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**west virginia** department of environmental protection

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## **ENGINEERING EVALUATION / FACT SHEET**

### BACKGROUND INFORMATION

Application No.: R13-2963  
Plant ID No.: 033-00014  
Applicant: Dominion Transmission, Inc.  
Facility Name: Law Compressor Station  
Location: Harrison County  
NAICS Code: 48621 (Pipeline Transportation of Natural Gas)  
Application Type: Modification  
Received Date: July 17, 2012  
Engineer Assigned: Laura Jennings  
Fee Amount: \$1,000  
Date Received: July 19, 2012  
Complete Date: August 23, 2012  
Due Date: November 21, 2012  
Applicant Ad Date: July 18, 2012  
Newspaper: *Exponent-Telegram*  
UTM's: Easting: 545.88 km      Northing: 4335.35 km      Zone: 17  
Description: Replacement of existing dehydration unit still, reboiler and flare.

### DESCRIPTION OF PROCESS

Dominion Transmission, Inc. (Dominion) is submitted this R13 modification permit application for the existing Law Compressor located in Harrison County, WV. The Law Compressor Station operates under Title V Permit R30-03300014-2011. The natural gas transmission facility currently consists of two (2) 660 HP natural gas fired reciprocating engines, one (1) dehydrator reboiler, one (1) dehydration unit with a flare, one (1) air compressor, seven (7) storage tanks of various sizes, and two (2) emergency generators.

Dominion is proposing to replace the existing Glycol Dehydration Unit, rated at 12.6 million standard cubic feet per day (mmscfd), with a new Cameron Glycol Dehydration Unit, rated at 9.0 mmscfd. Emissions from the new regenerator still vent [DEHY02] will be routed to a Questor Technology, Inc (QTI), Model Q100 flare [F1], rated at 4 million British Thermal Units per hour (MMBtu/hr), for volatile organic compounds (VOC), hazardous air pollutant (HAP), and odor control. The new natural gas-fired reboiler associated with the unit

[RBR02] will be rated at 0.771 MMBtu/hr. The existing dehydration unit still (DEHY01), reboiler (RBR01), and flare (DEHY) will be taken out of service.

The glycol dehydration process removes water vapor from natural gas. Removing water vapor prevents hydrate formation and corrosion, and maximizes pipeline efficiency. Wet gas contacts dry glycol and the glycol absorbs water from the gas. Wet gas enters the contactor tower at the bottom and lean glycol flows down the still from the top. The dehydrated gas leaves the contactor tower. The water rich glycol leaves the contactor still and goes to the glycol regenerator [DEHY02]. Water escapes as steam, and the purified lean glycol returns to the contact tower where it contacts wet gas again.

Emissions Unit Table:

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/Modified	Design Capacity	Type and Date of Change	Control Device ID
DEHY02	F1	New Dehydration unit still; Cameron Model 300/550	2013	9 mmscf/day	New	F1
RBR02	RBR02	Dehydration unit Reboiler; Cameron Model 300/550	2013	0.771 MMBtu/hr	New	None
F1	F1	Dehydration unit flare; QTI, Q100	2013	4.0 MMBtu/hr 95% efficiency	New	NA
DEHY01	DEHY01	Dehydration unit still; Nalco 5GR-1000-DX	1973	12.6 mmscf/day	Removal	DEHY
DEHY	DEHY	Dehydration unit flare	1973	22.1 cfm	Removal	NA
RBR01	RBR01	Dehydration unit reboiler; Production Equipment, Inc. 1513R	1973	17 MMBtu/hr	Removal	None

## SITE INSPECTION

A full on site inspection was conducted on April 20, 2012 by Lou Ann Lee of DAQ's Compliance and Enforcement Section and the facility was found to be in compliance at the time of the inspection.

Directions to facility: Taker Route 19 North from Jane Lew, turn left on Two Lick Run Road, travel 1.1 miles, station is through farm gate at the top of the hill.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

GRI - GlyCalc, Version 4.0 was used to estimate VOC and HAP emissions from the new dehydration unit still [DEHY02] that will be controlled by the new flare [F1]. AP-42 emission factors were used to estimate emissions of NO<sub>x</sub>, and PM<sub>2.5</sub> from the new flare [F1]. Manufacturer's data was used to estimate emissions of CO from the new flare [F1]. Both the controlled emissions from DEHY02 and the combustion emissions from F1 are shown in the emissions summary table below and venting through emission point ID F1.

AP-42 emission factors were used to estimate PM, SO<sub>2</sub>, and HAP emissions from the new glycol dehydration reboiler vent [RBR02]. Manufacturer data was used to estimate emissions of NO<sub>x</sub>, CO, and VOCs from the new glycol dehydration reboiler vent [RBR02].

