Protox

Protox Inc.
14120 - 23rd Avenue North
Minneapolis, Minnesota 55447
(612) 557-1292

June 20, 1989

RECEIVED
JUN 26 1989
DER - BAQM

Mr. Willard Hanks
Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Fl 32301

Dear Mr. Hanks:

Enclosed is our application to construct an air pollution source and a check for $200 to cover the application fee.

If you have any questions, please contact Dr. Robert Wills, Manager of Process Engineering or me.

Sincerely,

James K. Poucher

James K. Poucher, P.E.
President

JKP:ds

enclosures

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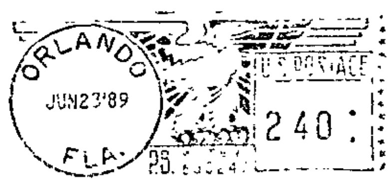
DER - MAIL ROOM
1989 JUN 26 PM 1:58



GENCOR INDUSTRIES, INC.
5201 N. ORANGE BLOSSOM TRAIL
ORLANDO, FLORIDA 32810

TO:

MR. WILLARD HANKS
BUREAU OF AIR QUALITY MANAGEMENT
FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

1757

PROTOX INC.
14120 - 23RD AVENUE, NORTH
MINNEAPOLIS, MN 55447

RIVERSIDE BANK
MINNESOTA CENTER OFFICE
BLOOMINGTON, MN 55435
17-127/910

Two Hundred dollars and NO cents

DATE	AMOUNT
6/20/89	**$200.00**

PAY TO THE ORDER OF: Department of Environmental Regulation

⑈001757⑈ ⑆091001270⑆ 150 228 0⑈

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Enclosed is our application to construct an air pollution source and a check for $200 to cover the application fee.

If you have any questions, please contact Dr. Robert Wills, Manager of Process Engineering or me.

Sincerely,

James K. Poucher, P.E.
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1031

PROTOX INC.

1757

	INVOICE NO.	DATE	AMOUNT	DISCOUNT	NET AMT.
Department of Environmental Regulation		6/20/89			$200.00

DATE

CHECK NUMBER

Application fee

Protox PROTOX INC.
14120 23RD AVENUE, NORTH
MINNEAPOLIS, MN 55447

RIVERSIDE BANK
MINNESOTA CENTER OFFICE
BLOOMINGTON, MN 55435
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Department of Environmental
Regulation

⑈001757⑈ ⑆091001270⑆ 150 228 0⑈

PROTOX INC.

1757

	INVOICE NO.	DATE	AMOUNT	DISCOUNT	NET AMT.
Department of Environmental Regulation		6/20/89			$200.00

DATE

CHECK NUMBER

Application fee

$200 pd.
6-26-89
Recpt:#117633

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AC 48-166670

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Soil Treater [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [x] Construction [ ] Operation [ ] Modification

COMPANY NAME: Protox Inc. COUNTY: Hennepin

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Thermal Soil Desorber

SOURCE LOCATION: Street Mobile City ______

UTM: East ______ North ______

Latitude ___° ___' ___"N Longitude ___° ___' ___"W

APPLICANT NAME AND TITLE: James K. Poucher, P.E., President

APPLICANT ADDRESS: 14120 23rd Avenue North, Minneapolis, MN 55447

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Protox Thermal Desorber

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: James K. Poucher

James K. Poucher, P.E., President
Name and Title (Please Type)

Date: 5/26/89 Telephone No. (612) 557-1292

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed [signature]

David F. Brashears
Name (Please Type)

General Combustion Corporation
Company Name (Please Type)

5201 North Orange Blossom Trail, Orlando, FL
Mailing Address (Please Type)

Florida Registration No. 30038 Date: JUNE 8, 1989 Telephone No. (407) 290-6000

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

SEE ATTACHED

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction May 1, 1989 Completion of Construction June 30, 1989

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Afterburner - $83,270

Baghouse - $87,995

Knock-out - $5,700

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

NONE

6. General Description

Protox Inc. is a turnkey remedial action contractor providing engineering design and field services related to investigating and remediating releases of petroleum and hazardous substances in the environment. Protox provides field investigative services to obtain site data for clients, engineering services to develop remedial alternatives and detailed designs, and site remediation services. The company's primary strength is its extensive experience in remedial planning, site cleanup and varied treatment technologies. Environmental services are the company's only business.

DESCRIPTION OF EQUIPMENT

The Protox Thermal Desorption system is a simple process whereby organics on soils are thermally desorbed in a rotating chamber fired by a propane burner. Equipment associated with this heater are the load-in conveyor, load-out conveyor and a variety of air quality control equipment. As seen on the accompanying diagram, soils are taken by a front-end loader and placed into a hopper where they are sifted and broken into a size acceptable for processing. Next, these materials are conveyed up a 6 foot belt to a hopper on top of the primary treatment unit.

The primary treatment unit consists of a rotating drum that is 5 foot 4 inches in diameter and 20 feet long. It is made of a high-alloy carbon steel with internal flights to provide efficient showering of the materials in front of the burner flame. The burner on the unit is 25 million BTU/hour.

The bulk of the treated materials exit the primary combustor via an air lock assembly beneath the primary treatment unit. The treated materials are conveyed via a screw conveyor. This conveyance is versatile and can be used to create a clean soil pile or can be configured so that it will load out directly into end-dump trucks.

