AES Warrior Run

we are the energy

11600 Mexico Farms Road, SE • Cumberland, MD 21502 • (301) 777-0055 • FAX (301) 777-8772

February 17, 2017

Re: CCB Report

Ms. Martha Hynson, Chief
Solid Waste Operations Division
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, MD 21230-1719

Ms. Hynson,

Please find the enclosed CCB report for AES Warrior Run, LLC. We have completed the report as required and included applicable attachments.

If there are any questions about this report please do not hesitate to contact us.

Regards,

Kara Hawkins

Kara Hawkins
Environmental Specialist
AES Warrior Run

Maryland
Department of
the Environment

Larry Hogan
Governor

Boyd Rutherford
Lieutenant Gowrnor

Ben Crumbles
Secretary

January 27, 2017

Mr. Jeff Leaf
AES Warrior Run LLC
11600 Mexico Farms Rd SE
Cumberland MD 21502

Re: Annual Generator Tonnage Report for Calendar Year 2016-AES Warrior Run

Dear Mr. Leaf:

Code of Maryland Regulations (COMAR) 26.04.10.08 promulgated ffective December 1, 2008, states that non-residential generators of coal combustion byproducts (CCBs) will submit an annual report to the Maryland Department of the Environment ("Department") describing the manner in which CCBs generated wi$.n the State were managed during the preceding calendar year.

You are hereby reminded that this annual report is due by March 1, 2017. The report covers the period from January 1, 2016 to December 31, 2016 and must be returned to the Department at the address shown on the form. A copy of the annual generator tonnage report form is enclosed, and it can also be downloaded from the Department's website at http://www.mde.state.rod.us/programs/Land/SolidWaste/CoalCombustionByproducts/pages/Programs/LandPrograms/Solid_Waste/ccbs/index.aspx

Thank you for your cooperation. If you have any questions concerning this letter or the form, please contact Ms. Sara Haile at (410) 537-3315.

Sincerely,

Martha Hynson, Chief
Solid Waste Operations Division

MH:SH:sh

Enclosure

cc: Ms. Hilary Miller
Mr. Brian Coblentz

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

Coal Combustion Byproducts (CCBs)
Annual Generator Tonnage Report
Instructions for Calendar Year 2016

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 2016. Please answer the questions on the form provided, attaching additional information and any requested supplemental information to the back of the form. *Note that the form for this year requires both volume and weight of the CCBs produced. If you know one of these parameters but not the others, for example, you have ihe tonnage produced but not the volume, you may calculate the other parameter: however: please 12rovide the calculations and assumptions t.Jiat 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 ot 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 ubmit 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 COMAR26.04.10.08.

II. General Information and Applicability.

A. Definitions. CCBs are defined in COMAR 26.04.10.02Bas:

> *"(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."*

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, 2017:

A. Contact information:

Facility Name: AES Warrior Run

Name of Permit Holder: AES Warrior Run LLC

Facility Address: 11600 Mexico Farms RD SE
Street

Facility Address: Cumberland Maryland 21502
City State Zip

County: Allegany

Contact Information (Person filing report or Environmental Manager)

Facility Telephone No.: 301-777-0055 Facility Fax No.: 301-777-8772

Contact Name: Kara Hawkins

Contact Title: Environmental Specialist

Contact Address: 11600 Mexico Farms RD SE
Street

Contact Address: Cumberland Maryland 21502
State Zip

Contact Email: kara.hawkins@aes.com

Contact Telephone No.: 301-777-0055 ext.1105 Contact Fax No.: 301-777-8772

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

Facility Name: AES Warrior Run **CCB Tonnage Report - 2016**

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:

AES Warrior Run (AES) is an electric co-generation facility located at 11600 Mexico Farms Road, S.E in Cumberland in Allegany County in Maryland. The Facility operates a 180-megawatt coal-fired steam electric cogeneration plant and a 150-ton per day food grade carbon dioxide production plant. The facility consists of an ABB CE coal-fired atmospheric fluidized bed combustion boiler (AFBC) burning bituminous coal and Number 2 fuel oil as a start-up fuel.

Selective non-catalytic reduction (SNCR) system provides supplemental control of nitrogen oxides (NOx) to the AFBC boiler design. Sulfur dioxide (SO2) emissions are controlled by the introduction of limestone into the fluidized bed of the boiler. A bag house controls particulate emissions in the boiler flue gas.

Bed ash is removed at the bottom of the boiler and is loaded into a silo for eventual removal. Fly ash is removed at the bottom of the baghouse, air heater, and boiler backpass sections and is kept segregated from the bed ash in a separate silo. Both flyash and bed ash are mixed with small amounts of service water (to control dusting) and loaded into trucks for disposal off-site.

