



**west virginia department of environmental protection**

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**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Application No.: R13-3299  
Plant ID No.: 023-00003  
Applicant: Virginia Electric & Power Company  
Facility Name: Mt. Storm  
Location: Grant  
NAICS Code: 221112  
Application Type: Construction  
Received Date: February 24, 2016  
Engineer Assigned: Steven R. Pursley, PE  
Fee Amount: \$1,000.00  
Date Received: February 25, 2016  
Complete Date: March 24, 2016  
Due Date: June 22, 2016  
Applicant Ad Date: February 23, 2016  
Newspaper: *The Grant County Press*  
UTM's: Easting: 649.85    Northing: 4,340.00    Zone: 17  
Description: Installation of a fly ash separation process.

*Entire Document*  
**NON-CONFIDENTIAL**

**DESCRIPTION OF PROCESS**

Virginia Electric and Power Company (Dominion) proposes to install and operate a process for separating the fly ash generated at the Mt. Storm Power Station. This process would be constructed, owned, and operated by a third-party, Separation Technologies LLC (ST) on the Mt. Storm property.

The project consists of a process to separate high-carbon fly ash from low-carbon fly ash. The mineral content ash (ProAsh®) will be used as a supplementary cementitious product for ready mix concrete. The high-carbon fly ash (EcoTherm®) may be returned to the boilers as fuel (which will off-set the use of some virgin coal fuel and subsequently create a higher mineral content ash that can be recovered through the separation process) or it may continue to be trucked to the landfill. Capturing and beneficially reusing both the mineral and high-carbon content ash has the benefit of minimizing the amount of fly ash

that will need to be landfilled. Currently, all of the ash generated by Mt. Storm is landfilled. This project will not affect the generation or disposal of bottom ash (the ash that forms in the bottom of the boilers and is not entrained in the boiler exhaust).

Initially, a single separator will be installed to process ash from Units 1 and 2, which will utilize approximately half of the plant total fly ash production. Subsequently a second separator will be installed, increasing the capacity to process all of the fly ash produced from Units 1, 2 and 3.

## **Project Description**

The Mt. Storm Power Station is a coal-fired electric power generating facility that generates ash and other byproducts (such as gypsum) from its operation. Most of these byproducts are currently placed in an on-site landfill that was designed for this purpose. Two general categories of ash are produced by the boilers: fly ash (so called because it becomes airborne in the combustion process) and bottom ash (which forms in the bottoms of the boilers and does not become airborne). This application is only concerning the fly ash portion of these byproducts.

Fly ash has long been used as a substitute for Portland cement. Fly ash is a good substitute or admixture with cement as long as the carbon content of the ash is low. High carbon ash does not result in acceptable concrete for most purposes (the resulting concrete is generally darker and less structurally sound than normal Portland cement). Therefore, only low-carbon ash is desirable as a cement substitute. There are two widely available methods of generating low-carbon ash for the cement market; either processing the ash in a separate circulating fluidized bed boiler which leaves only low-carbon ash, or physically separating the high-carbon ash from the low-carbon ash. The project that is the subject of this application is a physical separation process.

Separation Technologies LLC's (ST) proprietary technology consists of a unique, triboelectrostatic belt separator. Fly ash that is collected in the main boilers electrostatic precipitators (ESPs) at Mt. Storm is placed into silos at the facility. From there, it will be fed into the separation process, which is a belt conveyor with a thin gap between two parallel planar electrodes. The ST separator utilizes electrical charge differences between materials to separate the fly ash into two products. The separator produces a 3% "loss on ignition" ("LOI") low-carbon mineral product (ProAsh®), which is sold as a supplementary cementitious material for use in concrete, and a high-carbon ash product (EcoTherm®). For the Mt. Storm facility, the high-carbon ash product (EcoTherm®) will be returned to the utility for re-burning, as discussed below.

A new building will be constructed to accommodate the new separator and its associated equipment. Fly ash will be fed from the existing fly ash silos using new airslide assemblies connecting the existing silos to the separators. ProAsh® will be conveyed from

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the separators by dilute phase transport to a new ProAsh® silo. The new ProAsh® silo will be equipped with a dry loadout spout assembly and truck scale for loading of bulk pneumatic tanker trucks.