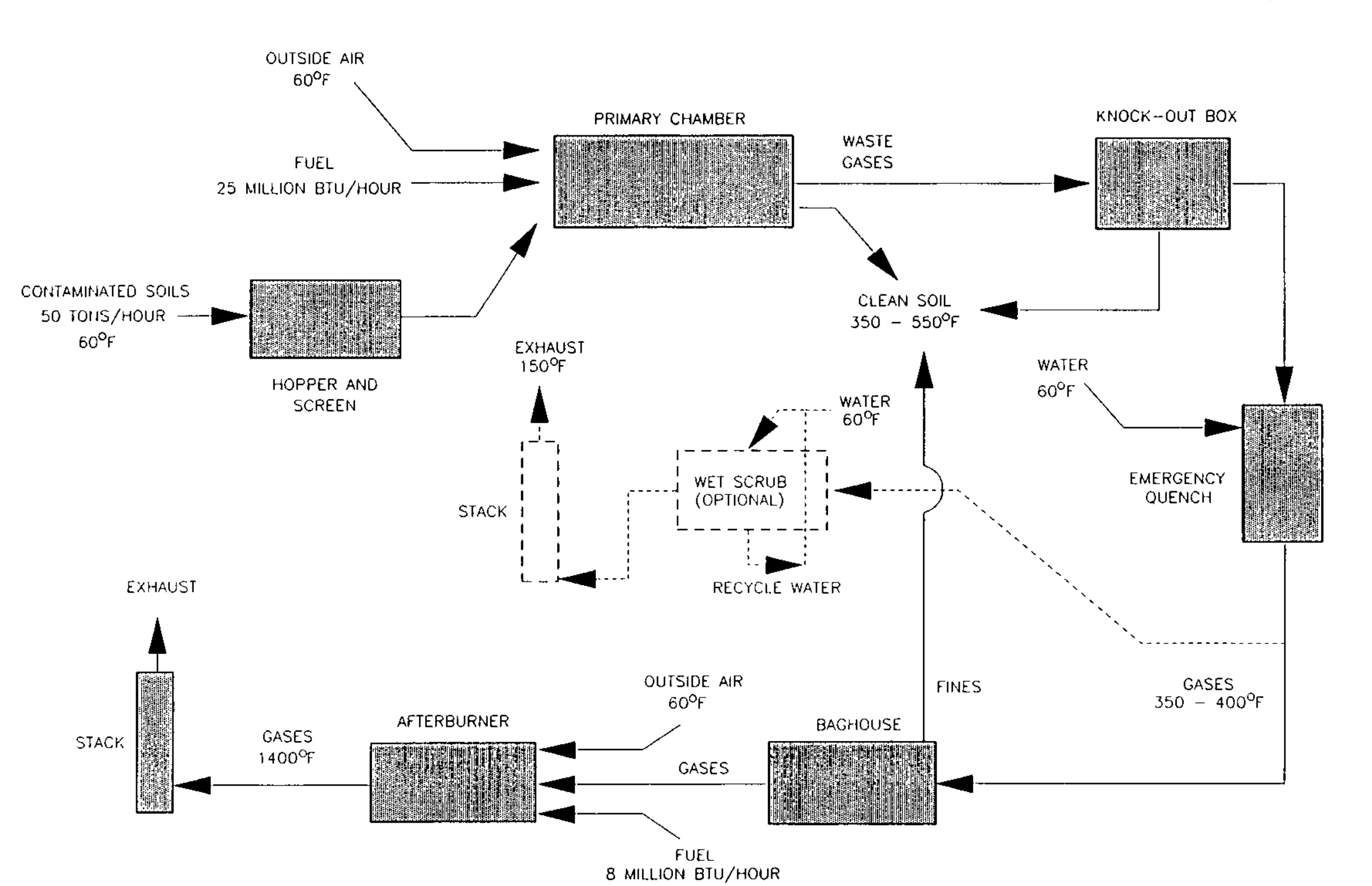
The exhaust gases from the primary treatment unit (see attached) are conveyed to a 400 ft^3 Knockout Box. A drag slat/screw conveyor at the bottom of the Knockout Box allow the large particulates to be deposited with the clean soils. From the Knockout Box, the hot gases are conveyed through a quench unit which is incorporated into the duct work to the baghouse. The quench keeps the temperature down in the hot gases coming from the Knockout. No waste water is created in this unit as all of the water entering is evaporated.

In the present Protox configuration, the gases going from the quench chamber would enter the baghouse (see attached). The baghouse is approximately 12 feet x 16 feet x 8.5 feet. The baghouse has 7-foot bags providing 2260 square feet of filter area. The baghouse is equipped with a 11500 ACFM ID fan. Normal operational conditions would allow approximately 9500 ACFM through the baghouse giving an air to cloth ratio of 4.2. The bags are of Nomex and the cleaning system is the pulse jet style. Gencor, the baghouse manufacturer, guarantees less than 0.04 gr/dscf in the exhaust gases from the baghouse.

Dust collected in the baghouse is removed through an augering system, moving through a rotary airlock. These fines from the baghouse are incorporated back into the clean soil that was conveyed out of the primary treatment unit.

From the baghouse the exhaust gases pass through the afterburner. The afterburner is a six-foot diameter, 30 foot long chamber that is capable of heating the hot exhaust gases to a temperature of $1400^{O}F$ with a residence time of 0.50 seconds. The burner is rated at 8 million BTU/hour. As this afterburner is vertical it also serves as the stack. The top of the afterburner is 34 feet from ground level.

As part of an optional configuration a wet scrubber can be used. This unit would accept gases from the quench chamber and exhaust through its own stack.



Protox

14120 - 23rd Avenue North
Minneapolis, Minnesota 55447
(612) 557-1292

PROTOX THERMAL DESORBER

FLOW DIAGRAM

CLIENT:			
LOCATION:			
DATE:	5/8/89	DRAWN BY:	DJF
PROPOSAL:	EQUIPMENT	CHECKED BY:	RAW

GENCOR INDUSTRIES INC.
5201 N. Orange Blossom Trail • Orlando, Florida 32810
(407)290-6000 • TELEX GENCO 56-4454

May 11, 1989

Dr. Bob Wills
Protox, Inc.
14120 23rd. Avenue N.
Minneapolis, MN 55447

Reference: Proposal 13119 - Revised, May 11, 1989

Dear Dr. Wills:

We are pleased to quote, on your inquiry, one soil remediation unit designed to process soil contaminated by non-recycled distillate oil products to remove these oil products from the soil.

