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# ENGINEERING EVALUATION / FACT SHEET

## BACKGROUND INFORMATION

| | |
|---|---|
| Application No.: | R13-3232 |
| Plant ID No.: | 039-00656 |
| Applicant: | Tennessee Gas Pipeline Company, LLC |
| Facility Name: | Station 118A |
| Location: | Charleston, Kanawha County |
| NAICS Code: | 486210 |
| Application Type: | Construction |
| Received Date: | February 3, 2015 |
| Engineer Assigned: | Roy F. Kees, PE |
| Fee Amount: | $4,500.00 |
| Date Received: | February 9, 2015 |
| Complete Date: | March 18, 2015 |
| Due Date: | June 18, 2015 |
| Applicant Ad Date: | March 2, 2015 |
| Newspaper: | *The Charleston Gazette* |
| UTM's: | Easting: 438.130 km Northing: 4,252.460 km Zone:17 |
| Description: | Construction of a new natural gas compressor station consisting of one compressor turbine, one emergency generator, one hydronic heater and one storage tank. |

## DESCRIPTION OF PROCESS

Natural gas from the transmission pipelinewill be routed and compressed through this station. Natural gas will be compressed to a higher pressure and discharged downstream into the sales line. The natural gas fired compressor turbine (118-CT-01) that will be operated is a Solar Taurus 70-10802S turbine with a design capacity of 11,523 brake horsepower. Station 118A will also operate one (1) natural gas fired emergency generator )118-EG-03), one (1) natural gas fired hydronic heater (118-WH-02) and one (1) pipeline liquids storage tank (118-PF-04).

## SITE INSPECTION

A site inspection was performed on March 19, 2015 by the writer and Todd Shrewsbury of the enforcement section. The actual site was located behind a closed gate marked as a private landfill. From the location of the gate the site could be seen and is appropriate for this facility.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the facility will be as indicated below.

### Criteria Pollutants

PTE is based on AP-42 emission factors (PM, VOCs for turbine E01, PM for emergency generator G04), mass balance ($SO_2$) and vendor/test data (CO, $NO_x$ for turbine, CO, $NO_x$ and VOCs for emergency generator). The tank emissions were caluculated using E&P Tanks, and he loading emssions were calculated using AP-42. Additionally, the calculations assume maximum load and operation 8,760 hours per year.

| | $NO_x$ | | CO | | VOC | | $SO_2$ | | $PM/PM_{2.5}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy |
| 118-CT-01 | 8.48 | 35.10 | 5.16 | 34.50 | 0.59 | 2.59 | <0.01 | <0.01 | 0.61 | 2.49 |
| 118-WH-02 | 0.11 | 0.48 | 0.25 | 1.11 | 0.03 | 0.12 | <0.01 | 0.01 | 0.05 | 0.20 |
| 118-EG-03 | 4.56 | 1.14 | 9.13 | 2.28 | 2.28 | 0.57 | <0.01 | <0.01 | 0.08 | 0.02 |
| 118-PF-04 | -- | -- | -- | -- | 0.05 | 0.20 | -- | -- | -- | -- |
| 118-LR-05 | -- | -- | -- | -- | 21.20 | 0.01 | -- | -- | -- | -- |
| **Total** | **13.20** | **36.70** | **14.50** | **37.70** | **24.80** | **6.00** | **0.30** | **1.30** | **0.70** | **2.70** |

**Non-criteria Pollutants**

Formaldehyde and total HAP emissions are based on AP-42 and 8,760 hours per year of operation.

| | Formaldehyde | | Toluene | | Xylene | | Acetaldehyde | | Benzene | | Ethylbenzene | | Total HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy |
| 118CT 01 | 0.07 | 0.29 | 0.02 | 0.05 | 0.01 | 0.03 | -- | 0.01 | -- | -- | -- | -- | 0.09 | 0.41 |
| 118WH 02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.04 |
| 118EG 03 | 0.43 | 0.11 | -- | -- | -- | -- | 0.07 | 0.02 | -- | -- | -- | -- | 0.59 | 0.15 |
| 118PF 04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.01 |
| 118LR 05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.84 | -- |
| **Total** | **0.50** | **0.40** | **0.02** | **0.05** | **0.01** | **0.03** | **0.07** | **0.03** | **0.00** | **0.00** | **0.00** | **0.00** | **1.60** | **1.00** |

REGULATORY APPLICABILITY

The following state and federal rules apply to the modified portion of the facility:

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

The Hydronic Heater (118-WH-02) has been determined to meet the definition of a "fuel burning unit" under 45CSR2 and is, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the unit is less than 10 mmBtu/hr (4.25 MMBtu/hr), it is not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement is under Section 3.1 - Visible Emissions Standards.

Pursuant to 45CSR2, Section 3.1, the line heater is subject to an opacity limit of 10%. Proper maintenance and operation of the unit (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

***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 construction of Station 118A Compressor Station has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant and, therefore, is subject to 45CSR13.

As required under §45-13-8.3, Tennessee Pipeline placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on March 2, 2015 in *The Charleston Gazette* and the affidavit of publication for this legal advertisement was submitted on March 17, 2015.

***45CSR22: Air Quality Management Fee Program***

Station 118A is not subject to 45CSR30. The facility is subject to 40CFR60 Subpart OOOO, JJJJ, and KKKK, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source, therefore, the facility is not subject and will pay its annual fees through the Rule 22 program.

