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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2892
Plant ID No.: 051-00141
Applicant: Caiman Eastern Midstream LLC (Caiman)
Facility Name: Ohio River Fractionation Plant
Location: Moundsville, Marshall County
SIC Code: 1321
NAICS Code: 211112
Application Type: Construction
Received Date: July 27, 2011
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$2,000.00
Date Received: January 11, 2011
Complete Date: October 26, 2011
Due Date: January 24, 2012
Applicant Ad Date: July 26, 2011
Newspaper: *Moundsville Daily Echo*
UTM's: Easting: 517.347 km Northing: 4418.112 km Zone: 17
Description: New facility that will fractionate natural gas liquids (NGL) into three (3) products, propane, butane, and natural gasoline. The products may then be loaded onto rail cars and/or trucks or routed to pipeline(s) for transportation to markets.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2892:

Caiman plans to construct and operate a 12,500 barrels per day Natural Gas Liquids (NGL) fractionation facility and loading terminal. The facility will be located along State Route 2 in Marshall County on a former industrial parcel approximately two (2) miles south of Moundsville. Caiman plans to install the equipment necessary to fractionate NGL into propane, mixed butanes, and natural gasoline, install various bulk storage tanks and both rail and truck loading facilities to allow transportation of these products to markets.

Emissions will include fractionation plant fugitive emissions, fugitive dust emissions associated with truck loading of products, and emissions from natural gas combustion for the facility heater.

The facility will receive NGL and process it through a series of distillation processes (de-propanizer and de-butanizer towers) to generate three (3) products: propane, mixed butanes and heavier weight organics identified as natural gasoline. The fractionation plant will consist of a series of distillation processes where propane and then mixed butanes are removed from the NGL. The remaining liquid is classified as “natural gasoline”. The incoming NGL will be accumulated in a series of six (6) 60,000 gallon pressure vessels. The primary purpose of these tanks is to act as a buffer for variations in the rate of NGL receipt to ensure a steady flow rate through the process, and providing plant storage. In addition, the facility will be capable of loading NGL into both trucks and rail cars. The three (3) products will be accumulated in a series of ten (10) pressure vessels ranging from 60,000 to 140,000 gallons in capacity.

There will be a single natural gas fired heater that will heat a fluid that will be used at various locations throughout the facility to precisely control the temperature within certain process equipment.

The facility will not have any permanent compression engines. There will be two (2) natural gas fired generators used during the first several months of operation, pending installation of commercial power line installation. These will be addressed in a separate permit application for temporary equipment.

Additionally, there will be rail car and truck loading operations. Truck and rail loading of the products (and potentially un-processed NGL) will be pipe connections with vapor return and no vents. As there are no vents or other emission points in the fractionation process, the unit itself is not a source of emissions other than minor fugitive emissions from valves and fittings. The fractionator is regulated under the New Source Performance Standards (40CFR60 Subpart KKK).

The facility will be equipped with a flare that will be used to combust NGL or products in the event of an emergency that requires rapid removal of NGL and/or product from one or more portions of the facility. Additionally, the flare will be used to combust NGL and/or one (1) or more of the product when an area of the plant must be de-pressurized in order to implement unscheduled repairs. A conservative estimated amount of product that would be routed to the flare was used for permitting purposes.

Fractionation Process

A fractionation process will be used to separate NGL into three (3) products: propane, mixed butanes and natural gasoline. The process consists of a controlled distillation whereby relatively high purity propane and mixed butanes are separated from the incoming NGL. Heat used in this process is provided by a hot oil heater that will utilize commercially provided natural gas as a fuel source. After removal of propane and butanes, the remaining material will have characteristics very similar to gasoline and will be sold for use in blending into various gasoline products.

NGL Tanks

It is projected that on an annual basis, up to 4,560,000 barrels of NGL will be received by the facility per year. The NGL will be temporarily accumulated in six (6) pressurized 60,000 gallon tanks. As these are pressure vessels operating well above atmospheric pressure with no atmospheric vents other than emergency relief vents, no emissions are anticipated during normal operation.

