

STATEMENT OF BASIS

To: Reviewers

Through: Lori Bocchino, Operating Permit Program Manager

From: William Tillman, Staff Engineer

Subject: Draft Chapter 6, Section 3 Operating Permit 3-2-026,
Mountain Gas Resources LLC - Patrick Draw Gas Processing Plant

Date: February 11, 2010

Introduction:

Attached for your review is the draft renewal Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 6, Section 3 Operating Permit 3-2-026 for Mountain Gas Resources, Patrick Draw Gas Processing Plant. This facility produces natural gas and natural gas liquids (NGL). The plant consists of inlet and residue gas compression, amine sweetening, mole sieve dehydration, cryogenic gas processing units, and liquid fractionators. The NGL produced is fractionated into products that range from ethane through natural gasoline. The liquid products are hauled off site via truck, railcar, and/or pipeline. The gas remaining after the NGL have been removed is referred to as 'residue' gas. This residue gas is re-compressed and returned to the pipeline for further transmission. There are flares and a thermal oxidizer unit located at this facility. The flares are used to combust material that is relieved and/or vented from the plant equipment while the thermal oxidizer is used to control volatile organic compounds (VOC) and hazardous air pollutant (HAP) emissions. The Smart Ash incinerators located at the facility have been removed from service per the annual inspection in January of 2006.

Permitting History:

The permits in this section are listed to document the permitting history. The original plant, consisting of compression, extraction, and fractionation equipment, was constructed prior to Chapter 6, Section 2 permitting requirements.

Waiver (7/8/1985): allowed for the construction of a 1.72 MMBtu/hr heater (H-401), which now provides regeneration heat for the mole sieve dehydrators.

Waiver (4/22/1986): allowed the construction of a 22 MMBtu/hr process heater (H-1), to replace two sweet gas fired heaters.

Permit MD-149(7/22/91): allowed the installation of an additional 800 hp White-Superior Model 8G-825 gas fired compressor engine (C-10), and added emission controls to an existing 750 hp White-Superior 8G-825 gas fired engine (C-5) installed without a permit in 1990. Engine C-5 engine was removed under permit MD-315 listed below.

Waiver (4/28/1992): allows the unloading of mixed butanes at the facility but limits the capacity to no more than 15,000 barrels per month. The vapors from this unloading operation are required to be routed back to the facility for recovery. The permittee no longer requires this waiver.

Permit MD-170 (5/4/92): allowed installation of an additional White-Superior 8G-825 gas fired compressor engine. It also allowed the upgrading of two existing 557 hp White-Superior 8G-825 gas fired compressor engines to 640 hp, with catalytic converters added to both engines.

Permit MD-203 (7/5/94): was issued to increase the NGL processing capacity from 2100 to 8100 barrels per day. The proposed project and equipment was never constructed.

Waiver (12/28/1994): This waiver allowed the construction of a Smart Ash incinerator.

Permit MD-291 (7/30/96): was issued to allow the modification of an existing 557 hp White-Superior compressor engine. The horsepower was increased to 701 and those increased emissions were offset by retro-fitting the engine with a catalytic converter.

Permit MD-315 (5/13/97) and MD-357 (5/18/98): Each permit allowed for the construction of an additional NGL separation and fractionation train with compression and other associated equipment. Each process train was designed to process 120 MMSCFD of natural gas. The permittee only installed one process train and in the process of constructing the plant and applying for the operating permit mixed both equipment numbers and equipment designations between the two proposed plants. Subsequent references to this equipment follow the numbering convention originally established for permit 30-026-1. Heater H-803, installed under MD-315 was originally labeled HMH. Heater H-805, from permit MD-357, was omitted from operating permit 30-026-1 and permit MD-663. The heater was re-labeled as H-901 in permit MD-924.

Applicable requirements include NO_x and CO emissions limits for several engines, and H₂S emission limits for amine still vents V-801 and V-802. (Unit V-802 was not built).

Waiver (7/24/97): allowed the construction of a second Smart Ash incinerator.

