TECHNICAL REVIEW DOCUMENT
OPERATING PERMIT 95OPLP063
to be issued to:

Amoco Production Company
Tiffany Compressor Station
La Plata County
Source ID 0670035

Prepared by Geoffrey D. Drissel
July 30, 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 Public Comment. Information in this report is taken primarily from the original application and from additional information submitted on May 8, 1995 and August 3, 1995.

II. Source Description:

The applicant indicated that this facility is defined under Standard Industrial Classification 1321, which describes establishments primarily engaged in producing liquid hydrocarbons from oil and gas field gases. After further investigation, it appears that this source should be classified as a natural gas compression facility defined under Standard Industrial Classification 4922. At this facility, gas is compressed to specification for transmission to sales pipelines using two Internal Combustion Engines to power two compressor units. A triethylene glycol dehydration unit also exists on site.

The facility is located in a rural area north of Tiffany in La Plata County, Colorado, in an area designated as attainment for all criteria pollutants. New Mexico is designated as an affected state located within a 50 mile radius of the facility. Mesa Verde National Park and the Weminuche National Wilderness Area are Federal Class I areas located within 100 kilometers of the facility. This facility is located on fee lands within the exterior boundaries of the Southern Ute Indian Reservation.

This facility 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)	Actual Emissions (tpy)
NOx	136.6	123.0
VOC	14.5	6.3
CO	24.5	20.7
HAPs	2.0	<2.0

Potential emissions are taken from the revised construction permits for this facility. Actual emissions are taken from AIRS summary data dated March 24, 1994. Actual HAP emission data were not available. The Division assumes that emissions from the facility have remained the same or decreased from the levels listed above.

The applicant certified, in an additional information submittal, that the facility was in compliance with all applicable requirements at the time of application submittal. The applicant indicated that the facility is 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 P001- AJAX Model DPC-800, Natural Gas Fired 2 Cycle Standard Lean Burn Internal Combustion Engine Site Rated at 690 HP, Serial No. 82576

Discussion:

1. Applicable Requirements- Prior to application submittal, Colorado Emission Permit 88LP048-6 defined applicable requirements for this engine. As part of the application process, Amoco proposed new emission limits based on manufacturer's emission factor data and a flue gas screening analysis. 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.

2. Emission Factors- Emissions from this reciprocating engine is produced

during the combustion process, and are dependent upon the air to fuel ratio adjustment, engine design 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 asserts that all HAP emissions except formaldehyde are below APEN reporting de minimis levels. The applicant proposes to calculate NOx and VOC emissions using emission factors supplied by the manufacturer and to calculate CO emissions using an emission factor developed from a flue gas screening analysis. The formaldehyde emission factor is taken from GRI engine testing data. These emission factors are as follows:

Pollutant	Emission Factor	Source
NOx	16.0 g/hphr	Mfr data
CO	2.9 g/hphr	Flue gas data
VOC	1.5 g/hphr	Mfr data
Formaldehyde	0.2 g/hphr	GRI data

The NOx, CO and VOC emission factors proposed by the applicant are higher than the AP-42 (US EPA) factors listed in Table 3.2-2, January 1995. The formaldehyde emission factor being proposed by the applicant is lower than the AP-42 factor listed in Table 3.2-3, but the factors in that table are based on very limited data and, consequently, have a poor factor rating. The Division has elected to accept all of the emission factors proposed by the applicant for this engine.

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	4.27 lb/MMBtu	Conversion
CO	0.77 lb/MMBtu	Conversion

VOC	0.40 lb/MMBtu	Conversion
Formaldehyde	0.053 lb/MMBtu	Conversion

3. Monitoring Plan- Conditions 1.1 to 1.5 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 Grid titled "Compliance/Scenario Summary - Gas Fired IC Engines." This Grid defines emission calculation and measurement of fuel use as a minimum requirement for this engine. Although the applicant has proposed semi-annual portable monitoring for this engine, the Division has determined that this will not be necessary based on the requirements set forth in the compliance grid.