The unit is not an incinerator, but will cause rapid evaporation or destruction of the distillates, leaving a soil at the discharge of the machine, having a total concentration of less than 30 ppb each of benzene, toluene, and xylene when operated in accordance with the operating instructions.

Exhaust gas emissions will be at a rate up to 11,500 CFM, with particulate emissions of less than .04 grains per dscf. The unit will be similar to our drawing CM17766A, except as further delineated in this proposal.

More specifically, the unit will consist of:

A. Drum dryer - 64' x 20' long, high strength steel drum with 6" x 2" riding rings and heat treated trunnion rollers. The drum is trunnion driven by an electric motor. The drum is complete with flights, including patented General Combustion designs.

B. Genco Astraflame 15 light oil/LP fired burner.

C. Sound shield sound suppression unit for burner system

D. Genco Genie dryer/burner electronic control system.

E. Pulse jet baghouse with 2,260 square feet of cloth area (Nomex bags).

F. Five ton feed hopper with feeder conveyor and variable speed to convey material to drum.

G. Five HP air compressor to provide high pressure air for fuel atomization and air actuators on gates.

H. Discharge screw conveyor to carry material away from the machine, up to 12 feet. Screw connected to one side of "pant leg" discharge so that it can be bypassed for larger materials and tonnages.

I. Weigh scale on feed conveyor with totalizer.

J. Water spray system to minimize dust from discharge.

K. Fuel oil pump.

L. Fuel oil tank, 250 gallon.

M. Automatic exhaust damper draft control system.

E. Requested permitted equipment operating time: hrs/day 8 ; days/wk 5 ; wks/yr 20 ;

if power plant, hrs/yr ____ ; if seasonal, describe: Not Seasonal

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? yes

   a. If yes, has "offset" been applied? no

   b. If yes, has "Lowest Achievable Emission Rate" been applied? no

   c. If yes, list non-attainment pollutants. Potential particulate, Ozone

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. no

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. no

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? no

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? no

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? yes

   a. If yes, for what pollutants? Particulates .03g/dscf

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

F.1.a Exempt as per 17-2.510 (2)(b) and 17-2.510(3)(a) and (b)
F.1.b Exempt as per 17-2.510 (2)(b) and 17-2.510 (3)(a) and (b)

F.2 Not over 100 tons per year.

F.3 Exempt as per 17-2.500 (2)(b)1.

H Exempt as per { VOC- 17-2.650 (1)(c)1.
part.- 17-2.650 (2)(b)1. }

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
N/A				

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 20,000 - 100,000

2. Product Weight (lbs/hr): 18,400 - 92,000

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Particulates	3.94	1.6	.03 gr/dscf	2.96	5.12×10^6	2560	
NOX	3.08	1.2	N/A	N/A	3.08	1.2	
VOC	2.44	0.98	Exempt	-----	3.21×10^4	16	

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard.

[4] Emission, if source operated without control (See Section V, Item 3).

Section III C - Emissions (Particulates)

As per the manufacturers attached statement.

$$\frac{11500\ ft^3}{min} \cdot \frac{0.04\ gr}{dscf} \cdot \frac{1.429 \times 10^{-4}\ lb}{gr} \cdot \frac{60\ min}{Hr} = \frac{3.94\ lb}{Hr}$$

(Intentionally set high)

$$\frac{3.94\ lb}{Hr} \cdot \frac{800\ Hr}{yr} \cdot \frac{Ton}{2000\ lb} = 1.58\ \frac{Ton}{yr}$$

Section III C - Potential Emissions (Particulates)

Under particulates there are two sources. One is from the fuel (Number 2 fuel oil) used to fire the dryer. The other are the fines from processing the soils. These fines vary from site to site. An estimate of 8 percent (wt) of the process mass would be fines which would be fugitive if the Air Quality Control equipment was <u>not</u> used. Therefore potential emissions are:

$$\frac{40\ \text{Ton Soil}}{\text{Hr}} \left| \frac{8\ \text{lb Fines}}{100\ \text{lb Soil}} \right| \frac{2000\ \text{lb}}{\text{Ton}} \left| \frac{800\ \text{Hr}}{\text{yr}} \right. = 5.12 \times 10^6\ \frac{\text{lb}}{\text{yr}}$$

$$\frac{6400\ \text{lb}}{\text{Hr}} \left| \frac{800\ \text{Hr}}{\text{yr}} \right| \frac{\text{Ton}}{2000\ \text{lb}} = 2560\ \frac{\text{T}}{\text{yr}}$$

The particulates from the fuel source are several orders of magnitude smaller than the above and are neglected.

