

**TECHNICAL REVIEW DOCUMENT**  
**for**  
**OPERATING PERMIT 95OPLO105**  
to be issued to:

KN Energy, Inc.  
Yenter Gas Processing Plant  
Logan County  
Source ID 0750029

I. Purpose:

This document will establish 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 and during Public Comment. The conclusions made in this report are based on information provided in the original application submittal of December 18, 1995, additional information received on October 28, 1997, and a review of APCD files. This facility and the KN Gas Gathering, Inc Yenter Compressor Station are considered one source by the Division. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

On April 16, 1998 the Colorado Air Quality Control Commission directed the Division to implement new procedures regarding the use of short term emission and production/throughput limits on Construction permits. These procedures are being directly implemented in all operating permits that had not started their Public Comment period as of April 16, 1998. All short term emission and production/throughput limits that appeared in the construction permits associated with this facility that are not required by a specific State or Federal standard or by the above referenced Division procedures have been deleted and all annual emission and production/throughput limits converted to a rolling 12 month total. Note that, If applicable, appropriate modeling to demonstrate compliance with the National Ambient Air Quality Standards was conducted as part of the Construction Permit processing procedures. If required by this permit, portable monitoring results and/or EPA reference test method results will be multiplied by 8760 hours for comparison to annual emission limits unless there is a specific condition in the permit restricting hours of operation.

II. Source Description:

This source is classified as a natural gas processing facility defined under Standard Industrial Classification 1321. Gas is compressed by two (2) Internal Combustion Engines to power compressor units then it is contacted with ethylene glycol to remove water. The gas is then sent to a demethanizer that separates liquid product

and natural gas. The only other significant activity is fugitive loss of VOCs from equipment leaks.

The facility is located in Logan County about 9 miles northwest of Sterling in an area designated as attainment for all criteria pollutants. This facility is not within 100 km of a Class I area but is within 50 miles of two (2) states, Nebraska and Wyoming. This source is subject to 40 CFR Part 60, Subpart KKK Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants. This source is considered to be a major source in an attainment area (Potential to Emit > 250 tons per year) and is considered major for purposes of Prevention of Significant Deterioration (PSD) regulations. Future modifications to this facility which are in excess of significance levels as defined in Colorado Regulation No. 3, Part A, Section I.B.58 will result in the application of the PSD review requirements. This facility is not subject to any Maximum Achievable Control Technology (MACT) standards at the time of permit issuance. However, a future MACT standard is being developed for operations at Oil and Gas facilities which may apply to this facility. The application certifies that the facility is subject to the provisions of section 112(r) of the Clean Air Act. The source indicated in their Title V application, that they consider themselves in compliance with all current applicable requirements. Facility wide emissions are as follows:

<u>Pollutant</u>	<u>Potential Emissions (tpy)</u>	<u>Actual Emissions (tpy)</u>
NOX	376.11	376.11
CO	89.25	89.25
VOC	135.81	135.81
HAPs	2.43	2.43

Facility wide potential emissions are based on worst case emissions at equipment maximum design rates (grandfathered units) and permit limits. The above emissions include the compressor station emissions. Actual emissions are based on recent APENs submitted with the application and additional information.

The processing plant was originally a grandfathered source, installed prior to 1972. Most of the equipment was removed from the site and replaced with two (2) engines and a dehydration unit (equipment permitted below) in 1989. The net result was a decrease in emissions of air pollutants at the site. Therefore, PSD review was not triggered with the addition of the permitted 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 E166- Caterpillar G398TASI, 4 Cycle Rich Burn, Internal Combustion Engine in Refrigeration Service, Maximum Rated at 500HP, SN: 73BI453, Natural Gas Fired. (1989)**

**Unit E167 - Waukesha 1197GU, 4 Cycle Rich Burn, Internal Combustion Engine, Maximum Rated at 126 HP, SN: 158559, Natural Gas Fired. (1989)**

Discussion:

**1. Applicable Requirements-** These engines were installed in 1989 and have Colorado Initial Approval Construction Permits 89LO295-1 and -2 with the following applicable requirements: visible emissions shall not exceed 20% Opacity; emissions of air pollutants limitations; consumption of natural gas limitations; and Air Pollution Emission Notice (APEN) Reporting in accordance with Regulation 3, Part A.II.

To account for the use of the lower heating value in the calculation of emissions the throughput limit above has been increased by 10%. The changes have been directly incorporated into the operating permit.

The short term limits have been removed per policy change stated above.

