



west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION/FACT SHEET

BACKGROUND INFORMATION

Application No.:	R14-0027E
Plant ID No.:	051-00002
Applicant:	Eagle Natrium, LLC
Facility Name:	Natrium Plant
Location:	Near Proctor, Marshall County
SIC/NAICS Code:	(2812, 2865)/(325181, 325110)
Application Type:	Modification
Received Date:	February 21, 2017
Engineer Assigned:	Joe Kessler, PE
Fee Amount:	\$4,500.00
Date Paid:	February 22, 2017
Complete Date:	March 13, 2017
Due Date:	June 11, 2017
Applicant Ad Date:	February 22, 2017
Newspaper:	<i>Moundsville Daily Echo</i>
UTM's:	Easting: 512.7 km Northing: 4,399.6 km Zone: 17
Latitude/Longitude:	39.74806°/-80.84889°
Description:	Installation of a 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler.

Eagle Natrium, LLC (Eagle) owns and operates a Chlor-Alkali and Derivatives Plant near Proctor in Marshall County, West Virginia commonly known as the “Natrium Plant.” In 1941, the U.S. Government purchased the current plant site and began to drill the salt bed to produce the brine needed to produce chlorine (Cl₂) and caustic soda (NaOH). In addition to producing Cl₂ and NaOH, the current facility now produces hydrogen gas (H₂), hydrochloric acid (HCl), and calcium hypochlorite [Ca(OCl)₂]. The facility was formerly owned and operated by PPG Industries, Inc. Effective January 28, 2013, Georgia Gulf Corporation and the commodity chemicals division of PPG Industries, Inc. merged to form a new company named Axiall. The facility is now referred to as Eagle Natrium LLC, which is a subsidiary of the Axiall Corporation.

The facility received its first air permit under 45CSR13 in 1974 and has been the subject of numerous permitting actions since that time. Currently, according to the last issued Title V Permit, the facility is operating under the authority of the following permits: R13-1527, R13-1664, R13-2046G, R13-2886, R13-3328, and R14-0027D.

R14-0027D covers only the facility power plant and has requirements for Boilers 3 through 6 (Boilers 1 and 2 have been permanently shut down). This permit was originally issued on June 2, 1980 as Permit Number R13-0580 for a modification of Boiler 3. The modification allowed PPG (the facility owner at the time) to change the boiler set-up from stoker-fired to combusting pulverized coal. Prior to this modification, the boiler had been shut-down for a long period of time. On October 8, 1980, EPA issued Permit Number “PSD 79WV06” for this modification of Boiler No. 3 (although both permits included limits for Boilers 3 through 5). At the time of the modification, WV was not authorized as a SIP-approved state to run the PSD program or delegated by the EPA to administer the PSD program. Therefore, the required PSD permit for the restart of the boiler was issued by EPA. On December 6, 2004, Permit Number R14-0027 was issued that superseded both R13-0580 and PSD 79WV06 for the removal of the 4.5% excess oxygen limit on Boiler 3 to allow for optimum operation of the low-NO_x burners. Although only a small change, the permit was reviewed and issued under the authority of 45CSR14 so as to appropriately transfer the responsibility of enforcing an EPA-issued PSD permit to WV. Since that time, R14-0027 has been modified four times:

- On March 28, 2007, R14-0027A was issued to implement control technology to achieve the required SO₂ reduction to meet compliance with the Best Available Retrofit Control Technology (BART) regulation;
- On April 23, 2008, R14-0027B was issued as a Class I Administrative Update to make emission limits placed on the No. 5 Boiler effective immediately rather than within 5 years of the BART compliance deadline in order to be exempt from BART requirements;
- On July 8, 2013, Permit Application R14-0027C was withdrawn; and
- On July 1, 2014, R14-0027D was issued to (1) convert Boiler 5 from coal to natural gas and (2) to authorize Boiler 6 to burn either hydrogen or natural gas at 100% of the unit's rated input.

