



TO James D. Rebarchak *4/18/19*
Manager, Regional Air Quality Program
Southeastern Regional Office

FROM David S. Smith *(DSS) 4/18/19*
Facilities Permitting Section
Air Quality Program

THROUGH Janine Tulloch-Reid, P.E. *(JTR) 4/18/2019*
Manager, Facilities Permitting Section
Air Quality Program

DATE April 18, 2019

RE Plan Approval Technical Review Memo
Application No. 09-0242
Adelphia Pipeline Company, LLC – Quakertown Compressor Station
West Rockhill Township
Bucks County
APS No.: 969182, AUTH No.: 1230871

1. Introduction

On May 16, 2018, Adelphia Pipeline Company, LLC (Adelphia) submitted a Plan Approval application to the Department of Environmental Protection (DEP), for construction and operation of a new Natural Gas Compressor Station – the Quakertown Compressor Station (Quakertown CS), located at West Rockhill Township, Bucks County.

Quakertown CS is a natural gas transmission facility, with a Standard Industrial Classification (SIC) Code 4922 and regulated by the Federal Energy Regulatory Commissions (FERC).

The application was received in triplicate, along copies of compliance review form, general information form, and application fee. The delivery confirmation for the municipal and county notifications was received on May 24, 2018. The application was considered administratively complete on June 5, 2018.

On August 30, 2018, DEP emailed the technical deficiencies of the application to Adelphia requesting clarification and additional information regarding this application (See Appendix A - Technical Deficiencies and Responses). Adelphia's initial responses to DEP's deficiency email was received on September 14, 2018; subsequently, Adelphia provided additional information for this application from October 25, 2018 through January 25, 2019.

Listed below is a summary:

Administrative/Notifications

<i>Application Received:</i>	<i>May 16, 2018</i>
<i>Application Fee:</i>	<i>\$1,700 along with Application</i>
<i>Municipal notification Confirmation:</i>	<i>May 24, 2018</i>
<i>Administratively Complete:</i>	<i>June 5, 2018</i>
<i>Technical Deficiency Email:</i>	<i>August 30, 2018</i>
<i>Responses to Tech Deficiency Received:</i>	<i>September 14, 2018</i>
<i>Additional Information Received:</i>	<i>October 25, 2018 -January 25, 2019</i>
<i>Public Notification:</i>	<i>November 3, 2018</i>

2. Project Description

2.1 Project Scope

The proposed Quakertown CS to be constructed at the current TETCO Interconnect site (See Appendix B – Site Plan) will compress pipeline natural gas from the interstate pipelines (either the existing TETCO or IEC Pipelines) and transport to the downstream customers along the transmission system. In addition, a new metering station will be constructed at this site.

The proposed facility is designed for 250 million cubic feet per day (mmcf/d) throughput capacity (daily maximum: 375 mmcf/d) with provisions for expanding to 350 mmcf/d (daily average throughput capacity) by installing an additional compressor (as shown in Appendix B – Plot Plan), or constructing a new midpoint compressor station.

The process flow for Quakertown CS is as follows:

- 1) Pipeline quality natural gas enters the station and flows through a suction filter separator and into station suction piping;
- 2) Three (3) units of reciprocating compressors compress natural gas from 820 psig to 1020 psig; and
- 3) The compressed natural gas flows into the discharge header, continues through a coalescing filter and exits the station that delivers natural gas to various downstream customers.
- 4) This project also includes constructing a new natural gas metering station at this site. Natural gas will be measured before entering the pipeline system.

The application indicates that at Quakertown CS:

- There are no cooling process and/or equipment installed as cooling for natural gas is not required.

- There is no glycol dehydration unit as part of this project. The glycol is exclusively used with an engine cooling system.
- All pneumatic controllers at Quakertown CS are air driven. Therefore, there are no air pollutant emissions associated with their operation. Please note that within the Metering Stations, some pneumatic controller maybe natural gas driven.

2.2 Source Aggregation

According to the Department's Guidance for Performing Single Stationary Source Determinations for Oil and Gas Industries (Docket 270-0810-006), the source aggregation analysis is based on the following three factors to determine whether emission sources should be aggregated:

- (1) the sources all belong to the same industrial grouping;
- (2) the activities are located on one or more contiguous or adjacent properties; and
- (3) the activities are under common control.

