west virginia department of environmental protection

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

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2896E
Plant ID No.:	051-00142
Applicant:	Blue Racer Midstream, LLC (Blue Racer)
Facility Name:	Natrium Extraction and Fractionation Plant
Location:	Near Proctor, Marshall County
NAISC/SIC Code:	211112/1321
Application Type:	Modification
Received Date:	July 8, 2015
Engineer Assigned:	Joe R. Kessler
Fee Amount:	$4,500
Date Received:	July 10, 2015 ($2,000), August 6, 2015 ($2,500)
Complete Date:	September 1, 2015
Due Date:	November 30, 2015
Applicant Ad Date:	July 16, 2015
Newspaper:	*Moundsville Daily Echo*
UTM's:	Easting: 512.1 km Northing: 4,400.8 km Zone: 17
Latitude/Longitude:	39.75996/-80.86101
Description:	Modification to authorize the addition of one (1) Cryogenic Train which includes one (1) Regeneration Gas Heater, one (1) Cryogenic HMO Heater, and two (2) Glycol Dehydration Units (GDU). Additionally, to update the emissions from the previously installed GDU to be routed to a vapor combustor and the addition of piping and fugitive components.

On December 19, 2011 Dominion Natrium, LLC (Dominion) was issued Permit Number R13-2896 for the construction of the 400 mmscf-natural gas/day Natrium Extraction and Fractionation Plant. The facility began operation on May 15, 2013. Since that time, the facility has been the subject of both permitting and compliance/enforcement actions. The following summarizes these actions:

- On June 10, 2013, permit application R13-2896A was submitted for the installation of two (2) heaters and a Vapor Recovery Unit (VRU). However, this application was withdrawn on July 23, 2013 due to its submission by Blue Racer Natrium, LLC, who had not previously transferred the permit into their name;

- On July 31, 2013, Dominion agreed to a Consent Order (CO-R13-E-2013-12) concerning (primarily) the operation of a flare. As part of the Orders for Compliance, Dominion was required to submit a permit application to "correct all deficiencies and violations with Permit R13-2896;"

- On September 24, 2013, Permit Number R13-2896 was transferred to "Blue Racer Natrium, LLC;"

- On December 26, 2013, Permit Number R13-2896B was issued to Blue Racer Natrium, LLC to replace the existing flare and make other changes pursuant to requirements of the Consent Order. Additionally, and unrelated to the Consent Order, the permit authorized installation of two (2) process heaters; and

- On February 21, 2014 the permit was transferred to "Blue Racer Midstream, LLC." Formed in December 2012, Blue Racer Midstream is a joint venture between Caiman Energy II, LLC and Dominion; and

- On February 26, 2014 Blue Racer Midstream, LLC submitted permit application R14-0031 to relax the Greenhouse Gases (GHGs) synthetic minor limits that were part of R13-2896. This required Blue Racer to undergo Prevention of Significant Deterioration (PSD) review under 45CSR14 for the requested changes. However, on June 23, 2014, in *Utility Air Regulatory Group v. Environmental Protection Agency*, the Supreme Court (SCOTUS) ruled that GHGs alone could no longer define a source as a "major stationary source" or a modification as a "major modification" for the purposes of PSD review. Therefore, consistence with EPA guidance and with the concurrence of the DAQ, on August 7, 2014, Blue Racer withdrew permit application R14-0031 and resubmitted a request for the changes under permit application R13-2896C as a minor modification.

- On November 6, 2014, Permit Number R13-2896C was issued to Blue Racer for the removal of the annual fuel usage limit on the 216.7 mmBtu/hr Hot Oil Heater (S001) and addition of the following: four (4) new 61.6 mmBtu/hr heaters, a second fractionation train consisting of two (2) de-ethanizer towers, an ethane amine treating unit, a depropanizer, and a debutanizer, and increasing various facility storage capacities. This modification increased the capacity of the plant to 460 million standard cubic feet per day (mmscfd);

- On January 16, 2015, Blue Racer agreed to a Consent Order (CO-R13-E-2015-3) to replace the existing elevated flare with a ground flare system to correct the on-going visible emissions problems with the existing flare. As part of the Orders for Compliance, Blue Racer was required to "submit a technically and administratively complete permit application (Rule 13 and/or Rule 14) for the construction, installation, and operation of a ground flare system within ninety (90) days of the effective date of this Order." This Consent Order allowed Blue Racer to begin construction of the new ground flare prior to issuance of a pre-construction permit; and

- On November 2, 2015, pursuant to the requirements of Consent Order CO-R13-E-2015-3, Permit Number R13-2896D was issued to Blue Racer for the replacement of the existing elevated flare with a ground flare system.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility

The Natrium Extraction and Fractionation Processing Plant is an existing 460 million standard cubic feet per day (mmscfd) natural gas processing plant with natural gas liquids (NGL) processing capability located approximately four (4) miles northwest of Proctor, Marshall County, WV. The facility has the capability to both process large amounts of raw natural gas (by separating out the liquids, drying it, and removing impurities) and to fractionate NGLs into usable components. NGLs are generally defined to be the lighter liquid components entrained in the gas stream as opposed to "condensate" which is the heavier (and with a higher boiling point) organic compounds that are easily separated at the well-head and usually sent to a refinery. NGLs - both after separation from gas pipelined to the site, as well as NGLs sent to the site via pipeline, truck, railcar, or barge - are separated (or "fractionated") into their constituent organic compounds. The compounds ethane, propane, butane, i-butane, and natural gasoline are produced by the fractionation process.