DESCRIPTION OF PROCESS/MODIFICATIONS

Eagle is now proposing the temporary construction and operation of a trailer mounted 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler (R200). The boiler, which will be rented from Ware, Inc., will be installed for use until a new project to convert the previously shutdown coal-fired boiler (Boiler 4) to natural gas is completed. Although a temporary boiler, as the unit is expected to be in use on-site longer than 180 days, so for regulatory purposes, it will not be considered a “temporary” boiler.

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SITE INSPECTION

Due to the nature of the proposed modification, the author did not perform a site inspection of the facility for this permitting action. The facility was last “Full On-Site” inspected by DAQ Compliance/ Enforcement (C/E) Inspector Douglas Hammell on July 27, 2016. This inspection found the facility be “Status 30 - In Compliance.”

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The potential-to-emit (PTE) from the 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler (S200) was based on emission factors provided by the boiler vendor, and as given in AP-42, Section 1.4 (AP-42 is a database of emission factors maintained by USEPA). Hourly emissions were based on the maximum design heat input (MDHI) of the boiler. Annual emissions were based on 8,760 hours of operation per year. The following table details the PTE of the boiler:

Table 1: Rental Boiler PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO	0.075 lb/mmBtu	Boiler Vendor	7.49	32.82
NO _x	0.0365 lb/mmBtu	Boiler Vendor	3.65	15.97
PM _{2.5} /PM ₁₀ /PM ⁽¹⁾	0.005 lb/mmBtu	Boiler Vendor	0.50	2.19
SO ₂ ⁽²⁾	5.88 x 10 ⁻⁴ lb/mmBtu	AP-42, Table 1.4-2	0.06	0.26
VOCs	0.004 lb/mmBtu	Boiler Vendor	0.40	1.75
Total HAPs ⁽²⁾	Various	AP-42, Table 1.4-3	0.18	0.81

(1) All particulate matter emissions are assumed to PM_{2.5} or less. Includes condensables.

(2) As calculated by the writer.

REGULATORY APPLICABILITY

The following will discuss each rule applicable or potentially applicable to only the modifications evaluated herein.

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 will apply to the proposed new 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler and is, therefore, subject to the applicable requirements therein. Each substantive 45CSR2 requirement is discussed below.

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45CSR2 Opacity Standard - Section 3.1

Pursuant to 45CSR2, Section 3.1, the boiler is subject to an opacity limit of 10%. Proper maintenance and operation of the unit (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

45CSR2 Weight Emission Standard - Section 4.1.b

The allowable particulate matter (non-condensable total particulate matter) emission rates for the unit (as part of a facility-wide 45CSR2 fuel burning allowable emission rate), identified as a Type “b” fuel burning unit, per 45CSR2, Section 4.1(a), is the product of 0.09 and the total design heat input of the unit in million Btu per hour. The maximum aggregate design heat input (short-term) of the boiler is 99.90 mmBtu/hr. Using the above equation, the 45CSR2 particulate matter emission limit of the boiler is 8.99 lb/hr. The maximum potential hourly PM emissions (including condensables) from the boiler is estimated to be 0.50 lb/hr. This emission rate is in compliance with the 45CSR2 limit.

45CSR2 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of Rule 2 requires testing for initial compliance with the limits therein, monitoring for continued compliance, and keeping records of that compliance. The TMR&R requirements are clarified under 45CSR2A and discussed below.

45CSR2A Applicability - Section 3

Pursuant to §45-2A-3, as an individual applicable “fuel burning unit” under 45CSR2 with an MDHI less than 100 mmBtu/hr, the boiler is not subject to the Testing and MRR Requirements under 45CSR2A.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

45CSR10 has requirements limiting SO₂ emissions from “fuel burning units,” limiting in-stack SO₂ concentrations of “manufacturing processes,” and limiting H₂S concentrations in process gas streams. The proposed new boiler is defined as a “fuel burning unit” and subject to the applicable requirements discussed below.

