



Montana Department of
ENVIRONMENTAL QUALITY

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April 5, 2012

Mr. Peter Mueller
Saga Petroleum, LLC
Big Coulee Field, Station 057
600 17th St., Suite 1700N
Denver, CO 80202

Dear Mr. Mueller:

Montana Air Quality Permit #2770-10 is deemed final as of March 30, 2012, by the Department of Environmental Quality (Department). This permit is for a natural gas compressor station. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Vickie Walsh
Air Permitting Program Supervisor
Air Resources Management Bureau
(406) 444-9741

Deanne Fischer, P.E.
Environmental Engineer
Air Resources Management Bureau
(406) 444-3403

VW:DF
Enclosure

Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #2770-10

Saga Petroleum, LLC
Big Coulee Field, Station 057
600 17th St., Suite 1700N
Denver, CO 80202

March 30, 2012



MONTANA AIR QUALITY PERMIT

Issued To: Saga Petroleum, LLC
Big Coulee Field, Station 057
600 17th St., Suite 1700N
Denver, CO 80202

MAQP: #2770-10
Application Complete: 02/21/2012
Preliminary Determination Issued: 02/27/2012
Department's Decision Issued: 03/14/2012
Permit Final: 03/30/2012
AFS #: 037-0001

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Saga Petroleum, LLC (Saga), Big Coulee Field, Station 057, pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq.*, as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

The Saga natural gas compressor station and associated equipment is located in the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 25, Township 5 North, Range 19 East, in Golden Valley County, Montana. This facility is known as the Big Coulee Field, Station 057. A listing of the permitted equipment can be found in Section I.A. of the permit analysis.

B. Current Permit Action

On January 30, 2012, the Department of Environmental Quality – Air Resources Management Bureau (Department) received an application from Saga for a modification to MAQP #2770-09. Additional information was received on February 21, 2012 to complete the application. The proposed modification includes the removal of an existing 360-brake horsepower (bhp) White Superior compressor engine and the addition of a 2009, 122-bhp Caterpillar engine. The current permit action updates the equipment list in the MAQP, revises the emissions inventory, and updates the permit to reflect current permit language and rule references used by the Department.

SECTION II: Conditions and Limitations

A. Emission Limitations

1. Saga shall not operate more than two natural gas compressor engines at any time. Compressor Engine number one (Source #1) shall have a maximum rated capacity of 515-bhp. Source #1 shall be of a 4-stroke rich-burn engine class, and shall be fired on pipeline quality natural gas. Source #2 shall have a maximum rated capacity of 122-bhp. Source #2 shall be of a 4-stroke rich-burn engine class, and shall be fired on pipeline quality natural gas (ARM 17.8.749 and ARM 17.8.752).
2. Saga shall properly operate and maintain Source #1 and associated control equipment. Source #1 shall be equipped and operated with an air-to-fuel ratio (AFR) controller and a Non-Selective Catalytic Reduction (NSCR) unit (ARM 17.8.752).

- The pound per hour (lb/hr) emissions limitations of Source #1 shall be determined using the following equation and pollutant-specific grams per brake horsepower-hour (g/bhp-hr) emission factors (ARM 17.8.752):

Equation:

Emissions Limit (lb/hr) = Emission Factor (g/bhp-hr) * maximum rated design capacity of engine (bhp) * 0.002205 lb/g

Emission Factors:

Oxides of Nitrogen (NO _x):	0.5 g/bhp-hr
Carbon Monoxide (CO):	0.5 g/bhp-hr
Volatile Organic Compounds (VOC):	0.3 g/bhp-hr

- Saga shall properly operate and maintain Source #2 and associated control equipment. Emissions from the 122-bhp rich-burn compressor engine shall be controlled with an AFR controller and an NSCR unit (ARM 17.8.752).
- The lb/hr emissions limitations of Source #2 shall be determined using the following equation and pollutant-specific g/bhp-hr emission factors (ARM 17.8.752 and 40 Code of Federal Regulations (CFR) 60, Subpart JJJJ):

Equation:

Emissions Limit (lb/hr) = Emission Factor (g/bhp-hr) * maximum rated design capacity of engine (bhp) * 0.002205 lb/g, and shall not exceed the following emissions limitations:

Emission Factors:

NO _x	1.0 g/bhp-hr
CO	2.0 g/bhp-hr
VOC	0.7 g/bhp-hr

- Saga shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).
- Saga shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).
- Saga shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.7 (ARM 17.8.749).
- Saga shall comply with any applicable standards and limitations, reporting, recordkeeping and notification requirements contained in 40 CFR 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, and 40 CFR 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* (ARM 17.8.340, 40 CFR 60, Subpart JJJJ, ARM 17.8.342, and 40 CFR 63, Subpart ZZZZ).

B. Testing Requirements

1. Source #2 shall be initially tested for NO_x, CO, and VOC concurrently within 180 days of the initial start-up date of the compressor engine, and the results submitted to the Department in order to demonstrate compliance with the emission limitations contained in Section II.A.5 (ARM 17.8.105, ARM 17.8.749, and 40 CFR 60, Subpart JJJ).
2. Sources #1 and #2 shall be tested for NO_x and CO concurrently on an every four year basis, or according to another testing/monitoring schedule as may be approved by the Department (ARM 17.8.105 and ARM 17.8.749).
3. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).
4. The Department may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Saga shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. Saga shall notify the Department of any construction or improvement project conducted, pursuant to ARM 17.8.745, that would include *the addition of a new emissions unit*, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to startup or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(1)(d) (ARM 17.8.745).
3. All records compiled in accordance with this permit must be maintained by Saga as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

D. Notification

1. Saga shall provide the Department with written notification of the actual startup date of the Source #2 (122 bhp compressor engine) postmarked within 15 days after the actual start-up date. The notification shall include the engine model and maximum rated design capacity (ARM 17.8.749).

SECTION III: General Conditions

- A. Inspection – Saga shall allow the Department’s representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (Continuous Emissions Monitoring System (CEMS), Continuous Emissions Rate Monitoring System (CERMS)) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.
- B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if Saga fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Saga of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.* (ARM 17.8.756).
- D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq.*, MCA.
- E. Appeals – Any person or persons jointly or severally adversely affected by the Department’s decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department’s decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department’s decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department’s decision on the application is final 16 days after the Department’s decision is made.
- F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the MAQP shall be made available for inspection by the Department at the location of the source.
- G. Permit Fee – Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by Saga may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.
- H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
Saga Petroleum, LLC
Big Coulee Field, Station 057
MAQP #2770-10

I. Introduction/Process Description

Saga Petroleum, LLC (Saga) owns and operates a compressor station and associated equipment located in the SE ¼ of the SE¼ of Section 25, Township 5 North, Range 19 East, in Golden Valley County, Montana, and is known as the Big Coulee Field, Station 057.

