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west virginia department of environmental protection

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## ENGINEERING EVALUATION/FACT SHEET

### B BACKGROUND INFORMATION

Application No.:	R14-0027D
Plant ID No.:	051-00002
Applicant:	Eagle Natrium LLC
Facility Name:	Natrium Plant
Location:	New Martinsville
NAICS Code:	325181 & 325110
Application Type:	Modification
Received Date:	November 01, 2013
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$4,500.00
Date Paid:	October 17, 2012
MACT Fee Date Paid	November 4, 2014
Complete Date:	December 4, 2013
Due Date:	March 3, 2014
Applicant Ad Date:	November 4, 2013
Newspaper:	<i>Moundsville Daily Echo</i>
UTM's:	Easting: 512.7 km      Northing: 4,399.6 km      Zone: 17
Description:	The application is for the conversion of Boilers #5 and #6 to natural gas.

### DESCRIPTION OF PROCESS

No. 5 Boiler currently burns pulverized coal and utilizes natural gas for start-up and flame stabilization. The dry bottom wall fired unit began operation in 1966. It is equipped with a dry, cold side, electrostatic precipitator and low NO<sub>x</sub> burners with over fire air. Low-NO<sub>x</sub> burners with the over fire air configuration were installed in 2004. This boiler was specifically configured to Turbine #7, which is a 70 megawatt (MW) steam turbine/generator set.

No. 6 Boiler was installed in 1993. It is a Zurn 181 MMBtu/hr boiler designed to burn hydrogen gas. However, it uses natural gas for start-up and stabilization procedures. The primary purpose of this unit is to generate steam that produces electricity and the remaining heat

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energy in the steam, after being exhausted by the turbines, is then used in the manufacturing process at the Natrium Plant. All of the electricity generated from these boilers is consumed by the Natrium Plant.

Eagle Natrium proposes to re-configure Boiler #5 to be completely fired by natural gas, which will require the heat input size of the unit to be increased up to 999 MMBtu/hr. For Boiler #6, Eagle Natrium proposes to configure Boiler #6 to be fired completely on natural gas and retain the ability to consume hydrogen gas. The main reason for the modification is to allow these two emission units to comply with the requirements of Subpart DDDDD of 40 CSR 63 (Boiler Maximum Available Control Technology (MACT)) as “Gas 1” affected sources.

## SITE INSPECTION

On December 5, 2012, the writer visited the site. Ms. Erika Baldauff, Engineer for Eagle Natrium, accompany the writer during this visit. The nature of this inspection was for the proposed installation of the #3 HCL Acid Production Unit. This visit included a stop at the power house. The proposed changes to No. 5 and 6 Boilers should result in actual decreases in potential and actual emissions. Since the last full onsite inspection determined that the facility was operating within compliance, the writer deemed a follow-up visit to the facility was not warranted.

## ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The applicant has determined that the heat input of Boiler #5 would have to be increased up 999 MMBtu/hr to yield the original designed steam output of 750,000 lb per hour. Using this new heat input rating and other design/operating parameters (i.e. excess air, percentage of over fire air), the applicant developed emission factors for oxides of nitrogen (NO<sub>x</sub>) and carbon monoxide (CO) that should be reasonably achievable from most burner manufacturers that could perform this retrofit project. The target for NO<sub>x</sub> and CO was 0.16 lb per MMBtu and 100 ppm respectively.

The following information was used to predict the emission potential of No. 5 Boiler before and after this project.

