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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2149D
Plant ID No.:	051-00100
Applicant:	Columbia Gas Transmission, LLC
Facility Name:	Adaline Compressor Station
Location:	Near Cameron, Marshall County
SIC/NAICS Codes:	486210/4922
Application Type:	Modification
Received Date:	March 8, 2018
Engineer Assigned:	Joe Kessler
Fee Amount:	$3,500 (General, MACT Fees)
Date Received:	March 9, 2018 ($1,000) March 26, 2018 ($2,500)
Complete Date:	March 29, 2018
Due Date:	June 27, 2018
Applicant's Ad Date:	February 12, 2018
Newspaper:	*Moundsville Daily Echo*
UTM's:	530.456 km Easting • 4,401.86 km Northing • Zone 17
Latitude/Longitude:	39.7656/-80.6442
Description:	Request to replace the existing glycol dehydration units' (GDU) 2.5 mmBtu/hr flare with a larger 6.0 mmBtu/hr enclosed flare. Additionally, this permitting action will bring in requirements of 40 CFR 63, Subpart HHH on the GDUs/flare.

Columbia Gas Transmission, LLC's (CGT) Adaline Compressor Station was constructed in the early 1950's and was, therefore, at the time the minor and major source permitting rules (45CSR13, and 45CSR14/19, respectively) were promulgated, considered a grandfathered source. However, since that time the station has undergone several modifications and has been the subject of various permitting actions. To place the current application in context, the following will summarize each of these previous substantive permitting actions.

- On April 23, 1991, Permit Number R13-1339 was issued to CGT for the installation of three (3) 2.5 mmBtu/hr flares (two ow which seemed to have been removed at some point) to control emissions from three (3) dehydration units which were added without permits in 1984 and 1985;

- On April 10, 1997, Permit Number R13-1339A was issued to CGT for: (1) a redefining of the emission sources as three dehydrators rather than the emission control flare and (2) revising the technical basis used to estimate emissions from the GDUs;

- On October 20, 1997, Permit Number R13-2149 was issued to CGT to increase the annual operating hours of the GDUs from 5,000 to 8,760. This permit incorporated the requirements of, and therefore superceded and replaced, Permit Number R13-1339A;

- On August 3, 1998, Permit Number R13-2149A was issued to CGT for the installation of a 440 horsepower (hp) Waukesha Model VGF18GL 4-stroke lean burn (4SLB) emergency generator;

- On May 30, 2001, a Class I Administrative Update was issued to CGT as Permit Number R13-2149B to add new specific requirements to the existing flare to assure that it was federally enforceable; and

- On January 13, 2010, a Class II Administrative Update was issued to CGT as Permit Number R13-2149B to replace the three (3) reboilers servicing the dehydration units at the station with new units.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility

CGT's Adaline Station is located approximately 5.93 miles southwest of Cameron, Marshall County, WV. The station receives natural gas via pipeline from an upstream compressor station, compresses it using natural gas-fired turbines and reciprocating internal combustion engines (RICE), and then transmits it via pipeline to a downstream station. Adaline is defined as a natural gas transmission and storage facility that transports or stores natural gas prior to entering the pipeline to a local distribution company or to a final end user. The station's compression stock currently consists of:

- Three (3) 880 hp natural gas-fired Clark HRA-8 2SLB compressor engines (installed in 1954 and 1956);

- Two (2) 2,000 hp natural gas-fired Clark TLA-6 2SLB compressor engines (installed in 1961); and

- One (1) 1,080 hp natural gas-fired Solar Saturn T-1001 compressor turbine (installed in 1966).

Auxiliary equipment at the facility includes one (1) 440 hp natural gas-fired Waukesha F3521GL emergency generator (1998), one (1) 1.00 mmBtu/hr natural gas-fired line heater (1956), one (1) 3.48 mmBtu/hr natural gas-fired heating system (1961), three (3) 117 mmscf/day GDUs (1984 and 1985) and controlled by one (1) 2.5 mmBtu/hr flare (1991), three (3) 0.55 mmBtu/hr natural gas-fired reboilers (2010), and numerous storage tanks for various low vapor-pressure liquids.

Proposed Modifications

CGT is now proposing to remove the existing 2.5 mmBtu/hr Natco flare (FLLP1) associated with the three existing dehydration units and replace it with a new 6.0 mmBtu/hr ETI enclosed flare (FLLP2). There are no proposed changes to the GDUs and the minimum destruction and removal efficiency (DRE) of the existing flare (98%) will remain the same with the new flare.

