Shaw Environmental & Infrastructure, Inc.

13 British American Boulevard
Latham, NY 12110-1405
518.783.1996
Fax 518.783.8397

Shaw The Shaw Group Inc.™

May 31, 2002

Office of the Building Department
Town of Smithtown
P.O. Box 575
Smithtown, New York 11787

Subject: **Construction Certification Report**
Permit Number 106499
100 Oser Avenue
Hauppauge, New York 11788

To Whom it May Concern:

Enclosed, please find a copy of the *Construction Certification Report* prepared for the soil vapor extraction system currently operating at the above-referenced property. The building permit number is 106499. This is being submitted in response to the Inspection Notice dated May 7, 2002 (**attached**) and per the May 30, 2002 telephone conversation between myself and Matt from your office.

Unless otherwise informed, it will be assumed that the above-referenced permit is in compliance with local code. Please contact me at 518-783-1996 with any questions or concerns pertaining to this permit.

Sincerely:
Shaw Environmental and Infrastructure, Inc.

Drew Graham
Geologist

attachments

c: C. Montroy, NYSDEC
T. Antonoff (cover letter only), Shaw E&I
H. Dudek (cover letter only), Shaw E&I

SECTION-BLOCK-LOT 195 - 1 - 60.2

L 7

BUILDING DEPARTMENT

P.O. Box 575, Smithtown, NY 11787

TOWN OF SMITHTOWN

INSPECTION NOTICE

Permit # 100499

Complaint # ______

NAME Suffolk County [illegible] DATE [illegible]

LOCATION 100 [illegible]

TYPE OF INSPECTION [illegible]

A PERMIT IS REQUIRED BEFORE ANY CONSTRUCTION WORK CAN START.

Inspection was performed on the above date and we OFFER the following instructions and comments:

[illegible] Certification [illegible] Building Dept. [illegible]

Final Notice

30 Days to Comply.

PLUMBING PERMIT REQUIRED YES ☐ NO ☐

SMOKE DETECTOR REQUIRED YES ☐ NO ☐

ELECTRICAL INSPECTION REQUIRED YES ☐ NO ☐

☐ Left on Job
☑ Hand Delivered
☐ Mailed
☐ Other (Explain)

IF VIOLATION EXISTS, you are hereby notified to remedy the conditions as stated above, either write or call for a reinspection and if you have any questions regarding this matter contact the BUILDING DEPARTMENT at 360-7520.

[illegible signature] Received by

[illegible signature] Deputy Inspector, Town of Smithtown

WHITE/File YELLOW/Inspector PINK/Applicant

Proj: NYSDEC/OSER
File Code: 9C

the it group

IT Corporation
13 British American Boulevard
Latham, NY 12110-1405
Tel. 518.783.1996
Fax. 518.783.8397

A Member of The IT Group

Construction Certification Report
100 Oser Avenue
Hauppauge, New York

IT Corporation Project No. 781882

February 7, 2001

Prepared for:
Ms. Crystal Montroy
NYSDEC
50 Wolf Road
Albany, New York 12205

Prepared By:
IT Corporation, Inc.
13 British American Boulevard
Latham, New York 12110

IT Corporation, Inc.
Written/Submitted By:

Heide-Marie Dudek
Project Engineer

IT Corporation, Inc.
Reviewed By/Approved By:

Thomas D. Antonoff
Project Manager

IT Corporation, Inc.
Reviewed By/Approved By:

Michael P. Sykes, PE
Senior Project Engineer

J: 800reps/NYSDEC-OserAve

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1.0 INTRODUCTION

The *Construction Certification Report* for the 100 Oser Avenue, Hauppauge, New York Site Interim Remedial Measure (IRM) **(Figure 1, Site Map)** has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) Order of Consent (Index # D1-0023-98-09). The Order states that the NYSDEC will develop and implement an Interim Remedial Measure (IRM) as needed, based on the Site characterization data. The Construction Certification Report describes the original IRM design, authorized modifications to the design, the project schedule, and the construction as-builts.

The primary purpose of the IRM was to take immediate steps to reduce concentrations of the halogenated volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE), in the unsaturated (vadose) zone in the immediate vicinity of the potential source of the vapors. Two dry wells proximate to the building's western exterior wall are currently identified as the primary source of PCE vapors at the site.

The project design and construction for the Oser Avenue IRM was conducted under Work Assignment No. D003666-21 under the NYSDEC by IT Corporation of Latham, New York. IT Corporation provided the project management, engineering, and field over-site, while the responsive "low bidder" Falmouth Products of Falmouth, Massachusetts provided the remedial equipment and installation. The total project cost was $138,042.

