UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

JUL 5 1994

Ref: 8ART-AP

Mr. Phil Poettmann
Snyder Oil Corporation
1625 Broadway, Suite #2200
Denver, CO 80202

Dear Mr. Poettman:

The U.S. Environmental Protection Agency (EPA) has completed its final review of Snyder Oil Corporation's application to do retrofit construction and operation of four internal combustion engines, pursuant to the regulations for the Prevention of Significant Deterioration (PSD) of air quality, 40 CFR §52.21. No revisions have been made to the May 17, 1994 proposed permit, since no comments were submitted.

The conditional permit shall become effective in accordance with Article IV of the enclosed permit. Construction and operation may not take place if this permit or any part thereof is rejected.

If you have any questions, please contact Monica Morales, of my staff, at (303) 294-7613.

Sincerely,

Patricia D. Hull

Patricia D. Hull, Director
Air, Radiation & Toxics Division

Enclosures

cc: Charles Collins, Director (WY DEQ)

Mr. Gary Holt
Wind River Environmental Quality Commission
P.O. Box 217
Fort Washakie, WY 82514

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APPENDIX I

APPENDIX I

PERMIT APPLICATION AND SUPPORTING DATA

CONDITIONAL PERMIT TO
COMMENCE CONSTRUCTION AND OPERATE

40 CFR 52.21(i)
Significant Deterioration of Air Quality

Snyder Oil Corporation
1625 Broadway - Suite # 2200
Denver, Colorado 80202

I. INTRODUCTION

Snyder Oil Corporation (hereinafter "the Applicant") proposes to modify its Riverton Dome Gas Plant on the Wind River Indian Reservation in Wyoming. The actual modifications occurred in 1982 and 1989 and consisted of the construction and operation of a compressor and natural gas-fired engine driver and three natural gas-fired engine/generators. The 520 horsepower compressor/engine (known as Compressor #4) was constructed in 1982. The three engine/generators (known as Generators 1, 2, and 3) were constructed in 1989. Generators 1 and 2 are site-rated at 385 horsepower and Generator 3 is site-rated at 577 horsepower. The construction of these four (4) units were major modifications to a major stationary source and must undergo a Prevention of Significant Deterioration (PSD) analysis. The operation of these units will hereinafter be referred to as "the Sources."

On September 24, 1993, the Applicant requested authorization from the U.S. Environmental Protection Agency, Region VIII (hereinafter "the EPA") to "construct and operate" the Sources pursuant to 40 CFR Section 52.21(i) (Review of Major Stationary Sources and Major Modifications). EPA found the application incomplete as of October 27, 1993. The Applicant submitted supplemental information concerning the national ambient air quality standards (NAAQS), an additional impact analysis, and Class I air quality related values (AQRV's) on January 26, 1994. EPA determined the application to be complete on January 27, 1994, the date this information was received.

The EPA issued a public notice in the Wind River News (Lander, WY) and the Riverton Ranger (Riverton, WY) on May 24, 1994. The notice proposed approval of an air quality permit for the source and gave opportunity for public comments during the ensuing 30 calendar days, including opportunity to request a public hearing. The permit application and the proposed permit with its supporting analysis were made available for public inspection at the Fremont County Clerk's Office in Lander, Wyoming, at the office of the Wind River Environmental

Quality Commission in Fort Washakie, Wyoming, and at the EPA Regional Office in Denver, Colorado. No comments or concerns were expressed during the public comment period.

II. FINDINGS

On the basis of information in the administrative record (see Appendix I), EPA has determined that:

1. The Applicant will meet all of the applicable requirements of the PSD regulations (40 CFR Section 52.21).

2. No applicable emission standard, PSD increment, or national ambient air quality standard will be violated by the emissions from these Sources.

3. EPA has good reason to believe that the Applicant can comply with the conditions of this permit. However, by issuing this permit, EPA does not assume any risk of loss which may occur as a result of the operation of the Sources by the Applicant, if the conditions of this permit are not met by the Applicant.