Proposed Modifications

Blue Racer is proposing to make the following substantive modifications at the Natrium facility:

- Installation of one (1) additional 230 mmscf/day natural gas cryogenic processing train;
- Installation of two (2) additional 230 mmscf/day glycol dehydration units (GDUs) and associated 3.0 mmBtu/hr natural gas-fired glycol reboilers;
- Installation of one (1) additional 9.7 mmBtu/hr natural gas-fired Regeneration Gas Heater;
- Installation of one (1) additional 26.3 mmBtu/hr Cryogenic HMO Heater;
- Addition of a vapor combustor on the existing 230 mmscf/day GDU for control of hydrocarbon emissions;
- Removal of the existing elevated flare from the permit;
- Quantifying the fugitive emissions associated with the new cryogenic processing train.

Post-Modification Process Description

The following is a description of the Natrium Extraction and Fractionation Processing Plant after the proposed modifications described above are completed.

Inlet Gas/Liquids Separation and Liquids Handling

Natural gas from regional gas wells is, after removal of condensate and water close to the well-head, sent to the facility for processing. Inlet gas first passes through horizontal separators, or slug catchers, which separate entrained liquids from the inlet gas. The liquids are first treated in the stabilizer (application of heat provided by the 216.7 mmBtu/hr Hot Oil Heater (S001)), where the lighter components are removed and combined with the separated inlet gas for processing. The remaining liquid components are then routed to the pressurized 865,200 gallon NGL Storage/Surge Tank prior to processing in the fractionation trains. As this tank is pressurized, there are no expected emissions. However, the tank is connected to the Main Flare in case the tank becomes depressurized due a malfunction. NGLs can also be received at the facility via pipeline, truck, railcar, or barge. Received NGLs are also stored in the pressurized NGL Storage/Surge Tank prior to processing. The NGLs unloading operations are performed under pressure, in order to prevent emissions to the atmosphere.

Water and other non-NGLs (called "slop oil") separated from the NGLs in the stabilizer are routed to the 21,000 gallon Slop Tank (S007) and hauled off site via trucks. The Slop Tank is equipped with a natural gas blanket to mitigate potential air emissions. Any emissions generated from the tank are routed via VRU to the Flare (C004) for control.

Natural Gas Processing

After liquids separation, the inlet gas is diverted into one of three (3) 230 mmscf/day cryogenic gas processing trains that mirror each other (the following is an accurate description of each train). In each train, the gas is compressed by electric compressors (no combustion emissions). Each compressor is equipped with a blowdown vent through which a small amount of natural gas is emitted during shutdown (i.e., for decompression, which is required for safety purposes). Note that these emissions are re-routed back to the inlet suction when possible. After compression, the gas is fed into one of three (3) triethylene glycol (TEG) dehydration units (GDU). The glycol dehydration system (S006, S031, S032) is used to remove any remaining water from the gas. Glycol dehydration is a liquid desiccant system used for the removal of water from natural gas. In the GDU, lean, water-free glycol is fed to the top of an absorber (known as a "contactor") where it is contacted with the wet natural gas stream. The glycol removes water from the natural gas by physical absorption and is carried out the bottom of the column.

In the GDU process, rich glycol is routed from the glycol contactor tower to the glycol reboiler, where heat from the Hot Oil Heater is used to drive off the water from the glycol. Heat for the GDUs in the cryogenic trains two are provided by one of three (3) 3.00 mmBtu/hr natural gas-fired reboilers (S020, S028, S029). Lean glycol is then returned to the contactor for reuse. The rich glycol flash tanks are not vented to the atmosphere, but are routed to the Hot Oil Heater fuel header for use as fuel, or if excess gas is produced, sent to the associated vapor combustor (V001 - V003) for control. The vapor combustors are guaranteed to achieve a destruction and removal efficiency (DRE) of 98% for organic compounds. The glycol regenerator still vent is routed first through a condenser for liquid removal (water that is routed to the Slop Tank), then to the inlet of the Natural Gasoline Storage Tank VRU where it is compressed and routed to the Hot Oil Heater fuel inlet. If excess gas is produced, the gases are routed to an associated vapor combustor for combustion.

From the GDUs, the gas is routed to the molecular sieve dehydration unit, where the water content is reduced further. Three (3) 9.7 mmBtu/hr natural gas-fired Mole Sieve Regenerator Heaters (S012, S022, S024) are used to heat a small amount of natural gas that is slip-streamed from the residue line as needed to regenerate the beds. The gas is then routed back into the system. The molecular sieve unit does not have vents to atmosphere. The residue gas from the beds that are regenerated is routed back to the residue gas stream. Therefore, the only emissions from this unit are associated with fugitive piping/equipment leaks and combustion-related emissions from the heaters. Collected water is sent to the Slop Tank.