Product Tanks

It is projected that on an annual basis, up to 2,035,000 barrels of propane, 1,048,000 barrels of mixed butanes and 1,475,000 barrels of natural gasoline will be produced by the facility per year. The propane will be temporarily accumulated in four (4) pressurized 90,000 gallon tanks and two (2) 114,000 gallon tanks prior to transportation to markets. Again, as these are pressure vessels operating well above atmospheric pressure with no atmospheric vents other than emergency relief vents, no emissions are anticipated during normal operation.

In a similar manner mixed butanes will be accumulated in two (2) 140,000 gallon pressure vessels and natural gasoline will be accumulated in two (2) 60,000 gallon pressure vessels prior to transportation to markets. As with the NGL tanks, these pressure vessels will operate above atmospheric pressure with no atmospheric vents other than emergency relief vents. Consequently, no emissions are anticipated during normal operation.

Rail and Truck Loading

Products accumulated in the various tanks discussed above will be routinely removed and transported to markets via rail and/or truck. Emissions of VOCs from this operation are projected to be negligible as all connections will be hard piped with a complete vapor return to the tanks.

Flare

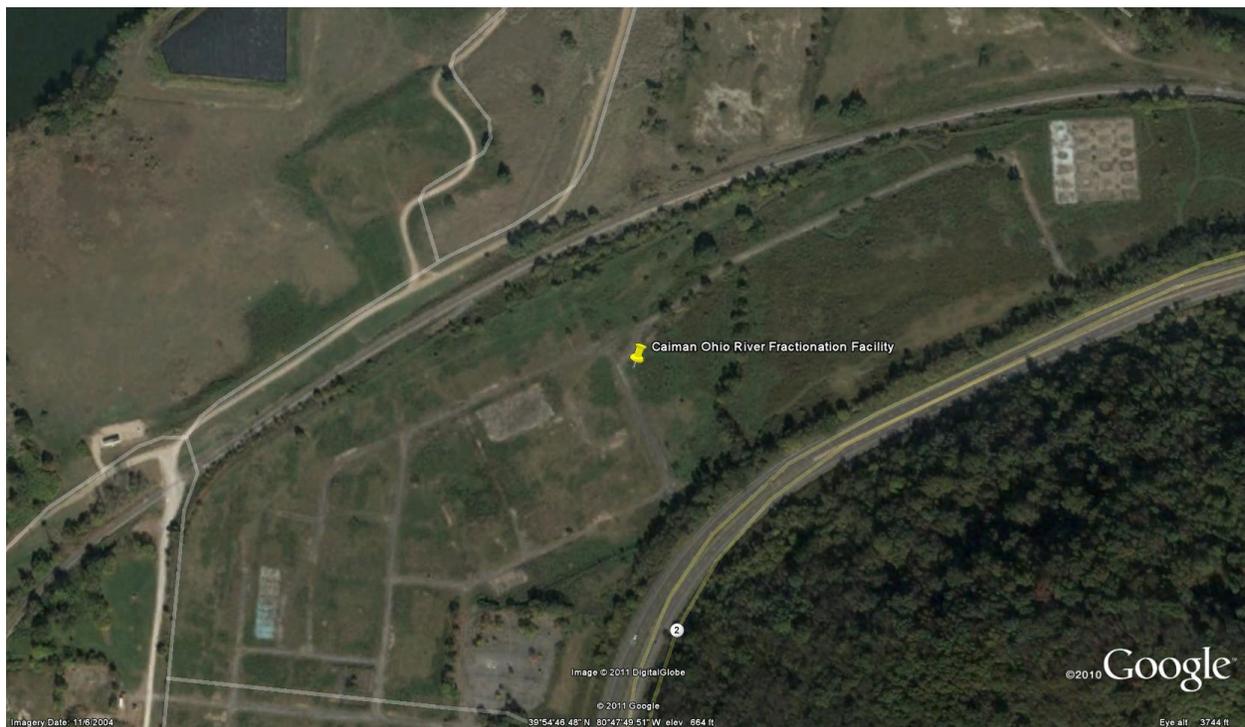
The facility will be equipped with a flare. This flare will serve two (2) purposes. First and foremost, it will be used for combustion of NGL/NGL products during emergency blowdowns of the station. Secondly, it will be used for combustion of these same materials when any non-routine maintenance operations require depressurization of parts of the facility. Emissions will be comprised of combustion by-products from commercial natural gas for the pilot light and combustion by-products from combustion of NGL or specific NGL components during the infrequent depressurizations of portions of the facility. Ideally, such depressurizations will not be required. However, for permitting purposes, it is conservatively assumed that depressurization events will occur a maximum of eight (8) times per year and involve the equivalent of 200,000 cubic feet of propane gas per event. The flare will be equipped with a pilot burner rated at 25 MBtu/hr.