III. CONDITIONAL PERMIT TO CONSTRUCT AND OPERATE

On the basis of the findings set forth in II. above, and pursuant to the authority (as delegated by the Administrator) of 40 CFR Section 52.21(u), EPA hereby conditionally authorizes Snyder Oil Corporation to construct and operate the Sources. This authorization is expressly conditioned as follows:

1. The Applicant shall abide by all representations, statements of intent and agreements contained in the application submitted by Snyder Oil Corporation, dated September 24, 1993, and supplemented with additional information in an application addendum, dated January 26, 1994.

2. Nothing in this authorization shall excuse the Applicant, the owner and/or the operator from complying with all other applicable Federal, State and local regulations.

3. Permit transfers shall be made in accordance with 40 CFR Part 122, Subpart D.

4. EPA or its authorized representatives may inspect the Sources during normal business hours for purpose of ascertaining compliance with all conditions of this permit.

5. This permit shall expire if the retrofit construction of the modification is not commenced on all four gas-fired engines within 18 months of the effective date of this permit or, once commenced, construction is discontinued for a period of 18 months or more.

6. Emission limitations:

   a) Emissions from the 520 hp natural gas-fired Superior 6G 825 compressor engine (Compressor #4) retrofitted with an air to fuel (A/F) ratio control and with non-selective catalytic reduction (NSCR) shall not exceed the following:

NO_x	2.3 lbs/hr	(2.0 g/hp-hr)
CO	1.7 lbs/hr	(1.5 g/hp-hr)
VOC	0.5 lbs/hr	(0.43 g/hp-hr)

   b) Emissions from the 385 hp natural gas-fired Caterpillar G-398 engines (Generators 1 and 2) retrofitted with A/F ratio controls and with NSCR shall not exceed the following for <u>each</u> engine:

NO_x	1.7 lbs/hr	(2.0 g/hp-hr)
CO	1.3 lbs/hr	(1.5 g/hp-hr)
VOC	0.4 lbs/hr	(0.43 g/hp-hr)

   c) Emissions from the 577 hp natural gas-fired Waukesha L5100G engine (Generator 3) retrofitted with an A/F ratio control and with NSCR shall not exceed the following:

NO_x	2.5 lbs/hr	(2.0 g/hp-hr)
CO	1.9 lbs/hr	(1.5 g/hp-hr)
VOC	0.6 lbs/hr	(0.43 g/hp-hr)

7. Each engine listed in Condition 6 above shall be operated and maintained in accordance with the manufacturer's specifications to meet all emission limitations listed in Condition 6.

8. Initial compliance with each engine emissions limit in Condition 6 above shall be determined by emission tests to be performed within 30 (thirty) calendar days following completion of each engine retrofit. All emissions tests shall be performed at the maximum operating capacity of each engine.

9. These emissions tests shall be performed in accordance with the test methods specified in 40 CFR Part 60 Appendix A.

10. The Applicant shall provide EPA Region VIII with at least 14 (fourteen) calendar days prior notice of each emissions test, in order to give EPA the opportunity to observe the test. The Applicant shall also provide EPA with a Test Protocol at this time.

11. The Applicant shall provide EPA with written emission test results within 30 (thirty) calendar days of the date of each emissions test. A report for each engine shall be submitted to EPA.

12. The Applicant shall send all notifications and reports to:

Mr. Douglas M. Skie, Chief
Air Programs Branch (8ART-AP)
U.S. Environmental Protection Agency, Region VIII
999 18th Street, Suite #500
Denver, Colorado 80202-2405

IV. GENERAL

This permit is issued in reliance upon the accuracy and completeness of the information set forth in the Applicant's application and its addendum to EPA for authorization to construct and operate the Sources. On the effective date of this permit, the conditions herein become enforceable by EPA pursuant to any remedies it now has or may have in the future, under the Clean Air Act. Each and every condition of this permit is a material part thereof, and is not severable. This permit is effective thirty (30) days after receipt of the permit, unless you notify this Regional Office, in writing, that this permit or a term or condition of it is rejected. Such notice should be made within fifteen (15) days after receipt of the permit, should include the reason or reasons for rejection and should be sent to Mr. Skie at the address shown in Condition 12. of Section III. above.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

