COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southwest Regional Office

MEMO

TO Air Quality Permit File TVOP-30-00077

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SUBJECT Review of Application for Title V Operating Permit Renewal
Holbrook Compressor Station
Texas Eastern Transmission, LP
Richhill Township, Greene County

BACKGROUND

Holbrook Station is a natural gas transmission compressor station, part of a system used to transport natural gas to the Northeastern and Mid-Atlantic states via an underground piping system that originates in the Gulf Coast region of the United States. Prior to 2008, the primary sources at the facility included eight (8) 1350 horsepower Cooper Bessemer GMV-10S engines (installed in 1956), four (4) 1350 hp Cooper Bessemer GMVA-10 Engines (installed in 1957), five (5) 2000 hp Ingersoll Rand KVS-412 engines (installed in 1958), and one 15,000 hp Solar Mars turbine (installed in 1990, uprated in 2005). Other sources at the site included two Caterpillar emergency generators and two pipeline liquids storage tanks.

Since January 26, 2009, two additional turbines, three fuel gas heaters, a remote reservoir parts washer and a Waukesha emergency generator have been installed. In addition, four Cooper Bessemer GMV-10S engines and one Ingersoll Rand KVS-412 internal combustion engine have been permanently disabled. See additional details below.

The initial TVOP was issued for this facility on July 5, 2000 with an expiration date of July 5, 2005. An administratively and technically complete TVOP Renewal application was received on January 8, 2005.

PREVIOUS AUTHORIZATIONS

In 1994, the 17 Engines and Turbine #1 were subject to the NOx and VOC Reasonably Available Control Technology (RACT) provisions of Title 25 Pa. Code § 129.91-95. After considering technically and economically feasible options for control of VOCs and NOx emissions, RACT for the existing equipment at this site was determined to be ignition retard for the eight (8) Cooper Bessemer GMV-10S Engines, maintenance and good operating practices for the four (4) Cooper Bessemer GMVA-10 Engines, installation of screw-in precombustion chambers on the five (5) Ingersoll RandKVS412 Engines, and the continued use of low NOx burners on Turbine #1, as originally approved in Plan Approval PA-30-399-004.

Turbine #1 was installed in 1990 under Plan Approval Plan Approval PA-30-399-004. At that time, dry low NOx (DLN) combustor technology was still in development. Plan Approval was issued with an allowable NOx emission rate of 125 ppm and 303 tons per year, with the provision that NOx emissions would be reduced to 42 ppm during the first overhaul, in 1994. (During the years between 1990 and 1994, operating hours of the five (5) 2000 hp Ingersoll Rand KVS-412 Engines were limited to 5,600 hours per year to offset the NOx emission increase attributable to Turbine #1) As a stationary gas turbine constructed after 1977 with a heat input greater than 10 MMBtu, the Solar Mars Turbine #1 was subject to the applicable requirements of 40 CFR Part 60 Subpart GG, Standards of Performance for Stationary Gas Turbines, and PA-30-399-004 was conditioned accordingly.

On April 21, 2005, Plan Approval PA-30-00077A was issued to allow TE to upgrade Turbine #1 Solar Model Mars 100-14000S to a Solar Model Mars 100-15000S turbine during a routine overhaul. The upgrade provided an additional an additional 1,000 hp, yet reduced allowable NOx emissions by 34 tons per year.

On January 26, 2009, Plan Approval PA-30-00077B was issued to allow TE to install a second Solar Mars 100-150002S III turbine rated at 15,000 hp, a fuel gas heater rated at 0.874 mmbtu/hr, and a remote reservoir parts washer. Additionally, TE permanently disabled four (4) of the Cooper Bessemer GMV-10S engines, which resulted in overall creditable decreases of NOX and VOCs.

On February 23, 2010, Plan Approval PA-30-00077C was issued to authorize the installation of a third Solar Mars 100-150002S III turbine rated at 13,300 hp, the installation of a Waukesha emergency generator, rated at 400 hp and operating less than 100 hours per year, the installation of two gas heaters rated respectively at 0.12 and 0.5 mmbtu/hr, and the permanent disablement of one existing Rand KVS-412 internal combustion engine. The turbine design incorporated dry low NOx (DLN) combustion technology along with oxidation catalyst to control emissions of Carbon Monoxide and Volatile Organic Compounds.

