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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3082A
Plant ID No.: 073-00005
Applicant: Allegheny Energy Supply Company, LLC
Facility Name: Pleasants Power Station
Location: Willow Island, Pleasants County
NAICS Code: 221112
Application Type: Class II Administrative Update
Received Date: June 22, 2015
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$300.00
Date Received: June 23, 2015
Complete Date: July 2, 2015
Due Date: August 31, 2015
Applicant Ad Date: June 23, 2015
Newspaper: *The Parkersburg News and Sentinel*
UTM's: Easting: 489.0 km Northing: 4,357.0 km Zone: 17
Description: Application to install a refined coal system for the application of sorbent chemicals to coal for pollution control

DESCRIPTION OF PROCESS

The Pleasants Power Station is planning on employing a clean coal technology known as refined coal to take advantage of federal income tax credits. In order to qualify for this tax credit the law requires that refined coal which is burned to produce electricity result in the reduction of NO_x in addition to either Hg or SO₂ emissions. In order to achieve these reductions three sorbents (two dry and one liquid) are applied to the coal.

The following comes directly from permit application R13-3082A:

System Overview

The Refined Coal System at Pleasants will consist of a mixer and the associated

chemical application equipment necessary to add the three required Chem-Mod sorbents to the coal necessary to produce refined coal. The unit numbers called out in this document refer to the equipment designations used in the process flow diagram (DRA Taggart Drawing 4932-0001-0003) which provides a graphic presentation of the system.

Pug Mill Mixer

The mixer (UNIT 3150) will be installed in the transfer tower between Conveyors C5A/B and Conveyors C6A/B. The system will be configured with flop gates that allow the coal to either be fed to the mixer to produce refined coal or to bypass the mixer so that the boiler can be operated on coal directly reclaimed from the yard to minimize detrimental impact on the power station availability. The mixer will be a twin screw pug mill which has a capacity of processing 1500+ tons of coal per hour. The three sorbents (MerSorb, S-Sorb, and Mitagent) will be added to the coal at the tail end of Conveyors C5A and/or C5B.

MerSorb System

The MerSorb application system will be located in a new pumphouse adjacent to the crusher house. The primary components of this system will be a 405 gallon day storage tank (UNIT 3630), application pumps (UNITS 3650, 3655), and a flow meter.

S-Sorb System

The S-Sorb application system will be located on the ground level adjacent to the crusher house. The primary components will be a 25 ton day bin (UNIT 3100), rotary vane feeder (UNIT 3130) to control the application rate, and a screw conveyor (UNIT 3120) to move the S-Sorb to the coal conveyors.

Mitagent System

The Mitagent application system will be located on the ground level adjacent to the crusher house. The primary components will be a 50 ton feed silo (UNIT 3200), rotary vane feeder (UNIT 3230) to control the application rate, and a screw conveyor (UNIT 3120) to move the S-Sorb to the coal conveyors.

Bulk Storage

In addition to the application systems there will be bulk storage systems for MerSorb and S-Sorb. For S-Sorb there will be two 218 ton capacity silos (UNITS 8200/8300) and a transfer blower (UNIT 8100). For MerSorb there will be a 6150 gallon storage tank (UNIT

3600) and transfer pumps (UNITS 3610/3620). These systems provide for bulk storage of sorbents on site to ensure availability. They also provide the means to transfer from the bulk storage containers to the day bin/tank for application.

Power and Control

The facility has a new Motor Control Center to provide power to all components. The MCC will be fed from the station bus. The facility has a PLC based control system. The PLC receives input from process instrumentation and provides output control signals to all components in the system. The PLC will be installed along with the MCC in a new electrical building.

Process

The coal being fed to the boiler house will be diverted from the discharge of Conveyors C5A and C5B into the mixer. Scales installed in Conveyors C5A and C5B sense the coal flow rate to the mixer and transmit that information to the PLC. The facility PLC calculates the required flow rates of MerSorb, S-Sorb, and Mitagent for the given coal flow.

MerSorb will be pumped from the day tank by an application pump, through a flow meter and into distribution manifolds on conveyors C5A and/or C5B where it will be applied to the coal. The application pumps will be fitted with variable frequency drives that will be controlled by the PLC. The measured flow rate will be communicated to the PLC which continuously adjusts the pump speed to match the flow of MerSorb to the coal flow.

S-Sorb will be fluidized in the day bin and discharged via a rotary vane feeder. The vane feeder will be fitted with a variable frequency drive that will be controlled by the PLC. The day bin sits on load cells which supply net weight indication to the PLC. As S-Sorb is discharged from the bin the change in weight will be used by the PLC to calculate the application rate of the S-Sorb. The PLC continuously adjusts the vane feeder to match flow of S-Sorb to the coal flow. The S-Sorb will be discharged from the vane feeder into a transfer screw conveyor which discharges the S-Sorb and Mitagent where they will be applied to the coal on conveyors C5A and/or C5B.