SITE INSPECTION

Due to the nature of the modification, the writer deemed a site inspection as not necessary. The Adaline Compressor Station was last "Full-On-Site" inspected by DAQ Compliance/ Enforcement (C/E) Inspector Mr. Greigory Paetzold on March 28, 2017. Based on that inspection, the facility was determined to be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

CGT included in Attachment N of the permit application air emissions calculations for the new enclosed flare proposed in this permitting action. The following will summarize the calculation methodologies used by CGT to calculate the potential-to-emit (PTE) of the new flare.

New Flare Combustion Exhaust Emissions

Emissions created from the combustion of the hydrocarbons (coming from the GDU Still Vents) at the enclosed flare (FL2) were based on emission factors provided for natural gas combustion as given in AP-42 Sections 13.5 (CO, NO_x, and VOCs) and 1.4 (particulate matter and total HAPs). While Section 1.4 of AP-42 is primarily intended for estimating emissions from boilers combusting natural gas, in the absence of other factors, it can be used to conservatively estimate the nominal amounts of expected combustion emissions from various pollutants from enclosed flares. Hourly emissions were based on the capacity of the unit (6.0 mmBtu/hr) and annual emissions were based on an annual operation of 8,760 hours. A waste gas heat content value of 1,020 Btu/ft^3 was used in the calculations.

Emissions Summary

Based on the above estimation methodologies, the change in annual facility-wide PTE as a result of the modifications and the new facility-wide PTE are given in the following table:

Table 1: Post-Modification and Change in Facility-Wide Annual PTE (tons/year)

Pollutant	Existing(1)	New Flare	Removed Flare	Post-Mod Facility-Wide	Change
CO	137.11	8.15	-4.05	141.21	4.10
NO_X	851.76	1.79	-0.74	852.81	1.05
$PM_{2.5}/PM_{10}/PM$(2)	10.07	0.20	-0.08	10.19	0.12
SO_2	0.27	0.02	-0.01	0.28	0.01
VOCs	42.42	17.34	-0.15	59.61	17.19
Formaldehyde	15.06(3)	~0.00	~0.00	15.06	~0.00
HAPs	20.33	0.05	-0.02	20.36	0.03

(1) Emissions taken from R30-05100100-2017Fact Sheet.
(2) Includes condensables.
(3) As an individual HAP has a PTE over 10 TPY, the Adaline Compressor Station is defined as a major source of HAPs for purposes of 40 CFR 61, 40CFR63, and Title V.

REGULATORY APPLICABILITY

This section will address the potential regulatory applicability/non-applicability of substantive state and federal air quality rules relevant to the emission units/sources proposed to be substantively modified at the Charleston Sanitary Landfill.

45CSR6: To Prevent and Control Particulate Air Pollution from Combustion of Refuse

CGT has proposed enclosed flaring for control of the waste gas produced from the GDUs. The enclosed flare meets the definition of an "incinerator" under 45CSR6 and is, therefore, subject to the requirements therein. The substantive requirements applicable to the enclosed flare are discussed below.

45CSR6 Emission Standards for Incinerators - Section 4.1

Section 4.1 limits filterable PM emissions from incinerators to a value determined by the following formula:

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is as indicated in Table I below:
Table I: Factor, F, for Determining Maximum Allowable Particulate Emissions

Incinerator Capacity	Factor F
A. Less than 15,000 lbs/hr	5.43
B. 15,000 lbs/hr or greater	2.72

Based on the maximum capacity of the enclosed flare of ~6,000 scf/hr (MDHI of 6.00 mmBtu/hr and a waste heat content of 1,020 Btu/scf), and using the density of methane (0.0422 lb/scf) as a reasonable surrogate, the capacity of the flare in lbs/hr would be approximately 253 lbs/hour (0.13 tons/hr). Using this value in the above equation produces a PM emission limit of 0.69 lb/hr. Conservatively using AP-42 Section 1.4 natural gas emission factors (see above), total PM (conservatively including condensables) from the enclosed flare was estimated to be 0.04 lbs/hr, which is in compliance with the 45CSR6 limit.

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 modification of the Adaline Compressor Station does not result in a net increase to the facility-wide PTE of a regulated pollutant in excess of the thresholds that would, pursuant to §45-13-2.17, define the changes as a "modification" under 45CSR13 (see Table 1 above). However, under Section 2.24 of 45CSR13, included in the definition of a "stationary source" is any facility that "is subject to any substantive requirement of an emission control rule promulgated by the Secretary." Based on long-standing DAQ policy and the "dual-definition" of a source, this test is also applied to proposed changes to determine if they meet the definition of modification. In the case of the proposed new flare, it does trigger a substantive requirement of 45CSR6 and, therefore, the changes are defined as a modification. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, the CGT is required to obtain a permit under 45CSR13 for the modification of Adaline Compressor Station.