Waiver (6/30/98): revises NO_x and CO emission limits set under MD-315 and MD-357 for H-803 heater to reflect the 'as built' firing rate.

Waiver AP-RFO (5/5/00): authorized the construction of two 1600 hp Waukesha 7044 GSI compressor engines (C-101E and C-101F) instead of the 3200 hp White-Superior 214G compressor engine permitted under MD-357. This waiver sets NO_x and CO emissions limits for the engines. It has been superseded by MD-5924.

Permit MD-663 (8/28/01): was issued for the replacement of one 528 hp Superior 8G825 engine with one 800 hp Superior 8G825 engine.

Waiver (6/9/03): The waiver allowed for a remediation pilot study on VOC emissions. The VOC emissions were estimated at 0.3 tons per year.

Waiver AP-0900 (7/22/03): was issued to allow the removal of two flares (FS101 and FS102) and replace them with a new smokeless, emergency flare with a destruction efficiency of 95 percent. The replacement flare was not constructed.

Permit MD-924 (9/8/03): was issued to ensure that the facility would remain a minor source of HAP emissions. This permit removed the requirement to comply with the NESHAP requirements of 40 CFR 63 Subpart HH for Oil & Gas production previously included in permit MD-663. Permit MD-924 acknowledged VOC and HAP emissions from equipment previously not considered in WAQSR Ch 6, Sec 2 permits.

Permit MD-924A (6/15/05): amended permit MD-924 to reflect a revised Preventative Maintenance Plan. The permit limited the contact solution in amine units V-801 and V-202 to DEA. Permit MD-924A3 listed below removed the restriction for unit V-801 only. The contact solution is still limited to DEA for unit V-202.

Waiver AP-3517 (6/28/05): allowed the permittee to construct a stabilizer system to reduce the vapor pressure of 'pigged' liquids entering the facility. The waiver requires bottom liquids off the stabilizer to be routed to existing pressurized tanks or to the liquid fractionation equipment. The stabilizer system is subject to 40 CFR 60, Subpart KKK. The stabilizer and stabilizer heater were never constructed.

Permit MD-663A (11/29/05): revises the preventative maintenance plan for the C-12 White-Superior 8G825 engine (unit 8). The permit also sets NO_x and CO emission limits for the engine. It has been superseded by MD-5924.

Permit MD-1439 (9/18/06): required the permittee to install control equipment on the C-7 White Superior 8G825 engine (unit 5) and the Plant #2 amine treating unit V-801 (unit 27) to ensure the facility stays a minor source for HAP emissions. The permit establishes NO_x and CO emission limits for the engine. The permittee is required to maintain the engine and air pollution equipment, and monitor the equipment. Equipment monitoring includes installation of a thermocouple to measure the inlet catalyst temperature, and installation of a device to measure pressure drop across the catalyst. Prior to resuming operation of the Plant #1 amine unit, the amine vent must be controlled.

Permit MD-1439A (1/23/07): allowed the replacement of two White-Superior 2416G compressor engines (old units 22 & 25) with one Caterpillar G3612LE engine (new unit 25). Some conditions applying to unit 5 and unit 32 were not included in permit MD-1439A or A2; therefore, any conditions in MD-1439 not specifically superseded in MD-1439A or A2 continue to apply

Waiver AP-5838 (2/12/07): allowed the permittee to test a chemical additive's effectiveness in controlling emissions from the amine vent V-801 (unit 27). The flare permitted under MD-1439 was supposed to control emissions from V-801, but due to the high amount of CO₂ in the vent

gas the flare would not stay lit. The test was unsuccessful in controlling either VOC or HAP emissions.

Permit MD-1439A2 (6/11/07): amended permit MD-1439A to allow the permittee to construct a thermal oxidizer to replace the flare authorized by permit MD-1439. VOC emissions associated with the Plant #2 amine unit are controlled using a thermal oxidizer, with a minimum efficiency of at least 95 percent. The thermal oxidizer temperature must be monitored using a thermocouple located in the combustion chamber, and the temperature of the oxidizer must be recorded continuously. The permit also sets NO_x and CO limits for the Caterpillar G3612LE engine (unit 25). The permittee is required to maintain the engine and air pollution equipment, and monitor the inlet catalyst temperature and the pressure drop across the catalyst.