Section III C - Containment (NO_x)

There are three sources of fuel that could create NO_x's in this dual combustion process. The first is from the burning of Number 2 diesel fuel for heating in the dryer. As per AP42 Table 1.3-1 using the Industrial Boilers category and Distillate Oil, the NO emission factor is 20 lb/1000 gallon. Our computer prediction of fuel needs for 40T/Hr of soil with 5 percent moisture is 99.6 gallon/Hr of Number 2 fuel oil (dryer only) and 78.8 gallon/Hr of propane (afterburner only). The second source, the contaminants in the soil are assumed to be virgin petroleum (gasoline and Number 2 fuel oil) at 100-500 ppm. The quantity of potential Number 2 fuel oil as a contaminant is:

$$\frac{40\ \text{T}}{\text{Hr}} \cdot \frac{500\ \text{lb \#2}}{10^6\ \text{lb Soil}} \cdot \frac{2000\ \text{lb}}{\text{T}} \cdot \frac{\text{gal}}{7.21\ \text{lb}} = 5.5\ \frac{\text{gal}}{\text{Hr}}$$

This number is added to the combustion fuel for computation:

$$\frac{(99.6 + 5.5)\ \text{gal}}{\text{Hr}} \cdot \frac{20\ \text{lb NO}}{1000\ \text{gal \#2}} = 2.1\ \frac{\text{lb}}{\text{Hr}}\ \text{NO}$$

$$\frac{2.1\ \text{lb}}{\text{Hr}} \cdot \frac{800\ \text{Hr}}{\text{yr}} \cdot \frac{\text{T}}{2000\ \text{lb}} = 0.84\ \text{T/yr}$$

The third source is the NO_x for propane, as per AP42 Table 1.5-1, using Industrial Propane, is 12.4 lb NO_x from this source is:

$$\frac{78.8\ \text{gal}}{\text{Hr}} \cdot \frac{12.4\ \text{lb } NO_x}{1000\ \text{gal}} = 0.98\ \frac{\text{lb}}{\text{Hr}}\ NO_x$$

$$\frac{0.98\ \text{lb}}{\text{Hr}} \cdot \frac{800\ \text{Hr}}{\text{yr}} \cdot \frac{\text{T}}{2000\ \text{lb}} = 0.39\ \frac{\text{T}}{\text{yr}}\ NO_x$$

So totals are $(0.98 + 2.1)\ \frac{\text{lb}}{\text{Hr}} = 3.08$ lb/Hr

and (0.84 + 0.39) T/yr = 1.2 T/yr

Section III C - VOC Emissions

Assuming that the afterburner is 94% efficient then the VOC emissions would be:

$$\frac{(40 + 0.025)\ \text{lb \#2 VOC's}}{\text{Hr}} \;\Big|\; 1-0.94 = 2.4\ \frac{\text{lb}}{\text{Hr}}$$

$$\frac{2.4\ \text{lb}}{\text{Hr}}\ \text{\#2 VOC's} + \frac{0.041\ \text{lb}}{\text{Hr}}\ \text{Propane VOC's} = \frac{2.44\ \text{lb}}{\text{Hr}}\ \text{VOC}$$

$$\frac{(16 + 0.01)\text{T \#2 VOC}}{\text{yr}} \;\Big|\; 1-0.94 = 0.96\ \text{T/yr}$$

$$0.96\ \frac{\text{T}}{\text{yr}}\ \text{\#2} + \frac{0.016\text{T}}{\text{yr}}\ \text{Propane} = 0.98\ \frac{\text{T}}{\text{yr}}$$

See previous page for calculations

Section III C - Contaminant (VOC) Potential Emissions

There are two sources of fuel that could create VOC's. For these calculations it will be assumed that all the Number 2 fuel oil in the soil is volatilized and not burned (worst case) in the dryer. The dryer burner uses Number 2 fuel oil at 99.6 gal/Hr. The afterburner uses propane at a rate of 78.8 gal/Hr. For the Number 2 fuel oil AP42 Table 1.3-1 lists the VOC emission as 0.2 lb per 1000 gallon (non-methane) and 0.052 lb/1000 gallon (methane). Therefore:

$$\frac{(0.2 + 0.052)\ \text{lb VOC}}{1000\ \text{gal \#2}} \,\Big|\, \frac{99.6\ \text{gal \#2}}{\text{Hr}} = 0.025\ \frac{\text{lb}}{\text{Hr}}$$

$$\frac{0.025\ \text{lb}}{\text{Hr}} \,\Big|\, \frac{800\ \text{Hr}}{\text{yr}} \,\Big|\, \frac{\text{T}}{2000\ \text{lb}} = 0.01\ \frac{\text{T}}{\text{yr}}$$

From AP42 Table 1.5-1 the VOC emission rates are 0.25 lb/1000 gal of propane (non-methane) and 0.27 lb/1000 gal of propane (methane).

$$\frac{(0.25 + 0.27)\ \text{lb VOC}}{1000\ \text{gal Propane}} \,\Big|\, \frac{78.8\ \text{gal}}{\text{Hr}} = 0.041\ \frac{\text{lb VOC}}{\text{Hr}}$$

$$\frac{0.041\ \text{lb VOC}}{\text{Hr}} \,\Big|\, \frac{800\ \text{Hr}}{\text{yr}} \,\Big|\, \frac{\text{Ton}}{2000\ \text{lb}} = 0.016\ \frac{\text{T}}{\text{yr}}$$

The VOC potential for 500 ppm of Number 2 fuel oil is:

$$\frac{40\ \text{T}}{\text{Hr}} \,\Big|\, \frac{2000\ \text{lb}}{\text{T}} \,\Big|\, \frac{500\ \text{lb \#2}}{10^6\ \text{lb soil}} = \frac{40\ \text{lb}}{\text{Hr}}$$

$$\frac{40\ \text{lb}}{\text{Hr}} \,\Big|\, \frac{800\ \text{hr}}{\text{yr}} \,\Big|\, \frac{\text{T}}{2000\ \text{lb}} = 16\ \frac{\text{T}}{\text{yr}}$$

So total potential VOC's are:

0.025 lb/Hr	0.01 T/yr
0.041	0.016
40.0	16.0
40.066 lb/Hr	16.026 T/yr

$$\frac{40.066\ \text{lb}}{\text{Hr}} \,\Big|\, \frac{800\ \text{Hr}}{\text{yr}} = 3.2 \times 10^4$$

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Settling Chamber	particulates	50% (wt)	> 50	Est/design
Cloth Bag Filter	particulates	99% (wt)	> 0.3	Est/design
Afterburner	organics	92%	N/A	Estimated

