Treating Site #2

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

AUG - 6 1997

Ref: 8P2-A

Mr. Ronald W. Hunter
Senior Environmental Coordinator
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

Dear Mr. Hunter:

The U.S. Environmental Protection Agency (EPA) has completed its final review of Vastar Resources' applications to do retrofit construction and operation of internal combustion engines located at seven (7) different coal-bed methane gas treating sites on the Southern Ute Indian Reservation in Colorado. We hereby issue conditional approval pursuant to the regulations for the Prevention of Significant Deterioration (PSD) of air quality, 40 CFR §52.21. Revisions have been made to the April 1, 1997 proposed permits as a result of the public comment process. Appendix I (enclosed) contains a summary of your comments and EPA's responses.

The seven conditional permits shall become effective in accordance with Article IV of the enclosed permits. Source operation shall cease if a permit or any of these permits or any part(s) thereof are rejected.

If you have any questions concerning your final permits, please contact Monica Morales of my staff at (303) 312-6936.

Sincerely,

Jay Gordon

for Richard R. Long
Director
Air Program

Enclosures

cc: Mike Frost (Southern Ute Tribe, w/enclosures)

CONCURRENCE COPY

JUL 3 1 1997

Ref: 8P2-A

Mr. Ronald W. Hunter
Senior Environmental Coordinator
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

Dear Mr. Hunter:

The U.S. Environmental Protection Agency (EPA) has completed its final review of Vastar Resources' applications to do retrofit construction and operation of internal combustion engines located at seven (7) different coal-bed methane gas treating sites on the Southern Ute Indian Reservation in Colorado. We hereby issue conditional approval pursuant to the regulations for the Prevention of Significant Deterioration (PSD) of air quality, 40 CFR §52.21. Revisions have been made to the April 1, 1997 proposed permits as a result of the public comment process. Appendix I (enclosed) contains a summary of your comments and EPA's responses.

The seven conditional permits shall become effective in accordance with Article IV of the enclosed permits. Source operation shall cease if a permit or any of these permits or any part(s) thereof are rejected.

If you have any questions concerning your final permits, please contact Monica Morales with the Air Program at (303) 312-6936.

Sincerely,

Original signed
Kerrigan G. Clough
Assistant Regional Administrator
Office of Pollution Prevention,
State & Tribal Assistance

Kerrigan G. Clough
Assistant Regional Administrator
Office of Pollution Prevention,
State and Tribal Assistance

Enclosures

8P2-A 8P2-A 8P2-A 8P2C

cc: Mike Frost (Southern Ute Tribe, w/enclosures)

fcd: M. Morales a:\vastar.fin

bcc: Cindy Reynolds (8ENF-T, w/enclosures)

APPENDIX I
Vastar Resources, Inc.
Summary of Comments

Comments 1, 2, 3, and 4:

Each of the permits is titled "Proposed Conditional Permit to Commence Construction and Operate." Section I in each permit contains the following language, "proposes to do retrofit construction" and Section III in each permit is titled "Conditional Permit to Construct and Operate." Vastar's comments focus on the fact that each of the seven treating sites have completed construction, including retrofit construction and that the construction language in the permits does not accurately depict the status of each permit. Any reference to construction or commence construction in the permits should be removed.

Response 1, 2, 3, and 4:

Vastar is correct that it has completed construction of its seven treating sites, including retrofit construction of air pollutant control technologies. However, EPA declines from deleting language in the Prevention of Significant Deterioration (PSD) permits that reference construction. The PSD permits in question were proposed to be issued under the authority of 40 CFR 52.21(i) and the final permits are being issued under this same authority. Section 52.21(i)(1) states that "No stationary source or modification to which the requirements of paragraphs (j) through (r) of this section apply **shall begin actual construction without a permit** which states that the stationary source or modification would meet those requirements." This language means that a **pre-construction** permit is required prior to commencing construction of a source subject to the PSD requirements.

In an enforcement action with EPA Region VIII, it was determined that Vastar constructed seven PSD sources prior to issuance of any PSD permits. Additionally, EPA makes clear in the introduction of each permit and in the statement of basis that construction of the seven sources has already occurred, that the sources are currently operating, and that the PSD permits require retrofit construction of internal combustion engines with air/fuel controllers and non-selective catalytic reduction units.

Comment 5:

Permit Condition III.5. should be clarified to reflect that the referenced emissions limitations are those expressed in "tons per year" in Table I to the permits. If EPA intends this provision to incorporate the "pounds per hour" figures in Table I as well, then it is critical that the provisions

concerning abnormal operating conditions proposed in Comment 10 below be included in the permits, for the reasons set forth in Comment 10.

Response 5:

EPA does intend for this permit provision to incorporate the "pounds per hour" emissions limit. Vastar must meet both the pollutant "pounds per hour" and the "tons per year" emissions limits in Table I. A "tons per year" emissions limit alone is not "practically enforceable" and cannot be directly determined through source testing. To be "practically enforceable" a limit must be **effective**, that is a limit must be written so that it is possible to verify compliance and to document violations when enforcement action is necessary.

Comment 6:

Vastar would like prior notification of a planned EPA inspection, due to the remote locations of the treating sites and the hazardous nature of the locations. Vastar would like the language in permit condition Section III (4.) changed to, "Vastar will be provided with reasonable advance notification of any such inspections."

Response 6:

EPA declines from including language in the PSD permits that requires EPA to provide notification to a source prior to an EPA inspection. As for Vastar's concern about the hazardous nature of the sites, EPA inspectors are required to complete at least 24 hours (most receive 40 hours) of safety training before they are allowed to conduct on-site inspections. In addition, they are subject to very thorough safety guidance and policies and are required to have in their possession for inspections all necessary safety equipment and clothing, including respirators, which are quantitatively fit tested for each inspector. Also, they are well acquainted with the risks of such sites. While EPA will usually make a call to such remote facilities prior to an inspection to make sure a company representative is available, EPA will not make such a commitment in the permit.

Comments 7 and 9:

Of the 34 internal combustion engines to be permitted, four of them are Waukesha VRG 330 engines used only for power generation or water transfer at Treating Sites #1, #2, #6, and #9. Vastar proposes that these engines be omitted from compliance testing and monitoring requirements due to the low horsepower rating, the amount of emissions generated by this type of engine, and the fact that EPA Methods 1 and 1a do not accomodate very small diameter exhaust stacks.

Response 7 and 9:

The engine testing requirement language [Section III.7. a) or Section III.8. a)] was revised for each affected permit by adding Vastar's recommended language. That is, emissions testing will not be required for the Waukesha VRG 330 model engines at Treating Sites #1, #2, #6, and #9.

Additionally, permit language requiring portable analyzer monitoring of the Waukesha VRG 330 engines at the four treating sites was also deleted.

Comment 8:

Section III.7.a) requires that compliance tests be performed on each engine type operated at Vastar's Treating Sites. Vastar is proposing that testing only be required on representative engines of each type (other than Waukesha VRG 330) used at Vastar's IBF operations, rather than on representative engines at a particular treating site. Vastar suggests that the number of engines of each type to be tested be identified in the permits as set forth in the proposed Table III.

Response 8:

Specifics concerning Vastar's emissions testing of its engines are to be detailed in the Testing Protocol to be submitted to EPA within 90 (ninety) calendar days of the effective date of the 7 (seven) permits, not in the conditions of the permits. This includes identification of the engines to be tested. Vastar must make its proposal to test a representative number of each type of engine (proposed Table III) in its Testing Protocol. EPA must approve of Vastar's Testing Protocol prior to testing of the engines.

Comment 10:

Vastar contends that the language in Section III (10.) of the PSD permits do not appropriately take into account the possibility of emissions limitations exceedances which may occur as a result of circumstances reasonably beyond the control of Vastar, including emergency conditions, upset conditions, equipment malfunction or breakdown of either the control equipment or the engine itself, and other similar situations including start-up and shut-down of equipment (collectively, "abnormal operating condition"). Many EPA-approved State Implementation Plans provide specific procedures pursuant to which excess emissions resulting from abnormal operating conditions are not considered to be permit violations. Vastar would like similar language to be included in its permits.

Response 10:

"Malfunction" is defined in 40 CFR §60.2 as "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment,

process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunction." Thus malfunctions cover control equipment breakdowns that are caused by circumstances beyond the source's control and that are unforeseeable or unpredictable. Upsets are similarly excused or not considered a permit violation if they meet these same criteria.

However, the permitting authority makes the ultimate decision of whether or not a permit emissions violation has occurred during any period of excess emissions. The language in the permit conditions concerning excess emissions provides Vastar with the enforcement protection they seek, but leaves final interpretation of malfunction and upset events to EPA. EPA **must** retain its enforcement discretion. The permits have implied affirmative defenses for malfunction and upset circumstances. Even though 40 CFR §70.6(g) provides language stating that an "emergency" constitutes an affirmative defense, these same provisions also allow the permitting authority enforcement discretion. This enforcement discretion comes under §70.6(g)(4) where the permittee has the burden of proof in establishing the occurrence of an emergency and the permitting authority has discretion for taking an enforcement action if sufficient proof is not provided.

This permit condition was modified for each of the seven permits to include the definition of "malfunction" as defined in 40 CFR §60.2.

Comment 11:

Vastar would like to add permit language to Section III (13.) stating that excess emissions occurring during the startup operation of uncontrolled replacement/overhauled engines will not be considered a violation of the permit, provided all requirements of Condition 13 are met.

Response 11:

No changes were made to the permits as EPA **must** retain its enforcement discretion. See EPA response to comment 10.

APPENDIX II

PERMIT APPLICATION AND SUPPORTING DATA

CONTENTS

APPENDIX II

VASTAR RESOURCES, INC.
PSD PERMIT APPLICATIONS ANALYSES
(Final Permit - Statement of Basis)

A. Applicability Determination

Vastar Resources, Inc. operates several facilities (treating sites) used to treat coal bed methane gas production. The treating facilities are located in the Ignacio Blanco Fruitland field in La Plata County, Colorado. The Ignacio Blanco Fruitland field is situated on the Southern Ute Indian Tribe reservation.

This Statement of Basis discusses the background and analyses of the PSD permits for seven of Vastar's treating sites located in the Ignacio Blanco Fruitland (IBF) field. Figure 1 illustrates the Ignacio Blanco Fruitland field and the various Vastar treating sites. The seven treating sites subject to PSD are Nos. 1, 2, 4, 5, 6, 7, and 9. Potential carbon dioxide (CO) emissions exceeding 250 tons per year (TPY) make each of the Vastar treating sites a major stationary source as defined under the August 7, 1980 PSD regulations or under 40 CFR § 52.21(b)(1)(i)(b). Emissions of nitrogen oxides (NOx) are also significant (greater than 40 TPY) and subject to the PSD requirements. A brief summary of each subject treating site, its emissions units, and its PSD applicability follows.

Treating Site #1

Treating Site #1 is located in the lower southeast corner of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small water injection pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units, except the generator, were installed in June/July of 1989. The generator was installed in January 1992.

The two compressor engines are Waukesha VHP series, Model L5790 GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #1 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 grams/horsepower-hour (g/hp-hr) for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 1 shows the potential emissions from all emissions units at Treating Site #1. All emissions are based on unit operations of 24 hours per day, 365 days per year.

IGNACIO BLANCO
FRUITLAND FIELD

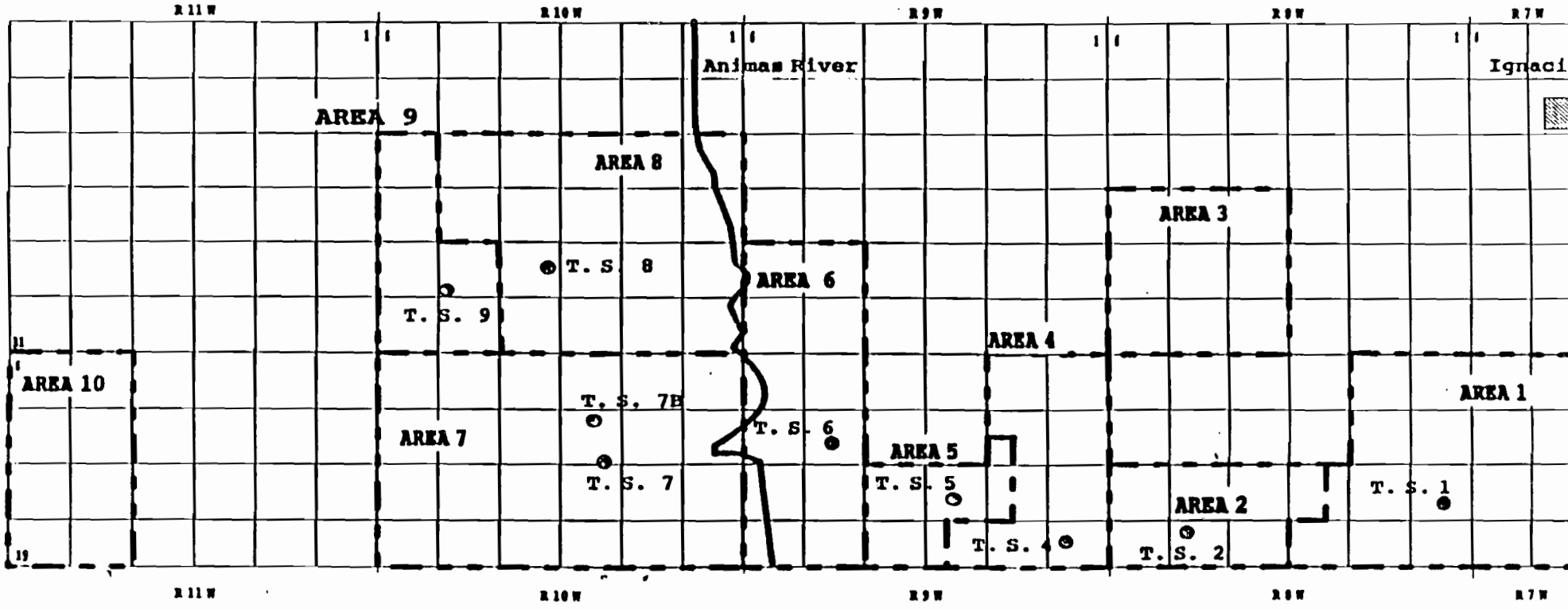

FIGURE 1.

TABLE 1

VASTAR'S TREATING SITE #1
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790 GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-2	Waukesha L5790 GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.036 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-4	Waukesha F11-G	89 hp	8.3 g/hp-hr	1.6	7.1	34.0 g/hp-hr	6.7	29.2	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			37.31	163.6		150.9	661.4		0.55	2.39		<0.01	0.04		0.07	0.33

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #2

Treating Site #2 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units were installed in June 1990.

The two compressor engines are Waukesha VHP series, Model L5790-GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #2 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 2 shows the potential emissions from all emissions units at Treating Site #2. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #4

Treating Site #4 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration unit. All units, except the largest compressor engine (Model L5790-GSI) and the Unit B water transfer pump, were installed in June/July of 1989. The largest compressor engine and the Unit B water transfer pump were installed in February 1990.

Two of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #4 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY. The 1990 addition of another compressor engine and a water transfer pump was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 300 TPY (significant CO level at 100 TPY) and NOx emissions greater than 85 TPY (significant NOx level at 40 TPY). Table 3 shows the potential emissions from all emissions units at Treating Site #4. All emissions are based on unit operations of 24 hours per day, 365 days per year.

TABLE 2

VASTAR'S TREATING SITE #2
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-2	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.005 g/hp-hr	< 0.01	< 0.01	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			35.71	156.7		144.4	632.6		0.06	0.24		< 0.01	0.04		0.07	0.32

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 3

VASTAR'S TREATING SITE #4
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4-1	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-2	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-3	Waukesha L5790-GSI	1118 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69	302.3	0.011 g/hp-hr	0.03	0.11	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS4-4	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-5	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-6	Waukesha F1197-G	136 hp	8.5 g/hp-hr	2.6	11.2	35.0 g/hp-hr	10.5	45.9	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS4-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4-12	Fugitives								see application	0.19	0.82						
	TOTALS			48.56	211.7		191.1	837.4		0.26	1.11		<0.01	0.04		0.08	0.45

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #5

Treating Site #5 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of four compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the largest compressor engine (Model L5790-GSI), the 738 hp (Model F3521-GSI) engine, and the glycol dehydration unit, were installed in May 1989. The largest compressor engine was installed in May 1990, the 738 hp engine was installed in February 1990, and the glycol reboiler was installed in February 1993.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. The fourth engine is a Waukesha VHP series, Model F3521-GSI engine with a rating of 738 hp. Upon its construction, Treating Site #5 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 738 and 1215 horsepower compressor engines **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY for these two engines. Table 4 shows the potential emissions from all emissions units at Treating Site #5. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #6

Treating Site #6 is located in the lower middle section of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and two glycol dehydration units. All units, except the 1478 hp compressor engine and the #2 glycol dehydration reboiler, were installed in March/April of 1990. Both the 1478 hp engine and the #2 glycol reboiler were installed in March 1995.