The applicant has not indicated how emissions will be calculated for fee purposes, although it will probably be based on actual fuel use and the fuel based emission factors. 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.

Compliance with the opacity standard of 20% will be demonstrated by a certification that the engine has used pipeline-quality 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 potential criteria pollutant 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 horsepower-hour emission factors and the maximum engine horsepower rating (800 hp). The revised emission limits for NOx and VOC are now based on manufacturer's horsepower-hour emission factors, maximum site-rated horsepower, and continuous annual operation. The revised emission limits for CO are now based on flue gas testing results, maximum site-rated horsepower, and continuous annual operation.

The applicant did not indicate the compliance status of the facility with regard to construction permit limits that were in effect at the time the operating

permit application was submitted. Because new permit limits were requested as part of the operating permit application, the applicant certified compliance with the requested limits. Thus, it is not apparent that this source was in compliance with all applicable requirements that existed at the time of application submittal. However, because the current construction permit contains the requested limits, this source appears to be in compliance with current emission and fuel use limits. Also, the applicant certified within the application that natural gas has been used exclusively as the fuel for this unit. Therefore, this source is considered to be currently in compliance with all applicable requirements.

Unit P002- AJAX Model DPC-360, Natural Gas Fired 2 Cycle Standard Rich Burn Internal Combustion Engine Site Rated at 310 HP, Serial No. 80754

Discussion:

1. Applicable Requirements- Prior to application submittal, Colorado Emission Permit 89LP132 defined applicable requirements for this engine. As part of the application process, Amoco proposed new emission limits based on manufacturer's emission factor data and a flue gas screening analysis. 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.

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 asserts that all HAP emissions except formaldehyde are below APEN reporting de minimis levels. The applicant proposes to calculate VOC emissions using an emission factor based on engineering judgement and to calculate NOx and CO emissions using emission factors developed from a flue gas screening analysis. The formaldehyde emission factor is taken from GRI engine testing data. These

emission factors are as follows:

Pollutant	Emission Factor	Source
NOx	10.0 g/hphr	Flue gas data
CO	1.7 g/hphr	Flue gas data
VOC	1.5 g/hphr	Eng judgement
Formaldehyde	0.2 g/hphr	GRI data

The CO and VOC emission factors proposed by the applicant are higher than the AP-42 (US EPA) factors listed in Table 3.2-2, January 1995. The NOx emission factor proposed by the applicant is slightly lower than the AP-42 factor listed in Table 3.2-1. The formaldehyde emission factor being proposed by the applicant is lower than the AP-42 factor listed in Table 3.2-3, but the factors in that table are based on very limited data and, consequently, have a poor factor rating. The Division has elected to accept all of the emission factors proposed by the applicant for this engine.

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	2.44 lb/MMBtu	Conversion
CO	0.41 lb/MMBtu	Conversion
VOC	0.37 lb/MMBtu	Conversion
Formaldehyde	0.049 lb/MMBtu	Conversion

3. Monitoring Plan- Conditions 2.1 to 2.5 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 grid titled "Compliance/Scenario Summary - Gas Fired IC Engines." This grid defines emission calculation and measurement of fuel use as a minimum requirement for this engine.

Because the NOx emission factor proposed by the applicant is lower than the AP-42 emission factor for this engine, the compliance grid indicates that quarterly verification using a portable monitor is required. However, because the proposed emission factor is only slightly lower than AP-42 and considering the compliance history of the source, the Division has determined that the use of portable monitors will not be required for this source.

The applicant has not indicated how emissions will be calculated for fee purposes, although it will probably be based on actual fuel use and the fuel based emission factors. 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.

Compliance with the opacity standard of 20% will be demonstrated by a certification that the engine has used pipeline-quality 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 horsepower-hour based emission factors and the maximum engine horsepower rating (360 hp). The revised emission limits for NOx and CO are now based on flue gas testing results, maximum site-rated horsepower, and continuous annual operation. The revised emission limits for VOC are now based on an emission factor derived from the applicant's engineering judgement, maximum site-rated horsepower, and continuous annual operation. The applicant's VOC emission factor is higher than the corresponding AP-42 emission factor.

