



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-1830I
Plant ID No.: 099-00010
Applicant: Braskem America, Inc.
Facility Name: Kenova Facility
Location: Kenova, Wayne County
NAICS Code: 325211
Application Type: Modification
Received Date: August 4, 2011
Engineer Assigned: Laura Jennings
Fee Amount: \$2,000
Date Received: August 4, 2011
Complete Date: September 6, 2011
Due Date: December 5, 2011
Applicant Ad Date: August 3, 2011
Newspaper: *Wayne County News*
UTM's: Easting: 360.6 km Northing: 4246.1 km Zone: 17
Description: Braskem submitted a permit application for a new natural gas-fired boiler [B604] at their polypropylene resin manufacturing facility at the Neal Plant. Upon completion of the commissioning phase for B604, Braskem will permanently shut down the existing natural gas-fired boiler [B603]. Boiler # 3 [B603] is a rental skid unit.

DESCRIPTION OF PROCESS

Braskem owns and operates a polypropylene resin manufacturing facility, commonly referred to as the Neal Plant. The Neal Plant is comprised of three main process areas: the purification process (Areas 10 and 11), the polymerization process (Area 91), and the product finishing and storage (FNS). The polymerization area includes a catalyst preparation system, two reaction loops, a material recovery step, and product extrusion process. Additionally, Braskem currently operates a 77 MMBtu/hr natural gas-fired boiler (B600), a 96.72 MMBtu/hr natural-gas fired boiler (B603), and two natural gas-fired boilers in the FNS process area.

Braskem intends to replace B603 with a new 99.66 MMBtu/hr natural gas-fired boiler (B604). During the commissioning phase for B604, Braskem will continue to operate B603 as a backup to B604. Upon completion of the commissioning phase for B604, Braskem will permanently shut down the rental skid boiler unit B603.

This application covers the installation of B604 and the permanent shutdown of B603.

B604 is a 99.66 MMBtu/hr natural gas-fired boiler manufactured by Babcock & Wilcox in 2011 capable of providing a maximum of 77,000 pounds of steam flow per hour. B604 is equipped with a flue gas recirculation (FGR) system to minimize nitrogen oxide (NO_x) emissions. Braskem intends to install B604 to replace B603 and to meet the facility's steam demands.

Table 1: Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type and Date of Change	Control Device
B604	75E	B604 - Boiler #4 (natural gas Boiler); Model # FM103-79	2011	99.66 MMBtu/hr	New	NA
B603	73E	B603 - Boiler #3 (natural gas boiler)	2010	96.72 MMBtu/hr	Permanent shutdown upon completion of the commissioning phase for B604	NA

SITE INSPECTION

Becky Johnson of DAQ's Compliance and Inspection section completed a full on site targeted inspection on July 27, 2011. Braskem was found to be in compliance. Becky reviewed the location designated for Boiler B604 during her inspection of the facility.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

A maximum firing rate of 99.66 MMBtu/hr was used to calculate hourly and annual emissions from B604 assuming continuous operation. B604 will operate with flue gas recirculation (FGR) and a low NO_x burner which reduce emissions of NO_x; this technology is inherent to the operation and is not considered a control device.

Emission Factors for NO_x (with 15% Flue Gas Recirculation), CO, VOC, Total Organic Compounds, and SO₂ were provided by the Boiler Manufacturer. Emission Factors from AP-42 were used for Lead and PM (Total). Emission Factors and Emission Calculations

were reviewed by the writer. The table below provides a summary for the potential emissions.

Table 2: Boiler #4 PTE Summary

Emission Point ID	Emission Unit ID	Pollutant	Potential Hourly Emissions	Potential Annual Emissions
			(lb/hr)	(tpy)
75E	B604	NO _x	4.98	21.83
		CO	3.99	17.46
		VOC	0.35	1.53
		PM/PM10/PM2.5 ^a	0.76	3.32
		SO ₂	0.03	0.15
		Lead	4.98E-5	2.18E-4
		Total HAPs	0.19	0.82
		CO ₂ e ^b	---	51,073

^a As described in footnote C to AP-42, Section 1.4, Table 1.4-2, all PM is assumed to be less than one (1) micron in aerodynamic diameter.

^b Carbon dioxide equivalents represent the sum of carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) emissions adjusted by each pollutant's global warming potential.

Emission Factors for the Greenhouse Gases are from Table C-1 and Table C-2 of 40 CFR98, Subpart C (Mandatory Reporting of Greenhouse Gases, Stationary Fuel Combustion Sources). The carbon dioxide equivalent emission factors and calculations were verified by the writer. Green House Gas Emissions and CO₂e Calculation Values are provided in the table below.