Two of the compressor engines are Waukesha VHP series, Model L5790-GSI engines with maximum site-ratings of 1215 horsepower. The third compressor engine is a Waukesha VHP series, (Model 7042-GL) lean burn engine with a maximum site-rating of 1478 horsepower. Upon its construction, Treating Site #6 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power

TABLE 4

VASTAR'S TREATING SITE #5
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-2	Waukesha F2895 G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-3	Waukesha L5790-GSI	1130 hp	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS5-4	Waukesha F3521-GSI	686 hp	7.0 g/hp-hr	10.6	46.4	28.0 g/hp-hr	42.4	185.5	0.005 g/hp-hr	0.01	0.03	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	92 hp	7.0 g/hp-hr	1.4	6.2	34.0 g/hp-hr	6.9	30.2	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.06						
	TOTALS			40.55	178.1		163.3	715		0.04	0.19		<0.01	0.05		0.09	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 5

VASTAR'S TREATING SITE #6
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6-2	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6-3	Waukesha 7042-GL	1331 hp	1.5 g/hp-hr	4.4	19.3	2.65 g/hp-hr	7.8	34.1	0.007 g/hp-hr	0.02	0.09	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.13
TS6-4	Waukesha F18-GL	338 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.006 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS6-5	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.9	0.002 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS6-6	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	TOTALS			46.1	202.5		168.7	738.2		0.03	0.19		0.01	0.08		0.14	0.6

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the two original compressor engines, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. The installation of the 1478 hp lean burn engine and glycol reboiler in 1995 was not a major modification. Table 5 shows the potential emissions from all emissions units at Treating Site #6. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #7

Treating Site #7 is located in the lower southwest quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the Unit B water injection pump, the largest compressor engine (1215 hp), the glycol reboiler, and the #3 and #4 tank heaters, were installed from May-July of 1989. The Unit B injection pump was installed in April 1990 and the #3 and 4 tank heaters were installed in February 1993. The glycol reboiler and the 1215 hp compressor engine were installed in January 1990.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third and largest engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #7 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 1215 horsepower engine and the Unit B water injection pump **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 300 TPY and the potential NOx emissions exceeded 70 TPY for just the 1215 horsepower engine. Table 6 shows the potential emissions from all emissions units at Treating Site #7. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #9

Treating Site #9 is located in the northwest quadrant of the IBF field. The facility consists of three compressor engines, a small generator, two water tanks and two paraffin sales tanks with tank heaters, an electric water transfer pump, and a glycol dehydration unit. All units, except one of the 738 horsepower compressor engines, the #3 tank heater, and the #4 tank heater were installed in November 1991. The Unit C, 738

TABLE 6

VASTAR'S TREATING SITE #7
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	339 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.013 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-2	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.9	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	93 hp	7.0 g/hp-hr	1.4	6.3	34.0 g/hp-hr	6.9	30.5	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-5	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-6	Waukesha L5790 GSI	1133 hp	7.0 g/hp-hr	17.5	76.7	28.0 g/hp-hr	70	306.6	0.005 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.11
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	TOTALS			35.76	157.4		136.8	599.6		0.03	0.18		<0.01	0.05		0.11	0.38

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

horsepower engine was installed in October 1992, the #3 tank heater was installed in June 1992, and the #4 tank heater was installed in June 1994.

All three of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. Upon its construction, Treating Site #9 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the engines, the potential CO emissions exceeded 350 TPY and the potential NOx emissions exceeded 90 TPY. The 1992 addition of the third 738 horsepower engine was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 180 TPY (significant CO level at 100 TPY) and NOx emissions greater than 45 TPY (significant NOx level at 40 TPY). Table 7 shows the potential emissions from all emissions units at Treating Site #9. All emissions are based on unit operations of 24 hours per day, 365 days per year.

The potential emission estimates (uncontrolled) for NOx, CO, and VOC emissions from the natural gas-fired internal combustion engines for <u>each</u> treating site were calculated using Waukesha Best Power emission factors. The January 1995 version of AP-42 lists no emission factors for SO_2 emissions for uncontrolled natural gas-fired pipeline compressor engines. The SO_2 emission factors used in the Vastar applications were based on a version of AP-42 prior to January 1995. The PM_{10} emissions calculated in Vastar's applications were based on EPA Speciate Database AFSEF for internal combustion engines. The TSP emissions were assumed to be 100 percent. The horsepower ratings for each engine have been derated due to the elevation; deration was based on manufacturer's data.

The uncontrolled emissions from the tank heaters and the dehydration unit reboilers were calculated using AP-42 factors (Tables 1.4-1 through 1.4-3) for uncontrolled commercial boilers (0.3 - 10 MMBtu/hr) burning natural gas. The January 1995 AP-42 version was used. The factors have been corrected for the estimated fuel gas heating value, 950 Btu/scf.

Emission factors prepared by the American Petroleum Institute for equipment leaks from natural gas production facilities were used to calculate the potential process fugitive emissions. (API Publication Number 4615, Emission Factors for Oil and Gas Operations, January 1995.) The number of process components is required since these process fluid leaks occur from valves, flanges, connections, relief valves, open-ended lines, pump seals, and compressor seals. Vastar's "Emission Rate

TABLE 7

VASTAR'S TREATING SITE #9
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9-1	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-2	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-3	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-4	Waukesha VRG330	68 hp	7.5 g/hp-hr	0.93	4.1	45.0 g/hp-hr	5.8	24.3	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-10	Fugitives								see application	0.12	0.52						
	TOTALS			32.34	141.8		130.4	571.1		0.24	0.99		<0.01	0.03		0.05	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Calculations" section of its applications details the gas analysis summary or the VOC fraction and the number of components (i.e. valves, flanges, pump seals, etc.).

Below are three sample calculations. Equation 1) is for determining CO emissions from a gas-fired reciprocating internal combustion engine, equation 2) is for calculating NOx emissions from external combustion units (heaters and reboilers), and equation 3) is for calculating process fugitive VOC emissions.

Internal Combustion Engine - 1215 hp: CO emissions

1) Emission factor = 28.0 g CO/hp-hr

(28.0 g CO/hp-hr) (1215 hp) (lb/453.6 g) = 75.0 lb CO/hr

(75.0 lb/hr)(365 day/yr)(24hrs/day)(ton/2000 lb) = 328.5 TPY

External Combustion - 0.5 MMBtu/hr heat input: NOx emissions

2) Emission factor = 95.0 lb NOx/MMscf

(95 lb NOx/MMscf) (0.5 MMBtu/hr) (MMscf/950 MMBtu)

= 0.05 lb NOx/hr

(.05 lb/hr)(24hr/day)(365 day/yr)(ton/2000 lb) = 0.22 TPY

Process Fugitives - Component (200 valves): VOC emissions

3) API Emission factor = 0.13900 lb/hr-component

(0.13900 lb/hr-comp) (200 components) (VOC fraction-0.97%)

= 0.27 lb/hr VOC

(0.27 lb/hr VOC) (8760 hrs/yr) (ton/2000 lbs) = 1.18 TPY

B. **Stack Height**

The applicant's proposed stack heights for its various compressor engines located at the seven PSD compressor station sites do not exceed 31.08 feet or 9.5 meters.

Good engineering practices (GEP) stack height regulations under 40 CFR Section 51.100(ii) consider 65 meters the de minimus level; therefore, Vastar meets the requirement of GEP for each of the stacks located at the seven sites.

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) found in 40 CFR Part 60.

The BACT analysis for each of the seven sites is located in the Control Technology section and supported by Appendices A and B of each application. An additional BACT analysis was also included in the June 20, 1996 Vastar submittal. This submittal conducted a BACT analysis for the smaller horsepower engines at each of the sites.

An NSPS standard does not exist for gas-fired compressor engines. A review of the RACT/BACT/LAER Clearinghouse establishes BACT limits of at least 2.0 g/hp-hr for NOx and 2.0 to 3.0 g/hp-hr for CO. The BACT Clearinghouse data can be found in Appendix B of the applications.

Vastar's BACT analysis included only an analysis of non-selective catalytic reduction (NSCR) coupled with an air/fuel ratio control system. Other engine control technologies to be considered in a BACT determination are selective catalytic reduction (SCR) and lean burn engines. An analysis of each option follows.

Selective Catalytic Reduction

Selective catalytic reduction is usually considered to be the top control technology for reducing engine emissions of NOx and CO. However, SCR has been determined 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. Due to the environmental problems, SCR is not considered to be BACT.

Lean Burn Engine Technology

Lean burn engine technology uses a precombustion chamber to enclose a rich mixture of air and fuel; the mixture is then ignited in this chamber. The resulting ignition-front then fires into the larger main area of the cylinder which contains a much leaner fuel mixture. Staging the combustion and burning a leaner fuel mixture keeps peak flame temperatures lower. Because the combustion temperature is cooler, the NOx concentration in the exhaust gas stream is lower; however, excess air in the fuel mixture can produce increased CO emissions.

The lean burn engine technology is not as economical as retrofitting NSCR with an air/fuel ratio controller, and therefore is not considered to be BACT.

Non-Selective Catalytic Reduction & Air/Fuel Controller

An NSCR unit controls NOx emissions by using the CO and the residual hydrocarbons in the exhaust of a rich burn engine as a reducing agent for NOx. In the presence of oxygen, the hydrocarbons will be oxidized instead of reacting with NOx. As the excess hydrocarbons and NOx pass over a honeycomb or monolithic catalyst, usually plated with a combination of noble metals such as platinum, palladium, and/or rhodium, the reactants are reduced to N_2, H_2O, and CO_2. The noble metal catalyst usually operates between 800 and 1,200 degrees Fahrenheit; therefore, the unit would normally be mounted near the engine exhaust to maintain a high enough temperature to allow the various reactions to occur. A rich fuel mixture is usually burned, in order to achieve the desired NOx reduction.

In order to provide for the most effective use of the catalyst, it is necessary to install an electronic air/fuel ratio controller. This device maintains the proper air/fuel ratio which will optimize the degree of reducing agents, thus providing for the maximum emission reduction while simultaneously minimizing agents that can poison the catalyst.

Vastar's application addressed a three-way non-selective catalytic reduction converter and an AccuNox air/fuel ratio control system. Vastar claims that together, the NSCR and the air/fuel ratio control system reduce emissions below what can be achieved with lean burn engine technology. At full operation, NSCR and air/fuel ratio control can achieve a 90% reduction in NOx, 80% reduction in CO, and a 50% reduction in VOC emissions for Vastar's Waukesha engines. This converts into NOx emissions of 1.0 g/hp-hr, CO emissions of 2.0 g/hp-hr, and VOC emissions of 1.0 g/hp-hr. These controls meet or exceed the BACT limits for similar internal combustion engines as established by the RACT/BACT/LAER Clearinghouse.

EPA concludes that the Applicant's proposed control technology of retrofitting the applicable engines at the seven different sites with NSCR and air/fuel ratio control to be the best available control technology or achievable emission rates.

Following is a summary of the engines at each site that are required to incorporate the NSCR and air/fuel ratio control BACT. The Applicant applied such controls to the listed engines prior to January 1996. Testing of the listed engines according to EPA methods will be required in the PSD permits.

Site	Emission Point No.	Horsepower	Emission Unit Description
1	TS1-1	1215	Waukesha L5790-GSI
1	TS1-2	1215	Waukesha L5790-GSI
2	TS2-1	1215	Waukesha L5790-GSI
2	TS2-2	1215	Waukesha L5790-GSI
4	TS4-1	738	Waukesha F3521-GSI
4	TS4-2	738	Waukesha F3521-GSI
4	TS4-3	1215	Waukesha L5790-GSI
5	TS5-3	1215	Waukesha L5790-GSI
5	TS5-4	738	Waukesha F3521-GSI
6	TS6-1	1215	Waukesha L5790-GSI
6	TS6-2	1215	Waukesha L5790-GSI
7	TS7-6	1215	Waukesha L5790-GSI
9	TS9-1	738	Waukesha F3521-GSI
9	TS9-2	738	Waukesha F3521-GSI
9	TS9-3	738	Waukesha F3521-GSI

* BACT was also applied at site #5 on emission point no. TS5-1 for a 421 horsepower Waukesha F2895-G engine and at site #7 on emission point no. TS7-5 for a 421 horsepower Waukesha F2895-G engine.

Tables 8 through 14 show the controlled emissions limits based on BACT, respectively for each of the subject Treating Sites. The BACT engine emission factors used to calculate the permit emission limits are as follows:

1) 1.0 g/hp-hr for NOx,

2) 2.0 g/hp-hr for CO, and

3) 1.0 g/hp-hr for VOC's.

The VOC emission factors have been adjusted to account for the fraction of VOC's in the fuel gas. The pollutant emissions limits are based on the maximum manufacturer's horsepower for each engine.

TABLE 8

VASTAR'S TREATING SITE #1
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1 1	Waukesha L5790 GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1 2	Waukesha L5790 GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1 3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.036 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1 4	Waukesha F11-G	105 hp	8.3 g/hp-hr	1.9	8.4	34.0 g/hp-hr	7.9	34.5	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1 5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1 6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1 7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1 8	Fugitives								see application	0.4	1.74						
	TOTALS			8.55	37.36		25.43	111.2		0.47	2.11		< 0.01	0.04		0.09	0.35

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 9

VASTAR'S TREATING SITE #2
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.8	45.0 g/hp-hr	6.7	29.5	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	18.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	18.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	18.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			6.65	28.96		17.53	76.65		0.04	0.2		<0.01	0.04		0.09	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 10

VASTAR'S TREATING SITE #4
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4 1	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4 2	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4 3	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS4 4	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4 5	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4 6	Waukesha F1197-G	162 hp	8.5 g/hp-hr	3	13.1	35.0 g/hp-hr	12.5	54.8	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4 7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4 8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4 9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4 12	Fugitives								see application	0.19	0.82						
	***TOTALS			13.1	57.6		39.7	173.4		0.22	1.02		<0.01	0.04		0.11	0.47

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS4-4 or TS4-5) at a time.

TABLE 11

VASTAR'S TREATING SITE #5
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-2	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.5	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-3	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS5-4	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.003 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.5	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.08						
	TOTALS			13.55	59.36		44.73	195.4		0.03	0.1		<0.01	0.05		0.1	0.37

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 12

VASTAR'S TREATING SITE #6
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-3	Waukesha 7042-GL	1478 hp	1.5 g/hp-hr	4.9	21.4	2.65 g/hp-hr	8.6	37.8	0.007 g/hp-hr	0.02	0.1	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.14
TS6-4	Waukesha F18 GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.006 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS6-5	Waukesha F11 GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.002 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS6-6	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	***TOTALS			15.6	68.6		41.3	180.9		0.03	0.18		0.01	0.08		0.16	0.62

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS6-4 or TS6-5) at a time.

TABLE 13

VASTAR'S TREATING SITE #7
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.013 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-2	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.4	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.4	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-5	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-6	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	*** TOTALS			16	70		56.6	247.4		0.03	0.17		<0.01	0.05		0.11	0.42

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS7-1 or TS7-2) at a time.

TABLE 14

VASTAR'S TREATING SITE #9
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9 1	Waukesha F3521 GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9 2	Waukesha F3521 GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9 3	Waukesha F3521 GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9 4	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.8	45.0 g/hp-hr	6.7	29.5	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9 5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9 6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9 7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9 8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9 9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0,02
TS9 10	Fugitives								see application	0.12	0.52						
	TOTALS			8.11	27.11		16.65	72.58		0.18	0.81		<0.01	0.03		0.08	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

D. Air Quality Models

The Applicant's air quality analysis is contained in the application addendums dated April 4th, May 3rd, and May 8th of 1996. The Industrial Source Complex Short-Term (ISCST3) model, version 95200, was used by the Applicant to predict the annual and 1-hour averaging period concentrations of NOx and the 1-hour and 8-hour averaging period concentrations of CO for both the surrounding Class II area and the nearby Class I areas. Tables 2-1 and 2-3 of the April 4th application addendum contain the stack parameters and emission rates used in the ISCST3 model. Table 3-1 lists the ISCST3 model options used in the NOx model run.

The ISCST3 model was also used to predict the Class II NO_2 increment consumption and the Class I increment for the Weminuche Wilderness area and the Mesa Verde National Park.

E. Air Quality Analysis

An air quality dispersion modeling analysis was performed to estimate the maximum off-property ground-level concentrations of NO_2 and CO due to point source emissions from Treating Site #9. Instead of performing seven air quality analyses, the Applicant's air quality analysis was performed using only the data from the treating site with the greatest controlled potential emissions of NOx and CO. Treating Site #9 is the site with the highest controlled potential emissions of NOx and CO, and thus was chosen to represent all of the treating sites.

Meteorological data measured at a Southern Ute Indian Tribe meteorological station outside of Ignacio, Colorado for 1994 was used as input for the ISCST3 model. This data was combined with upper air data from Grand Junction, Colorado. Figure 3-1 of the April 4, 1996 application addendum shows a wind rose for this meteorological data.

An annual average ambient NO_2 concentration of 7.008 micrograms per cubic meter (ug/m^3) was used as the background level. This background NO_2 concentration was measured in 1994 at the Ignacio, Colorado weather station. 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 conduct any "pre-construction" monitoring for NO_2. In this case, the Applicant commenced construction, completed construction, and operated the source prior to receipt of the appropriate PSD permits, thus pre-construction monitoring was not possible. However, since the annual average NO_2 concentration background is only one-half of the significant monitoring concentration, no additional monitoring was required.