After the molecular sieve dehydration unit, the propane-cooled cryogenic units remove heavier components to produce NGLs by cooling the stream and reducing the stream pressure. One cryogenic unit utilizes heat from the Hot Oil Heater, and the two other units have a dedicated 26.3 mmBtu/hr natural gas-fired heat medium oil (HMO) heater (S013, S026). The natural gas leaving the cryogenic units is lean and dry (i.e., pipeline quality), and it is compressed via electric-driven residue gas compressors and shipped off site via pipeline. Collected NGLs are sent to the NGL Storage/Surge Tank. The NGL liquids can be transferred back to the NGL storage/surge tank or directly into the deethanizers of the NGL fractionation trains. The only emissions from these cryogenic units are associated with fugitive piping/equipment leaks and the Cryo Unit HMO Heater. Collected water is sent to the Slop Tank.

NGL Fractionation

NGL received from the natural gas processing unit or received on-site as raw material feed is fed to a series of trayed columns for separation into constituent organic products identified above. The modified facility will contain two (2) fractionation lines with a total of three (3) deethanizer towers, two (2) depropanizers, and (2) debutanizers. At the bottom of each tower column is a reboiler that is heated by the facility's heating oil system (including four (4) new 61.6 mmBtu/hr natural gas-fired Hot Oil Heaters - S016 through S019). As the NGL stream enters a column in the middle, the reboiler vaporizes a portion of the feed to produce stripping vapors rising inside the column. This stripping vapor rises up through the column contacting down-flowing liquids allowing for the fractionation of the liquids. Vapor leaving the top of the column enters a condenser where heat is removed by a cooling medium and the vapor condensed. Liquid is returned to the column as reflux to limit the loss of heavy components overhead. The product leaving the lower part of the column has the highest boiling point, whereas the hydrocarbon leaving the top of the column has the lowest boiling point. This basic system is used in all towers to separate lighter organic components from heavier ones.

Ethane removed from the NGL stream is sent to one of the two ethane product amine units: one (1) 29 mmscfd unit (S011) and one (1) 100 mmscfd unit (S014). In these units, amine contactors are used to remove CO_2 and the trace amounts of hydrogen sulfide (H_2S) from the ethane product stream. Small amounts of hydrocarbons may also be absorbed in this process as well. In each unit, the saturated (rich) amine enters a flash tank where gaseous vapors are flashed and vented to atmosphere. After the flash tank, the liquid stream (rich amine) is routed to an amine regenerator, where heat from the facility's heating oil system volatilizes the remaining CO_2, H_2S and hydrocarbons from the rich amine stream. The lean amine is returned to the amine contactors for

reuse while the waste gas from the amine regenerator is vented to the atmosphere. The amine unit vent streams are primarily (~97%) CO_2, with water and trace amounts (~0.5%) of hydrocarbons. Dried ethane is sent to a pipeline via electric compressors. The remaining separated streams (propane, butanes, and natural gasoline) are sent to appropriate product storage tanks.

Product Storage and Loadout

The facility will utilize the following *product* storage tanks:

Table 1: Product Storage Tanks

Emission Unit ID	Description	Material	Size (Gallons)	Control Device
S005	Natural Gasoline Storage Tank	Natural Gasoline	714,000	Natural Gas Blanket(1)
S023	Natural Gasoline Storage Tank	Natural Gasoline	1,260,000	Natural Gas Blanket(1)
n/a	Pressurized Butane Bullet Tank	Butane	90,000	None(2)
n/a	Pressurized Butane Bullet Tank	Butane	90,000	None(2)
n/a	Pressurized Butane Bullet Tank	Butane	90,000	None(2)
n/a	Pressurized Butane Bullet Tank	Butane	90,000	None(2)
n/a	Horizontal Propane Storage Tank	Propane	2,142,000	None(2)
n/a	Horizontal Isobutane Storage Tank	Isobutane	865,200	None(2)
n/a	Horizontal Normal Butane Storage Tank	Butane	865,200	None(2)
n/a	Horizontal Propane Storage Tank	Propane	865,200	None(2)

(1) Tank uses a natural gas blanket to prevent emissions of natural gasoline. Working/breathing losses of natural gas blanket are collected and sent to Hot Oil Heater as a supplemental fuel.

(2) These tanks are pressurized to prevent working/breathing losses and, therefore, have no emissions. However each is connected to the Main Flare in case the tank becomes depressurized due a malfunction.

To remove products from the facility, Blue Racer utilizes a 35,000 gpm truck, railcar, and barge loadout (S008). All loading is pressurized with vapor return (solid connections on train cars, barges, and trucks return any vapors back into the product storage tank), in order to prevent emissions to atmosphere. There was no change to the permitted throughput of material loaded out of the facility.

Flaring

The facility will utilize one flare: a non-assisted 19,800,000 scf/hr Callidus CAL-MP staged, multi-point ground flare system (S004). The flare shall be used to both control continuous emissions of organic material as well as non-routine emergency events. These non-emergency VOC sources are defined as emissions from maintenance events, equipment blowdowns, and pressure relief valves.

The flare hall have a minimum permitted DRE of 98.0% and will utilize sixteen (16) natural gas-fired pilot lights for a total pilot light MDHI of 1.399 mmBtu/hr.

Diesel-Fired Engines

The facility utilizes two (2) Caterpillar C18 700 horsepower (hp) emergency diesel-fired (S002, S003) water pumps in case of fire. These engines are operated in non-emergency situations less than 100 hr/yr for testing and maintenance to ensure reliability during emergency situations.