The due date of the first semi-annual monitoring report required by this operating permit will be more than 180 days after the initial approval construction permits were issued and/or the equipment commenced operation. Therefore, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permits 89LO295-1 and -2 and the appropriate provisions of the construction permits have been directly incorporated into this operating permit.

**2. Emission Factors-** Emissions from these 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 (NOX), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted when combustion is incomplete.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>AP-42</u>
NOX	3.4 lb/MMBtu	2.3 lb/MMBtu
CO	0.43 lb/MMBtu	1.6 lb/MMBtu
VOC	0.14 lb/MMBtu	0.03 lb/MMBtu

The AP-42 values above are from Table 3.2-1 for 4 cycle rich burn engines. Emission factors used are below AP-42 values for CO.

**3. Monitoring Plan-** KN Energy will calculate emissions for fee purposes based on fuel consumption. Specific monitoring guidance for Internal

Combustion engines located in attainment areas has been developed by the Division as shown on the attached grid titled, "Compliance/Scenario Summary - Gas Fired IC Engines." The emission factors proposed are below AP-42 factors for CO. Therefore, the source will be required to conduct the emission calculations and fuel consumption monthly and submit Revised APENs per Colorado Regulation 3, Part A.II. The source will also be required to perform quarterly portable monitoring to ensure that CO emissions are within emission limits. Because NOx and CO emissions from internal combustion engines are related, both pollutants shall be monitored for compliance. Compliance with the Opacity standard of 20% will be ensured by a certification that the engine has used natural gas exclusively during the reporting period. The Division has determined, based on AP-42 emission factors and engineering judgement, that particulate emissions from this engine will be insignificant if the listed condition is met. The BTU Content of the natural gas used shall be calculated using the most recent gas analysis in the equation below:

$$EV_{BTU} = \frac{\sum_i (C_i \text{ (lb/hr)})(H_i \text{ (BTU/lb)})}{1000}$$

where:  $C_i$  = carbon content of gas in %  
 $H_i$  = heat of carbon (varies with gas) at 60 °F, 4.06 grains BTU/lb

**4. Compliance Status-** A current APEN reporting criteria emissions is on file with the Division. KN certified within the application that natural gas has been used exclusively as the fuel for these units and that they believe the units to be in compliance. An examination of the source file found no outstanding compliance issues. Therefore, these engines are currently considered to be in compliance with all applicable requirements.

**Unit D001 - Enertek REB3983, Ethylene Glycol Dehydrator, Equipped with Reboiler, Design Rate 300,000 Btu/hr, SN: 43482 (1995)**

Discussion:

**1. Applicable Requirements-**This Unit was last modified in January 1995, and has an initial approval construction permit 91LO133 with the following applicable requirements: Visible emissions shall not exceed twenty percent (20%) opacity, emissions of air pollutants shall not exceed 9.41 tons per year and 2.2 pounds per hour Volatile Organic Compounds (VOC), processing of natural gas shall not exceed 1,825 MMSCF/yr and 5.0 MMscf/day, and the glycol recirculation rate shall not exceed 1.5 gallons per minute.

The short term limits have been removed per policy change stated above.

A future MACT standard is being developed for operations at Oil and Gas facilities which may apply to this unit. Until such time as this rule is promulgated, no control requirements exist for this point.

The due date of the first semi-annual monitoring report required by this operating permit will be more than 180 days after the initial approval construction permit was issued and/or the equipment commenced operation. Therefore, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permit 91LO133 and the appropriate provisions of the construction permit have been directly incorporated into this operating permit.

**2. Emission Factors-** Ethylene glycol is contacted with the natural gas stream to remove moisture. This mixture is heated in the still vent portion of the unit which drives off the water and some entrained VOCs. Emissions from this process are typically predicted using the Gas Research Institute's GLYCalc (Version 2 or higher) Model. Emission factors of VOCs and various HAPs are dependent upon the variables input into this Model. These variables include glycol recirculation rate, cubic feet of gas processed, desired moisture content (dew point) of processed gas, and percentage breakdown by weight of constituents in the natural gas. Combustion emissions from the heater are exhausted through a separate stack. This heater falls under the insignificant activity category of Colorado Reg. 3, Part C, Section II.E.3.k. Therefore, these emissions do not need to be included in the Operating Permit.

### **HAP Emissions**

The following emissions of hazardous air pollutants are not limited by construction permit 91LO133 but are APEN reportable. This information is listed to inform the operator of the Division's analysis of the specific compounds. This information is listed on the Division's emission inventory system.