Constants of No. 5 Boiler:

Maximum Steam Production Rate:	750,000 lb/hr @ 1,300 psig
Maximum Coal Firing Rate:	35.88 tons per hour (tph); 303,787 tons per year (tpy)
24 –hour Maximum Natural Gas Fired Rate:	892.1Mscf per hour
Higher Heating Value (HHV) of Natural Gas:	1,020 Btu/scf

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<b>Table #1 – Emissions from No. 5 Boiler</b>			
<b>Pollutant</b>	<b>NOx (lb/hr)</b>	<b>PM (lb/hr)</b>	<b>SO<sub>2</sub> (lb/hr)</b>
Potential/Permitted Limits	702	79.0	1,479.0
Emission from Natural Gas at Maximum Heat Input Rate	159.84	0.46	0.5
Net Difference	-542.16	-78.54	-1,478.5

Other Pollutants that were estimated are carbon monoxide (CO), volatile organic compounds (VOCs) and carbon dioxide equivalent (CO<sub>2</sub>e).

<b>Table #2 – Other Emissions from No. 5 Boiler</b>			
<b>Pollutant</b>	<b>CO (lb/hr)</b>	<b>VOCs (lb/hr)</b>	<b>CO<sub>2</sub>e lb/hr</b>
Potential w/100% Coal Before	17.94	2.15	182,013.79
Emission w/Natural Gas After	81	8.12	116,980.9
Net Difference	63.06	5.97	-65,032.89

No. 6 Boiler was originally designed and constructed to burn hydrogen gas. Thus, the heat input needed for the boiler to generate 112,000 lb/hr of steam is nearly the same regardless of the fuel (natural gas or hydrogen gas). Again, Eagle Natrium has basically set the emission factor parameters on what should be reasonably achievable from most burner manufacturers that could provide equipment for this retrofit project. The targets for NO<sub>x</sub> and CO emission parameters are 0.04 lb/MMBtu and 100 ppm respectively.

The emission change as a result of this conversion is much different than for No. 5 Boiler. Hydrogen gas burned in No. 6 Boiler is a by-product from the Chlorine Circuits of 6, 7, and 8 at the facility. Burning hydrogen should yield just water and thermal NO<sub>x</sub>. Natural gas combustion yields nearly emissions of all criteria pollutants except for lead.

The following information was used to predict the emission potential of No. 6 Boiler before and after this project.

Constants of No. 6 Boiler:

Maximum Steam Production Rate:	112,000 lb/hr @ 865 psig
Maximum Hydrogen Gas Firing Rate:	3,112 lb per hour (pph); 567 M scf per hour
24 –hour Maximum Natural Gas Fired Rate:	165.5 Mscf per hour
HHV of Natural Gas:	1,020 Btu/scf
HHV of Hydrogen Gas:	320.89 Btu/scf (winter) 309.54 Btu/scf (summer)

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Pollutant	Permitted Limits (lb/hr)	After Conversion (lb/hr)
PM Filterable/Condensable Fractions	0.2	0.09
PM <sub>10</sub> Filterable/Condensable Fractions	-	0.09
PM <sub>2.5</sub> Filterable/Condensable Fractions	-	0.07
Sulfur Dioxide (SO <sub>2</sub> )	0.1	0.1
Oxides of Nitrogen (NO <sub>x</sub> )	10.6	7.29
Carbon Monoxide (CO)	1.3	15
Volatile Organic Compounds (VOCs)	0.1	1.53
Total Hazardous Air Pollutants (HAPs)	-	0.33
Carbon Dioxide Equivalent* (CO <sub>2e</sub> )	-	21,311.84

Eagle Natrium plans on operating both units on a continuous basis. Thus, no limitation for the annual operating schedule was proposed. Therefore, potential annual emissions were based on operating schedule of 8,760 at full heat input for both units. These emissions are summarized in the following table.

Pollutant	Boiler #5 (tpy)	Boiler #6 (tpy)	Total Emission (tpy)
PM Filterable/Condensable Fractions	2.07	0.38	2.45
PM <sub>10</sub> Filterable/Condensable Fractions	2.07	0.38	2.45
PM <sub>2.5</sub> Filterable/Condensable Fractions	2.07	0.31	2.38
Sulfur Dioxide (SO <sub>2</sub> )	2.19	0.44	2.63
Oxides of Nitrogen (NO <sub>x</sub> )	700.10	31.93	732.03
Carbon Monoxide (CO)	354.78	65.7	420.48
Volatile Organic Compounds (VOCs)	35.57	6.7	42.27
Total Hazardous Air Pollutants (HAPs)	7.8	1.45	9.25
Carbon Dioxide Equivalent* (CO <sub>2e</sub> )	512,376.35	93,345.84	605,722.19

