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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2615B
Plant ID No.: 045-00122
Applicant: EQT Gathering, LLC
Facility Name: Grant Compressor Station
Location: Holden, Logan County
NAICS Code: 1311
Application Type: Modification
Received Date: September 14, 2012
Engineer Assigned: Laura Jennings
Fee Amount: \$2,000
Date Received: September 19, 2012
Complete Date: October 17, 2012
Due Date: January 15, 2013
Applicant Ad Date: September 14, 2012
Newspaper: *The Logan Banner*
UTM's: Easting: 402.061 km Northing: 4184.536 km Zone: 17
Description: EQT Gathering, LLC (EQT) submitted a permit application seeking authorization for the construction of a new natural gas processing operation at the Grant Compressor Station near Holden, Logan County, WV to replace the existing extraction equipment.

DESCRIPTION OF PROCESS

The proposed project will involve the construction and operation of a skid mounted natural gas processing operation to separate natural gas components (propane and heavier) from the inlet natural gas stream. The gas flow rate for the proposed cryogenic processing plant will be 9.5 million standard cubic feet per day (MMscfd). The proposed project will not increase throughput through the existing equipment located at the site.

The Grant Station is a natural gas compression facility. The current permit includes one (1) TEG dehydration unit (10 MMscfd) controlled, one (1) reboiler for the dehydration unit (0.25 MMBtu/hr), two (2) natural gas fired compressor engines (637 hp, each), one (1) de-

ethanizer heater (0.075 MMBtu/hr), and eleven (11) miscellaneous storage tanks. The proposed project will not increase throughput through the existing equipment located at the site.

The proposed project will involve the construction and operation of a natural gas processing operation. The natural gas processing unit [S006] will be a skid mounted cryogenic unit, located downstream of the existing compressors at the station, used to separate natural gas components (propane and heavier) from the inlet natural gas stream. The gas flow rate for the proposed cryogenic processing plant will be 9.5 MMscfd.

The incoming gas stream will be cooled in a series of steps. As part of the cooling, ethylene glycol (EG) is injected into the process to prevent hydrate formation and freezing of any condensed water. The proposed process will include an ethylene glycol storage tank and a condensed glycol storage tank. The gas, glycol/water, and hydrocarbon phase mixture is sent to a separator to separate the liquid and gas phases. The liquid streams are separated into a product stream (i.e., hydrocarbon liquids) and a glycol/water stream. The hydrocarbon liquids are sent to a de-ethanizer column to separate the lighter ends, which are recycled back to compressor suction from the products (propane and heavier), which are stored under pressure with no emissions to the atmosphere in storage tanks prior to shipping offsite. The glycol stream is regenerated for reuse in the process. Heat for the system will be provided via a reconcentrator heater [S007] with a duty rating of 3.85 MMBtu/hr.

The Grant Station will remain a minor source of air emissions.

Emission Units Table:

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type and Date of Change	Control Device
S003	S003	Deethanizer/ Indirect Heater	2000	0.075 MMBtu/hr	Remove	None
S006	E6	Natural Gas Processing Unit	2012	9.5 MMscfd	New	None
S007	E7	Reconcentrator Heater	2012	3.85 MMBtu/hr	New	None
T12	E12	Ethylene Glycol Storage Tank	2012	300 gal	New	None
T13	E13	Recovered Glycol Tank (pressurized tank)	2012	4,000 gal	New	None

SITE INSPECTION

Directions: the facility is 7 miles SW of Logan off US Highway 119. From Logan, WV, go

south on Route 119 approximately 5 miles. At the intersection with Gaston Caperton Drive, go approximately 1 mile. Turn left onto access road to the site.

A full on-site targeted inspection was conducted by John Money Penny of DAQ's Compliance & Enforcement Section on August 23, 2012. At the time of the inspection, the facility was found to be in compliance.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The characteristics of air emissions from the proposed natural gas processing operation, along with the methodology for calculating emissions, are described below.

Emissions from the proposed project will result from the processing operation glycol regenerator, natural gas combustion in the reboiler, and storage of organic liquids in storage tanks. In addition, fugitive emissions from component leaks and haul roads will result from the operation of the station. The methods by which emissions from each of these source types is calculated are summarized below.

NG Processing Unit [S006]: Potential emissions of HAPS, VOC, and methane from the hydrate prevention unit were calculated using GRI-GLYCalc, Version 4.0. The emission calculations were reviewed and verified by the writer with the GRI-GLYCalc reports.