BY: Patricia D. Hull

Patricia D. Hull, Director
Air, Radiation, & Toxics Division

DATE: July 5, 1994

TABLE 1.0

SNYDER OIL CORPORATION
RIVERTON DOME GAS PLANT
EXISTING FACILITY POTENTIAL EMISSIONS

Unit	Equipment	Capacity	(days/yr)	Emission Calculations [1]														
				Emission Factor	NO_x (pph)	NO_x (tpy)	Emission Factor	CO (pph)	CO (tpy)	Emission Factor	NMHC (pph)	NMHC (tpy)	Emission Factor	SO_2 (pph)	SO_2 (tpy)	Emission Factor	PM-10 (pph)	PM-10 (tpy)
RDGP	C-1	330 hp	365	11 g/hp-hr	8.00	35.1	1.5 g/hp-hr	1.09	4.8	0.43 g/hp-hr	0.31	1.4	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.12	0.5
RDGP	#1	397 hp	365	11 g/hp-hr	9.63	42.2	1.5 g/hp-hr	1.31	5.8	0.43 g/hp-hr	0.38	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	#2	611 hp	365	11 g/hp-hr	14.82	64.9	1.5 g/hp-hr	2.02	8.8	0.43 g/hp-hr	0.58	2.5	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.22	0.9
RDGP	#4	520 hp	365	11 g/hp-hr	12.61	55.2	1.5 g/hp-hr	1.72	7.5	0.43 g/hp-hr	0.49	2.2	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.18	0.8
RDGP	#5	534 hp	365	11 g/hp-hr	12.95	56.7	1.5 g/hp-hr	1.77	7.7	0.43 g/hp-hr	0.51	2.2	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.19	0.8
RDGP	G-1	385 hp	365	11 g/hp-hr	9.34	40.9	1.5 g/hp-hr	1.27	5.6	0.43 g/hp-hr	0.36	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	G-2	385 hp	365	9.3 g/hp-hr	7.89	34.6	1.5 g/hp-hr	1.27	5.6	0.43 g/hp-hr	0.36	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	G-3	577 hp	365	11 g/hp-hr	13.99	61.3	1.5 g/hp-hr	1.91	8.4	0.43 g/hp-hr	0.55	2.4	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.20	0.9
RDGP	H-1	2.340 MMBtu/hr	365	0.1 lb/MMBtu	0.22	0.9	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	H-2	0.375 MMBtu/hr	365	0.1 lb/MMBtu	0.03	0.2	0.02 lb/MMBtu	0.01	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	H-3	0.075 MMBtu/hr	365	0.1 lb/MMBtu	0.01	0.0	0.04 lb/MMBtu	0.003	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	NPT	2.500 MMBtu/hr	365	0.1 lb/MMBtu	0.23	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.02	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	OPT	1.950 MMBtu/hr	365	0.1 lb/MMBtu	0.18	1.0	0.02 lb/MMBtu	0.04	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.0
RDGP	TT	1.545 MMBtu/hr	365	0.1 lb/MMBtu	0.14	0.8	0.02 lb/MMBtu	0.03	0.1	0.006 lb/MMBtu	0.01	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.0
RDGP	HT	0.500 MMBtu/hr	365	0.1 lb/MMBtu	0.05	0.2	0.02 lb/MMBtu	0.01	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	H-4	2.343 MMBtu/hr	365	0.1 lb/MMBtu	0.22	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	H-5	2.343 MMBtu/hr	365	0.1 lb/MMBtu	0.22	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
	TOTALS				**90.5**	**396.9**		**12.6**	**55.4**		**3.6**	**15.9**		**0.0**	**0.1**		**1.4**	**6.1**

[1] Emission factors are from AP-42 Sections 1.4 and 3.2 - Table 3.2-1 (2-cycle Lean Burn): There is not an emission factor for SO_2 or PM-10. For SO_2 we assumed the old factor of 0.002 g/hp-hr, and for PM-10 Table 3.2-4 was used (0.16 g PM-10/hp-hr)

