TECHNICAL REVIEW DOCUMENT
For
OPERATING PERMIT 05OPRB282
to be issued to:

Public Service Company – Greasewood Compressor Station
Rio Blanco County
Source ID 1030086

Prepared by Jacqueline Joyce
August 2006
Revised October 2006
Revised January 2007 Based on Comments Received During the Public Comment Period

I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties. Conclusions made in this report are based on information provided by the applicant in the Title V application submitted October 17, 2005, comments on the draft permit and technical review document received on October 2, 2006, comments on the draft permit and technical review document received on November 24, 2006 during the public comment period, various telephone conversations and e-mail correspondence with the source and review of Division files. This narrative is intended as an adjunct to the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised Construction Permit.

II. Source Description

This facility consists of four natural gas-fired compressor engines for the transmission of natural gas.

The facility is located at 9949 County Road 76, in Rio Blanco County, Colorado. The area in which the plant operates is designated as attainment for all criteria pollutants.

Utah is an affected state within 50 miles of the plant. Flat Tops Wilderness Area, a Federal Class I designated area, is within 100 kilometers of the plant. In addition, Dinosaur National Monument is federal land within 100 kilometers of the facility. This area has been designated by the State to have the same sulfur dioxide increment as federal Class I designated areas.

This facility is considered to be a minor stationary source (Potential to Emit < 250 tons/yr). Facility wide potential and actual emissions are shown on the following tables follows:

Emission Unit		**Potential to Emit (tons/yr)**			
ID No.	Startup Date	NO_X	CO	VOC	HAPS
E001	1967	57.21	53.77	0.43	See Table on Page 11
E002	1967	46.04	47.09	0.37	
E003*	Nov. 2004	70.10	61.92	0.49	
E004*	Nov. 2004	70.10	61.92	0.49	
Emergency Generator (32 hp)**		2.70	4.40	0.04	
Two (2) space heaters (0.266 mmBtu/hr, each)**		0.23	0.19	0.01	
Total		246.38	229.29	1.83	2.59

*These engines commenced operation in 1973 at another location in Colorado.
** These sources are exempt from APEN reporting and permitting requirements. However, since the facility is close to the major stationary source threshold emissions from these units are included here. Note that since the APEN exemptions for these units are not based on limited hours of operation, PTE is based on 8760 hrs/yr of operation.

Emission Unit		**Actual Emissions (tons/yr)**			
ID No.	Startup Date	NO_X	CO	VOC	HAPS
E001	1967	21.2	14.7	0.3	0.24
E002	1967	2.13	1.5	0.03	0.02
E003*	Nov. 2004	0	0	0	0
E004*	Nov. 2004	0	0	0	0
Total		23.33	16.2	0.33	0.26

*These engines commenced operation in 1973 at another location in Colorado.

In the above table potential to emit for criteria pollutants is based on the design rate of the engine, emission factors and 8760 hours per year of operation. Note that permitted emission limits for engines E003 and E004 will be set at the values indicated in the above tables. Actual emissions are based on APENS submitted in October 2005 (2004 data). Note that the source reports actual emissions and potential emissions using different emission factors, some of which are out-dated AP-42 emission factors. This is

not an acceptable practice. With the issuance of the Title V permit, the emission factors to be used for both potential and actual emission calculations will be clearly indicated.

In the above table, the breakdown of HAP emissions by emission unit and individual HAP is provided on page 11 of this document. As indicated in the footnotes for the table on page 11, the HAP PTE is based on design rate, 8760 hours per year of operation and the most conservative emission factor from AP-42 or HAPCalc 2.0.

The source indicated in the Title V permit application that the facility was not subject to the risk management plan provisions in section 112(r) of the Act.

None of the significant emission units at this facility are equipped with a control device, therefore, the compliance assurance monitoring (CAM) requirements do not apply.

Since the facility is not a major source for HAPS, no MACT requirements apply to the equipment at this facility.

III. Emission Sources

The following sources are specifically regulated under terms and conditions of the Operating Permit for this Site.

Unit E001: White Superior, Model No. 6G825, 4-Cycle Rich Burn Internal Combustion Engine (Compressor Engine), Rated at 395 hp (site), 3.3 mmBtu/hr (7750 Btu/hp-hr), Serial No. 19732. Natural Gas Fired.