A. Permitted Equipment

- One 4-stroke rich-burn compressor engine, with a capacity up to 515-brake horsepower (bhp), equipped with an air-to-fuel ratio controller (AFR) and non-selective catalytic reduction unit (NSCR) – currently a 1990 Waukesha
- One 4-stroke rich-burn compressor engine, with a capacity up to 122-bhp equipped with an AFR and NSCR - currently a 2009 Caterpillar.
- One Tri-ethylene glycol (TEG) dehydrator unit with associated 150-thousand British thermal units per hour (MBtu/hr) reboiler
- Various Building Heaters <1-million British thermal units per hour (MMBtu/hr)
- Pneumatic Valves
- Two 125 bhp electric driven compressors

B. Source Description

The complex has two primary purposes. The first is to pump field gas from natural gas wells and to compress the field gas up to the required pressure in the natural gas transmission system, accomplished through compressors powered by two engines, one up to a 515-bhp engine, and one up to a 122-bhp engine.

The second purpose of the complex is to "dry" the gas as it is being processed. The gas contains some moisture, which must be removed from the system prior to being sent into the transmission system. This is accomplished with a dehydrator, also commonly called a reboiler or glycol unit. The gas is treated with a tri-ethylene glycol solution, which absorbs the water in the gas stream. The glycol solution is then heated to about 300 degrees Fahrenheit (°F) to drive off the water and return the glycol. Burning natural gas in the dehydrator reboiler generates the heat necessary for this activity. This unit will have a heat input of approximately 150 MBtu/hr. The reboiler is small by industrial standards, having a size approximately equivalent to a typical natural gas-fired small office heating system.

C. Permit History

On June 22, 1993, the Montana Power Company, Big Coulee Field, Station 057 (Montana Power - Station 057), was issued **MAQP #2770-00** for the operation of their compressor station and associated equipment, located in the SE¼ of the SE¼ of Section 25, Township 5 North, Range 19 East, Golden Valley County near Ryegate, Montana. The station was identified as the Big Coulee Field, Station 057.

A Best Available Control Technology (BACT) determination was not required for the two 360-bhp White Superior compressor engines, since they were operating at the same location prior to March 16, 1979.

Montana Power - Station 057 tested each 360-bhp White Superior compressor engine for oxides of nitrogen (NO_x) and carbon monoxide (CO), concurrently, and demonstrated compliance with the emission limits contained in the permit in November of 1993.

MAQP #2770-01 was issued to Montana Power - Station 057 to revise the emission limitation units from grams per brake horsepower-hour (g/bhp-hr) to pounds per hour (lb/hr). The revision allowed flexibility to account for varying parameters such as engine revolutions per minute (rpm), operating load (bhp), ambient air temperature, gas temperature, site, elevation, fuel gas quality, air/fuel ratio (AFR), field gas conditions, etc. Rather than limit the engines to a g/bhp-hr limit, an hourly emission limit allowed additional operational flexibility. Also, to clarify NO_x mass emission calculations, NO_x emission limitations were identified as nitrogen dioxide (NO₂). **MAQP #2770-01** replaced MAQP #2770-00 and on March 7, 1994, MAQP #2770-01 became final.

MAQP #2770-01 was modified to include an hourly operational limit that allowed Montana Power - Station 057 to stay below the Title V Operating Permit threshold. In addition, this permit change updated the rule references in the permit. **MAQP #2770-02** replaced MAQP #2770-01. On September 7, 1997, MAQP #2770-02 became final.

MAQP #2770-02 was amended to address a name change from Montana Power Company to the Montana Power Gas Company. The appropriate references in the permit were changed to reflect the name change. In addition, the permit was updated to reflect the current format used for writing permits. **MAQP #2770-03** replaced MAQP #2770-02 and on March 24, 1999, MAQP #2770-03 became final.

On January 22, 2002, the Department of Environmental Quality (Department) received a notice of corporate merger and name change from the Montana Power Gas Company to PanCanadian Energy Resources, Inc. (PanCanadian). The letter notified the Department that Montana Power Gas Company, Xeno, Inc., and Entech Gas Ventures, Inc., merged into North American Resources Company (NARCO) as of January 1, 2002. The letter also stated that at the same time, NARCO changed its corporate name to PanCanadian. In addition, on April 18, 2002, the Department received a letter from PanCanadian requesting a name change from PanCanadian to EnCana. This permit action transferred the permit from PanCanadian to EnCana and updated the permit with current permit language and rule references used by the Department. **MAQP #2770-04** replaced MAQP #2770-03 and on August 22, 2002, MAQP #2770-04 became final.

On June 5, 2003, the Department received a letter from Aspen Consulting & Engineering, Inc., on behalf of EnCana requesting the Department change the corporate name on MAQP #2770-04 from EnCana Energy Resources, Inc. to EnCana Gathering Services (USA), Inc. This permitting action changed the name from EnCana Energy Resources, Inc., to EnCana Gathering Services (USA), Inc., and updated the permit to reflect current permit language and rule references used by the Department. **MAQP #2770-05** replaced MAQP #2770-04 and on August 16, 2003, MAQP #2770-05 became final.

On April 13, 2005, the Department received a letter from Buys & Associates, Inc., on behalf of EnCana requesting the Department change the corporate name from EnCana Gathering Services (USA), Inc., to EnCana, and update the mailing address. Additionally, EnCana requested that the Department modify Section II.A.5. of MAQP #2770-05 to allow for continuous operation of one compressor engine while keeping the combined hourly operational limit of the two compressor engines the same. This permit action changed the corporate name on MAQP #2770-05, modified Section II.A.5., and updated the emission

inventory to reflect the modification to Section II.A.5. and the most appropriate emissions factors. In addition, MAQP #2770-05 was updated to reflect the current permit language and rule references used by the Department. **MAQP #2770-06** replaced MAQP #2770-05 and on July 10, 2005, MAQP #2770-06 became final.

