PACIFIC
ENVIRONMENTAL
GROUP, INC.

1/4/92 Reviewed BE

November 11, 1992
Project 305-79.01

Mr. Robert Cave
Permit Services Division
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

Re: Shell Service Station
285 Hegenberger Road at Leet Drive
Oakland, California
WIC No 204-5508-5504

Dear Mr. Cave:

Enclosed is an air discharge permit application package for operation of a soil remediation system at the referenced site (Figure 1). The remediation system is being installed to remove petroleum hydrocarbons from impacted soil beneath the site. To assist with permit application approval, reference can be made to BAAQMD permit number 9409 which is similar to this application.

SYSTEM DESCRIPTION

Soil remediation at the site will be accomplished by soil vapor extraction. The soil vapor extraction system for this site will consist of a vacuum source, and two soil vapor extraction wells. Extracted soil vapor will contain a mixture of air and volatile petroleum hydrocarbons. Before atmospheric discharge, extracted soil vapor will be abated by either: (1) thermal oxidation via an internal combustion engine (ICE), (2) catalytic oxidation (Cat-Ox), or (3) vapor-phase carbon adsorption.

The vapor treatment method used at the site will vary depending on the total volatile hydrocarbon (TVH) concentration of the extracted soil vapor. The flexibility in abatement device use is desirable as each abatement method is most cost effective within a specific TVH influent concentration range. A process flow diagram of the soil vapor extraction and treatment system is shown on Figure 2.

2025 Gateway Place, Suite 440, San Jose, California 95110 (408) 441-7500 FAX (408) 441-7539
620 Contra Costa Blvd., Suite 209, Pleasant Hill, California 94523 (510) 825-0855 FAX (510) 825-0882

When using the Cat-Ox unit or the vapor-phase carbon adsorption system at the site, the vacuum unit will consist of a Rotron, model DR707, regenerative vacuum blower driven by a 5-horsepower electric motor, a water knockout vessel, inlet filter, dilution air valve, recirculation valve, and flow indicators. The vacuum source is rated for 250 standard cubic feet per minute (scfm) at 40 inches of water vacuum. Manufacturer specifications for the regenerative blower have been included in Attachment A. When using the ICE for vapor abatement at the site the ICE will also be the vacuum source. In all cases the maximum vacuum extraction flow rate will be 250 scfm.

The ICE unit to be used is a VR Systems, Model V4 or a similar unit of equivalent performance. The unit utilizes a specially configured dual-fuel ICE. It works by accomplishing two simultaneous actions. First, it draws the vapors from the ground by virtue of the manifold vacuum, acting as the soil vapor extraction vacuum source. It then burns the vapors as fuel to run the engine. The typical TVH destruction efficiency for this unit is rated by the manufacturer to be 99.97 percent or greater. The ICE unit operation is automated to maintain correct operating parameters while in use. Some functions are listed below:

- Control of the fuel to the engine is by means of an electro/mechanical system including a Master Control Unit (MCU). The MCU adjusts the supplemental fuel flow to compensate for changing influent hydrocarbon concentrations and maintains a stoichiometric air/fuel ratio.
- Monitoring includes a 16-channel data reporting system on engine vital signs and operation.
- The system is protected by automatic shut down under the following conditions: overspeed, high coolant temperature, high oil temperature, low oil temperature, fire, and high water level.

Manufacturer specifications for the ICE unit have been included in Attachment A.

The Cat-Ox unit to be used is a ThermTech, model VAC 25, catalytic oxidizer, or a similar unit of equivalent performance. This unit has a nominal 250 scfm capacity with a maximum allowable TVH inlet concentration of approximately 3,000 parts per million by volume (ppmv). The catalyst section for this unit consists of two stages of platinum catalyst fixed on a ceramic monolith substrate. The unit is equipped with a gas-fired pre-heater and a shell-and-tube heat exchanger. The typical TVH destruction efficiency for this unit is rated by the manufacturer to be 98.5 percent or greater. The Cat-Ox unit operation is automated to maintain correct operating parameters while in use. Some functions are listed below:

- o Regulation of the pre-heater unit to maintain the catalyst bed temperature close to a preset temperature (650 to 1,050 degrees Fahrenheit).
- o Termination of system operation if catalyst bed temperatures range above the manufacturer's recommended operating temperatures.
- o Termination of system operation if a low flow situation occurs.
- o Continuous monitoring of the catalyst bed temperatures (catalyst inlet, mid-bed, catalyst outlet). Temperature outputs are recorded on three channels of a strip chart recorder.

Manufacturer specifications for the Cat-Ox unit have been included in Attachment A.

The vapor-phase carbon adsorption system to be used will consist of two Westates VSC-1200 carbon vessels connected in series. These vessels are rated for a maximum flow rate of 500 scfm. The typical TVH adsorption capacity for the carbon unit is rated by the manufacturer to be approximately 0.20 pounds of TVH per pound of carbon. Manufacturer specifications for the vapor-phase carbon unit have been included in Attachment A.

SYSTEM OPERATION

The soil remedial system will be operated 24 hours per day, 7 days per week. Operation of the soil remedial system should continue for approximately 9 to 12 months.

When utilizing the ICE unit, monitoring will occur weekly. Current and past operating parameters for the month will be inspected to ensure that all permit conditions are being maintained. In addition, a portable Flame Ionization Detector (FID) will be used to monitor influent and effluent TVH concentrations and to determine whether the minimum TVH destruction efficiency is being maintained.

When utilizing the Cat-Ox unit, monitoring will occur monthly. Current and past operating parameters for the month (as recorded by the strip chart unit) will be inspected to ensure that all permit conditions are being maintained. In addition, a portable FID will be used to monitor influent and effluent TVH concentrations and to determine whether the minimum TVH destruction efficiency is being maintained.

When utilizing the carbon units, the extracted soil vapor passes through two carbon vessels arranged in series. The carbon unit influent and effluent TVH

concentrations will be monitored with a portable FID on a schedule that reflects current loading rates and predicted carbon capacity. For example, at 250 scfm and 100 ppmv, TVH predicted carbon usage (at 20 percent loading) is approximately 45 pounds per day. At this rate, the 1,200-pound primary carbon vessel would breakthrough in approximately 26 days. For this scenario, carbon performance would be monitored weekly. **When breakthrough of the primary carbon vessel occurs that vessel will be recharged with new carbon and the vessel order will be reversed to maximize carbon loading.**

TREATMENT SYSTEM DISCHARGE RATES

From data obtained from soil vapor extraction tests performed on similar sites and soil sample concentrations, the extracted soil vapor influent to the soil vapor treatment system is expected to have a maximum flow rate of 250 scfm and a maximum TVH concentration of 15,000 ppmv. Because the TVH in the extracted soil vapor will be gasoline, we can estimate the maximum TVH influent and effluent rates. In addition, a maximum estimated benzene influent concentration of 75 ppmv was derived from soil sample concentrations. Soil samples gathered indicated benzene concentrations averaging 0.5 percent of measured TVH concentrations.

The maximum TVH influent flow rate to the soil vapor treatment system is estimated to be approximately 1,350 pounds per day. From this estimate, the maximum TVH effluent flow rate from the system is calculated to be approximately 20.25 pounds per day based on 98.5 percent TVH destruction. The maximum benzene influent flow rate is estimated to be 5.40 pounds per day with a resulting effluent rate of 0.081 pounds per day. Calculations used to determine these results are shown in Attachment B.

Utilizing the benzene emission rate and system parameters, an analysis of effluent benzene concentrations as a function of stability and wind speed was performed. The program utilized, PTPLU, is based on the California Air Resources Board Modeling Section recommended specifications. The point of vapor emission is presented in Figure 3. The results of the analysis indicates that the maximum benzene concentration of .0022 milligrams per cubic meter (mg/m^3) will occur approximately .005 kilometer (km) from the emission point at an effective height of 4.2 meter (m). **A benzene concentration level of .0022 mg/m^3 translates into a risk factor of 4.3 per 1,000,000 which is below the risk limit of 10 per 1,000,000 (.005 mg/m^3) as specified by the Bay Area air Quality Management District (BAAQMD) for systems utilizing best available** vapor abatement **technology.** The results of the analysis are presented in Attachment C.

SURROUNDING AREA

The site is bounded to the west and south by thoroughfares, located at the northeast corner of the intersection of Hegenberger and Leet Drive in Oakland, California (Figure 1). The surrounding area is residential and commercial property. To the southeast, approximately 1,500 feet away, is Dag Hammarskjold School. Approximately 3,000 feet to the east is Brookfield Village School.

All application forms have been completed and are included in Attachment D. **We are very eager to begin work at this site and hope to have the remedial system operational in February 1993, please do not hesitate to call if you require** any additional information to process this application.

Sincerely,

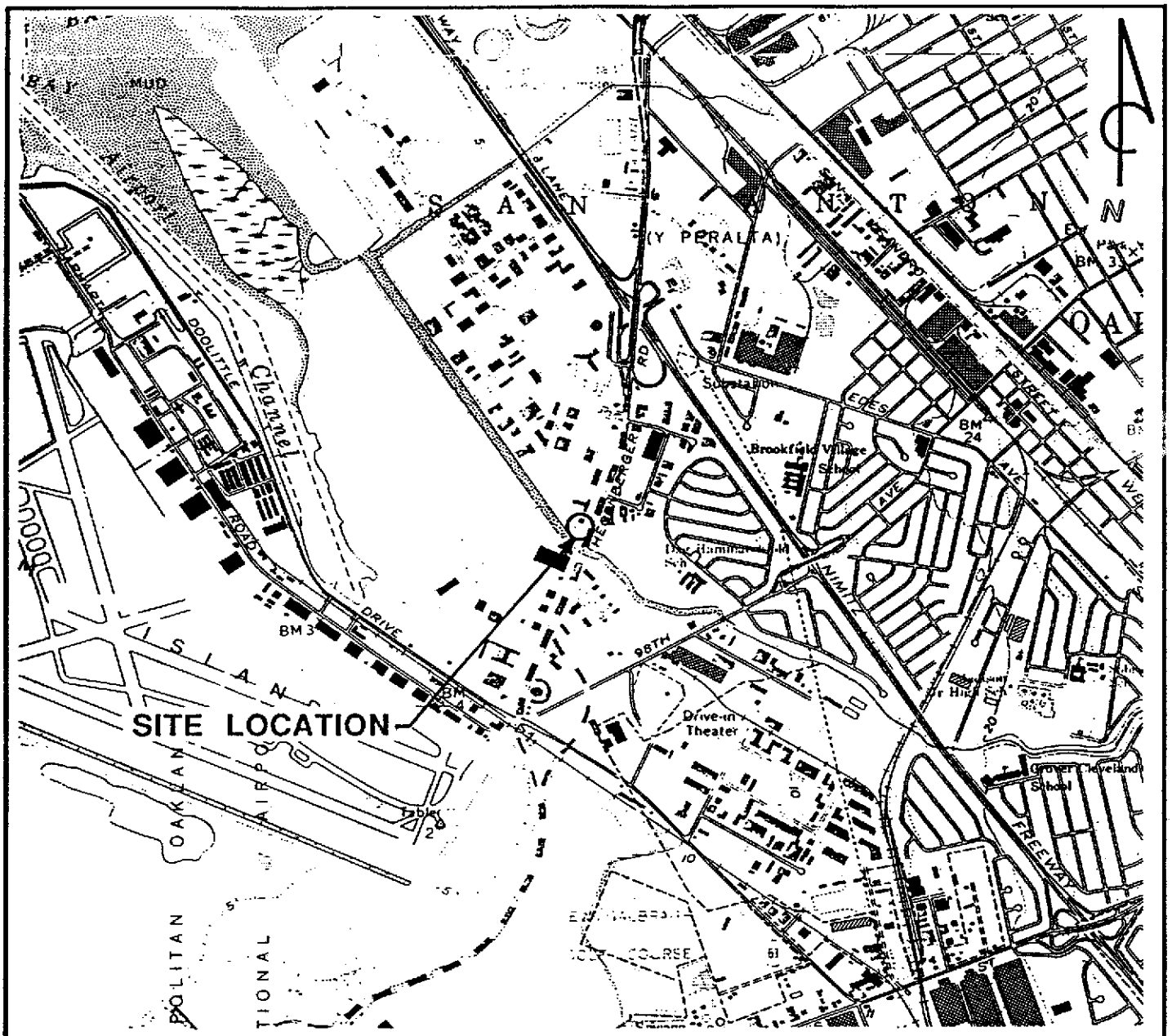
Pacific Environmental Group, Inc.