Fugitive Emissions

A new area of fugitive emissions (FUG AREA 3) has been designated for the additional piping and component counts located in the new Cryogenic Train.

SITE INSPECTION

On September 17, 2014, the writer conducted an announced site inspection of the Natrium Extraction and Fractionation Plant. The primary contact at the facility was Mr. Sean Wilson, Director EHS for Caimen Energy. The facility has received multiple inspections from the Compliance/Enforcement Section. An additional inspection by the writer for this modification was deemed as not necessary.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Blue Racer, in Attachment N of the permit application, provided a revised post-modification facility-wide potential-to-emit (PTE) for the Natrium facility and calculations for all equipment and processes at the facility. The following section will detail the air emissions and emissions calculation methodologies used by Blue Racer to calculate the potential-to-emit of new or modified emission units only.

Other Process Heaters

Potential emissions from the new Regeneration Gas Heater (P024), Cryogenic HMO Heater (P026), and the Glycol Reboilers (P028, P029) were based on emission factors 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 each heater (S022: 9.70 mmBtu/hr, S020: 3.00 mmBtu/hr). Individual unit annual emissions were based on 8,760 hours of operation per year. A fuel gas heat content of 1,020 Btu/scf was used in the calculations.

Glycol Dehydrator Unit Emissions

Uncontrolled VOC and HAP emissions from the new GDU Regenerator Still Vents/SDU Flash Tanks (P001, P031, P032) were based on the emissions calculation program GRI-GLYCalc Version 4.0. (with a 10% safety factor applied to the uncontrolled emissions). GRI-GLYCalc is a well-known program for estimating air emissions from glycol dehydration units using TEG.

Included in the application is a copy of the appropriate GLY-Calc analysis sheets. Input values to GLYCalc are based on gas sampling done at Natrium on March 26, 2014 (at the inlet contactor). The aggregate controlled emissions from these sources, as emitted each from the associated vapor combustor (V001 through V003), are based on the combustors achieving a DRE of 98%.

Vapor Combustor Exhaust

Two sources of air emissions occur at the Vapor Combustors (V001-V003): VOC/HAP emissions that pass-through the units uncombusted and the products of combusting the organic vapors sent to the combustors for destruction. This section details the products of combustion generated at the units (the pass-through emissions are discussed above under the GDU Section). Emissions (CO and NO_x) from the products of combustion are primarily based on emission factors as given in Texas Commission on Environmental Quality's (TCEQ) "Flares and Vapor Oxidizers" Report (RG-109: pp. 19). These emission factors are generally accepted for estimating products of combustion from flares/vapor combustors at oil and gas processing facilities when combusting high BTU gas streams. Additional emissions (particulate matter, formaldehyde, and total HAPs) were based on emission factors given under AP-42 Section 1.4. While Section 1.4 of AP-42 is used for estimating emissions from boilers combusting natural gas, in the absence of other factors, it can be used to conservatively estimate the nominal amounts of expected emissions from various pollutants from vapor combustors.

Hourly emissions from each vapor combustor was based on an hourly heat input of 5.38 mmBtu/hr and annual emissions were based on the calculated maximum annual heat input of the gases sent to each unit of 47,102 mmBtu/yr. Each calculated heat rate sent to the flare is based on the expected gas volume and heat content of the various waste gas streams sent to the units for control.

Equipment Leaks

Blue Racer based their updated (FUG AREA 1 and 2) and new (FUG AREA 3) uncontrolled VOC and HAP equipment leak calculations on emission factors taken from the document EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates." Emission factors were, with only one exception (no emission factor was available for Pump Seals in Heavy Liquid Service), taken from Table 2-4: "OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)." As stated in the document, the average emission factor approach is "one accepted approach for estimating emissions" from components in service with the oil and gas industry. This method is most effective when used, as Blue Racer is using them, "for estimating emissions from a population of equipment."

Component counts were based on actual existing component counts and proposed component counts for new and modified equipment. As the provided emission factors are for Total Organic Compounds (TOCs), VOC, and HAP contents of the serviced materials were used to determine specific pollutant emissions. Controlled emission rates were based on reduction percentages taken from the document "Control Efficiencies for TCEQ Leak Detection and Repair Programs" and "TCEQ Technical Guidance Document for Equipment Leak Fugitives." The percent reductions are

dependent on Blue Racer using the 28LAER Leak Detections and Repair (LDAR) Program at the Natrium facility. The requirements of this program are given here:

http://www.tceq.state.tx.us/assets/public/permitting/air/Guidance/NewSourceReview/bpc_rev28laer.pdf

Emissions Summary

Based on the above estimation methodology as submitted in Attachment N of the permit application, the revised post-modification facility-wide PTE of the Natrium Extraction and Fractionation Plant is given in Attachment A. The change in annual facility-wide PTE as a result of the modifications evaluated herein is given in the following table:

Table 2: Change In Facility-Wide Annual PTE

Pollutant	R13-2896D(1)	R13-2896E	Change
	tons/year	tons/year	tons/year
CO	97.64	131.71	34.07
NO_X	72.95	100.52	27.57
$PM_{2.5}$	17.21	18.90	1.69
PM_{10}	20.85	22.54	1.69
PM	32.00	33.69	1.69
SO_2	1.65	1.82	0.17
VOCs	43.51	75.30	31.79
HAPs	5.65	6.27	0.62

(1) Emissions taken from R13-2896D Fact Sheet.

