TECHNICAL REVIEW DOCUMENT
OPERATING PERMIT 95OPWE003

to be issued to:

Williams Natural Gas
Cheyenne Compressor Station
Weld County
Source ID 1230078

Prepared by Geoffrey D. Drissel
December 18, 1997

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. Information in this report is taken primarily from the original application and from additional information submitted on February 21, 1995 and July 25, 1995. In addition, a site visit was conducted on August 15, 1995 to confirm some of the information in the application.

II. Source Description:

This source is classified as a natural gas compression facility defined under Standard Industrial Classification 4922. Gas is compressed to specification for transmission to sales pipelines using an Internal Combustion Engine to power four compressor units. An emergency shutdown device is used for periodic and emergency blowdown of process lines and equipment. A small boiler, used for facility heating, also exists on site.

The facility is located in a rural area north of Ft. Collins in Weld County, Colorado, in an area designated as attainment for all criteria pollutants. Wyoming is designated as an affected state located within a 50 mile radius of the facility. Rocky Mountain National Park and the Rawah Wilderness Area are Federal Class I areas located within 100 kilometers of the facility. This source is minor with respect to Prevention of Significant Deterioration (PSD) requirements and has facility-wide potential and actual emissions as follows:

Pollutant	Potential to Emit (tpy)	1994 Actual Emissions (tpy)
NOx	238.3	184.0
VOC	17.9	14.9
CO	26.1	20.0
HAPs	2.40	2.21

Potential emissions are taken from the revised construction permits for this facility. Actual emissions are taken from the most recent revised APENs that were included in the operating permit application and additional information submittals. HAP emissions were not estimated by the applicant for the compressor engine (S1). They have been estimated by the Division based on GRI HAPCalc emission factors, the site-rated horsepower of the engine, the 1994 average engine horsepower and the 1994 actual annual operating hours of the engine. The Division assumes that emissions from the facility have remained the same or decreased from the levels listed on these revised APENs.

The applicant certified, in an additional information submittal, that the facility was not in compliance with all applicable requirements, specifically the engine fuel use limitation. The applicant also indicated that the facility is not subject to 112(r).

III. Emission Sources:

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

Unit E001- **Cooper Model GVMH-12M, Natural Gas Fired 2 Cycle Lean Burn Internal Combustion Engine Rated at 2,700 HP, Serial No. 48666**

Discussion:

1. Applicable Requirements- Prior to Title V application submittal, Colorado Emission Permit 12WE380, initially issued in June of 1979, defined applicable requirements for this engine. As part of the application process, Williams Natural Gas proposed new emission limits based on manufacturer's emission factor data. Therefore, the aforementioned permit was revised to reflect emission limits consistent with the requested changes. The following

terms and conditions of the revised Construction Permit have been incorporated into the Draft Operating Permit as Applicable Requirements: annual and hourly emission limits for NOx, CO and VOC, annual and hourly fuel use limitations and a 20% opacity limit.

It should be noted that, as a result of the operating permit review process, the applicant requested that the annual and hourly fuel use limitations be increased to compensate for a possible future drop in the heating value of the natural gas being combusted. The Division has agreed to increase these limits, but will not change the emission limits for NOx, CO and VOC.

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 (VOCs). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted when combustion is incomplete. The applicant claims that HAP emissions are below de minimis levels for APEN reporting. The applicant proposes to calculate NOx, CO and VOC emissions using emission factors supplied by the manufacturer. These emission factors are as follows:

Pollutant	Emission Factor	Source
NOx	9.14 g/hphr	Mfr data
CO	1.0 g/hphr	Mfr data
VOC	0.5 g/hphr	Mfr data

The VOC emission factor provided by the manufacturer is higher than the AP-42 (US EPA) factor listed in Table 3.2-1. The NOx and CO factors supplied by the manufacturer are slightly lower than the AP-42 factors listed in Table 3.2-1. If the AP-42 factor for NOx was used to calculate NOx PTE, this facility would be a major source for future PSD purposes. The Division has decided to accept these emission factors, although the compliance monitoring requirements for NOx will be more stringent because of the major/minor source issue.