SOURCES, CONTROLS AND EMISSIONS

In accordance with RACT OP-30-000-307, NOx emissions from the RACT sources are minimized: through the use of ignition retard on the four remaining Cooper Bessemer GMV-10S engines; through maintenance and good operating practices on the four Cooper Bessemer GMVA-10 Engines; through the use of screw-in precombustion chambers on the four remaining Ingersoll RandKVS412 Engines. In accordance with Plan Approval PA-30-00077A, NOx emissions from Turbine #1 are minimized through the use of low NOx burners (LNB). In accordance with PA-30-00077B, emissions from Turbine #2 are minimized through the use of LNB and catalytic oxidation. Similarly, in accordance with PA-30-00077C, emissions from Turbine #3 are minimized through the use of LNB and catalytic oxidation. Emergency Generators #2 #3 and #4 are limited to 500 hours on a rolling 12-month basis.

Where appropriate, similar units at this facility have been grouped together under one source. Seven small boilers and heaters (all rated at <0.5 mmbtu/hr) have been consolidated under Source 126. All liquid storage tanks/pressure vessels have been consolidated under Source 123. Fugitive emissions from pipelines and truck loading areas are all included under Source 122.

Between September 14, 2004 and September 21, 2005, the Department exempted four Requests for Determination related to gas release event programs. These events have always been part of the routine operations at natural gas facilities. In order to safely do work such as expansions, maintenance and tie-ins on pipelines and equipment, all gas must occasionally be removed from different sections of the system. Not all of the events occur precisely on the Holbrook Station site; most are related to sections of pipelines that are upstream or downstream of the Holbrook Station. Nevertheless, TE has chosen to attribute all releases to the Holbrook Station. In this TVOP renewal application, TE has identified the releases as an additional source of emissions: Gas Release Events. These are now included in the TVOP as Source 130.

On February 17, 2009, DEP exempted from Plan Approval the installation of an emergency generator (rated at 880 hp and operating for no more than 100 hours per year) and two gas-fired space heaters (rated at 0.176 and 0.75 mmbtu/hr) with resulting emission increases of 0.2 tons of NOx per year, 0.17 tons of CO per year, and lesser amounts of other pollutants. These sources have been included in the proposed renewal TVOP.

In 2011, this facility had actual emissions of 141 tons NOx, 55 tons VOCs, 2.5 tons SOx, 7.9 tons PM10, 46.3 tons CO, 25.7 tons formaldehyde and 29.3 tons of all HAPs combined. The potential to emit for sources at this facility are shown below. This facility also has the potential to emit greater than 100,000 tons CO2e per year.

Potential to Emit
(Tons per year on a rolling 12-month basis)

ID and Source	NOx	VOCs	SOx	PM10	CO	Formal-Dehyde	All HAPs Combined
101 CB GMV-10S Engine	153	9	0.03	2.85	22.75	4.03	5.81
102 CB GMV-10S Engine	153	9	0.03	2.85	22.75	4.03	5.81
106 CB GMV-10S Engine	153	9	0.03	2.85	22.75	4.03	5.81
108 CB GMV-10S Engine	153	9	0.03	2.85	22.75	4.03	5.81
109 CB GMVA-10S Engine	59	9	0.04	2.85	22.75	4.03	5.81
110 CB GMVA-10S Engine	59	9	0.04	2.85	22.75	4.03	5.81
111 CB GMVA-10S Engine	59	9	0.04	2.85	22.75	4.03	5.81
112 CB GMVA-10S Engine	59	9	0.04	2.85	22.75	4.03	5.81
114 IR KVS-1-412 Engine	65	11	0.04	0.7	38.5	4.9	6.6
115 IR KVS-1-412 Engine	65	11	0.04	0.7	38.5	4.9	6.6
116 IR KVS-1-412 Engine	65	11	0.04	0.7	38.5	4.9	6.6
117 IR KVS-1-412 Engine	65	11	0.04	0.7	38.5	4.9	6.6
118 Mars Turbine 1	50	4.0	1.9	3.7	76	1.3	2.0
120 Emergency Generator #2	1.8	0.04	0.0	0.003	0.13	0.018	0.025
121 Emergency Generator #3	1.6	0.04	0.0	0.002	0.11	0.016	0.022
122 Fugitives	N/A	10.6	N/A	N/A	N/A	N/A	1.16
123 Tanks/Pressure Vessels	N/A	4.95	N/A	N/A	N/A	N/A	0.36
125 Solar Mars Turbine #2	30.12	2.03	1.9	3.7	9	0.1	0.37
126 Misc. Boilers and Heaters	1.0	0.05	0.005	0.07	0.67	0.007	0.02
127 Parts Washer	N/A	0.42	N/A	N/A	N/A	N/A	N/A
128 Solar Mars Turbine #3	30.12	2.03	1.9	3.7	9	0.1	0.37
Emergency Generator #4	0.09	0.02	N/A	N/A	0.08	0.008	0.01
130 Gas Release Events	N/A	59	N/A	N/A	N/A	N/A	5.03
TOTALS	**1,222.6**	**196.4**	**6.1**	**36.6**	**430.4**	**53.2**	**82.3**

REGULATORY ANALYSIS

The applicability of the following regulations has been considered.