## REGULATORY APPLICABILITY

Nos. 5 and 6 Boilers are currently subject to Rules 2 & 10 (45 CSR 2, 45 CSR 10) for PM and SO<sub>2</sub>, and Subpart DDDDD of Part 63 (National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters) referred to as the Boiler MACT. Only No. 5 Boiler is subject to the Clean Air Interstate Rule (CAIR) Control of Ozone Season Nitrogen Oxides Emissions (45 CSR 40). This proposed change in operation does not affect or change this unit's applicability status with these rules. However, the proposed modification will change the way these emission units demonstrate compliance with the emission standards from these rules will be explained in the remainder of this section except for the 45 CSR 40 (WV CAIR Rule). Under CAIR, Eagle Natrium will still be required to obtain allowances to cover NO<sub>x</sub> emissions from No. 5 Boiler that were emitted during the Ozone Season.

### **Subpart Db of Part 60**

This proposal has the potential to make these units affected sources to Subpart Db of the New Source Performance Standard as a reconstructed source or modification in 40CFR 60.14(a), which states "... operational change to an existing facility which results in an increase in the emission rate in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act...". No 5 Boiler meets the basic criteria of a potentially affected source under Subpart Db (i.e. indirect heat exchanger (boiler) with a heat input of greater than 100 MMBtu/hr). The pollutants that this subpart set a standard for are PM, SO<sub>2</sub>, and NO<sub>x</sub>.

Because Eagle Natrium is attempting to re-gain lost steam generating capacity due to the installation of low-NO<sub>x</sub> burners, the source had to make a demonstration to prove the project does not constitute "reconstruction" as defined under Part 60. Under 40 CFR §60.15(d), reconstruction is triggered if the "fixed capital cost" of a project exceeds 50 percent that would be required to construct a comparable new emission unit. For this particular project, Eagle Natrium estimated the fixed capital cost with the conversion of No. 5 Boiler is projected to be 7.9 million dollars and the cost of a replacement unit for No. 5 Boiler to be 37 million dollars. Thus, the cost of the conversion project for No. 5 Boiler is just 21% of a replacement unit and does not meet the Part 60 definition of reconstruction. Therefore, No. 5 Boiler will not be an affected source under Part 60.

The maximum design heat input of No. 6 Boiler will be 182 MMBtu/hr, which exceeds the subparts' applicability threshold of 100 MMBtu/hr. No. 6 Boiler was constructed after June 19, 1984 applicability date of this subpart. Permit R13-1637 established a less than 10% capacity factor limit for the unit to be fired on natural gas, which excluded the unit from the NO<sub>x</sub> emission limitation of §60.44b(b) according to §60.44b(e). This limit was retained in Permit R13-1637A in Condition 4.1.3. The proposed modification requests the capacity of the unit to use 100% natural gas means that the NO<sub>x</sub> limit of §60.44b becomes in effect upon re-start from the conversion.

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For natural gas burning affected units under Subpart Db, only the NO<sub>x</sub> emission standard is applicable to those units. Boiler #6 has a heat release rate of 89,435 Btu/hr-ft<sup>3</sup>. The heat release rate is a function of the furnace volume and design heat input rate. Subpart Db classifies Boiler #6 as a “high heat release rate” unit. According to 40 CFR §60.44b(a), Boiler #6 will be subject to the NO<sub>x</sub> limit of 0.20 lb per MMBtu/hr. Eagle Natrium predicts the NO<sub>x</sub> rate with the low NO<sub>x</sub> burners and fuel gas recirculation to be 0.04 lb per MMBtu from boiler #6. Under the subpart, Eagle Natrium will be required to use continuous emission monitors to demonstrate compliance with the limit on a 30 day rolling average.