Roger Lampert
Staff Engineer

Justin L. Hawkins
Project Engineer

Attachments:
- Figure 1 - Site Location Map
- Figure 2 - Soil Vapor Extraction/Treatment System Process Flow Diagram
- Figure 3 - Site Map
- Attachment A - Manufacturer Specifications
- Attachment B - Calculations
- Attachment C - Risk Screening Analysis Information and PTPLU Program Run Results
- Attachment D - BAAQMD Permit Application Forms

cc: Mr. Dan Kirk, Shell Oil Company
Mr. Barney Chan, Alameda County Environmental Health Department



QUADRANGLE LOCATION

REFERENCES:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: SAN LEANDRO, CALIFORNIA
DATED: 1959 REVISED: 1980
TITLED: OAKLAND EAST, CALIFORNIA
DATED: 1959 REVISED: 1980

SCALE
2000 0 2000 FEET

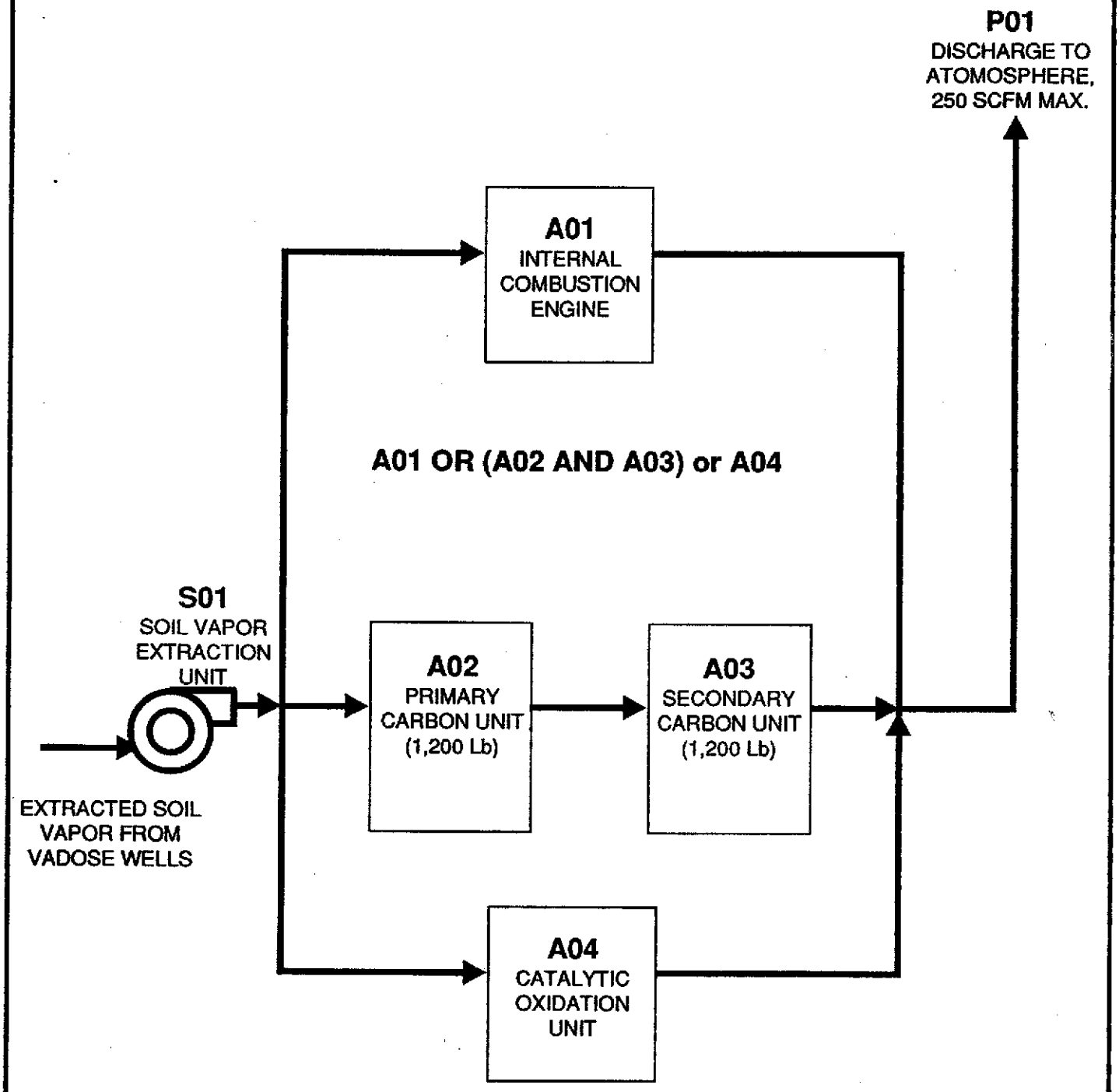
PACIFIC ENVIRONMENTAL GROUP INC.

SHELL SERVICE STATION
285 Hegenberger Road at Leet Drive
Oakland, California

SITE LOCATION MAP

FIGURE: 1
PROJECT: 305-79.01

REORDER NO. A54081



PACIFIC ENVIRONMENTAL GROUP, INC.	**FORMER SHELL SERVICE STATION** 285 Hegenberger Road Oakland, California **SOIL VAPOR EXTRACTION/TREATMENT SYSTEM PROCESS FLOW DIAGRAM**	FIGURE: **2** PROJECT: 305-79.01

11/11/92

N

CHANNEL

LEET DRIVE

PLANTER

TRUCK STORAGE AREA

SOIL REMEDIATION SYSTEM LOCATION

P01

WASTE OIL TANK

STATION BUILDING

UNDERGROUND FUEL STORAGE TANKS

CANOPY

PLANTER

PLANTER

PARKING

PLANTER

SIDEWALK

PLANTER

PRODUCT ISLANDS

LEGEND

P01 ◑ EMISSION POINT LOCATION AND DESIGNATION

HEGENBERGER ROAD

SIDEWALK

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE

0 40 80 FEET

SHELL SERVICE STATION
285 Hegenberger Road at Leet Drive
Oakland, California

SITE MAP

FIGURE: **3**

PROJECT: 305-79.01

11/11/92

ATTACHMENT A

MANUFACTURER SPECIFICATIONS

DR 707
Regenerative Blower

FEATURES

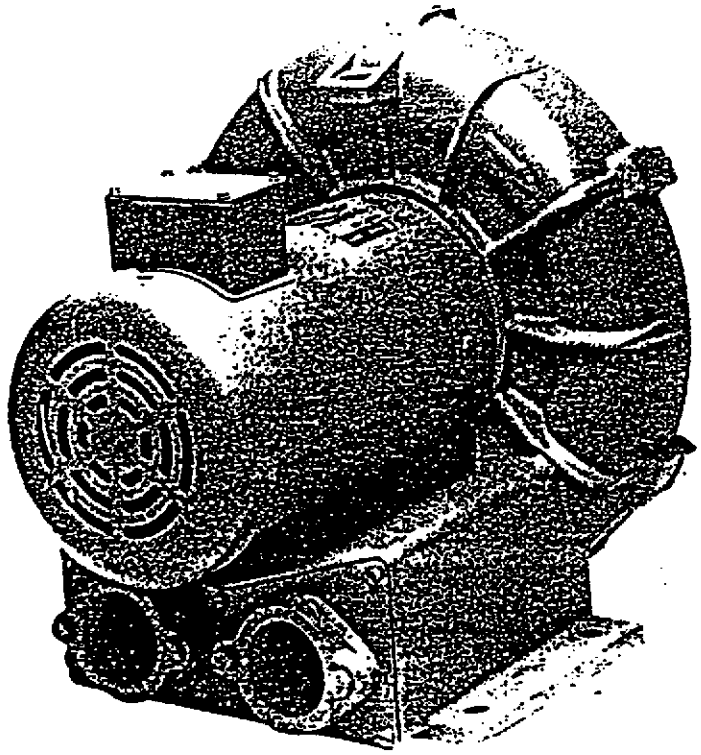
- Manufactured in the USA
- Maximum flow 280 SCFM
- Maximum pressure 114" WG
- Maximum vacuum 6.8" Hg
- 5 HP standard
- Blower construction—cast aluminum housing, impeller and cover
- Inlet and outlet internal muffling
- Noise level within OSHA standards
- Weight: 156 lbs. (71 Kg)