40 CFR Part 60 Subpart GG, Standards of Performance for Stationary Gas Turbines

In accordance with 40 CFR 60.330, Turbine #1 (installed in 1990) is an affected facility for purposes of 40 CFR 60, Subpart GG as it is a stationary gas turbine constructed after October 3, 1977 but before February 18, 2005, with a heat input greater than 10 MMBtu. Therefore, Solar Mars Turbine #1 is subject to the applicable requirements of 40 CFR 60, Subpart GG. Subpart GG contains limits for NOx and SOx; however, the NOx and

SOx limits established through the Best Available Technology provisions of PA Code Title 25 §§ 127.1 127.12(a)(5) are more stringent than those contained in Subpart GG. Therefore, only the applicable testing, monitoring, recordkeeping and reporting requirements of Subpart GG have been included for Turbine #1.

40 CFR 60, Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

This rule applies to stationary combustion turbines installed after February 18, 2005. Turbines #2 and #3 (March 3, 2009 April 6, 2010, installed in under Plan Approvals PA-30-00077B and PA-30-00077C, are subject to this rule. The applicable emissions limitations, testing, monitoring, recordkeeping and reporting requirements have been included in the TVOP. Turbines meet the NOx emission standard established at 40 CFR 60.4320(a). In accordance with 40 CFR 60.4340(a), TE demonstrates compliance with NOx standard through periodic stack testing conducted in accordance with 40 CFR 60.4400.

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

The applicability of has been evaluated. The affected sources under Subpart HHH are glycol dehydration units. Since the Holbrook does not have any of these units, the facility is not subject to the requirements of the Subpart HHH.

40 CFR 63, Subpart YYYY – National Emissions Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

On March 5, 2004, EPA promulgated 40 CFR 63, Subpart YYYY. The Holbrook facility is a major source of HAPs, therefore the two new lean premix gas fired turbines (Turbines #2 and #3) could have been subject to this rule. However, on April 7, 2004, EPA published in the Federal Register a proposal to delist this subcategory of source from the source category list. On August 18, 2004, EPA published a final rule staying the effectiveness of 40 CFR 63, Subpart YYYY for this subcategory of source. DEP is not required to do a Case-by-Case MACT determination here, because EPA **did** promulgate a standard pursuant to the schedule established under section 112(c) of the Clean Air Act. Subpart YYYY establishes limits for formaldehyde. Using the Best Available Technology provisions of Title 25 Pa. Code § 127.12b, the formaldehyde limits contained in Subpart YYYY (91 ppmvd @ 15% O2) were included in the Plan Approvals as necessary conditions that assure the proper operation of Turbines #2 and #3 to meet BAT provisions of Title 25 Pa. Code § 127.1. These formaldehyde limits have been carried over to the TVOP.

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

The applicability of 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions has been evaluated. Finalized on June 15, 2004, this subpart establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

At the Holbrook facility, fifteen natural-gas fired engines that are RICE are currently in operation. The Station is also a major source of HAPs. Fourteen engines are rated at greater than 500 hp and have been installed at the facility since the 1950s. Emergency Generators #2 and #3, rated at 675 hp and 600 hp respectively, were installed in 1990 and 1995. Since these fifteen engines were installed before December 19, 2002, they are existing stationary RICE under 40 CFR § 63.6590(a)(1)(i).

In accordance with 40 CFR 63.6590(b)(3):

"The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions"

Therefore there are no applicable ZZZZ requirements for the nineteen existing stationary RICE.

Emergency Generator #4 is rated at 400 hp and was installed in 2010; it meets the definition of new stationary RICE under 40 CFR § 63.6590(a)(2)(ii). In accordance with 40 CFR § 63.6590(c)(6), this new emergency stationary RICE with a rating of less than 500 hp, located at a major source of HAPs, must meet the requirements of ZZZZ by complying with the requirements of 40 CFR 60, Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. These requirements were spelled out in Plan Approval PA-30-00077C, and have been carried over to the proposed TVOP.

40 CFR 63, Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

There eight small (less than 0.9 mmbtu/hr) boilers and process heaters at the Holbrook facility. As such, they meet the 40 CFR § 63.7575 definition of small gaseous fuel subcategory which "includes any size of firetube boiler and any other boiler or process heater with a rated capacity of less than or equal to 10 MMBtu per hour heat input that burn gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply emergencies, or for periodic testing of liquid fuel. Periodic testing is not to exceed a combined total of 48 hours during any calendar year."

