



west virginia department of environmental protection

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Austin Caperton, Cabinet Secretary
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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3392
Plant ID No.:	051-00252
Applicant:	ECC Windsor Inc
Facility Name:	Bailey Mine –19H Gob well
Location:	North of Cameron on County Highway 68/1
NAICS Code:	213113
Application Type:	Construction
Received Date:	November 20, 2017
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1000.00
Date Received:	November 27, 2017
Completeness Date:	December 20, 2017
Due Date:	March 20, 2018
Newspaper:	Wheeling News Register
Applicant Ad Date:	November 24, 2017
UTMs:	Easting: 540.58 km Northing: 4,412.44 km Zone: 17
Description:	This application is for the construction of a flare to control methane from a borehole (gob well) of a longwall coalmine operation.

DESCRIPTION OF PROCESS

ECC Windsor Inc. (ECC) has elected to install an enclosed flare for the purposes of destroying the methane component of the gob gas. The Bailey Mine is an active underground coalmine, which is owned by CONSOL Energy. CONSOL Energy will be leasing the 19H Site to ECC to destroy the methane gas that is venting from the existing borehole.

ECC proposes to voluntarily install a flare to convert the methane in the gas stream, which is classified as a greenhouse gas, to carbon dioxide and water. The gas stream will be evacuated from the well using an induction fan (blower). The blower will create suction on the well, which will draw the gas to the surface. ECC is proposing to use a John Zink ZTOF Flare System to destroy the gas. This flare system is an enclosed ground flare with a six feet diameter. The stack will confine the exhaust from the burner and extend upward with a total height above ground elevation of approximately 30 feet. The entire flare system, including the blower, will be mounted on a trailer to make the system portable.

SITE INSPECTION

The site of this proposed flare is the 19H-1 Ventilation Borehole. West Virginia Department of Environmental Protection, Division of Mining had approved this ventilation borehole, which included the associated drilling activities to construct the borehole as part of CONSOL Energy Mining Permit U-2006-01.

The writer conducted a site inspection of the proposed site on January 10, 2018. Greigory Paetzold, an Compliance and Enforcement Inspector assigned to the DAQ's Northern Panhandle Regional Office, accompanied the writer during the inspection. During this inspection, methane gas was observed to be venting from the borehole using a FLIR Model GF320 optical gas imaging camera in normal and enhance operating modes.

The proposed site is approximately 0.32 miles north of William's Ohio Valley Midstream - Woodruff Dehy, Facility Identification Number 051-00193. The writer estimates the nearest residential structure to the site is approximately 300 feet northeast of the borehole.



Figure 1 - Site Entrance



Figure 2 - 19H-1 Ventilation Borehole

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The emission estimates in the application were based on the methane content in the gas stream of 100% at flow rate of 300 standard cubic feet per minute (scfm) from the borehole and emission factors from John Zink for the ZTOF Flare System. In these calculations, EPA Method 19 was used to determinate the mass rate from concentrations at measured oxygen levels. These emission estimates are presented in the following table.

Table #1 – Flare Emissions			
Pollutants	lb/hr	TPY	Concentration in ppm _{dv}
NO _x	2.73	11.97	42.3
CO	3.64	15.96	92.7
CO ₂	2,044.51	8954.95	33,100.4
Methane	15.23	66.70	676.4

The carbon dioxide equivalent (CO_{2e}) of this methane without the flare would be 83,373 tons per year. The proposed flare would reduce the CO_{2e} emissions down to 10,604 tons per year.

REGULATORY APPLICABILITY

45CSR6 - To Prevent and Control Air Pollution From Combustion of Refuse

The purpose of this rule is to prevent and control air pollution from combustion of refuse. The permittee has proposed to construct a flare to destroy the gas stream from the borehole. This rule defines incineration as the destruction of combustible refuse by burning in a furnace designed for that purpose. The purpose of this flare is to destroy the gob gas through incineration. Thus, the proposed enclosed flare meets the definition.

Per section 4.1, this flare must meet the particulate matter limit by weight. The flare will have an allowable particulate matter emission rate of 2.03 pounds per hour (based on maximum mass flow rate of the methane in the gas stream of 746 lb/hr). The predicted particulate matter rate from the flare has been estimated to be 0 pounds per hour, which is significantly less than the allowable under this rule.

The flare is also subject to the 20% opacity limitation in section 4.3 of this rule. Typically, the incineration or burning of natural gas (methane) produces little to no visible emissions when combusted.

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 potential-to-emit from the proposed flare does not exceed the 6 pounds per hour and 10 tons per year for any regulated pollutant, which is the trigger level of a stationary source as

defined in 45CSR§13-2.24. However, Rule 6 requires all incinerators to obtain a construction or modification permit in accordance with Rule 13 regardless of size. ECC has proposed to install a flare, which is subject to Rule 6. Therefore, the facility is required to obtain a permit as required in 45CSR6-6.1.

The applicant has satisfied the applicable requirements of Rule 13 to obtain a construction permit by publishing a Class I Legal Advertisement in the Wheeling News Register on September 2, 2014, paid the \$1000.00 application fee, and submitted a complete permit application.

The flare will not have a potential to exceed the major source trigger level under Title V. Thus, this flare will be subject to Rule 22 as a 9M source.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Hazardous air pollutants (HAPs) from the flare will most likely be products of incomplete combustion, which is expected to be released in trace amounts. Due to the very low emission rate, there will be no toxicity discussion of these HAPs.

AIR QUALITY IMPACTS ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed flare does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

There is no state rule or federal regulation that requires ECC to destroy the methane (gob gas) before it is emitted to the atmosphere. ECC is doing this project on a voluntary basis. The real driving force for ECC is trading these CO₂e reductions on a carbon-offset market or

exchange. These markets have specific protocols to be used when quantifying and validating the carbon reduction or offsets, which may differ by market or exchange.

Methane content in the gas stream will decrease over time to the point that the flare cannot be operated. This period is relatively short (two to three years). Natural gas is considered a clean burning fuel. Because natural gas is mainly composed of 80 to 90 percent methane, this gas stream should behave the same. Monitoring of natural gas combustion sources is usually focused on the amount of natural gas combusted in a given period and proper operation of the flare that could be indicated by combustion chamber temperature, which should not fall below 1,400°F. Considering everything, the writer recommends that the operator continuously monitor the combustion chamber and estimate the amount of methane flared.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed flare will meet all the requirements of the application rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting ECC a Rule 13 construction permit for this flare associated with the Bailey Mine at the 19H-1 Ventilation Borehole site, near Cameron in Marshall County, West Virginia.

Edward S. Andrews, P.E.
Engineer

Date: January 17, 2018