45CSR10 Fuel Burning Units - Section 3

The allowable SO₂ emission rates for the new boiler (facility located in Priority Classification I), identified as a Type “b” fuel burning unit, per 45CSR10, Section 3.1(e), is the product of 3.1 and the total design heat input of the unit in million Btu per hour (as part of a facility-wide 45CSR10 fuel burning allowable emission rate). The maximum aggregate design heat input (short-term) of the boiler is 99.9 mmBtu/hr. Using the above equation, the 45CSR10 SO₂ emission limit of the boiler is 309.69 lb/hr. The maximum potential hourly SO₂ emissions from the unit is estimated to be 0.06 lb/hr. This emission rate represents only a trace of the 45CSR10 limit.

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45CSR10 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of Rule 10 requires to test for initial compliance with the limits therein, monitor for continued compliance, and keep records of that compliance. The TMR&R requirements are clarified under 45CSR10A and discussed below.

45CSR10A Applicability - Section 3

Pursuant to §45-10A-3.1(b), as the proposed new boiler combusts “natural gas, wood or distillate oil, alone or in combination,” the unit is not subject to the Testing and MRR Requirements under 45CSR10A.

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 installation of the rental boiler will increase the PTE has the potential to increase the PTE of the facility in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant (see Table 1 above) and, therefore, pursuant to §45-13-2.17, the changes are defined as a “modification” under 45CSR13. Pursuant to §45-13-5.1, “[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . . obtaining a permit to construct.” Therefore, Eagle is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 (“Notice Level A”), Eagle placed a Class I legal advertisement in a “newspaper of general circulation in the area where the source is . . . located.” The ad ran on February 22, 2017 in the *Moundsville Daily Echo* and the affidavit of publication for this legal advertisement was submitted on February 28, 2017.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration (NON-Applicability)

The Natrium Plant is an existing “major stationary source” under 45CSR14 and the proposed installation of the 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler is considered, pursuant to §45-14-2.40, a “physical change or a change in the method of operation.” Therefore, to determine if the project is defined as a “major modification” to the Natrium Plant, pursuant to §45-14-3.4(a), the project is examined under a two-step applicability test: “[A] project is a major modification for a regulated NSR pollutant if it causes two types of emissions increases -- a significant emissions increase (as defined in subsection [§45-14-2.75]), and a significant net emissions increase (as defined in subsections [§45-14-2.46] and [§45-14-2.74]). The proposed project is not a major modification if it does not cause a significant emissions increase. If the proposed project causes a significant emissions increase, then the project is a major modification only if it also results in a significant net emissions increase.”

Therefore, for the proposed installation to meet the definition of a major modification, the installation of the new rental boiler itself must result in a significant emissions increase. The

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methodology for calculating the emissions increase under the first step is given under Sections §45-14-3.4(b), 3.4(c), 3.4(d) and 3.4(f). The substantive language relevant to the changes evaluated herein is given below:

[§45-14-3.4(b)]

The procedure for calculating (before beginning actual construction) whether a significant emissions increase (i.e., the first step of the process) will occur depends upon the type of emissions units being modified, according to subdivisions 3.4.c through 3.4.f.

[§45-14-3.4(d)]

Actual-to-potential test for projects that only involve construction of a new emissions unit(s). -- A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit (as defined in subsection 2.58) from each new emissions unit following completion of the project and the baseline actual emissions (as defined in subdivision 2.8.c) of these units before the project equals or exceeds the significant amount for that pollutant (as defined in subsection 2.74).

Based on the PTE of the proposed rental boiler as given under Table 1 above, no PSD pollutant exceeds the significant emissions threshold under 2.74 and, therefore, the proposed installation is not defined as a “major modification” under 45CSR14.

It is important to note, that the above PSD Applicability Analysis is based on treating the proposed installation of the rental boiler as a new project, and not as part of the changes made to Boilers 5 and 6 in 2014. This is based on discussions with Eagle that indicate that after Boiler 4 was shutdown (with intention to be permanent), it was realized that, to account for unanticipated steam demand, additional boiler capacity was needed. This determination resulted in a decision to propose the installation of the rental boiler with the longer-term plan to convert the shutdown Boiler 4 to natural gas (it was previously coal-fired).