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 concentration impact, including background concentration, was 26.9 ug/m^3 using the Ozone Limiting Method (OLM).

Modeling results showed that there were no predicted violations of the 40,000 ug/m^3 1-hour NAAQS for CO or the 10,000 ug/m^3 8-hour NAAQS for CO. The maximum 1-hour predicted CO concentration impact was 5671.80 ug/m^3 and the maximum 8-hour predicted CO concentration impact was 2976.65 ug/m^3.

The predicted off-property ground-level concentrations of NO_2 and CO yielded by this air quality analysis represent maximum estimates of off-property, ground-level concentrations surrounding the other six treating sites as well.

F. Ambient Air Increments

The maximum allowable incremental increase in ambient pollutant concentrations that is allowed to occur above a baseline concentration for a given pollutant is defined as the PSD increment. Treating Site #9 is located in a Class II area where the allowable annual PSD increment for NO_2 is 25.0 ug/m^3. The baseline area for NOx is the entire state of Colorado and the minor source baseline date was triggered March 30, 1989. The Applicant predicted a maximum annual Class II NO_2 increment of 19.9 ug/m^3. No PSD increments exist for carbon monoxide for any of the three different classes.

The Class I area impact analysis section (Section I) that follows, contains the Class I increment analysis for the Weminuche Wilderness Area and the Mesa Verde National Park.

G. Source Information

The PSD application submitted on December 13, 1995 and the application addendums, dated April 4, 1996, May 3, 1996, and May 8, 1996 were concluded to be incomplete by EPA Region VIII in a May 17, 1996 letter to Vastar Resources, Inc. The Applicant responded to the incomplete determination by submitting another application addendum, dated June 18, 1996. This addendum contained revised emission estimates for Treating Sites #4, 6, and 7, and a BACT analysis for four different engines ranging in horsepowers from 68 to 225. On June 28, 1996, EPA determined the application to be complete as of the date the last addendum was received (June 20, 1996). 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 of the April 4, 1996 application addendum. The Applicant focused on the impact to growth, local soils and vegetation, and visibility that resulted from the construction of the seven treating sites. One conclusion from the analysis was that the construction of the treating sites did not result in a growth of the workforce in nearby communities or a growth in industrial and commercial development.

The construction and operation of the seven sites showed no impact on the local soils and vegetation during the years the sites were operated without BACT. The installation of BACT and reduction in emissions will only negate any unforeseen impacts to the soils and vegetation.

Visibility impairments are caused by emissions of nitrogen oxides, particulates, primary nitrogen dioxide, soot, and primary sulfate. The impact area for NO_2 extends no more than 2.2 kilometers from Treating Site #9. There are no airports, scenic vistas, or national forests located in the impact area to justify a detailed visibility analysis for the Class II area. The NOx emissions from Treating Site #9 have been reduced by approximately 117 TPY upon the application of BACT. There has been no visibility degradation in the impact area since the start up of the source, thus a decrease in emissions will reduce the impact on any potential visibility impairment. Emissions from the remaining six sites have also been reduced, thus further reducing any potential visibility impairment for the area.

I. Class I Area Impact Analysis

EPA is required under 40 CFR §52.21(p) to provide written notice to the Federal Land Manager (FLM) concerning any permit application for a proposed major stationary source or major modification, in which the emissions "may affect" a Class I area. EPA policy has interpreted "may affect" to include at least all major sources or major modifications which propose to locate within 100 km of a Class I area. The Applicant is required to conduct an analysis of the emissions impact on the Class I air quality related values (AQRV's) and the Class I increments. Class I AQRV's include visibility, flora, fauna, water, soil, odor, and cultural/archeological resources. Sources located more than 100 km from a Class I area may also be required

to conduct these analyses if the FLM is concerned about potential emission impacts from these sources.

The Class I areas within 100 km of the Applicant's treating sites are the Mesa Verde National Park (36.8 km) and the Weminuche Wilderness Area (43 km). The National Park Service is the FLM for the Mesa Verde National Park and the U.S. Forest Service is the FLM for the Weminuche Wilderness Area.

A copy of the Vastar PSD permit application and air quality analysis for Treating Site #9 was sent on May 17, 1996 to the Permit Review Branch of the National Park Service in Denver, Colorado and the Rocky Mountain Region of the U.S. Forest Service in Lakewood, Colorado. A June 17, 1996 letter from the U.S. Forest Service confirmed that **controlled** (installed w/BACT) emissions from the treating sites will not have adverse impacts on the AQRV's in the Weminuche wilderness. A June 17, 1996 telephone conversation with Ms. Cathy Rhodes of the National Park Service also confirmed that the AQRV's of the Mesa Verde National Park should not be affected by the **controlled** treating sites emissions.

As was done for the air quality analysis, emissions data from Treating Site #9 were used by the Applicant to determine the amount of NOx increment consumed in the Class I areas. The annual Class I increment for NOx is 2.5 ug/m^3. (As stated earlier, no Class I increments exist for CO.) The maximum predicted annual average NO_2 concentration (based on the Ozone Limiting Method) from Treating Site #9 is 0.0028 ug/m^3 and 0.0038 ug/m^3 for the Weminuche Wilderness Area and Mesa Verde National Park, respectively. The predicted NO_2 impacts are well below the Class I increment.

Maximum predicted 1-hour average CO concentrations were 3.47 ug/m^3 and 24.3 ug/m^3 respectively, for the Weminuche Wilderness and Mesa Verde Park. The maximum predicted 8-hour average CO concentrations were 0.67 ug/m^3 and 3.04 ug/m^3 for the Weminuche Wilderness and Mesa Verde Park, respectively.

A visibility analysis was done using Level I of the VISCREEN model. VISCREEN is a conservative screening model used to evaluate the visual impact from pollutant plumes of particulate, nitrogen oxides, soot, primary nitrogen dioxide, and primary sulfate. The maximum short-term emission rates of particulate and nitrogen oxides for all sources at Treating Site #9 were used in the VISCREEN model to provide a worst-case estimate of visibility impairment from each of the seven treating sites. Tables 6-2 and 6-3 of the April 4, 1996 application addendum show the maximum visual impacts inside the Class I area and outside the Class I area. Adverse visibility impairment is not expected in either of the Class I areas, because the predicted maximum visual impacts are below the two screening criteria.

J. Public Participation

The application, analysis, and proposed permit were made available for public inspection at the EPA Regional Office in Denver, Colorado, the Southern Ute Indian Tribe's Environmental Programs Office in Ignacio, Colorado, and the La Plata County Clerk's Office in Durango, Colorado. Public notices were published in the Durango Herald and the Southern Ute Drum on April 11, 1997, giving opportunity for public comment on our proposed action and the opportunity to request a public hearing.

EPA received comments from Vastar Resources, Inc. concerning enforcement discretion issues, testing requirements for the Waukesha VRG 330 engines, and several commence construction issues. These comments have been addressed in the final permits and/or EPA's response to comments in Appendix I.

TABLE II.

EMISSION INVENTORY DATA ELEMENTS

1) Year of record for emissions
2) Plant name
3) Plant location/street address
4) City, State, and zip code
5) Plant latitude
6) Plant longitude
7) UTM description (section, township, range)
8) Primary SIC code
9) SCC number
10) Principal product
11) Plant contact and telephone number
12) Estimated hours of operation per year of each point source
13) Estimated amount of fuel consumed by each point source
14) Stack height (ft) of each point source
15) Stack diameter (ft) of each point source
16) Temperatures of exit gases (degrees F) from engine stacks
17) Exhaust gas flow rate (ACFM) from each engine stack
18) Exit gas velocity (ft/sec) from each engine stack
19) CAS code for each pollutant
20) Measured emissions (lbs/day and TPY) for each point source that is tested
21) Calculated emissions (lbs/day and TPY) for each point source not tested
22) Emission factors used to calculate emissions
23) Permit emission limits (lbs/day and TPY) for each point source
24) Point source design capacity (i.e. engine brake horsepower and burner Btu rating)
25) Actual average point source capacity operation (i.e. engine's derated brake horsepower)
26) Type of control device and its efficiency for each point source (if applicable)
27) Hours of uncontrolled operation of engines due to engine replacement/overhaul

CONDITIONAL PERMIT TO
COMMENCE CONSTRUCTION AND OPERATE

40 CFR 52.21(i)
Significant Deterioration of Air Quality

Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

I. INTRODUCTION

Vastar Resources, Inc. (hereinafter "the Applicant") proposes to do retrofit construction on specified internal combustion engines located at Treating Site #1, which is used to treat coal bed methane gas. The treating site is located in the Ignacio Blanco Fruitland field in La Plata County, Colorado, which is situated on the Southern Ute Indian Reservation.

Original construction of Treating Site #1 occurred in 1989 with the installation of two compressor engines, a water injection pump, two water tanks with heaters, and a glycol dehydration unit. A small generator was installed in 1992. The two compressor engines are Waukesha VHP series, Model L5790 GSI engines with a maximum site-rating of 1215 horsepower. The construction of Treating Site #1 was a major stationary source subject to a Prevention of Significant Deterioration (PSD) analysis. The operation of these units will hereinafter be referred to as "the Source."

On December 13, 1995, the Applicant requested that a PSD permit be issued by the U.S. Environmental Protection Agency, Region VIII (hereinafter "the EPA") for its Source pursuant to 40 CFR Section 52.21(i) (Review of Major Stationary Sources and Major Modifications). The Applicant submitted application addendums dated April 4, 1996, May 3, 1996, and May 8, 1996. EPA found the application incomplete as of May 17, 1996. The Applicant submitted supplemental information on June 18, 1996 concerning a Best Available Control Technology (BACT) analysis for engines with maximum site-ratings of 68 to 225 horsepower. EPA determined the application to be complete on June 20, 1996, the date the supplemental information was received.

The EPA issued a public notice in the Durango Herald (Durango, CO) and the Southern Ute Drum (Ignacio, CO) on April 11, 1997. 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 La Plata County Clerk's Office in Durango, Colorado, at the Southern Ute Indian Tribe's Tribal Affairs Building (Environmental Programs) in Ignacio, Colorado, and at the U.S. Environmental Protection Agency office in Denver, Colorado. A summary of the comments and concerns expressed during the public comment period are contained in Appendix I together with EPA responses.

II. FINDINGS

On the basis of information in the administrative record (see Appendix II), 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 this Source.

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 Source 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 Section II. above, and pursuant to the authority (as delegated by the Administrator) of 40 CFR Section 52.21(u), EPA hereby conditionally authorizes Vastar Resources, Inc. to construct and operate the Source. 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 Vastar Resources, Inc., dated December 13, 1995, and supplemented with additional information in application addendums, dated April 4, 1996, May 3, 1996, May 8, 1996, and June 18, 1996.

2. Nothing in this authorization shall excuse the Applicant, the owner and/or the operator from complying with all other applicable Federal, State, and Tribal 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 Source during normal business hours for purpose of ascertaining compliance with all conditions of this permit.

5. The Applicant shall limit emissions from the Source to those shown in Table I.

6. At all times, including periods of startup (except for replacement/overhauled engines), shut-down, and equipment malfunction, the Source, to the extent practical, shall be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator, which may include, but not be limited to monitoring results, review of operating and maintenance procedures, manufacturer's specifications, industry practices, or inspection of the Source.

7. Testing Requirements:

   a) Initial compliance with emissions limits in Condition 5. above for each engine type (except for the Waukesha VRG 330 model for which testing is not required) shall be determined by emission tests to be performed within 90 calendar days of EPA's approval of an engine Testing Protocol, unless a longer timeframe is agreed upon by the Applicant and EPA.

   b) These emissions tests shall be performed in accordance with the test methods specified in 40 CFR Part 60, Appendix A. EPA Reference Method 7 shall be used to measure NOx emissions and EPA Reference Method 10 shall be used to measure CO emissions, unless alternative methods are approved by the Administrator.

   c) The Applicant shall provide EPA with an engine Testing Protocol within 90 (ninety) calendar days of the effective date of this permit. The Testing Protocol shall be approved by EPA prior to commencement of engine testing by the Applicant. The Testing Protocol must document which compressor engine parameters are to be monitored in order to calculate the engine horsepower.

TABLE I.

VASTAR'S TREATING SITE #1
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.036 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-4	Waukesha F11-G	105 hp	8.3 g/hp-hr	1.9	8.4	34.0 g/hp-hr	7.9	34.5	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			8.55	37.36		26.43	111.2		0.47	2.11		< 0.01	0.04		0.09	0.35

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

d) The Applicant shall provide EPA with at least 30 (thirty) calendar days prior notice (in writing) of each emissions test, in order to give EPA the opportunity to observe the test; unless a shorter timeframe is agreed upon by the Applicant and EPA.

8. Monitoring Requirements:

a) The Applicant shall measure NOx and CO emissions from the catalytically-controlled (Units TS1-1 and TS1-2) compressor engines at least once every calendar quarter beginning the first calendar quarter after the Applicant's submittal of initial compliance test results to EPA. Upon demonstration of compliance with the permit limits set forth in Table I for six (6) consecutive calendar quarters, the Applicant may conduct the NOx and CO monitoring for these engines on a semi-annual basis.

b) The Applicant shall measure NOx and CO emissions from the uncontrolled, non-Waukesha VRG 330 engine (Unit TS1-4) at least once every semi-annual period (January 1 - June 30 and July 1 - December 31) beginning the first semi-annual period after the Applicant's submittal of initial compliance test results to EPA.

c) To meet the monitoring requirements above, the Applicant shall measure the NOx and CO emissions from each engine using a portable analyzer and the monitoring protocol approved by EPA. The Applicant shall submit the analyzer specifications and monitoring protocol to EPA for approval within 120 (one-hundred twenty) calendar days of the effective date of this permit.

d) The Applicant shall not conduct NOx and CO emissions monitoring on the engines identified in Sections III 8. a) and b) above that have not been operated during the specified monitoring period. The Applicant must certify that the engine(s) did not operate during the specified monitoring period and maintain this certification in accordance with the recordkeeping requirements listed in Section III 9. of this permit.

9. Recordkeeping Requirements:

a) The Applicant shall keep a record of all initial compliance tests and emissions monitoring required by this permit. The record shall include:

(i) The date, place, and time of sampling or monitoring;
(ii) The date(s) the analyses were performed;
(iii) The company or entity that performed the analyses;
(iv) The analytical techniques or methods used;
(v) The results of such analyses; and
(vi) The operating conditions that existed at the time of sampling or monitoring.

b) The Applicant shall keep records of the maintenance activities performed at the Source and make them available for review. Such records should be sufficient to establish the level of maintenance performed and may be maintained at either the field location or at the Applicant's nearest regularly manned facility.

10. Reporting Requirements:

a) The Applicant shall submit a written report containing the initial compliance test results for each engine tested. This report shall be submitted to EPA within 30 (thirty) calendar days of the date the emissions tests are complete.

b) The Applicant shall submit a written report containing the emissions monitoring results for Units TS1-1, TS1-2, and TS1-4. This report shall be submitted semi-annually to EPA by January 31 and July 31 of each year.

c) Except for replacement/overhauled engines which are addressed under Condition 14(b), the Applicant shall verbally notify EPA not more than 48 (forty-eight) hours after the discovery of excess emissions during periods of startup, shut-down, equipment malfunction, or upset conditions. Malfunction is defined as any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Not more than 15 (fifteen) days after discovery, all of the following shall be provided to EPA in writing:

i) The identity of the stack or emission point where excess emissions occurred;
ii) The magnitude of excess emissions expressed in terms of permit conditions;
iii) The time and duration of excess emissions;
iv) The reason(s) for the excess emissions;
v) Steps and procedures taken to minimize excess emissions;
vi) Steps and procedures taken or anticipated to be taken to prevent reoccurrence of the excess emissions.

Even if the reporting and other requirements of this section are satisfied, the Source will be considered to be in violation of the permit if EPA determines that the information submitted does not evidence a malfunction, upset condition, startup, or shut-down and the Source exceeded the emission limits shown in Table I.

11. Emissions Inventory:

a) The Applicant shall submit an annual emission inventory for the Source to EPA by March 1 of each year for all point source air emissions released during the period January 1 to December 31 of the previous year.

b) The emissions inventory shall contain the information listed in Table II. (attached)

12. All records, reports, notifications, and support information (i.e. testing, monitoring, measurements, observations, maintenance activities, etc.) compiled in accordance with this permit must be maintained by the Applicant as a permanent business record for at least five (5) years following the date of the record/report, must be available at the Applicant's nearest regularly manned facility for inspection by EPA, and must be submitted to EPA upon request.

13. Compressor Engine Replacement/Overhaul:

a) The Applicant may replace an existing permitted engine requiring a complete overhaul with a new or overhauled engine of the same make, model, horsepower rating, and configuration. Such a like-kind replacement engine will be configured for operation in the same manner as the engine being replaced. Each like-kind replacement engine

shall have equivalent types of air emissions control devices installed as the engine being replaced including, but not limited to, non-selective catalytic reduction (NSCR) devices and air-to-fuel ratio controllers.

b) The Applicant shall be allowed to operate the replacement/overhauled engine without the use of the catalytic converter assembly for a period not to exceed 200 hours from engine startup, unless a longer time period has been approved by EPA, in writing. The Applicant must keep a record of the number of hours of operation of the uncontrolled replacement/overhauled engine.

c) The Applicant shall conduct a compliance demonstration test on the replacement/overhauled engine. The compliance demonstration shall measure NOx and CO emissions from the replaced/overhauled engine using a portable analyzer and monitoring protocol approved by EPA. This demonstration shall be conducted within 60 (sixty) calendar days of engine start-up.

d) The Applicant shall provide notice to EPA of such compliance demonstration testing in accordance with the provisions of Condition 7. d). The Applicant shall adhere to the recordkeeping and reporting requirements of Conditions 9. and 10. respectively, for the compliance demonstration of the replacement/overhauled engine.