Permit MD-924A3 (9/10/07): removed the restriction limiting the amine contact solution to DEA for the Plant #2 amine unit V-801 (unit 27). The permit includes requirements for a preventative maintenance program for engine sources 6, 7, 9, 10, 28 and 29, and requires periodic testing for engine sources 19-21, 23 and 24.

Permit MD-5924 (2/20/08): authorized replacement of most of the older existing engines with new lean burn technology Caterpillar engines. Engines 19, 21, 22, and 24 have been installed and performed the required initial performance test, which indicated compliance with emission limitations. As of the date of this memo, five of the affected engines have not yet been replaced. The permittee is not required to replace those engines, but if they do so the replacement engines will be subject to the applicable requirements from MD-5924. The Division does not typically include in operating permits requirements for equipment not yet constructed, unless it is requested by the permittee.

The permit set emission limits for NO_x, CO, and formaldehyde for the engines. After unit 5 (White Superior 8G-825 compressor engine) is replaced, the visible emissions from all emission sources at the facility, with the exception of the flares and Thermal Oxidizer, will be limited to 20% opacity by Method 9 analysis. The permit sets limits, in lb/MMBtu, for three existing heaters (units 16, 26, and 33). The permit also allowed the construction of Amine Plant #3 and two hot oil heaters for the amine plant (H-301A and H-301B). These sources have not yet been constructed and are not included in this operating permit. The heaters have NO_x and CO emission limits set by permit condition and are required to have a performance test to demonstrate compliance with these limits after startup. The Thermal Oxidizer will control the still vent from Amine Plant #3 and will have new NO_x, CO, and VOC emission limits to accommodate the new source. The Thermal Oxidizer will be required to have another performance test to demonstrate the minimal operating temperature required for 95 percent removal of VOC compounds as well as demonstrate compliance with the other emission limits after completion of construction and startup of the #3 Amine unit.

The emergency flares and the Thermal Oxidizer, after startup of the #3 Amine Unit, will be required to be smokeless with no visible emission per WAQSR Chapter 3, Section 6(b)(i). The flares are to be operated and maintained such that they remain effective control devices during emergency situations. There is also a condition requiring each flare have its pilot flame be

monitored by thermocouple and continuous recorder, which is also a requirement of Subpart KKK.

For engine units 08, 09, 10, 19, 21, 22, 24, 25, 28, and 29, this permit establishes testing, monitoring, and maintenance requirements. (Units 05, 06, 07, 20, and 23 will have requirements from this permit upon replacement.) There is also a condition limiting loading/unloading of mixed butanes; the equipment necessary for this operation was never installed and therefore this condition is not included in the operating permit.

Waiver AP-8504 (11/14/08): allowed the construction of a Ford WSG-1068 emergency engine at the facility (unit 34). The engine has emission limits for NO_x, CO, and VOC and is subject to testing in accordance with 40 CFR 60 Subpart JJJJ. The emergency engine is also limited to 500 hours of annual operation.

Permit MD-5924 (Corrected) (2/2/09): changed the monitoring frequency for engines 28 and 29 from "semi-annual, or as otherwise specified by the Administrator" to "annual, or as otherwise specified by the Administrator". Engine 25 originally authorized by MD-1492A2 has had the horsepower de-rated and will comply with the emission limits and requirements of this permit.

There was a second correction to permit MD-5924, issued 2/1/10, which addressed the NO_x and CO emission limits for heaters H-803 and H-901. The correct emission factors for H-803 were in the waiver issued on June 30, 1998 which set the NO_x emission factor at 0.08 lb/MMBtu and the annual emission limit at 9.6 TPY, and the CO emission factor at 0.04 lb/MMBtu with an annual limit of 4.8 TPY. The correct emission limits for H-901 were in permit MD-924 which set the NO_x limit at 5.7 TPY (0.03 lb/MMBtu) and the CO limit at 7.4 TPY (0.04 lb/MMBtu).