AES commenced commercial operation on February 10, 2000, and produces electricity for distribution by the Potomac Electric Power Company. The applicable SIC Code for the facility is 4911 - Electric Services

C. The volume and weight of CCBs generated during calendar year 2016, 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 1: Volume and Weight of CCBs Generated for Calendar Year 2016: Please note the change to this table from previous years, to include both the volume and weight of the types of CCBs your facility produces.

Volume and Weight of CCBs Generated for Calendar Year 2016			
Fly Ash	**Bed Ash**	**Slag Ash**	
Type of CCB	Type of CCB	Type of CCB	Type of CCB
319,730.14	**132,658.53**	**17,809.04**	
Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards	Volume of CCB, in Cubic Yards
180,703.04	**85,909.22**	**10,665.59**	
Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons	Weight of CCB, in Tons

Additional notes:

Slag ash consists of fly ash and bed ash as a mixture. We use the term slag ash to differentiate from the discreet fly ash and bed ash in our system.

Volumes were determined with the calculated densities of: Fly Ash = 0.57 tons/cu yd, Bed Ash = 0.65 tons/cu yd, Slag Ash = 0.60 tons/cu yd

C. 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.

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

E. A description of how you disposed of or used your CCBs in calendar year 2016, 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:

2016	Fly Ash Tons	Fly Ash CuYds	Bed Ash Tons	Bed Ash CuYds	Slag Ash Tons	Slag Ash CuYds	Use
Cabin Run Mine	109,339.22	193,461.30	84,169.66	129,972.35	103.51	172.84	Mine Reclamation
Jackson Mountain Coal	616.05	1,090.02	-	-	-	-	Mine Reclamation
ARJ Coal Mine	68,599.09	121,377.02	24.25	37.45	67.08	112.01	Mine Reclamation
Beechwood Coal Mine	1,119.19	1,980.26	1,121.45	1,731.71	-	-	Mine Reclamation
Walker Brothers Coal Mine	1,029.49	1,821.55	593.86	917.02	10,495.00	17,524.20	Mine Reclamation
Total	180,703.04	**319,730.14**	85,909.22	**132,658.53**	10,665.59	**17,809.04**	

and (b) The different uses by type and volume of CCBs:
See chart above.

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

F. 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:

No change, same as previous years.

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

No change, same as previous years.

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

Facility Name: AES Warrior Run **CCB Tonnage Report-2016**

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 jn 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.		
P Bajc Signature	Peter Bajc Plant Manager (301) 777-0055 Name, Title, & Telephone No. (Print or Type) peter.bajc@aes.com Your Email Address	1-15-17 Date

V: Attachments (please Jist):

1. TCLP-Total Metals Analysis Fly & Bed Ash

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT:	AES Warrior Run Inc.	**Client Sample ID:**	Fly Ash
Lab Order:	G1612B94		C#72119
Project:	TCLP Ash Analysis	**Sampled By:**	AES Warrior
Lab ID:	G1612B94-001	**Collection Date:**	12/14/2016
Matrix:	ASH	**Received Date:**	12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: LNG				EPA 3050	EPA 6010
Aluminum	40800	10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Antimony	< 2.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Arsenic	39.4	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Barium	605	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Beryllium	3.25	0.10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Boron	31.7	5.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Cadmium	0.2	0.2		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Chromium	38.8	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Cobalt	12.2	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Copper	40.4	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Lead	22.7	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 11:58 AM
Lithium	90.3	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Manganese	66.4	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Molybdenum	9.8	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Nickel	30.1	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Selenium	5.8	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
Silver	< 0.5	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 11:58 AM
Vanadium	83.9	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 11:58 AM
Zinc	47.9	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:37 PM
MERCURY		Analyst: RLR				ASTM D6414	EPA 7471
Mercury	0.766	0.050		mg/Kg-dry	10	01/03/17 10:54 PM	01/04/17 5:02 AM
CARBONATE RESULTS		Analyst: LNG					Calculated
Calcium Carbonate	28.4			%	1		12/27/16 12:00 AM
Calcium Carbonate Equivalent	32.1			%	1		12/27/16 12:00 AM
Magnesium Carbonate	3.1			%	1		12/27/16 12:00 AM
MAJOR / MINOR ELEMENTS IN ASH		Analyst: LNG				ASTM D 6349	EPA 6010
Calcium Oxide	15.91	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:15 PM
Magnesium Oxide	1.48	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:15 PM
TCLP EXTRACTION		Analyst: MAG					EPA 1311
Extraction Fluid Used	2.0				1		12/26/16 9:30 AM
Final pH	11.8	1.0			1		12/26/16 9:30 AM
Initial pH	12.7	1.0			1		12/26/16 9:30 AM
pH with HCl	12.3	1.0			1		12/26/16 9:30 AM