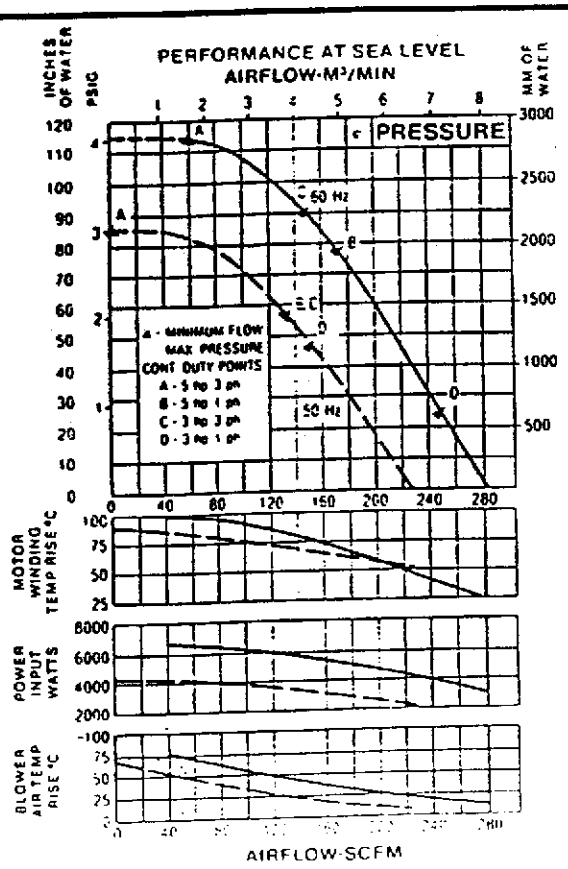
ACCESSORIES

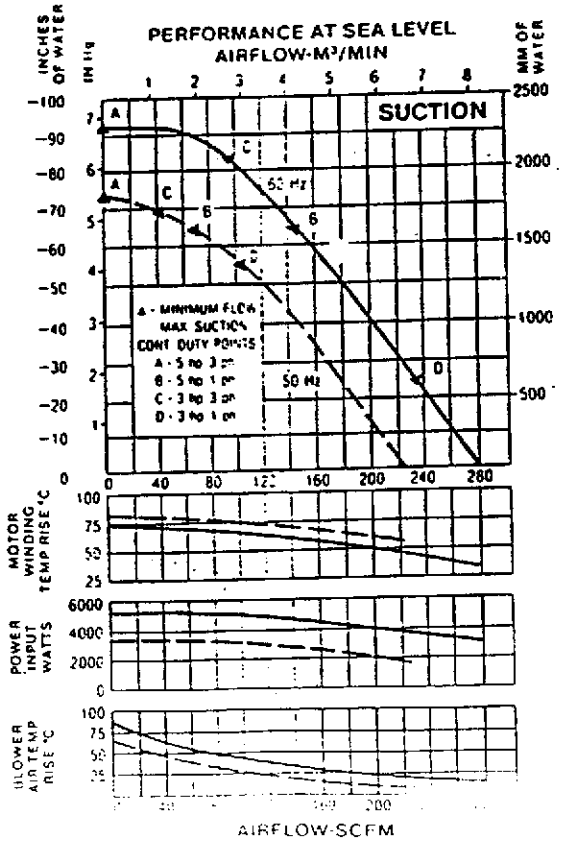
- External mufflers
- Slip-on flanges
- Inlet and/or Inline filters
- For details see Accessories Section

OPTIONS

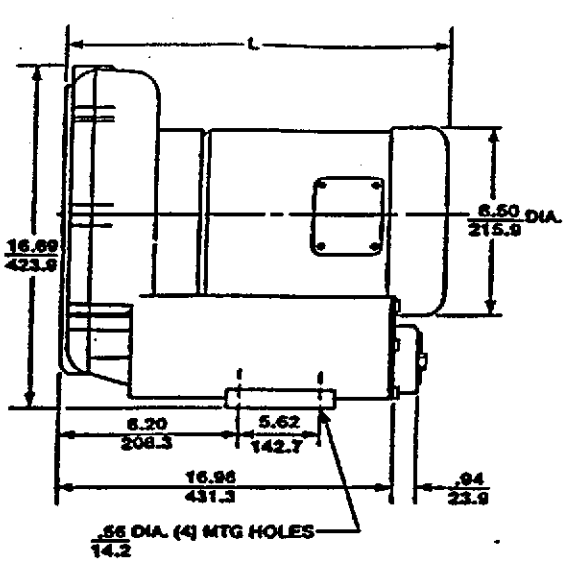
- Smaller HP motors
- 575-volt and XP motors
- Surface treatment or plating
- Single or three phase motors
- Remote drive (motorless) model
- Gas tight sealing
- Belt drive (motorless) model; for details see Remote Drive Section

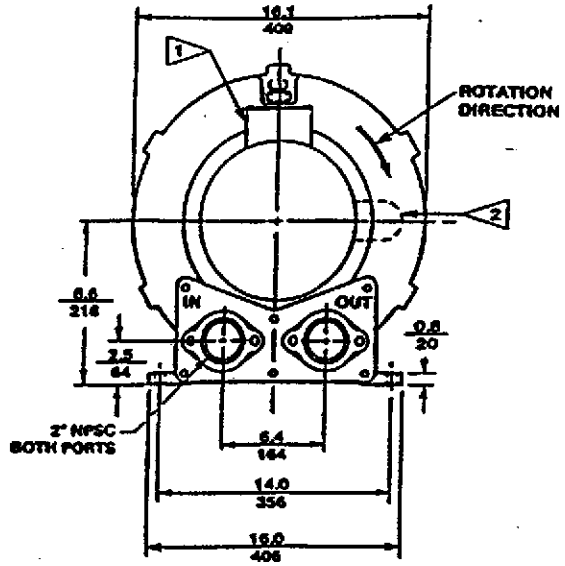






DR 707
Regenerative Blower





Model	L (IN)	L (MM)
DR707D89X	18.17	461.5
DR707K72X	18.17	461.5
DR707F72X	20.49	520.4
DR707D86X	18.17	461.5
DR707D5X	19.67	499.6
DR707K9X	17.5	444.5

1. T'BOX CONNECTION 1.06" DIA. ON TEFC MOTORS, .75 NPT ON XP MOTORS
2. LOCATION OF CAPACITOR ON SINGLE PHASE MOTORS

DIMENSIONS: IN / MM
TOLERANCE: .XX ± .1 / 2.5

Specifications subject to change without notice.

PECIFICATIONS

MODEL	DR707D89X	DR707K72X	DR707F72X	DR707D86X	DR707D5X	DR707K9X
Part No.	036789	036791	036790	036914	036875	036794
Motor Enclosure Type	TEFC	TEFC	XP	TEFC	TEFC	TEFC
Motor Horsepower	5	3	5	5	5	3
Voltage[1]	208-230/460	230/460	230/460	575	230	115/230
Phase	3	3	3	3	1	1
Frequency[1] (Hz)	60	60	60	60	60	60
Insulation Class[2]	F	F	B	F	F	F
NEMA Rated Motor Amps	14.2-14.0/7.0	8.0/4.0	14.0/7.0	5.6	21	26.2/13.1
Service Factor	1.15	1.15	1.0	1.15	1.0	1.0
Locked Rotor Amps	98-96/48	52/26	96/48	37	124	158/79
Max. Blower Amps	18.5-18.2/9.1	13/6.5	14.0/7.0	6.9	25	18.5/9.25
Recommended NEMA Starter Size	1-1/0	0/0	1/0	0	1.5	1.5/1
Weight (lbs/Kg)	169/76.8	157/71.4	184/83.6	169/76.8	194/88.2	186/84.5
Blower Limitations for Continuous Duty (60 Hz/50 Hz)						
Max. Pressure-in. of water	113/83	90/65	100/75	113 (60 Hz)	77/65	25/55
Max. Suction-in. of water	93/73	83/70	82/70	93 (60 Hz)	65/65	25/55
Min. Flow-Pressure-SCFM	60/0	145/120	120/88	60 (60Hz)	175/120	245/130
Min. Flow-Suction-SCFM	0/0	97/40	100/44	0 (60 Hz)	145/70	230/105

3 phase motors are factory tested and certified to operate on 200-230/460 VAC-3 ph-60 Hz and 220-240/380-415 VAC-3-ph-50 Hz.

ximum operating temperatures: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F insulation or 110°C Class B insulation. Blower outlet air temperature should not exceed 140°C (air temperature rise plus ambient).

VR systems inc.

Technology In Support of the Environment.

V4 STANDARD FEATURES

* FIRE CONTROL SYSTEM
* INPUT FLAME ARRESTER
* AUTO SHUT DOWN
  - High Water Temperature
  - High Oil Temperature
  - Low Oil Level
* AUTOMATIC OIL LEVEL REGULATOR
* "0" PRESSURE COOLANT SYSTEM
  (Safety & Long Life)
* WELL GAS FLOW METER
* EASILY TRANSPORTED - ONE MAN SETUP
* SHUTDOWN/CALL-UP CAPABILITY
* PERMITTABILITY IN SCAQMD
  - Soil Remediation (Various Locations)
  - Underground Tank Degassing (Various Locations)
  - Above Ground Tank Degassing (In Progress)
* L.A. CITY FIRE DEPARTMENT
  General Approval
* 20 MINUTE INSTALLATION CAPABILITY
* SLIDE IN/SLIDE OUT ENGINE PACKAGE
* LARGE SERVICE DOORS
* PERMANENT STAND OR TRANSPORTABILITY
* PRINTER AND PRINTER STAND
* 15' X 3" INTERNALLY GROUNDED VAPOR HOSE
* 50' STATIC REELS
* LCD MONITOR W/16 ITEM READOUT & DISC DRIVE
  For Report Accumulation
* INVERTER PACKAGE
  For "Stand Alone" Capability

AVAILABLE OPTIONS

* MONITORING BY MODEM
* FOXBORO OVA
* KIT FOR NATURAL GAS OPERATION

9/91

1338 KNOLLWOOD CIRCLE • ANAHEIM, CALIFORNIA 92801 • TELEPHONE: (714) 826-0483 FAX: (714) 826-8746

VR systems inc.

Technology In Support of the Environment.

SPECIFICATIONS
V.R. SYSTEMS MODEL V4

U.S. PATENT 4846134
CANADIAN PATENT 1,287,805

1.00 GENERAL

It is the intent of these specifications to describe a "State of the Art" Soil Remediation and Tank Degassing System including an internal combustion engine capable of extracting hydrocarbon vapors from contaminated soil or storage tanks without the use of a compressor or pump, and destruct such vapors as fuel in a controlled manner by the use of an on-board computer system.

2.00 DETAILED DESCRIPTION

System shall conform to the following minimum requirements:

2.01 ENGINE

Engines shall be an industrial version; 2 each 460 C.I.D. Ford Model LSG-875. Engines shall be totally controlled by the computer system described below and shall be capable of operating one week (168 hours) without need of servicing. Engines shall be equipped with an automatic oil level device together with three (3) automotive type cartridge filters. Engines serve as both a vacuum pump and a means of destroying hydrocarbon vapors removed from the soil. Engine cooling shall be by means of an oversized radiator and zero-pressure coolant system to insure safety and long life.

2.02 FUEL CONTROL SYSTEM (Patent 5070850)

Supplemental fuel as may be required for proper combustion shall be either Propane (LPG) or Natural Gas. The control of the fuel to the engine shall be by means of an electro/mechanical system including a Master Control Unit (MCU). The MCU shall adjust the supplemental fuel flow to compensate for changing influent hydrocarbon concentrations and maintain an air/fuel ratio at stoichiometric.

2.03 IGNITION SYSTEM

Ignition System shall be an electronic type, automatically adjusted by commands from the computer.

2.04 ELECTRICAL POWER

Electrical power required shall be supplied by an on-board inverter system for "stand-alone" capability. Outside 120v, 60cyc power (dedicated service) may be used as an option.