The HAP emissions from the dehydration unit in the permit will include limits for the BTEX emissions, consistent with the practice for other natural gas compressor stations and were estimated using GRI - GlyCalc, Version 4.0. BTEX is an acronym used for Benzene, Toluene, Ethylbenzene, and Xylene.

Emissions Summary Table:

Emission Point ID	Emission Unit ID	Control Device ID	Regulated Pollutant	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy
DEHY02	DEHY02	F1	VOC	48.56	212.69	2.43	10.63
			Benzene	0.81	3.54	0.04	0.18
			Ethylbenzene	0.48	2.10	0.02	0.10
			Hexane	0.52	2.30	0.03	0.11
			Toluene	1.97	8.62	0.10	0.43
			Xylene	2.97	13.02	0.15	0.65
			Total HAP	6.75	29.59	0.34	1.48
RBR02	RBR02	n/a	PM Filterable	<0.01	<0.01	<0.01	<0.01
			PM <sub>10</sub> (Filterable)	<0.01	<0.01	<0.01	<0.01
			PM <sub>2.5</sub> (Filterable)	<0.01	<0.01	<0.01	<0.01
			PM (Condensables)	<0.01	0.02	<0.01	0.02
			SO <sub>2</sub>	<0.01	<0.01	<0.01	<0.01
			NO <sub>x</sub>	0.03	0.13	0.03	0.13
			CO	0.02	0.09	0.02	0.09
VOC	0.03	0.15	0.03	0.15			

			Total HAP	<0.01	<0.01	<0.01	<0.01
			CO <sub>2</sub> e	n/a	n/a	n/a	335
F1	n/a	F1	VOC	<0.01	0.01	<0.01	0.01
			NOX	0.12	0.50	0.12	0.50
			CO	0.02	0.09	0.02	0.09
			PM <sub>2.5</sub>	0.03	0.13	0.03	0.13
			CO <sub>2</sub> e	n/a	n/a	n/a	219

## REGULATORY APPLICABILITY

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

The reboiler [RBR02] will be subject to this rule. Smoke/ particulate matter into the open air is limited to 10% opacity based on a six minute block average (45CSR§2-3.1). Compliance will be demonstrated by compliance with permit requirements. The reboiler will not be subject to the weight emission standard of 45CSR§2-4 because the reboiler is rated less than 10 MMBtu/hr and is therefore exempt from sections 4, 5, 6, 8, and 9.

### 45CSR6 CONTROL OF AIR POLLUTION FROM COMBUSTION OF REFUSE

The applicant is subject to 45CSR6 for the new flare [F1]. Particulate matter emissions are limited to the value derived in the equation in §45-6-4.1. Opacity is limited to less than 20%, except less than 40% opacity for a period aggregated no more than 8 minutes per startup, per §45-6.4.3 and 4.

Compliance will be demonstrated by compliance with permit requirements.

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

The reboiler [RBR02] is less than 10 MMBtu/hr and is exempt from section 3 and sections 6 through 8 of this rule.

45CSR§10-4 sets SO<sub>2</sub> limits from source operations. 45CSR§10-4 does not apply to RBR02 because it is not a “source operation” as defined in 45CSR§10-2.19. 45CSR§10-5.1. prohibits combustion of refinery process gas streams or other process gas streams that contain certain concentrations of hydrogen sulfide. 45CSR§10-5.2. pertains to by-product coke operations. The permittee’s source RBR02 is not subject to

either of these subsections; therefore, 45CSR§10-5 does not apply to RBR02.

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 applicant meets the definition of a “stationary source” according to the definition in section 2.24 and is required to apply for a modification permit. The uncontrolled potential emissions are more than 6 lb/hr and 10 tpy of any regulated pollutant. Additionally, the uncontrolled emissions of hazardous air pollutants exceed the stationary source definitions both on a per pollutant and on an aggregated basis.

The applicant paid the application fee of \$1,000 for a modification permit and published a Class I legal advertisement in *The Exponent-Telegram* on July 18, 2012.

In addition to the equipment in modification permit application R13-2963, Dominion’s Law Compressor Station operates two emergency generators at the Law Compressor Station under General Permit Registration G60-C041.

45CSR14 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTION FOR THE PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The construction and operation of the new dehydrator still, reboiler, and flare at the Law Compressor Station will not trigger New Source Review (NSR) permitting. The replacement of this equipment does not constitute a major modification to an existing major source under the NSR rules for any criteria pollutant.