SITE INSPECTION

A site inspection was conducted by the writer on November 8, 2011. The writer did not see any problems with locating the facility at the proposed site.

Directions as given in the permit application are as follows:

From Moundsville, take WV Route 2 south approximately 2 miles. Site is on the right at the site of the former Olin Factory in Round Bottom.



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this permit will consist of a fractionation plant, product loading, NGL accumulation tanks, propane accumulation tanks, butane accumulation tanks, natural gasoline accumulation tanks, hot oil heater, and a flare. The estimated emission calculations were performed by Caiman and checked for accuracy and completeness by the writer. The following tables include the emission source, and controlled emission rate:

Emission Point ID#	Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
1E	36.7 MMBTU/hr Hot Oil Heater	Nitrogen Oxides	3.79	16.59
		Carbon Monoxide	3.19	13.94
		Particulate Matter-10	0.29	1.27
		Sulfur Dioxide	0.03	0.10
		Volatile Organic Compounds	0.21	0.92
		Carbon Dioxide Equivalent	4,547	19,915
		Methane	0.48	0.63
1S	Fractionation Plant Fugitive Emissions	Volatile Organic Compounds	5.30	23.22
		Hazardous Air Pollutants	0.02	0.09
4E	Normal, Emergency, Maintenance Flare	Nitrogen Oxides	21.67	1.30
		Carbon Monoxide	12.50	0.75
		Particulate Matter-10	0.167	0.01
		Sulfur Dioxide	1.17	0.07
		Volatile Organic Compounds	143.33	8.60
		Carbon Dioxide Equivalent	20,837	1,254
Fugitive	Unpaved Haulroads	Particulate Matter-10	0.65	2.84

In regards to greenhouse gases (GHG) the only sources of methane are from the combustion of natural gas for the Hot Oil Heater (1E) and the pilot for the flare (4E). Fugitive emissions from the process equipment will contain a variety of volatile organics, but since the feedstock (raw NGL) is essentially methane free, these fugitive emissions as well as the flare emissions, do not contain methane. There are insignificant amounts of other GHG components.

Emissions from the NGL and Product Tanks are not intended, as these are pressure vessels operating well above atmospheric pressure with no atmospheric vents other than emergency relief vents. Therefore, no emissions are anticipated during normal operation. Similarly, products accumulated in the various tanks discussed above will be routinely removed and transported to markets via rail and/or truck. Emissions of VOCs from this operation are projected to be negligible as all connections will be hard piped with a complete vapor return to the tanks.

As stated earlier, in calculating emissions for permitting purposes for the flare (4E), Caiman conservatively assumed that a maximum of ten (10) events of the equivalent of 20,000 gallons of propane each will be routed to the flare per year. With each event expected to last 12 hours.

The facility wide annual emissions associated with this application are shown in the following table:

Pollutant	Total Facility Emissions (tons/year)
Nitrogen Oxides	17.90
Carbon Monoxide	14.69
Volatile Organic Compounds	32.73
Particulate Matter-10	4.11
Sulfur Dioxide	0.17
Total Hazardous Air Pollutants	0.09
CO ₂ e	21,178

REGULATORY APPLICABILITY

The following rules apply to the facility:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

45CSR2 classifies the hot oil heater (1E) as a 'type b' unit. The allowable PM emission rate for the hot oil heater (1E) would be the product of 0.09 and the total design heat input of the heater (36.7 MMBTU/hr). This equates to a maximum allowable PM emission rate of 3.31 lb/hr. According to Caiman's permit application, the proposed PM emission rate is 0.29 lb/hr. Therefore, Caiman would meet this rule.

Caiman also would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

45CSR4 (To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors)

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

45CSR6 (To Prevent and Control Air Pollution from the Combustion of Refuse)

The purpose of this rule is to prevent and control air pollution from combustion of refuse.