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2.05 ON-BOARD COMPUTER CONTROL

The system shall include a "State of the Art" Data Acquisition System for monitoring the engine control.

2.06 MONITORING

Monitoring shall include a 36 channel data reporting system on engine vital signs and operation. An LCD monitor shall be supplied to continuously view the operational data. Also supplied shall be a 720K, 3.5 inch floppy drive, for data storage. Remote monitoring by modem shall also be available.

2.07 WELL GAS FILTER

The system shall include a well gas filter and moisture knock out. A transducer shall be included to indicate well gas vacuum levels.

2.08 EXHAUST SYSTEM

The Exhaust System shall include a dual NOx reduction monolith and a dual hydrocarbon/CO monolith. The oxygen supply to the NOx reduction unit shall be controlled at all times as 0.5% to 0.7% as read by an O_2 sensor in the exhaust manifold.

3.00 OPERATION

The operation of the system shall be automatic (except for start up, shut down and RPM set point) and shall not require manual adjustment for influent gas, supplemental fuel or combustion air.

4.00 CAPACITIES

4.01 VACUUM AND FLOW

The system shall be capable of developing up to 18" Hg at the well gas inlet. Flow rates shall be from 0 to 500 CFM. These conditions will depend on soil conditions, hydrocarbon concentration and level of inerts encountered.

4.02 HYDROCARBON REMOVAL

The system shall be capable of removing up to 110 lbs/hr of hydrocarbons at a total destruction efficiency of 99.97%.

5.00 SAFETY FEATURES

5.01 FIRE CONTROL SYSTEM

A Fire Control System shall be included as an integral part of the unit and consists of a Kidde 21# dry chemical automatic package with dual "Rate of Rise" temperature probes and a manual emergency overide.

502 FLAME ARRESTER

A 3" flame arrester shall be included to protect the well gas source from any "Flash Back" from the engine.

5.03 GROUNDING

A 50' static line and reel shall be included.

5.04 AUTOMATIC ENGINE SHUT DOWN

The system shall be protected by automatic shut down under the following conditions:

Overspeed
High Coolant Temperature
High Oil Temperature
Low Oil Pressure
Fire
High Water Level (Well Gas Filter)

The computer shall be programmed to store and report the reason for the automatic engine shut down.

5.05 FUEL SHUT OFF

Means shall be included to shut off the fuel supply should the engine shut down for any reason.

5.06 LABEL AND INSTRUCTIONS

An Operation and Maintenance Manual shall be included establishing safe operation and required maintenance together with pertinent Material Safety Data Sheets from various suppliers. Safety and warning labels shall be appropriately affixed to the unit according to accepted standards. Safety and Operating instructions shall be conspicuously posted at the operation console within easy view of the operator.

6.00 TRANSPORTATION AND INSTALLATION

Included as part of the package shall be a transporter to safely move the unit from one site to another. Also, a stand shall be available and means supplied to slide the unit off of the transporter onto the stand (and vice versa) as a one-man operation.

7.00 **GENERAL APPROVAL**

The system shall have an approval by a registered third party testing laboratory for safety and operation.

8.00 **WARRANTY**

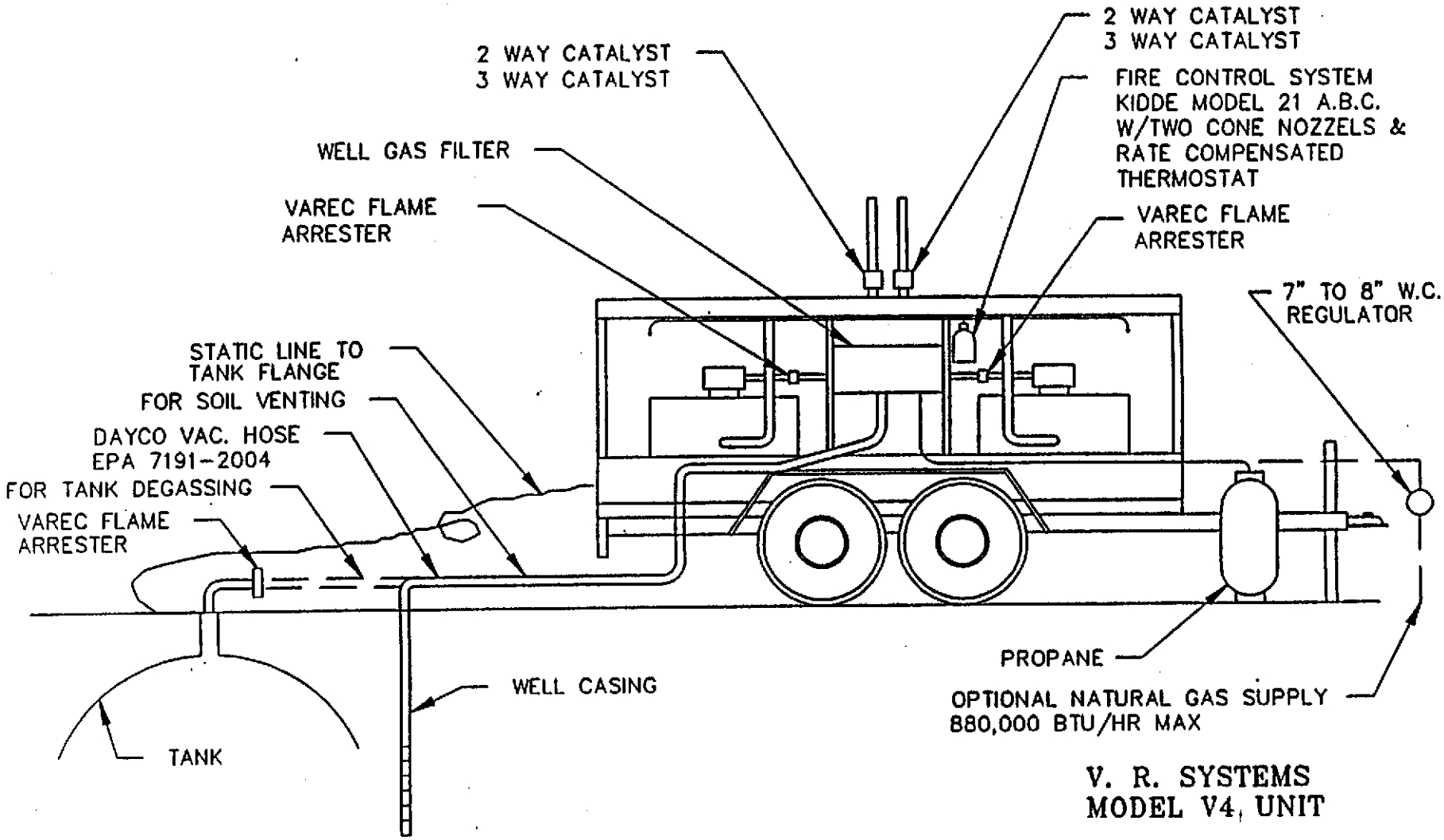
The system will carry a one-year warranty on all items manufactured by the sellers and the seller will pass on the guarantee of the manufacturer of purchased parts installed on the unit.

9.00 **MANUFACTURE**

The unit shall be manufactured in the United States of America and the supplier shall hold the owner and/or its various departments free and harmless from any patent infringement suit arising out of the purchase of this Soil Venting System.

MATL	FINISH	DESC.	SHEET OF	ITEM NO.
———	———	V4 SYSTEM SCHEMATIC		EC2B031-

DATE 2-92
REV DATE 2-92



V. R. SYSTEMS
MODEL V4, UNIT

NOT TO SCALE

DRAWN BY: DBG	DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.	VR SYSTEMS
SCALE: NONE	TOLERANCES UNLESS OTHERWISE SPECIFIED ARE AS FOLLOWS: ANGLES: ±1° FRACTIONS ±1/16 .XX ±.01 .XXX ±.001	ANAHEIM, CA.

THERMTECH, INC.

POLLUTION CONTROL EQUIPMENT

Houston, Texas

THERMTECH, INC.
POLLUTION CONTROL EQUIPMENT

SAFE • SIMPLE • ECONOMICAL

November 1, 1990

VAPOR CHECK

MODEL: VAC 25

GENERAL DATA

* SCFM rating	250 SCFM
* burners maximum output capability	1,000,000 BTU
* burner turndown ratio	20 to 1
* combustion blower motor size	1 HP
* combustion chamber I D	27" x 27" x 60"
* stack I D	12" x 12"
* skid size	39" x 112"
* velocity through process inlet	
@ 125 SCFM from process stream	23.8 ft./sec.
@ 250 SCFM from process stream	47.5 ft./sec.

THERMAL DATA

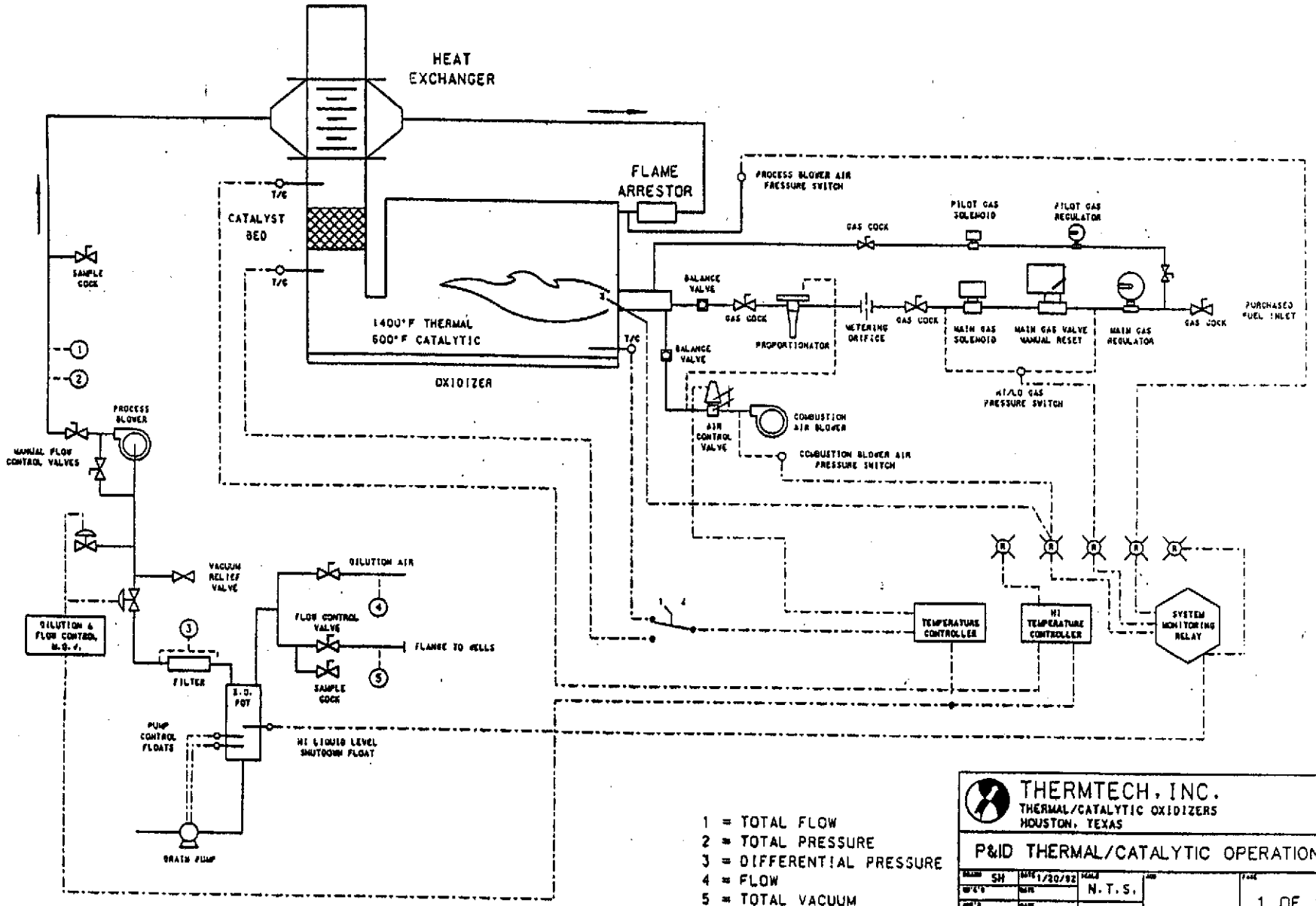
* SCFM added by combustion blower when fired on ratio	96 SCFM
* total ACFM @ 1400°F	1219 ACFM
* burner chamber volume required for 0.5 seconds retention time @ 1400°F	10.2 cu. ft.
* burner chamber volume required for 1.0 seconds retention time at 1500°F	21.4 cu. ft.
* stack velocity	
@ 125 SCFM from process stream	10.2 ft./sec.
@ 250 SCFM from process stream	20.3 ft./sec.
* estimated weight, thermal unit only	1550 lbs.