It is Division policy, for permitted engines, to convert the horsepower based emission factors to fuel based emission factors. This will result in the source being out of compliance if an excessive amount of fuel is combusted in this engine. The emission factor conversion is accomplished using the horsepower based emission factors, the design heat rate of the engine and

the engine horsepower, as shown on the attached calculation sheet. The resulting fuel based emission factors are as follows:

Pollutant	Emission Factor	Source
NOx	2.92 lb/MMBtu	Conversion
CO	0.32 lb/MMBtu	Conversion
VOC	0.16 lb/MMBtu	Conversion

3. Monitoring Plan- Conditions 1.1 to 1.7 of Section II of the Operating Permit list the monitoring and recordkeeping provisions necessary to verify compliance with Applicable Requirements for this engine. Specific monitoring guidance for Internal Combustion Engines in Attainment areas has been developed by the Division as shown on the attached Grids titled "Compliance/Scenario Summary - Gas Fired IC Engines." These Grids define emission calculation and measurement of fuel use as a minimum requirement for this engine.

Because the applicant has elected to use a NOx emission factor that is lower than AP-42, the facility PTE is calculated to be less than the major source threshold for PSD review. Using the AP-42 emission factor, the facility would be a major source for future PSD purposes. The distinction between major and minor source status is an important one and will require that the source verify the accuracy of the NOx emission factor. Consequently, the source will be required to complete a one-time stack test and to perform quarterly portable monitoring to verify both the emission rate and the emission factor for NOx. Simultaneous verification of the CO emission rate and emission factor will also be required because of the correlation between NOx and CO emissions.

The applicant will be required to calculate emissions based on actual fuel usage and the calculated fuel based emission factors. For the purpose of demonstrating compliance with emission limits, the applicant will be required to conduct the emission calculation monthly. For the purpose of calculating fees, the applicant will be required to conduct the emission calculation annually and submit a revised APEN to the Division if emissions increase by more than 5 tons/year or 50%, whichever is less, compared to the latest APEN on file with the Division.

The opacity standard of 20% will be demonstrated 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.

4. Compliance Status- A revised APEN reporting criteria emissions was submitted with the operating permit application requesting increased emission levels based on newly obtained emission factors. The previous emission limits were based on AP-42 fuel based emission factors and a fuel use limitation. The revised emission limits are now based on a manufacturer's horsepower-hour emission factor, maximum design horsepower, and continuous annual operation.

The applicant submitted calculations, using actual operating hours and actual average horsepower, that demonstrated compliance with the current permit emission limits.

The applicant certified within the application that natural gas has been used exclusively as the fuel for this unit. The applicant also indicated that the facility was not in compliance with the annual fuel use limitation. Consequently, the construction permit for this source has been modified and this source is in compliance with the new annual fuel use limit. Therefore, this source is considered to be currently in compliance with all applicable requirements.

<u>Unit V001</u>- Emergency Shutdown Device

Discussion:

1. Applicable Requirements - This source had not received a construction permit prior to submittal of the operating permit application. As a result of the construction permit application that was submitted with the operating permit application, an Initial Approval construction permit (95WE618) was issued on August 9, 1996. The following terms and conditions of the construction permit have been incorporated into the proposed operating permit as applicable requirements: annual emission limitation for VOC; annual limitation on venting of natural gas. Because the annual limits are based on the venting of natural gas for one hour each year, the short term hourly limits will be the same as the annual limits.

Permit 95WE618 also included conditions pertaining to odor and upset

conditions. While these are generally applicable to this emission point they are not of major concern and are not specifically referenced in the operating permit. Odor and upset conditions apply to all facilities and can be found in the General Permit Conditions section of the operating permit.

2. Emission Factors - Emissions from this source are produced from the venting of natural gas during a blowdown or emergency shutdown. The facility has indicated that during an emergency shutdown they release 172,800 scf of natural gas per hour assuming a line pressure of 960 psia. Using a gas density of 3.16 lb/scf (at 960 psia) and a gas speciation analysis, the amount of VOC released during a particular time period can be calculated. There are no specific emission factors associated with this emission point.