Reconcentrator Heater [S007]: Potential emissions from the proposed natural gas-fired reboiler of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 emission factors for natural gas combustion equipment, Chapter 1.4. These calculations assume a site-specific heat content of natural gas of 1,050 Btu/scf. Greenhouse gas emissions are calculated according to 40 CFR 98, Subpart C. The emission calculations were reviewed and verified by the writer.

Storage Tanks: The EG reconcentrator condensate (a mixture of glycol and water) stored in the new tanks at the facility have low vapor pressures (i.e., less than 1.5 psia at typical storage temperatures). Emissions are assumed to be negligible from these tanks due to the combination of the small sizes of the tank and the low vapor pressures of the material stored.

Fugitive Equipment Leaks: Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with *Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995*. Emission factors used are based on average measured TOC from component types indicated in gas service at O&G Production Operations. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98, Subpart W, Section 98.233(r).

There will be loading/unloading operations; however, the application indicated that the tanks are loaded under pressure and there are no fugitive emissions.

Blowdown Emissions: Emissions of VOC, HAPs, and greenhouse gases from blowdown events at the Grant Station are calculated using known volume of gas vented and number of events per year and using a mass bass approach to convert emissions of natural gas to pollutant emissions.

Haul Roads: Fugitive dust emitted from facility roadways have been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads, Section 13.2.2.

Emission Points Data Summary:

Emission Point ID	Emission Unit ID	Regulated Pollutant	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
			lb/hr	tpy	lb/hr	tpy
E6	S006	VOC	0.51	2.24	0.51	2.24
		Total HAPs	0.005	0.02	0.005	0.02
		n-Hexane	0.005	0.02	0.005	0.02
		CO ₂ e	11.25	49.26	11.25	49.26
E7	S007	NOx	0.37	1.60	0.37	1.60
		CO	0.31	1.35	0.31	1.35
		VOC	0.02	0.09	0.02	0.09
		SO ₂	0.002	0.01	0.002	0.01
		PM	0.03	0.12	0.03	0.12
		Total HAPs	0.01	0.03	0.01	0.03
		CO ₂ e	450	1970	450	1970
Total	Total	CO ₂ e	461	2020	461	2020

Fugitive Emissions Table:

Source of Fugitive Emissions	Regulated Pollutants	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
		lb/hr	tpy	lb/hr	tpy
Unpaved Haul Roads	PM	0.20	0.86	0.20	0.86
	PM ₁₀	0.05	0.22	0.05	0.22
	PM _{2.5}	0.005	0.022	0.005	0.022

Equipment Leaks	VOC	2.72	11.92	2.72	11.92
	Total HAP	0.0063	0.027	0.0063	0.027

The leak source data sheet in the application provided the following:

Source Category	Pollutant	Number of Source Components	Number of Components Monitored by Frequency	Estimated Annual Emission Rate (lb/yr)
Pumps	light liquid VOC	2	Per Subpart OOOO	123
Valves	Gas VOC	432	Per Subpart OOOO	7,969
Safety Relief Valves	Gas VOC	32	Per Subpart OOOO	10,283
Compressors	VOC	6	Per Subpart OOOO	4,227
Flanges	VOC	219	Per Subpart OOOO	1,238

The table below provides the summary of changes to the permitted site potential emissions. There were no emission limits for the De-ethanizer unit [S003], for the Dehydration Reboiler, or Equipment Leaks in R13-2615A.

Changes to Site Permitted PTE:

Regulated Pollutant	R13-2615A		R13-2615B		Change in Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
NO _x	5.62	24.60	5.99	26.20	0.37	1.60
CO	4.76	20.80	5.07	22.15	0.31	1.35
VOCs	4.69	19.37	5.22	33.62	0.53	2.33
PM _{2.5}	0	0	0.03	0.12	0.03	0.12
n-Hexane	0.07	0.28	0.07	0.28	0	0
Benzene	0.16	0.67	0.16	0.67	0	0
Toluene	0.33	1.43	0.33	1.43	0	0
Xylene	0.35	1.51	0.35	1.51	0	0
Total HAPs	-----	----	0.02	0.05	0.02	0.05

REGULATORY APPLICABILITY

State Regulations:

The following state regulations were evaluated for applicability as they relate to the proposed changes addressed in permit application R13-2615B.

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

The reconcentrator heater [S007] is subject to the opacity requirements of 45CSR2 (shall not exceed 10% opacity based on a six minute block average). Typically, natural gas fired re-boilers do not have 45CSR2 permit requirements for opacity.