The Law Compressor Station is an existing major stationary source as defined in section 2.43.b because it has the potential to emit two hundred fifty (250) tpy or more of NO<sub>x</sub>. The facility is located in Harrison County, which is in attainment for all criteria pollutants.

The proposed replacement of the dehydrator still [DEHY02], reboiler [RBR02], and flare [F1] does not meet the definition of a major modification and does not result in an increase in emissions that is significant for either ozone (VOC) or NO<sub>x</sub>. The significant threshold for each pollutant is 40 tpy. The new dehydrator still, reboiler, and flare

have a potential to emit 10.79 tpy of VOC emissions and 0.63 tpy of NO<sub>x</sub> emissions after controls.

45CSR16 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES PURSUANT TO 40 CFR PART 60

The applicant is subject to this regulation because they are subject to 40CFR60, Subpart OOOO.

45CSR21 REGULATION TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF VOLATILE ORGANIC COMPOUNDS

The scope of this regulation is limited to sources located in Putnam, Kanawha, Cabell, Wayne, and Wood Counties. The facility is located in Harrison County and therefore is not subject to this regulation.

45CSR27 TO PREVENT AND CONTROL THE EMISSIONS OF TOXIC AIR POLLUTANTS

The applicant is not subject to this regulation because the dehydration unit and reboiler does not meet the definition of a “chemical processing unit” per §45-27-2.4 because the definition excludes equipment used in the production and distribution of petroleum products providing that such equipment does not product or contact materials containing more than 5% benzene by weight.

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

Dominion, Law Compressor Station operates under Title V permit R30-03300014-2011 and meets the definition of a major stationary source per 45CSR30, section 2.26b because it has the potential to emit 100 tpy or more of NO<sub>x</sub> and VOC’s. It is not classified as a major source in regards to hazardous air pollutants.

The applicant submitted a joint permit application to also update the Title V permit.

45CSR34 EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The applicant is subject to this regulation because they are subject to 40CFR63, Subpart HH.

Federal Regulations:

40CFR Part 60 NEW SOURCE PERFORMANCE STANDARDS

## Subpart A

The applicant is subject to the general NSPS provisions as specified in Table 3 of Subpart OOOO.

The applicant proposes to operate the flare in accordance with procedures outlined in §60.18 for non-assisted flares and therefore; these provisions will be added to the permit language. Compliance with the net heating value of the waste gas going to the proposed flare and the calculation of the exit velocity of the flare were demonstrated in the permit application. Compliance with the monitoring requirements of §60.18 will be demonstrated with compliance to permit requirements.

## Subpart OOOO

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

Subpart OOOO was published in the Federal Register August 16, 2012 and became effective October 15, 2012. At the time the application was received and deemed complete, the standard was not yet effective. Because of the timing, the NSPS fee was not requested prior to the permit being issued.

The applicant is subject to the applicable provisions of this subpart because they are an owner or operator of an onshore affected facility that will commence construction after August 23, 2011. The group of all equipment, except compressors, within a process unit is an affected facility. Equipment associated with a dehydration unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421, and 60.5422 because it is located at an onshore natural gas processing plant per §60.5365(f).

Initial and continuous compliance demonstration requirements for equipment leaks are provided in §§60.5410 and 60.5415. The initial compliance period begins upon initial startup and ends no later than one year after the initial startup date for the affected facility. The initial compliance period may be less than one full year. Initial and continuous compliance with the VOC requirements is demonstrated if you are in compliance with the requirements of §60.5400.

The affirmative defense for violations of emission standards during malfunction provided in §60.5415(h) apply for affected facilities at onshore natural gas processing plants.

There are no notification, reporting, and recordkeeping requirements from §60.5420 that apply to affected onshore natural

gas process plants; the recordkeeping and reporting requirements are provided in §§60.5421 and 60.5422.

The Law Compressor Station must be in compliance with the standards of this subpart for the affected facility upon startup.

Compliance will be demonstrated by compliance with the permit requirements.

40CFR Part 63      NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

Subpart A      The applicant is subject to the general NESHAP provisions as specified in Table 2 of Subpart HH.

Subpart HH      NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM OIL AND NATURAL GAS PRODUCTION FACILITIES

The amendments to Subpart HH were published in the Federal Register August 16, 2012 and became effective October 15, 2012. The review of this subpart was conducted after the amendments were published in the Federal Register even though the application was received prior to this date.

The Law Compressor Station will be subject to 40 CFR Part 63, Subpart HH because the facility processes natural gas and includes a triethylene glycol (TEG) dehydration unit located at a facility that meets the criteria specified in §63.760(a). The Law Compressor Station is subject to the area source requirements, and the only affected source is the new Glycol Dehydration Unit [DEHY02]. The facility is not located within an urbanized area plus offset (UA plus offset) or urban cluster (UC) boundary.