Unit E002: Climax, Model No. V-125HC, 4-Cycle Rich Burn Internal Combustion Engine (Compressor Engine), Rated at 298 hp (site), 2.89 mmBtu/hr (9700 Btu/hp-hr), Serial No. 47568. Natural Gas Fired.

1. Applicable Requirements – According to the Title V permit application, these units were first placed into service and last modified in 1967. These engines are permit exempt under the provision that construction commenced or operation began prior to October 1, 1983 and the engines are rated at less than 1,000 horsepower. Therefore the only specific applicable requirements that apply to these units are the Reg 1 20 % and 30 % opacity limits (Reg 1, Section II.A.1 and 4) and APEN reporting (Regulation 3, Part A Section II).

Note that the 30% opacity standard is applicable during certain operating activities. The specific activities under which the 30% opacity standard applies are: building a new fire, cleaning of fire boxes, soot blowing, startup, any process modification, or adjustment or occasional cleaning of control equipment. Based on engineering judgment the Division considers that building a new fire, cleaning of fire boxes and soot-blowing does not apply to the operation of internal combustion engines. In addition, these engines do not have control devices, so adjustment or occasional cleaning of control devices do not apply to these engines. Process modifications and startup may

apply to engines, however, based on engineering judgment, the Division believes that such activities would be unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement has not been included in the operating permit.

2. Emission Factors - Emissions from reciprocating engines are produced during the combustion process, and are dependent upon the air to fuel ratio adjustment and specific properties of the natural gas being burned. The pollutants of concern are Nitrogen Oxides (NO_X), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC). Small quantities of HAPs are also emitted when combustion is incomplete. Approval of emission factors for these units is necessary to the extent that accurate actual emissions are required to verify the need to submit revised APENs to update the Division's emission inventory and for the payment of fees. The source is proposing to use emission factors identified in AP-42 (July 2000), Section 3.2, Table 3.2-3 for 4-cycle rich burn engines for CO and VOC and manufacturer's emission factors for NO_X, as indicated in the following table:

	NO_X	CO	VOC
AP-42 Emission Factors (CO at 90-105% load, NO_X at < 90% load)[1]	2.27 lb/mmBtu	3.72 lb/mmBtu	0.0296 lb/mmBtu
Manufacturer's emission factor	E001 – 15 g/hp-hr E002 – 16 g/hp-hr		
Converted Manufacturer's Emission Factor	E001 – 3.96 lb/mmBtu E002 –3.64 lb/mmBtu		

[1]NO_X emission factor shown for comparison purposes

In order to compare the manufacturer's emission factor to AP-42, the emission factors was converted to units of lb/mmBtu using the following equation:

$$EF\ (lb/mmBtu) = \frac{EF\ (g/hp\text{-}hr) \times site\ rated\ hp}{453.6\ g/lb \times design\ heat\ input\ (mmBtu/hr)}$$

For permit exempt engines, the Division normally allows the source to use emission factors in units of lb/mmBtu or g/hp-hr, since the AP-42 emission factors are in units of lb/mmBtu and to make the emission factors consistent, the emission factors in the permit will be in units of lb/mmBtu.

3. Monitoring Plan – Sections II.1 and 2 of the permit list the Monitoring and Recordkeeping provisions necessary to verify compliance with Applicable Requirements for these engines. These methods of verifying compliance are consistent with the requirements identified in the Monitoring Grid for Internal Combustion Engines developed by the Division (see attached). The Grid defines monthly emission calculations and measurement of fuel use as minimum requirements for these engines. Although the grid specifies monthly recording of fuel use and emission calculations, since the APEN reporting requirements are based on calendar year emissions, the Division considers that annual calculation of emissions and monitoring of fuel consumption is sufficient.