Table 3: Greenhouse Gases

Greenhouse Gases	Global Warming Potential
Carbon Dioxide (CO ₂)	1 Ton CO ₂ = 1 Ton CO ₂ e
Methane (CH ₄)	1 Ton CH ₄ = 21 Tons CO ₂ e
Nitrous Oxide (N ₂ O)	1 Ton N ₂ O = 310 Tons CO ₂ e

REGULATORY APPLICABILITY

STATE REGULATIONS:

45CSR2 TO PREVENT AND CONTROL PARTICULATE AIR POLLUTION FROM COMBUSTION OF FUEL IN INDIRECT HEAT EXCHANGERS

The proposed boiler B604 is subject to 45CSR2. The boiler is classified as a "type b" fuel burning unit per section 2.10.b. The particulate matter weight emission standard is for all fuel burning units located at the site. Braskem is in compliance with the weight emission standard of section 4.1.b.

Boiler B604 is exempt from the requirements of 8.1.a and 8.2 because the only fuel that will be used is natural gas.

A permit condition already exists for the facility and will include B604. Compliance with permit condition 4.1.14 will assure compliance with the other requirements of 45CSR10.

45CSR10 TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF SULFUR OXIDES

The proposed boiler B604 is subject to 45CSR10. The boiler is classified as a "type b" fuel burning unit per section 2.8.b. Wayne County has been assigned a priority classification III. Braskem is in compliance with the sulfur dioxide weight emission standards of section 3.3.f. The emission standard for B604 is 319 lb SO₂/hr and the potential SO₂ emissions calculated for B604 is 0.03 lb/hr.

Boiler B604 is exempt from the testing, monitoring, recordkeeping, and reporting requirements of section 8 because the only fuel that will be used is natural gas.

A permit condition already exists for the facility and will include B604. Compliance with permit condition 4.1.17 will assure compliance with the other requirements of 45CSR10.

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

The facility has met the applicable requirements of this rule by publishing a Class I Legal Advertisement, paid the \$1000.00 application fee for a modification permit for a major stationary source, the \$1000.00 NSPS fee, and submitted a complete permit application.

45CSR14 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTION FOR THE PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

Braskem is located in Wayne County, WV. Wayne County was designated as nonattainment for the regulated pollutant PM_{2.5} (annual) by the EPA in 2005. Wayne County is in attainment for all other regulated pollutants.

As stated in the permit application, Braskem is an existing “major” source with regard to PSD with facility-wide emissions of at least one PSD pollutant greater than 100 tpy. 100 tpy which is the “major” source PSD threshold for chemical process plants per 45CSR14-2.43.a.

The proposed addition of Boiler B604 does not meet the definition of a major modification of an existing major stationary source because there is not a “significant emissions increase” per the definitions provided in 45CSR14-2.40, 2.74 and 2.75. This proposed project is not a major modification if it does not cause a significant emissions increase as stated in the applicability criteria provided in section 45CSR14-3.4 and no additional analysis is required.

The new GHG Source [Natural Gas Fired Boiler #4] is *not subject to regulation* as defined in 40 CFR §51.166(b)(48) to PSD rule 45CSR14 because it falls below the specified cutoffs and does not meet the definition of *a regulated NSR pollutant* and therefore is not subject to PSD permitting requirements.

Table 4: PSD Applicability

Pollutant	Trigger Level (tpy)	Proposed Project Potential Emissions (tpy)
Carbon Monoxide	100	17.46
Nitrogen Oxides	40	21.83
Sulfur Dioxide	40	0.15
Ozone (VOC)	40	1.53

Particulate Matter	25	3.32
PM ₁₀	15	3.32

45CSR19 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTION WHICH CAUSE OR CONTRIBUTE TO NONATTAINMENT (NNSR)

Braskem is located in Wayne County, WV. Wayne County was designated as nonattainment for the regulated pollutant PM_{2.5} (annual) by the EPA in 2005. Wayne County is in attainment for all other regulated pollutants.

The preconstruction permit program requirements apply to the construction of any new major stationary source or major modification that is major for the pollutant for which the area is designated nonattainment under 40 CFR Part 81, Subpart C. The proposed project is not a major modification because it does not cause a “significant emissions increase” per the applicability criteria in section 3.4.a. This proposed project is not a major modification and no additional analysis is required.

Table 5: NNSR Applicability

Pollutant	Trigger Level (tpy)	Proposed Project Potential Emissions (tpy)
PM _{2.5}	10	3.32
PM _{2.5} (SO ₂ emissions)	40	0.15
PM _{2.5} (NO _x emissions)	40	21.83

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

Braskem Title V operating permit is R30-09900010-2006. Braskem submitted in June 2010 a Title V renewal application.