## **Rules 2 &10**

For No. 6 Boiler, this project does not affect how this unit will comply with the PM and SO<sub>2</sub> standard in these rules. The potential of these two pollutants will remain in significant with the switch to natural gas. Both of these rules have provisions that recognize the insignificant amount of PM and SO<sub>2</sub> emissions generated from burning natural gas, which excludes them from the requirements of periodic testing and monitoring.

No. 5 Boiler has been subject and complying with the PM and SO<sub>2</sub> emission standards and monitoring requirements. Eagle Natrium currently ensures a specific number of fields of the electrostatic precipitator to be in service and conducts monthly visible emission observations with periodic PM testing based on the schedule outlined in 45 CSR 2A. For Rule 10, the source operates and maintains a SO<sub>2</sub> continuous emission monitor.

The conversion for No. 5 Boiler will allow the operator to discontinue these monitoring measures. The margin of compliance for PM emissions from the unit will increase by 99% without the use of an add-on control device. For SO<sub>2</sub> emissions, No. 5's new potential will be less than a half percent of the existing permitted limit of 1479 lb/hr.

After the conversion, the permit will establish compliance with these two rules by restricting the fuel type to pipeline quality natural gas for No. 5 and hydrogen/pipeline quality natural gas for No. 6.

## **PSD & Nonattainment Permitting**

The Natrium Plant is classified as an existing major source under 45 CSR14. Therefore, a PSD review of this project must be conducted. PSD looks at long term emissions to determine if a project needs to undergo the Major Source Permitting Process. This type of applicability analysis only looks at criteria pollutants such as PM, PM<sub>10</sub>, PM<sub>2.5</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, VOCs, lead (Pb), and CO<sub>2e</sub>. With these pollutants in consideration, the review will look to see if this project would result in a “significant net increase” of the individual pollutant being evaluated.

The first step in the netting process is to determine if the project by itself would result in an emission increase greater than the significant level for the respective New Source Review (NSR) pollutant.

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Pollutant	New Potential from the No.5 & 6 Boilers (tpy)	Significance Threshold (tpy)	Significance Trigger (Yes/No)
PM	2.45	25	No
PM <sub>10</sub>	2.45	15	No
PM <sub>2.5</sub> Direct	2.38	10	No
SO <sub>2</sub>	2.63	40	No
NO <sub>x</sub> (precursor of Ozone and PM <sub>2.5</sub> )	732.03	40	Yes
CO	420.48	100	Yes
VOCs	42.27	40	Yes
CO <sub>2</sub> equivalent (CO <sub>2e</sub> )	605,722.19	75,000	Yes

Since the project poses a significant increase for NO<sub>x</sub>, CO, VOCs, and greenhouse gases in the form of CO<sub>2e</sub>, the next step is to compare the new potential for these four pollutants with the baseline emissions from No. 5 and No. 6 Boilers. Eagle Natrium selected operating years of 2004 and 2005 to establish baseline actual emissions (BAE) for this project. The emissions from these years are based on different sources of data. CO, NO<sub>x</sub>, and CO<sub>2</sub> releases were acquired using continuous emission monitoring system (CEMs). VOCs emissions were based on emission factors published in AP-42.

Pollutant	CO	NO <sub>x</sub>	VOC	CO <sub>2e</sub>
Unit	Tpy	tpy	Tpy	tpy
No. 5	199.09	1178.25	7.17	608884.12
No. 6	0.13	22.76	0.01	172.20
Baseline Total from 5 & 6	199.22	1201.01	7.18	609056.32
New Potential	420.48	732.03	42.27	605,722.32
Net Difference	221.26	-468.98	35.09	-3,334
Significance Threshold (tpy)	100	40	40	75,000
Is Significance Met?	Yes	No	No	No

Since the project is still posing a significant increase for CO emissions, the applicant has to conduct a netting analysis to determine if the project must be treated as a major modification under Rule 14. Thus, Eagle Natrium has identified all creditable increases and decreases at the facility that occurred during the contemporaneous period. These changes are identified in the following table.