Applicable Requirements:

Applicable requirements include the conditions from the WAQSR Ch 6, Sec 2 permits and waivers listed above, and visible emission limits set forth in Ch 3, Sec 2, and Ch 3, Sec 6.

The requirements of 40 CFR 60 Subpart KKK, Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants, apply to affected facilities constructed after January 20, 1984. Additionally, the permittee voluntarily added 40 CFR 60 Subpart KKK monitoring and maintenance requirements to the older parts of the facility to obtain a VOC emission tradeoff in permitting under WAQSR Ch 6, Sec 4. The federally enforceable permit condition for application of the Subpart KKK requirements is contained in permits MD-315, MD-357, and MD-5924. Condensate tanks TK-16 and TK-17 were subject to 40 CFR 60 Subpart Kb Performance Standards for Volatile Liquid Storage Tanks when the last operating permit was issued. Revisions to Subpart Kb promulgated October 15, 2003 removed all requirements for these tanks.

All of the reciprocating internal combustion engines (RICE) located at Patrick Draw are subject to 40 CFR 63, Subpart ZZZZ, requirements for stationary RICE at an area source of HAPs. Under the regulation, engines 05-10, 20, and 29 are existing affected facilities, with no applicable requirements from Subpart ZZZZ or Subpart A and no initial notification necessary. Engines 19, 21-25, 28, and 34 are new by the definitions of Subpart ZZZZ and are, therefore, subject to 40

CFR 60, Subpart JJJJ, Performance Standards for Stationary Spark Ignition Internal Combustion Engines. Based on the dates of manufacture, only engines 19, 21, and 24 have applicable requirements from Subpart JJJJ. However, engine 34 is subject to the testing requirements of Subpart JJJJ by conditions of permit AP-8504.

The Waukesha compressor engines are subject to the requirements of Compliance Assurance Monitoring (CAM) as directed by WAQSR Ch 7, Sec 3.

The heaters H-803 and H-901 are subject to the requirements of 40 CFR 60 Subpart Dc because they are steam generating units as defined by §60.41c.

Periodic Monitoring:

Where periodic monitoring is not specified by an applicable requirement, periodic monitoring methods are established according to the Division's July 1, 2003 guidance document. The permittee will conduct quarterly visible emissions monitoring of the plant flares. Monitoring for visible emissions from the other sources will consist of verifying natural gas is the sole fuel source.

Monitoring for NO_x and CO will be conducted annually for the White-Superior 8G-825 and Waukesha 7044GSI compressor engines. The White-Superior 2416G compressor engines will be monitored semi-annually for CO emissions and once every 5 years for NO_x emissions. The Caterpillar G3612LE engines will be monitored semi-annually for NO_x, CO, and formaldehyde emissions. The permittee is also required to monitor the inlet temperature of the oxidation catalyst and the pressure differential across the catalyst monthly for the Caterpillar engines. The Ford WSG-1068 emergency engine will be monitored once every three years, after it is installed, for NO_x, CO, and VOC emissions.

The Waukesha 7044GSI compressor engines are subject to the requirements of CAM for NO_x and CO emissions. The permittee will monitor the inlet temperature of the catalyst daily, and the pressure differential across the catalyst monthly, to assess compliance with the NO_x and CO limits.

The monitoring of NO_x and CO emissions from heaters H-1, H-803, and H-901 will be once every two years for comparison with their permitted emission limits. The Division will not require the monitoring of NO_x and CO emissions from the Regenerator Gas Heater H-401 because although this source has emission limits from MD-357, the hourly emission rates are so small that instrument detection may not be feasible and this would be an uneconomical use of resources.

The monitoring of H₂S from the amine unit still vent (V-801) will not be required because it is not feasible. Permit MD-1439 required that the emissions from the still vent be routed to the Thermal Oxidizer rather than to the atmosphere, this modification results in H₂S being converted to SO₂. The amine unit still vent emission limit for H₂S is still in the operating permit because the underlying permit MD-357 has not been amended; therefore, the emission limit is still in effect.