TABLE 2.0

SNYDER OIL CORPORATION
RIVERTON DOME GAS PLANT
FACILITY EMISSIONS

Unit	Equipment	Capacity	(days/yr)	Emission Calculations [1]														
				Emission Factor	NO_x (pph)	NO_x (tpy)	Emission Factor	CO (pph)	CO (tpy)	Emission Factor	NMHC (pph)	NMHC (tpy)	Emission Factor	SO_2 (pph)	SO_2 (tpy)	Emission Factor	PM-10 (pph)	PM-10 (tpy)
RDGP	C-1	330 hp	365	11 g/hp-hr	8.00	35.1	1.5 g/hp-hr	1.09	4.8	0.43 g/hp-hr	0.31	1.4	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.12	0.5
RDGP	#1	397 hp	365	11 g/hp-hr	9.63	42.2	1.5 g/hp-hr	1.31	5.8	0.43 g/hp-hr	0.38	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	#2	611 hp	365	11 g/hp-hr	14.82	64.9	1.5 g/hp-hr	2.02	8.8	0.43 g/hp-hr	0.58	2.5	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.22	0.9
RDGP	#4 *	520 hp	365	2 g/hp-hr	2.29	10.0	1.5 g/hp-hr	1.72	7.5	0.43 g/hp-hr	0.49	2.2	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.18	0.8
RDGP	#5	534 hp	365	11 g/hp-hr	12.95	56.7	1.5 g/hp-hr	1.77	7.7	0.43 g/hp-hr	0.51	2.2	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.19	0.8
RDGP	G-1 *	385 hp	365	2 g/hp-hr	1.70	7.4	1.5 g/hp-hr	1.27	5.6	0.43 g/hp-hr	0.36	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	G-2 *	385 hp	365	2 g/hp-hr	1.70	7.4	1.5 g/hp-hr	1.27	5.6	0.43 g/hp-hr	0.36	1.6	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.14	0.6
RDGP	G-3 *	577 hp	365	2 g/hp-hr	2.54	11.1	1.5 g/hp-hr	1.91	8.4	0.43 g/hp-hr	0.55	2.4	0.002 g/hp-hr	0.00	0.0	0.16 g/hp-hr	0.20	0.9
RDGP	H-1	2.340 MMBtu/hr	365	0.1 lb/MMBtu	0.22	0.9	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	H-2	0.375 MMBtu/hr	365	0.1 lb/MMBtu	0.03	0.2	0.02 lb/MMBtu	0.01	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	H-3	0.075 MMBtu/hr	365	0.1 lb/MMBtu	0.01	0.0	0.04 lb/MMBtu	0.003	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	NPT	2.500 MMBtu/hr	365	0.1 lb/MMBtu	0.23	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.02	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	OPT	1.950 MMBtu/hr	365	0.1 lb/MMBtu	0.18	1.0	0.02 lb/MMBtu	0.04	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.0
RDGP	TT	1.545 MMBtu/hr	365	0.1 lb/MMBtu	0.14	0.8	0.02 lb/MMBtu	0.03	0.1	0.006 lb/MMBtu	0.01	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.0
RDGP	HT	0.500 MMBtu/hr	365	0.1 lb/MMBtu	0.05	0.2	0.02 lb/MMBtu	0.01	0.0	0.006 lb/MMBtu	0.00	0.0	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.00	0.0
RDGP	H-4	2.343 MMBtu/hr	365	0.1 lb/MMBtu	0.22	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
RDGP	H-5	2.343 MMBtu/hr	365	0.1 lb/MMBtu	0.22	1.0	0.02 lb/MMBtu	0.05	0.2	0.006 lb/MMBtu	0.01	0.1	0.001 lb/MMBtu	0.00	0.0	0.005 lb/MMBtu	0.01	0.1
	TOTALS				**54.9**	**241.0**		**12.6**	**55.4**		**3.6**	**15.9**		**0.0**	**0.1**		**1.4**	**6.1**

[1] Emission factors are from AP-42 Sections 1.4 and 3.2 – Table 3.2-1 (2-cycle Lean Burn): There is not an emission factor for SO_2 or PM-10. For SO_2 we assumed the old factor of 0.002 g/hp-hr, and for PM-10 Table 3.2-4 was used (0.16 g PM-10/hp-hr)

* NO_x BACT (permitted) emission limit

SNYDER OIL CORPORATION
PSD PERMIT APPLICATION ANALYSIS
(Final Permit - Statement of Basis)

A. Applicability Determination

The Riverton Dome Gas Plant located approximately six (6) miles south of Riverton, Wyoming, was constructed in 1963 on the Wind River Indian Reservation. Arco Oil and Gas Company owned and operated the Riverton Dome Gas Plant from its construction in 1963 through February 27, 1993. Snyder Oil Corporation has owned and operated the Riverton Dome Gas Plant since February 27, 1993.