As required under §45-13-8.3 (“Notice Level A”), CGT placed a Class I legal advertisement in a “newspaper of *general circulation* in the area where the source is . . . located.” The ad ran on February 12, 2018 in the *Moundsville Daily Echo* and the verification that this legal advertisement ran was submitted on March 9, 2018.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (Not Applicable)

Adaline Compressor Station is located in Marshall County, WV. Marshall County is classified as "in attainment" with all National Ambient Air Quality Standards (NAAQS) except for, in certain tax districts (Washington, Clay, and Franklin), SO_2. The Liberty Tax District, where Adaline is located, however, is classified as “in attainment" with all the NAAQs. Therefore, applicability to major New Source Review (NSR) for all pollutants is determined under 45CSR14.

As the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all criteria pollutants is 250 TPY. As given above in Table 1, the existing facility-wide PTE of Adaline is greater than 250 TPY for NO_x. Therefore, the existing facility is defined as a "major stationary source" under 45CSR14.

Therefore, to determine if the proposed changes are defined as a "major modification" to the Adaline Compressor Station, pursuant to §45-14-3.4(a), the project is examined under a two-step applicability test: "[A] project is a major modification for a regulated NSR pollutant if it causes two types of emissions increases -- a significant emissions increase (as defined in subsection [§45-14-2.75]), and a significant net emissions increase (as defined in subsections [§45-14-2.46] and [§45-14-2.74]). The proposed project is not a major modification if it does not cause a significant emissions increase. If the proposed project causes a significant emissions increase, then the project is a major modification only if it also results in a "significant net emissions increase."

Therefore, for the proposed changes to meet the definition of a major modification, the flare replacement project must alone result in a significant emissions increase. Based on the projected emissions increase of the flare replacement project (given under Table 1) being less than the thresholds that would define the project as "significant," the proposed changes are not defined as a "major modification" and 45CSR14 does not apply.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The Adaline Compressor Station meets the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. Therefore, the facility is subject to 45CSR30. The facility was last issued a Title V permit on March 14, 2017. Changes authorized by the proposed permit must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

40 CFR 63, Subpart HHH: National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities

Subpart HHH is the federal Maximum Achievable Control Technology (MACT) that applies to owners and operators of natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company), and that are major sources of HAPs emissions. CGT's Adaline facility is a major source of HAPs (see Table 1 above) and is defined as a natural gas transmission and storage facility that meets the above description. Therefore, applicable affected sources at the Adaline Compressor Station are subject to Subpart HHH.

The GDUs are defined as affected facilities (specifically as "large glycol dehydration units") and are already subject to Subpart HHH with the full suite of applicable requirements given under the Title V permit (Section 7.0 - pp. 33). The substantive emission standards for large glycol dehydration units are given as an either/or compliance choice under §63.1275(b)(1)(i) and (ii). CGT has chosen to comply with the standards given under (ii): *"The owner or operator of a large glycol dehydration unit shall connect the process vent to a control device or a combination of control devices through a closed-vent system and the outlet benzene emissions from the control device(s) shall be less than 0.90 megagrams per year. The closed-vent system shall be designed and operated in accordance with the requirements of §63.1281(c). The control device(s) shall be designed and*

operated in accordance with the requirements of §63.1281(d), except that the performance requirements specified in §63.1281(d)(1)(i) and (ii) do not apply."

Therefore the proposed new enclosed flare used for controlling the GDU regenerator overheads shall be also subject to the applicable control device requirements given specifically under §63.1281(d). The annual emissions of benzene from the existing GDUs will remain unchanged at 0.75 TPY and therefore the compliance status of Subpart HHH shall remain unchanged.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the proposed compressor engines and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

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. All HAPs may have both carcinogenic and 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*.

The proposed changes evaluated herein do not substantively increase the emissions of any non-criteria regulated pollutants at the facility.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the modification are less than applicability thresholds that would define the proposed modification as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature and location of the proposed source, an air quality impacts modeling analysis was not required under §45-13-7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR) on the proposed new flare are as given under 40 CFR 63, Subpart HHH.

PERFORMANCE TESTING OF OPERATIONS

The performance testing requirements on the proposed new flare are as given under 40 CFR 63, Subpart HHH.

CHANGES TO PERMIT R13-2149C

The substantive changes made to Permit R13-2149C are as follows:

- Emission Units Table 1.0 was revised with the changes proposed herein; and
- Section 7.0 of the draft permit was re-written to reflect the Subpart HHH applicability to operation of the GDUs and flare. Most of the non-Subpart HHH MRR was removed from the permit. However, only applicability to Subpart HHH was specified in the permit - the existing Title V permit has a detailed list of cited Subpart HHH requirements and it was not necessary to duplicate in the draft permit.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-2149D to the Columbia Gas Transmission, LLC for the proposed modification of the Adaline Compressor Station located near Cameron, Marshall County, WV.

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Joe Kessler, PE
Engineer

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Date