The proposed Quakertown CS is sited partially within the boundaries of, or adjacent to, the existing Quakertown Metering (M&R) Station. The existing Quakertown M&R Station, which would be under the control of Adelphia, consists of piping components and a small exempt emergency generator. The new proposed meter station consists of additional piping components and fugitive emissions. As a result of the above-described analysis, it is determined that the proposed Quakertown CS shall be aggregated with the existing Quakertown and the new M&R Stations but not with any other sources.

2.3 Program Coordination

This project is not in coordination with any other Department programs.

3. Emission Sources and Regulations

Quakertown CS is designed to have the following equipment and processes.

3.1 Compressors and Compressor Engines (Source IDs 101 – 103)

Adelphia will install three (3) identical units of reciprocating compressors, as indicated below:

Rated capacity:	125 mmcf/d each
operating range:	820 psig to 1020 psig
proposed operating hours:	8760 hours per year (hr/yr) for each unit

Each compressor is powered by a spark ignition (SI) Engine (3 identical units):

manufacturer/model:	Caterpillar G3606, stationary spark ignition
rated capacity:	1,875 bhp each, 4-stroke, lean burn
fuel consumption:	natural gas, 13,955 standard cubic feet per hour (SCF/hr)
proposed operating hours:	8760 hr/yr for each engine
engine emission control:	each engine with an oxidation catalytical unit
post-control emissions:	meeting BAT standards [Section C1(c)(i), GP5]

Adelphia uses oxidation catalytical units (Source IDs C101 – C103) for compressor engine emission control:

manufacturer/model:	DCL America, Inc. Model No. DC66-18CC (or equivalent), 3 units
flowrate capacity:	11,972 cfm
inlet temperature of gas flow:	847 °F
pressure drop across the unit:	less than 3.6 inches of water
emission performance guarantee:	meeting the BAT standards

40 CFR Part 60 Subpart OOOOa — *Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015.*

The reciprocating compressors at this facility (a natural gas compressor station) are subject to the applicable requirements of this subpart in accordance with §60.5365a(c). **The facility elects the option of “replacing the reciprocating compressor rod packing” as specified in 40 CFR §60.5385a(a)(1) or (2), to demonstrate their compliance status with the GHG and VOC standards of this subpart.** The respective requirements for the compressor rod packing pursuant to 40 CFR Part 60 Subpart OOOOa have been incorporated.

40 CFR Part 60 Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

The compressor engines, stationary spark ignition (SI) internal combustion engines (ICE), **are** subject to the applicable requirements of this subpart in accordance with §60.4230(a).

40 CFR Part 63 Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The compressor SI engines are subject to 40 CFR Part 63 Subpart ZZZZ (as new area sources). **The facility elects to fulfill the applicable Subpart ZZZZ requirements by complying with the standards of 40 CFR Part 60 Subpart JJJJ in accordance with 40 CFR §63.6590(c).**

Best Available Technology (BAT) Standards

For the compressor SI engines, the Department BAT standards as specified in Section C Condition 1 (c)(i), of General Plan Approval and/or General Operating Permit BAQ-GPA/GP-5 (GP5), for lean burn SI engines constructed after August 8, 2018 (500 hp < engine < 2370 hp), were used as the baseline for BAT standards. These standards are shown below:

CO (Carbon Monoxide):	0.25 g/bhp-hr
NO _x (Nitrogen Oxides):	0.5 g/bhp-hr
VOCs (NMNEHC as propane, excluding HCHO):	0.25 g/bhp-hr
HCHO (Formaldehyde):	0.05 g/bhp-hr

According to the manufacturer's specifications for the oxidation catalytical units (Source IDs C101 – C103), post-control emissions of the compressor engines **meet** the above BAT standards. In addition, Adelphia is required to conduct post-construction testing for the compressor engines to ensure that the emission standards are being met.

25 Pa. Code §§ 129.203 - 129.205 (Additional NO_x Requirements)

The compressor engines are subject to the applicable requirements of 25 Pa. Code §§129.203 through 129.205, as the engines are rated at greater than 1,000 horsepower and located in Bucks County.

3.2 Pigging Operations (Source ID 300)

Purpose of the pigging operations at Quakertown CS is to:

- clean the pipeline by sweeping any liquid out of the line to improve overall flow efficiency; and
- conduct in-line inspections of natural gas pipelines.

