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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3082
Plant ID No.:	073-00005
Applicant:	Allegheny Energy Supply Company, L.L.C.
Facility Name:	Pleasants Power Station
Location:	Willow Island, Pleasants County
NAICS Code:	221112
Application Type:	Modification
Received Date:	May 22, 2013
Engineer Assigned:	Joe Kessler
Fee Amount:	$1,000
Date Received:	May 29, 2013
Complete Date:	June 21, 2013
Due Date:	September 12, 2013
Applicant's Ad Date:	May 23, 2013
Newspaper:	*The Parkersburg News and Sentinel*
UTM's:	Easting: 474.638 km Northing: 4,357.521 km Zone: 17
Latitude/Longitude:	39.36678/-81.29442
Description:	Addition of an SBS Injection System (with associated material handling operations) to control SO_3 formation from Units 1 and 2.

On August 24, 2012, Allegheny Energy Supply Company, L.L.C. (Allegheny) entered into Consent Order CO-R2-E-2011-17 to install an SO_3 Control System to minimize the potential for opacity problems at the Pleasants Power Station. Included in the Consent Order was an Order For Compliance to "apply to the Director for a 45CSR13 permit for the operation of the SO_3 Control Systems for both Units." The permit application evaluated herein is the result of this requirement.

DESCRIPTION OF PROCESS/MODIFICATIONS

Pleasants Power Station is a large steam-electric generating station located in Willow Island, West Virginia. The facility consists of two (2) coal-fired boilers ("Unit I" and "Unit 2" or collectively "Units") with a generating capacity of 657 MWe each. These boilers exhaust combustion gases to the atmosphere via separate liners of a common flue stack, following separate

trains of air pollution controls including selective catalytic reduction units (SCR), electrostatic precipitators (ESP), and flue gas desulfurization units (FGD).

A side-effect of the use of SCR is enhanced creation of SO_3 across the catalyst bed. As the SO_3 passes the SCR and cools, it can combine with moisture generated in the scrubbing process to form sulfuric acid aerosols. These aerosols can produce long-lasting visible emissions from the stack.

On January 8, 2010, the Director issued a Notice of Violation (NOV) to Allegheny for excessive visual emissions from Pleasants observed during inspections by DAQ personnel. These inspections were initiated by citizen complaints alleging plume touchdowns on nearby properties. On February 9, 2010, Allegheny responded and identified the source of opacity as increased SO_3 formation from the SCR.

As stated above, in the subsequent Consent Order, Allegheny proposed the use of a sorbent injection system (specifically, SBS™ Injection) to minimize the formation of SO_3. The sorbent injection system works by injection of a soda ash solution (a base) directly into the flue gas to neutralize acid formation. The solution flash-evaporates and the resulting solids efficiently react with SO_3 (and/or SO_2) to produce a benign particulate (sodium sulfate) that is removed with the fly ash in the ESP.

To accomplish this, soda ash and salt are delivered to the facility by truck and pneumatically unloaded into either a 170,000 gallon (P26 - soda ash) or 5,482 gallon (P27 - brine) storage tank. Allegheny has estimated a maximum salt usage of 260 tons/year and a maximum soda ash usage of 15,600 tons/year. During delivery, the soda ash is wetted in a solids “wetting tee” prior to delivery to the storage tank as a solution. Similarly, when salt is unloaded into the brine tank, it is first mixed with water and also pumped in as a solution. During loading of each tank, displaced air from the tanks are removed via tank vents (P27 and P26). The reagent tank vent includes a mist collector to further control any potential emissions from that tank. Any substantive particulate matter emissions from the delivery of these materials should be mitigated by these wetting processes and the mist collector.

Additionally, truck traffic from the delivery of these materials - as controlled by a water truck - will potentially result in small amounts fugitive emissions.

SITE INSPECTION

Due to the nature of the modifications, the writer did not conduct a site inspection. According to information in the DAQ database, the last full on-site inspection occurred on February 8, 2013 by Mr. Mike Rowe of the Compliance/Enforcement Section. The facility was given a status code of "30 - In Compliance" as a result of the inspection.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Salt and Soda Ash Unloading

While any emissions from the unloading of salt and soda ash to the storage tanks (in solution) should be insignificant, Allegheny did submit a conservative estimate of potential emissions resulting from this process. The estimate was based on a particulate matter emission factor of 0.25 gr/dscf obtained from process vendor (as controlled by the water mixing). Hourly emissions were based on maximum potential air flows during delivery and annual emissions were based on the maximum annual material usage rates and unloading times. Using this methodology, Allegheny estimated a potential-to-emit (PTE) of the material unloading operations to be 4.45 lb/hour and 1.70 tons/year.