Since emission factors are based on the heat input to the engine, the heat content of the gas must be determined. The Division had originally proposed semi-annual sampling of the natural gas to determine the Btu content of the gas for use in emission calculations. In their comments on the draft permit (received on October 2, 2006), the source requested that the source be allowed to use data from PSCo's Greaswood transmission zone. The Division has approved the use of data from certain transmission zones for other PSCo facilities since this data has shown that the transmission zone data is consistent with the data from individual station sampling located within that zone. Therefore, rather than requiring PSCo to perform gas analyses at the facility, the Division will allow PSCo to perform emission calculations using the annual average heat content for the Greasewood Zone. Records of these analyses are to be maintained and made available to the Division upon request. In the absence of credible evidence to the contrary, compliance with the opacity limit shall be presumed since the engines are only permitted to burn natural gas as fuel.

4. Compliance Status – The source indicated in the Title V permit application that these engines were in compliance with all applicable requirements.

Unit E003: Waukesha, Model No. L5108GU, 4-Cycle Rich Burn Internal Combustion Engine, Rated at 484 hp (site), 3.8 mmBtu/hr (7529 Btu/hp-hr), Serial No. 242322. Natural Gas Fired.

Unit E003: Waukesha, Model No. L5108GU, 4-Cycle Rich Burn Internal Combustion Engine, Rated at 484 hp (site), 3.8 mmBtu/hr (7529 Btu/hp-hr), Serial No. 242579. Natural Gas Fired.

1. Applicable Requirements – According the Title V permit application these units were first placed in service in 1973 and while that is correct and such engines would be exempt from the construction permit requirements (construction commenced or operation began prior to October 1, 1983 and the engines are rated at less than 1,000 horsepower), the engines first commenced operation at the White River Dome Compressor Station. In 2004, the source proposed relocating these engines from the White River Dome compressor station to the Greasewood compressor station. At the time of the initial proposal, the Division considered that the engines could keep their exempt status upon relocation, provided a modeling analysis was submitted that demonstrated compliance with the ambient air quality standards. However, after further review, the Division considers that these engines do not retain their exempt status upon relocation and therefore considers that these engines are subject to the minor source permitting requirements in Colorado Regulation No. 3, Part B. At the time of the original relocation (November 2004), the Division was still internally discussing whether the engines would retain their exempt status and therefore no construction permit was issued. At this time the Division will not issue a construction permit but will process the permit for these engines as a combined construction/operating permit. The due date of the first semi-annual monitoring report required by this operating permit will be more than 180 days after the engines commenced operation. Therefore, the Division

considers that the Responsible Official certification submitted with that report will serve as the self-certification that these units can comply with the applicable requirements. The appropriate applicable requirements are as follows:

- Opacity of emissions shall not exceed 20% (Reg 1, Section II.A.1)

  Note that no condition is included for the Reg 1 30% opacity standard, which is applicable during certain operating activities. The specific activities under which the 30% opacity standard applies are: building a new fire, cleaning of fire boxes, soot blowing, startup, any process modification, or adjustment or occasional cleaning of control equipment. Based on engineering judgment the Division considers that building a new fire, cleaning of fire boxes and soot-blowing does not apply to the operation of internal combustion engines. In addition, these engines do not have control devices, so adjustment or occasional cleaning of control devices do not apply to these engines. Process modifications and startup may apply to engines, however, based on engineering judgment, the Division believes that such activities would be unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement has not been included in the operating permit.

- Natural Gas consumption shall not exceed 33.5 mmscf/yr, **for each engine** (as requested by APEN submitted October 17, 2005).

- Emissions of air pollutants shall not exceed the following limitations, **for each engine** (as requested by APEN submitted October 17, 2005):

  - NO_X 70.1 tons/yr
  - CO 62 tons/yr
  - VOC 0.50 tons/yr

  Note that since requested VOC emissions are below the APEN de minimis levels, the VOC emission limit will not be included in the permit, although VOC emissions, as well as other criteria pollutant emissions shall be reported on any APENs submitted.