CATALYTIC DATA

* SCFM added by combustion blower when fired on ratio	29 SCFM
* total ACFM @ 600°F	560 ACFM
* catalyst volume for 90% plus destructive efficiency	1/2 cu. ft.
* inlet temperature	600°F
* maximum concentrations	25% of the LEL
* stack velocity	
@ 125 SCFM from process stream	4.7 ft./sec. +
@ 250 SCFM from process stream	9.3 ft./sec. +
* estimated weight, thermal unit plus catalytic module	1770 lbs.

* The above data is intended to be used as general, guide line type information. For a specific application proposal, please contact the manufacturer.

P.O. Box 5318 • Kingwood, Texas 77325 • (713) 987-8271 • FAX (713) 987-8274



1 = TOTAL FLOW
2 = TOTAL PRESSURE
3 = DIFFERENTIAL PRESSURE
4 = FLOW
5 = TOTAL VACUUM

THERMTECH, INC.
THERMAL/CATALYTIC OXIDIZERS
HOUSTON, TEXAS

P&ID THERMAL/CATALYTIC OPERATION

DRAWN SH	DATE 1/20/92	SCALE N.T.S.	JOB	PAGE 1 OF 1
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APP'D	DATE			

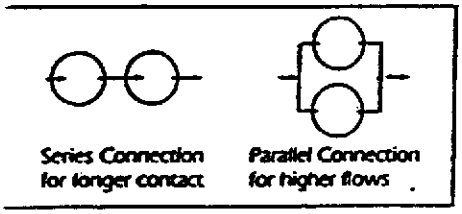
ir Purification Systen.

VENT-SCRUB™

VSC-1200 VSC-2000

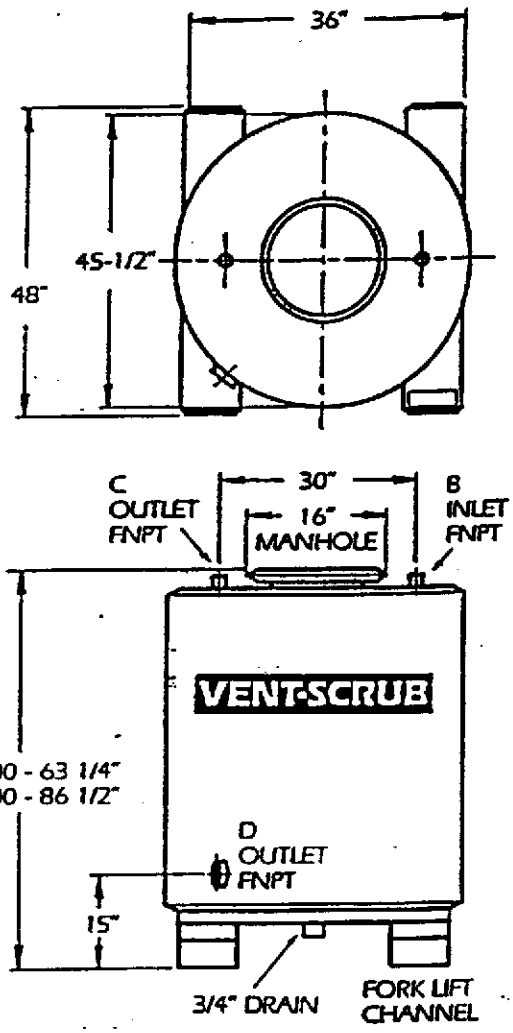
EASY TO INSTALL

/ENT-SCRUB™ adsorbers are designed for fast and easy installation on any hard, flat surface. Place the unit as close to the vapor source as possible. The only hardware needed is properly sized pipe or ducting—rigid or flexible—for connection to the inlet/outlet ports. For outdoor use, a rain guard may be needed to protect VENT-SCRUB's™ exhaust.



SAFETY

Jnder certain conditions, some chemical compounds may oxidize, decompose, or polymerize in the presence of activated carbon. This could result in temperature increases sufficient to cause ignition. As a esult, particular care must be taken with compounds having peroxide-orming tendencies.



CORROSION RESISTANCE

The combination of activated carbon and many VOC's can cause severe corrosive or electrolytic damage to metals, even stainless steel. VENT-SCRUB™ adsorbers are designed to prevent these effects in normal service.

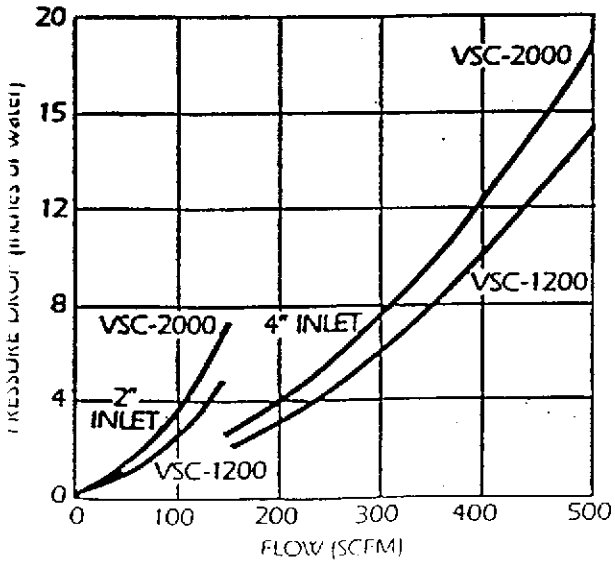
DIMENSIONS

Model No.	A	B	C	D
VSC-1200-2	63-1/4"	2"	2"	N/A
VSC-1200-4	63-1/4"	4"	N/A	4"
VSC-2000-4	86-1/2"	4"	N/A	4"
VSC-2000-4V	86-1/2"	4"	N/A	4"

MATERIALS OF CONSTRUCTION

Vessel:
Coated 12 ga. Carbon Steel
7 ga. Top/Bottom
External Coating:
Powder Coat Enamel
Internal Coating:
Fusion Bonded Epoxy
Piping: PVC

PRESSURE DROP



SPECIFICATIONS

	VSC-1200	VSC-2000
Flow* cfm (max)	500	500
Pressure psig (max)	12	12
Vacuum (in Hg)	15	**
Temperature deg F (max)	120	120
Carbon Fill Volume (cu. ft.)	33	65
Cross Section (sq. ft.)	12.5	12.5
Shipping Weight (lbs.)	1600	2500

*Note: actual design should be based on superficial bed velocity (sbv) as required for specific contaminants.

** VSC-2000-4 8 (in Hg) VSC-2000-4V 15 (in Hg)

WESTATES ACTIVATED CARBON SYSTEMS

WESTATES CARBON, INC.
2130 Leo Ave., Los Angeles, CA 90040
PHONE: (213) 722-7500
FAX (213) 722-8207 TWX 910-321-2355

ATTACHMENT B

CALCULATIONS

Calculations

TVH and Benzene Emission Rate Calculations

- From previous experience under similar site conditions, assume system influent is 250 SCFM with 15,000 ppmv total volatile hydrocarbons (TVH).
- Assume TVH vapor density at standard temperature and pressure (273 K, 1 atmosphere) is same as for gasoline vapor (approximately 0.25 lb/ft^3).
- Assume TVH destruction efficiency of 98.5%
- Assuming Ideal Gas Law, benzene density is .20 lb/ft^3 .

TVH Emission Rate Calculations

TVH vapor influent rate $= (250 \text{ scfm}) \frac{(15{,}000 \text{ ppmv})}{(1 \times 10^6)}$

$= (3.75 \text{ scfm TVH vapor influent}) (0.25 \text{ lb/scf})$

$= (0.94 \text{ lb TVH vapor/min.}) (1440 \text{ min/day})$

$= 1{,}350 \text{ lb TVH vapor/day influent}$

TVH effluent rate $= 1{,}350 \text{ lb TVH per day } (1.00\text{-}0.985)$

$= 20.25 \text{ lb TVH per day}$

Benzene Emission Rate Calculations

- If we assume that the benzene concentration can be approximated from soil sample concentrations, then approximately 0.5% of the TVH vapor by volume is benzene, or 75 ppmv is the benzene influent concentration.

