TECHNICAL REVIEW DOCUMENT
for
OPERATING PERMIT 95OPAD047
to be issued to:

Colorado Interstate Gas Company
Watkins Compressor Station
Adams County
Source ID 0010036

Prepared on January 22, 1997 by David H. Webb
Revised on November 19, 1997 by Doris Jung

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. The conclusions made in this report are based on information provided in the original Title V application submittal of March 1, 1995, a supplemental technical submittals of June 22, 1995, as well as numerous phone contacts with the applicant.

II. Source Description:

This source is classified as a natural gas transmission facility defined under Standard Industrial Classification 4922. Natural gas enters the plant at a pressure between 400 and 700 psig. Some of the gas is blended with air to achieve a customer specified BTU value and is delivered to Front Range cities. The remaining natural gas is compressed up to a pressure of 920 psig using compressors powered by internal combustion engines, and enters the CIG mainline system.

The plant is located in a flat, suburban area approximately 3 miles due east of Aurora, CO. The area is designated as nonattainment for Carbon Monoxide, PM_{10}, and Ozone. The source emits greater than 250 tons per year of Nitrogen Oxides, Carbon Monoxide and Volatile Organic Compounds and is considered to be a major source in a nonattainment area. This facility is located in an area designated nonatttainment for the following criteria pollutants: Particulate Matter less than 10 micrometers (PM_{10}), Ozone, and Carbon Monoxide (CO). It is categorized as a major stationary source subject to Nonattainment New Source Review for certain pollutants. The Nonattainment NSR Requirements shall apply to any modification of any of the sources addressed in this operating permit. Any source modification or contemporaneous modification of several sources that increases the source(s) potential-to-emit of a nonattainment pollutant above the applicable NSR thresholds shall require a full Nonattainment NSR review of the source(s) modification.

Volatile organic compounds are considered to be precursors for ozone. In the

Denver nonattainment area, NO_x and SO_2 are considered to be precursors for PM_{10}. Future modifications to this facility which are in excess of the significance levels defined in Colorado Regulation No. 3, Part A, Section I.B.58 for NO_x, VOC, PM_{10}, or CO will result in the application of the Nonattainment NSR requirements. Facility wide emissions are as follows:

Pollutant	Potential to Emit (tpy)	Actual (tpy)
NO_x	994	411.4
VOC	354	174.5
CO	440	153.3
HAPs	36	19.2

Potential emissions are as calculated in the Title V application using established emission factors and assuming 8760 hours of operation for each piece of equipment. Actual emissions are based on 1994 data submitted by CIG to demonstrate compliance with existing permit terms. For the engines, facility fuel use was apportioned to each unit based on hours of operation and engine size. Cubic feet per engine was then used in the following equation to determine emissions:

$$\text{Tons/yr} = \frac{(\text{cubic ft/yr})(\text{BTU Content of NG})(\text{g/hp-hr EF})}{(\text{Design Heat Rate})(453.6\ \text{g/lb})(2000\ \text{lbs/ton})}$$

Fugitive emissions were assumed to be equal to PTE, lacking any measured data to show otherwise.

The emissions are calculated only for equipment specifically regulated under the Operating Permit for this site (See Section III of this document), and do not include emissions from insignificant activities listed in Appendix A of the Permit.

There are no affected states associated with this facility, and there are no Federally designated Class I area within 100 kilometers. This facility is classified as a gas transmission station, and therefore is exempt from Accidental Release Provisions of Section 112(r) of the CAAA of 1990.

Colorado Interstate Gas certified to operating in compliance with all applicable requirements at the time of their application submittal on March 1, 1995.

III. Emission Sources:

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

Units E001, E002- Worthington Model SLHC 10 A 4-Cycle Internal Combustion Engines, Rated at 1200 HP, Serial Nos. G-2879 and G-2880.

Discussion:

1. Applicable Requirements- A Final Approval Emission Permit (P-10,675)

was issued for these two engines on August 13, 1976 with only a pound/hour limit for particulate emissions. CIG requested that this limit be dropped in the cover letter to the Title V application submitted March 1, 1995. As noted below under 'Emission Factors', particulate emissions are not considered to be a significant source of air pollution from internal combustion engines burning natural gas. Therefore, the particulate limit from P-10,675 has not been incorporated into the Operating Permit and the only applicable requirements for these engines are Air Pollution Emission Notice (APEN) reporting and a 20% Opacity limitation.