A sulfur recovery unit (SRU) was installed at the plant at the time of original construction. In 1973, the SRU was removed and all acid gas was flared. The estimated SO_2 emissions in 1973 were 2700 tons per year (TPY). In 1991, actual SO_2 emissions were 2010 TPY. Potential SO_2 emissions exceeding 250 TPY make the Riverton Dome Gas Plant a major stationary source as defined under the August 7, 1980 PSD regulations or under 40 CFR § 52.21(b)(1)(i)(b).

In 1982, Compressor #4, composed of a compressor unit and a natural gas-fired driver, was installed at the Riverton Dome Gas Plant. The driver is a Model 6G 825 Superior engine with a maximum site-rating of 520 horsepower. The installation of Compressor #4 was a major modification to a major stationary source, since the potential to emit of NO_x emissions are greater than the 40.0 TPY significant level (40 CFR § 52.21 (b)(23)). Based on the AP-42 emission factor of 11.0 g/hp-hr for natural gas-fired engines and a unit operation of 8760 hours per year, the potential NO_x emissions for Compressor #4 are 55.2 TPY.

In 1989, Generators 1, 2, and 3 were installed. Generators 1 and 2 use G-398 natural gas-fired Caterpillar engines, which are site rated at 385 horsepower. Using the same AP-42 emission factor from above, the potential NO_x emissions from Generator 1 are 40.9 TPY. Generator 2 has an air to fuel ratio controller (A/F) to restrict its potential to emit to 34.6 TPY of NO_x. Generator 3 is powered by a Waukesha L5100G natural gas-fired engine, which is site rated at 577 horsepower. Its potential NO_x emissions are 61.3 TPY.

The addition of the 3 generators was a major modification to a major stationary source, since the combined potential NO_x emissions of 136.8 TPY are greater than the 40.0 TPY significant level.

Table 1.0 shows the potential emissions from the existing units at the Riverton Dome Gas Plant, including Compressor #4 and Generators 1, 2, and 3. The table does not show the SO_2 emissions from the flare. All emissions are based on a unit operation of 24 hours per day, 365 days per year.

The potential emission estimates for NO_x, SO_2, CO, PM_{10}, and VOC's from the Riverton Dome Gas Plant are based on emission factors found in sections 1.4 and 3.2 of the U.S. Environmental Protection Agency's AP-42, Compilation of Air Pollutant Emission Factors. The emission factors used in the calculations are shown in Table 1.0. Section 1.4 (version 4/93) of AP-42 lists emission factors for natural gas combustion sources and section 3.2 (version 4/93) lists factors for gas-fired engines. The emission factors for a 2-cycle lean burn engine, in grams per horsepower hour (g/hp-hr), listed in Table 3.2-1 were used in the engine emission calculations. Table 3.2-1 does not list factors for SO_2 or PM_{10}. An emission factor of 0.002 g/hp-hr was used for SO_2. This factor was listed for SO_2 in previous versions of section 3.2. The PM_{10} emission factor of 0.16 g/hp-hr was obtained from Table 3.2-4 for a two-stroke lean burn engine.

Below are two sample calculations. Equation 1) is for determining NO_x emissions from a gas-fired engine and equation 2) is for calculating NO_x emissions from natural gas combustion.

Engine - 520 hp:

1) (11.0 g NO_x/hp-hr) (520 hp) (lb/453.6 g) = 12.6 lb NO_x/hr

(12.6 lb/hr)(365 day/yr)(24hrs/day)(ton/2000lb) = 55.2 TPY

Gas Combustion - Capacity of 2.5 MMBtu/hr:

2) (100 lb NO_x/MM ft^3) (ft^3/1000 Btu) = 0.1 lb NO_x/MMBtu

(2.5 MMBtu/hr) (0.1 lb NO_x/MMBtu) = 0.25 lb NO_x/hr

(0.25 lb/hr)(24 hr/day)(365 day/yr)(ton/2000lb) = 1.1 TPY

Table 2.0 shows the Riverton Dome Gas Plant emissions using the Best Available Control Technology (BACT) NO_x emission limit of 2.0 g/hp-hr for Compressor #4 and Generators 1, 2, and 3. The NO_x emissions are reduced to 10.0, 7.4, 7.4, and 11.1 TPY respectively, for Compressor #4 and Generators 1, 2, and 3.