Benzene vapor influent rate $= (250 \text{ scfm}) \frac{(75 \text{ ppmv})}{(1 \times 10^6)}$

$= (0.019 \text{ scfm benzene vapor influent}) (0.20 \text{ lb/scf})$

$= (0.0038 \text{ lb benzene vapor/min.}) (1440 \text{ min/day})$

=5.40 lb benzene vapor /day influent

Benzene effluent rate = 10.80 lb benzene per day (1.00-0.985)

= 0.081 lb benzene per day

Actual Vapor Flow Rate at 500°F

- Assume flow rate at standard temperature and pressure (32°F, 1 atm.) = 250 ft^3/min.
- From the ideal gas law:

$$V_2 \approx V_1 \frac{T_2}{T_1} \qquad \text{when } P_1 = P_2$$

$$V_2\,(500\ °F) = (250\ ft^3/min)\left(\frac{959\ °R}{492°R}\right)$$

$$V_2 = 487\ ft^3/min\ @\ 500\ °F$$

Water Vapor Content of Effluent Stream

- Assume 60% saturated air at 100°F influent
- Assume water contributions from oxidation reaction are negligible.
- At 100°F and 60% humidity, moisture content = 0.025 kg H_2O/kg air
- MW (H_2O) = 18 MW (Air) ≈ 29

$$\text{moisture content} = (0.025)\left(\frac{\text{kg } H_2O}{\text{kg Air}}\right)\left(\frac{\frac{29\text{ kg Air}}{\text{kmol Air}}}{\frac{18\text{ kg } H_2O}{\text{kmol } H_2O}}\right)$$

$$= 0.0403\ \frac{\text{kmol } H_2O}{\text{kmol Air}}$$

$$= 0.0387\ \frac{\text{kmol } H_2O}{\text{Total kmol}}$$

= 3.9% H_2O by volume, if we assume the ideal gas law holds for this case.

Calculation of Vapor Emissions Risk Factor

- Maximum benzene concentration derived was based on the PTPLU modelling program which utilizes California Resources Air Board's recommended modelling specifications.

Risk Factor = (Maximum Benzene Concentration) (10%) ($2.9 \exp^{-5}$)

= (0.0022) (.1) ($2.9 \exp^{-5}$)

= 4.3×10^{-6}

- 4.3×10^{-6} translates into a risk factor of 4.3 per million which is well below the specified limit of 10 per million if the facility is utilizing best available abatement technology.

ATTACHMENT C

RISK SCREENING ANALYSIS INFORMATION AND PTPLU PROGRAM RUN RESULTS

REQUEST FOR INFORMATION:
RISK SCREENING ANALYSIS

NOTE: You must fill out one of these forms for each source in the permit application that requires a risk screen, unless all sources exhaust through a single stack. These may be discrete sources such as stacks or area sources such as surface area fugitive emissions.

Plant name Shell Service Station

Source description Soil Vapor Extraction

Source # S-1 (if known) Emission point P-01 (if known)

SECTION A

1. Is the source a clearly defined emission point, i.e., a stack?
   (YES) NO (If NO, go on to section B)

2. Does the stack stand alone or is it located on the roof of a building?
   (ALONE) ON ROOF

3. What is the stack height? 10 meters or (feet)
   (Note: stack height only, whether free-standing or on rooftop)

4. What is the combined stack height and building height (if applicable)?
   NA meters or feet

5. What is the stack diameter? 0.17 meters or (feet)

6. What is the stack gas flowrate? 488 (cfm) or m^3/sec

7. What is the stack gas exit temperature? 500 degrees
   (Fahrenheit) or Centigrade

8. If the stack is located on a rooftop, what are the dimensions of the building?

   height = _____ meters or feet

   width = _____ meters or feet

   length = _____ meters or feet

9. Are there any buildings, walls or other structures located near this source ?

(YES) NO

If YES, what are their dimensions?

height = 10 meters or (feet)

width = 30 meters or (feet)

length = 70 meters or (feet)

distance from source 5 meters or (feet)

(GO ON TO SECTION C)

SECTION B

1. Is the source located within a building? YES NO

(If NO, please provide a description of the source. For example, fugitive emissions that must be evaluated as an area source. If an area source, provide the dimensions of the area in question. Then go on to section C.)

(If YES, proceed to #2, below)

2. Does the source exhaust through the building ventilation system?
YES NO

a. If NO, can we assume that emissions from the source escape via the building's doors and windows? YES NO

(If your answer here is also NO, please explain where the emissions are going)

3. Please provide the building dimensions:

height = _____meters or feet

width = _____meters or feet

Length = _____meters or feet

4. Are there any buildings, walls or other structures located near this source ?

YES NO

If YES, what are their dimensions?

height = _____meters or feet

width = _____meters or feet

length = _____meters or feet

distance from source _____meters or feet

(GO ON TO SECTION C)

SECTION B

1. Describe the area where the source is located (select one):

(a) zoned for commercial use

b) zoned for residential use

c) zoned for mixed commercial and residential use

2. Distance from source (stack or building) to property line =

55 meters or (feet)

(continued on p. 4)

3. Distance from source to nearest receptor** =

60 meters or (feet)

You must provide a plot plan or a map, drawn to scale, which clearly demonstrates the location of your site, the property lines and any surrounding residences and/or businesses. The plot plan or map should also show the location of the source(s) at the site and their relationship to the property line.

** Receptors are defined as individual dwellings where persons are assumed to be in continuous residence.

PTPLU (Version 2.0)
Analysis of concentration as a function of stability and wind speed
(California Air Resources Board Modeling Section version)

test

Source Conditions
---
emission rate = 0.081 lbs/day = 0.000 g/sec
physical stack height = 10.00 ft = 3.05 m
stack gas temperature = 500.00 deg. F = 533.15 deg. K
stack gas velocity = 21500.00 ft/min = 109.22 m/sec
stack diameter = 0.17 ft = 0.05 m
volume flow rate = 0.230 m^3/sec
buoyancy flux = 0.326 m^4/sec^3

Meteorological Conditions
---
ambient temperature = 65.00 deg. F = 291.48 deg. K
anemometer height = 10.00 m
mixing height = 2000.00 ft = 609.60 m
Wind profile exponents: A: 0.15, B: 0.15, C: 0.20, D: 0.25, E: 0.30, F: 0.30

Receptor data
---
receptor elevation above ground level = 10.00 ft = 3.05 m

Options used
---
stack downwash
buoyancy induced dispersion
urban dispersion coefficients (McElroy-Pooler)

Results - using extrapolated winds

Stability	Wind Speed (m/sec)	Maximum Concentration (mg/m^3)	Distance of Max. (km)	Effective Height (m)
A	0.42	1.04227E-04	0.113	43.6
A	0.67	1.50995E-04	0.074	28.4
A	0.84	1.78505E-04	0.060	23.3
A	1.26	2.37608E-04	0.042	16.6
A	1.67	2.86920E-04	0.032	13.2
A	2.09	3.30563E-04	0.026	11.2
A	2.51	3.72527E-04	0.021	9.8
B	0.42	1.04227E-04	0.113	43.6
B	0.67	1.50995E-04	0.074	28.4
B	0.84	1.78505E-04	0.060	23.3
B	1.26	2.37608E-04	0.042	16.6
B	1.67	2.86920E-04	0.032	13.2
B	2.09	3.30563E-04	0.026	11.2
B	2.51	3.72527E-04	0.021	9.8
B	3.35	4.64263E-04	0.014	8.1
B	4.18	5.69176E-04	0.011	7.1
C	1.58	3.24573E-04	0.042	13.8
C	1.97	3.75153E-04	0.033	11.7
C	2.37	4.22504E-04	0.027	10.2
C	3.15	5.21310E-04	0.019	8.4

C	7.89	1.25756E-03	0.007	5.2	
C	9.46	1.50554E-03	0.006	4.8	
C	11.83	1.86859E-03	0.005	4.5	
D	0.37	1.01805E-04	0.232	48.7	
D	0.59	1.51539E-04	0.148	31.6	
D	0.74	1.81200E-04	0.120	25.9	
D	1.11	2.45726E-04	0.083	18.3	
D	1.49	2.99964E-04	0.063	14.5	
D	1.86	3.47466E-04	0.051	12.2	
D	2.23	3.91272E-04	0.042	10.7	
D	2.97	4.79611E-04	0.029	8.8	
D	3.72	5.80152E-04	0.022	7.6	
D	5.20	8.02885E-04	0.015	6.3	
D	7.43	1.14294E-03	0.010	5.3	
D	8.92	1.37302E-03	0.009	5.0	
D	11.15	1.71870E-03	0.007	4.6	
D	14.86	2.28560E-03	0.005	4.2	<-- MAX
E	1.40	1.10990E-04	0.182	21.3	
E	1.75	1.01579E-04	0.169	20.0	
E	2.10	9.41992E-05	0.164	19.0	
E	2.80	8.25106E-05	0.153	17.5	
E	3.50	7.46969E-05	0.144	16.5	
F	1.40	1.55171E-04	0.151	18.2	
F	1.75	1.41583E-04	0.141	17.1	
F	2.10	1.31255E-04	0.133	16.3	
F	2.80	1.14769E-04	0.126	15.1	
F	3.50	1.03564E-04	0.119	14.2	

ATTACHMENT D

BAAQMD PERMIT APPLICATION FORMS

PERMIT SERVICES DIVISION
BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109
(415) 771-6000

FORM P-101B

BAAQMD PLANT NUMBER_____ APPLICATION NUMBER_____

APPLICATION FOR AUTHORITY TO CONSTRUCT AND PERMIT TO OPERATE INDUSTRIAL SOURCES

BUSINESS NAME Shell Oil Company

MAILING ADDRESS P.O. Box 5278 CITY/ZIP CODE Concord

PLANT ADDRESS 285 Hegenberger CITY/ZIP CODE Oakland, 94621

NAME OF CONTACT Mr. Dan Kirk TELEPHONE NUMBER 510-675-6168

EQUIPMENT DESCRIPTION Soil Vapor Extraction and Treatment System

NUMBER OF SOURCES	(1)	RELOCATION	( )
NEW CONSTRUCTION	(X)	DEMOLITION OR SHUTDOWN	( )
MODIFICATION	( )	TRANSFER OF OWNERSHIP	( )
REPLACEMENT	( )	ABATEMENT EQUIPMENT ONLY	( )

HAS AN ENVIRONMENTAL IMPACT REPORT (EIR) BEEN PREPARED FOR THIS PROJECT? YES_____ NO X

IF YES, BY WHOM?_____

IS THIS APPLICATION A RESULT OF A VIOLATION NOTICE? YES_____ NO X

IF YES, GIVE THE VIOLATION NOTICE NUMBER_____

TOTAL EMISSIONS FOR THIS APPLICATION 0.84 lb/hr

EMISSIONS IN LB/HR				
PARTICULATE	NMHC	SO_x	NO_x	CO
NA	0.84	NA	NA	NA

TYPICAL USAGE RATE: HOURS/DAY 24 ; DAYS/WEEK 7 ; WEEKS/YEAR 52

ARE OFFSETS OR TRADEOFFS INVOLVED IN THIS APPLICATION? YES _____ NO X

IF YES, GIVE DOCUMENTS AND PAGE NUMBERS ON WHICH THIS INFORMATION IS PROVIDED _____

HAVE YOU PROVIDED AN AIR QUALITY ANALYSIS? YES _____ NO X

IF YES, GIVE DOCUMENTS AND PAGE NUMBERS ON WHICH THIS INFORMATION IS PROVIDED _____

THE FOLLOWING ITEMS SHOULD ACCOMPANY THIS APPLICATION: (a) location of this facility; (b) process flow diagram (if applicable) and; (c) a description or manufacturer's catalogue of equipment and air pollution abatement equipment. (See AB884 - Lists And Criteria for further details.