Mitagent will be fluidized in the silo and discharged via a rotary vane feeder. The vane feeder will be fitted with a variable frequency drive that will be controlled by the PLC. The day bin sits on load cells which supply net weight indication to the PLC. As Mitagent is discharged from the bin the change in weight will be used by the PLC to calculate the application rate of the Mitagent. The PLC continuously adjusts the vane feeder to match flow of Mitagent to the coal flow. The S-Sorb will be discharged from the vane feeder into a transfer screw conveyor which discharges the Mitagent and S-Sorb where they will be applied to the coal on conveyors C5A and/or C5B.

Conveyors C5A and/or C5B will discharge the Coal, MerSorb, S-Sorb, and Mitagent into the mixer which will thoroughly blend them. The mixer will then discharge the now Refined Coal onto the plant conveyors C6A and/or C6B where it subsequently flows to the silos for each boiler.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

There are only two sources of emissions (PM) associated with this application.

Haul Road Emissions

Haul road emissions from the facility will increase due to the delivery of the S-Sorb, MerSorb and Mitagent. Emissions from the haulroads were based on AP-42 Section 13.2.1.3 for paved roads. Annual emissions were based on yearly throughputs while hourly emissions assume a steady delivery of sorbent over 8 hours, 365 days per year. Allegheny also assumed an 80% control efficiency for the use of water sprays on the road ways.

Bin Vent Emissions

Bin vent emissions result from the off loading of the Mitagent and S-Sorb from the trucks to the Silos and from transfer of the S-Sorb from the Silos to the Day Bin. Emissions from the bin vents were estimated by applying the minimum design efficiency from vendor literature and applying it to the calculated inlet grain loading.

It should be noted that because the MerSorb is delivered to the facility as a liquid and because the S-Sorb and Mitagent are both fluidized in the day bin/silo there are no transfer point emissions associated with the process (other than the transfer of the S-Sorb and Mitagent from their delivery trucks to the Silos and from the S-Sorb silo to the day bin).

Emissions due to the refined coal process should be as follows:

	PM		PM ₁₀	
	lb/hr	tpy	lb/hr	tpy
Bin Vent 1E	0.01	0.01	0.01	0.01
Bin Vent 2E	0.01	0.01	0.01	0.01
Bin Vent 3E	0.02	0.01	0.02	0.01
Bin Vent 4E	0.02	0.01	0.02	0.01
Haul Roads	0.05	0.07	0.01	0.02
Total	0.11	0.11	0.07	0.06

REGULATORY APPLICABILITY

The proposed modification is subject to the following state rules (no federal rules apply to this application):

STATE RULES

45CSR2: To Prevent And Control Particulate Air Pollution From Combustion Of Fuel In Indirect Heat Exchangers.

The main requirement of 45CSR2 applicable to this modification is the requirement that all sources of fugitive particulate matter to be equipped with a fugitive particulate matter control system. Transfer of the S-Sorb and Mitagent will be controlled by bin vent filters until the material is fluidized.

45CSR13: "Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation"

Allegheny wishes to make several substantive changes to its existing permit. Since these changes do not result in an increase of emissions of more than 6 pounds per hour and 10 tons per year, the changes can be made as a Class II Administrative Update. As required under §45-13-8.3 ("Notice Level A"), Allegheny placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on June 23, 2015 in *The Parkersburg News and Sentinel* and the affidavit of publication for this legal advertisement was submitted on July 2, 2015.

45CSR30: Requirements For Operating Permits.

The facility is an existing Title V major source with an issued Title V permit (R30-07300005-2013). Allegheny must update their Title V permit in accordance with 45CSR30.

MONITORING OF OPERATIONS

In addition to the monitoring already required by R13-3082, the permit will require the following monitoring:

- * Records of the amount of each type of sorbent delivered to the facility.

Fact Sheet R13-3082A
Allegheny Energy Supply Company, LLC
Willow Island

CHANGES TO PERMIT R13-3082

The following changes were made to R13-3082:

- * Table 1.0 was updated to include the new equipment
- * Condition 4.1.1 was updated to include permit application R13-3082A.
- * New conditions 4.1.6 through 4.1.11 were added. Old condition 4.1.6 was renumbered to 4.1.12.
- * New conditions 4.2.3 through 4.2.5 were added.

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 R13-3082A for the installation of a refined coal system at the Pleasants Power Station near Willow Island be granted to Allegheny Energy Supply Company, LLC.



Steven R. Pursley, PE
Engineer

9-2-15

September 2, 2015

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