FEDERAL REGULATIONS:

40 CFR 60 NATIONAL STANDARDS OF PERFORMANCE

Subpart Dc NSPS FOR SMALL INDUSTRIAL-COMMERCIAL-INSTITUTIONAL STEAM GENERATING UNITS

Boiler B604 is subject to Subpart Dc because it is a steam generating unit for which construction, modification, or reconstruction will be commencing after June 9, 1989 and that has a maximum design heat input capacity of 100 MMBtu/hr or less and greater than 10 MMBtu/hr.

There is not an SO₂ standard for natural gas fired boilers. There is not a PM standard for natural gas fired boilers. Braskem is subject to the reporting and recordkeeping requirements of this subpart. Compliance with the permit requirements will demonstrate compliance to these requirements.

Braskem will also be subject to the applicable NSPS general provision requirements of Subpart A.

40 CFR 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart DDDDD (Boiler MACT)

The Boiler MACT was signed final on February 21, 2011. It had an effective date of May 20, 2011 with compliance dates of May 20, 2011 for new sources and March 21, 2014 for existing sources; however, on May 18, 2011, the effective date was delayed until further notice. EPA says that delay is due to "significant technical issues" raised by comments on the proposed rule. Pursuant to notice in the Federal Register the "delay of effectiveness" will remain in place until the proceedings for judicial review are completed or the EPA completes its reconsideration of the rules, whichever is earlier, and the Agency publishes a notice in the Federal Register announcing that the rules are in effect. EPA has said that simply promulgating the rule has fulfilled the requirements of section 112. Therefore case by case MACT determinations under 112(j) are not necessary. Rule 13 permits should not be incorporating specific requirements of the rule since they are not currently effective and may change before they are effective. Subsequent court filings indicate that EPA intends to have a proposed rule by October 31, 2011 and a final rule by April 30, 2012.

Braskem would NOT be subject to 40 CFR 63, Subpart DDDDD if it were effective because with the shutdown of their coal fired boiler (B602) in July 2010 they are no longer a major source of hazardous air pollutants (HAPs).

Subpart JJJJJJ (Boiler GACT for Area Sources)

Braskem is NOT subject to 40 CFR 63, Subpart JJJJJJ because natural

gas fired boilers are exempt per §63.11195 (e).

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There are no new materials or pollutants associated with this modification.

AIR QUALITY IMPACT ANALYSIS

The proposed project does not meet the definition of a major modification according to the definitions in 45CSR14 and 45CSR19; therefore, modeling is not required for this permit application.

MONITORING OF OPERATIONS

- Opacity limits for B604 required by 45CSR2 will be monitored with visual emission check procedures.
- Natural gas usage records for B604 will be maintained.
- Initial performance testing for Boiler B604 (CO and NOx)
- Notification requirement for the permanent shutdown of Boiler B603.

CHANGES TO PERMIT R13-1830H

- General permit changes reflecting dates, revision numbers, etc.
- Added Boiler B604 to the emission unit table in section 1.0.
- Added emission limits for B604 to the emission limits table 4.1.1.
- Updated section 4.1.8 by:
 - (a) added B604;
 - (b) adding the phrase “and in combination with B604” for the natural gas consumption requirement for B603 in requirement 4.1.8.1;
 - (c) inserted requirement 4.1.8.2 “Boiler B604 shall be limited to a maximum design heat input of 99.66 mmBtu/hr and shall combust only natural gas” and re-numbered subsequent requirements;
 - (d) added the phrase “or B604” to requirement 4.1.8.3;
 - (e) inserted requirement 4.1.8.4 “The permittee shall permanently shut down B603 upon completion of the commissioning phase for B604”;
 - (f) added the reference to 4.1.8.5; and (g) added 4.1.8.6 “The permittee shall meet all applicable requirements as given under 40 CFR 60, Subpart A [40 CFR §60.1]”.
- Added additional detail to the 45CSR2 requirements of 4.1.14 by addition 4.1.14.1, 4.1.14.2, and 4.1.14.3.
- Added reference to section 4.1.14.1 to section 4.2.1. and added 45CSR2-3.2 to reference.
- Added initial testing requirement 4.3.9 for Boiler B604.

- Added B604 to the recordkeeping requirement 4.4.4 and added references to 4.4.4.
- Inserted SSM recordkeeping requirement 4.4.5 and re-numbered subsequent requirements.
- Added reporting requirement 4.5.4, 4.5.5, and 4.5.6

RECOMMENDATION TO DIRECTOR

Based on the information provided in this application along with supplemental information that was received related to this permit application, Braskem meets all applicable federal and state regulations. It is therefore, the recommendation of the writer that permit R13-1830I be granted to Braskem America, Inc., Kenova Facility located in Wayne County, WV.

Laura Jennings
Permit Engineer

Date