2. Emission Factors - Emissions from reciprocating engines are produced during the combustion process, and are dependent upon the air to fuel ratio adjustment and specific properties of the natural gas being burned. The pollutants of concern are Nitrogen Oxides (NO_X), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC). Small quantities of HAPs are also emitted when combustion is incomplete. Approval of emission factors for these units is necessary to the extent that accurate actual emissions are required to verify the need to submit revised APENs to update the Division's emission inventory and for the payment of fees. The source is proposing to use emission factors identified in AP-42 (July 2000), Section 3.2, Table 3.2-3 for 4-cycle rich burn engines for CO and VOC and manufacturer's emission factors for NO_X, as indicated in the following table:

	NO_X	CO	VOC
AP-42 Emission Factors (CO at 90-105% load, NO_X at < 90% load)[1]	2.27 lb/mmBtu	3.72 lb/mmBtu	0.0296 lb/mmBtu
Manufacturer's emission factor	15 g/hp-hr		
Converted Manufacturer's Emission Factor	4.21 lb/mmBtu		

[1]NO_X emission factor shown for comparison purposes

In order to compare the manufacturer's emission factor to AP-42, the emission factors was converted to units of lb/mmBtu using the following equation:

$$\text{EF (lb/mmBtu)} = \frac{\text{EF (g/hp-hr) x site rated hp}}{\text{453.6 g/lb x design heat input (mmBtu/hr)}}$$

For engines subject to permit limitations, the Division requires the source to use emission factors in units of lb/mmBtu or lb/mmSCF, since the AP-42 emission factors are in units of lb/mmBtu, the emission factors included in the permit will be in units of lb/mmBtu.

3. Monitoring Plan - Conditions 3.1 through 3.5 of the Operating Permit list the Monitoring and Recordkeeping provisions necessary to verify compliance with Applicable Requirements for these engines. These methods of verifying compliance are consistent with the requirements identified in the Monitoring Grid for Internal Combustion Engines developed by the Division (see attached). The Grid defines monthly emission calculations and measurement of fuel use as minimum requirements for these engines. Monthly emissions and fuel consumption shall be used in rolling twelve month totals to monitor compliance with the annual emission and fuel consumption limits.

The monitoring grid also requires that semi-annual natural gas analyses be performed to determine the heat content of the gas. As discussed previously for engines E001 and E002, rather than requiring sampling at the facility, the Division will allow the source to use the annual average heat content for the Greasewood Zone. In the absence of credible evidence to the contrary, compliance with the opacity limit shall be presumed since the engines are only permitted to burn natural gas as fuel.

4. Compliance Status – The source indicated in the Title V permit application that the engines were in compliance with all applicable requirements. Although the engines did not receive construction permits prior to their relocation to the Greasewood facility, at the time of the relocation the Division had considered that the units would be able to retain their exempt status. However, after further consideration, the Division considers that the units lose their exempt status upon relocation.

IV. Insignificant Activities

The source indicated that the following general categories of insignificant activities at this site include: individual fuel burning equipment (gaseous fuel) < 5 mmBtu/hr and <

10 mmBtu/hr (comfort heat only), chemical storage tanks/containers < 500 gal (annual throughput < 25 gal/day), landscaping and site housekeeping devices < 10 hp, lube oil storage tanks < 40,000 gal, venting of natural gas, butane or propane (capacity < 1 gal), storage tanks limited throughput (400,000 gal/yr) and liquids stored, stationary internal combustion engines – limited size/hrs of operation. Specific insignificant activities identified in the Title V permit application are as follows:

Units with emissions less than the APEN de minimis - criteria (Reg 3 Part C.II.E.3.a)

Fugitive VOC emissions from equipment leaks (VOC emissions < 2 tons/yr)
Natural gas venting during system blowdowns (VOC emissions < 2 tons/yr)
Unpaved roads – vehicle traffic (PM and PM_{10} emissions < 2 tons/yr)

Chemical storage tanks of containers < 500 gal, annual throughput < 25 gal/day (Reg 3 Part C.II.E.3.n)

Ambitrol storage drums (55 gal, each – generally 4 on site)

Storage tanks less than 40,000 gal capacity - lubricating oil (Reg 3 Part C.II.E.3.aaa)

Three (3) used oil storage tanks (500 gallons, vaulted)
One (1) lube oil tank (500 gal, above ground)
One (1) lube oil tank (1,000 gal above ground)

Fuel burning equipment less than 10 mmBtu/hr - for heating (Reg 3 Part C.II.E.3.ggg)

Two (2) space heating units (0.266 mmBtu/hr, each)

Emergency Power Generators – limited size or hours (Reg 3 Part C.II.E.nnn.(i))

Generac, Model 4742, 32 hp emergency generator (less than 260 hp)

V. Alternative Operating Scenarios

No alternative operating scenarios were requested for this facility; however, the Division included the alternative operating scenario for permanent and temporary engine replacement.