IMPORTANT: All information that you submit will be considered as public information unless you indicate that it is considered TRADE SECRET and give the reasons.

[ ] ACKNOWLEDGEMENT

SIGNATURE D. T. Kirk for Shell O. I Company TITLE Environmental Engineer

NAME (PRINTED) Mr. Dan Kirk DATE 11/10/92

NOTE: Permits for your project may also be required from other agencies. For further information, you should contact the local city or county office in which the proposed project will be located. Also, the Office of Permit Assistance within the Office of Planning and Research in Sacramento is available to provide information on permitting. The address is as follows:

OFFICE OF PLANNING AND RESEARCH
1400 Tenth Street
Sacramento, CA 95814

BAY AREA

AIR QUALITY MANAGEMENT DISTRICT

PERMIT SERVICES DIVISION
939 Ellis Street, San Francisco
California 94109
(415) 771-6000

PLANT DATA P-201

Plant Identification No.

Shell Oil Company
Business Name

NA
Other Business Name(s)(if any)

NA
Plant Telephone Number

Shell Oil Company
Name of Parent Company (if any)

285 Hegenberger Road at Leet Drive
Plant Address

Oakland, CA 94621
City State Zip Code

P.O. Box 5278
Mailing Address

Concord, CA 94520
City State Zip Code

PLANT AREA (Acres) 0.79

NUMBER OF EMPLOYEES NA

PRINCIPAL PRODUCT NA

OWNERSHIP:

(X) Private
( ) Utility
( ) Local Government
( ) State Government
( ) Federal Government

Please submit a name and address to whom all correspondence can be sent.

Justin Hawkins / Project Engineer
Contact Name Title

Pacific Environmental Group
2025 Gateway Place, #440
Street Address

San Jose, CA 95110
City State Zip Code

408-441-7500
Telephone Number

*Plant Identification Numbers are assigned by the BAAQMD. Leave blank if number is not known.

Justin Hawkins, Project Engineer
Name & Title of person preparing this fo

signature

9/84

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM G
General Air Pollution Source

If in addition to the general process described hereon this source burns fuel, then complete Form C also.
Use specific forms if applicable: Form T (organic tankage, loading), Form S (surface coating, solvent use).

Business Name: Shell Oil Company Plant No: _____ (If unknown, leave blank)

SIC Number: _____ Date of Initial Operation: 02-01-93

Name or Description: Soil Vapor Extraction Unit Source No.: S 01

Make, Model, and Rated Capacity of Equipment: Vacuum Unit

Process Code* (Column A): 7156 Materials Code* (Column B): 572 Usage Unit* (Column C): ft^3

Total throughput, last 12 months: 0 Usage Units* Max operating rate: 250 SCFM Usage Units*/hr

Typical % of total throughput: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %

Typical operating times: 24 hrs/day 7 days/week 52 weeks/year

For batch or cyclic processes: NA min/cycle NA min. between cycles

Exhaust gases from source: (at max. operation) Wet gas flow rate 250 cfm at 70 °F

Approximate water vapor content 3,9 vol %

EMISSION FACTORS (at maximum operating rate)

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Source is already in operation, completion of table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

[ ] Check box if factors apply to emissions after Abatement Device(s).

	EMISSION FACTORS lbs/Usage Unit*	Basis Code (see reverse)
Particulate	0	4
Organics	8.4E-3	3,4
Nitrogen Oxides (as NO_2)	0	4
Sulfur Dioxide	0	4
Carbon Monoxide	0	4
Other: 41	3.3E-5	3,4
Other:		

With regard to air pollutant flow from this source, what source(s), abatement device(s) and/or emission points(s) are immediately downstream? S S S

(A01 or(A02 and A03) or A04) P 01 P P P

*From Tables G-1 through G-7 (See listing on reverse side)

Person Completing this Form: Justin Hawkins, Project Engineer Date: 10-22-92

Pacific Environmental Group, Inc.

8-77

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

CODE TABLES* for GENERAL AIR POLLUTION SOURCES

Table	Process
G-1	Food & Agricultural
G-2	Metallurgical (Primary Metals)
G-3	Metallurgical (Secondary Metals)
G-4	Mineral
G-5	Petroleum Refining
G-6	Incineration
G-7	Chemical/Other

*Available from the BAAQMD upon request.

BAY AREA
IR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

Business Name: Shell Oil Company Plant No.: _____ (If unknown, leave blank)

Name or Description: Internal Combustion Engine Abatement Device No.: A 01

Make, Model and Rated Capacity: VR Systems, Model 4 500 SCFM

Abatement Device Code (Table on reverse side): 65 Date of Initial Operation: 02-01-93

With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

S 01	S	S					
S	S	S	A	A	A	A	A

Typical Gas Stream Temperature at Inlet: 70 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)		BASIS CODE (Codes on reverse side)
Particulate	NA	%	4
Organics	98.5	%	3,4
Nitrogen Oxides (as NO_2)	NA	%	4
Sulfur Dioxide	NA	%	4
Carbon Monoxide	NA	%	4
Other: 41	98.5	%	3,4
Other:		%	

[X] Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S	A	A	P 01	P	P	P	P

30-87

Person Completing this Form: Justin Hawkins Date: 10-22-92

Pacific Environmental Group, Inc.

Abatement Device Codes

CODE	DEVICE
	ABSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
49	Claus Solution Reaction, for Sulfur Plant
50	Dual Absorption, for H_2SO_4 Plant
51	Flue Gas Desulfurization, for Fossil Fuel Combustion
52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109
(415) 771-6000

DATA FORM C
FUEL COMBUSTION SOURCE

District Use Only
New [ ]
Modified [ ]
Retro [ ]

Form C is for all operations which burn fuel. If the operation also involves evaporation of any organic solvent, complete Form S and attach to this form. If the operation involves a process which generates any other air pollutants, complete Form G and attach to this form.

[X] Check box if this source has a secondary function as an abatement device for some other source(s); complete Lines 1, 2, & 7-13 on Form A (using the source number below for the Abatement Device No.) and attach to this form.

1. Company Name Shell Oil Company Plant No. _____ (If Unknown, Leave Blank) Source No. S A1
2. Equipment Name and Number, or Description Internal Combustion Engine
3. Make, Model VR Systems, Model 4 Maximum Firing Rate 8.8E 5 BTU/Hr
4. Date of Modification or Initial Operation 02-01-93
5. Primary Use (Check One): [ ] Electrical Generation [ ] Space Heat [ ] Waste Disposal [ ] Testing [X] Abatement Device [ ] Cogeneration [ ] Resource Recovery [ ] Other [ ] Process Heat; Material Heated _____
6. SIC Number _____ (If Unknown, Leave Blank)
7. Equipment Type (Check One):

Internal Combustion	[ ] Diesel Engine [X] Otto Cycle Engine [ ] Gas Turbine [ ] Other _____	Displacement 920 cubic inches NA hp
Incinerator	[ ] Salvage Operation [ ] Liquid Waste [ ] Pathological Waste [ ] Other _____	Temperature _____ °F Residence Time _____ Sec
Others	[ ] Boiler [ ] Afterburner [ ] Flare [ ] Open Burning [ ] Other _____	[ ] Dryer [ ] Oven [ ] Furnace [ ] Kiln Material dried, baked, or heated _____

8. [ ] Yes [X] No Overfire Air? If Yes, what percent (%) _____
9. [ ] Yes [X] No Flue Gas Recirculation? If Yes, what percent (%) _____
10. [ ] Yes [X] No Air Preheat? Temperature _____ °F
11. [ ] Yes [X] No Low NOx Burners? Make, Model _____
12. Maximum Flame Temperature 3200 °F
13. Combustion Products: Wet Gas Flow Rate 488 acfm at 500 °F
    Typical Oxygen Content _____ dry volume % or _____ wet volume %
    or 10 % excess air
14. Typical Use: Hours/Day 24 Days/Week 7 Weeks/Year 52
15. Typical % of Annual Total: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
16. With regard to air pollutant flow, what source(s) or abatement device(s) are immediately upstream?
    S 01 S S S S S S A A A
17. With regard to air pollutant flow, what source(s), abatement device(s), and/or emission points are immediately downstream?
    S S A A P01 P

10/82

Person Completing This Form Justin Hawkins Date 10-22-92
Pacific Environmental Group, Inc.

FUELS

INSTRUCTIONS: Complete one line in Section A for each fuel. Section B is OPTIONAL. Please use the units at the bottom of each table. N/A means "Not Applicable".

SECTION A: Fuel Data

	Fuel Name	Fuel Code **	Total Annual Usage ***	Maximum Possible Fuel Use Rate	Typical Heat Content	Sulfur Content	Nitrogen Content (OPTIONAL)	Ash Content (OPTIONAL)
1.								
2.	LPG	160	2916	.031	2.6E6	NA	NA	NA
3.			MSCF	MSCF/HR	BTU/MSCF			
4.								
5.								

Use the appropriate units for each fuel

Natural Gas	Therms*	BTU/Hr	N/A	N/A	N/A	N/A
Other Gas	MSCF*	MSCF/Hr	BTU/MSCF	ppm	N/A	N/A
Liquid	MGAL*	MGAL/Hr	BTU/MGAL	wt %	wt %	wt %
Solid	TONS	Ton/Hr	BTU/Ton	wt %	wt %	wt %

SECTION B: Emission Factors (OPTIONAL)

	Fuel Name	Particulates		NOx		CO		Other_____		Other_____	
		Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis
1.											
2.											
3.											
4.											
5.											

Use the appropriate units for each fuel

Natural Gas	lb/Therm
Other Gas	lb/MSCF
Liquid	lb/MGAL
Solid	lb/Ton

NOTES:

* MSCF = thousand standard cubic feet

* MGAL = thousand gallons

* Therm = 100,000 BTU

** See tables below for Fuel and Basis Codes

*** Total Annual Usage is: Projected usage over next 12 months if equipment is new or modified.

: Actual usage for last 12 months if equipment is existing and unchanged.