B. Stack Height

The Applicant's proposed stack height for Compressor #4 is 7.3 meters and the proposed stack heights for Generator 1,

Generator 2, and Generator 3 are 5.3 meters, 5.3 meters, and 6.8 meters, respectively. Good engineering practices (GEP) stack height regulations under 40 CFR Section 51.100(ii) consider 65 meters the de minimus level; therefore, Snyder Oil Corporation meets the requirement of GEP for each of its stacks.

C. Best Available Control Technology Review

In general, the BACT requirement is defined as an emission limitation based on the maximum degree of reduction for each pollutant which would be emitted from any major source or modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. This definition includes the requirement that the determination be made on what is achievable. Therefore, it also involves a determination about what is "not achievable" on the basis of energy, environmental, and economic impacts and other costs to eliminate a technically feasible control from consideration. BACT must also be at least as stringent as any New Source Performance Standard (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) found in 40 CFR Parts 60 and 61.

Section 3.0 of the application detailed the BACT analysis for NO_x emissions from the Applicant's Compressor #4 and Generators 1, 2, and 3. The BACT analysis included an evaluation of three (3) different control techniques and emission limits. These techniques, discussed below, are selective catalytic reduction (SCR), a new clean burn engine, and an A/F ratio control with non-selective catalytic reduction (NSCR). The baseline potential NO_x emissions from the four engines are 192.0 TPY.

Selective Catalytic Reduction

Selective catalytic reduction is considered in the analysis to be the top control technology available for reducing NO_x engine emissions. It is capable of achieving approximately 85% reduction in emissions at an emission rate of 1.5 g/hp-hr. This would reduce the NO_x emissions from the four engines by 163.0 TPY.

Achieving an emission rate of 1.5 g/hp-hr using SCR technology was determined in the analysis to have significant environmental concerns. These environmental concerns being emissions of toxic air contaminants due to ammonia slip and

generation of hazardous wastes from catalyst disposal. There are also potential hazards in transporting, handling, and storing large quantities of ammonia.

It was determined in the analysis that due to the environmental problems, SCR could not be considered to be BACT.

New Clean Burn Engines

The clean burn engine uses a precombustion chamber on each cylinder which serves to reduce NO_x formation through combustion of a lean air-fuel mixture and reduced combustion time.

Installation of new clean burn engines would accomplish the same amount of NO_x reduction as the SCR technology, that is, 163.0 TPY from the 192.0 TPY baseline value.

An economic analysis was done for the clean burn engines as shown in Tables 3-4 and 3-5 of the permit application. These tables illustrate the capital and annual costs for installing four new engines. The cost effectiveness was calculated at approximately $4,900 per ton of NO_x removed. It was determined in the analysis that the installation of new clean burn engines was not cost effective and could not be considered to be BACT.

Non-Selective Catalytic Reduction (A/F Controller)

A technical description of the NSCR process utilizing an A/F ratio controller is outlined in Section 3.7.5 of the permit application. Application of NSCR with A/F ratio control on each of the engines will reduce total NO_x emissions by 152.0 TPY. The NO_x emission rate from each engine will be 2.0 g/hp-hr.

The only potential environmental impact will be from catalyst disposal, but this should be insignificant because most of the catalyst material is recyclable. The economic analysis is summarized in Tables 3-6 and 3-7 of the permit application. A cost effectiveness of $600 per ton of NO_x removed was calculated. It was determined in the analysis that NSCR with A/F ratio control on the engines would be BACT at the 2.0 g/hp-hr NO_x emission rate.

EPA finds that the Applicant's BACT analysis included all applicable control techniques. EPA concludes that the Applicant's proposed control technology of retrofitting the engines with NSCR and A/F ratio control to achieve a NO_x emission rate of 2.0 g/hp-hr to be the best available control technology. Additionally, no NSPS exists for gas-fired engines.