***40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.***

The proposed 1,035 hp emergency generator 118-EG-03 is defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and is, pursuant to §60.4230(a)(4)(ii), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): "Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE." Therefore, as the proposed generator engine is an emergency engine greater than 130 HP, the engine must comply with the following emission standards:

| | $NO_x$ | CO | VOC |
|---|---|---|---|
| Standard (g/HP-hr) | 2.0 | 4.0 | 1.0 |

Since the applicant submitted nothing indicating that the engine is a "certified engine" (and I can find nothing online indicating that it is a certified engine) under the rule, it will have to demonstrate compliance by performing testing in accordance with §60.4244 of the rule. Additionally, per §60.4243(b)(2)(i) the permittee will have to "keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions."

***40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines.***

Per §60.4305, Subpart KKKK applies to combustion turbines with a peak heat input of 10 MMBTU/hr or greater. Since the new Solar Mars turbine is rated at 93 MMBTU/hr it will be subject to the rule. §60.4320 requires the turbine to meet the $NO_x$ requirement in Table 1 of the rule. Since the turbine is a new, natural gas fired turbine between 50 and 850 MMBTU/hr, Table 1 requires it to meet a $NO_x$ limit of 25 ppm at 15% $O_2$ or 150 ng/J of useful output. To demonstrate compliance with the limit, §60.4400(a) requires both an initial (within 180 days of startup or 60 days of achieving full load operation) and annual (not to exceed 14 months from previous test) performance test. However, §60.4340 allows the permittee to be exempted from the annual testing if continuous emission monitors or continuous parameter monitoring systems are installed that meet the requirements of the section. Additionally, if the $NO_x$ testing results show emissions less than 75% of the limit, testing frequency can be reduced to once every 2 years (with no more than 26 months after the previous test.)

The rule also limits $SO_2$ emissions from the turbine. §60.4330(a)(2) allows the facility to meet this limit by burning fuel with a total potential $SO_2$ emissions of less than 0.06 lb/MMBTU. Additionally, §60.4365(a) exempts the permittee from monitoring fuel sulfur content if a source burns only natural gas that is covered by a purchase or transportation contract that limits sulfur to no more than 20 grains per 100 scf. Tennessee Pipeline qualifies for this exemption.

***40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines***

The proposed emergency generator will be considered “new” under Subpart ZZZZ since the engine commenced construction after June 12, 2006. Therefore, the engine will only need to meet the provisions of 40CFR60 Subpart JJJJ.

**NOT APPLICABLE**

**45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration.**

The facility-wide potential-to-emit of the Station 118A compressor station is below the levels that would define the source as "major" under 45CSR14 and, therefore, the construction evaluated herein is not subject to the provisions of 45CSR14.

Classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

Station 118A shares the same SIC code as several other facilities owned by Tennessee Pipeline in the area. Therefore, the potential classification of the Station 118A facility as one stationary source any other facility depends on the determination if these stations are considered "contiguous or adjacent properties."

"Contiguous or Adjacent" determinations are made on a case by case basis. These

determinations are proximity-based, and it is important to focus on this and whether or not it meets the common sense notion of one stationary source. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; having a common endpoint or border.

The Station 118A natural gas compressor station is not located contiguous with, or directly adjacent to any other Tennessee Pipeline facility. The nearest Tennessee Pipeline facility (Station 119A) is approximately 2.25 miles away.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

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. Tennessee Pipeline included the following HAPs as emitted in substantive amounts in their emissions estimate: Benzene, Ethylbenzene, Acetaldehyde, Formaldehyde, Toluene, and Xylene. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

| HAPs | Type | Known/Suspected Carcinogen | Classification |
|---|---|---|---|
| **Formaldehyde** | VOC | Yes | Category B1 - Probable Human Carcinogen |
| **Benzene** | VOC | Yes | Category A - Known Human Carcinogen |
| **Ethylbenzene** | VOC | No | Inadequate Data |
| **Acetaldehyde** | VOC | Yes | Category B2 - Probable 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 from the proposed Station 118A compressor station are less than applicability thresholds that would define the proposed facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed construction, modeling was not required under 45CSR13, Section 7.

## MONITORING AND TESTING OF OPERATIONS

The permittee shall monitor and record the following:

* Monthly operating hours of the compressor turbine (118-CT-01) and the Emergency Generator (118-EG-03).

* Monthly operating hours of the compressor turbine (118-CT-01) at less than 50% load.

* Monthly operating hours of the compressor turbine (118-CT-01) at less than 0°F.

* Monthly number of compressor turbine (118-CT-01) startup and shutdown cycles.

* Per §60.4243(b)(2)(i) for the emergency generator, the permittee will have to "keep a maintenance plan and records of conducted maintenance and must..."

The permittee shall perform the following tests:

* Testing to determine the emission rates of $NO_x$, CO and VOCs from the emergency generator per §60.4244.

* Testing to determine the $NO_x$ emissions from the new turbine (E04) per §60.4400(a).

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-3232 for the construction of a compressor station near Charleston, Kanawha County, be granted to Tennessee Pipeline Company, LLC.

_____
Roy F. Kees, P.E.
Engineer - NSR Permitting

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Date