Paved Haulroads

Allegheny provided an emissions estimate for truck traffic unloading material at the facility. As all the roadways are paved, Allegheny used the equation given in Section 13.2.1 of AP-42 and appropriate variables (truck weights, haulroad distance, trips per year, etc.) to estimate potential uncontrolled emissions. Controlled emission rates were determined by applying a water truck control efficiency of 50%.

Summary

The PTE associated with the SO_3 Control System material handling operations is given in the following table:

Table 1: Facility-Wide PTE

Section	Potential-To-Emit					
	$PM_{2.5}$		PM_{10}		PM	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Salt/Soda Ash Unloading	4.45	1.70	4.45	1.70	4.45	1.70
Paved Haulroads[(1)]	0.34	0.02	1.38	0.08	6.90	0.39
Total Facility-Wide	4.79	1.72	5.83	1.78	11.35	2.09

(1) Hourly emissions from haulroads based on assumption of one loaded truck delivery/hour.

REGULATORY APPLICABILITY

The SO_3 Control System material handling operations are subject to the following substantive state air quality rules and regulations: 45CSR7 and 45CSR13. Each applicable rule (and those that have questionable non-applicability), and Allegheny's compliance therewith, will be discussed in detail below.

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

Pursuant to the definition of "fuel burning unit" under 45CSR2 ("producing heat or power by indirect heat transfer"), 45CSR2 applies to the Pleasant Power Station boilers. Therefore, potential fugitive emissions associated with the operation of these boilers are covered under Section 5 of 45CSR2. §45-2-5.1 states that will not "permit any source of fugitive particulate matter to operate that is not equipped with a fugitive particulate matter control system" and shall " include, but not be limited to" the processes listed under 5.1(a) through (c). Based on previous determinations, the material handling operations (including the use of haulroads) associated with the SO_3 Control System are subject to this section.

All haulroads that will service the salt and soda ash delivery trucks are paved and dust is controlled by a water truck. Salt and soda ash are delivered into storage tanks in a slurry. These actions clearly represent a fugitive particulate matter control system.

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

The proposed modification of the Pleasants Power Station has a potential to increase emissions of several regulated pollutants (particulate matter) at the facility. However, the increase is not in excess of six (6) lbs/hour and ten (10) TPY and, therefore, the proposed modification would normally be eligible for review as a Class II Administrative Update (to one of the other 45CSR13 permits at the facility). However, as the permit application was required by the Consent Order Allegheny submitted the application as a modification to the facility to be authorized under a separate 45CSR13 permit.

Therefore, 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 May 23, 2013 in *The Parkersburg News and Sentinel* and the affidavit of publication for this legal advertisement was submitted on May 22, 2013.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The Pleasants Power Station, defined under Title V as a "major source," was last issued a Title V permit on April 23, 2008. Proposed changes evaluated herein must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from a proposed facility and that are not classified as "criteria pollutants" or greenhouse gases (GHGs). Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Sulfur Dioxide (SO_2). GHGs are identified as primarily Carbon Dioxide (CO_2), Methane (CH_4), and Nitrous Oxide (N_2O). Allegheny has not identified any potential emission sources of non-criteria regulated pollutants from the process evaluated herein.

AIR QUALITY IMPACT ANALYSIS

Based on the nature of the proposed modifications, an air quality impacts modeling analysis was not required.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The following substantive monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR) shall be required:

- For the purposes of demonstrating compliance with the maximum material throughput limits set forth in 4.1.2(a) of the draft permit, Allegheny shall monitor the monthly and rolling twelve month throughputs of salt and soda as; and

- Allegheny shall perform daily monitoring and recordkeeping of the total daily sorbent usage rate, and records of startups, shut-downs, malfunctions, and maintenance of the SO_3 Control System. Daily records maintained in accordance with this paragraph shall be available upon request at the Facility.

PERFORMANCE TESTING OF OPERATIONS

The following substantive performance testing requirements shall be required:

- At such reasonable time(s) as the Secretary may designate, in accordance with the provisions of 3.3 of the draft permit, Allegheny shall be required to conduct or have conducted test(s) to determine compliance with the emission limitations established in this permit and/or applicable regulations.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all

applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3082 to Allegheny Energy Supply Company, L.L.C. for the proposed addition of an SO_3 Control System to the Pleasants Power Station located in Willow Island, Pleasants County, WV.

Joe Kessler, PE
Engineer

Date