14. The Applicant shall send all required notifications and reports to:

Mr. Richard R. Long, Director
Air Program (8P2-A)
U.S. Environmental Protection Agency, Region VIII
999 18th Street, Suite #500
Denver, Colorado 80202-2466

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 addendums to EPA. 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 thirty (30) days of receipt of the permit, should include the reason or reasons for rejection and should be sent to Mr. Long at the address shown in Condition 14 of Section III. above.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

BY: Kerrigan Clough

Kerrigan G. Clough
Assistant Regional Administrator
Office of Pollution Prevention,
State and Tribal Assistance

DATE: JUL 31 1997

TABLE II.

EMISSION INVENTORY DATA ELEMENTS

1) Year of record for emissions
2) Plant name
3) Plant location/street address
4) City, State, and zip code
5) Plant latitude
6) Plant longitude
7) UTM description (section, township, range)
8) Primary SIC code
9) SCC number
10) Principal product
11) Plant contact and telephone number
12) Estimated hours of operation per year of each point source
13) Estimated amount of fuel consumed by each point source
14) Stack height (ft) of each point source
15) Stack diameter (ft) of each point source
16) Temperatures of exit gases (degrees F) from engine stacks
17) Exhaust gas flow rate (ACFM) from each engine stack
18) Exit gas velocity (ft/sec) from each engine stack
19) CAS code for each pollutant
20) Measured emissions (lbs/day and TPY) for each point source that is tested
21) Calculated emissions (lbs/day and TPY) for each point source <u>not</u> tested
22) Emission factors used to calculate emissions
23) Permit emission limits (lbs/day and TPY) for each point source
24) Point source design capacity (i.e. engine brake horsepower and burner Btu rating)
25) Actual average point source capacity operation (i.e. engine's derated brake horsepower)
26) Type of control device and its efficiency for each point source (if applicable)
27) Hours of uncontrolled operation of engines due to engine replacement/overhaul

PROPOSED CONDITIONAL PERMIT TO COMMENCE CONSTRUCTION AND OPERATE

40 CFR 52.21(i)
Significant Deterioration of Air Quality

Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

I. INTRODUCTION

Vastar Resources, Inc. (hereinafter "the Applicant") proposes to do retrofit construction on specified internal combustion engines located at Treating Site #1, which is used to treat coal bed methane gas. The treating site is located in the Ignacio Blanco Fruitland field in La Plata County, Colorado, which is situated on the Southern Ute Indian Reservation.

Original construction of Treating Site #1 occurred in 1989 with the installation of two compressor engines, a water injection pump, two water tanks with heaters, and a glycol dehydration unit. A small generator was installed in 1992. The two compressor engines are Waukesha VHP series, Model L5790 GSI engines with a maximum site-rating of 1215 horsepower. The construction of Treating Site #1 was a major stationary source subject to a Prevention of Significant Deterioration (PSD) analysis. The operation of these units will hereinafter be referred to as "the Source."

On December 13, 1995, the Applicant requested that a PSD permit be issued by the U.S. Environmental Protection Agency, Region VIII (hereinafter "the EPA") for its Source pursuant to 40 CFR Section 52.21(i) (Review of Major Stationary Sources and Major Modifications). The Applicant submitted application addendums dated April 4, 1996, May 3, 1996, and May 8, 1996. EPA found the application incomplete as of May 17, 1996. The Applicant submitted supplemental information on June 18, 1996 concerning a Best Available Control Technology (BACT) analysis for engines with maximum site-ratings of 68 to 225 horsepower. EPA determined the application to be complete on June 20, 1996, the date the supplemental information was received.

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 this Source.

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 Source 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 Section II. above, and pursuant to the authority (as delegated by the Administrator) of 40 CFR Section 52.21(u), EPA hereby conditionally authorizes Vastar Resources, Inc. to construct and operate the Source. 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 Vastar Resources, Inc., dated December 13, 1995, and supplemented with additional information in application addendums, dated April 4, 1996, May 3, 1996, May 8, 1996, and June 18, 1996.

2. Nothing in this authorization shall excuse the Applicant, the owner and/or the operator from complying with all other applicable Federal, State, and Tribal 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 Source during normal business hours for purpose of ascertaining compliance with all conditions of this permit.

5. The Applicant shall limit emissions from the Source to those shown in Table I.

6. At all times, including periods of startup (except for replacement/overhauled engines), shut-down, and equipment malfunction, the Source, to the extent practical, shall be maintained and operated in a manner consistent with good air pollution control practices

TABLE I.

VASTAR'S TREATING SITE #1
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.036 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-4	Waukesha F11-G	105 hp	8.3 g/hp-hr	1.9	8.4	34.0 g/hp-hr	7.9	34.5	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			8.55	37.36		25.43	111.2		0.47	2.11		< 0.01	0.04		0.09	0.35

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator, which may include, but not be limited to monitoring results, review of operating and maintenance procedures, manufacturer's specifications, industry practices, or inspection of the Source.

7. Testing Requirements:

a) Initial compliance with emissions limits in Condition 5. above for each engine type shall be determined by emission tests to be performed within 90 calendar days of EPA's approval of an engine Testing Protocol, unless a longer timeframe is agreed upon by the Applicant and EPA.

b) These emissions tests shall be performed in accordance with the test methods specified in 40 CFR Part 60, Appendix A. EPA Reference Method 7 shall be used to measure NOx emissions and EPA Reference Method 10 shall be used to measure CO emissions, unless alternative methods are approved by the Administrator.

c) The Applicant shall provide EPA with an engine Testing Protocol within 90 (ninety) calendar days of the effective date of this permit. The Testing Protocol shall be approved by EPA prior to commencement of engine testing by the Applicant. The Testing Protocol must document which compressor engine parameters are to be monitored in order to calculate the engine horsepower.

d) The Applicant shall provide EPA with at least 30 (thirty) calendar days prior notice (in writing) of each emissions test, in order to give EPA the opportunity to observe the test; unless a shorter timeframe is agreed upon by the Applicant and EPA.

8. Monitoring Requirements:

a) The Applicant shall measure NOx and CO emissions from the catalytically-controlled (Units TS1-1 and TS1-2) compressor engines at least once every calendar quarter beginning the first calendar quarter after the Applicant's submittal of initial compliance test results to EPA. Upon demonstration of compliance with the permit limits set forth in Table I for six (6) consecutive calendar quarters, the Applicant may conduct the NOx and CO monitoring for these engines on a semi-annual basis.

b) The Applicant shall measure NOx and CO emissions from the uncontrolled (Units TS1-3 and TS1-4) engines at least once every semi-annual period (January 1 - June 30 and July 1 - December 31) beginning the first semi-annual period after the Applicant's submittal of initial compliance test results to EPA.

c) To meet the monitoring requirements above, the Applicant shall measure the NOx and CO emissions from each engine using a portable analyzer and the monitoring protocol approved by EPA. The Applicant shall submit the analyzer specifications and monitoring protocol to EPA for approval within 120 (one-hundred twenty) calendar days of the effective date of this permit.

d) The Applicant shall not conduct NOx and CO emissions monitoring on the engines identified in Sections III 8. a) and b) above that have not been operated during the specified monitoring period. The Applicant must certify that the engine(s) did not operate during the specified monitoring period and maintain this certification in accordance with the recordkeeping requirements listed in Section III 9. of this permit.

9. Recordkeeping Requirements:

a) The Applicant shall keep a record of all initial compliance tests and emissions monitoring required by this permit. The record shall include:
   (i) The date, place, and time of sampling or monitoring;
   (ii) The date(s) the analyses were performed;
   (iii) The company or entity that performed the analyses;
   (iv) The analytical techniques or methods used;
   (v) The results of such analyses; and
   (vi) The operating conditions that existed at the time of sampling or monitoring.

b) The Applicant shall keep records of the maintenance activities performed at the Source and make them available for review. Such records should be sufficient to establish the level of maintenance performed and may be maintained at either the field location or at the Applicant's nearest regularly manned facility.

10. Reporting Requirements:

a) The Applicant shall submit a written report containing the initial compliance test results for each engine tested. This report shall be submitted to EPA within 30 (thirty) calendar days of the date the emissions tests are complete.

b) The Applicant shall submit a written report containing the emissions monitoring results for Units TS1-1, TS1-2, TS1-3, and TS1-4. This report shall be submitted semi-annually to EPA by January 31 and July 31 of each year.

c) Except for replacement/overhauled engines which are addressed under Condition 14(b), the Applicant shall verbally notify EPA not more than 48 (forty-eight) hours after the discovery of excess emissions during periods of startup, shut-down, equipment malfunction, or upset conditions. Not more than 15 (fifteen) days after discovery, all of the following shall be provided to EPA in writing:

i) The identity of the stack or emission point where excess emissions occurred;
ii) The magnitude of excess emissions expressed in terms of permit conditions;
iii) The time and duration of excess emissions;
iv) The reason(s) for the excess emissions;
v) Steps and procedures taken to minimize excess emissions;
vi) Steps and procedures taken or anticipated to be taken to prevent reoccurrence of the excess emissions.

Even if the reporting and other requirements of this section are satisfied, the Source will be considered to be in violation of the permit if EPA determines that the information submitted does not evidence a malfunction or upset condition and the Source exceeded the emission limits shown in Table I.

11. Emissions Inventory:

a) The Applicant shall submit an annual emission inventory for the Source to EPA by March 1 of each year for all point source air emissions released during the period January 1 to December 31 of the previous year.

b) The emissions inventory shall contain the information listed in Table II. (attached)

12. All records, reports, notifications, and support information (i.e. testing, monitoring, measurements, observations, maintenance activities, etc.) compiled in accordance with this permit must be maintained by the Applicant as a permanent business record for at least five (5) years following the date of the record/report, must be available at the Applicant's nearest regularly manned facility for inspection by EPA, and must be submitted to EPA upon request.

13. Compressor Engine Replacement/Overhaul:

a) The Applicant may replace an existing permitted engine requiring a complete overhaul with a new or overhauled engine of the same make, model, horsepower rating, and configuration. Such a like-kind replacement engine will be configured for operation in the same manner as the engine being replaced. Each like-kind replacement engine shall have equivalent types of air emissions control devices installed as the engine being replaced including, but not limited to, non-selective catalytic reduction (NSCR) devices and air-to-fuel ratio controllers.

b) The Applicant shall be allowed to operate the replacement/overhauled engine without the use of the catalytic converter assembly for a period not to exceed 200 hours from engine startup, unless a longer time period has been approved by EPA, in writing. The Applicant must keep a record of the number of hours of operation of the uncontrolled replacement/overhauled engine.

c) The Applicant shall conduct a compliance demonstration test on the replacement/overhauled engine. The compliance demonstration shall measure NOx and CO emissions from the replaced/overhauled engine using a portable analyzer and monitoring protocol approved by EPA. This demonstration shall be conducted within 60 (sixty) calendar days of engine start-up.

d) The Applicant shall provide notice to EPA of such compliance demonstration testing in accordance with the provisions of Condition 7. d). The Applicant shall adhere to the recordkeeping and reporting requirements of Conditions 9. and 10. respectively, for the compliance demonstration of the replacement/overhauled engine.

14. The Applicant shall send all required notifications and reports to:

Mr. Richard R. Long, Director
Air Program (8P2-A)
U.S. Environmental Protection Agency, Region VIII
999 18th Street, Suite #500
Denver, Colorado 80202-2466

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 addendums to EPA. 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 thirty (30) days of receipt of the permit, should include the reason or reasons for rejection and should be sent to Mr. Long at the address shown in Condition 14 of Section III. above.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

BY: _____

Kerrigan G. Clough
Assistant Regional Administrator
Office of Pollution Prevention,
State and Tribal Assistance

DATE: _____

TABLE II.

EMISSION INVENTORY DATA ELEMENTS

1) Year of record for emissions
2) Plant name
3) Plant location/street address
4) City, State, and zip code
5) Plant latitude
6) Plant longitude
7) UTM description (section, township, range)
8) Primary SIC code
9) SCC number
10) Principal product
11) Plant contact and telephone number
12) Estimated hours of operation per year of each point source
13) Estimated amount of fuel consumed by each point source
14) Stack height (ft) of each point source
15) Stack diameter (ft) of each point source
16) Temperatures of exit gases (degrees F) from engine stacks
17) Exhaust gas flow rate (ACFM) from each engine stack
18) Exit gas velocity (ft/sec) from each engine stack
19) CAS code for each pollutant
20) Measured emissions (lbs/day and TPY) for each point source that is tested
21) Calculated emissions (lbs/day and TPY) for each point source <u>not</u> tested
22) Emission factors used to calculate emissions
23) Permit emission limits (lbs/day and TPY) for each point source
24) Point source design capacity (i.e. engine brake horsepower and burner Btu rating)
25) Actual average point source capacity operation (i.e. engine's derated brake horsepower)
26) Type of control device and its efficiency for each point source (if applicable)
27) Hours of uncontrolled operation of engines due to engine replacement/overhaul

APPENDIX I

PERMIT APPLICATION AND SUPPORTING DATA

CONTENTS

APPENDIX I

VASTAR RESOURCES, INC.
PSD PERMIT APPLICATIONS ANALYSES
(Statement of Basis)

A. Applicability Determination

Vastar Resources, Inc. operates several facilities (treating sites) used to treat coal bed methane gas production. The treating facilities are located in the Ignacio Blanco Fruitland field in La Plata County, Colorado. The Ignacio Blanco Fruitland field is situated on the Southern Ute Indian Tribe reservation.

This Statement of Basis discusses the background and analyses of the PSD permits for seven of Vastar's treating sites located in the Ignacio Blanco Fruitland (IBF) field. Figure 1 illustrates the Ignacio Blanco Fruitland field and the various Vastar treating sites. The seven treating sites subject to PSD are Nos. 1, 2, 4, 5, 6, 7, and 9. Potential carbon dioxide (CO) emissions exceeding 250 tons per year (TPY) make each of the Vastar treating sites a major stationary source as defined under the August 7, 1980 PSD regulations or under 40 CFR § 52.21(b)(1)(i)(b). Emissions of nitrogen oxides (NOx) are also significant (greater than 40 TPY) and subject to the PSD requirements. A brief summary of each subject treating site, its emissions units, and its PSD applicability follows.

Treating Site #1

Treating Site #1 is located in the lower southeast corner of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small water injection pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units, except the generator, were installed in June/July of 1989. The generator was installed in January 1992.

The two compressor engines are Waukesha VHP series, Model L5790 GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #1 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 grams/horsepower-hour (g/hp-hr) for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 1 shows the potential emissions from all emissions units at Treating Site #1. All emissions are based on unit operations of 24 hours per day, 365 days per year.

IGNACIO BLANCO
FRUITLAND FIELD

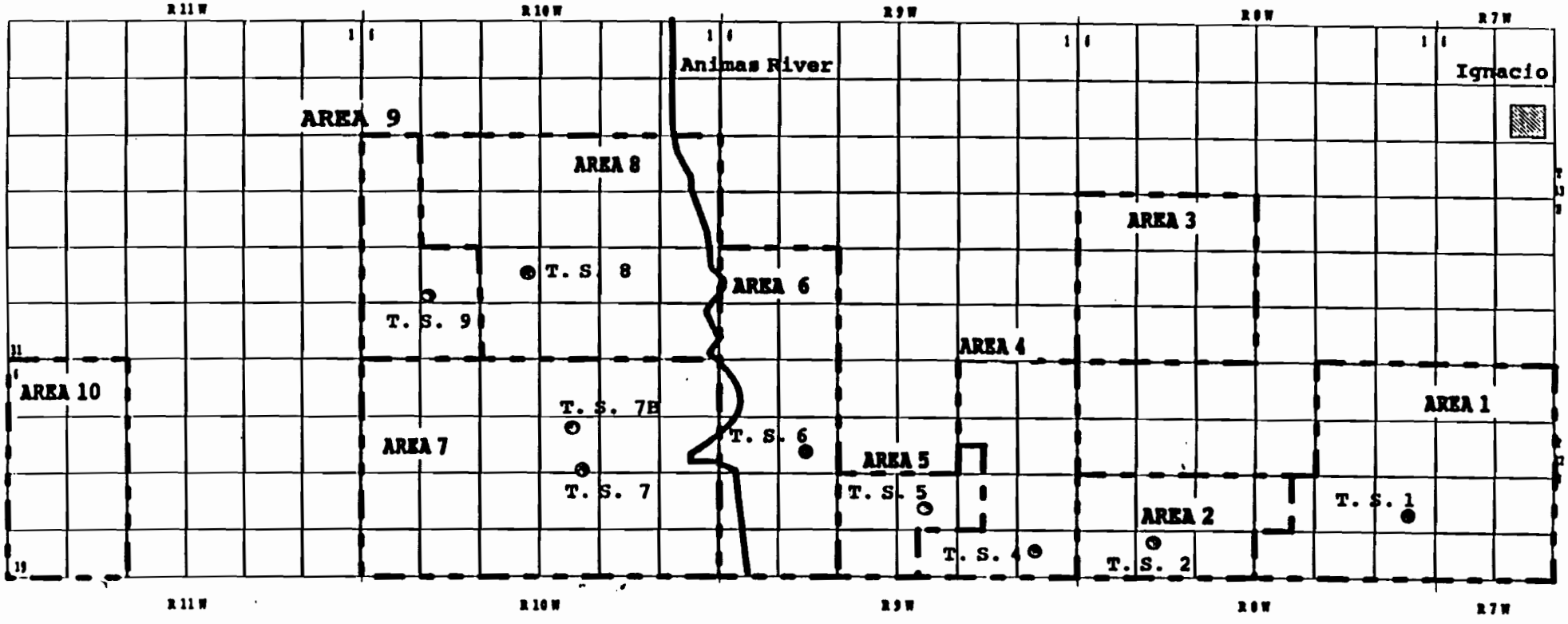

FIGURE 1.