In accordance with 40 CFR § 63.7506(c)(3-4):

"The affected boilers and process heaters listed in paragraphs (c)(1) through (4) of this section are not subject to the initial notification requirements in §63.9(b) and are not subject to any requirements in this subpart or in subpart A of this part (*i.e.* , they are not subject to the emission limits, work practice standards, performance testing, monitoring, SSM plans, site-specific monitoring plans, recordkeeping and reporting requirements of this subpart, or any other requirements in subpart A of this part.)

(1) N/A

(2) N/A

(3) Existing small gaseous fuel boilers and process heaters.

(4) New or reconstructed small gaseous fuel units."

Therefore, no DDDDD requirements have been added to the proposed TVOP.

40 CFR Part 64, Compliance Assurance Monitoring

In accordance with 40 CFR 64.2(a)(1), the requirements of 40 CFR 64.1-10 "apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies all of the following criteria:

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under paragraph (b)(1) of this section;

(2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. For purposes of this paragraph, "potential pre-control device emissions" shall have the same meaning as "potential to emit," as defined in §64.1, except that emission reductions achieved by the applicable control device shall not be taken into account."

As established in Plan Approvals PA-30-00077B and PA-30-00077C, Turbines #2 and #3 are subject to emission limitations for NOx, SOx, PM, CO, VOCs, and formaldehyde. These units are equipped with catalytic oxidation for control of CO, VOCs and formaldehyde. However, without the control device, Turbines #2 and #3 do not exceed the major source thresholds for CO, VOCs and formaldehyde. with pre-control potential annual emissions of 180 tons CO per unit. Therefore, a CAM Plan for Turbines #2 and #3 is not required.

40 CFR Part 98, Greenhouse Gas Mandatory Reporting Rule (GHG MRR)

Codified under 40 CFR 98, the GHG MRR includes monitoring and reporting requirements for facilities in various industry sectors with actual emissions in excess of 25,000 metric tons of carbon dioxide equivalents (CO2e) per year. This rule became effective on December 30, 2010, and required affected facilities to monitor and report actual GHG emissions for the 2011 calendar year.

The Holbrook facility emits CO2e in excess of 100,000 tons per year and is therefore subject to the GHG MRR of 40 CFR 98, Subpart W - Petroleum and Natural Gas Systems. However, EPA has determined that the GHG MRR is not considered an "applicable requirement" under the Title V operating permit program. The following language is found in the preamble to the GHG MRR:

> *"Comment:* EPA also received numerous comments about whether the requirements imposed by this rule are ''applicable requirements'' under the title V operating permit program. The majority of the comments took the position that the current definitions of ''applicable requirement'' at 40 CFR 70.2 and 71.2 do not include a rule such as this, promulgated under CAA section 114(a)(1) and 208. Commenters requested that EPA confirm their interpretation of the regulations.
>
> *Response:* As currently written, the definition of ''applicable requirement'' in 40 CFR 70.2 and 71.2 does not include a monitoring rule such as today's action, which is promulgated under CAA sections 114(a)(1) and 208."

Because the GHG MRR rules of 40 CFR 98, Subpart W are not applicable requirements for purposes of Title V, these regulations have not been included in the proposed TVOP.

Greenhouse Gas Tailoring Rule

This rule refers to the revisions of 40 CFR 52.21 published in the Federal Register on June 3, 2010, effective January 2, 2011. The revised regulations establish a process for conducting Prevention of Significant Deterioration (PSD) reviews, including Best Available Control Technology (BACT) determinations for control of greenhouse gases (GHG) when a new source or a modification to an existing source results in emissions of GHGs in excess of certain thresholds. Since January 2, 2011, there have not been any modifications to the Holbrook facility that triggered a GHG PSD review.

RECOMMENDATIONS

TE has submitted an administratively and technically complete TVOP renewal application. All relevant conditions established during the issuance of Plan Approvals PA-30-00077A, 30-00077B, and 30-00077C have been incorporated into the proposed TVOP. The proposed TVOP contains applicable emission restriction, testing, monitoring, recordkeeping, reporting and work practice standard conditions sufficient for this facility to operate in compliance with Air Quality regulations. I recommend the issuance of a renewal TVOP for a period of 5 years subject to the attached special conditions. This proposed TVOP must go through the full public comments process found at Title 25 Pa. Code § 127.424-425 and § 127.521-522.