2. Emission Factors- Emissions from these reciprocating engines are produced during the combustion process, and are dependent upon the air to fuel ratio adjustment, engine design specifications, 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 Hazardous Air Pollutants (HAPs) are also emitted when combustion is incomplete. Approval of emission factors for these engines are necessary to the extent that accurate actual emissions are required to verify the need to submit Revised APENs to update the Division Emission Inventory and for annual fee purposes. Colorado Interstate Gas has proposed the use of AP-42 factors for 4-Cycle, Rich-Burn engines from Table 3.2-2 (7/93) as follows:

Pollutant	Emission Factor
NO_x	10.0 grams/bhp-hr
CO	8.60 "
VOC	0.14 "

3. Monitoring Plan- Colorado Interstate Gas has proposed to calculate emissions for fee purposes using these AP-42 factors multiplied by maximum site-rated horsepower and recorded hours of operation. They will be required to conduct the emission calculation annually and submit a Revised APEN to the Division if emissions increase by more than 50 tons/year or 5%, whichever is less, compared to the latest APEN on file with the Division. This plan is consistent with the Monitoring Grid for Internal Combustion Engines developed by the Division (attached). Note that hours of operation must be determined monthly rather than annually since individual engine fuel use allocation is dependent upon run time hours of each engine on site.

The Division has determined, based on AP-42 emission factors and engineering judgement, that particulate emissions from these engines will be insignificant if natural gas is used exclusively as fuel. Use of natural gas will be the compliance demonstration method for the Opacity standard.

4. Compliance Status- Colorado Interstate Gas has submitted updated APENs reporting actual 1994 emissions of criteria pollutants based on AP-42 factors and Hazardous Air Pollutants based on the EPA SPECIATE database. CIG certified within the application that natural gas has been

used exclusively as the fuel for these engines. These engines are therefore considered to be operating in compliance with all applicable requirements.

<u>Units E003 - E011</u> - Cooper Model GMVH12 2-Cycle, Lean Burn Internal Combustion Engines, Rated at 2700 HP, Serial Nos. 48535 - 48542, 48943. Natural Gas Fired.

Discussion:

1. Applicable Requirements- The history of these nine engines is detailed in the attached memo dated June 6, 1996 relating to potential PSD issues at the Watkins site. As noted, current Construction Permits C11,629(1-4) and C11,630(1-5) were issued on July 1, 1982. The permits establish limitations on the hourly and annual emissions of NO_X, CO and VOC. These limits have been incorporated into the Operating Permit. The June 6, 1996 memo concluded with a question as to whether the conversion of the Cooper Engines to Clean Burn design (reducing NO_X emissions) may have triggered the significant increase thresholds for CO and VOC. The Division has verified through file review that this conversion was directly linked to a proposed installation of four additional reciprocating engines for which a Federal PSD permit was issued on May 13, 1983. The decrease in NO_X emissions was considered by EPA the critical issue for authorizing the installation of the four additional engines. Through acceptance of the state issued permits in July of 1982, CIG agreed to the lower NO_X emission limits associated with the PSD action. The Division has concluded that the increases of CO and VOC associated with the conversion were less than the increases accepted by EPA in their PSD permit of May 13, 1983. Therefore, the Division will not require any further permitting action associated with these increases.

A 20% Opacity limitation has been incorporated into the Operating Permit per Colorado Regulation No. 1, Section II.A.1.

2. Emission Factors- Certified manufacturer's data was submitted as part of the Title V application providing gram/hp-hr emission factors (EFs) used to calculate emissions from these engines:

Pollutant	Emission Factor	AP-42 EF's (Table 3.2-1, 10/96)
NO_x	3.15 grams/hp-hr	10.88 grams/hp-hr
CO	1.01 grams/hp-hr	1.50 grams/hp-hr
VOC	1.39 grams/hp-hr	5.89 grams/hp-hr

Note that the factors proposed are significantly below the AP-42 emission factors for uncontrolled 2-cycle lean burn engines.

The lb/MMBTU factors listed for compliance purposes in the Operating Permit were converted from CIG's proposed factors as detailed on the attached Engineering Calculation worksheet.

3. Monitoring Plan- The methods of verifying compliance with the stated applicable requirements as listed under Conditions 2.1 to 2.6 of the Operating Permit are consistent with the Monitoring Grid for Internal Combustion Engines developed by the Division (attached). The Grid calls for portable monitoring on a quarterly basis for engines with listed emission factors below AP-42 levels as a regular method to ensure that the factors are representative of continued operation. Portable Monitoring results will also be used to verify compliance with the hourly emission limitations listed under Condition 2.1 of the Permit for NO_X and CO. The compliance emission factors will be converted to fuel based factors for determination of emission levels. This is consistent with the method CIG utilized in the Operating Permit application to demonstrate compliance with existing permit conditions.