D. Air Quality Models

The Applicant's air quality analysis is contained in Section 4.0 of the permit application and addendum. The Industrial Source Complex Short-Term (ISCST2) model, version 93109, was used by the Applicant to predict the air quality impact of NO_x emissions from the engines. The ISCST2 model was also used to predict the Class II NO_2 increment consumption and the Class I increment for the Bridger Wilderness area and the Popo Agie Wilderness area (Popo Agie is a Class II wilderness area. Table 4-5 of the permit application addendum contains the stack parameters used in the ISCST2 model and Table 4-1 lists the technical options used to run ISCST2.

E. Air Quality Analysis

A March 31, 1994 memo from EPA Region VIII's Assessment, Modeling & Emissions Section summarizes the air quality analysis of NO_x emissions from the Riverton Dome Gas Plant.

Meteorological data measured at Lander, Wyoming during 1984, 1985, 1987, and 1988 was used as input for the ISCST2 model. Lander is located approximately 30 to 35 kilometers (km) southwest of the Riverton Dome Gas Plant. The winds are most frequent from the southwest and west southwest with the next most predominant winds from the southeast and northwest.

An annual average ambient NO_2 concentration of 3.0 micrograms per cubic meter (ug/m^3) was used as the background level. This value was measured during a PSD monitoring project from September 1986 through August 1987 and was conducted about 45 miles east northeast of Riverton. A second study at the Chevron East Painter facility in 1992 also measured an annual ambient NO_2 background concentration of 3.0 ug/m^3. Since the annual ambient NO_2 concentration is less than the annual significant monitoring concentration of 14.0 ug/m^3, the Applicant did not have to conduct pre-construction monitoring for NO_2.

The predicted 1.0 ug/m^3 impact area was measured 2.27 km from the Riverton Dome Gas Plant. No offsite sources are located in this area, thus only emissions from equipment located at the Riverton Dome Gas Plant were modeled.

Modeling results showed that there were no predicted violations of the 100 ug/m^3 annual National Ambient Air Quality Standard (NAAQS) for NO_2. The maximum annual predicted NO_2 impact, including background concentration, was 83.4 ug/m^3 using

the conservative assumption of 100% conversion of NO_x to NO_2. The maximum annual predicted NO_2 impact was 61.4 ug/m^3 (includes background concentration) upon application of the Ozone Limiting Method (OLM).

F. Ambient Air Increments

The allowable annual PSD increment for NO_2 is 25.0 ug/m^3. The Applicant predicted a maximum annual Class II NO_2 increment of 23.3 ug/m^3 assuming 100% conversion of NO_x to NO_2. The predicted maximum increment was 17.7 ug/m^3 after applying the OLM.

The Class I area impact analysis section (Section I) that follows, contains the Class I increment analysis for the Bridger and Popo Agie Wilderness areas.

G. Source Information

The PSD application submitted on September 24, 1993, was concluded to be incomplete by EPA Region VIII in an October 27, 1993 letter to Science & Engineering Analysis Corporation (SEACOR), who prepared and submitted the application on behalf of Snyder Oil Corporation. SEACOR responded to the incomplete determination by submitting an application addendum, dated January 26, 1994. This addendum contained an additional impact analysis, an analysis of the Class I AQRV's, and an air quality analysis of the NO_x emissions. On February 16, 1994, EPA determined the application to be complete as of the date the addendum was received (January 27, 1994). The above information was used to make the determination that all requirements of the PSD regulations would be satisfied.

H. Additional Impact Analysis

Section 52.21(o) of the federal PSD regulations requires that each PSD permit application include an additional impact analysis for impairment to visibility, soils, and vegetation that would occur in the impact area as a result of emissions from the proposed Sources and emissions from associated commercial, residential, and industrial growth.

The additional impact analysis is detailed in Section 6.0 of the permit application addendum. One conclusion from the analysis was that the installation of the engines in 1982 and 1988 did not result in a growth of the workforce at the

plant or a growth in industrial development in the Riverton area. Therefore, only an impact analysis of the Sources' emissions was demonstrated in the application addendum.

Another conclusion from the impact analysis was that the soils in the impact area are poor soils for irrigating purposes and thus, only vegetation having grazing use is found in this area.