REGULATORY APPLICABILITY

The Blue Racer Natrium Extraction and Fractionation Plant is subject to a variety of substantive state and federal air quality rules and regulations. These include the following state rules: 45CSR2, 45CSR6, 45CSR10, 45CSR13, 45CSR14, and 45CSR30. Substantive Federal regulations that apply to the facility include: 40 CFR 60 - Subpart Db, Subpart Dc, and Subpart Kb, Subpart KKK, Subpart IIII, and Subpart OOOO; and 40 CFR 63, Subpart HH, Subpart ZZZZ, Subpart DDDDD, and Subpart JJJJJJ. Each applicable rule, and Blue Racer's proposed compliance thereto, will be discussed in detail below *with respect only to those emission units added or modified as part of this permitting action*. Additionally, those rules that have questionable applicability but have been determined to not apply will also be discussed.

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

45CSR2 "establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units." The new Regeneration Gas Heater, Cryo HMO Heater, and

Glycol Reboilers have each been determined to meet the definition of a "fuel burning unit" under 45CSR2 and are, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the new Regeneration Gas Heater and the Glycol Reboilers are less than 10 mmBtu/hr, the units are not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement for the new Regeneration Gas Heater and the Glycol Reboilers are under Section 3.1 - Visible Emissions Standards. Each substantive 45CSR2 requirement is discussed below.

45CSR2 Opacity Standard - Section 3.1

Pursuant to 45CSR2, Section 3.1, the new Regeneration Gas Heater, Cryo HMO Heater, and Glycol Reboilers are subject to an opacity limit of 10%. Proper maintenance and operation of the units (and use of natural gas as primary fuel) should keep the opacity of the units well below 10% during normal operations.

45CSR2 Weight Emission Standard - Section 4.1.b

The facility-wide allowable particulate matter (PM) emission rate for all of the non-exempt gas-fired heaters, identified as Type "b" fuel burning units, per 45CSR2, Section 4.1(b), is the product of 0.09 and the total design heat input of the units in million Btu per hour. The maximum aggregate design heat input (short-term) of the non-exempt units (S001, S013, S016-S019, S026) will be 515.62 mmBtu/Hr. Using the above equation, the 45CSR2 facility-wide PM emission limit of the units will be 46.41 lb/hr. This limit represents filterable PM only and does not include condensable PM. The exemption of condensable PM is located within the 45CSR2 Appendix - which establishes compliance test procedures - by not requiring measurement of the condensable PM. The maximum potential hourly PM emissions during normal operations from the units (*including* condensables) is estimated to be 3.85 lb/hr. This emission rate is 2.15% of the 45CSR2 limit.

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

Section 8 of 45CSR2 requires testing for initial compliance with the limits under Section 3 and 4, monitoring for continued compliance, and record-keeping of that compliance. The TMR&R requirements are clarified under 45CSR2A and discussed below.

45CSR2A Applicability - Section 3

Pursuant to 45CSR2, Section 3.1(b), the owner or operator of a "fuel burning unit(s) which combusts only natural gas shall be exempt from sections 5 and 6." Therefore, there is no substantive performance testing or monitoring requirements under 45CSR2 for the new Regeneration Gas Heater, Cryo HMO Heater, and Glycol Reboilers.

45CSR2A Record-keeping and Reporting Requirements - Section 7

Section 7 sets out the record-keeping requirements that Blue Racer will have to meet under 45CSR2A for the fuel burning units. For units that combust only pipeline natural gas, the record-

keeping requirements are limited to the date and time of start-up and shutdown, and the quantity of fuel consumed on a monthly basis.

45CSR6: To Prevent and Control Particulate Air Pollution from Combustion of Refuse

The new vapor combustors each meet the definition of an "incinerator" under 45CSR6 and are, therefore, subject to the requirements therein.

Emission Standards for Incinerators - Section 4.1

Section 4.1 limits PM emissions from incinerators to a value determined by the following formula:

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is as indicated in Table I below:

Table I: Factor, F, for Determining Maximum Allowable Particulate Emissions

Incinerator Capacity	Factor F
A. Less than 15,000 lbs/hr	5.43
B. 15,000 lbs/hr or greater	2.72

Based on information taken from GRI-GLYCalc, the uncontrolled weight rate of hydrocarbons going to each vapor combustor is 220 lbs/hr (0.11 tons/hr). Using this amount as the capacity of the vapor combustor, it has a particulate matter limit of 0.60 lbs/hour. The particulate matter emission rate from the vapor combustor was estimated to be 0.03 lbs/hr, which is in compliance with the 45CSR6 limit.

Opacity Limits for Incinerators - Section 4.3, 4.4

Pursuant to Section 4.3, and subject to the exemptions under 4.4, each vapor combustor has a 20% limit on opacity during operation. Proper design and operation of the units should prevent any significant opacity.

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

The purpose of 45CSR10 is to "prevent and control air pollution from the emission of sulfur oxides." 45CSR10 has requirements limiting SO_2 emissions from "fuel burning units," limiting in-stack SO_2 concentrations of "manufacturing process source operations," and limiting H_2S concentrations in "process gas" streams that are combusted. As noted under the discussion of 45CSR2 applicability, the Regeneration Gas Heater, Cryo HMO Heater, and Glycol Reboilers are each defined as a "fuel burning unit" and, therefore, subject to the applicable requirements discussed below.