Table #7 Facility Wide CO Emission Changes	
Unit	CO (tpy)
Installation of #1 HCl Synthesis Unit	43.80
Installation of #2 HCl Synthesis Unit	43.80
Installation of #3 HCl Synthesis Unit	83.22
Shutdown of #3 Boiler	-154.76
Shutdown of #4 Boiler	-149.42
Sum of CO Emission Change	-133.36
Net of #5 & 6 Boilers Difference from Table #6	221.26
Net CO Emission Change	87.9

The net CO change of this project is less than the 100 tpy significant threshold. Therefore, this project does not represent a “net significant” increase of CO emissions and a major modification of a major source. This concludes the PSD applicability review of this project.

The Natrium Plant is located in Marshall County. Marshall County was designated as attaining the National Ambient Air Quality Standard (NAAQS) in September 2013. Therefore, Rule 19 does not apply.

### **Boiler MACT**

The Natrium Plant is a major source for hazardous air pollutants (HAPs). This project will reduce HAP emissions from the facility but will remain as a major source of HAPs. Thus, the Boilers 5, and 6 are affected sources under Subpart DDDDD of Part 63.

Natural gas is classified under this subpart as a “gas 1” fuel. However, hydrogen gas is not defined in this subpart specifically. However, Eagle Natrium will make the case that the hydrogen gas produced at the facility and consumed by No. 6 Boiler meets the definition of “other gas one fuels”, which is a gas with a mercury concentration of less than 40 micrograms per cubic meter of gas (40 CFR §63.7575). Units consuming a fuel classified under “gas 1” or “other gas 1 fuel” are only subject to the work practices requirement of this subpart, which are periodic tune-ups for each unit and a one-time energy assessment of the facility.

Both of these boilers currently operate with oxygen trim systems and will be equipped with oxygen trim after the conversion. Thus, subsequent tune-ups for these units will have to be conducted once every five years.

The hydrogen fuel for No. 6 Boiler is supplied from the chlorine circuits at the facility. There are three chlorine circuits, including Circuits 6, 7 and 8. The hydrogen gas generated from

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Circuits 6 and 8 does not exceed the mercury limit as defined in the subpart. Conversely, the hydrogen from Circuit 7 will have the potential to exceed the mercury threshold as defined. The hydrogen from Circuit 7 will be combined with hydrogen from other two circuits to meet this threshold level of an “other gas 1 fuel”. Under the Chlor-Alkail MACT (Subpart IIII of Part 63), Eagle Natrium is required to continuously measure the actual mercury concentration in the hydrogen produce from Circuit 7. The Boiler MACT requires sources using “other gas 1 fuel” to prepare and submit site specific fuel analysis plan for approval to determine if the gas meets the definition. Once the plan is approved, Eagle Natrium will have to implement it and determine if the hydrogen fuel meets the criteria of an “other gas 1 fuel”.

Under Part 63, the definition of reconstruction is the same as under Part 60. Thus, this modification for No.5 Boiler does not meet this definition. The cost of modification for No.6 Boiler was estimated at 1.3 million dollars. To completely replace it with a new unit was estimated at 4.2 million dollars. The projected cost of the project for No. 6 Boiler is less than 29% of a new boiler. Therefore, this project does not trigger reconstruction for either boiler under Part 63. Therefore, both units are treated as existing units under the Boiler MACT.

The compliance date for the Boiler MACT is January 31, 2016. On March 19, 2014, the applicant filed a compliance date extension request. Eagle Natrium requested an extension to cover Nos. 3, 4, and 5 Boilers to the completion of the conversion project or until December 2016, whichever is sooner. The modification for No. 6 Boiler is projected to be complete by November 2015. Thus, No. 6 Boiler is expected to be operating in compliance with the MACT standard prior to the compliance date of January 31, 2016.