3LE 1

VASTAR'S TREATING SITE #1
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.6 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-2	Waukesha L5790-GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.6 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.036 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-4	Waukesha F11-G	89 hp	8.3 g/hp-hr	1.6	7.1	34.0 g/hp-hr	6.7	29.2	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			37.31	163.6		150.9	661.4		0.55	2.39		<0.01	0.04		0.07	0.33

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #2

Treating Site #2 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units were installed in June 1990.

The two compressor engines are Waukesha VHP series, Model L5790-GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #2 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 2 shows the potential emissions from all emissions units at Treating Site #2. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #4

Treating Site #4 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration unit. All units, except the largest compressor engine (Model L5790-GSI) and the Unit B water transfer pump, were installed in June/July of 1989. The largest compressor engine and the Unit B water transfer pump were installed in February 1990.

Two of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #4 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY. The 1990 addition of another compressor engine and a water transfer pump was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 300 TPY (significant CO level at 100 TPY) and NOx emissions greater than 85 TPY (significant NOx level at 40 TPY). Table 3 shows the potential emissions from all emissions units at Treating Site #4. All emissions are based on unit operations of 24 hours per day, 365 days per year.

TABLE 2

VASTAR'S TREATING SITE #2
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.9	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-2	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.9	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.005 g/hp-hr	< 0.01	< 0.01	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			35.71	156.7		144.4	632.6		0.06	0.24		< 0.01	0.04		0.07	0.32

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 3

VASTAR'S TREATING SITE #4
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4-1	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-2	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-3	Waukesha L5790-GSI	1118 hp	7.0 g/hp-hr	17.3	75.6	28.0 g/hp-hr	69	302.3	0.011 g/hp-hr	0.03	0.11	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS4-4	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-5	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-6	Waukesha F1197-G	136 hp	8.5 g/hp-hr	2.6	11.2	35.0 g/hp-hr	10.5	45.9	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS4-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4-12	Fugitives								see application	0.19	0.82						
	TOTALS			48.56	211.7		191.1	837.4		0.26	1.11		<0.01	0.04		0.08	0.45

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #5

Treating Site #5 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of four compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the largest compressor engine (Model L5790-GSI), the 738 hp (Model F3521-GSI) engine, and the glycol dehydration unit, were installed in May 1989. The largest compressor engine was installed in May 1990, the 738 hp engine was installed in February 1990, and the glycol reboiler was installed in February 1993.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. The fourth engine is a Waukesha VHP series, Model F3521-GSI engine with a rating of 738 hp. Upon its construction, Treating Site #5 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 738 and 1215 horsepower compressor engines **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY for these two engines. Table 4 shows the potential emissions from all emissions units at Treating Site #5. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #6

Treating Site #6 is located in the lower middle section of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and two glycol dehydration units. All units, except the 1478 hp compressor engine and the #2 glycol dehydration reboiler, were installed in March/April of 1990. Both the 1478 hp engine and the #2 glycol reboiler were installed in March 1995.

Two of the compressor engines are Waukesha VHP series, Model L5790-GSI engines with maximum site-ratings of 1215 horsepower. The third compressor engine is a Waukesha VHP series, (Model 7042-GL) lean burn engine with a maximum site-rating of 1478 horsepower. Upon its construction, Treating Site #6 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power

TABLE 4

VASTAR'S TREATING SITE #5
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-2	Waukesha F2895-G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-3	Waukesha L5790-GSI	1130 hp	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS5-4	Waukesha F3521-GSI	686 hp	7.0 g/hp-hr	10.6	46.4	28.0 g/hp-hr	42.4	185.5	0.005 g/hp-hr	0.01	0.03	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	92 hp	7.0 g/hp-hr	1.4	6.2	34.0 g/hp-hr	6.9	30.2	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.06						
	TOTALS			40.55	178.1		163.3	715		0.04	0.19		<0.01	0.05		0.09	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the two original compressor engines, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. The installation of the 1478 hp lean burn engine and glycol reboiler in 1995 was not a major modification. Table 5 shows the potential emissions from all emissions units at Treating Site #6. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #7

Treating Site #7 is located in the lower southwest quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the Unit B water injection pump, the largest compressor engine (1215 hp), the glycol reboiler, and the #3 and #4 tank heaters, were installed from May-July of 1989. The Unit B injection pump was installed in April 1990 and the #3 and 4 tank heaters were installed in February 1993. The glycol reboiler and the 1215 hp compressor engine were installed in January 1990.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third and largest engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #7 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 1215 horsepower engine and the Unit B water injection pump **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 300 TPY and the potential NOx emissions exceeded 70 TPY for just the 1215 horsepower engine. Table 6 shows the potential emissions from all emissions units at Treating Site #7. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #9

Treating Site #9 is located in the northwest quadrant of the IBF field. The facility consists of three compressor engines, a small generator, two water tanks and two paraffin sales tanks with tank heaters, an electric water transfer pump, and a glycol dehydration unit. All units, except one of the 738 horsepower compressor engines, the #3 tank heater, and the #4 tank heater were installed in November 1991. The Unit C, 738

TABLE 5

VASTAR'S TREATING SITE #6
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6-2	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6-3	Waukesha 7042-GL	1331 hp	1.5 g/hp-hr	4.4	19.3	2.65 g/hp-hr	7.8	34.1	0.007 g/hp-hr	0.02	0.09	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.13
TS6-4	Waukesha F18-GL	338 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.006 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS6-5	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.9	0.002 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS6-6	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	TOTALS			46.1	202.5		168.7	738.2		0.03	0.19		0.01	0.08		0.14	0.6

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 6

VASTAR'S TREATING SITE #7
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	339 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.013 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-2	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.9	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	93 hp	7.0 g/hp-hr	1.4	6.3	34.0 g/hp-hr	6.9	30.5	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-5	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-6	Waukesha L5790-GSI	1133 hp	7.0 g/hp-hr	17.5	76.7	28.0 g/hp-hr	70	306.6	0.005 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.11
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	TOTALS			35.76	157.4		136.8	599.6		0.03	0.18		<0.01	0.05		0.11	0.38

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

horsepower engine was installed in October 1992, the #3 tank heater was installed in June 1992, and the #4 tank heater was installed in June 1994.

All three of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. Upon its construction, Treating Site #9 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the engines, the potential CO emissions exceeded 350 TPY and the potential NOx emissions exceeded 90 TPY. The 1992 addition of the third 738 horsepower engine was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 180 TPY (significant CO level at 100 TPY) and NOx emissions greater than 45 TPY (significant NOx level at 40 TPY). Table 7 shows the potential emissions from all emissions units at Treating Site #9. All emissions are based on unit operations of 24 hours per day, 365 days per year.

The potential emission estimates (uncontrolled) for NOx, CO, and VOC emissions from the natural gas-fired internal combustion engines for <u>each</u> treating site were calculated using Waukesha Best Power emission factors. The January 1995 version of AP-42 lists no emission factors for SO_2 emissions for uncontrolled natural gas-fired pipeline compressor engines. The SO_2 emission factors used in the Vastar applications were based on a version of AP-42 prior to January 1995. The PM_{10} emissions calculated in Vastar's applications were based on EPA Speciate Database AFSEF for internal combustion engines. The TSP emissions were assumed to be 100 percent. The horsepower ratings for each engine have been derated due to the elevation; deration was based on manufacturer's data.

The uncontrolled emissions from the tank heaters and the dehydration unit reboilers were calculated using AP-42 factors (Tables 1.4-1 through 1.4-3) for uncontrolled commercial boilers (0.3 - 10 MMBtu/hr) burning natural gas. The January 1995 AP-42 version was used. The factors have been corrected for the estimated fuel gas heating value, 950 Btu/scf.

Emission factors prepared by the American Petroleum Institute for equipment leaks from natural gas production facilities were used to calculate the potential process fugitive emissions. (API Publication Number 4615, Emission Factors for Oil and Gas Operations, January 1995.) The number of process components is required since these process fluid leaks occur from valves, flanges, connections, relief valves, open-ended lines, pump seals, and compressor seals. Vastar's "Emission Rate

TABLE 7

VASTAR'S TREATING SITE #9
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9-1	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-2	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-3	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-4	Waukesha VRG330	56 hp	7.5 g/hp-hr	0.93	4.1	45.0 g/hp-hr	5.6	24.3	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-10	Fugitives								see application	0.12	0.52						
	TOTALS			32.34	141.8		130.4	571.1		0.24	0.99		<0.01	0.03		0.05	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Calculations" section of its applications details the gas analysis summary or the VOC fraction and the number of components (i.e. valves, flanges, pump seals, etc.).

Below are three sample calculations. Equation 1) is for determining CO emissions from a gas-fired reciprocating internal combustion engine, equation 2) is for calculating NOx emissions from external combustion units (heaters and reboilers), and equation 3) is for calculating process fugitive VOC emissions.

Internal Combustion Engine - 1215 hp: CO emissions

1) Emission factor = 28.0 g CO/hp-hr

(28.0 g CO/hp-hr) (1215 hp) (lb/453.6 g) = 75.0 lb CO/hr

(75.0 lb/hr)(365 day/yr)(24hrs/day)(ton/2000 lb) = 328.5 TPY

External Combustion - 0.5 MMBtu/hr heat input: NOx emissions

2) Emission factor = 95.0 lb NOx/MMscf

(95 lb NOx/MMscf) (0.5 MMBtu/hr) (MMscf/950 MMBtu)

= 0.05 lb NOx/hr

(.05 lb/hr)(24hr/day)(365 day/yr)(ton/2000 lb) = 0.22 TPY

Process Fugitives - Component (200 valves): VOC emissions

3) API Emission factor = 0.13900 lb/hr-component

(0.13900 lb/hr-comp) (200 components) (VOC fraction-0.97%)

= 0.27 lb/hr VOC

(0.27 lb/hr VOC) (8760 hrs/yr) (ton/2000 lbs) = 1.18 TPY

B. **Stack Height**

The applicant's proposed stack heights for its various compressor engines located at the seven PSD compressor station sites do not exceed 31.08 feet or 9.5 meters.

Good engineering practices (GEP) stack height regulations under 40 CFR Section 51.100(ii) consider 65 meters the de minimus level; therefore, Vastar meets the requirement of GEP for each of the stacks located at the seven sites.

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) found in 40 CFR Part 60.

The BACT analysis for each of the seven sites is located in the Control Technology section and supported by Appendices A and B of each application. An additional BACT analysis was also included in the June 20, 1996 Vastar submittal. This submittal conducted a BACT analysis for the smaller horsepower engines at each of the sites.

An NSPS standard does not exist for gas-fired compressor engines. A review of the RACT/BACT/LAER Clearinghouse establishes BACT limits of at least 2.0 g/hp-hr for NOx and 2.0 to 3.0 g/hp-hr for CO. The BACT Clearinghouse data can be found in Appendix B of the applications.

Vastar's BACT analysis included only an analysis of non-selective catalytic reduction (NSCR) coupled with an air/fuel ratio control system. Other engine control technologies to be considered in a BACT determination are selective catalytic reduction (SCR) and lean burn engines. An analysis of each option follows.

Selective Catalytic Reduction

Selective catalytic reduction is usually considered to be the top control technology for reducing engine emissions of NOx and CO. However, SCR has been determined 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. Due to the environmental problems, SCR is not considered to be BACT.

Lean Burn Engine Technology

Lean burn engine technology uses a precombustion chamber to enclose a rich mixture of air and fuel; the mixture is then ignited in this chamber. The resulting ignition-front then fires into the larger main area of the cylinder which contains a much leaner fuel mixture. Staging the combustion and burning a leaner fuel mixture keeps peak flame temperatures lower. Because the combustion temperature is cooler, the NOx concentration in the exhaust gas stream is lower; however, excess air in the fuel mixture can produce increased CO emissions.

The lean burn engine technology is not as economical as retrofitting NSCR with an air/fuel ratio controller, and therefore is not considered to be BACT.

Non-Selective Catalytic Reduction & Air/Fuel Controller

An NSCR unit controls NOx emissions by using the CO and the residual hydrocarbons in the exhaust of a rich burn engine as a reducing agent for NOx. In the presence of oxygen, the hydrocarbons will be oxidized instead of reacting with NOx. As the excess hydrocarbons and NOx pass over a honeycomb or monolithic catalyst, usually plated with a combination of noble metals such as platinum, palladium, and/or rhodium, the reactants are reduced to N_2, H_2O, and CO_2. The noble metal catalyst usually operates between 800 and 1,200 degrees Fahrenheit; therefore, the unit would normally be mounted near the engine exhaust to maintain a high enough temperature to allow the various reactions to occur. A rich fuel mixture is usually burned, in order to achieve the desired NOx reduction.

In order to provide for the most effective use of the catalyst, it is necessary to install an electronic air/fuel ratio controller. This device maintains the proper air/fuel ratio which will optimize the degree of reducing agents, thus providing for the maximum emission reduction while simultaneously minimizing agents that can poison the catalyst.

Vastar's application addressed a three-way non-selective catalytic reduction converter and an AccuNox air/fuel ratio control system. Vastar claims that together, the NSCR and the air/fuel ratio control system reduce emissions below what can be achieved with lean burn engine technology. At full operation, NSCR and air/fuel ratio control can achieve a 90% reduction in NOx, 80% reduction in CO, and a 50% reduction in VOC emissions for Vastar's Waukesha engines. This converts into NOx emissions of 1.0 g/hp-hr, CO emissions of 2.0 g/hp-hr, and VOC emissions of 1.0 g/hp-hr. These controls meet or exceed the BACT limits for similar internal combustion engines as established by the RACT/BACT/LAER Clearinghouse.

EPA concludes that the Applicant's proposed control technology of retrofitting the applicable engines at the seven different sites with NSCR and air/fuel ratio control to be the best available control technology or achievable emission rates.

Following is a summary of the engines at each site that are required to incorporate the NSCR and air/fuel ratio control BACT. The Applicant applied such controls to the listed engines prior to January 1996. Testing of the listed engines according to EPA methods will be required in the PSD permits.

Site	Emission Point No.	Horsepower	Emission Unit Description
1	TS1-1	1215	Waukesha L5790-GSI
1	TS1-2	1215	Waukesha L5790-GSI
2	TS2-1	1215	Waukesha L5790-GSI
2	TS2-2	1215	Waukesha L5790-GSI
4	TS4-1	738	Waukesha F3521-GSI
4	TS4-2	738	Waukesha F3521-GSI
4	TS4-3	1215	Waukesha L5790-GSI
5	TS5-3	1215	Waukesha L5790-GSI
5	TS5-4	738	Waukesha F3521-GSI
6	TS6-1	1215	Waukesha L5790-GSI
6	TS6-2	1215	Waukesha L5790-GSI
7	TS7-6	1215	Waukesha L5790-GSI
9	TS9-1	738	Waukesha F3521-GSI
9	TS9-2	738	Waukesha F3521-GSI
9	TS9-3	738	Waukesha F3521-GSI

* BACT was also applied at site #5 on emission point no. TS5-1 for a 421 horsepower Waukesha F2895-G engine and at site #7 on emission point no. TS7-5 for a 421 horsepower Waukesha F2895-G engine.

Tables 8 through 14 show the controlled emissions limits based on BACT, respectively for each of the subject Treating Sites. The BACT engine emission factors used to calculate the permit emission limits are as follows:

1) 1.0 g/hp-hr for NOx,

2) 2.0 g/hp-hr for CO, and

3) 1.0 g/hp-hr for VOC's.

The VOC emission factors have been adjusted to account for the fraction of VOC's in the fuel gas. The pollutant emissions limits are based on the maximum manufacturer's horsepower for each engine.

TABLE 8

VASTAR'S TREATING SITE #1
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.036 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-4	Waukesha F11-G	105 hp	8.3 g/hp-hr	1.9	8.4	34.0 g/hp-hr	7.9	34.5	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			8.55	37.36		25.43	111.2		0.47	2.11		<0.01	0.04		0.09	0.35

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 9

VASTAR'S TREATING SITE #2
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			6.65	28.96		17.53	76.65		0.04	0.2		<0.01	0.04		0.09	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 10

VASTAR'S TREATING SITE #4
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4-1	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4-2	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4-3	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS4-4	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-5	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-6	Waukesha F1197-G	162 hp	8.5 g/hp-hr	3	13.1	35.0 g/hp-hr	12.5	54.8	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4-12	Fugitives								see application	0.19	0.82						
	***TOTALS			13.1	57.5		39.7	173.4		0.22	1.02		<0.01	0.04		0.11	0.47

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS4-4 or TS4-5) at a time.