On October 17, 2005, the Department received an administrative amendment request for the transfer of ownership of MAQP #2770-06 from EnCana Oil and Gas (USA), Inc. (EnCana) to Saga. Further, Saga submitted additional information on the replacement of the dehydrator unit, and submitted this information on November 18, 2005, in response to the Department incompleteness letter. The new dehydrator was reported to have a process rate of 150 MBtu/hr value. In addition, MAQP #2770-06 was updated to reflect the current permit language and rule references used by the Department. **MAQP #2922-07** replaced MAQP #2922-06 and on January 7, 2006, MAQP #2770-07 became final.

On September 16, 2009, the Department received a request to change the mailing address for Saga from 410 17th Street, Suite 1520 to 600 17th Street, Suite 1700N. Also, on December 28, 2009, the Department received a request to remove the BS&B Boiler from the permit as the equipment is no longer at the site. The permit action changed the mailing address, removed the BS&B Boiler from the permitted equipment, and updated the permit to reflect the current format and rule references used by the Department. **MAQP #2770-08** replaced MAQP #2770-07.

On July 26, 2010, the Department received a complete application from Saga for changes to the Big Coulee Field, Station 057. The changes included the removal of one of the 1969 360-bhp White Superior compressor engines, and the addition of a 1990 515-bhp Waukesha engine. The permit action incorporated these changes. **MAQP #2770-09** replaced MAQP #2770-08.

D. Current Permit Action

On January 30, 2012, the Department received a complete application from Saga for a modification to MAQP #2770-09. Additional information was received on February 21, 2012 to complete the application. The proposed modification includes the removal of an existing 360- bhp White Superior compressor engine and the addition of a 2009 122-bhp Caterpillar engine. The current permit action updates the equipment list in the MAQP, revises the emissions inventory, and updates the permit to reflect current permit language and rule references used by the Department. **MAQP #2770-10** replaces MAQP #2770-09.

E. Additional Information

Additional information, such as applicable rules and regulations, BACT/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department. Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.
3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

Saga shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than 4 hours.
5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
2. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
3. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
4. ARM 17.8.213 Ambient Air Quality Standard for Ozone
5. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
6. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
7. ARM 17.8.221 Ambient Air Quality Standard for Visibility
8. ARM 17.8.222 Ambient Air Quality Standard for Lead
9. ARM 17.8.223 Ambient Air Quality Standard for PM₁₀

Saga must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.
2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Saga shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.
4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.
5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. (4) Commencing July 1, 1972, no person shall burn liquid or solid fuels containing sulfur in excess of 1 pound of sulfur per million Btu fired. (5) Commencing July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 dry standard cubic feet (dscf) of gaseous fuel, calculated as hydrogen sulfide at standard conditions. Saga will burn pipeline quality natural gas, which will meet this limitation.
6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.
7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). This facility is not an NSPS affected source because it does not meet the definition of any NSPS subpart defined in 40 CFR Part 60.
 - a. 40 CFR 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:
 - b. 40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE). This subpart applies to owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured on or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 horsepower (except lean burn engines with a maximum engine power greater than or equal to 500 horsepower and less than 1,350 horsepower); on or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 horsepower and less than 1,350 horsepower; on or after July 1, 2008, for engines with a maximum engine power less than 500 horsepower; or on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 kilowatts (25 horsepower).

Also, owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006 are also subject to this standard.

The engine permitted as Source #1 was manufactured in 1990. Should Source #1 be determined modified or reconstructed, Saga would be subject to this subpart. As this permit is written in a de minimis friendly manner, any future engine change-out may potentially make this subpart applicable to Source #1.

The engine permitted as Source #2 in this permitting action was manufactured in 2009. Therefore, Saga would be subject to this subpart for Source #2.

8. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with the requirements of 40 CFR Part 63, as listed below:
- a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to an NESHAP Subpart as listed below:
 - b. 40 CFR 63, Subpart HH - National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities. Owners or operators of oil and natural gas production facilities, as defined and applied in 40 CFR Part 63 shall comply with the applicable provisions of 40 CFR 63, Subpart HH. In order for a natural gas production facility to be subject to 40 CFR 63, Subpart HH requirements, certain criteria must be met. First, a facility must be a major or area source of hazardous air pollutants (HAPs) as determined according to paragraphs (a)(1)(i) through (a)(1)(iii) of 40 CFR 63, Subpart HH. Second, a facility that is determined to be either a major or area source for HAPs must also either process, upgrade, or store hydrocarbon liquids prior to the point of custody transfer, or process, upgrade, or store natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user. Third, the facility must also contain an affected source as specified in paragraphs (b)(1) through (b)(4) of 40 CFR 63, Subpart HH. Finally if the first three criteria are met, and the exemptions contained in paragraphs (e)(1) and (e)(2) of 40 CFR 63, Subpart HH do not apply, the facility is subject to the applicable provisions of 40 CFR 63, Subpart HH. Based on previous information provided by Saga, the Big Coulee Field, Station 057 facility is considered an area source of HAPs that is subject to 40 CFR 63, Subpart HH. For area sources under 40 CFR 63, Subpart HH, the affected sources include each TEG glycol dehydration unit. Therefore, Saga operates an affected source under the area source provisions of Subpart HH.
 - c. 40 CFR 63, Subpart HHH National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities. Owners or operators of natural gas transmission or storage facilities, as defined and applied in 40 CFR Part 63, shall comply with the standards and provisions of 40 CFR 63, Subpart HHH. In order for a natural gas transmission and storage facility to be subject to 40 CFR 63, Subpart HHH requirements, certain criteria must be met. First, the facility must transport or store natural gas prior to the gas entering the pipeline to a local distribution company or to a final end user if there is no local distribution company. In addition, the facility must be a major source of HAPs as determined using the maximum natural gas throughput as calculated in either paragraphs (a)(1) and (a)(2) or paragraphs (a)(2) and (a)(3) of 40 CFR 63, Subpart HHH. Second, a facility must contain an affected source (glycol dehydration unit) as defined in paragraph (b) of 40 CFR 63, Subpart HHH. Finally, if the first two criteria are met, and the exemptions contained in paragraph (f) of 40 CFR 63, Subpart HHH, do not apply, the facility is subject to the applicable provisions of 40 CFR 63, Subpart HHH. Based on the information submitted by Saga, the Big Coulee Field, Station 057 facility is not subject to the provisions of 40 CFR 63, Subpart HHH because the facility is not a major source of HAPs.