No.5 Boiler is scheduled to be taken down at the end of February 2016, after the compliance date, to be converted for natural gas firing. It has been estimated the conversion project will take about three months to complete for No. 5 Boiler. For Eagle Natrium to continue operating the Natrium Plant, the applicant will have to purchase electricity externally. This option poses risk to potential electric power curtailments at the discretion of the utility operator.

Usually, extensions under Part 63 can be up to a full year for existing sources (four year compliance schedules). Because Eagle Natrium’s proposed plan for this conversion project required Nos. 3 and 4 Boilers to be permanently shutdown to avoid PSD, the driver for the length of the extension is the outcome of the netting analysis under Rule 14. Thus, the extension has to become part of the permitting process.

The extension request was approved on April 10, 2014 and will be incorporated into the permit, which includes the efforts the applicant will implement to minimize HAP emissions during the extension period. After the conversion is complete, Nos. 5 and 6 Boilers will be capable of meeting the requirements of the MACT Standard without the use of any add on control device(s).

## **Rule 13**

Eagle Natrium prepared and submitted a complete application, paid the filing fee, and published a Class I Legal ad in the *Moundsville Daily Echo* on November 4, 2013. This modification will not make these emission sources applicable to any additional regulations, except for Subpart Db for No. 6 Boiler. The Natrium Plant will remain as a major source and be required to maintain a valid operating permit in accordance with 45 CSR 30. Eagle Natrium included Attachment S with this application to have the changes made in Permit R14-0027D be included in the facility's Title V Permit.

Because the netting analysis in this application relies on the CO reductions from shutting down Nos. 3 and 4 Boilers, to avoid a major modification under Rule 14, Notice Level C procedures of Rule 13 needs to be executed for this particular application during the upcoming public comment phase.

### TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Nos. 5 and 6 Boilers will not emit any new pollutants that aren't already being emitted by the unit before this modification. The HAPs emissions from No. 5 Boiler after the conversion to natural gas will significantly reduce actual HAPs emission. Just looking at 2013 actual reported emissions from No. 5, hydrochloric acid (HCl), which is one of the 187 HAPs, could have been reduced by 183 tons in 2013. For No. 6 Boiler, this modification will have little effect on HAPs emitted from the unit. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

### AIR QUALITY IMPACT ANALYSIS

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

### MONITORING OF OPERATIONS

Under CAIR and Subpart Db, Nos. 5 and 6 Boilers will be required to continuously monitor NO<sub>x</sub> emissions. As outlined in this evaluation, this project is within 90% of the trigger level for CO under Rule 14 even with the shutdown of Nos. 3 and 4 Boiler. Thus, the monitoring of actual CO emissions is warranted to ensure that the project does not exceed the CO limits and potentially void the netting analysis. Eagle Natrium had proposed the use of a continuous emission monitoring system (CEMS) for both of these pollutants, oxygen, and carbon dioxide. During the application review, the applicant inquired about the use of predictive emission monitoring systems (PEMS).

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PEMS is not exactly the same CEMS. However, EPA has developed a specific performance specification (PS-16) for PEMS and has approved the use on case-by-case basis for use of demonstrating compliance with federal emission standards/emission trading programs as acceptable alternative to CEMS. The writer believes that the use of PEMS would be an acceptable application for these two units if installed in accordance with PS-16.

After careful studying of Subpart Db of Part 60, 40 CSR 40, Part 75, the agency does not have the authority to approve the use of PEMS in lieu of CEMS for demonstrating compliance with these rules. 40 CSR §40-71.6 refer to process outline Subpart E of 40 CFR Part 75 to obtain approval of alternative monitoring from the Administrator, which will be the Clean Air Markets Division of the EPA.

Subpart Db does not mention an alternative form of monitoring in lieu of CEMS for NO<sub>x</sub> compliance. Thus, it must be approved by the Administrator, as well, either at Region III and/or Emissions, Monitoring & Analysis Division at OAQPS of the EPA.