This is accomplished by inserting a pig into a "pig launcher"— an oversized section in the pipeline, reducing to the normal diameter. The launching station is then closed and the pressure-driven flow of the natural gas in the pipeline is used to push the pig along down the pipe until it reaches the receiving trap — the "pig receiver".

The application indicates that Quakertown CS conducts the pigging operations based on the following schedule:

- cleaning the pipeline, annually.
- conducting inspections, once every 5-7 years.

The estimated gas volume from the pigging operations are:

16,000 scf per year for Quakertown CS

BAT standards

There are no requirements in 40 CFR Part 60 Subpart OOOOa established for the pigging operations. Therefore, the Department BAT standards for pigging operations as specified in Section K of GP5 were established for Quakertown Pigging Operations. The conditions are as follows:

The emissions from pigging operations shall not exceed the following limits, as a 12-month rolling sum:

Methane:	200 tons/year, or
VOC:	2.7 tons/yr or
A single HAP:	0.5 tons/yr, or
Combined total HAPs:	1.0 tons/yr

3.3 Fugitive Emissions Components (Source ID 400)

Fugitive emissions components at Quakertown CS are any component that has the potential to emit fugitive emissions of methane or VOC as specified in 40 CFR §60.5430a, including but not limited to:

- compressor rod packing and seal leaking,
- engine crankcase,
- natural gas pipeline valves, connectors, flanges,
- pressure relief devices, emergency shutdown,
- activities at two metering stations, and pipeline valve/connectors, and flanges,
- any maintenance activities.

The permittee shall comply with the applicable monitoring, recordkeeping, reporting, and work practice standards as specified in 40 CFR Part 60 Subpart OOOOa and the BAT requirements as specified in Section G of GP5.

3.4 Two Emergency Generator SI Engines (Source IDs 600 and 601)

The following SI engines for emergency generator sets are permitted as “exempt engines” in this Plan Approval:

- A SI engine for Cummins GTA28 Emergency Generator Set
 - generator engine: 4 stroke, rich-burn engine, Caterpillar G3412C
 - rated capacity: 701 bhp (670 hp)
 - engine fuel: natural gas, 5,699 SCF/hr
 - operating hours: 500 hr/yr proposed by Adelphia
 - control device: a non-selective catalytical reduction unit
 - post-control emissions: meeting NSPS Subpart JJJJ emission standards

Testing is required for the compressor SI engines to ensure that the emission standards are being met.

- Existing SI engine for Generac Emergency Generator Set (Model: CorePower)
 - generator engine: Generac Power System
 - rated capacity: 14.8bhp
 - engine fuel: natural gas, 148.0 SCF/hr
 - operating hours: 500 hr/yr proposed by Adelphia

In accordance with the DEP document, 275-2101-003 / August 8, 2018:

“25 Pa. §127.14(a)(8) Item 6: Internal combustion engines regardless of size, with combined NOx emissions less than 100 lbs/hr, 1000 lbs/day, 2.75 tons per ozone season and 6.6 tpy on a 12-month rolling basis for all exempt engines at the site.”

The above exempt limitations are placed in the Plan Approval as well as the applicable requirements of 40 CFR Part 60 Subpart JJJJ and Part 63 Subpart ZZZZ. **Adelphia elects to fulfill the applicable Subpart ZZZZ requirements by complying the Subpart JJJJ standards.**

3.5 Insignificant Emission Sources

DEP has determined that emissions from the following sources are of insignificant size and do not require additional limitations.

3.5.1 Produced Fluids Tank

Capacity:	1,000 gallons
Vapor pressure of liquid of the tank:	<1.5 psia
Total throughput:	24,000 gallons/year

3.5.2 Engine Oil Tank

Capacity:	500 gallons
Vapor pressure of liquid of the tank:	negligible
Total throughput:	6,000 gallons/year

3.5.3 Triethylene Glycol (TEG) Tank

Capacity:	500 gallons
Vapor pressure of liquid of the tank:	negligible
Total throughput:	6,000 gallons/year

These vessels **are not** subject to the regulations and requirements as identified below:

40 CFR Part 60 Subpart OOOOa

The potential-to-emit (PTE) VOC emissions from each storage vessel are significantly less than 6 tons per year. In accordance with §60.5395a(e), all storage vessels at Quakertown CS are not subject to this subpart.