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT:	AES Warrior Run Inc.	**Client Sample ID:**	Fly Ash
Lab Order:	G1612B94		C#72119
Project:	TCLP Ash Analysis	**Sampled By:**	AES Warrior
Lab ID:	G1612B94-001	**Collection Date:**	12/14/2016
Matrix:	ASH	**Received Date:**	12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TCLP, non-volatile	NA				1		12/26/16 9:30 AM
TCLP METALS		Analyst: **RLR**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0002	0.0002		mg/L	1	12/28/16 2:00 PM	12/29/16 6:31 AM
TCLP METALS		Analyst: **LNG**				**EPA 200.2**	**EPA 6010**
Aluminum	0.2	0.1		mg/L	1	12/27/16 11:40 AM	12/30/16 1:33 AM
Antimony	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/30/16 11:44 AM
Arsenic	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Barium	2.0	0.3		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Beryllium	< 0.001	0.001		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Boron	0.27	0.05		mg/L	1	12/27/16 11:40 AM	12/30/16 1:33 AM
Cadmium	< 0.002	0.002		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Chromium	0.12	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Cobalt	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Copper	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Lead	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Lithium	0.27	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Manganese	0.02	0.01		mg/L	1	12/27/16 11:40 AM	12/30/16 1:33 AM
Molybdenum	0.29	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Nickel	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Selenium	0.03	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Silver	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM
Vanadium	0.022	0.005		mg/L	1	12/27/16 11:40 AM	12/30/16 11:44 AM
Zinc	0.04	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:33 AM

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT:	AES Warrior Run Inc.	**Client Sample ID:**	Bed Ash North
Lab Order:	G1612B94		C#72120
Project:	TCLP Ash Analysis	**Sampled By:**	AES Warrior
Lab ID:	G1612B94-002	**Collection Date:**	12/14/2016
Matrix:	ASH	**Received Date:**	12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: LNG				EPA 3050	EPA 6010
Aluminum	24900	10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Antimony	< 2.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Arsenic	37.3	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Barium	294	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Beryllium	2.07	0.10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Boron	29.0	5.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Cadmium	< 0.2	0.2		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Chromium	31.7	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Cobalt	7.4	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Copper	19.3	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Lead	6.8	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:03 PM
Lithium	39.2	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Manganese	78.2	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Molybdenum	5.8	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Nickel	20.0	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
Silver	< 0.5	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:03 PM
Vanadium	65.8	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:03 PM
Zinc	27.8	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 6:56 PM
MERCURY		Analyst: RLR				EPA 7471	EPA 7471
Mercury	< 0.005	0.005		mg/Kg-dry	1	01/03/17 10:54 PM	01/04/17 6:08 AM
CARBONATE RESULTS		Analyst: LNG					Calculated
Calcium Carbonate	49.9			%	1		12/27/16 12:00 AM
Calcium Carbonate Equivalent	56.0			%	1		12/27/16 12:00 AM
Magnesium Carbonate	5.1			%	1		12/27/16 12:00 AM
MAJOR / MINOR ELEMENTS IN ASH		Analyst: LNG				ASTM D 6349	EPA 6010
Calcium Oxide	27.97	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:19 PM
Magnesium Oxide	2.42	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:19 PM
TCLP EXTRACTION		Analyst: BAB					EPA 1311
Extraction Fluid Used	2.0				1		12/26/16 9:30 AM
Final pH	12.5	1.0			1		12/26/16 9:30 AM
Initial pH	12.5	1.0			1		12/26/16 9:30 AM
pH with HCl	11.8	1.0			1		12/26/16 9:30 AM

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT:	AES Warrior Run Inc.	**Client Sample ID:**	Bed Ash North
Lab Order:	G1612B94		C#72120
Project:	TCLP Ash Analysis	**Sampled By:**	AES Warrior
Lab ID:	G1612B94-002	**Collection Date:**	12/14/2016
Matrix:	ASH	**Received Date:**	12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TCLP, non-volatile	NA				1		12/26/16 9:30 AM
TCLP METALS		Analyst: **RLR**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0002	0.0002		mg/L	1	12/28/16 2:00 PM	12/29/16 6:33 AM
TCLP METALS		Analyst: **LNG**				**EPA 200.2**	**EPA 6010**
Aluminum	< 0.1	0.1		mg/L	1	12/27/16 11:40 AM	12/30/16 1:37 AM
Antimony	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/30/16 11:48 AM
Arsenic	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:36 AM
Barium	0.9	0.3		mg/L	1	12/27/16 11:40 AM	12/29/16 3:36 AM
Beryllium	< 0.001	0.001		mg/L	1	12/27/16 11:40 AM	12/29/16 3:36 AM
Boron	< 0.05	0.05		mg/L	1	12/27/16 11:40 AM	12/30/16 1:37 AM
Cadmium	< 0.002	0.002		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Chromium	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Cobalt	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Copper	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Lead	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Lithium	0.09	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Manganese	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/30/16 1:37 AM
Molybdenum	0.13	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Nickel	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Selenium	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Silver	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM
Vanadium	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/30/16 11:48 AM
Zinc	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:38 AM