Caiman has a flare at the facility. The flare is subject to section 4, emission standards for incinerators. The flare has an allowable emission rate of 19.1 pounds of particulate matter per hour (assuming a worst case scenario of 20,000 gallons of propane over a 12 hour period would be routed to the flare (assuming a propane density of 4.22 lb/gal). The flare has negligible amounts of particulate matter per hour. Therefore, the facility's flare will demonstrate compliance with this section. The facility will demonstrate compliance by maintaining the amount of natural gas consumed by the flare and the hours of operation. The facility will also monitor the flame of the flare and record any malfunctions that may cause no flame to be present during operation. In addition, the facility will also monitor visible emissions from the flare on a monthly basis.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

The purpose of this rule is to establish standards for emissions of sulfur oxides from fuel burning units, manufacturing operations and gas streams.

45CSR10 classifies the hot oil heater (1E) as a 'type b' unit. The allowable SO₂ emission rate for the hot oil heater (1E) would be the product of 3.1 and the total design heat input of the heater (36.7 MMBTU/hr). This equates to a maximum allowable SO₂ emission rate of 113.77 lb/hr. According to Caiman's permit application, the proposed SO₂ emission rate is 0.03 lb/hr. Therefore, Caiman would meet this rule. Furthermore, 45CSR10A exempts fuel burning units that combust natural gas from testing and monitoring requirements.

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)

45CSR13 applies to this source due to the fact that Caiman exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year, and they are also subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR60 Subparts A, Dc, and KKK).

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subparts A, Dc, and KKK. Caiman is subject to the recordkeeping, monitoring, and testing required by 40CFR60 Subparts A, Dc, and KKK.

45CSR30 (Requirements for Operating Permits)

Caiman is a nonmajor source subject to 45CSR30.

40CFR60 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)

This rule applies to steam generating units with a heat input capacity of 100 MMBTU/hr or less, but greater than or equal to 10 MMBTU/hr for which construction commenced after June 9, 1989. The 36.7 MMBTU/hr hot oil heater (1E) that Caiman proposes to install will be subject to this rule.

Caiman is subject to all applicable notifications, recordkeeping, and reporting requirements present in 40CFR60 Subpart Dc. In accordance with 40CFR60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, the applicant shall conduct compliance testing of the 36.7 MMBTU/hr hot oil heater (1E) within 180 days after initial startup.

40CFR60 Subpart KKK (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984. The Ohio River facility is subject to this rule due to the natural gas processing facility. Caiman must meet the LDAR requirements of Subpart KKK, which must be conducted in accordance with Subpart VV for equipment in VOC or wet gas service. This includes specific requirements, recordkeeping requirements, and reporting requirements.

The following rules do not apply to the facility:

40CFR60 Subpart Kb (Standards of Performance for Volatile Organic Liquid Storage Vessels)

The affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m³) (19,813 gallons) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. This subpart does not apply to storage vessels with a capacity greater than or equal to 151 m³ storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m³ but less than 151 m³ storing a liquid with a maximum true vapor pressure less than 15.0 kPa. This subpart also does not apply to pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

Some of the tanks that Caiman proposes for the Ohio River facility are greater than the volume threshold in the rule, however these tanks will operate at a maximum allowable working pressure of approximately 1,724 kPa each. Therefore, this subpart would not apply, since they will be pressure vessels operating in excess of 204.9 kPa.

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Ohio River PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	14.69	No
Nitrogen Oxides	250	100	17.90	No
Sulfur Dioxide	250	100	0.17	No
Particulate Matter 10	250	NA	4.11	No
Ozone (VOC)	250	NA	32.73	No
Greenhouse Gas	100,000	NA	21,170	No

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as seen in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

SOURCE AGGREGATION DETERMINATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

1. The Ohio River Fractionation Facility will operate under SIC code 1321 (Natural Gas Liquid Extraction), while the existing Fort Beeler Processing Facility also operates under SIC Code 1321. Therefore, the two (2) facilities do belong to the same industrial grouping.
2. Both the Ohio River Fractionation Facility and Fort Beeler Processing Facility are owned and operated by Caiman.
3. The Ohio River Fractionation Facility will be located approximately 11 miles from the Fort Beeler Processing Facility. This is not considered to be on contiguous or adjacent property as Caiman does not own the land in between the facilities, and the facilities are not mutually dependent.