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 Natrium Plant, defined under Title V as a “major source,” was last issued a Title V permit on April 23, 2013. Proposed changes evaluated herein must also be incorporated into the facility's Title V operating permit (if the proposed rental boiler is used more than 12 months). Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

40 CFR 60, Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

40 CFR 60 Subpart Dc is the New Source Performance Standard (NSPS) for industrial-commercial-institutional steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design heat input capacity between 10 and 100 mmBtu/hr. The proposed boiler is subject to 40 CFR 60, Subpart Dc under the above applicability requirements of §60.40c(a). Subpart Dc does not have any

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emission standards for units that combust only natural gas. The unit is, however, subject to the record-keeping and reporting requirements given under §60.48c.

40 CFR 63 Subpart DDDDD: National Emission Standards for Hazardous Air Pollutants for Hazardous Air Pollutants Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters

40 CFR 63, Subpart DDDDD is a federal maximum achievable control technology (MACT) rule that establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAPs. Pursuant to §63.7485, Subpart DDDD applies to "an industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is part of, a major source of HAPs." As the Natrium Plant is an existing major source of HAPs, the proposed installation of the rental boiler is subject to the applicable requirements of this rule. The proposed rental boiler is not, however, pursuant to §63.7500(e) subject to any emission standards: "Boilers and process heaters in the units designed to burn gas 1 fuels subcategory [includes natural gas] are not subject to the emission limits in Tables 1 and 2 or 11 through 13 to this subpart, or the operating limits in Table 4 to this subpart." However, the unit is subject to the applicable testing, analysis, initial compliance, notification, reporting, and record-keeping requirements as given under §63.7500-§63.7560.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the proposed rental boiler and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM₁₀, and PM_{2.5}), and Sulfur Dioxide (SO₂). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) standards promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. As it is combusting natural gas, the proposed rental boiler does not have, with the exception of n-Hexane and formaldehyde, the potential to increase HAPS in any substantive amount (> 20 pounds/year). There is a potential, however, for the boiler to emit n-Hexane and formaldehyde over this amount (0.77 and 0.02 tons per year, respectively). The following table lists each of these HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

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Table 2: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, there are no federal or state ambient air quality standards for these specific chemicals. For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris

AIR QUALITY IMPACT ANALYSIS

The proposed modification does not meet the definition of a “major modification” pursuant to 45CSR14 and, therefore, an air quality impact (computer modeling) analysis was not required. Additionally, based on the nature of the proposed modification, modeling was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, RECORD-KEEPING, AND REPORTING REQUIREMENTS

As the emission limits of the proposed rental boiler have been calculated at MDHI and operating 8,760 hours/year, there is no required fuel use or hours of operation monitoring. Nominal record-keeping and reporting is required under 40 CFR Subpart Dc and 43 CFR 63, Subpart DDDDD.

PERFORMANCE TESTING OF OPERATIONS

There are no performance testing requirements for the proposed rental boiler.

CHANGES TO PERMITS R14-0027D

The following substantive changes were made to Permit Number R14-0027D:

- The proposed 99.9 mmBtu/hr Babcock & Wilcox Model RB-747 natural gas-fired boiler was added to Emissions Units Table 1.0;

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- Emission limits, operating requirements, and rule applicability relating to the proposed rental boiler were all added under requirement 4.1.10 of the draft permit. All requirements relating to the new boiler were added under one requirement so as to facilitate easy removal from the permit when the rental boiler will no longer be used; and
- The draft permit was revised throughout by removing all references to the shutdown process of Boilers 4 and 5 (which were permanently shutdown on July 8, 2016 and August 6, 2016, respectively) and the conversion process of Boiler 5 to gas firing (which was completed in 2016).

RECOMMENDATION TO DIRECTOR

The information provided in permit application R14-0027E indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R14-0027E to Eagle Natrium LLC for the proposed installation of the rental boiler discussed herein at the Natrium Plant located near Proctor, Marshall County, WV.

Joe Kessler, PE
Engineer

Date

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