3. Monitoring Plan - Conditions 2.1 to 2.3 of the operating permit list the monitoring and recordkeeping provisions necessary to verify compliance with the applicable requirements. Specifically, the facility will need to record the occurances and durations of emergency shutdowns and/or blowdowns. A gas analysis that shows the speciation of the natural gas must be performed semi-annually and the results used to determine the type and quantity of pollutants released.

4. Compliance Status - Williams Natural Gas submitted an Air Pollution Emission Notice (APEN) and construction permit application for this emission point. The facility did not indicate that they were out of compliance for failing to report this emission point. However, because the current construction permit contains the requested limits, this source appears to be in compliance with current emission and gas venting limits. Therefore, this source is considered to be currently in compliance with all applicable requirements.

IV. Insignificant Activities

Several insignificant activities were listed by the applicant as an addendum to form 102B. These activities consist of two storage tanks, a standby generator, a lawnmower and miscellaneous chemical storage containers, all of which were deemed insignificant based on size or emission level. Fugitive emissions due to leaks from equipment and piping components were also listed as insignificant.

V. Alternative Operating Scenarios

There are no alternative operating scenarios associated with this facility.

VI. Permit Shield

A specific permit shield was not requested for this facility.

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT	Source: WNG-Cheyenne Station	File Name: efcon003.xls
	Permit Number: 95OPWE003	Date: 10/20/97 9:35
Engineering Calculations	Facility ID: 1230078	Review Engineer: G. Drissel

EMISSION FACTOR CONVERSION
G/HP-HR TO LB/MMBTU AND LB/MMSCF

1. Cooper GMVH-12M

A. Engine Characteristics:

NOx emission factor, g/hp-hr:	9.14	Engine heat rate, Btu/hp-hr:	6900
CO emission factor, g/hp-hr:	1.0	Gas heating value, Btu/scf:	1033
VOC emission factor, g/hp-hr:	0.5	Engine design rate, MMBtu/hr:	18.63
Annual fuel limitation, MMscf:	158.0	Max rated horsepower:	2700
Site altitude, ft:	6000		

B. Calculations:

lb/MMBtu = (g/hp-hr) (max rated horsepower) / ((engine design rate) (453.6 g/lb))
lb/MMscf = (lb/MMBtu) (Btu/scf)
lb/hr = (lb/MMBtu) (engine design rate, MMBtu/hr)
tons/yr = (lb/hr) (8760 hours) / 2000 lb/ton

C. Converted Emission Factors:

	lb/MMBtu	lb/MMscf
NOx	2.92	3016.6
CO	0.32	330.0
VOC	0.16	165.0

D. Emission Limits:

	Calculated Limits		CP Limits		OP Limits	
Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
NOx	54.40	238.3	54.41	238.3	54.41	238.3
CO	5.95	26.1	5.95	26.1	5.95	26.1
VOC	2.98	13.0	2.98	13.0	2.98	13.0

COMPLIANCE/SCENARIO SUMMARY - IC ENGINE AND VENT
ATTAINMENT AREA LOCATION

10/20/97

WNG - CHEYENNE STATION - VOC EMISSIONS

EMISSIONS CALCULATED USING EMISSION FACTORS = or > AP-42

E001
V001

COMPLIANCE DEMONSTRATION METHOD	EMISSION UNIT SCENARIO										
	FACILITY CRITERIA PTE > 250 TPY, OR FACILITY CRITERIA PTE < 200 TPY			CRITERIA REVISIONS NEAR MAJOR MOD, OR FACILITY CRITERIA PTE > 200, < 250 TPY			EMISSION UNIT PSD/BACT REQUIREMENTS		EMISSION UNIT HAP EMISSIONS		
	G'FATHERED/ EXEMPT/ NO LIMITS	PERMIT LIMITS, NO CONTROLS	PERMIT LIMITS, CONTROLS	G'FATHERED/ EXEMPT/ NO LIMITS	PERMIT LIMITS, NO CONTROLS	PERMIT LIMITS, CONTROLS	PERMIT LIMITS, NO CONTROLS	PERMIT LIMITS, CONTROLS	NO PERMIT LIMITS	PERMIT LIMITS, NO CONTROLS	PERMIT LIMITS, CONTROLS
NONE									NOT APPLICABLE		
EMISSION FACTORS/CALCULATION	X(A)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)			
HP/HRS/FUEL USE MEASUREMENT	X(A)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)			
CATALYST PARAMETERS			R(M)			R(M)		R(M)			
A/F CONTROLLER PARAMETERS			R(M)			R(M)	R(M)	R(M)			
PORTABLE MONITOR			X(S)			X(Q)	X(Q)	X(Q)			
STACK TEST							X(1)	X(1)			
CEM											