40 CFR 63, Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). An owner or operator is subject to this subpart if the stationary RICE is operated at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. Therefore, Saga will be subject to this subpart

D. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. Saga submitted the appropriate permit application fee for the current permit action.
2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an MAQP (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

An air quality operation fee is separate and distinct from an MAQP application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an MAQP or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Saga has a PTE greater than 25 tons per year of oxides of nitrogen (NO_x) and carbon monoxide (CO); therefore, an MAQP is required.
3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.
4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.
5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Saga submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Saga submitted an affidavit of publication of public notice for the January 19, 2012 issue of the *Times Clarion*, a newspaper of general circulation in the Town of Harlowton in Wheatland County, as proof of compliance with the public notice requirements.
6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this

subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.
 8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.
 9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Saga of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.*
 10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.
 11. ARM 17.8.762 Duration of Permit. An MAQP shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.
 12. ARM 17.8.763 Revocation of Permit. An MAQP may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).
 13. ARM 17.8.764 Administrative Amendment to Permit. An MAQP may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.
 14. ARM 17.8.765 Transfer of Permit. This rule states that an MAQP may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.
- F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:
1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source because this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

G. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to :

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:
 - a. PTE > 100 tons/year of any pollutant;
 - b. PTE > 10 tons/year of any one HAP, PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or
 - c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀) in a serious PM₁₀ nonattainment area.
2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #2770-10 for Saga, the following conclusions were made:
 - a. The facility's PTE is less than 100 tons/year for any pollutant.
 - b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.
 - c. This source is not located in a serious PM₁₀ nonattainment area.
 - d. This facility is subject to a current NSPS (40 CFR 60, Subpart JJJJ).
 - e. This facility is subject to area source provisions of current NESHAP standards (40 CFR 63, Subpart HH and 40 CFR 63, Subpart ZZZZ).
 - f. This source is not a Title IV affected source, nor a solid waste combustion unit.
 - g. This source is not an EPA designated Title V source.

Based on these facts, the Department determined that Saga will be a minor source of emissions as defined under Title V.

III. BACT Determination

A BACT determination is required for each new or modified source. Saga shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized. The following control options have been reviewed by the Department in order to make the following BACT determination.

The primary criteria pollutants from natural gas-fired reciprocating engines are NO_x, CO, and VOC. CO and VOC species are primarily the result of incomplete combustion. Particulate matter (PM) emissions include trace amounts of metals, non-combustible inorganic material, and condensable, semi-volatile organics which result from volatilized lubricating oil, engine wear, or from products of incomplete combustion. Sulfur oxides (SO₂) are very low since sulfur compounds are removed from natural gas in forming pipeline quality natural gas. However, trace amounts of sulfur containing odorant are added to pipeline quality natural gas for the purpose of leak detection.

Three generic control techniques have been developed for reciprocating engines: parametric controls (timing and operating at a leaner air-to-fuel ratio); combustion modifications such as advanced engine design (clean-burn cylinder head designs and prestratified charge combustion for rich-burn engines); and post combustion catalytic controls installed on the engine exhaust system. Post-combustion catalytic technologies include selective catalytic reduction (SCR) for lean-burn engines, NSCR for rich-burn engines, and CO oxidation catalysts for lean-burn engines.

The proposed compressor engine is of a 4-stroke rich-burn engine class. These engines may be either naturally aspirated, using the suction from the piston to entrain the air charge, or turbocharged, using an exhaust-driven turbine to pressurize the charge. The proposed engine is naturally aspirated. Rich-burn engines operate near the stoichiometric air-to-fuel ratio with exhaust excess oxygen levels less than 4 percent (typically closer to 1 percent).

NO_x and CO BACT

The only technically feasible option for control of NO_x and CO for the rich-burn 4-stroke compressor engine is NSCR with AFR Control. Selective catalytic reduction and oxidation catalysts require the stoichiometry of a lean-burn engine.

NSCR with AFR

This technique uses the residual hydrocarbons and CO in the rich-burn engine exhaust as a reducing agent for NO_x. In an NSCR, hydrocarbons and CO are oxidized by oxygen (O₂) and NO_x. The excess hydrocarbons, CO, and NO_x pass over a catalyst (usually a noble metal such as platinum, rhodium, or palladium) that oxidizes the excess hydrocarbons and CO to water (H₂O) and carbon dioxide (CO₂), while reducing NO_x to N₂. NO_x reduction efficiencies are usually greater than 90 percent, while CO reduction efficiencies are approximately 90 percent. The NSCR technique is effectively limited to engines with normal exhaust oxygen levels of 4 percent or less. This includes 4-stroke rich-burn naturally aspirated engines and some 4-stroke rich-burn turbocharged engines. Engines operating with NSCR require tight air-to-fuel ratio control to maintain high reduction effectiveness without high hydrocarbon emissions. To achieve effective NO_x reduction performance, the engine may need to be run with a richer fuel adjustment than normal. Therefore, because NSCR requires tight air-to-fuel ratio control to maintain high reduction effectiveness, AFR control is usually required for optimized NSCR operation.

As proposed, the Department determined that a properly operated and maintained 122-bhp rich-burn engine with an NSCR unit and AFR controller constitutes BACT for NO_x and CO. The resulting BACT limit will be 1.0 g/bhp-hr and 2.0 g/bhp-hr for NO_x and CO respectively. A rich-burn engine equipped with an NSCR unit and an AFR controller is frequently used in the natural gas compression industry and the BACT determination is consistent with other recently permitted similar

VOC BACT

The Department is not aware of any BACT determinations that have required controls for VOC emissions alone from compressor engines. The uncontrolled potential to emit of VOC emissions is relatively small and any add-on controls specifically installed for VOC emissions would be cost prohibitive.

However, the NSCR technology selected as BACT for NO_x and CO also reduces VOC emissions. The Department determined that no additional controls for control of VOC emissions, with proper operations and maintenance of the control equipment and engine, constitutes BACT for VOC emissions.

As proposed by Saga, the BACT limit will be 0.7 g/bhp-hr for VOC, based on the rates guaranteed by the control technology vendor.

PM and SO₂ BACT

The Department is not aware of any BACT determinations that have required controls for PM or SO₂ emissions from natural gas fired compressor engines. The uncontrolled potential to emit of PM and SO₂ emissions are relatively small and any add-on controls installed for PM or SO₂ emissions only would be cost prohibitive. The Department has determined that the burning of Pipeline Quality Natural Gas constitutes BACT for PM and SO₂.