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Primary #2 Fuel Oil	99.6 gal	161.9 gal	22.1
Afterburner Propane	78.8 gal	128 gal	11.0

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: P - Propane No2 - Number 2 Fuel Oil

Percent Sulfur: P-O; No2 - less than 0.5 Percent Ash: P-O; No2 - less than 0.1

Density: P - 4.24; No2 - 7.21 lbs/gal Typical Percent Nitrogen: P-0; No2 less than0.0

Heat Content: P-20,251; No2-16,960 BTU/lb P - 86,000; No2 - 136,500 BTU/gal

Other Fuel Contaminants (which may cause air pollution): None

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N/A Maximum

G. Indicate liquid or solid wastes generated and method of disposal.

None

NOTE: The afterburner doubles as the stack.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 34 ft. Stack Diameter: 6 ft.

Gas Flow Rate: 24,200 ACFM 4867 DSCFM Gas Exit Temperature: 1400 °F.

Water Vapor Content: 29.5 (vol) % Velocity: 18.6 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated	N/A						
Uncon-trolled (lbs/hr)							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber					
Secondary Chamber					

Stack Height: ______ ft. Stack Diamter: ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity: ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) ______

Brief description of operating characteristics of control devices: ____________________

____

____

____

____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

____

____

____

____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [X] No

Contaminant	Rate or Concentration
N/A	

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration
N/A	

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
N/A	

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

Section V (attachment)

1. Anticipated Input Rate: 40 Tons/Hr containing, 5 percent moisture, 100-500 ppm contaminants.

   Product Weight: 38 Tons/Hr containing, 0 percent moisture, <0.1 ppm contaminants.

   (In normal operations water would be added to the clean soils loading out, to suppress dust.)

2. The basis for the calculations made in Section III concerning the unit are as follows:

   Materials into the processing unit:
   Silty-sandy soils, 40 Tons/Hr
   5 percent moisture content
   500 ppm contamination by Number 2 fuel oil

   Burner fuel for dryer - Number 2 fuel oil
   with a Ht of combustion of 136,500 BTU/gal
   Excess air is approximately 25 percent

   Maximum air flow is 11,500 cfm or

$$\frac{11{,}500\ \text{ft}^3}{\text{min}} \times 1\ \text{atm} \times \frac{1}{(350 + 460)\,^{\circ}\text{R}} \times \frac{\text{lb}\cdot\text{mol}\ ^{\circ}\text{R}}{0.7302\ \text{ft}^3\cdot\text{atm}} \times \frac{60\ \text{min}}{\text{Hr}} \times \frac{28.9\ \text{lb}}{\text{lb}\cdot\text{mol}} = \frac{33{,}715\ \text{lb}}{\text{Hr}}$$

The properties of the Number 2 fuel oil and the propane were taken from Chemical Engineers Handbook by Perry and Chilton, 5th Edition.

Emissions estimates were per AP42 as given in Volume 1 and Supplement A. Tables 1.3-1 and 1.5-1 were used (see attached copies).

The dryer and afterburner were treated as Industrial Boilers using Distillate Oil or Propane. Calculations for emissions both potential (uncontrolled) and estimated real are given in Section III.

Section V

Proposed testing and analytical methods to be used are given below along with methods for potential, but thus far, unspecified testing:

Particulates - 40CFR60, Appendix A, Method 5D, p. 611-615. A water cooled probe would be necessary.

NO_x - 40CFR60, Appendix A, Method 7, p. 667-673 (stationary source). Should the DER deem this method inappropriate Method 7E (Instrumental Analyzer Procedure) could be substituted.

VOC - 40CFR60, Appendix A, Method 18, p. 823-852. (Measurement by GC).

Stack Gas Velocity - 40CFR60, Appendix A, Method 2, p. 544-561 (pitot tube).

If needed:

CO_2, O_2, XS Air, Dry Mole. Wt. Analysis - Method 3

Stack Gas Moisture - Method 4

SO_2 Emissions - Method 6

Capacity - Method 9; Alternate Method 17

CO - Method 10

Inorganic Lead - Method 12

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ____________ no. sites ____________ TSP ____________ ( ) SO^2* ____________ Wind spd/dir

Period of Monitoring ____ / ____ / ____ to ____ / ____ / ____
month day year month day year

Other data recorded ______________________________

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)__________

3. Upper air (mixing height) data obtained from (location)__________

4. Stability wind rose (STAR) data obtained from (location)__________

C. Computer Models Used

1. __________ Modified? If yes, attach description.

2. __________ Modified? If yes, attach description.

3. __________ Modified? If yes, attach description.

4. __________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	__________ grams/sec
SO^2	__________ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

TABLE 1.3-1. UNCONTROLLED EMISSION FACTORS FOR FUEL OIL COMBUSTION

EMISSION FACTOR RATING: A

Boiler Type[a]	Particulate Matter[b]		Sulfur Dioxide[c]		Sulfur Trioxide		Carbon Monoxide[d]		Nitrogen Oxide[e]		Volatile Organics[f] Nonmethane		Volatile Organics[f] Methane	
	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$
Utility Boilers														
Residual Oil	[g]	[g]	19S	157S	0.34S[h]	2.9S[h]	0.6	5	8.0 (12.6)(5)[i]	67 (105)(42)[i]	0.09	0.76	0.03	0.28
Industrial Boilers														
Residual Oil	[g]	[g]	19S	157S	0.24S	2S	0.6	5	6.6[j]	55[j]	0.034	0.28	0.12	1.0
Distillate Oil	0.24	2	17S	142S	0.24S	2S	0.6	5	2.4	20	0.024	0.2	0.006	0.052
Commercial Boilers														
Residual Oil	[g]	[g]	19S	157S	0.24S	2S	0.6	5	6.6	55	0.14	1.13	0.057	0.475
Distillate Oil	0.24	2	17S	142S	0.24S	2S	0.6	5	2.4	20	0.04	0.34	0.026	0.216
Residential Furnaces														
Distillate Oil	0.3	2.5	17S	142S	0.24S	2S	0.6	5	2.2	18	0.085	0.713	0.214	1.78