4. Compliance Status- Colorado Interstate Gas verified compliance with the emissions limitations of Permits C11,629 and C11,630 in supplemental information to the Operating Permit application submitted June 22, 1995. 1994 actual values for all pollutants were well below permit limitations. CIG certified in their application to the continuous use of natural gas to fuel these engines demonstrating compliance with the Opacity standard. These engines are therefore currently in compliance with all applicable requirements.

<u>Unit F001</u> - Fugitive Emissions of VOC from Equipment Leaks

Discussion:

1. Applicable Requirements- Emissions as submitted in CIG's permit application exceed the 2 ton per year permitting threshold for Volatile Organic Compounds in ozone non-attainment areas as defined by Colorado Regulation No. 3. Fugitive emissions at compressor stations have historically not been permitted by the Division unless requirements of New Source Performance Standard (NSPS) Subpart KKK apply. In this case, the facility does not meet the definition of natural gas processing defined in the Subpart. However, as part of the Title V process, equipment leak estimates at these sources will be included in the Operating Permit if the state permitting thresholds are exceeded. An Initial Approval permit (95AD144) was issued for fugitives at this plant. This permit was moved to Final Approval status based upon the self-certification by the source that the plant was operating in full compliance with each applicable requirement in their Initial Approval permit. Terms of permit 95AD144 have been incorporated into the Operating Permit as Applicable Requirements with the following exceptions; 1) The Division has determined that an hourly fugitive VOC emission limit is not enforceable as a practical matter unless conditions are imposed requiring use of leak detection devices on each component. This is more than is required for the NSPS Subpart KKK facilities, which this is not. 2) A limit on specific components (e.g. valves, seals) restricts flexibility. As long as the source can demonstrate that they are under their annual limit for VOC, no restriction on the specific number of each component is required

in the Operating Permit.

2. Emission Factors- The calculated VOC emissions in the Draft Operating Permit are based on EPA's Protocol for Equipment Leak Estimates, Table 2-6 (EPA-453/R-93-026).

3. Monitoring Plan-As a means of recordkeeping, CIG must maintain a running tally of the number of process valves, relief valves, pump seals, compressor seals and flanges/connections in order to recalculate the emissions from fugitive leaks. Calculation results will be compared to the annual VOC limit to determine compliance. No component count has been specified in the Operating permit to allow flexibility under the VOC emission limitation. CIG must also document steps taken to repair or mitigate leaks discovered during the reporting period (See Condition 3.2 of Draft Operating Permit).

4. Compliance Status- CIG accurately quantified emissions of VOC from Equipment Leaks and submitted a representative APEN in the Operating Permit application. They are therefore currently in compliance with state requirements.

IV. Insignificant Activities

Emissions from Purging/Venting during Start-up or Shut-Down

CIG estimated that 6000 cubic feet of gas would be released from each engine during repair. Assuming one repair per engine each year, this converts to an annual release of 126 pounds of VOC, well below reportable levels.

Fuel Burning Equipment

CIG identified four combustion sources in their Title V application that were specifically listed as Insignificant Activities in Colorado Regulation No. 3, Part C, Section III.E.3. All four of these units had previously received a Construction Permit from the Division prior to specific exemption in the Colorado Regulations. The Division has confirmed that these units are insignificant activities, and their listing in Appendix A of the Operating Permit will be considered cancellation of the existing permits.

Equipment	Permit Number	Specific Exemption
Regeneration Heater	C-12,683-1	Section III.E.3.k
Gas Heater	P10,677	Section III.E.3.k
Smalling Heating Boiler	C-12,683-2	Section III.E.3.ggg
Bryan Process Boiler	P10,678	Section III.E.3.k

V. Alternative Operating Scenarios

Temporary Engine Replacement-

CIG has indicated that replacement engines are typically not used during major engine overhaul. They are aware that any temporary or permanent replacement of engines at this site shall not be conducted without prior notification to the Division. The Division will determine whether the proposed change at the site will require a Construction Permit and/or modification of the Operating Permit. Installation of equipment not specifically identified in the Permit prior to notification to the Division shall be considered a violation subject to enforcement action.

VI. Permit Shield

The regulation citations identified as not applicable to this source in Section III of the Operating Permit are based on a condensed version of the requested Permit Shield citations as submitted with the original application for this plant. The original list contained many citations that were clearly unnecessary for the shield. For example, CIG stated that Incinerator regulations would not apply since no equipment on site met the definition of an incinerator. It is the Division's opinion that the Shield should be reserved for regulations that might reasonably otherwise apply to equipment at the plant in question. Therefore, the Division proposes that the Permit Shield be condensed to a format similar to that submitted for CIG's Vilas Station.