EMISSIONS CALCULATED USING EMISSION FACTORS < AP-42

COMPLIANCE DEMONSTRATION METHOD	EMISSION UNIT SCENARIO										
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HP/HRS/FUEL USE MEASUREMENT	X(A)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)			
CATALYST PARAMETERS			R(M)			R(M)		R(M)			
A/F CONTROLLER PARAMETERS			R(M)		R(M)	R(M)	R(M)	R(M)			
PORTABLE MONITOR	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)			
STACK TEST				X(1)	X(1)	X(1)	X(1)	X(1)			
CEM											

NOTES:
1) NSPS SOURCES WILL HAVE CASE-BY-CASE REQUIREMENTS.
2) COMPLIANCE HISTORY MAY BE USED TO ADJUST THE STRINGENCY OF THE DEMONSTRATION METHOD.
3) USE OF PIPELINE QUALITY NATURAL GAS IS CONSIDERED ADEQUATE FOR DEMONSTRATING COMPLIANCE WITH OPACITY REQUIREMENTS.
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10) CATALYST PARAMETERS CONSIST OF UNIT PRESSURE DROP, EXHAUST GAS TEMPERATURE DROP.
11) A/F CONTROLLER PARAMETERS CONSIST OF UNIT MILLIVOLT READING.
12) THE PERMIT SHOULD CONTAIN A GENERAL STATEMENT THAT THE ENGINE WILL BE MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
13) PORTABLE MONITORING RESULTS MAY TRIGGER A STACK TEST REQUIREMENT TO DEMONSTRATE COMPLIANCE.

COMPLIANCE/SCENARIO SUMMARY - GAS-FIRED IC ENGINES
ATTAINMENT AREA LOCATION

10/20/97

WNG - CHEYENNE STATION - NOx EMISSIONS

EMISSIONS CALCULATED USING EMISSION FACTORS = or > AP-42

COMPLIANCE DEMONSTRATION METHOD	EMISSION UNIT SCENARIO										
	FACILITY CRITERIA PTE > 250 TPY, OR FACILITY CRITERIA PTE < 200 TPY			CRITERIA REVISIONS NEAR MAJOR MOD, OR FACILITY CRITERIA PTE > 200, < 250 TPY			EMISSION UNIT PSD/BACT REQUIREMENTS		EMISSION UNIT HAP EMISSIONS		
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NONE									NOT APPLICABLE		
EMISSION FACTORS/CALCULATION	X(A)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)			
HP/HRS/FUEL USE MEASUREMENT	X(A)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)	X(M)			
CATALYST PARAMETERS			R(M)			R(M)		R(M)			
A/F CONTROLLER PARAMETERS			R(M)			R(M)	R(M)	R(M)			
PORTABLE MONITOR			X(S)			X(Q)	X(Q)	X(Q)			
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CEM											

EMISSIONS CALCULATED USING EMISSION FACTORS < AP-42

E001

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CATALYST PARAMETERS			R(M)			R(M)		R(M)			
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PORTABLE MONITOR	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)	X(Q)			
STACK TEST				X(1)	X(1)	X(1)	X(1)	X(1)			
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COMPLIANCE/SCENARIO SUMMARY - GAS-FIRED IC ENGINES
ATTAINMENT AREA LOCATION

10/20/97

WNG - CHEYENNE STATION - CO EMISSIONS

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E001

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