Caiman currently operates the Fort Beeler Processing Facility under Permit R13-2826D. The original Fort Beeler permit was issued on March 29, 2010. Therefore, Caiman was operating the Fort Beeler facility independent of the Ohio River facility.

The purpose of the Fort Beeler facility is to remove natural gas liquids (NGL) including ethane, propane, butane and other higher molecular weight organics from the raw natural gas stream produced from nearby wells. This brings the quality of the natural gas to within contractual standards making it suitable for sale to and distribution by interstate pipelines.

The purpose of the Ohio River facility is to take the NGL removed from the produced gas and separate them into individual components such as propane and butane. Caiman does

not own the natural gas; they only provide a third party service and further process the gas for these parties.

The Fort Beeler facility currently trucks the NGL to either third party fractionators or to a rail car loading facility. Approximately 98% of the NGL product produced at Fort Beeler is owned by customers for whom Caiman provides natural gas processing services. This product is marketed for the customers by an independent, third party company that has been contracted to market the product for customers that do not desire to market it on their own. The third party marketing company determines how the product will be transported, where it will be transported, negotiates the contracts under which third party fractionators perform their NGL processing, and then markets the final product. Caiman's only connection will be that that they will attempt to serve the needs of these customers by offering the use of the Ohio River facility.

Of this 98%, approximately one half of the product being produced at the Fort Beeler facility is controlled by one entity which has sole control regarding the manner in which the product is marketed and has no specific tie to Caiman. Its product is currently delivered to a third party fractionator in Pennsylvania.

The Ohio River facility will initially possess the capability to receive 210,000 gallons per day of raw condensate or NGL product by truck, and 100,000 gallons per day of raw condensate or NGL product by rail. Caiman is also constructing two (2) pipelines to the Ohio River facility. One will be a pipeline for condensate from producing well locations with a capacity of 250,000 gallons per day. The second pipeline will be from the Fort Beeler facility for NGL product with a capacity of 2,100,000 gallons per day. Therefore, the Ohio River facility will be able to receive product from three (3) sources other than Fort Beeler initially, with the possibility for others in the future.

The Ohio River site was chosen based on transportation access (highway and rail), land availability, and suitable size. The Fort Beeler facility and the Ohio River facility do not share facilities or equipment.

The Fort Beeler and Ohio River facilities do have the same industrial grouping and are owned by the same company and are under common control. However, the two (2) facilities are not considered "contiguous or adjacent". The facilities are separated by 11 miles and Caiman does not own the land in between the two (2) facilities. Furthermore, the facilities are not mutually dependent. The Fort Beeler facility has been in operation more than one (1) year currently and could continue to operate without the Ohio River facility. In addition, as explained in item 3, the Ohio River facility also has the capability of operating without the Fort Beeler facility. Caiman will market the ability to use both facilities. However, Caiman will not have an ownership interest in the product and will have no control over the Fort Beeler product unless the owner chooses Caiman to utilize its services further.

Because of the reasons listed above, the emissions from these two (2) facilities should not be aggregated in determining major source or PSD status.

MONITORING OF OPERATIONS

Caiman will be required to perform the following monitoring:

1. Monitor and record quantity of natural gas consumed for all combustion sources.
2. Monitor and record quantity of product throughput (NGL, propane, butane, natural gasoline).
3. Monitor the presence of the flare pilot flame with a thermocouple or equivalent.
4. Establish a Leak Detection and Repair (LDAR) program for all equipment in VOC or wet gas service according to 40CFR60 Subparts KKK and VV.

Caiman will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed in the hot oil heater and the flare.
2. Maintain records of the amount of product throughput (NGL, propane, butane, natural gasoline).
3. Maintain records of the flare design evaluation.
4. Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
5. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
6. Maintain records of the visible emission opacity tests conducted per the permit.
7. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
8. The records shall be maintained on site or in a readily available off-site location maintained by Caiman for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Caiman meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Marshall County location should be granted a 45CSR13 construction for their facility.

Jerry Williams, P.E.
Engineer

Date