VI. Permit Shield

The source identified and justified a short list of nonapplicable requirements that they wish to be specifically shielded from. The nonapplicable requirements that the source will be shielded from are as follows:

- Colorado Regulation No. 1, Section III.A – Particulate Matter Requirements for Fuel Burning Equipment. The permit application states that these requirements are not applicable to this facility because the definition of fuel-burning equipment

is A...burning fuel solely for the purpose of producing heat." The permit shield was granted based on the source=s justification.

- Colorado Regulation No. 1, Section VI.B – Sulfur Dioxide Emission Requirements for New Sources. The justification in the permit application states that the regulation does not apply because the engines burn natural gas, the SO_2 emissions are less than the regulated limit and that natural gas firing is the most technologically feasible and economically reasonable method of control that is available and practical. The permit shield was granted because none of the activities and/or equipment regulated under this section (coal or oil-fired operations, combustion turbines, natural gas desulfurization, petroleum refining, production of oil from shale, refining of oil produced from shale) occur at the facility.

- Colorado Regulation No. 7 – Volatile Organic Compound Emissions. The justification in the permit application states that the standards do not apply (except "no disposal by evaporation", Reg 7 part V.A) because Greasewood Compressor Station does not store petroleum liquid (Paragraphs VI.B.1 and 2) or crude oil (Section VII) in tanks larger than 40,000 gallons, and therefore, these sections do not apply. The permit shield was granted due to the source's justification for those parts of Reg 7 that apply statewide (Reg 7, Sections VI.B.1 and 2 and VII.C). The permit shield was granted for the remaining requirements, except for Section V.A, because the facility is not located within any a non-attainment area for the 1-hour ozone standard, within the Denver 1-hour ozone attainment/maintenance area, or in the 8-hour ozone control area. The standards in Regulation No. 7 only apply to sources located in those specific areas, except for Section V, Paragraphs VI.B.A and 2 and Subsection VII.C, which apply statewide. The permit shield is granted for Subsection V.B because the facility is not/does not include a bulk gasoline terminal, bulk gasoline plant or gasoline dispensing facility.

- Colorado Regulation No. 7, Section X – Volatile Organic Compound Emissions, Use of Solvents for Cleaning and Degreasing. The permit application included the justification stated above for Reg 7. The permit shield was granted because the facility is not located within a non-attainment area for the 1-hour ozone standard or within the Denver 1-hour ozone attainment/maintenance area and the requirements in Regulation No. 7, Section X only apply to sources located in those specific areas.

- Colorado Regulation No. 3, Part D, Section VI - Prevention of Significant Deterioration (PSD) review requirements. The justification in the permit application states that no construction or modification of sources exceeding the 250 tons/yr threshold has occurred since August 7, 1977. The permit shield was granted because the facility is not a major stationary source for purposes of PSD review.

- 40 CFR Part 60 Subpart KKK, as adopted by reference in Colorado Regulation No. 6, Part A - Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants. The justification in the permit application states that the standard does not apply because the facility is not a natural gas processing facility and VOC content of the gas is less than 10%. The permit shield was granted because the facility is not a natural gas processing plant.

PSCo - Greasewood Facility HAP Emissions

Unit	HAP Emissions (tons/yr)										
	acetaldehyde	acrolein	benzene	toluene	Ethylbenzene	xylene	formaldehyde	n-hexane	2,2,4-trimethylpentane	methanol	**total**
E001	0.04	0.04	0.08	0.03		0.01	0.38	0.00	0.00	0.04	0.62
E002	0.04	0.03	0.06	0.02		0.00	0.28	0.00	0.00	0.04	0.48
E003	0.05	0.04	0.10	0.03		0.01	0.46	0.00	0.00	0.05	0.75
E004	0.05	0.04	0.10	0.03		0.01	0.46	0.00	0.00	0.05	0.75
Total	0.17	0.16	0.35	0.11	0.00	0.03	1.59	0.00	0.00	0.18	2.59

Engine emissions are based on most conservative emission factor for each pollutant.