IV. Emission Inventory

Source	Tons/Year							
	PM	PM ₁₀	PM _{2.5}	NO _x	VOC	CO	SO ₂	HAPs
515-bhp 4-stroke rich-burn compressor engine	0.98	0.98	0.98	2.49	1.49	2.49	0.01	1.36
122-bhp Caterpillar Compressor Engine	0.08	0.08	0.08	1.18	0.82	2.36	0.0024	0.05
NATCO Dehy Reboiler 150 MBtu/hr	0.01	0.01	0.01	0.08	0.004	0.07	0.001	ND
TEG Dehy Vent Emissions					10.12			ND
Various Building Heaters < 1 MMBtu/hr	0.04	0.04	0.04	0.53	0.03	0.44	0.003	
Pneumatic Valves					0.55			
Total :	1.11	1.11	1.11	4.28	13.01	5.36	0.016	1.41

*Emissions Inventory and Calculation Notes:

- bhp = brake horsepower
- Btu = british thermal unit
- CH₂O = formaldehyde
- HAP = hazardous air pollutant
- hr = hour
- lb = pound
- MM denotes 10⁶, M denotes 10³
- N/A = not applicable
- ND = no data available
- PM = particulate matter
- PM₁₀ = particulate matter with an aerodynamic diameter of 10 microns or less
- PM_{2.5} = particulate matter with an aerodynamic diameter of 2.5 microns or less
- SO₂ = oxides of sulfur
- SO₂ = sulfur dioxide
- scf = standard cubic feet
- VMT = vehicle miles traveled

SOURCE #01 515-bhp 4-Stroke Rich-Burn Compressor Engine

515 bhp 4-stroke rich-burn compressor engine

Rated bhp: 515 bhp (MAQP 2770-09 application)
 Hours of Operation: 8760 hr/yr

NO_x Emissions - controlled

Emissions Factor: 0.5 g/bhp-hr (BACT - MAQP 2770-09)

Calculations: $0.5 \text{ g/bhp-hr} * 515 \text{ bhp} * 8760 \text{ hr/yr} * 0.002205 \text{ lb/g} = 4973.82 \text{ lb/yr}$

CO Emissions - controlled

Emissions Factor: 0.5 g/bhp-hr (BACT - MAQP 2770-09)
Calculations: $0.5 \text{ g/bhp-hr} * 515 \text{ bhp} * 8760 \text{ hr/yr} * 0.002205 \text{ lb/g} = 4973.82 \text{ lb/yr}$

VOC Emissions - controlled

Emissions Factor: 0.3 g/bhp-hr (BACT - MAQP 2770-09)
Calculations: $0.3 \text{ g/bhp-hr} * 515 \text{ bhp} * 8760 \text{ hr/yr} * 0.002205 \text{ lb/g} = 2984.29 \text{ lb/yr}$

HAPs Emissions

Emissions Factor: 0.0671 lb/MMBtu AP-42 Table 3.2-2 (07/2000)
Max Fuel Rate: 9000 Btu/bhp-hr Dept estimate - likely conservative
Calculations: $9000 \text{ Btu/bhp-hr} * 515 \text{ bhp} * 8760 \text{ hr/yr} * 0.0671 \text{ lb/MMBtu} = 2725.16 \text{ lb/yr}$
 $2725.168555008 \text{ lb/yr} * 0.0005 \text{ lb/ton} = 1.36 \text{ ton/yr}$

PM Emissions

Emissions Factor: 0.0483 lb/MMBtu AP-42 Table 3.2-2 (07/2000) including condensable
Max Fuel Rate: 9000 Btu/bhp-hr
Calculations: $9000 \text{ Btu/bhp-hr} * 0.5 \text{ g/bhp-hr} * 515 \text{ bhp} * 8760 \text{ hr/yr} * 0.002205 \text{ lb/g} = 1961.51 \text{ lb/yr}$
 $1961.511606 \text{ lb/yr} * 0.0005 \text{ lb/ton} = 0.98 \text{ ton/yr}$

SO₂ Emissions

Emissions Factor: 0.0006 lb/MMBtu AP-42 Table 3.2-2 (07/2000) including condensable
Max Fuel Rate: 9000 Btu/bhp-hr
Calculations: $9000 \text{ Btu/bhp-hr} * 0.000588 \text{ lb/MMBtu} = 23.873 \text{ lb/yr}$
 $23.8743288 \text{ lb/yr} * 0.0005 \text{ lb/ton} = 0.01 \text{ ton/yr}$

SOURCE #02 122 bhp Caterpillar 4 Stroke Rich-burn Compressor Engine

Brake Horsepower: 122 bhp
Max Fuel Rate: $7,775 \text{ Btu/bhp-hr} = 7.78\text{E-}03 \text{ MMBtu/bhp-hr}$ (application)
Hours of operation: $8,760 \text{ hr/yr}$

PM/PM₁₀/PM_{2.5} Emissions (Filterable & Condensable)

Emission Factor: $1.941\text{E-}02 \text{ lb/MMBtu}$ (filterable + condensable; AP-42, Chapter 3, Table 3.2-3, 7/00)
Calculations: $7.78\text{E-}03 \text{ MMBtu/bhp-hr} * 122 \text{ bhp} * 1.941\text{E-}02 \text{ lb/MMBtu} = 0.184 \text{ lb/hr}$
 $0.184 \text{ lb/hr} * 8,760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.08 \text{ ton/yr}$

NO_x Emissions

Emission factor: $1.0 \text{ gram/bhp-hour}$ (BACT and 40 CFR 60 Subpart JJJ)
Calculations: $1.0 \text{ gram/bhp-hour} * 122 \text{ bhp} * 0.002205 \text{ lb/gram} = 0.27 \text{ lb/hr}$
 $0.27 \text{ lb/hr} * 8,760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 1.18 \text{ ton/yr}$

VOC Emissions

Emission factor: $0.7 \text{ gram/bhp-hour}$ (BACT and 40 CFR 60 Subpart JJJ)
Calculations: $0.7 \text{ gram/bhp-hour} * 122 \text{ bhp} * 0.002205 \text{ lb/gram} = 0.19 \text{ lb/hr}$
 $0.19 \text{ lb/hr} * 8,760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.82 \text{ ton/yr}$

CO Emissions

Emission factor: $2.0 \text{ gram/bhp-hour}$ (BACT and 40 CFR 60 Subpart JJJ)
Calculations: $2.0 \text{ gram/bhp-hour} * 122 \text{ bhp} * 0.002205 \text{ lb/gram} = 0.54 \text{ lb/hr}$
 $0.54 \text{ lb/hr} * 8,760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 2.36 \text{ ton/yr}$