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT: AES Warrior Run Inc.
Client Sample ID: Bed Ash South
Lab Order: G1612B94 C#72121
Project: TCLP Ash Analysis
Sampled By: AES Warrior
Lab ID: G1612B94-003
Collection Date: 12/14/2016
Matrix: ASH
Received Date: 12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TOTAL METALS		Analyst: LNG				EPA 3050	EPA 6010
Aluminum	25900	10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Antimony	< 2.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Arsenic	40.5	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Barium	321	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Beryllium	2.23	0.10		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Boron	29.5	5.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Cadmium	< 0.2	0.2		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Chromium	34.3	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Cobalt	7.8	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Copper	19.8	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Lead	6.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:07 PM
Lithium	41.1	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Manganese	78.6	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Molybdenum	5.7	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Nickel	21.3	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Selenium	< 2.0	2.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
Silver	< 0.5	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:07 PM
Vanadium	70.7	0.5		mg/Kg-dry	1	12/28/16 1:45 PM	12/30/16 12:07 PM
Zinc	26.6	1.0		mg/Kg-dry	1	12/28/16 1:45 PM	12/29/16 7:00 PM
MERCURY		Analyst: RLR				ASTM D6414	EPA 7471
Mercury	0.006	0.005		mg/Kg-dry	1	01/03/17 10:54 PM	01/04/17 6:09 AM
CARBONATE RESULTS		Analyst: LNG					Calculated
Calcium Carbonate	49.5			%	1		12/27/16 12:00 AM
Calcium Carbonate Equivalent	55.3			%	1		12/27/16 12:00 AM
Magnesium Carbonate	4.9			%	1		12/27/16 12:00 AM
MAJOR / MINOR ELEMENTS IN ASH		Analyst: LNG				ASTM D 6349	EPA 6010
Calcium Oxide	27.72	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:24 PM
Magnesium Oxide	2.32	0.02		% Dry	2	12/26/16 5:25 AM	12/27/16 12:24 PM
TCLP EXTRACTION		Analyst: BAB					EPA 1311
Extraction Fluid Used	2.0				1		12/26/16 9:30 AM
Final pH	12.5	1.0			1		12/26/16 9:30 AM
Initial pH	12.2	1.0			1		12/26/16 9:30 AM
pH with HCl	11.3	1.0			1		12/26/16 9:30 AM

ACCREDITED IN ACCORDANCE WITH NELAC
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *10-Jan-17*

CLIENT:	AES Warrior Run Inc.	**Client Sample ID:**	Bed Ash South
Lab Order:	G1612B94		C#72121
Project:	TCLP Ash Analysis	**Sampled By:**	AES Warrior
Lab ID:	G1612B94-003	**Collection Date:**	12/14/2016
Matrix:	ASH	**Received Date:**	12/22/2016 11:59:25 AM

Analyses	Result	QL	Q	Units	DF	Date Prepared	Date Analyzed
TCLP, non-volatile	NA				1		12/26/16 9:30 AM
TCLP METALS		Analyst: **RLR**				**SM 3112 B**	**EPA 7470**
Mercury	< 0.0002	0.0002		mg/L	1	12/28/16 2:00 PM	12/29/16 6:35 AM
TCLP METALS		Analyst: **LNG**				**EPA 200.2**	**EPA 6010**
Aluminum	< 0.1	0.1		mg/L	1	12/27/16 11:40 AM	12/30/16 1:40 AM
Antimony	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/30/16 11:53 AM
Arsenic	0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Barium	0.8	0.3		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Beryllium	< 0.001	0.001		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Boron	< 0.05	0.05		mg/L	1	12/27/16 11:40 AM	12/30/16 1:40 AM
Cadmium	< 0.002	0.002		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Chromium	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Cobalt	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Copper	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Lead	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Lithium	0.09	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Manganese	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/30/16 1:40 AM
Molybdenum	0.13	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Nickel	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Selenium	< 0.02	0.02		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Silver	< 0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM
Vanadium	0.005	0.005		mg/L	1	12/27/16 11:40 AM	12/30/16 11:53 AM
Zinc	< 0.01	0.01		mg/L	1	12/27/16 11:40 AM	12/29/16 3:43 AM