40 CFR Part 60 Subparts K and Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids

- 40 CFR Part 60 Subpart K and Ka apply to storage tanks constructed, reconstructed, or modified prior to 1978 and 1984, respectively. All storage vessels at Quakertown CS are constructed after these dates; therefore, the requirements of Subparts K and Ka do not apply.
- 40 CFR Part 60 Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m³ (~19,813 gallons). All storage vessels at Quakertown CS do not have a capacity greater than 75 m³. Therefore, Subpart Kb does not apply.

25 Pa. Code §129.56: Storage tanks greater than 40,000 gallons capacity containing VOCs.

25 Pa. Code §129.57: Storage tanks less than 40,000 gallons capacity containing VOCs.

- These storage vessels are not subject to 25 Pa. Code §129.56 as the capacity of each vessels is less than 40,000 gallons.
- These storage vessels are not subject to 25 Pa. Code §129.57 as the provisions of this section apply to above ground stationary storage tanks with a capacity equal to or greater than 2,000 gallons.

BAT Standards

Based on the Plan Approval application, the combined PTE VOC emissions from all storage vessels at Quakertown CS are significantly less than 2.7 tons per year. Thus, these storage vessels are not subject to the standards in Section E of GP5.

In accordance with the DEP document, 275-2101-003 / August 8, 2018, these storage vessels are exempt from the Plan Approval requirements:

1. *25 Pa. §127.14(a)(8) Item 15: storage vessels for VOC [which do not contain HAP] which have capacities less than 10, 000gallons....., and*
2. *25 Pa. §127.14(a)(8) Item 31: Sources of uncontrolled VOC emissions not addressed elsewhere in this exemption listing modified or newly added, such that emission increases are less than 2.7 tpy.*

3.5.4 Pneumatic Controllers

All pneumatic controllers at Quakertown CS will either be air driven. Accordance with §60.5365a(d)(1); therefore, these units **are not** subject to 40 CFR Part 60 Subpart OOOOa.

Quakertown CS is **not** subject to the following regulations, as indicated below:

40 CFR Part 63 Subpart HH — National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities

Subpart HH – NESHAP for natural gas production facilities applies to glycol dehydration units at natural gas production facilities that are major or area sources of HAP emissions prior to custody transfer to the transmission pipeline. The proposed project would be located after custody transfer. Therefore, the proposed Marcus Hook CS would not be a natural gas production facility as defined by the rule, and this subpart would not be applicable.

40 CFR Part 63 Subpart HHH – Natural Gas Transmission and Storage Facilities

This subpart applies to glycol dehydration units at natural gas transmission and storage facilities that are major sources of HAP emissions. Quakertown CS is an area source of HAP emissions; therefore, Quakertown CS is not subject to Subpart HHH.

40 CFR Part 98 — Mandatory Greenhouse Gas Reporting

The facility's Greenhouse Gases (GHG) potential-to-emit is 34,000 tons per year carbon dioxide equivalent (CO₂e), less than the GHG Title V threshold level of 75,000 ton/yr CO₂e. Furthermore, the facility is not listed as a source category in Table A-3 (40 CFR § 98.2(a)(1)), Table A-4 (40 CFR § 98.2(a)(2)) or Table A-5 (40 CFR § 98.2(a)(4)) of 40 CFR Part 98 Subpart A. Therefore, Quakertown CS is not a Major facility for GHG emissions and is not subject to the standards of 40 CFR Part 98.

4. Emission Limits

The potential-to-emit (PTE) emissions calculations for this facility are shown below.

Table 4.1 PTE Emissions from Compressor Engine and Emergency Engine Operations

Pollutant	3 Compressor Engines ¹⁾ Source IDs 101 - 103		Cummins Emergency Engine ²⁾ Source ID 600		Generac Emergency Engine ²⁾ Source ID 601	
	Emission factors (g/bhp-hr)	Emissions (ton/yr)	Emission factors (g/bhp-hr)	Emissions (ton/yr)	Emission factors (g/bhp-hr)	Emissions (ton/yr)
NOx	0.30	16.30	2.0	0.77	6.0 ³⁾	<0.05
VOC ³⁾	0.16	8.69	1.0	0.39	6.0 ³⁾	<0.05
CO	0.17	9.47	4.0	1.54	455	3.70
HCHO	0.04	2.06	0.02	0.01	-	-

- 1): Operating hour: 8760 hr/yr for each compressor SI engine.
- 2): Operating hour: 500 hr/yr.
- 3): VOC includes HCHO.