45CSR10 Fuel Burning Units - Section 3

Pursuant to §45-10-10.1, as the MDHI of the Regeneration Gas Heater and the Glycol Reboilers are less than 10 mmBtu/hr, they are exempt from the requirements of Section 3.

The allowable sulfur dioxide (SO_2) emissions from the non-exempt gas-fired heaters, each identified as a Type "b" fuel burning unit in a Priority I Region (which includes Marshall County), per 45CSR10, Section 3.1.e, is the product of 3.1 and the total design heat input of each unit in million Btu per hour. The total design heat input of the non-exempt units (S001, S013, S016-S019, S026) will be 515.62 mmBtu/Hr. Using the above equation results in a SO_2 limit of 1,598.42 pounds per hour. The maximum aggregate potential SO_2 emissions from the non-exempt units are estimated to be 0.36 pounds per hour. This emission rate is only a trace of the 45CSR10 limit.

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

Section 8 of 45CSR10 requires testing for initial compliance with the limits therein, monitoring for continued compliance, and record-keeping of that compliance. Interpretative Rule 45CSR10A provides guidance and clarification for complying with the testing, monitoring, recordkeeping and reporting requirements of 45CSR10.

Pursuant to §45-10-10.3 and §45-10-3.1(b), as all the gas-fired heaters "combust natural gas, wood or distillate oil, alone or in combination," they are not subject to the Testing and MRR Requirements under Section 8 of 45CSR10 or 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 changes at Blue Racer's Natrium Extraction and Fractionation Plant has the potential to increase the PTE in excess of six (6) lbs/hour and ten (10) TPY of several regulated pollutants 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, Blue Racer is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 ("Notice Level A"), Blue Racer placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on July 16, 2015 in *Moundsville Daily Echo* and the affidavit of publication for this legal advertisement was submitted on September 1, 2015.

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

The Natrium Extraction and Fractionation Plant is located in Marshall County, WV. Marshall County is classified as "in attainment" with all National Ambient Air Quality Standards except for, in certain tax districts, SO_2. The Franklin Tax District, where the Natrium facility is located, is classified as "non-attainment" for SO_2. Therefore, applicability to major New Source Review (NSR) for all pollutants except for SO_2 is determined under 45CSR14.

As the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all criteria pollutants is 250 TPY. As given in Attachment A, the facility-wide post-modification PTE of the Natrium Extraction and Fractionation Plant is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 45CSR14.

It is important to note that the modified facility contains a "nested" listed source under §45-14-2.43: "Fossil Fuel Boilers (or combinations thereof) Totaling More than 250 Million Btu/hour Heat Input." Generally, units that are not subject to 40 CFR 60, Subpart Db, Dc, or are otherwise defined as "process heaters" under the Subparts and do not use a heat transfer medium are not included in this listed source definition. These exemptions would remove Glycol Reboilers and the Regeneration Gas Heaters the MDHI from contributing their MDHI toward the 250 mmBtu/hr threshold. The remaining heaters (S001, S013, S016-S019, and S026) have an aggregate MDHI of 515.62 mmBtu/hr. Therefore, the noted units constitute a "nested" source. The location of a nested source does not reset the major source threshold for the entire facility at 100 TPY. The facility-wide PSD threshold (including, however, the PTE contributed from the nested source) remains at the non-listed threshold of 250 TPY.

However, the PTE of the units that are part of the nested source have a PSD threshold of 100 TPY. As shown in Attachment A, the aggregate PTE of the nested source (heaters S001, S013, S016-S019, and S026) is not over 100 TPY of any PSD pollutant (the highest emitted pollutant is CO at 96.86 TPY). Therefore, neither the entire facility or the nested source is defined as a "major stationary source" under 45CSR14 and PSD does not apply to the modifications reviewed herein.

45CSR19: Requirements fo Pre-Construction Review, Determination of Emission Offsets for Proposed New or Modified Stationary Sources of Air Pollutants and Emission Trading for Intrasource Pollutants - (NON APPLICABILITY)

Pursuant to §45-19-3.1, 45CSR19 "applies to all major stationary sources and major modifications to major stationary sources proposing to construct anywhere in an area which is designated non-attainment." As noted above, the Natrium Extraction and Fractionation Plant is located in Marshall County, WV which is classified as in attainment with all NAAQS with the exception of SO_2 in the areas defined as the Clay, Washington, and Franklin (where the source is located) Tax Districts. Pursuant to §45-14-2.35, the individual major source applicability threshold for the specific non-attainment pollutant is 100 TPY. As given Attachment A, the facility-wide post-modification SO_2 PTE of the Natrium Extraction and Fractionation Plant is less than 100 TPY. Therefore, the facility is not defined as a "major stationary source" under 45CSR19.

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 existing Natrium Extraction and Fractionation Plant is considered a non-major source subject to Title V (through NSPS applicability). However, the modified facility will now meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. Therefore, a Title V (45CSR30) permit application will be due within twelve (12) months after the commencement date of any operation authorized by the draft permit.