Both types of monitoring systems will either measure or predict NO<sub>x</sub> and CO emissions. Other data required for CAIR and Subpart Db are exhaust flow rate and heat input. EPA allows measuring fuel usage to determine flow rate using the procedures outlined in Method 19 and heat input by using engineering calculations.

The writer recommends using either CEMS or PEMS for demonstrating compliance with the NO<sub>x</sub> and CO emission limits. The proposed limits are in terms of lb of pollutant per MMBtu on a 30 day rolling average basis. To cap the annual emissions without establishing a second limit, the writer recommends limiting the annual heat input on a 12 month rolling total per unit. This approach simplifies the requirements, standardizes the term without creating an inflexible condition for No. 6 Boiler, which will be consuming two different fuels.

#### CHANGES TO PERMITS R14-0027B & R13-1637A

Permit R14-0027B covers No. 3, 4, and 5 Boilers for the Natrium Plant. These boilers are coal fired units that are subject to the applicable requirements of Rule 2 (PM), and 10 (SO<sub>2</sub>). The permit established the mass based limits for PM and SO<sub>2</sub> for each of these boilers in two different tables, one for each pollutant. In addition to these limits, the permit established a total hourly SO<sub>2</sub> limit from the all three units of 3,766.8 lb/hr (Permit R14-0027A) for compliance with Regional Haze and Best Available Retrofit Technology (BART) State Implementation Plan. Permit R14-0027A addressed the BART mandates for the No. 5 Boiler as a BART unit.

Nevertheless, the State of New Jersey commented on the State of West Virginia's BART SIP submittal that the emission reductions should be prior implemented before approving the SIP instead of the BART Compliance Dates. Thus, the permittee elected to accept the SO<sub>2</sub> reductions earlier that stipulated in Permit R14-0027A, which created Permit R14-0027B. Permit R14-0027B left a total SO<sub>2</sub> limit for No. 3 and 4 Boilers of 2,288 lb per hour (Condition A.6.) and total combine limit of SO<sub>2</sub> limit of 3,767 lb per hour from all three units.

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These total limits are direct sums of the individual limits. It would have made sense to have a total SO<sub>2</sub> for No. 3 and 4 Boiler, which vents to a common stack or implementing the original BART compliance date. The permittee operates separate SO<sub>2</sub> CEMs on the exhaust of each unit before mixing into the common stack. The writer believes that compliance is being monitored with SO<sub>2</sub> CEMs from each unit that the permitted limit should only reflect the individual and not the summation of these individual limits. Therefore, the combined SO<sub>2</sub> limits in Conditions A.6. and A.10. were not carried into this proposed permit.

Boiler No. 3 will be permanently shut down as result of this modification. Of the existing conditions in Permit R14-0027B, all were retained except for the lb/MMBtu for PM in A.4. and A.7. to install low-NO<sub>x</sub> burners. Both limits are redundant or meaningless with the other limits in place. The permit establishes mass limit for PM and lb/MMBtu for NO<sub>x</sub> emissions with specific means to demonstrate compliance.

The writer re-organized the existing limits/conditions into three individual conditions, one for each unit (Condition 4.1.1. for No. 3; Condition 4.1.2. for No. 4; Condition 4.1.3. for No. 5). The existing limits for these units were incorporated into item a. of these conditions. Other changes to the existing conditions was stating the compliance with the SO<sub>2</sub> limit to be determined on a continuous 24 hour average period as stipulated in 45 CSR §10-3.8.

The existing permit required CEMs for NO<sub>x</sub> from No. 3 and SO<sub>2</sub> from No. 5. The permittee has certified CEMS for NO<sub>x</sub>, SO<sub>2</sub>, CO<sub>2</sub>, and volumetric flow rate for Nos.3, 4, and 5 boilers. There are un-certified CO CEMS on the three units too. The applicant identified the use of SO<sub>2</sub> CEMS for compliance with in the facility's Rule 10 monitoring plan submittal pursuant to 45 CSR §10-8.2.c.