General Standards §63.764:

(d) The potential benzene emissions from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 tpy) and meet the exemption criteria of §63.764(e)(1)(ii), except that the records of the determination of these criteria must be maintained as required in §63.774(d)(1).

Glycol dehydration unit process vent standards §63.765:

(a) This section does not apply because it is not subject to control for air emissions specified in paragraph (d)(1)(I) of §63.764.

Equipment leak standards §63.769:

This section does not apply because the ancillary equipment is subject to and controlled under the requirements specified in 40 CFR part 60, subpart OOOO, except that the periodic reports shall be submitted as specified in §63.775(e).

Test methods, compliance procedures, and compliance demonstrations §63.772:

The applicant is subject to the procedures specified in §63.772(b)(2) to determine the actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere to determine the exemption in §63.764(e)(1)(ii).

Reporting requirements §63.775:

Owners or operators of TEG dehydration units located at an area source that meets the exemption criteria in §63.764(e)(1)(ii) is exempt from the reporting requirements for area sources in paragraphs (c)(1) through (c)(7). They are subject to the Notice of Compliance Status (NOCS) requirements in paragraph (d), the Notification of Process Change requirements in paragraph (f), and the Electronic Reporting requirements in paragraph (g). They are not subject to the Periodic Reports in paragraph (e) because they are an area source that is not located inside a UA plus offset and not located inside a UC boundary.

Compliance with the requirements of this subpart will be demonstrated by compliance with permit requirements.

Subpart HHH NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM NATURAL GAS TRANSMISSION AND STORAGE FACILITIES

The amendments to Subpart HHH were published in the Federal Register August 16, 2012 and became effective October 15, 2012. The review of this subpart was conducted after the amendments were published in the Federal Register even though the application was received prior to this date.

The Law Compressor Station will not be subject to this subpart because it applies to owners/operators of natural gas transmission and storage facilities that are a major HAP source and that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end used if there is no local distribution company. A compressor station that transports natural gas prior to the point of custody transfer or to a natural gas processing plant is not considered a part of the natural gas transmission and storage source category per §63.1270(a). As stated in the permit application, the Law Compressor Station is an area source of HAP and transports gas to a natural gas processing facility.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

### Benzene:

Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

### Ethyl Benzene:

Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

### n-Hexane:

n-Hexane is a solvent that has many uses in the chemical and food industries, either in pure form or as a component of commercial hexane. The latter is a mixture that contains approximately 52% n-hexane; the balance is made up of structural analogs and related chemicals such as methylpentane and methylcyclopentane. Highly purified n-hexane is used as a reagent for chemical or chromatographic separations. Other grades of n-hexane are used as solvents for extracting edible fats and oils in the food industry and as a cleaning agent in the textile, furniture, and printing manufacturing industries. Hexane is the solvent base for many commercial products, such as glues, cements, paint thinners, and degreasers. n-Hexane is a minor constituent of crude oil and natural gas and occurs in different petroleum distillates. No data are available regarding the potential toxicity of n-hexane in humans orally exposed to n-hexane. However, as might be expected for a chemical with such wide application, the potential exists for persons to be environmentally and/or occupationally exposed to n-hexane via other routes of exposure.

### Toluene:

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies. The major use of toluene is as a mixture added to gasoline to improve octane ratings. Toluene is also used to produce benzene and as a solvent in paints, coatings, synthetic fragrances, adhesives, inks, and cleaning agents. Toluene is also used in the production of polymers used to make nylon, plastic soda bottles, and polyurethanes and for pharmaceuticals, dyes, cosmetic nail products, and the synthesis of organic chemicals.

#### Xylene:

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity. Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.

### 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

The following monitoring requirements are included in the permit.

- Monitoring of the dehydration system operating parameters that are used as inputs to calculate actual emissions when using GRI-GLYCCalc

- Monitoring of the daily wet natural gas throughput through the dehydration unit
- Visual emissions monitoring of flare
- Monitoring flare for presence or absence of a pilot flame
- Monitoring of flare to ensure that it is operated and maintained in conformance with its design
- Continuous compliance for equipment leaks per NSPS, Subpart OOOO requirements.

#### RECOMMENDATION TO DIRECTOR

It is the recommendation of the writer that Permit R13-2963 be granted to Dominion Transmission, Inc., Law Compressor Station facility located in Harrison 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.

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Laura Jennings  
Permit Engineer

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Date