TABLE 11

VASTAR'S TREATING SITE #5
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-2	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.5	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-3	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS5-4	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.003 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.5	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.06						
	TOTALS			13.55	59.36		44.73	195.4		0.03	0.1		<0.01	0.05		0.1	0.37

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 12

VASTAR'S TREATING SITE #6
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-3	Waukesha 7042-GL	1478 hp	1.5 g/hp-hr	4.9	21.4	2.65 g/hp-hr	8.6	37.8	0.007 g/hp-hr	0.02	0.1	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.14
TS6-4	Waukesha F18-GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.006 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS6-5	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.002 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS6-6	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	***TOTALS			15.6	68.6		41.3	180.9		0.03	0.18		0.01	0.08		0.16	0.62

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS6-4 or TS6-5) at a time.

TABLE 13

VASTAR'S TREATING SITE #7
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.013 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-2	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.4	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.4	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-5	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-6	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	*** TOTALS			16	70		56.6	247.4		0.03	0.17		<0.01	0.05		0.11	0.42

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS7-1 or TS7-2) at a time.

TABLE 14

VASTAR'S TREATING SITE #9
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9-1	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-2	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-3	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-4	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-10	Fugitives								see application	0.12	0.52						
	TOTALS			6.11	27.11		16.65	72.59		0.18	0.81		<0.01	0.03		0.08	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

D. **Air Quality Models**

The Applicant's air quality analysis is contained in the application addendums dated April 4th, May 3rd, and May 8th of 1996. The Industrial Source Complex Short-Term (ISCST3) model, version 95200, was used by the Applicant to predict the annual and 1-hour averaging period concentrations of NOx and the 1-hour and 8-hour averaging period concentrations of CO for both the surrounding Class II area and the nearby Class I areas. Tables 2-1 and 2-3 of the April 4th application addendum contain the stack parameters and emission rates used in the ISCST3 model. Table 3-1 lists the ISCST3 model options used in the NOx model run.

The ISCST3 model was also used to predict the Class II NO_2 increment consumption and the Class I increment for the Weminuche Wilderness area and the Mesa Verde National Park.

E. **Air Quality Analysis**

An air quality dispersion modeling analysis was performed to estimate the maximum off-property ground-level concentrations of NO_2 and CO due to point source emissions from Treating Site #9. Instead of performing seven air quality analyses, the Applicant's air quality analysis was performed using only the data from the treating site with the greatest controlled potential emissions of NOx and CO. Treating Site #9 is the site with the highest controlled potential emissions of NOx and CO, and thus was chosen to represent all of the treating sites.

Meteorological data measured at a Southern Ute Indian Tribe meteorological station outside of Ignacio, Colorado for 1994 was used as input for the ISCST3 model. This data was combined with upper air data from Grand Junction, Colorado. Figure 3-1 of the April 4, 1996 application addendum shows a wind rose for this meteorological data.

An annual average ambient NO_2 concentration of 7.008 micrograms per cubic meter (ug/m^3) was used as the background level. This background NO_2 concentration was measured in 1994 at the Ignacio, Colorado weather station. 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 conduct any "pre-construction" monitoring for NO_2. In this case, the Applicant commenced construction, completed construction, and operated the source prior to receipt of the appropriate PSD permits, thus pre-construction monitoring was not possible. However, since the annual average NO_2 concentration background is only one-half of the significant monitoring concentration, no additional monitoring was required.

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 concentration impact, including background concentration, was 26.9 ug/m^3 using the Ozone Limiting Method (OLM).

Modeling results showed that there were no predicted violations of the 40,000 ug/m^3 1-hour NAAQS for CO or the 10,000 ug/m^3 8-hour NAAQS for CO. The maximum 1-hour predicted CO concentration impact was 5671.80 ug/m^3 and the maximum 8-hour predicted CO concentration impact was 2976.65 ug/m^3.

The predicted off-property ground-level concentrations of NO_2 and CO yielded by this air quality analysis represent maximum estimates of off-property, ground-level concentrations surrounding the other six treating sites as well.

F. Ambient Air Increments

The maximum allowable incremental increase in ambient pollutant concentrations that is allowed to occur above a baseline concentration for a given pollutant is defined as the PSD increment. Treating Site #9 is located in a Class II area where the allowable annual PSD increment for NO_2 is 25.0 ug/m^3. The baseline area for NOx is the entire state of Colorado and the minor source baseline date was triggered March 30, 1989. The Applicant predicted a maximum annual Class II NO_2 increment of 19.9 ug/m^3. No PSD increments exist for carbon monoxide for any of the three different classes.

The Class I area impact analysis section (Section I) that follows, contains the Class I increment analysis for the Weminuche Wilderness Area and the Mesa Verde National Park.

G. Source Information

The PSD application submitted on December 13, 1995 and the application addendums, dated April 4, 1996, May 3, 1996, and May 8, 1996 were concluded to be incomplete by EPA Region VIII in a May 17, 1996 letter to Vastar Resources, Inc. The Applicant responded to the incomplete determination by submitting another application addendum, dated June 18, 1996. This addendum contained revised emission estimates for Treating Sites #4, 6, and 7, and a BACT analysis for four different engines ranging in horsepowers from 68 to 225. On June 28, 1996, EPA determined the application to be complete as of the date the last addendum was received (June 20, 1996). 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 of the April 4, 1996 application addendum. The Applicant focused on the impact to growth, local soils and vegetation, and visibility that resulted from the construction of the seven treating sites. One conclusion from the analysis was that the construction of the treating sites did not result in a growth of the workforce in nearby communities or a growth in industrial and commercial development.

The construction and operation of the seven sites showed no impact on the local soils and vegetation during the years the sites were operated without BACT. The installation of BACT and reduction in emissions will only negate any unforeseen impacts to the soils and vegetation.

Visibility impairments are caused by emissions of nitrogen oxides, particulates, primary nitrogen dioxide, soot, and primary sulfate. The impact area for NO_2 extends no more than 2.2 kilometers from Treating Site #9. There are no airports, scenic vistas, or national forests located in the impact area to justify a detailed visibility analysis for the Class II area. The NOx emissions from Treating Site #9 have been reduced by approximately 117 TPY upon the application of BACT. There has been no visibility degradation in the impact area since the start up of the source, thus a decrease in emissions will reduce the impact on any potential visibility impairment. Emissions from the remaining six sites have also been reduced, thus further reducing any potential visibility impairment for the area.

I. Class I Area Impact Analysis

EPA is required under 40 CFR §52.21(p) to provide written notice to the Federal Land Manager (FLM) concerning any permit application for a proposed major stationary source or major modification, in which the emissions "may affect" a Class I area. EPA policy has interpreted "may affect" to include at least all major sources or major modifications which propose to locate within 100 km of a Class I area. The Applicant is required to conduct an analysis of the emissions impact on the Class I air quality related values (AQRV's) and the Class I increments. Class I AQRV's include visibility, flora, fauna, water, soil, odor, and cultural/archeological resources. Sources

located more than 100 km from a Class I area may also be required to conduct these analyses if the FLM is concerned about potential emission impacts from these sources.

The Class I areas within 100 km of the Applicant's treating sites are the Mesa Verde National Park (36.8 km) and the Weminuche Wilderness Area (43 km). The National Park Service is the FLM for the Mesa Verde National Park and the U.S. Forest Service is the FLM for the Weminuche Wilderness Area.

A copy of the Vastar PSD permit application and air quality analysis for Treating Site #9 was sent on May 17, 1996 to the Permit Review Branch of the National Park Service in Denver, Colorado and the Rocky Mountain Region of the U.S. Forest Service in Lakewood, Colorado. A June 17, 1996 letter from the U.S. Forest Service confirmed that **controlled** (installed w/BACT) emissions from the treating sites will not have adverse impacts on the AQRV's in the Weminuche wilderness. A June 17, 1996 telephone conversation with Ms. Cathy Rhodes of the National Park Service also confirmed that the AQRV's of the Mesa Verde National Park should not be affected by the **controlled** treating sites emissions.

As was done for the air quality analysis, emissions data from Treating Site #9 were used by the Applicant to determine the amount of NOx increment consumed in the Class I areas. The annual Class I increment for NOx is 2.5 ug/m^3. (As stated earlier, no Class I increments exist for CO.) The maximum predicted annual average NO_2 concentration (based on the Ozone Limiting Method) from Treating Site #9 is 0.0028 ug/m^3 and 0.0038 ug/m^3 for the Weminuche Wilderness Area and Mesa Verde National Park, respectively. The predicted NO_2 impacts are well below the Class I increment.

Maximum predicted 1-hour average CO concentrations were 3.47 ug/m^3 and 24.3 ug/m^3 respectively, for the Weminuche Wilderness and Mesa Verde Park. The maximum predicted 8-hour average CO concentrations were 0.67 ug/m^3 and 3.04 ug/m^3 for the Weminuche Wilderness and Mesa Verde Park, respectively.

A visibility analysis was done using Level I of the VISCREEN model. VISCREEN is a conservative screening model used to evaluate the visual impact from pollutant plumes of particulate, nitrogen oxides, soot, primary nitrogen dioxide, and primary sulfate. The maximum short-term emission rates of particulate and nitrogen oxides for all sources at Treating Site #9 were used in the VISCREEN model to provide a worst-case estimate of visibility impairment from each of the seven treating

sites. Tables 6-2 and 6-3 of the April 4, 1996 application addendum show the maximum visual impacts inside the Class I area and outside the Class I area. Adverse visibility impairment is not expected in either of the Class I areas, because the predicted maximum visual impacts are below the two screening criteria.

J. Public Participation

The application, analysis, and proposed permit were made available for public inspection at the EPA Regional Office in Denver, Colorado, the Southern Ute Indian Tribe's Environmental Programs Office in Ignacio, Colorado, and the La Plata County Clerk's Office in Durango, Colorado. Public notices were published in the Durango Herald and the Southern Ute Drum giving opportunity for public comment on our proposed action.

APPENDIX II

PERMIT APPLICATION AND SUPPORTING DATA

CONTENTS

APPENDIX II

VASTAR RESOURCES, INC.
PSD PERMIT APPLICATIONS ANALYSES
(Final Permit - Statement of Basis)

A. Applicability Determination

Vastar Resources, Inc. operates several facilities (treating sites) used to treat coal bed methane gas production. The treating facilities are located in the Ignacio Blanco Fruitland field in La Plata County, Colorado. The Ignacio Blanco Fruitland field is situated on the Southern Ute Indian Tribe reservation.

This Statement of Basis discusses the background and analyses of the PSD permits for seven of Vastar's treating sites located in the Ignacio Blanco Fruitland (IBF) field. Figure 1 illustrates the Ignacio Blanco Fruitland field and the various Vastar treating sites. The seven treating sites subject to PSD are Nos. 1, 2, 4, 5, 6, 7, and 9. Potential carbon dioxide (CO) emissions exceeding 250 tons per year (TPY) make each of the Vastar treating sites a major stationary source as defined under the August 7, 1980 PSD regulations or under 40 CFR § 52.21(b)(1)(i)(b). Emissions of nitrogen oxides (NOx) are also significant (greater than 40 TPY) and subject to the PSD requirements. A brief summary of each subject treating site, its emissions units, and its PSD applicability follows.

Treating Site #1

Treating Site #1 is located in the lower southeast corner of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small water injection pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units, except the generator, were installed in June/July of 1989. The generator was installed in January 1992.

The two compressor engines are Waukesha VHP series, Model L5790 GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #1 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 grams/horsepower-hour (g/hp-hr) for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 1 shows the potential emissions from all emissions units at Treating Site #1. All emissions are based on unit operations of 24 hours per day, 365 days per year.

IGNACIO BLANCO
FRUITLAND FIELD

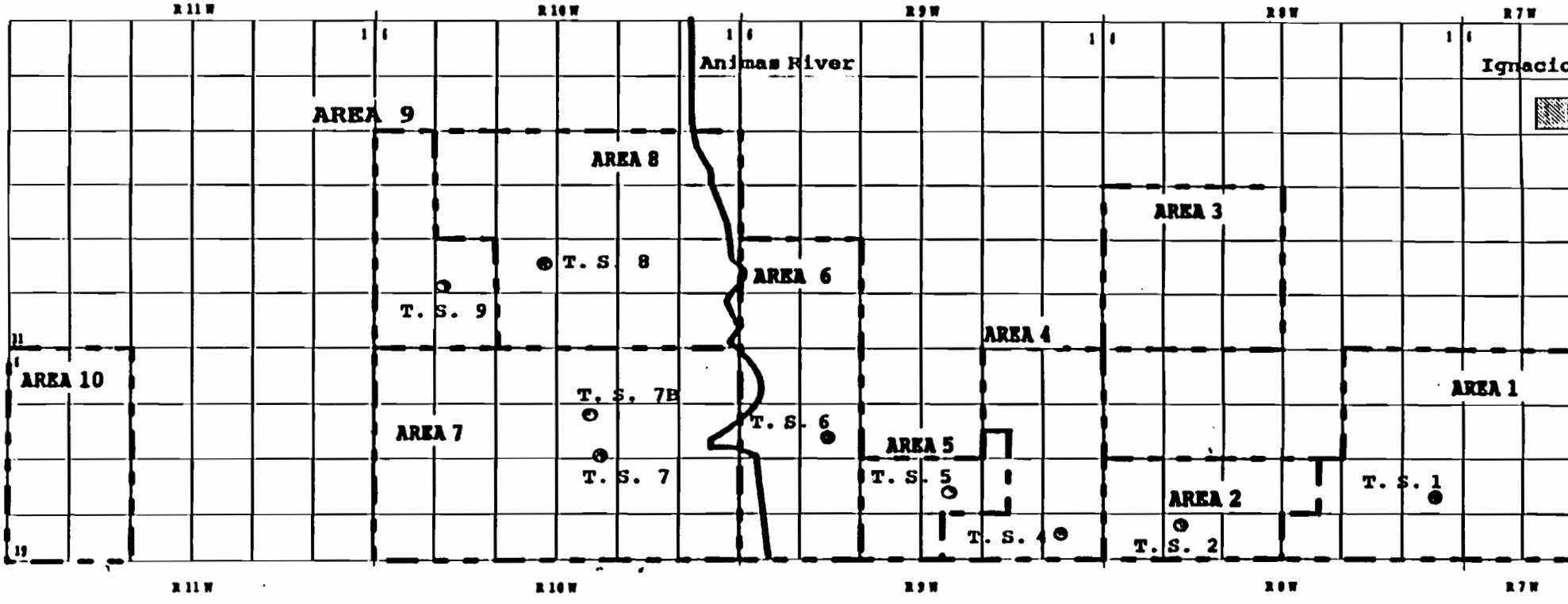

FIGURE 1.

TABLE 1

VASTAR'S TREATING SITE #1
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-2	Waukesha L5790-GSI	1122 hp	7.0 g/hp-hr	17.3	75.8	28.0 g/hp-hr	69.2	303.4	0.027 g/hp-hr	0.07	0.29	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS1-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.036 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-4	Waukesha F11-G	89 hp	8.3 g/hp-hr	1.6	7.1	34.0 g/hp-hr	6.7	29.2	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			37.31	163.6		150.9	661.4		0.55	2.39		<0.01	0.04		0.07	0.33

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #2

Treating Site #2 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of two compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration unit. All units were installed in June 1990.

The two compressor engines are Waukesha VHP series, Model L5790-GSI engines with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #2 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. No major modifications have been made to the site. Table 2 shows the potential emissions from all emissions units at Treating Site #2. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #4

Treating Site #4 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration unit. All units, except the largest compressor engine (Model L5790-GSI) and the Unit B water transfer pump, were installed in June/July of 1989. The largest compressor engine and the Unit B water transfer pump were installed in February 1990.

Two of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #4 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY. The 1990 addition of another compressor engine and a water transfer pump was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 300 TPY (significant CO level at 100 TPY) and NOx emissions greater than 85 TPY (significant NOx level at 40 TPY). Table 3 shows the potential emissions from all emissions units at Treating Site #4. All emissions are based on unit operations of 24 hours per day, 365 days per year.