The IRM consists of two stages. The initial stage (Stage I) modified the existing HVAC configuration at the Site to increase fresh airflow into the building. This new HVAC configuration reduced indoor air concentrations of PCE below New York State Department of Health (NYSDOH) guidelines. Stage I was implemented by the Oser Avenue Facility under the NYSDOH, and was not included in the IT Corporation scope of work. The second stage (Stage II) of the IRM included designing and installing a soil vapor extraction (SVE) system (the System) to reduce VOC soil vapor concentrations at the source. This SVE System includes a catalytic oxidation (CATOX) unit to destroy VOCs in the soil vapor effluent stream.

IT Corporation received notice to proceed with the design on September 28, 2000. The remedial System was installed on September 12, 2000.

2.0 PROJECT DESIGN

The IRM design was based in part on information obtained during the January 2000 soil vapor extraction pilot test conducted by IT Corporation, and discussion with the NYSDEC concerning remedial objectives for this site. Stage I of the IRM (changes to the HVAC system) was completed in the Spring of 2000.

2.1 General Process Description and Equipment List

The IRM Stage II System consists of one pre-existing vapor extraction well located on the west side of the Site building (**Figure 2, Site Map**), a soil vapor extraction system and a catalytic oxidation system for off-gas treatment. The System is contained with a chain-linked fence, approximately 100 square feet in area, next to the west side of Site building. The System is connected to the vapor extraction well via above ground conveyance piping. A Piping and Instrumentation Diagram is provided as **Drawing P-2**.

2.1.1 Soil Vapor Extraction Well

The vapor extraction well (SVE-1), located on the west side of the Site building, was installed during a previous investigation. Details of the well construction are provided in **Appendix A**.

2.1.2 Above Grade Piping

Because the System is intended to be interim and therefore temporary, all of the vapor extraction piping was installed above existing grade. This minimized intrusive work and allowed easy installation. The piping running from the extraction well to the System is 3-inch PVC SCH 80. Between the vapor extraction well and the moisture separator, a sampling port, drain port, and orifice plate meter are installed.

2.1.3 Electrical Installation

Electrical service required to power the System equipment is 3-phase 125 amp, 208-volt service. The System service is connected into the existing Site building distribution system. A new circuit breaker was installed into the existing distribution system rated 3-phase, 125 amp, and 208-volt. A distribution panel was installed outside the Site building, within the equipment area and connected to the Site building distribution system with 4-#1 AWG wire in 2-inch diameter galvanized conduit. An electric submeter demand instrument, rated not to exceed 200 amps, was installed between the Site building distribution system and the new distribution panel. The new distribution panel has 125 amp with a main circuit and 42 available circuits. The available circuits will include one 3-pole, 70 amp breaker; one 3-pole, 15 amp breaker; one 3-pole, 60 amp breaker; one 2-pole, 20 amp breaker; three 1-pole, 20 amp breakers; and one 1-pole, 15 amp breaker.

2.1.4 Vapor Extraction Equipment

The soil vapors are extracted from the well by a skid mounted unit which includes a moisture separator, particulate filter, dilution control system, regenerative blower, and influent and effluent pressure/vacuum gauges. The regenerative blower is capable of handling flow of 25 scfm to 50 scfm at 20 inches of water.

The moisture separator placed inline between the blower and well system is used to separate moisture from the air stream prior to entering the blower. The separator has a 40 gallon capacity, a cleanout, drain port, and a high level alarm. The high level alarm will activate at the 30-gallon level and shut down the System until the tank is emptied and the system is manually restarted. Drained process water is stored on-site in a DOT-approved 55-gallon drum prior to sampling and appropriate disposal.

All piping on the unit is stainless steel or schedule 80 PVC. The skid-mounted unit is equipped with all the safety guards as required by OSHA for safe operation.

2.1.5 Catalytic Oxidation System

A catalytic oxidation system with chlorine solvent catalyst is used to destroy chlorinated VOCs in the soil vapor stream. The CATOX system is able to handle airflow rates from 25 scfm to 300 scfm with 99-percent destruction efficiency. The unit is also equipped with an automatic dilution control valve that will regulate influent VOC concentrations to the CATOX burner and the SVE blower. VOC concentrations to the blower will be kept below 20-percent of the lower explosive limit (LEL) and constant to the CATOX burner. Any abrupt increase in the vapor stream VOC concentrations will trigger an automatic SVE/CATOX system shutdown.