Part 75 has procedures for missing data or developing method to handle bias data. Acid Rain program needed these procedures to make the "cap-trading" program to work as it was designed to do. These procedures are not normally accepted for determine compliance in other programs or rules (i.e. Part 60, 45 CSR §10A-6.1.b.1.) Thus, the CEMS monitoring requirement of Conditions A.9. and A.11. of R14-0027B will be incorporated into as Condition 4.2.3. and expanded to cover the all of the existing CEMS on all three units. Condition 4.5.3. outlines the submission of Compliance Reports on a semi-annual basis, which mirroring off of the reporting period in Title V and requirements of Rules 10 and 10A.

Section B of Permit R14-0027B contained specific applicable rule citations from 45 CSR 2, 45 CSR 10, 45 CSR 13, and 45 CSR14. For the most part these rule citations are no longer necessary due the new DAQ Permit Format. The citations from Rules 2 and 10 are incorporated as part of the specific conditions for PM and SO<sub>2</sub>, except for the opacity standard of 45 CSR§2-3.1. Condition 4.1.4. was created to incorporate the visible emission standard for the three boilers in the modified permit. The monitoring plan requirements of Rule 2 of 45 CSR §2-8.2.(a) was incorporated in in Condition 4.2.3., which contains the appliance's approved monitoring plan for Rule 2.

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No. 6 Boiler is currently covered by Permit R13-1637A. The proposed modification application request to consolidate Permit R13-1637A, which makes sense that that the facility's boilers will be covered under one permit. This permit set emissions, fuel, and heat input limits for this unit. Only Condition 4.1.3. was incorporated as stated in Permit R13-1673A in the proposed permit. Permit R13-1637A relied on fuel monitoring. This fuel monitoring requirement was incorporated into Condition 4.4.4. as a fuel tracking requirement for all of the boilers covered by the permit. Condition 4.1.3. was the federally enforceable limit that allowed the boiler not to be subject to NO<sub>x</sub> limit under Subpart Db. Due to the long lead time for this particular project, over 18 months away, the writer felt it was necessary to retain this as a transition condition or the source would be require to install NO<sub>x</sub> CEMs after issuance.

The rest of the specific conditions from Permit R13-1637A were replace in the proposed draft, which mainly focus on CO and NO<sub>x</sub> emissions with an annual ceiling limit on heat input. While operating during the transition period, CO emission should be relative minimal and NO<sub>x</sub> emissions should be less than the newly establish limit in the permit. So, the unit should be capable of complying with the emission limits in the proposed draft. As noted earlier in this evaluation, the heat input limit is the preferred choice than set a total fuel limit or individual fuel by type.

Permit R13-1637A has general language for the unit to comply with the Boiler MACT. This condition will be replaced with the applicable specific requirements and compliance schedule for these units. Both units will be re-equipped with oxygen trim system, and therefore there is condition requiring such combustion controls. This allow for the timing of the subsequent tune-up for each unit to be once every five years. Another condition was established that require the applicant to conduct the one-time energy assessment.

The specific requirements for No. 6 Boiler has a mercury concentration limit for the hydrogen fuel and required to develop a site specific fuel analysis plan to demonstrate compliance with the fuel restriction.

## RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the Nos. 5 and 6 Boilers will meet all the requirements of the application rules and regulations when operated in accordance to the permit application. By granting the MACT Extension Request makes this proposed scheduling of this modification to be acceptable. Once completion of this project is complete, this modification will reduce the potential to emit of nearly 6,500 tons per year of sulfur dioxide and 2,400 tons per year of oxides of nitrogen without the use of add on controls, which are pollutants that Marshall County has had issue maintaining within acceptable levels. Therefore, this writer recommends combining Permits R13-1637A and R14-0027B and granting Eagle Natrium a Rule 13 modification permit for their Natrium Plant located near New Martinsville, WV.

Edward S. Andrews, P.E.  
Engineer

May 12, 2014  
Date

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