SO₂ Emission

Emission factor: 5.88E-04 lb/MMBtu (AP-42, Chapter 3, Table 3.2-3, 7/00)
Fuel Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 7.78E-03 MMBtu/bhp-hr * 122 bhp * 5.88E-04 lb/MMBtu = 0.0006 lb/hr
0.0006 lb/hr * 8,760 hr/yr * 0.0005 ton/lb = 0.0024 ton/yr

HCOH (Formaldehyde) Emissions

Emission factor: 2.05E-02 lb/MMBtu (AP-42, Chapter 3, Table 3.2-3, 7/00)
Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 2.05E-02 lb/MMBtu * 122 bhp * 7.78E-03 MMBtu/bhp-hr = 0.0195 lb/hr
0.0195 lb/hr * 8,760 hr/yr * 0.0005 ton/lb = 0.09 ton/yr

HAPs Emission

Emission factor: 1.192E-02 lb/MMBtu (AP-42, Chapter 3, Table 3.2-3, 7/00)
Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 7.78E-03 MMBtu/bhp-hr * 122 bhp * 1.192E-02 lb/MMBtu = 0.011 lb/hr
0.011 lb/hr * 8,760 hr/yr * 0.0005 ton/lb = 0.05 ton/yr
Formaldehyde: 0.09 ton/yr (see above)
Total HAPs: 0.09 ton/yr + 0.05 ton/yr = 0.14 ton/yr

CO₂ Emissions

Emission factor: 53.02 kg/MMBtu = (40 CFR 98, Subpart C Table C-1)
Fuel Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 7.78E-03 MMBtu/bhp-hr * 122 bhp * 53.02 kg/MMBtu = 50.292 kg/hr
50.29 kg/hr * 8,760 hr/yr * 0.001 kg/metric ton = 440.56 metric ton/yr
440.56 metric ton/yr * 1.10 ton/metric ton = 484.61 ton/yr

CH₄ Emissions

Emission factor: 1.00E-03 kg/MMBtu = (40 CFR 98, Subpart C Table C-2)
Fuel Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 7.78E-03 MMBtu/bhp-hr * 122 bhp * 1.00E-03 kg/MMBtu = 0.001 kg/hr
0.001 kg/hr * 8,760 hr/yr * 0.001 kg/metric ton = 0.01 metric ton/yr
0.01 metric ton/yr * 1.10 ton/metric ton = 0.01 ton/yr

N₂O Emissions

Emission factor: 1.00E-04 kg/MMBtu = (40 CFR 98, Subpart C Table C-2)
Fuel Consumption: 7.78E-03 MMBtu/bhp-hr (Maximum Design)
Calculations: 7.78E-03 MMBtu/bhp-hr * 122 bhp * 1.00E-04 kg/MMBtu = 0.0001 kg/hr
0.0001 kg/hr * 8,760 hr/yr * 0.001 kg/metric ton = 0.001 metric ton/yr
0.001 metric ton/yr * 1.10 ton/metric ton = 0.001 ton/yr

SOURCE #03 NATCO Dehy Reboiler 150 MBtu/hr

Hours of Operation: 8,760 hr/yr
Fuel Heating Value: 842.30 Btu/scf {Company Information}
or 0.0012 MMscf/MMBtu
Max Fuel Combustion Rate: 0.150 MMBtu/hr {Company Information}
0.150 MMBtu/hr * 0.0012 MMscf/MMBtu = 0.00018 MMscf/hr

PM Emissions

Emission Factor: 7.60 lb/MMscf {AP-42, 1.4-2}
Hourly Calculations: 7.60 lb/MMscf * 0.00018 MMscf/hr = 0.0014 lb/hr
Daily Calculations: 0.0014 lb/hr * 24.00 hr/day = 0.04 lb/day
Annual Calculations: 0.0014 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 0.01 ton/yr

PM₁₀ Emissions

Emission Factor: 7.60 lb/MMscf {AP-42, 1.4-2}
Hourly Calculations: 7.60 lb/MMscf * 0.00018 MMscf/hr = 0.0014 lb/hr

Daily Calculations: $0.0014 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.04 \text{ lb/day}$
Annual Calculations: $0.0014 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.01 \text{ ton/yr}$

NO_x Emissions

Emission Factor: 100.000 lb/MMscf {AP-42, 1.4-1, 7/98}
Hourly Calculations: $100.000 \text{ lb/MMscf} * 0.00018 \text{ MMscf/hr} = 0.018 \text{ lb/hr}$
Daily Calculations: $0.018 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.43 \text{ lb/day}$
Annual Calculations: $0.018 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.08 \text{ ton/yr}$

VOC Emissions

Emission Factor: 5.500 lb/MMscf {AP-42, 1.4-2, 7/98}
Hourly Calculations: $5.500 \text{ lb/MMscf} * 0.00018 \text{ MMscf/hr} = 0.001 \text{ lb/hr}$
Daily Calculations: $0.001 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.03 \text{ lb/day}$
Annual Calculations: $0.001 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.004 \text{ ton/yr}$

CO Emissions

Emission Factor: 84.000 lb/MMscf {AP-42, 1.4-1, 7/98}
Hourly Calculations: $84.000 \text{ lb/MMscf} * 0.00018 \text{ MMscf/hr} = 0.0151 \text{ lb/hr}$
Daily Calculations: $0.0151 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.36 \text{ lb/day}$
Annual Calculations: $0.0151 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.07 \text{ ton/yr}$

SO₂ Emissions

Emission Factor: 0.6000 lb/MMscf {AP-42, 1.4-2, 7/98}
Hourly Calculations: $0.6000 \text{ lb/MMscf} * 0.00018 \text{ MMscf/hr} = 0.0001 \text{ lb/hr}$
Daily Calculations: $0.0001 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.003 \text{ lb/day}$
Annual Calculations: $0.0001 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.0004 \text{ ton/yr}$

SOURCE #04 Dehydrator Vent Emissions

The emissions were calculated using the GRI-GLYCalc program.