Fuel burning units having a heat input under 10 MMBTU/hr are exempt from sections 4, 5, 6, 8, and 9 per §45-2-11.1. The reconcentrator heater [S007] has a maximum heat input of 3.85 MMBTU/hr.

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

Any fuel burning unit having a design heat input under 10 MMBTU/hr will be exempt from section 3 and sections 6 through 8 per §45CSR10-10.1.

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

The changes proposed in this application meet the definition of a Class II Modification according to 45CSR13 § 2.17.

The applicant has met the requirements of 45CSR13 by placing a Class I legal notice in *The Logan Banner* on September 14, 2012, providing a complete permit application, and paying the required \$2,000 application fee and the \$1,000 NSPS fee.

On December 20, 2012, EQT Gathering, LLC signed Consent Order CO-R13-E-2012-08 for Grant compressor station to authorize work to begin for natural gas liquids processing in advance of permit issuance. The signed consent order was received by WV DEP, Division of Air Quality on December 26, 2012.

Consent Order CO-R13-E-2012-08:

This consent order was issued by WV DAQ on December 11, 2012 to authorize work to

begin the natural gas liquids processing in advance of permit issuance. The consent order shall terminate upon completion of the items in the Order for Compliance Section and final issuance or denial of the Rule 13 Permit Application R13-2615B.

45CSR14 PERMITS FOR THE CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES FOR THE PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY

(As taken from the application)

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD) and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). PSD and NNSR regulations apply when a major source makes a change, such as installing new equipment or modifying existing equipment, and a significant increase in emissions results from the change. The Grant Station is not currently a major source with respect to the NSR program since its potential emissions are below all the NSR/PSD thresholds, nor will the proposed project result in the construction of a major source. As such, NSR/PSD permitting is not triggered by this construction activity. EQT will monitor future construction activities at the site closely and will compare any future increase in emissions with the NSR/PSD thresholds to ensure these activities will not trigger this program.

45CSR16 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

The applicant continues to be subject to 45CSR16 because they are subject to NSPS, Subpart OOOO.

45CSR22 AIR QUALITY FEE MANAGEMENT PROGRAM

The source continues to be subject to the 45CSR22 fee program.

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

The potential emissions of all regulated pollutants are below the corresponding thresholds at this facility after the project. The Grant Station is not a major source for Title V purposes.

Sources that are subject to NSPS, Subpart OOOO are exempt from Title V permitting not otherwise required. Applicability to 45CSR30 has not changed as a result of this permit application.

Federal Regulations:

The following state regulations were evaluated for applicability as they relate to proposed changes addressed in the submitted permit application.

40 CFR 60 New Source Performance Standards (NSPS)

Subpart Dc STANDARDS OF PERFORMANCE FOR SMALL INDUSTRIAL-COMMERCIAL-INSTITUTIONAL STEAM GENERATING UNITS

This subpart is not applicable because the proposed unit [S007] is less than 10 MMBtu/hr.

Subpart OOOO STANDARDS OF PERFORMANCE FOR CRUDE OIL AND NATURAL GAS PRODUCTION, TRANSMISSION AND DISTRIBUTION

NSPS, Subpart OOOO was published in the Federal Register on August 16, 2012 and became effective October 15, 2012. This subpart establishes emissions standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO₂) emissions from affected facilities that commence construction, modification, or reconstruction after August 23, 2011. The applicant is subject to this subpart for the reasons described in this section of the evaluation.

The new cryogenic natural gas processing unit for the Grant Station meets the definition of natural gas processing plant as the unit will extract natural gas liquids from field gas and is not a Joule-Thompson valve, a dew point depression valve, or a standalone JT skid. The Grant Station is not a gas wellhead facility, nor are there sweetening units proposed as part of this project. The only compressor included in the proposed project is an electric-driven screw compressor, which does not meet the NSPS Subpart OOOO definition of a centrifugal compressor or reciprocating compressor and is not subject to the rule. Therefore, the only potentially applicable requirements are those for pneumatic controllers, equipment leaks, and storage vessels.

There were no changes to the existing compressor engines or dehydration units requested in this application; therefore, NSPS, Subpart OOOO requirements for these emission units were not reviewed in this engineering evaluation.

Storage Vessels. There are two storage vessels as defined in Subpart OOOO as part of this permit application for Grant Station. The recovered liquids storage vessel does not meet the definition of a storage vessel under NSPS, Subpart OOOO because it is designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere. One tank will contain ethylene glycol, which will have negligible VOC emissions and the potential VOC emissions will be below 6tpy. Therefore, the proposed storage tanks [T12, T13] do not meet the control threshold under Subpart OOOO.