<b>CAS NO.</b>	<b>Hazardous Air Pollutant</b>	<b>Pounds/Year</b>
71-43-2	Benzene	593.4
110-54-2	(n-)Hexane	1327.4
108-88-3	Toluene	1190.4
107-21-1	Ethylene glycol	1752.0

**3. Monitoring Plan-** KN Energy will use the GRI GLYCalc (version 2.0 or higher) Model to predict annual emissions of VOC and HAPs from the still vent of this dehydration unit to verify fees using worst-case scenario parameters. Daily recording of these parameters and quarterly gas analysis will be conducted as outlined in Condition 2.1 of the Draft Operating Permit to insure accurate input to the Model.

**4. Compliance Status-** A current APEN reporting criteria emissions is on file with the Division. A review of APCD files has revealed no outstanding compliance issues. Therefore, this facility is currently considered to be in compliance with all applicable requirements.

### **Unit F001 - Fugitive Emissions of VOCs from Equipment Leaks**

Discussion:

**1. Applicable Requirements-** The Division had made the determination that Fugitive VOC emissions from equipment leaks at gas compression or processing facilities must be calculated and evaluated for the appropriate permitting requirements. Therefore there is an initial approval construction permit 89LO295-5 for fugitive emissions at this source with the following applicable requirements: 40 CFR Part 60, Subpart KKK requirements include inspection, maintenance, record keeping and reporting requirements; emissions of air pollutants shall not exceed 93 tons per year VOCs; and APEN reporting in accordance with Regulation 3, Part A.II.

The due date of the first semi-annual monitoring report required by this operating permit will be more than 180 days after the initial approval construction permit was issued and/or the equipment commenced operation. Therefore, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permit 89LO295-5 and the appropriate provisions of the construction permit have been directly incorporated into this operating permit.

**2. Emission Factors-** KN has calculated emissions from equipment leaks based on emission factors from EPA's Protocol for Emission Leak Estimates. Factors are multiplied by the number of components of each type (e.g. Compressor Seals) and the VOC weight percentage in the gas stream as determined in the most recent analysis. EPA factors are given in terms of Total Organic Compounds.

**3. Monitoring Plan-** As a means of recordkeeping, an initial physical hard-count of facility components will be conducted within 90 days of permit issuance to verify existing hardware inventory. Records shall be kept of all component additions and deletions, and a running tally maintained. A physical hard-count of facility components shall be conducted every five years following the initial count required under this condition.

The source will be required to submit a report detailing the specific applicable and nonapplicable sections of NSPS KKK to the Division within 6 months of the Operating Permit issue date following the format provided in Appendix G of the draft Operating Permit. Compliance with the reporting requirements of NSPS KKK shall be demonstrated semi-annually.

**4. Compliance Status-** A current APEN reporting criteria emissions is on file with the Division. A review of APCD files has revealed no outstanding compliance issues. Therefore, this facility is currently considered to be in compliance with all applicable requirements.

#### IV. Insignificant Activities

Cummings diesel back-up generator  
Refrigerant compressor blowdown  
8" Springdale pig receiver  
Two (2) natural gas ESD (emergency relief valve)  
Propane gas ESD (emergency relief valve)  
Sludge tank vent  
Office heater, 50,000 Btu/hr  
Two (2) portable heaters, 5,000 Btu/hr and 10,000 Btu/hr  
Portable generator, 8 HP  
Portable air compressor, 10 HP  
Portable pressure washer, 18 HP  
Acetylene torch  
Ethylene glycol storage tank, <500 gal  
Methanol storage tank, <500 gal  
Used engine oil tank  
Diesel storage tank  
25 liquid storage tanks for sales (propane, BG and NGL)

#### V. Alternative Operating Scenarios

##### **Temporary Engine Replacement-**

KN has requested that temporary replacement of engines during times of engine overhaul be considered an Alternative Operating Scenario under the Operating Permit if they can determine through flue gas analyzer testing that emissions will be equal to or less than those from the engine replaced. The Division has concluded that temporary replacement will be defined as less than a 3 month period. KN must be willing to accept a determination of non-compliance should flue gas analyzer testing indicate that the emission factors for the engine in question exceed those defined in the Operating Permit. Non-compliance will be considered to have occurred from the day the engine was replaced.

#### VI. Permit Shield

The original application requested citations that did not include an adequate explanation of why the unit did not apply. Therefore, no specific regulations have been included in the permit shield.