 H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2 <u>W</u> , pH >10
C -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2 <u>W</u> , pH >10
D -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
E -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
H2	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
K -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
L -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
M -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
P -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
W -	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
V -	Unpreserved	HCl	HCl / Ascorbic Acid	HCl / NaTHIO	(Checked at time of Analysis)		
F -	Unpreserved	NaTHIO (Checked at time of Analysis)					
S -	Unpreserved	NaTHIO (Checked at time of Analysis)					
SN -	Unpreserved	NaTHIO / NaTHIO/EDTA (Checked at time of Analysis)					
	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10
	Unpreserved	H2SO4	HNO3	HCl	NaOH	NaOH/Ascorbic Acid	If preserved pH <2, pH >10

Describe preservation requirements not met:

All Acid preserved <2 pH NaOH preserved >12 pH All others >2 and <10 (usually 4-8)

Sample ID: _____ H2SO4 HNO3 NaOH _____ mls added
Sample ID: _____ H2SO4 HNO3 NaOH _____ mls added
Sample ID: _____ H2SO4 HNO3 NaOH _____ mls added
Sample ID: _____ H2SO4 HNO3 NaOH _____ mls added

H2SO4 - Sulfuric Acid, HNO3 - Nitric Acid, NaOH - Sodium Hydroxide, ASC - Ascorbic Acid, NaTHIO - Sodium Thiosulfate

Describe Anomalies:

18B0087 - No COC rec'd with sample,
COC written by SR Tech upon receipt. [Signature] 02/22/18

Contact information / Summary of Actions:

Date / Time: _____ Contact: _____ Contact By: _____
Comments: _____

**SUBCONTRACT ORDER
18B1353**



SENDING LABORATORY:

Microbac Laboratories, Inc. - Baltimore
2101 Van Deman Street
Baltimore, MD 21224
Phone: 410.633.1800
Project Manager: Melanie C. Duszynski

RECEIVING LABORATORY:

Microbac - CGL
250 West 84th Drive
Merrillville, IN 46410
Phone: (219) 769-8378

18C0594

Project Info:

Project Name: Morgantown-Fly Ash
Project No: Morgantown-Fly Ash

Client: NRG Energy - Morgantown
Project Type: ENV-WasteWater
Project Location: Maryland (South)

Report TAT: 7
Due: 03/09/2018 17:00

Sample ID: 18B1353-01

Matrix: Solid

Sampled: 02/02/2018 10:00

Analysis	Method	Analysis Due	Expires
SUB_Sulfur Sulfur	ASTM D129-91 0.05 % by We	03/08/2018 16:00	03/02/2018 10:00

Sample ID: 18B1353-02

Matrix: Solid

Sampled: 02/02/2018 11:00

Analysis	Method	Analysis Due	Expires
SUB_sulfur Sulfur	ASTM D129-91 0.05 % by We	03/08/2018 16:00	03/02/2018 11:00

Sample ID: 18B1353-03

Matrix: Solid

Sampled: 02/02/2018 13:00

Analysis	Method	Analysis Due	Expires
SUB_Sulfur Sulfur	ASTM D129-91 0.05 % by We	03/08/2018 16:00	03/02/2018 13:00

Sample ID: 18B1353-04

Matrix: Solid

Sampled: 02/02/2018 14:00

Analysis	Method	Analysis Due	Expires
SUB_Sulfur Sulfur	ASTM D129-91 0.05 % by We	03/08/2018 16:00	03/02/2018 14:00

Released By: *[Signature]* Date: *03/08/18* Received By: *[Signature]* Date: *3/9/18*
 Released By: _____ Date: _____ Received By: *[Signature]* Date: *03/05*
4.7
~~*2.7*~~ *at*
2.0