The storage vessel requirements in Subpart OOOO were amended and signed final on

August 2, 2013; however, at the time of this evaluation, they are not yet in the Federal Register and the amendments are not yet effective.

Pneumatic controllers. As provided in the permit application, the controllers that are part of the proposed processing unit will be driven by instrument air and are not driven by natural gas; therefore, they will not meet the definition of a pneumatic controller affected facility.

Equipment (as defined in § 60.5430) located at onshore natural gas processing plants. [§ 60.5365(f)] The applicant is subject to the applicable provisions of this subpart because they are the owner or operator of (f) the group of all equipment, except compressors, within a process unit for which construction, modification, or reconstruction began after August 23, 2011. Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§ 60.5400, 60.5401, 60.5402, 60.5421, and 60.5422 if it is located at an onshore natural gas processing plant. *Equipment as defined in § 60.5430* means each pump, pressure relief device, open ended valve or line, valve, and flange or other connector that is in VOC service or in wet gas service, and any device or system required by this subpart.

There were no amendments to §§ 60.5400, 60.5401, 60.5402, 60.5421, and 60.5422 when the proposed reconsideration of requirements were signed final on August 2, 2013. NSPS, Subpart OOOO requires the implementation of a leak detection and repair program in accordance with NSPS, Subpart VVa, with the exceptions noted in § 60.5401.

Pumps in light liquid service, valves in gas/vapor and light liquid service, and pressure relief devices in gas/vapor service that are located at a nonfractionating plant that does not have the design capacity to process 10 mmscfd or more of field gas are exempt from the routine monitoring requirements of §§ 60.482-21(a)(1) and 60.482-7a(a)), and paragraph (b)(1) of this section. [§ 60.5401(d)]. The cryogenic unit [S006] is designed under 10 mmscfd. Section 60.5401 also provides an exemption from the sampling connection systems of § 60.482-5a.

Based on the information provided in the fugitive emission leak source data sheet, the following sections of Subpart VVa are required by § 60.5400(a): §§ 60.482 - 1a(a), (b), and (d), § 60.482-6a, § 60.482-9a, § 60.482-10a, § 60.482-11a.

Additionally, the following are required or are allowable alternatives: §§ 60.5400(c), (d), (e), and (f) ; §§ 60.5401(f), (g); § 60.5402 alternative emission limitations; § 60.5421 additional recordkeeping requirements ; and § 60.5422 additional reporting requirements.

40 CFR 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart HHH NATURAL GAS TRANSMISSION AND STORAGE FACILITIES

This subpart only applies to major sources of HAP that transport or store natural gas prior to entering the transmission pipeline to end users as defined by § 63.1271. The Grant Station facility is an area source; and therefore, this subpart is not applicable.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There are no new hazardous air pollutants as a result of this permit application.

AIR QUALITY IMPACT ANALYSIS

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

MONITORING OF OPERATIONS

- Equipment leaks are monitored in accordance with the monitoring requirements of NSPS, Subpart OOOO.
- The throughput of natural gas to the natural gas processing unit and re-concentrator heater shall be monitored and recorded.
- Records shall be maintained to demonstrate compliance with the natural gas processing unit emission limits.

CHANGES TO PERMIT R13-2615A

- General updates such as references to current permit revisions, etc.
- Emission unit table 1.0 was updated to: (1) remove the De-ethanizer [S003], add the NG Processing Unit [S006], add the Reprocessing Heater [S007], add the EG Storage Tank [T12], and add the Recovered Glycol Tank [T13].
- Section 6.0: (1) remove [S003] and add the natural gas processing unit (S006, S007) in the title; (2) 6.1.4 - delete [S003] requirements; (3) add new 6.1.4 with natural gas processing unit emission limits; (4) add 6.1.5 to add natural gas throughput limit for the re-concentrator heater; (5) added design capacity limit on the NG processing unit to 10 mmscfd; (6) add the re-concentrator heater to 6.2.1; (7) update 6.4.3 with records for 6.1.4; and (8) and replace 6.4.4 from records for S003 with S007.
- Add Section 8.0 for NSPS, Subpart OOOO LDAR requirements.

RECOMMENDATION TO DIRECTOR

It is the recommendation of the writer that Permit R13-2615B be granted to Equitable Production Company, Grant Compressor Station facility located in Logan County, WV. Based on the information provided in the permit application, the applicant meets all applicable federal and state air regulations pertaining to the requested change.

Laura Jennings
Permit Engineer

Date