[a] Boilers can be approximately classified according to their gross (higher) heat rate as shown below:
- Utility (power plant) boilers: >106 x 10^9 J/hr (>100 x 10^6 Btu/hr)
- Industrial boilers: 10.6 x 10^9 to 106 x 10^9 J/hr (10 x 10^6 to 100 x 10^6 Btu/hr)
- Commercial boilers: 0.5 x 10^9 to 10.6 x 10^9 J/hr (0.5 x 10^6 to 10 x 10^6 Btu/hr)
- Residential furnaces: <0.5 x 10^9 J/hr (<0.5 x 10^6 Btu/hr)

[b] References 3-7 and 24-25. Particulate matter is defined in this section as that material collected by EPA Method 5 (front half catch).

[c] References 1-5. S indicates that the weight % of sulfur in the oil should be multiplied by the value given.

[d] References 3-5 and 8-10. Carbon monoxide emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.

[e] Expressed as NO_2. References 1-5, 8-11, 17 and 26. Test results indicate that at least 95% by weight of NO_x is NO for all boiler types except residential furnaces, where about 75% is NO.

[f] References 18-21. Volatile organic compound emissions are generally negligible unless boiler is improperly operated or not well maintained, in which case emissions may increase by several orders of magnitude.

[g] Particulate emission factors for residual oil combustion are, on average, a function of fuel oil grade and sulfur content:
- Grade 6 oil: 1.25(S) + 0.38 kg/10^3 liter [10(S) + 3 lb/10^3 gal] where S is the weight % of sulfur in the oil. This relationship is based on 81 individual tests and has a correlation coefficient of 0.65.
- Grade 5 oil: 1.25 kg/10^3 liter (10 lb/10^3 gal)
- Grade 4 oil: 0.88 kg/10^3 liter (7 lb/10^3 gal)

[h] Reference 25.

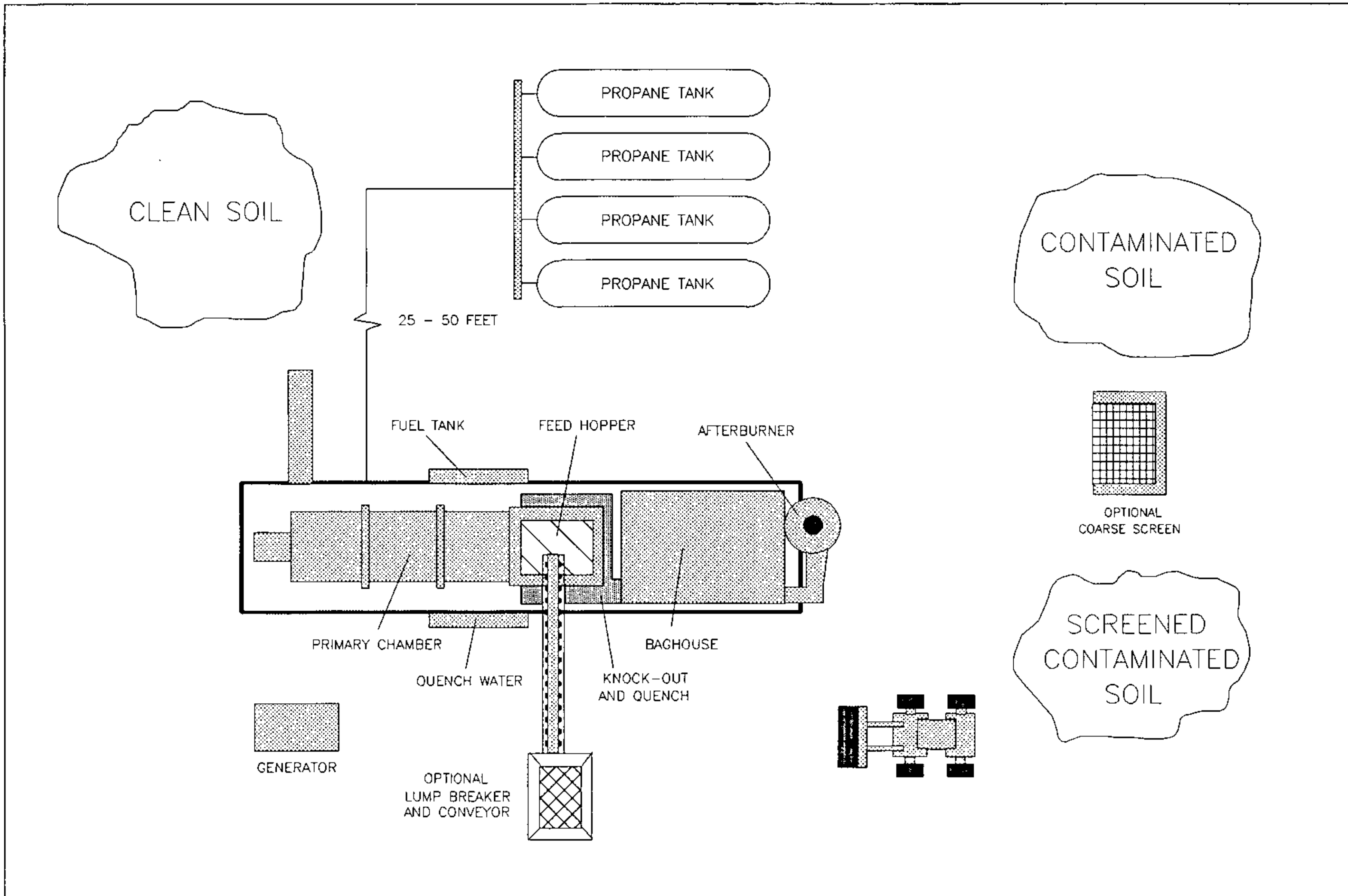
[i] Use 5 kg/10^3 liters (42 lb/10^3 gal) for tangentially fired boilers, 12.6 kg/10^3 liters (105 lb/10^3gal) for vertical fired boilers, and 8.0 kg/10^3 liters (67 lb/10^3 gal) for all others, at full load and normal (>15%) excess air. Several combustion modifications can be employed for NO_x reduction: (1) limited excess air can reduce NO_x emissions 5-20%, (2) staged combustion 20-40%, (3) using low NO_x burners 20-50%, and (4) ammonia injection can reduce NO_x emissions 40-70% but may increase emissions of ammonia. Combinations of these modifications have been employed for further reductions in certain boilers. See Reference 23 for a discussion of these and other NO_x reducing techniques and their operational and environmental impacts.