Uncontrolled Regenerator Emissions - VOC: 10.13 ton/yr

Hours of operation: 8760 hr/yr

Dehydrator Still Vent

VOC Emissions

Emission Factor: 2.31 lb/hr (GRI-GLYCalc, Version 4.0)
Calculations: $2.31 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 10.12 \text{ ton/yr}$

Source #05 Various Building Heaters <1 MMBtu/hr

Hours of Operation: 8,760 hr/yr or 24 hr/day
Fuel Heating Value: 842.30 Btu/scf {Company Information}
or 0.0012 MMscf/MMBtu
Max Fuel Combustion Rate: 1.00 MMBtu/hr {Company Information}
 $1.000 \text{ MM Btu/hr} * 0.0012 \text{ MMscf/MMBtu} = 0.0012 \text{ MMscf/hr}$

PM Emissions

Emission Factor: 7.60 lb/MMscf {AP-42, 1.4-2, 7/98}
Hourly Calculations: $7.60 \text{ lb/MMscf} * 0.0012 \text{ MMscf/hr} = 0.009 \text{ lb/hr}$
Daily Calculations: $0.009 \text{ lb/hr} * 24.00 \text{ hr/day} = 0.22 \text{ lb/day}$
Annual Calculations: $0.009 \text{ lb/hr} * 8760 \text{ hr/yr} * 0.0005 \text{ ton/lb} = 0.04 \text{ ton/yr}$

PM₁₀ Emissions

Emission Factor: 7.60 lb/MMscf {AP-42, 1.4-2, 7/98}

Hourly Calculations: $7.60 \text{ lb/MMscf} \times 0.0012 \text{ MMscf/hr} = 0.009 \text{ lb/hr}$
Daily Calculations: $0.009 \text{ lb/hr} \times 24.00 \text{ hr/day} = 0.22 \text{ lb/day}$
Annual Calculations: $0.009 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.04 \text{ ton/yr}$

NO_x Emissions

Emission Factor: 100.000 lb/MMscf {AP-42, 1.4-1}
Hourly Calculations: $100.000 \text{ lb/MMscf} \times 0.0012 \text{ MMscf/hr} = 0.12 \text{ lb/hr}$
Daily Calculations: $0.12 \text{ lb/hr} \times 24.00 \text{ hr/day} = 2.88 \text{ lb/day}$
Annual Calculations: $0.12 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.53 \text{ ton/yr}$

VOC Emissions

Emission Factor: 5.500 lb/MMscf {AP-42, 1.4-1}
Hourly Calculations: $5.500 \text{ lb/MMscf} \times 0.0012 \text{ MMscf/hr} = 0.007 \text{ lb/hr}$
Daily Calculations: $0.007 \text{ lb/hr} \times 24.00 \text{ hr/day} = 0.16 \text{ lb/day}$
Annual Calculations: $0.007 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.03 \text{ ton/yr}$

CO Emissions

Emission Factor: 84.000 lb/MMscf {AP-42, 1.4-1}
Hourly Calculations: $84.000 \text{ lb/MMscf} \times 0.0012 \text{ MMscf/hr} = 0.1008 \text{ lb/hr}$
Daily Calculations: $0.1008 \text{ lb/hr} \times 24.00 \text{ hr/day} = 2.42 \text{ lb/day}$
Annual Calculations: $0.1008 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.44 \text{ ton/yr}$

SO₂ Emissions

Emission Factor: 0.6000 lb/MMscf {AP-42, 1.4-1}
Hourly Calculations: $0.6000 \text{ lb/MMscf} \times 0.0012 \text{ MMscf/hr} = 0.0007 \text{ lb/hr}$
Daily Calculations: $0.0007 \text{ lb/hr} \times 24.00 \text{ hr/day} = 0.02 \text{ lb/day}$
Annual Calculations: $0.0007 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.003 \text{ ton/yr}$

Source #06 Pneumatic Valves

Hours of Operation: 8,760 hr/yr or 24 hr/day
Fuel Usage: 90 scf/hr {Company Information}
Weight % of VOC in Gas Stream: 2.9380 {Company Information}
Relative Mole Weight: 18.106 lb/lb-mol {Company Information}

VOC Emissions

Hourly Calculations: $90.00 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 18.1060 \text{ lb/lb-mole} \times 0.02938 = 0.126 \text{ lb/hr}$
Daily Calculations: $0.126 \text{ lb/hr} \times 24.00 \text{ hr/day} = 3.03 \text{ lb/day}$
Annual Calculations: $0.126 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 0.0005 \text{ ton/lb} = 0.55 \text{ ton/yr}$

V. Existing Air Quality

The SE¹/₄ of Section 25, Township 5 North, Range 19 East, in Golden Valley County, Montana is currently designated attainment/unclassifiable for all criteria pollutants.

VI. Ambient Air Impact Analysis

The Department determined that the impact from this permitting action will be minor. The Department believes it will not cause or contribute to a violation of any ambient air quality standard.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
XX		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	XX	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	XX	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	XX	4. Does the action deprive the owner of all economically viable uses of the property?
	XX	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	XX	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	XX	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	XX	7a. Is the impact of government action direct, peculiar, and significant?
	XX	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	XX	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	XX	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued To: Saga Petroleum, LLC
600 17th Street, Suite 1700 N
Denver, CO 80202

Montana Air Quality Permit Number (MAQP): 2770-10

Preliminary Determination Issued: February 27, 2012

Department Decision Issued: March 13, 2012

Permit Final: March 30, 2012

1. *Legal Description of Site:* SE ¼ of the SE¼ of Section 25, Township 5 North, Range 19 East, in Golden Valley County, Montana.
2. *Description of Project:* To remove one 360-brake horsepower (bhp) compressor engine from the MAQP and add one 122-bhp engine in its place.
3. *Objectives of Project:* To continue to compress and dehydrate natural gas for distribution through the natural gas pipeline.
4. *Alternatives Considered:* In addition to the proposed action, the Department also considered the “no-action” alternative. The “no-action” alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the “no-action” alternative to be appropriate because Saga demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the “no-action” alternative was eliminated from further consideration.
5. *A Listing of Mitigation, Stipulations, and Other Controls:* A list of enforceable conditions, including a Best Available Control Technology (BACT) analysis, would be included in MAQP #2770-10.
6. *Regulatory Effects on Private Property:* The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The “no-action” alternative was discussed previously.

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats			XX			Yes
B	Water Quality, Quantity, and Distribution			XX			Yes
C	Geology and Soil Quality, Stability and Moisture			XX			Yes
D	Vegetation Cover, Quantity, and Quality			XX			Yes
E	Aesthetics			XX			Yes
F	Air Quality			XX			Yes
G	Unique Endangered, Fragile, or Limited Environmental Resources			XX			Yes
H	Demands on Environmental Resource of Water, Air and Energy			XX			Yes
I	Historical and Archaeological Sites			XX			Yes
J	Cumulative and Secondary Impacts			XX			Yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats

Through the BACT process, MAQP #2770-10 would require the proposed compressor engine to be equipped with control technology. These controls greatly reduce the potential emissions from this source. Overall, the additional allowable emissions as a result of the permitting action would result in a very small increase, on an industrial scale, of all criteria pollutants. The Department would expect minor impacts to terrestrials and aquatic life and habitats.