The EcoTherm® from the separators will be conveyed by dilute phase transport to a new storage silo for temporary storage and subsequent re-burning by the utility. For re-burning, the EcoTherm® will be conveyed by pneumatic transport to a carbon return system located just above the existing coal belt. The carbon return system consists of a filter-receiver discharging through a rotary feeder and impact scale to a high speed mixer located over the existing coal conveyors. When a coal conveyor is running and carrying coal to replenish the bunkers, EcoTherm® may be conveyed from the high-carbon ash storage silo to the carbon return filter receiver. The EcoTherm® is then metered into the high speed mixer where it is mixed with just enough water to suppress dust (typically about 8 weight percent moisture) and discharged onto the operating coal conveyor. A gravity "V" diverter valve is provided on the mixer discharge to permit a selection between the two existing conveyors. For disposal, if necessary, the high carbon ash will be wet conditioned at the high carbon storage silo. A central vacuum cleaning system will also be installed to facilitate housekeeping in the operating areas.

#### SITE INSPECTION

No site inspection of the facility was deemed necessary. The facility was last inspected on July 24, 2014 by Karl Dettinger of DAQs Eastern Panhandle Regional Office and was found to be in compliance. To get to the facility, take I79 north to exit 99. Then take Corridor H (US Route 48 / US Route 219) east approximately 84 miles. Then turn right on WV Route 93 and go approximately 0.5 miles. The plant access road is on the right.

#### ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the proposed operations consist only of equipment emissions, transfer points and paved haul roads. All equipment emissions and transfer operations will be controlled by baghouses. Emissions from these sources were calculated by multiplying the baghouses guaranteed grain loading by the maximum flow rate. Haul road emissions were calculated using AP-42 Section 13.2.1 Equation 2. Annual emissions from the baghouses were based on 8,760 hours per year. Annual haulroad emissions were based on a maximum of 525,600 tons per year of ash (ProAsh) being shipped offsite via truck.

Controlled emissions from the operations covered by this permit will be limited to the following:

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Emission Point ID	PM		PM <sub>10</sub>		PM <sub>2.5</sub>	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
ST-E1	0.05	0.24	0.05	0.24	0.04	0.19
ST-E9	0.05	0.24	0.05	0.24	0.04	0.19
ST-E2	0.30	1.30	0.30	1.30	0.24	1.04
ST-E3	0.03	0.15	0.03	0.15	0.03	0.12
ST-E4	0.25	1.10	0.25	1.10	0.20	0.88
ST-E5	0.13	0.58	0.13	0.58	0.11	0.47
ST-E6	0.16	0.68	0.16	0.68	0.12	0.55
ST-E7	0.06	0.24	0.06	0.24	0.04	0.19
ST-E8	0.10	0.45	0.10	0.45	0.08	0.36
Haul Roads	4.72	2.31	0.95	0.47	0.24	0.12
<b>Total</b>	<b>5.85</b>	<b>7.29</b>	<b>2.08</b>	<b>5.45</b>	<b>1.14</b>	<b>4.11</b>

#### REGULATORY APPLICABILITY

The following state regulations apply to the facility (no federal rules, i.e. NSPS, MACT/NESHAPs are applicable):

**45CSR13**      **Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation).**

Because uncontrolled emissions from the facility exceed 6 pounds per hour and 10 tons per year of PM the facility is subject to 45CSR13.

**45CSR17**      **To Prevent and Control Particulate Matter Air Pollution From Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter.**

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The main requirement of 45CSR17 is the prohibition of fugitive particulate matter which causes or contributes to statutory air pollution. VEPCO will comply with this requirement with the use of baghouses.

**45CSR30: Requirements For Operating Permits.**

The facility is an existing Title V major source with an issued Title V permit (R30-02300003-2011). VEPCO must update their Title V permit in accordance with 45CSR30.

**Nonapplicability Determinations**

**45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration**

Although the facility is an existing major stationary source, as can be seen from the following table the increase in emissions from this project are not "significant" (as defined in 45CSR14):

Pollutant	Increase (TPY)	Significance Level (TPY)	PSD (Y/N)
PM <sub>2.5</sub>	4.11	10	N
PM <sub>10</sub>	5.45	15	N
PM	7.29	25	N

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

No non-criteria regulated pollutants are addressed in this permit.

AIR QUALITY IMPACT ANALYSIS

Because this is a minor modification to an existing major stationary source, no modeling was required.

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## MONITORING OF OPERATIONS

The permittee shall maintain the following records:

- \* Records of monthly EPA Method 22 opacity testing and any corrective actions taken.
- \* Monthly production of ProAsh shipped offsite.
- \* Monthly inspection of all baghouse bags.

## RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-3299 for the construction of a fly ash separation process at the Mount Storm Power Station, Grant County, be granted to Virginia Electric & Power Company.



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Steven R. Pursley, PE  
Engineer

5-31-16

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May 31, 2016

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