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

Subpart Dc of 40 CFR 60 is the federal NSPS for "steam generating units" that have a Maximum Design Heat Input (MDHI) of less than 100 mmBtu/hr and greater than 10 mmBtu/hr and that were constructed, modified, or reconstructed after June 9, 1989. Subpart Dc contains within it emission standards, compliance methods, monitoring requirements, and reporting and record-keeping procedures for affected facilities applicable to the rule.

Pursuant to §60.40c(a), Subpart Dc applies to "each steam generating unit that commences construction . . . after June 9, 1989, and that has a maximum design heat input capacity of. . . 100 mmBtu/hr or less, but greater than or equal to 10 mmBtu/hr." Subpart Dc defines a "Steam Generating Unit" as "a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium." The new Cryogenic HMO Heater meets the above applicability requirements and is subject to the applicable provisions Subpart Dc. Subpart Dc does not, however, have any emission standards for gas fired units. Therefore, the Cryogenic HMO Heater is only subject to the record-keeping and reporting requirements given under §60.48c.

40 CFR 60, Subpart KKK: Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants - (NON-APPLICABILITY)

Subpart KKK of 40 CFR 60 is the federal NSPS that applies to onshore natural gas processing plants that commenced construction after January 20, 1984 and before August 23, 2011. "Natural Gas Processing Plant" is defined in Subpart KKK as "any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both." The existing Fractionation Train 1 and Cryogenic Train 2 are subject to this rule (Cryogenic Train 1 was reconstructed after August 23, 2011 and, at that time, fell out of applicability to Subpart KKK). As the proposed construction of Cryogenic Train 3 will occur after August 23, 2011, the emission units and processes therein shall not be subject to Subpart KKK.

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

Subpart OOOO of 40 CFR 60 is the federal NSPS that contains requirements for a variety of natural gas production, transmission and distribution operations and facilities that commence construction after August 23, 2011. Included are requirements for affected facilities at an onshore

natural gas processing plant. A "natural gas processing plant" is defined under Subpart OOOO as "any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both." The proposed Cryogenic Train 2 proposed for the Natrium Plant is, therefore, subject to the applicable requirements of Subpart OOOO.

The substantive requirement for affected facilities at a natural gas processing plant is to meet the applicable Leak Detection and Repair Requirements (LDAR) conditions under Subpart VVa. Blue Racer has proposed compliance with requirements by the following:

- Pumps in light liquid service will be monitored monthly to detect leaks and will be visually inspected every calendar week for indications of liquids dripping, and will follow the protocol for leak repairs as specified in §60.482-2(a);

- Relief valves in gas service emissions will be routed to the Main Flare and will comply with the monitoring and inspection requirements of §60.482-11a in lieu of the requirements of §482-4a(a) and (b);

- Sampling connections will comply with the requirements of §60.482-5(a) through the use of closed-loop sampling that does not cause additional emissions during sampling. Also, purged process fluid is returned to the process line. However, per §60.5401(c), sampling connections are not subject to the requirements of §60.482-5(a);

- Valves in vapor service and light liquid service will be monitored monthly to detect leaks as specified in §60.482-7(a);

- Pumps, valves, and connectors in heavy liquid service and pressure relief devices in light liquid or heavy liquid service will be inspected and repaired as outlined in §60.482-8(a);

- Connectors in vapor service and light liquid service will comply with the monitoring and repair requirements of §60.482-11a; and

- Blue Racer will comply with the recordkeeping requirements of §60.486a and reporting requirements of §60.487a as well as the additional requirements of §60.5421 and §60.5422.

40 CFR 63 Subpart HH: National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. Pursuant to §63.760(a)(3), as the Natrium Extraction and Fractionation Plant - an area source of HAPs (see Attachment A) - "process[es], upgrade[s], or store[s] natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user," it is defined as an area source subject to the applicable provisions under Subpart HH.

Pursuant to §63.760(b)(2), each TEG GDU located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e): if (1) "actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters [3 mmscf/day] per day" or (2) "actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year."

The proposed new GDU at Natrium will have potential emissions of benzene of less than 1 TPY. Therefore, these units are only subject to the applicable record-keeping requirements under §63.774.

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 - (NON APPLICABILITY)

Subpart DDDDD of 40 CFR 63 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 HAP. Pursuant to §63.7485, a boiler or process heater is applicable to Subpart DDDDD "that is located at, or is part of, a major source of HAP[s]." A major source of HAPs is defined under §63.2 as a source that "has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants" The Natrium Extraction and Fractionation Plant will not have a potential to emit of HAPs at or above this threshold and is, therefore, not subject to Subpart DDDDD (see Attachment A).

40 CFR 63 Subpart JJJJJJ: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources - (NON APPLICABILITY)

Subpart JJJJJJ of 40 CFR 63 establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers located at area sources of HAPs. An area sources of HAPs is defined as a facility that has a PTE, considering controls, in the aggregate, of less than 10 tons per year any HAP or less than 25 tons per year or more of any combination of HAPs. The Natrium Extraction and Fractionation Plant meets the definition of an area source of HAPs.

Pursuant to §63.11237, the definition of "boiler" covered under Subpart JJJJJJ is limited to "an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water." This would not include the proposed new glycol reboilers and regenerative gas heater but would include the proposed new Cryo HMO Heater. However, pursuant to §63.11195(e), as all of these units are exclusively "gas-fired," they are exempt from Subpart JJJJJJ.