FUEL CODES

CODE	FUEL
25	Anthracite Coal
33	Bagasse
35	Bark
43	Bituminous Coal
47	Brown Coal
242	Bunker C Fuel Oil
80	Coke
89	Crude Oil
98	Diesel Oil
493	Digester Gas
100	Distillate Oil
128	Gasoline
158	Jet Fuel
160	LPG
165	Lignite
167	Liquid Waste
494	Municipal Solid Waste
189	Natural Gas
234	Process Gas - Blast Furnace
235	Process Gas - CO
236	Process Gas - Coke Oven Gas
238	Process Gas - RMG
237	Process Gas - Other
242	Residual Oil
495	RDF
493	Sludge Gas
256	Solid Propellant
257	Solid Waste
304	Wood - Hogged
305	Wood - Other
198	Other - Gaseous Fuels
200	Other - Liquid Fuels
203	Other - Solid Fuels

BASIS CODES

CODE	METHOD
0	Not applicable for this pollutant
1	Source testing or other measurement by plant (attach copy)
2	Source testing or other measurement by BAAQMD (give date)
3	Specifications from vendor (attach copy)
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD
6	Taken from AP-42 (Compilation of Air Pollutant Emission Factors, EPA)
7	Taken from literature, other than AP-42 (attach copy)
8	Guess

BAY AREA
IR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

Business Name: Shell Oil Company Plant No.: _____ (If unknown, leave blank)

Name or Description: Vapor Phase Carbon Unit Abatement Device No.: A 02

Make, Model and Rated Capacity: Westates, VSC 1200, 500 SCFM, 1000# Carbon

Abatement Device Code (Table on reverse side): 56 Date of Initial Operation: 02-01-93

With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

S 01	S	S					
S	S	S	A	A	A	A	A

Typical Gas Stream Temperature at Inlet: 120 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)	BASIS CODE (Codes on reverse side)
Particulate	NA %	4
Organics	90 %	3,4
Nitrogen Oxides (as NO_2)	NA %	4
Sulfur Dioxide	NA %	4
Carbon Monoxide	NA %	4
Other: 41	90 %	3,4
Other:	%	

☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S	A03	A	P	P	P	P	P

10-87

Person Completing this Form: Justin Hawkins Date: 10-22-92

Pacific Environmental Group, Inc.

Abatement Device Codes

CODE	DEVICE
	ADSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
49	Claus Solution Reaction, for Sulfur Plant
50	Dual Absorption, for H_2SO_4 Plant
51	Flue Gas Desulfurization, for Fossil Fuel Combustion
52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

. Business Name: Shell Oil Company Plant No.: _____ (If unknown, leave blank)

. Name or Description: Vapor Phase Carbon Unit Abatement Device No.: A03

. Make, Model and Rated Capacity: Westates, VSC 1200, 500 SCFM, 1000# Carbon

. Abatement Device Code (Table on reverse side): 56 Date of Initial Operation: 02-01-93

. With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

S	S	S	A 02	A	A	A	A	
S	S	S						

. Typical Gas Stream Temperature at Inlet: 120 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)	BASIS CODE (Codes on reverse side)
Particulate	NA %	4
Organics	90 %	3,4
Nitrogen Oxides (as NO_2)	NA %	4
Sulfur Dioxide	NA %	4
Carbon Monoxide	NA %	4
Other: 41	90 %	3,4
Other:	%	

☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

. With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S	A	A	P 01	P	P	P	P

30-87

Person Completing this Form: Justin Hawkins Date: 10-22-92

Pacific Environmental Group, Inc.

Abatement Device Codes

CODE	DEVICE
	ABSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
49	Claus Solution Reaction, for Sulfur Plant
50	Dual Absorption, for H_2SO_4 Plant
51	Flue Gas Desulfurization, for Fossil Fuel Combustion
52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA
IR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

. Business Name: Shell Oil Company Plant No.: _____ (If unknown, leave blank)

. Name or Description: Catalytic Oxidation Unit Abatement Device No.: A 04

. Make, Model and Rated Capacity: Therm Tech, Vac 25, 250 SCFM

. Abatement Device Code (Table on reverse side): 2 Date of Initial Operation: 02-01-93

. With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

S 01	S	S					
S	S	S	A	A	A	A	A

. Typical Gas Stream Temperature at Inlet: 120 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)	BASIS CODE (Codes on reverse side)
Particulate	NA %	4
Organics	98.5 %	3,4
Nitrogen Oxides (as NO_2)	NA %	4
Sulfur Dioxide	NA %	4
Carbon Monoxide	NA %	4
Other: 41	98.5 %	3,4
Other:	%	

[X] Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S	A	A	P 01	P	P	P	P

30-87

Person Completing this Form: Justin Hawkins Date: 10-22-92

Pacific Environmental Group, Inc.

Abatement Device Codes

CODE	DEVICE
	ABSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
49	Claus Solution Reaction, for Sulfur Plant
50	Dual Absorption, for H_2SO_4 Plant
51	Flue Gas Desulfurization, for Fossil Fuel Combustion
52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109
(415) 771-6000

DATA FORM C
FUEL COMBUSTION SOURCE

District Use Only
New [ ]
Modified [ ]
Retro [ ]

Form C is for all operations which burn fuel. If the operation also involves evaporation of any organic solvent, complete Form S and attach to this form. If the operation involves a process which generates any other air pollutants, complete Form G and attach to this form.

[X] Check box if this source has a secondary function as an abatement device for some other source(s); complete Lines 1, 2, & 7-13 on Form A (using the source number below for the Abatement Device No.) and attach to this form.

1. Company Name Shell Oil Company Plant No. _____ (If Unknown, Leave Blank) Source No. SA-04
2. Equipment Name and Number, or Description Catalytic Oxidation Process Heater
3. Make, Model Therm Tech, VAC 25 Maximum Firing Rate 356,000 BTU/Hr
4. Date of Modification or Initial Operation 02-01-93
5. Primary Use (Check One): [ ] Electrical Generation [ ] Space Heat [ ] Waste Disposal [ ] Testing [ ] Abatement Device [ ] Cogeneration [ ] Resource Recovery [ ] Other [X] Process Heat; Material Heated Extraction Soil Vapor
6. SIC Number _____ (If Unknown, Leave Blank)
7. Equipment Type (Check One):

Internal Combustion	[ ] Diesel Engine [ ] Otto Cycle Engine	Displacement _____ cubic inches
	[ ] Gas Turbine [ ] Other _____	_____ hp
Incinerator	[ ] Salvage Operation [ ] Liquid Waste [ ] Pathological Waste [ ] Other _____	Temperature _____ °F Residence Time _____ Sec
Others	[ ] Boiler [ ] Dryer [ ] Afterburner [ ] Oven [ ] Flare [ ] Furnace [ ] Open Burning [ ] Kiln [X] Other Direct-Fire Preheater	Material dried, baked, or heated _____

8. [ ] Yes [X] No Overfire Air? If Yes, what percent (%) _____
9. [ ] Yes [X] No Flue Gas Recirculation? If Yes, what percent (%) _____
10. [X] Yes [ ] No Air Preheat? Temperature 100 °F
11. [ ] Yes [X] No Low NOx Burners? Make, Model _____
12. Maximum Flame Temperature 3,200 °F
13. Combustion Products: Wet Gas Flow Rate 488 acfm at 500 °F
    Typical Oxygen Content _____ dry volume % or _____ wet volume %
    or 10 % excess air
14. Typical Use: Hours/Day 24 Days/Week 7 Weeks/Year 52
15. Typical % of Annual Total: Dec-Feb 25 % Mar-May 25 % Jun-Aug 25 % Sep-Nov 25 %
16. With regard to air pollutant flow, what source(s) or abatement device(s) are immediately upstream?

S 01	S	S	S	S	S	S	A	A	A

17. With regard to air pollutant flow, what source(s), abatement device(s), and/or emission points are immediately downstream?

S	S	A	A	P 01	P

10/82

Person Completing This Form _____ Date 10-22-92
Justin Hawkins - Pacific Environmental Group

FUELS

INSTRUCTIONS: Complete one line in Sect \ for each fuel. Section B is OPTIONAL. Ple ise the units at the bottom of each table. N/A means .c Applicable".

SECTION A: Fuel Data

	Fuel Name	Fuel Code **	Total Annual Usage ***	Maximum Possible Fuel Use Rate	Typical Heat Content	Sulfur Content	Nitrogen Content (OPTIONAL)	Ash Content (OPTIONAL)
1.	Natural Gas	189	2,000	580,000	NA	NA		
2.			THERMS	BTU/HR				
3.								
4.								
5.								

Use the appropriate units for each fuel							
Natural Gas	Therms*	BTU/Hr	N/A	N/A	N/A	N/A	
Other Gas	MSCF*	MSCF/Hr	BTU/MSCF	ppm	N/A	N/A	
Liquid	MGAL*	MGAL/Hr	BTU/MGAL	wt %	wt %	wt %	
Solid	TONS	Ton/Hr	BTU/Ton	wt %	wt %	wt %	

SECTION B: Emission Factors (OPTIONAL)

	Fuel Name	Particulates		NOx		CO		Other_____		Other_____	
		Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis	Emission Factor	**Basis
1.											
2.											
3.											
4.											
5.											

Use the appropriate units for each fuel	
Natural Gas	lb/Therm
Other Gas	lb/MSCF
Liquid	lb/MGAL
Solid	lb/Ton

NOTES:

* MSCF = thousand standard cubic feet

* MGAL = thousand gallons

* Therm = 100,000 BTU

** See tables below for Fuel and Basis Codes

*** Total Annual Usage is: Projected usage over next 12 months if equipment is new or modified.

: Actual usage for last 12 months if equipment is existing and unchanged.

FUEL CODES

CODE	FUEL	CODE	FUEL
25	Anthracite Coal	189	Natural Gas
33	Bagasse	234	Process Gas - Blast Furnace
35	Bark	235	Process Gas - CO
43	Bituminous Coal	236	Process Gas - Coke Oven Gas
47	Brown Coal	238	Process Gas - RMG
242	Bunker C Fuel Oil	237	Process Gas - Other
80	Coke	242	Residual Oil
89	Crude Oil	495	RDF
98	Diesel Oil	493	Sludge Gas
493	Digester Gas	256	Solid Propellant
100	Distillate Oil	257	Solid Waste
128	Gasoline	304	Wood - Hogged
158	Jet Fuel	305	Wood - Other
160	LPG	198	Other - Gaseous Fuels
165	Lignite	200	Other - Liquid Fuels
167	Liquid Waste	203	Other - Solid Fuels
494	Municipal Solid Waste		

BASIS CODES

CODE	METHOD
0	Not applicable for this pollutant
1	Source testing or other measurement by plant (attach copy)
2	Source testing or other measurement by BAAQMD (give date)
3	Specifications from vendor (attach copy)
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD
6	Taken from AP-42 (Compilation of Air Pollutant Emission Factors, EPA)
7	Taken from literature, other than AP-42 (attach copy)
8	Guess

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM P
Emission Point

Form P is for well-defined emission points such as stacks or chimneys only; do not use for windows, room vents, etc.

Business Name: Shell Oil Company Plant No.:

Emission Point No.: P 01

With regard to air pollutant flow into this emission point, what source(s) and/or abatement device(s) are immediately upstream?

S S S

S S S A 01 or (A02 and A 03) or A04

Exit Cross-section Area: 0.022 Square feet Height above grade: 10 Feet

Effluent Flow from Stack:

	Typical Operating Condition		Maximum Operating Condition	
Actual Wet Gas Flow Rate	488	cfm	589	cfm
Percent Water Vapor	3.9	Vol %	3.9	Vol %
Temperature	500	°F	700	°F

If this stack is equipped to measure (monitor) the emission of any air pollutants,

-is monitoring continuous? NA

-what pollutants are monitored? NA

Person Completing this Form Justin Hawkins, Project Engineer Date 10-22-92
Pacific Environmental Group, Inc.

4-25-77