[j] Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are strongly related to fuel nitrogen content, estimated more accurately by the empirical relationship:
kg $NO_2/10^3$ liters = 2.75 + $50(N)^2$ [lb $NO_2/10^3$gal = 22 + $400(N)^2$] where N is the weight % of nitrogen in the oil. For residual oils having high (>0.5 weight %) nitrogen content, use 15 kg $NO_2/10^3$ liter (120 lb $NO_2/10^3$gal) as an emission factor.

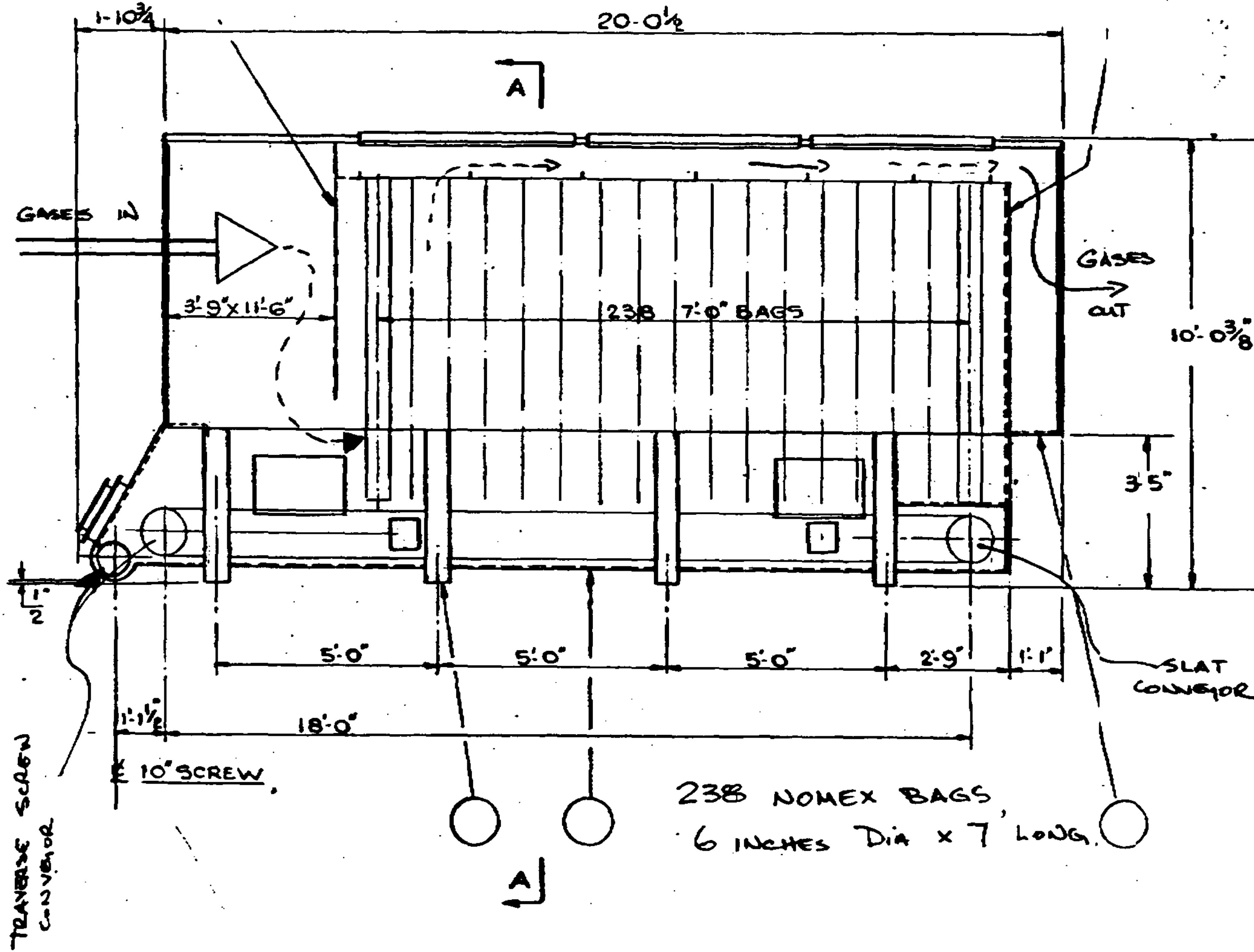
TABLE 1.5-1. EMISSION FACTORS FOR LPG COMBUSTION[a]
EMISSION FACTOR RATING: C

Furnace Type and Fuel	Particulates		Sulfur Oxides[b]		Nitrogen Oxides[c]		Carbon Monoxide		Volatile Organics: Nonmethane		Volatile Organics: Methane	
	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$
Industrial												
Butane	0.01-0.06	0.10-0.47	0.01S	0.09S	1.58	13.2	0.4	3.3	0.03	0.26	0.03	0.28
Propane	0.01-0.05	0.09-0.44	0.01S	0.09S	1.49	12.4	0.37	3.1	0.03	0.25	0.03	0.27
Domestic/commercial												
Butane	0.01-0.06	0.10-0.47	0.01S	0.09S	1.13	9.4	0.23	1.9	0.06	0.5	0.03	0.25
Propane	0.01-0.05	0.09-0.44	0.01S	0.09S	1.05	8.8	0.22	1.8	0.06	0.47	0.03	0.24