The impact area extends 2.27 km from the Riverton Dome facility. There are no airports, scenic vistas, or National forests located in the impact area to justify a detailed visibility analysis. The NO_x emissions from the Sources will be reduced by 83.4 TPY (119.4 TPY of actual 1992 emissions minus the proposed PSD emissions of 36.0 TPY) after applying BACT. There has been no visibility degradation in the impact area since the start up of the engines thus, a decrease in emissions will reduce the impact on the visibility.

I. Class I Area Impact Analysis

A PSD source located within 100 km of a Class I area must conduct an analysis of the emission impacts on the Class I AQRV's and an analysis of the Class I increment. The AQRV's that must be analyzed are flora, fauna, water, visibility, odor, soil, and cultural/archeological resources. The annual Class I increment for NO_x is 2.5 ug/m^3.

The Sources are located within 100 km of two Class I wilderness areas (Bridger and Fitzpatrick) and one Class II wilderness area (Popo Agie) in western Wyoming. The U.S. Forest Service (U.S.F.S.) is the federal land manager for these areas. The U.S.F.S. advised the Applicant that only an analysis of the AQRV's for the Bridger and Popo Agie areas would be necessary as these areas would represent the "worst case" analysis, since they are the closest to the Sources and currently have the greatest increment consumption above baseline. The Riverton Dome Gas Plant is approximately 62 km downwind from the Bridger Wilderness area and 55 km downwind from the Popo Agie Wilderness.

The U.S. Fish and Wildlife Service uses an annual average Class I area significance level of 0.025 ug/m^3 for NO_2. Assuming 100% conversion of NO_x to NO_2, the maximum predicted annual average NO_2 concentration from the Sources is 0.003 ug/m^3. The maximum predicted annual average NO_2 concentration from the Sources and existing sources in the area is respectively, 0.018 and 0.021 ug/m^3, at the Bridger and Popo Agie borders. The predicted NO_2 impacts are well below the Class I increment of 2.5 ug/m^3 and are even below the 0.025 ug/m^3 significance level.

The following three sensitive AQRV's have been identified in the higher elevation wilderness areas of northwestern Wyoming as needing special observation due to susceptibility to degradation:

1) visibility,

2) alpine vegetation which is potentially sensitive to enrichment effects from high nitrogen deposition, and

3) alpine cirque lakes, which possess low acid-neutralizing capacity; their limited capacity to buffer makes them vulnerable to acidification.

The Class I AQRV analysis presented in the application focused on the AQRV's listed above, since the U.S.F.S. determined these AQRV's to be the most affected by the NO_x emissions.

A visibility analysis was done using Level I of the VISCREEN model (EPA, 1992b). Table 5-2 in the application addendum lists the parameters input into VISCREEN for the analysis. Tables 5-3 and 5-4 show the screening results for the Bridger and Popo Agie areas, respectively. Adverse visibility impairment is not expected in either wilderness area, because the predicted maximum visual impacts are below the default criteria.

Increased nitrogen deposition in alpine zones could result in abnormally high plant growth rates and a possible shift in plant species composition. It is noted in the application that a screening value for nitrogen deposition of 3 to 5 kilograms per half-acre per year (kg/ha/yr) has been recommended by the Cary Conference for the Bridger Wilderness. Annual deposition of nitrogen for 1992 has been measured at sites south and west of the Bridger area at concentrations of 1.10, 1.13, and 0.79 kg/ha. The small amount of NO_x emissions from the Sources should not any have adverse effects on the alpine vegetation or soil, since current nitrogen deposition is low.

Increases in NO_x and SO_2 emissions over the past 50 years has not impaired high elevation lake chemistry. Measurements of lake alkalinity in 1935 and 1989 showed that there has not been any significant change. These measurements include the original NO_x emissions from the Sources that are now being permitted.

J. Public Participation

The application, analysis and proposed permit were made available for public inspection at the EPA Regional Office in Denver, Colorado, the Wind River Environmental Quality Commission

in Fort Washakie, Wyoming, and the Fremont County Clerk's Office in Lander, Wyoming. EPA issued a public notice in the Wind River News and the Riverton Ranger on May 24, 1994, giving opportunity for public comments and to request a public hearing on our proposed action.

No comments were received during the thirty (30) day public comment period.