The applicant did not indicate the compliance status of the facility with regard to construction permit limits that were in effect at the time the operating permit application was submitted. Because new permit limits were requested as part of the operating permit application, the applicant certified compliance with the requested limits. Thus, it is not apparent that this source was in compliance with all applicable requirements that existed at the time of application submittal. However, because the current construction permit contains the requested limits, this source appears to be in compliance with

current emission and fuel use limits. Also, the applicant certified within the application that natural gas has been used exclusively as the fuel for this unit. Therefore, this source is considered to be currently in compliance with all applicable requirements.

IV. Insignificant Activities

Numerous insignificant activities were listed by the applicant as an addendum to form 102B. The majority of these activities consist of various storage tanks and several tank heaters, all of which were deemed insignificant based on size or emission level. Other specific insignificant activities consist of the following:

Insignificant Activity	Basis
TEG Dehydrator	less than de minimis emissions
Process Fugitives	less than de minimis emissions
Compressor Blowdown	less than de minimis emissions

V. Alternative Operating Scenarios

There are no alternative operating scenarios associated with this facility.

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 facility. The original list contained many citations that were not specific and for which justification was not provided. It is the Division's opinion that the Shield should be reserved for regulations that might reasonably otherwise apply to equipment at the facility in question. Therefore, the review engineer decided that many of the requested shield items were unnecessary and so included only certain ones. The Division proposes that the requested list of citations be condensed to the list contained in Section III of the Operating Permit.

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT	Source: Amoco-Tiffany	File Name: efcon063.xls
	Permit Number: 95OPLP063	Date: 7/30/97 14:47
Engineering Calculations	Facility ID: 0670035	Review Engineer: G. Drissel

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

1. AJAX DPC-800

A. Engine Characteristics:

NOx emission factor, g/hp-hr:	16.0	Engine heat rate, Btu/hp-hr:	8100
CO emission factor, g/hp-hr:	2.9	Gas heating value, Btu/scf:	930
VOC emission factor, g/hp-hr:	1.5	Engine design rate, MMBtu/hr:	5.7
Annual fuel limitation, MMscf:	58.0	Site rated horsepower:	690

B. Calculations:

lb/MMBtu = (g/hp-hr) (site 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/day) (365 days) / 2000 lb/ton

C. Converted Emission Factors:

	lb/MMBtu	lb/MMscf
NOx	4.27	3971.0
CO	0.77	719.8
VOC	0.40	372.3

D. Emission Limits:

	Calculated Limits		CP Limits	
	lb/hr	tons/yr	lb/hr	tons/yr
NOx	24.34	106.6	24.34	106.6
CO	4.41	19.3	4.41	19.3
VOC	2.28	10.0	2.28	10.0

2. AJAX DPC-360

A. Engine Characteristics:

NOx emission factor, g/hp-hr:	10.0	Engine heat rate, Btu/hp-hr:	8400
CO emission factor, g/hp-hr:	1.7	Gas heating value, Btu/scf:	930
VOC emission factor, g/hp-hr:	1.5	Engine design rate, MMBtu/hr:	2.8
Annual fuel limitation, MMscf:	26.1	Site rated horsepower:	310

B. Calculations:

lb/MMBtu = (g/hp-hr) (site rated horsepower) / ((engine design rate) (g/lb))
lb/MMscf = (lb/MMBtu) (Btu/scf)
lb/hr = (lb/MMBtu) (engine design rate, MMBtu/hr)
tons/yr = (lb/day) (365 days) / 2000 lb/ton

C. Converted Emission Factors:

	lb/MMBtu	lb/MMscf
NOx	2.44	2269.9
CO	0.41	385.9
VOC	0.37	340.5

D. Emission Limits:

	Calculated Limits		CP Limits	
	lb/hr	tons/yr	lb/hr	tons/yr
NOx	6.83	29.9	6.83	30.0
CO	1.16	5.1	1.16	5.1
VOC	1.03	4.5	1.03	4.5