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that have a potential to be emitted from the modifications evaluated herein 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 ($PM_{2.5}$ and PM_{10}), and Sulfur Dioxide (SO_2). 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 and state programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits 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. The modifications evaluated herein have the potential to emit the following HAPs as in substantive amounts: Formaldehyde, n-Hexane, Benzene, Toluene, and Xylenes. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 3: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects 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 estimated maximum emissions of the modified facility are less than applicability thresholds that would define the proposed facility as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required pursuant to that rule. Additionally, an air quality impacts modeling analysis pursuant to 45CSR13, Section 7 was deemed not necessary.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

With the exception of Section 10.0, there were no substantive changes to the monitoring, compliance demonstration, reporting, and recording of operations (MRR) as required under R13-2896D. New equipment was integrated into the existing permit requirements. However, under Section 10.0, new MRR requirements were added for the GDUs. These include the following substantive monitoring requirements:

- For the purposes of demonstrating compliance with the maximum wet gas throughput limit set forth in 10.1.1. of the draft permit, Blue Racer shall be required to monitor and maintain monthly and rolling twelve month records of the wet gas throughputs in each of the Glycol Dehydration Units;

- Compliance with the Maximum Glycol Recirculation Limitations set forth in 10.1.2. of the draft permit shall be determined using an average of a minimum of quarterly readings of the actual glycol pump(s) rate. If more than one pump is operating simultaneously then the rate of each operating pump shall be recorded and totaled for compliance purposes;

- To demonstrate compliance with the pilot flame requirements of sections 10.1.7(d) of the draft permit, the Blue Racer shall follow (a) and (b).

    a. The presence of a pilot flame shall be continuously monitored using a thermocouple or any other equivalent device to detect the presence of a flame when emissions are vented to it. The pilot shall be equipped such that it sounds an alarm, or initiates notification via remote alarm to the nearest field office, when the pilot light is out.

    b. For any absence of pilot flame, or other indication of smoking or improper equipment operation, you must ensure the equipment is returned to proper operation as soon as practicable after the event occurs. At a minimum, you must: (1) Check the air vent for obstruction. If an obstruction is observed, you must clear the obstruction as soon as practicable. (2) Check for liquid reaching the combustor.

    c. The Blue Racer is exempt from the pilot flame requirements of paragraphs (a) and (b) of this section if the Blue Racer installed an enclosed combustion device model that was tested under §60.5413(d) which meets the criteria in §60.5413(d)(11).

Additionally, MRR consistent with the Subpart HH requirements relating to the annual major source status update will be required.

PERFORMANCE TESTING OF OPERATIONS

With the exception of Section 10.0, there were no substantive changes to the performance testing as required under R13-2896D. New equipment was integrated into the existing permit requirements. However, under Section 10.0, new performance testing requirements were added for the GDUs:

- To demonstrate compliance with the visible emissions requirements of section 10.1.7(e) of the draft permit, the permittee shall conduct visible emission checks and/or opacity monitoring and recordkeeping for all emission sources subject to an opacity limit.

  a. The visible emission check shall determine the presence or absence of visible emissions. The observations shall be conducted according to Section 11 of EPA Method 22. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training may be obtained from written materials found in the References 1 and 2 from 40CFR Part 60, Appendix A, Method 22 or from the lecture portion of the 40CFR Part 60, Appendix A, Method 9 certification course. The observation period shall be:

     (1) [Reserved]
     (2) a minimum of 15 minutes if demonstrating compliance with 10.1.7(e)(1) of the draft permit; or
     (3) a minimum of 1 hour if demonstrating compliance with 10.1.7(e)(2) of the draft permit.

  b. The visible emission check shall be conducted initially within 180 days of start-up to demonstrate compliance while vapors are being sent to the control device.

  c. If during this visible emission check or at any other time visible emissions are observed, compliance with section 10.1.7(e) of the draft permit shall be determined by conducting opacity tests in accordance with Method 9 or 40 CFR 60, Appendix A.

CHANGES TO PERMIT R13-2896D

The substantive changes made to Permit R13-2896D are:

- New emission units have been added to the Emission Units Table 1.0;
- New control devices have been added to the Control Devices Table 1.1;
- The new Cryo HMO Heater and Regeneration Gas Heater (including emission limits) were integrated into the existing limits given in Section 6.0 and Section 7.0, respectively, of the draft permit;

- Section 10.0 of the draft permit (requirements for GDUs) was completely re-written to incorporate the latest requirements and compliance determinations for GDUs;

- The existing elevated flare (replaced under CO-R13-E-2015-3), and all related requirements, were removed from Section 13.0 of the draft permit;

- The new Cryogenic Train 3 was integrated into the existing 40 CFR 60, Subpart OOOO requirements under Section 17.0 of the draft permit; and

- Fugitive Area 3 was added to Section 18.0 of the draft permit to meet the requirements of the TCEQ 28LAER leak detection and repair (LDAR) program.

RECOMMENDATION TO DIRECTOR

The information provided in permit application R13-2896E indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-2896E to Blue Racer Midstream, LLC for the modifications discussed herein at the Natrium Extraction and Fractionation Plant located in Proctor, Marshall County, WV.

_____
Joe Kessler, PE
Engineer

_____
Date