B. Water Quality, Quantity and Distribution

This project would not result in regular usage of water during normal operations, with the exception of small amounts of water which may be required for fugitive dust control. Furthermore, the controls that would be required in issuance of MAQP #2770-10 would result in an emissions increase which is very small on an industrial scale. Therefore, the Department would expect minor, if any, impacts to water quality, quantity, and distribution.

C. Geology and Soil Quality, Stability and Moisture

Small amounts of water may be required for fugitive dust control of the access roads and the general facility property during installation and as needed during regular operations. Any change in the deposition of pollutants would be expected to be very minor as the change in emissions associated with this project would be small as a result of the control requirements that would be placed in MAQP #2770-10, and the dispersion of those emissions. Impacts to geology and soil quality, stability, and moisture would be expected to be minor.

D. Vegetation Cover, Quantity, and Quality

The current permitting action would take place at an existing facility. Therefore, any impacts to vegetation cover, quantity, and quality would be expected to be minor, if any.

E. Aesthetics

The proposed project would be to install a compressor engine at an already existing industrial natural gas facility. A minor impact to aesthetics may be expected.

F. Air Quality

MAQP #2770-10 would require emission controls on the proposed compressor engine. These emission controls would greatly reduce the potential emissions from this source. Furthermore, the conditions and limitations which would be part of MAQP #2770-10 are derived from rules designed to protect air quality. Therefore, impacts to air quality would be expected to be minor.

G. Unique Endangered, Fragile, or Limited Environmental Resources

MAQP #2770-10 would require emissions controls on the proposed compressor engine. The resulting allowable emissions from the proposed engine would be very small on an industrial scale. Therefore, the Department would expect minor, if any, effects to unique endangered, fragile, or limited environmental resources.

H. Demands on Environmental Resource of Water, Air and Energy

The project would be to install a natural gas compressor engine. This engine would be fired on natural gas. However, the engine would be required to ensure proper distribution of natural gas through the pipeline. As described in Section 7.B above, the proposed project would not result in water usage as a part of normal operations of the compressor engine. However, small amounts of water may be required for fugitive dust control of the access roads and the general facility property during installation and as needed during normal operations. As described in Section 7.F above, impacts to air quality would be expected to be minor. Overall, the demands on the environmental resources of water, air, and energy would be expected to be minor.

I. Historical and Archaeological Sites

Minor, if any, affects to any historical or archaeological sites would be expected as a result of this project as the current project would take place within an already developed compressor station site.

J. Cumulative and Secondary Impacts

Potential physical and biological effects of any individual considerations above would be expected to be minor. Collectively, the potential cumulative and secondary impacts would be expected to be minor.

8. *The following table summarizes the potential economic and social effects of the proposed project on the human environment. The “no-action” alternative was discussed previously.*

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores			XX			Yes
B	Cultural Uniqueness and Diversity			XX			Yes
C	Local and State Tax Base and Tax Revenue			XX			Yes
D	Agricultural or Industrial Production			XX			Yes
E	Human Health			XX			Yes
F	Access to and Quality of Recreational and Wilderness Activities			XX			Yes
G	Quantity and Distribution of Employment			XX			Yes
H	Distribution of Population			XX			Yes
I	Demands for Government Services			XX			Yes
J	Industrial and Commercial Activity			XX			Yes
K	Locally Adopted Environmental Plans and Goals			XX			Yes
L	Cumulative and Secondary Impacts			XX			Yes

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The following comments have been prepared by the Department.

A. Social Structures and Mores

The current project would replace an existing compressor engine at an existing industrial site. No additional employment is expected as a result of this project. Minor, if any, effects to social structures and mores would be expected as a result of this project.

B. Cultural Uniqueness and Diversity

The current project would replace an existing compressor engine at an existing industrial site. No additional employment is expected as a result of this project. Minor, if any, effects to cultural uniqueness and diversity would be expected as a result of this project.

C. Local and State Tax Base and Tax Revenue

The current project would replace an existing compressor engine at an existing industrial site. Impacts to local and state tax base and revenue associated with this project would be expected to be minor.

D. Agricultural or Industrial Production

The current project would take place at an existing industrial facility. Impacts from the installation of the engine would be expected to be minor. Limitations and conditions in MAQP #2770-10 would minimize allowable emissions. As the current project would replace an existing compressor engine at an existing industrial site, effects to agricultural or industrial production would be expected to be minor.

E. Human Health

The current project would replace an existing compressor engine at an existing industrial site. MAQP #2770-10 would contain conditions and limitations derived from rules designed to protect human health. The application indicated noise levels created by the proposed project would be approximately 195 dBA at less than 1 meter. Impacts to human health would be expected to be minor.

F. Access to and Quality of Recreational and Wilderness Activities

The current project would take place at an existing facility. Any effects to the quality of recreational and wilderness activities would be expected to be minor.

G. Quantity and Distribution of Employment

No additional employment is expected as a result of this project. Any effects to quantity and distribution of employment would be expected to be minor.

H. Distribution of Population

Installation of the proposed compressor engine may require a temporary increase of activity in the area. However, no additional permanent employment would be expected as a result of this project. Therefore, any effects to quantity and distribution of employment or distribution of population would be expected to be minor.

I. Demands for Government Services

The proposed compressor engine would require the proper permitting and associated compliance activities from the state. Effects to the demands for government services would be expected to be minor.

J. Industrial and Commercial Activity

As the proposed engine would operate at an already existing industrial site, any effects to industrial and commercial activity would be expected to be minor.

K. Locally Adopted Environmental Plans and Goals

The Department is not aware of any locally adopted environmental plans and goals affected by the issuance of MAQP #2770-10. The MAQP would contain limits for protecting air quality and keeping facility emissions in compliance with state and federal air quality standards.

L. Cumulative and Secondary Impacts

Potential economic and social effects of any individual considerations above would be expected to be minor. The Department has determined that collectively, the potential cumulative and secondary impacts would be expected to be minor.

Recommendation: No Environmental Impact Statement (EIS) is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The current permitting action is for the construction and operation of a compressor engine. MAQP #2770-10 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau.

EA prepared by: Deanne Fischer

Date: February 15, 2012