TABLE 2

VASTAR'S TREATING SITE #2
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.9	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-2	Waukesha L5790-GSI	1123 hp	7.0 g/hp-hr	17.3	75.9	28.0 g/hp-hr	69.3	303.6	0.004 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS2-3	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			35.71	156.7		144.4	632.6		0.06	0.24		<0.01	0.04		0.07	0.32

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 3

VASTAR'S TREATING SITE #4
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4-1	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-2	Waukesha F3521-GSI	679 hp	7.0 g/hp-hr	10.5	45.9	28.0 g/hp-hr	41.9	183.6	0.011 g/hp-hr	0.02	0.07	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS4-3	Waukesha L5790-GSI	1118 hp	7.0 g/hp-hr	17.3	75.6	28.0 g/hp-hr	69	302.3	0.011 g/hp-hr	0.03	0.11	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS4-4	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-5	Waukesha F11-GSI	207 hp	8.0 g/hp-hr	3.7	16	30.5 g/hp-hr	13.9	60.9	0.007 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-6	Waukesha F1197-G	136 hp	8.5 g/hp-hr	2.6	11.2	35.0 g/hp-hr	10.5	45.9	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS4-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4-12	Fugitives								see application	0.19	0.82						
	TOTALS			48.56	211.7		191.1	837.4		0.26	1.11		<0.01	0.04		0.08	0.45

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Treating Site #5

Treating Site #5 is located in the lower southeast quadrant of the IBF field, near the New Mexico border. The facility consists of four compressor engines, a small electric water transfer pump, a small generator, two water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the largest compressor engine (Model L5790-GSI), the 738 hp (Model F3521-GSI) engine, and the glycol dehydration unit, were installed in May 1989. The largest compressor engine was installed in May 1990, the 738 hp engine was installed in February 1990, and the glycol reboiler was installed in February 1993.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third compressor engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. The fourth engine is a Waukesha VHP series, Model F3521-GSI engine with a rating of 738 hp. Upon its construction, Treating Site #5 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 738 and 1215 horsepower compressor engines **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 450 TPY and the potential NOx emissions exceeded 100 TPY for these two engines. Table 4 shows the potential emissions from all emissions units at Treating Site #5. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #6

Treating Site #6 is located in the lower middle section of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and two glycol dehydration units. All units, except the 1478 hp compressor engine and the #2 glycol dehydration reboiler, were installed in March/April of 1990. Both the 1478 hp engine and the #2 glycol reboiler were installed in March 1995.

Two of the compressor engines are Waukesha VHP series, Model L5790-GSI engines with maximum site-ratings of 1215 horsepower. The third compressor engine is a Waukesha VHP series, (Model 7042-GL) lean burn engine with a maximum site-rating of 1478 horsepower. Upon its construction, Treating Site #6 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power

TABLE 4

VASTAR'S TREATING SITE #5
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-2	Waukesha F2895 G	358 hp	7.0 g/hp-hr	5.5	24.2	28.0 g/hp-hr	22.1	96.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS5-3	Waukesha L5790-GSI	1130 hp	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.02	0.11
TS5-4	Waukesha F3521-GSI	686 hp	7.0 g/hp-hr	10.6	46.4	28.0 g/hp-hr	42.4	185.5	0.005 g/hp-hr	0.01	0.03	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	92 hp	7.0 g/hp-hr	1.4	6.2	34.0 g/hp-hr	6.9	30.2	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.06						
	TOTALS			40.55	178.1		163.3	715		0.04	0.19		<0.01	0.05		0.09	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 5

VASTAR'S TREATING SITE #6
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (ppH)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6 2	Waukesha L5790-GSI	1130 HP	7.0 g/hp-hr	17.4	76.4	28.0 g/hp-hr	69.8	305.5	0.002 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.1	0.02	0.01 g/hp-hr	0.02	0.11
TS6-3	Waukesha 7042-GL	1331 hp	1.5 g/hp-hr	4.4	19.3	2.65 g/hp-hr	7.8	34.1	0.007 g/hp-hr	0.02	0.09	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.13
TS6-4	Waukesha F18-GL	338 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.008 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS6-5	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.8	0.002 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS6 6	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.96	4.2	45.0 g/hp-hr	5.8	25.2	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	TOTALS			46.1	202.5		168.7	738.2		0.03	0.19		0.01	0.08		0.14	0.6

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the two original compressor engines, the potential CO emissions exceeded 600 TPY and the potential NOx emissions exceeded 150 TPY. The installation of the 1478 hp lean burn engine and glycol reboiler in 1995 was not a major modification. Table 5 shows the potential emissions from all emissions units at Treating Site #6. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #7

Treating Site #7 is located in the lower southwest quadrant of the IBF field, near the New Mexico border. The facility consists of three compressor engines, two small water injection pumps, a small generator, four water tanks with tank heaters, and a glycol dehydration reboiler. All units, except the Unit B water injection pump, the largest compressor engine (1215 hp), the glycol reboiler, and the #3 and #4 tank heaters, were installed from May-July of 1989. The Unit B injection pump was installed in April 1990 and the #3 and 4 tank heaters were installed in February 1993. The glycol reboiler and the 1215 hp compressor engine were installed in January 1990.

Two of the compressor engines are Waukesha VHP series, Model F2895-G engines with maximum site-ratings of 421 horsepower. The third and largest engine is a Waukesha VHP series, Model L5790-GSI engine with a maximum site-rating of 1215 horsepower. Upon its construction, Treating Site #7 was **not** a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was **less** than 250 TPY. The 1990 addition of the 1215 horsepower engine and the Unit B water injection pump **was** a modification that was major in and of itself. That is, the potential CO emissions from these two engines were greater than 250 TPY; making the source a major stationary source subject to PSD. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation, the potential CO emissions exceeded 300 TPY and the potential NOx emissions exceeded 70 TPY for just the 1215 horsepower engine. Table 6 shows the potential emissions from all emissions units at Treating Site #7. All emissions are based on unit operations of 24 hours per day, 365 days per year.

Treating Site #9

Treating Site #9 is located in the northwest quadrant of the IBF field. The facility consists of three compressor engines, a small generator, two water tanks and two paraffin sales tanks with tank heaters, an electric water transfer pump, and a glycol dehydration unit. All units, except one of the 738 horsepower compressor engines, the #3 tank heater, and the #4 tank heater were installed in November 1991. The Unit C, 738

TABLE 6

VASTAR'S TREATING SITE #7
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	339 hp	2.6 g/hp-hr	1.9	8.5	1.75 g/hp-hr	1.3	5.7	0.013 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-2	Waukesha F11-GSI	210 hp	8.0 g/hp-hr	3.7	16.2	30.5 g/hp-hr	14.1	61.8	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	93 hp	7.0 g/hp-hr	1.4	6.3	34.0 g/hp-hr	6.9	30.5	0.005 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-5	Waukesha F2895-G	360 hp	7.0 g/hp-hr	5.5	24.3	28.0 g/hp-hr	22.2	97.3	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.03
TS7-6	Waukesha L5790-GSI	1133 hp	7.0 g/hp-hr	17.5	76.7	28.0 g/hp-hr	70	306.6	0.005 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.11
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	TOTALS			35.76	157.4		136.8	599.6		0.03	0.18		<0.01	0.05		0.11	0.38

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

horsepower engine was installed in October 1992, the #3 tank heater was installed in June 1992, and the #4 tank heater was installed in June 1994.

All three of the compressor engines are Waukesha VHP series, Model F3521-GSI engines with maximum site-ratings of 738 horsepower. Upon its construction, Treating Site #9 was a major stationary source subject to the PSD permitting requirements, since the potential to emit of CO emissions was greater than 250 TPY. Based on Waukesha Best Power emission factors of 28.0 g/hp-hr for CO, 7.0 g/hp-hr for NOx and an 8760 hours per year operation for the engines, the potential CO emissions exceeded 350 TPY and the potential NOx emissions exceeded 90 TPY. The 1992 addition of the third 738 horsepower engine was a major modification to a major stationary source; and therefore also subject to PSD. The major modification consisted of potential CO emissions greater than 180 TPY (significant CO level at 100 TPY) and NOx emissions greater than 45 TPY (significant NOx level at 40 TPY). Table 7 shows the potential emissions from all emissions units at Treating Site #9. All emissions are based on unit operations of 24 hours per day, 365 days per year.

The potential emission estimates (uncontrolled) for NOx, CO, and VOC emissions from the natural gas-fired internal combustion engines for <u>each</u> treating site were calculated using Waukesha Best Power emission factors. The January 1995 version of AP-42 lists no emission factors for SO_2 emissions for uncontrolled natural gas-fired pipeline compressor engines. The SO_2 emission factors used in the Vastar applications were based on a version of AP-42 prior to January 1995. The PM_{10} emissions calculated in Vastar's applications were based on EPA Speciate Database AFSEF for internal combustion engines. The TSP emissions were assumed to be 100 percent. The horsepower ratings for each engine have been derated due to the elevation; deration was based on manufacturer's data.

The uncontrolled emissions from the tank heaters and the dehydration unit reboilers were calculated using AP-42 factors (Tables 1.4-1 through 1.4-3) for uncontrolled commercial boilers (0.3 - 10 MMBtu/hr) burning natural gas. The January 1995 AP-42 version was used. The factors have been corrected for the estimated fuel gas heating value, 950 Btu/scf.

Emission factors prepared by the American Petroleum Institute for equipment leaks from natural gas production facilities were used to calculate the potential process fugitive emissions. (API Publication Number 4615, Emission Factors for Oil and Gas Operations, January 1995.) The number of process components is required since these process fluid leaks occur from valves, flanges, connections, relief valves, open-ended lines, pump seals, and compressor seals. Vastar's "Emission Rate

TABLE 7

VASTAR'S TREATING SITE #9
UNCONTROLLED POTENTIAL EMISSIONS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9-1	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-2	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-3	Waukesha F3521-GSI	674 hp	7.0 g/hp-hr	10.4	45.6	28.0 g/hp-hr	41.6	182.2	0.024 g/hp-hr	0.04	0.15	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.07
TS9-4	Waukesha VRG330	58 hp	7.5 g/hp-hr	0.93	4.1	45.0 g/hp-hr	5.8	24.3	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.08 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-10	Fugitives								see application	0.12	0.52						
	TOTALS			32.34	141.8		130.4	571.1		0.24	0.99		<0.01	0.03		0.05	0.34

* Horsepower engine ratings shown are derated due to elevation.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

Calculations" section of its applications details the gas analysis summary or the VOC fraction and the number of components (i.e. valves, flanges, pump seals, etc.).

Below are three sample calculations. Equation 1) is for determining CO emissions from a gas-fired reciprocating internal combustion engine, equation 2) is for calculating NOx emissions from external combustion units (heaters and reboilers), and equation 3) is for calculating process fugitive VOC emissions.

Internal Combustion Engine - 1215 hp: CO emissions

1) Emission factor = 28.0 g CO/hp-hr

(28.0 g CO/hp-hr) (1215 hp) (lb/453.6 g) = 75.0 lb CO/hr

(75.0 lb/hr)(365 day/yr)(24hrs/day)(ton/2000 lb) = 328.5 TPY

External Combustion - 0.5 MMBtu/hr heat input: NOx emissions

2) Emission factor = 95.0 lb NOx/MMscf

(95 lb NOx/MMscf) (0.5 MMBtu/hr) (MMscf/950 MMBtu)

= 0.05 lb NOx/hr

(.05 lb/hr)(24hr/day)(365 day/yr)(ton/2000 lb) = 0.22 TPY

Process Fugitives - Component (200 valves): VOC emissions

3) API Emission factor = 0.13900 lb/hr-component

(0.13900 lb/hr-comp) (200 components) (VOC fraction-0.97%)

= 0.27 lb/hr VOC

(0.27 lb/hr VOC) (8760 hrs/yr) (ton/2000 lbs) = 1.18 TPY

B. **Stack Height**

The applicant's proposed stack heights for its various compressor engines located at the seven PSD compressor station sites do not exceed 31.08 feet or 9.5 meters.

Good engineering practices (GEP) stack height regulations under 40 CFR Section 51.100(ii) consider 65 meters the de minimus level; therefore, Vastar meets the requirement of GEP for each of the stacks located at the seven sites.

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) found in 40 CFR Part 60.

The BACT analysis for each of the seven sites is located in the Control Technology section and supported by Appendices A and B of each application. An additional BACT analysis was also included in the June 20, 1996 Vastar submittal. This submittal conducted a BACT analysis for the smaller horsepower engines at each of the sites.

An NSPS standard does not exist for gas-fired compressor engines. A review of the RACT/BACT/LAER Clearinghouse establishes BACT limits of at least 2.0 g/hp-hr for NOx and 2.0 to 3.0 g/hp-hr for CO. The BACT Clearinghouse data can be found in Appendix B of the applications.

Vastar's BACT analysis included only an analysis of non-selective catalytic reduction (NSCR) coupled with an air/fuel ratio control system. Other engine control technologies to be considered in a BACT determination are selective catalytic reduction (SCR) and lean burn engines. An analysis of each option follows.

Selective Catalytic Reduction

Selective catalytic reduction is usually considered to be the top control technology for reducing engine emissions of NOx and CO. However, SCR has been determined 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. Due to the environmental problems, SCR is not considered to be BACT.

Lean Burn Engine Technology

Lean burn engine technology uses a precombustion chamber to enclose a rich mixture of air and fuel; the mixture is then ignited in this chamber. The resulting ignition-front then fires into the larger main area of the cylinder which contains a much leaner fuel mixture. Staging the combustion and burning a leaner fuel mixture keeps peak flame temperatures lower. Because the combustion temperature is cooler, the NOx concentration in the exhaust gas stream is lower; however, excess air in the fuel mixture can produce increased CO emissions.

The lean burn engine technology is not as economical as retrofitting NSCR with an air/fuel ratio controller, and therefore is not considered to be BACT.

Non-Selective Catalytic Reduction & Air/Fuel Controller

An NSCR unit controls NOx emissions by using the CO and the residual hydrocarbons in the exhaust of a rich burn engine as a reducing agent for NOx. In the presence of oxygen, the hydrocarbons will be oxidized instead of reacting with NOx. As the excess hydrocarbons and NOx pass over a honeycomb or monolithic catalyst, usually plated with a combination of noble metals such as platinum, palladium, and/or rhodium, the reactants are reduced to N_2, H_2O, and CO_2. The noble metal catalyst usually operates between 800 and 1,200 degrees Fahrenheit; therefore, the unit would normally be mounted near the engine exhaust to maintain a high enough temperature to allow the various reactions to occur. A rich fuel mixture is usually burned, in order to achieve the desired NOx reduction.

In order to provide for the most effective use of the catalyst, it is necessary to install an electronic air/fuel ratio controller. This device maintains the proper air/fuel ratio which will optimize the degree of reducing agents, thus providing for the maximum emission reduction while simultaneously minimizing agents that can poison the catalyst.

Vastar's application addressed a three-way non-selective catalytic reduction converter and an AccuNox air/fuel ratio control system. Vastar claims that together, the NSCR and the air/fuel ratio control system reduce emissions below what can be achieved with lean burn engine technology. At full operation, NSCR and air/fuel ratio control can achieve a 90% reduction in NOx, 80% reduction in CO, and a 50% reduction in VOC emissions for Vastar's Waukesha engines. This converts into NOx emissions of 1.0 g/hp-hr, CO emissions of 2.0 g/hp-hr, and VOC emissions of 1.0 g/hp-hr. These controls meet or exceed the BACT limits for similar internal combustion engines as established by the RACT/BACT/LAER Clearinghouse.

EPA concludes that the Applicant's proposed control technology of retrofitting the applicable engines at the seven different sites with NSCR and air/fuel ratio control to be the best available control technology or achievable emission rates.

Following is a summary of the engines at each site that are required to incorporate the NSCR and air/fuel ratio control BACT. The Applicant applied such controls to the listed engines prior to January 1996. Testing of the listed engines according to EPA methods will be required in the PSD permits.

Site	Emission Point No.	Horsepower	Emission Unit Description
1	TS1-1	1215	Waukesha L5790-GSI
1	TS1-2	1215	Waukesha L5790-GSI
2	TS2-1	1215	Waukesha L5790-GSI
2	TS2-2	1215	Waukesha L5790-GSI
4	TS4-1	738	Waukesha F3521-GSI
4	TS4-2	738	Waukesha F3521-GSI
4	TS4-3	1215	Waukesha L5790-GSI
5	TS5-3	1215	Waukesha L5790-GSI
5	TS5-4	738	Waukesha F3521-GSI
6	TS6-1	1215	Waukesha L5790-GSI
6	TS6-2	1215	Waukesha L5790-GSI
7	TS7-6	1215	Waukesha L5790-GSI
9	TS9-1	738	Waukesha F3521-GSI
9	TS9-2	738	Waukesha F3521-GSI
9	TS9-3	738	Waukesha F3521-GSI

* BACT was also applied at site #5 on emission point no. TS5-1 for a 421 horsepower Waukesha F2895-G engine and at site #7 on emission point no. TS7-5 for a 421 horsepower Waukesha F2895-G engine.

Tables 8 through 14 show the controlled emissions limits based on BACT, respectively for each of the subject Treating Sites. The BACT engine emission factors used to calculate the permit emission limits are as follows:

1) 1.0 g/hp-hr for NOx,

2) 2.0 g/hp-hr for CO, and

3) 1.0 g/hp-hr for VOC's.

The VOC emission factors have been adjusted to account for the fraction of VOC's in the fuel gas. The pollutant emissions limits are based on the maximum manufacturer's horsepower for each engine.

