



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-1814C
Plant ID No.: 099-00053
Applicant: MarkWest Energy Appalachia, LLC
Facility Name: Kenova
Location: Kenova, Cabell County
SIC Code: 1321
Application Type: Modification
Received Date: November 5, 2010
Engineer Assigned: David Keatley
Fee Amount: \$1,000
Date Received: November 8, 2010
Complete Date: March 8, 2011
Due Date: June 6, 2011
Applicant Ad Date: November 18, 2010
Newspaper: *Charleston Gazette*
UTM's: Easting: 380.6 km Northing: 17 km Zone: 17
Description: This facility is a natural gas processing plant. The purpose of this facility is to separate NGLs (natural gas liquids) from the rest of the natural gas. The purpose of the truck loading is to provide a method to load and unload NGLs during periods when the liquids pipeline is out of service. MarkWest proposes to increase the maximum truck loading rate from 45,000 gallons per day (gal/day) to 216,000 gal/day.

DESCRIPTION OF PROCESS

This facility is a NGLs extraction plant that dries the natural gas and extracts liquid hydrocarbons. The natural gas needs to be dried to avoid ice formation in the cryogenic liquid recovery process. Natural gas is delivered to the facility through underground pipelines from the adjacent Columbia Gas compressor station. First two compressor engines (S-1 and S-2) compress the wet natural gas. Then a molecular sieve dehydrator is used to absorb water in a desiccant media. This molecular sieve dehydrator has two chambers. One of the chambers is absorbing water from the process natural gas and the other chamber is being regenerated by a flow of residual

natural gas. The regenerative gas heater (S-4) heats the residual natural gas to cause the evaporation of the water that is trapped in the desiccant media being regenerated. After the process gas goes through the molecular sieve dehydrator it then goes to the Cryogenic Liquid Recovery Unit to remove the NGLs. After the removal of the liquid product the residual gas is consumed as fuel for the flare (S-3), used to power the two inlet gas compressors (S-1 and S-2), and used as a medium for transferring heat to regenerate the molecular sieve dehydrators. The residual natural gas that is not consumed by this facility returns to the adjacent Columbia Gas compressor station. The mixed liquid hydrocarbons are delivered from this facility to the Mark West Siloam Fractionation Plant (in Kentucky) through an underground pipeline. This facility has a truck loadout (S-5) that loads and unloads NGLs to trucks during periods when the pipeline is out of service.

SITE INSPECTION

Jamie Jarrett from DAQ's Compliance and Enforcement Section and the permit writer went to this facility on March 8, 2011. Directions to the facility from Charleston are the following: take I64 W to exit 1 Kenova, take US 52 S for about three (3) miles and the facility is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
S-1	Caterpillar G3612 Diesel Engine	Total Particulate Matter	0.23	2.01
		Sulfur Dioxide	0.0065	0.028
		Nitrogen Oxides	5.10	22.34
		Carbon Monoxide	2.8	12.26
		Volatile Organic Compounds	1.1	4.82
		Formaldehyde	0.61	2.67
		Acetaldehyde	0.10	0.42
S-2	Caterpillar G3612 Diesel Engine	Total Particulate Matter	0.23	2.01
		Sulfur Dioxide	0.0065	0.028
		Nitrogen Oxides	5.10	22.34
		Carbon Monoxide	2.8	12.26
		Volatile Organic Compounds	1.1	4.82
		Formaldehyde	0.61	2.67
		Acetaldehyde	0.10	0.42
S-3	Emergency Flare and Purge	Total Particulate Matter	0.001	0.0044
		Sulfur Dioxide	0.0001	0.00044
		Nitrogen Oxides	0.04	0.175
		Carbon Monoxide	0.008	0.35
		Volatile Organic Compounds	0.001	0.0044

S-4	Regenerative Heater	Total Particulate Matter	0.023	0.099
		Sulfur Dioxide	0.002	0.008
		Nitrogen Oxides	0.15	0.65
		Carbon Monoxide	0.25	1.1
		Volatile Organic Compounds	0.016	0.072
S-5	Truck Loadout	Volatile Organic Compounds	0.0022	0.0019

REGULATORY APPLICABILITY

45CSR2 - *To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers*

The regenerative gas heater (S-4) at this facility meets the definition for fuel burning unit (section 2.10). This heater is less than 10 mmBTU and is exempt from the following sections: 4,5,6,8, and 9.

No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average (section 3.1). Compliance with the visible emission requirements will not have to be done using Method 9. When burning pipeline quality natural gas, such records shall include, but not be limited to, the date and time of start-up and shutdown, and the quantity of fuel consumed on a monthly basis.

When burning #2 fuel oil, such records shall include, but not be limited to, the date and time of start-up and shutdown, the quantity of fuel consumed on a monthly basis and a BTU analysis for each shipment.

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

The Louis A. Johnson VA Medical Center shall not cause the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

45CSR6 - *Control of Air Pollution From Combustion of Refuge*

From section 2.7 this facilities emergency flare (S-3) meets the definition of incineration and is therefore subject to applicable Rule 6 requirements. From section 4.1 the maximum allowable total particulate matter emission rate is 136.6 lb/hr. This facilities potential to emit of total particulate matter is well below this threshold. The opacity limit for the emergency flare is 20%.

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 because this source exceeds the regulatory emission threshold for regulated air pollutants of 6 lb/hr and 10 ton/year.

45CSR16 - *Standards of Performance for New Stationary Sources*

Since this source is subject to 40CFR60 Subpart KKK it is subject to this rule.

45CSR30 - *Requirements for Operating Permits*

MarkWest's Kenova Facility is subject to 40CFR60 Subpart KKK, and are therefore subject to 45CSR30 as a deferred source. The Louis A. Johnson VA Medical Center will be required to keep their Certificate to Operate current.

40CFR60 Subpart KKK- *Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants*

This facility meets the definition of an onshore natural gas processing plant because this facility extractions natural gas liquids from field gas and is inside the outer continental shelf. This facility will follow the applicable requirements of subpart VV, but follow the exceptions of subpart KKK.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Acetaldehyde

Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is ubiquitous in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on inadequate human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

Formaldehyde

Formaldehyde is used mainly to produce resins used in particleboard products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation

studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

AIR QUALITY IMPACT ANALYSIS

Based on the annual emissions rates this facility will not be a major source as defined by 45CSR14, so no air quality impact analysis was performed.

CHANGES TO PERMIT R13-1814B

MarkWest proposes to increase the maximum truck loading to 216,000 gallons per day and 15,552,000 gallons per year.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates Mark West's natural gas liquid extraction plant meets all the requirements of applicable rules and regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Wayne County location should be granted a 45CSR13 construction permit for their facility.

David Keatley
Engineer

Date