Table 4.2 Facility-wide PTE Emissions (tons/yr) ¹⁾

Pollutant	Leaks & Fugitive Emissions ²⁾	Compressor Engines Operation	Compressor Engines Crankcase	ID 600 Engine Operation	ID 601 Engine Operation	Combined Total Emissions
NOx	-	16.30	0.77	0.77	<0.08	17.92
VOC ³⁾	7.42	10.86	4.46	0.42	0.002	23.16
CO	-	9.47	1.54	1.54	0.14	12.69
HCHO	-	2.16	0.01	0.01	-	2.18

- 1): This emission estimate is based on the facility design capacity, manufacturer's emission factors and/or specifications, AP-42 emission factors (Fifth Edition), and facility operating parameters.
- 2): The emissions from all *fugitive emissions components* as defined in 40 CFR §60.5430a of Subpart OOOOa and GP5 (see Appendix C for detailed calculations).
- 3): VOC includes HCHO.

DEP has established the following:

a. facility-wide emission limits from all emitting sources, calculated as a 12-month rolling sum:

Nitric Oxides (NOx):	24.9 tons per year
Volatile Organic Compounds (VOCs):	24.9 tons per year
Individual Hazardous Air Pollutant (HAP):	9.9 tons per year
Total HAPs:	24.9 tons per year

Tons per year = Tons per 12-month rolling period, calculated monthly.

HCHO = Formaldehyde.

NMNEHCs = Non-methane, non-ethane hydrocarbons, as propane, excluding HCHO.

b. the combined emission limits for the three (3) compressor engines:

<u>Pollutant</u>	<u>ton/yr (as a 12-month rolling sum)</u>
Carbon Monoxide (CO):	9.47
Formaldehyde (HCHO):	2.06
Nitrogen Oxides (NOx):	16.30
NMNEHCs (non-methane hydrocarbons):	8.69

Quakertown CS is a State-only (not a Major) facility as their NOx and VOC emissions are below the threshold level of 25 tons per year, respectively. Potential-to-emit HAP emissions are also below the threshold levels, 10 ton/yr for any single HAP emissions and 25 ton/yr for combined total HAP emissions. Thus, Quakertown CS is an area source for HAP emissions.

5 Additional Requirements and Analysis

5.1 New Source Review (NSR)

The VOC and NOx emissions from the proposed project at Quakertown CS are below the threshold of 25 tons respectively. Therefore, the Marcus Hook CS is not considered a major facility, and NSR does not apply.

5.2 Best Available Technology (BAT) Determination

BAT is a pollutant specific determination and each plan approval application is required to demonstrate that the emissions from the new source will be the minimum attainable through the use of a BAT analysis as per 25 Pa. Code §127.12(a)(5). In accordance with the Department's definition of BAT, Adelphia has conducted such an analysis and researched the following databases: EPA's NSR website, RBLC database, technical books and articles, vendor information, and various state and federal regulations and documents.

5.3 Testing

Testing is required for the compressor engines and Cummins Emergency Engine (Source ID 600) to ensure that the emission standards are being met.

5.4 Monitoring, recordkeeping, and implementation

In accordance with the requirements of 40 CFR § 60.18, sufficient monitoring and recordkeeping is required to be retained for a minimum of five (5) years.

6. Recommendation

I recommend issuing Plan Approval, No. 09-0242, to Adelphia – the Quakertown Compressor Station, located at West Rockhill Township, Bucks County, based on the above conditions.

7. Listing of Appendices

Appendix A – Technical Deficiencies and Responses

- A1 – Identified Technical Deficiencies
- A2 – Revised Application Form
- A3 – Revised Emission Calculations
- A4 – General Responses from Adelphia

Appendix B – Diagrams

- B1 – Site Plan
- B2 – Plot Plan

Appendix C – Leaks and Fugitive Emissions Calculation