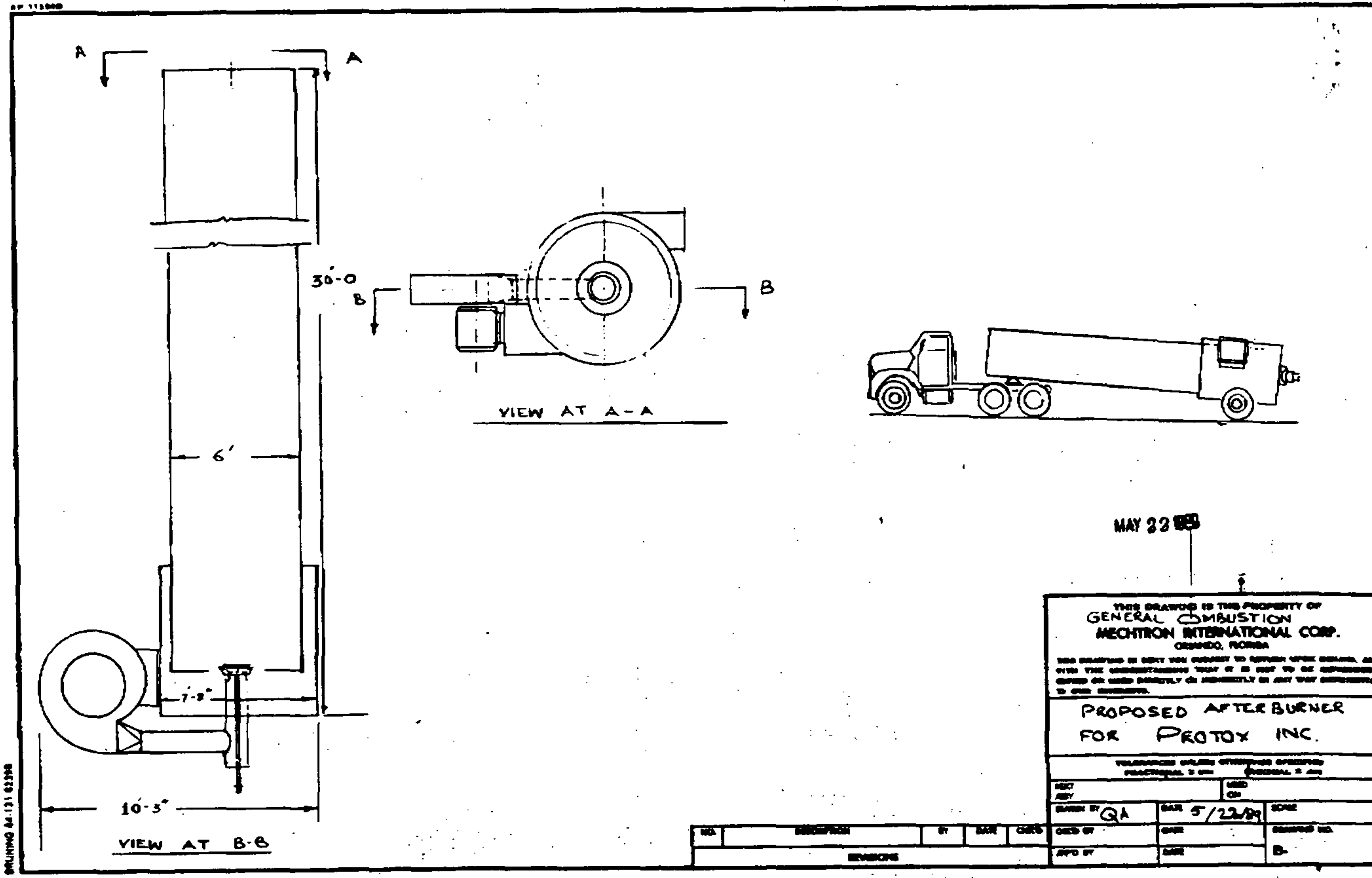
[a] Assumes emissions (except sulfur oxides) are the same, on a heat input basis, as for natural gas combustion.
[b] Expressed as SO_2. S equals the sulfur content expressed in $g/100\ m^3$ gas vapor. For example, if sulfur content is 0.366 $g/100m^3$ (0.16 $gr/100ft^3$) vapor, the SO_2 emission factor would be 0.01 x 0.366 or 0.0037 kg $SO_2/10^3$ liters (0.09 x 0.16 or 0.014 lb of SO_2/1000 gal) butane burned.
[c] Expressed as NO_2.



PROCESSING AREA PLAN VIEW	CLIENT:			
	LOCATION:	MOBILE UNIT		
	DATE:	5/30/89	DRAWN BY:	DJF
	PROPOSAL:	EQUIPMENT	CHECKED BY:	JKP



238 NOMEX BAGS, 6 INCHES DIA x 7' LONG.


A
A
30'-0
B
B
6'
7'-3"
10'-5"
VIEW AT B-B
VIEW AT A-A
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