TABLE 8

VASTAR'S TREATING SITE #1
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS1-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.013 g/hp-hr	0.03	0.15	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS1-3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.036 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-4	Waukesha F11-G	105 hp	8.3 g/hp-hr	1.9	8.4	34.0 g/hp-hr	7.8	34.5	0.053 g/hp-hr	0.01	0.05	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS1-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-7	Reboiler #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.101 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS1-8	Fugitives								see application	0.4	1.74						
	TOTALS			8.55	37.38		25.43	111.2		0.47	2.11		< 0.01	0.04		0.09	0.35

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 9

VASTAR'S TREATING SITE #2
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS2-1	Waukesha L5790 GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2-2	Waukesha L5790 GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.002 g/hp-hr	< 0.01	0.02	0.002 g/hp-hr	< 0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS2 3	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.005 g/hp-hr	< 0.01	< 0.01	0.002 g/hp-hr	< 0.01	< 0.01	0.01 g/hp-hr	< 0.01	0.01
TS2-4	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-5	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-6	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.014 lb/MMscf	< 0.01	< 0.01	0.57 lb/MMscf	< 0.01	< 0.01	11.4 lb/MMscf	0.01	0.03
TS2-7	Fugitives								see application	0.04	0.16						
	TOTALS			6.65	28.96		17.53	76.65		0.04	0.2		< 0.01	0.04		0.09	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 10

VASTAR'S TREATING SITE #4
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS4-1	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4-2	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.005 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS4-3	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.005 g/hp-hr	0.01	0.06	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS4-4	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-5	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	15.1	66.3	0.007 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-6	Waukesha F1197-G	162 hp	8.5 g/hp-hr	3	13.1	35.0 g/hp-hr	12.5	54.8	0.014 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS4-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-9	Tank Heater #3	675 MBtu/hr	95.0 lb/MMscf	0.07	0.3	19.95 lb/MMscf	0.01	0.06	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS4-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS4-11	Reboiler #1	350 MBtu/hr	95.0 lb/MMscf	0.04	0.15	19.95 lb/MMscf	0.01	0.03	0.04 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS4-12	Fugitives								see application	0.19	0.82						
	***TOTALS			13.1	57.5		39.7	173.4		0.22	1.02		<0.01	0.04		0.11	0.47

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS4-4 or TS4-5) at a time.

TABLE 11

VASTAR'S TREATING SITE #5
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS5-1	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-2	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.5	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS5-3	Waukesha L5790 GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS5-4	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.003 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS5-5	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.5	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS5-6	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-7	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-8	Reboiler #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS5-9	Fugitives								see application	0.02	0.08						
	TOTALS			13.55	59.36		44.73	195.4		0.03	0.1		<0.01	0.05		0.1	0.37

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

TABLE 12

VASTAR'S TREATING SITE #6
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS6-1	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-2	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.001 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS6-3	Waukesha 7042-GL	1478 hp	1.5 g/hp-hr	4.9	21.4	2.65 g/hp-hr	8.6	37.8	0.007 g/hp-hr	0.02	0.1	0.002 g/hp-hr	0.01	0.03	0.01 g/hp-hr	0.03	0.14
TS6-4	Waukesha F18-GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.006 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS6-5	Waukesha F11 GSI	225 hp	8.0 g/hp-hr	3.9	17.4	30.5 g/hp-hr	16.1	66.3	0.002 g/hp hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp hr	<0.01	0.02
TS6-6	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.003 g/hp-hr	<0.01	<0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS6-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-11	Reboiler #1	512 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS6-12	Reboiler #2	850 MBtu/hr	95.0 lb/MMscf	0.09	0.37	19.95 lb/MMscf	0.02	0.08	0.009 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.04
TS6-13	Fugitives								see application	0.01	0.04						
	***TOTALS			15.6	68.6		41.3	180.9		0.03	0.18		0.01	0.08		0.16	0.62

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS6-4 or TS6-5) at a time.

TABLE 13

VASTAR'S TREATING SITE #7
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS7-1	Waukesha F18-GL	375 hp	2.6 g/hp-hr	2.1	9.4	1.75 g/hp-hr	1.4	6.3	0.013 g/hp-hr	0.01	0.05	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-2	Waukesha F11-GSI	225 hp	8.0 g/hp-hr	3.9	17.4	38.5 g/hp-hr	15.1	66.3	0.004 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.02
TS7-3	Waukesha F817-G	108 hp	7.0 g/hp-hr	1.7	7.3	34.0 g/hp-hr	8.1	35.4	0.005 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS7-4	Waukesha F2895-G	421 hp	7.0 g/hp-hr	6.5	28.4	28.0 g/hp-hr	26	113.8	0.005 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-5	Waukesha F2895-G	421 hp	1.0 g/hp-hr	0.9	4.1	2.0 g/hp-hr	1.9	8.1	0.003 g/hp-hr	<0.01	0.01	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.01	0.04
TS7-6	Waukesha L5790-GSI	1215 hp	1.0 g/hp-hr	2.7	11.7	2.0 g/hp-hr	5.4	23.5	0.003 g/hp-hr	0.01	0.04	0.002 g/hp-hr	<0.01	0.02	0.01 g/hp-hr	0.03	0.12
TS7-7	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-8	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-9	Tank Heater #3	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-10	Tank Heater #4	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-11	Reboiler #2	600 MBtu/hr	95.0 lb/MMscf	0.06	0.26	19.95 lb/MMscf	0.01	0.06	0.02 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS7-12	Fugitives								see application	0.01	0.04						
	*** TOTALS			16	70		56.6	247.4		0.03	0.17		<0.01	0.05		0.11	0.42

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

*** Total rates based on operation of only one water pump engine (TS7-1 or TS7-2) at a time.

TABLE 14

VASTAR'S TREATING SITE #9
BACT PERMITTED EMISSIONS LIMITS

UNIT	UNIT DESCRIPTION	CAPACITY *	EMISSION FACTOR	NOx (pph)	NOx (tpy)	EMISSION FACTOR	CO (pph)	CO (tpy)	EMISSION FACTOR **	VOC (pph)	VOC (tpy)	EMISSION FACTOR	SO2 (pph)	SO2 (tpy)	EMISSION FACTOR	PM10 (pph)	PM10 (tpy)
TS9-1	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-2	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-3	Waukesha F3521-GSI	738 hp	1.0 g/hp-hr	1.6	7.1	2.0 g/hp-hr	3.3	14.3	0.012 g/hp-hr	0.02	0.09	0.002 g/hp-hr	<0.01	0.01	0.01 g/hp-hr	0.02	0.07
TS9-4	Waukesha VRG330	68 hp	7.5 g/hp-hr	1.1	4.9	45.0 g/hp-hr	6.7	29.5	0.032 g/hp-hr	<0.01	0.02	0.002 g/hp-hr	<0.01	<0.01	0.01 g/hp-hr	<0.01	0.01
TS9-5	Tank Heater #1	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-6	Tank Heater #2	500 MBtu/hr	95.0 lb/MMscf	0.05	0.22	19.95 lb/MMscf	0.01	0.05	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	0.01	0.03
TS9-7	Tank Heater #3	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-8	Tank Heater #4	375 MBtu/hr	95.0 lb/MMscf	0.04	0.16	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-9	Reboiler #1	341 MBtu/hr	95.0 lb/MMscf	0.03	0.15	19.95 lb/MMscf	0.01	0.03	0.09 lb/MMscf	<0.01	<0.01	0.57 lb/MMscf	<0.01	<0.01	11.4 lb/MMscf	<0.01	0.02
TS9-10	Fugitives								see application	0.12	0.52						
	TOTALS			6.11	27.11		16.65	72.59		0.18	0.81		<0.01	0.03		0.08	0.34

* Engine ratings are based on the maximum manufacturer's horsepower.

** VOC emission factors shown are adjusted for the fraction of VOC's in the fuel gas.

D. Air Quality Models

The Applicant's air quality analysis is contained in the application addendums dated April 4th, May 3rd, and May 8th of 1996. The Industrial Source Complex Short-Term (ISCST3) model, version 95200, was used by the Applicant to predict the annual and 1-hour averaging period concentrations of NOx and the 1-hour and 8-hour averaging period concentrations of CO for both the surrounding Class II area and the nearby Class I areas. Tables 2-1 and 2-3 of the April 4th application addendum contain the stack parameters and emission rates used in the ISCST3 model. Table 3-1 lists the ISCST3 model options used in the NOx model run.

The ISCST3 model was also used to predict the Class II NO_2 increment consumption and the Class I increment for the Weminuche Wilderness area and the Mesa Verde National Park.

E. Air Quality Analysis

An air quality dispersion modeling analysis was performed to estimate the maximum off-property ground-level concentrations of NO_2 and CO due to point source emissions from Treating Site #9. Instead of performing seven air quality analyses, the Applicant's air quality analysis was performed using only the data from the treating site with the greatest controlled potential emissions of NOx and CO. Treating Site #9 is the site with the highest controlled potential emissions of NOx and CO, and thus was chosen to represent all of the treating sites.

Meteorological data measured at a Southern Ute Indian Tribe meteorological station outside of Ignacio, Colorado for 1994 was used as input for the ISCST3 model. This data was combined with upper air data from Grand Junction, Colorado. Figure 3-1 of the April 4, 1996 application addendum shows a wind rose for this meteorological data.

An annual average ambient NO_2 concentration of 7.008 micrograms per cubic meter (ug/m^3) was used as the background level. This background NO_2 concentration was measured in 1994 at the Ignacio, Colorado weather station. 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 conduct any "pre-construction" monitoring for NO_2. In this case, the Applicant commenced construction, completed construction, and operated the source prior to receipt of the appropriate PSD permits, thus pre-construction monitoring was not possible. However, since the annual average NO_2 concentration background is only one-half of the significant monitoring concentration, no additional monitoring was required.

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 concentration impact, including background concentration, was 26.9 ug/m^3 using the Ozone Limiting Method (OLM).

Modeling results showed that there were no predicted violations of the 40,000 ug/m^3 1-hour NAAQS for CO or the 10,000 ug/m^3 8-hour NAAQS for CO. The maximum 1-hour predicted CO concentration impact was 5671.80 ug/m^3 and the maximum 8-hour predicted CO concentration impact was 2976.65 ug/m^3.

The predicted off-property ground-level concentrations of NO_2 and CO yielded by this air quality analysis represent maximum estimates of off-property, ground-level concentrations surrounding the other six treating sites as well.

F. Ambient Air Increments

The maximum allowable incremental increase in ambient pollutant concentrations that is allowed to occur above a baseline concentration for a given pollutant is defined as the PSD increment. Treating Site #9 is located in a Class II area where the allowable annual PSD increment for NO_2 is 25.0 ug/m^3. The baseline area for NOx is the entire state of Colorado and the minor source baseline date was triggered March 30, 1989. The Applicant predicted a maximum annual Class II NO_2 increment of 19.9 ug/m^3. No PSD increments exist for carbon monoxide for any of the three different classes.

The Class I area impact analysis section (Section I) that follows, contains the Class I increment analysis for the Weminuche Wilderness Area and the Mesa Verde National Park.

G. Source Information

The PSD application submitted on December 13, 1995 and the application addendums, dated April 4, 1996, May 3, 1996, and May 8, 1996 were concluded to be incomplete by EPA Region VIII in a May 17, 1996 letter to Vastar Resources, Inc. The Applicant responded to the incomplete determination by submitting another application addendum, dated June 18, 1996. This addendum contained revised emission estimates for Treating Sites #4, 6, and 7, and a BACT analysis for four different engines ranging in horsepowers from 68 to 225. On June 28, 1996, EPA determined the application to be complete as of the date the last addendum was received (June 20, 1996). 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 of the April 4, 1996 application addendum. The Applicant focused on the impact to growth, local soils and vegetation, and visibility that resulted from the construction of the seven treating sites. One conclusion from the analysis was that the construction of the treating sites did not result in a growth of the workforce in nearby communities or a growth in industrial and commercial development.

The construction and operation of the seven sites showed no impact on the local soils and vegetation during the years the sites were operated without BACT. The installation of BACT and reduction in emissions will only negate any unforeseen impacts to the soils and vegetation.

Visibility impairments are caused by emissions of nitrogen oxides, particulates, primary nitrogen dioxide, soot, and primary sulfate. The impact area for NO_2 extends no more than 2.2 kilometers from Treating Site #9. There are no airports, scenic vistas, or national forests located in the impact area to justify a detailed visibility analysis for the Class II area. The NOx emissions from Treating Site #9 have been reduced by approximately 117 TPY upon the application of BACT. There has been no visibility degradation in the impact area since the start up of the source, thus a decrease in emissions will reduce the impact on any potential visibility impairment. Emissions from the remaining six sites have also been reduced, thus further reducing any potential visibility impairment for the area.

I. Class I Area Impact Analysis

EPA is required under 40 CFR §52.21(p) to provide written notice to the Federal Land Manager (FLM) concerning any permit application for a proposed major stationary source or major modification, in which the emissions "may affect" a Class I area. EPA policy has interpreted "may affect" to include at least all major sources or major modifications which propose to locate within 100 km of a Class I area. The Applicant is required to conduct an analysis of the emissions impact on the Class I air quality related values (AQRV's) and the Class I increments. Class I AQRV's include visibility, flora, fauna, water, soil, odor, and cultural/archeological resources. Sources located more than 100 km from a Class I area may also be required

to conduct these analyses if the FLM is concerned about potential emission impacts from these sources.

The Class I areas within 100 km of the Applicant's treating sites are the Mesa Verde National Park (36.8 km) and the Weminuche Wilderness Area (43 km). The National Park Service is the FLM for the Mesa Verde National Park and the U.S. Forest Service is the FLM for the Weminuche Wilderness Area.

A copy of the Vastar PSD permit application and air quality analysis for Treating Site #9 was sent on May 17, 1996 to the Permit Review Branch of the National Park Service in Denver, Colorado and the Rocky Mountain Region of the U.S. Forest Service in Lakewood, Colorado. A June 17, 1996 letter from the U.S. Forest Service confirmed that **controlled** (installed w/BACT) emissions from the treating sites will not have adverse impacts on the AQRV's in the Weminuche wilderness. A June 17, 1996 telephone conversation with Ms. Cathy Rhodes of the National Park Service also confirmed that the AQRV's of the Mesa Verde National Park should not be affected by the **controlled** treating sites emissions.

As was done for the air quality analysis, emissions data from Treating Site #9 were used by the Applicant to determine the amount of NOx increment consumed in the Class I areas. The annual Class I increment for NOx is 2.5 ug/m^3. (As stated earlier, no Class I increments exist for CO.) The maximum predicted annual average NO_2 concentration (based on the Ozone Limiting Method) from Treating Site #9 is 0.0028 ug/m^3 and 0.0038 ug/m^3 for the Weminuche Wilderness Area and Mesa Verde National Park, respectively. The predicted NO_2 impacts are well below the Class I increment.

Maximum predicted 1-hour average CO concentrations were 3.47 ug/m^3 and 24.3 ug/m^3 respectively, for the Weminuche Wilderness and Mesa Verde Park. The maximum predicted 8-hour average CO concentrations were 0.67 ug/m^3 and 3.04 ug/m^3 for the Weminuche Wilderness and Mesa Verde Park, respectively.

A visibility analysis was done using Level I of the VISCREEN model. VISCREEN is a conservative screening model used to evaluate the visual impact from pollutant plumes of particulate, nitrogen oxides, soot, primary nitrogen dioxide, and primary sulfate. The maximum short-term emission rates of particulate and nitrogen oxides for all sources at Treating Site #9 were used in the VISCREEN model to provide a worst-case estimate of visibility impairment from each of the seven treating sites. Tables 6-2 and 6-3 of the April 4, 1996 application addendum show the maximum visual impacts inside the Class I area and outside the Class I area. Adverse visibility impairment is not expected in either of the Class I areas, because the predicted maximum visual impacts are below the two screening criteria.

J. Public Participation

The application, analysis, and proposed permit were made available for public inspection at the EPA Regional Office in Denver, Colorado, the Southern Ute Indian Tribe's Environmental Programs Office in Ignacio, Colorado, and the La Plata County Clerk's Office in Durango, Colorado. Public notices were published in the Durango Herald and the Southern Ute Drum on April 11, 1997, giving opportunity for public comment on our proposed action and the opportunity to request a public hearing.

EPA received comments from Vastar Resources, Inc. concerning enforcement discretion issues, testing requirements for the Waukesha VRG 330 engines, and several commence construction issues. These comments have been addressed in the final permits and/or EPA's response to comments in Appendix I.

TABLE II.

EMISSION INVENTORY DATA ELEMENTS

1) Year of record for emissions
2) Plant name
3) Plant location/street address
4) City, State, and zip code
5) Plant latitude
6) Plant longitude
7) UTM description (section, township, range)
8) Primary SIC code
9) SCC number
10) Principal product
11) Plant contact and telephone number
12) Estimated hours of operation per year of each point source
13) Estimated amount of fuel consumed by each point source
14) Stack height (ft) of each point source
15) Stack diameter (ft) of each point source
16) Temperatures of exit gases (degrees F) from engine stacks
17) Exhaust gas flow rate (ACFM) from each engine stack
18) Exit gas velocity (ft/sec) from each engine stack
19) CAS code for each pollutant
20) Measured emissions (lbs/day and TPY) for each point source that is tested
21) Calculated emissions (lbs/day and TPY) for each point source not tested
22) Emission factors used to calculate emissions
23) Permit emission limits (lbs/day and TPY) for each point source
24) Point source design capacity (i.e. engine brake horsepower and burner Btu rating)
25) Actual average point source capacity operation (i.e. engine's derated brake horsepower)
26) Type of control device and its efficiency for each point source (if applicable)
27) Hours of uncontrolled operation of engines due to engine replacement/overhaul