The CATOX system is also equipped with a flame arrestor, a 20-foot emission stack, influent and effluent sample ports, control panel, and three thermocouples. The thermocouples monitor temperatures upstream of the catalyst, mid-stream in the catalyst, and down stream of the catalyst. These couples are linked to a programmable controller.

2.1.6 Control Panel

The CATOX system is equipped with a control panel that controls the operation of the System. It is housed in a NEMA 4 enclosure. The control panel includes the following:

1) Moisture separator high-level switch – The System shuts down until manually restarted.
2) CATOX Pressure Switch – The System shuts down until manually restarted.
3) Three programmable temperature controllers – The System shuts down until manually restarted.

The SVE blower is controlled by a Hand/Off/Auto Switch.

2.1.7 System Operation and Maintenance

The System has been designed to operate automatically. The System operation includes:

- Removal of 250 ppm PCE soil vapor (initially this will be approximately 2.5 to 5 cfm) from the SVE well.
- Combust soil vapors with PCE concentrations from 0 ppm to 250 ppm.
- Automatic adjustment of the soil gas flow to maintain soil gas concentrations below the LEL.
- Automatic trapping of water droplets in the moisture separator.
- Automatic shut down of the System when 30 gallons of water have been collected.

2.1.7.1 SVE/CATOX Maintenance

Maintenance of major components of the System includes the following tasks:

SVE Blower:

- Change oil monthly. The oil in the gear case should be AEON PD Synthetic blower lubricant. Viscosity required is 700 to 1000 SSU.
- Grease motor bearings monthly (NLGI Grade 2 EP Premium grade Petroleum-base grease or vendor specified).
- Inspect and tighten the belts on a monthly basis, if necessary.
- Check air filter and replace if necessary.
- Check and record operating parameters.
- Investigate and repair any unusual noises (belt slap, bearing noises) as necessary.

Moisture Separator

- Inspect moisture separator tank for leaks or cracks monthly.
- Empty moisture separator tank and store water appropriately.

CATOX System

- Follow vendor supplied Operation and Maintenance requirements (**Appendix B**).
- Check discharge stack for deterioration.
- Monitor and record operating parameters.

2.2 Scheduled Operation and Maintenance Work Scope

2.2.1 Operation and Maintenance (O&M) Training

Training for the System will include on-site training by the equipment vendors, and on-site training by the project engineer for IT technical staff. The equipment vendors will be on-site to familiarize IT engineers or staff with the proper operation and maintenance of the SVE blowers and CATOX system as described in **Section 2.1.7.1**. IT Corporation will also train the site technicians to ensure that the system influent concentrations are maintained. Instructions will also detail how and when to sample the influent and effluent streams for routine monitoring.

2.2.2 System Start Up

System start-up includes the brief period of operation directly upon initiation of the IRM System. The system will be monitored frequently during a period of approximately three weeks to sample influent air concentrations and flow rates. Due to the variable nature of soil vapor concentrations, this monitoring will allow early detection of excursions from the permitted system effluent concentrations. This monitoring period also provides for early detection of equipment problems including unsafe operating conditions.

2.2.3 Site O&M Visits (Maintenance)

Monthly site visits are scheduled to perform routine maintenance and monitor system performance. These monthly visits will begin in October 2000 and continue through March 2002. Maintenance tasks to be performed will include all tasks identified in **Section 2.1.7.1**.

2.2.4 Site O&M Sampling

Work at the site will also include the collection of all necessary influent, effluent and soil vapor samples in order to monitor system performance and progress.

Air samples will be collected from the influent and effluent streams of the treatment system. The influent air samples will be analyzed for PCE. Effluent samples will be analyzed for PCE and hydrochloric acid. PCE samples will be collected from the system and soil vapor at vapor monitor points, according to the following schedule. The vapor monitor points (VMP) will be sampled monthly for the first six months, and quarterly thereafter.

System Vapor Streams	Sample Point/Event	Sampling Points	Frequency	Number of Samples
CATOX/SVE System	Startup Influent/Effluent	2	2	4
CATOX/SVE System	Influent	1	18	18
CATOX/SVE System	Effluent	1	18	18
VMP	Startup	8	1	8
VMP	Months 2-6	6	5	30
VMP	Quarterly during months 7-18	6	4	24
Total				102

HCl samples will be collected twice in the first month, monthly during months two through nine, and quarterly thereafter for a total of 13 samples.

2.2.5 O&M Reporting

Operation and Maintenance Reports (Reports) will be created monthly for the first six months of operations, and quarterly thereafter during the O&M period. The reports will be designed to be brief, providing basic operating parameters, results of influent/effluent and soil vapor monitoring point sampling. A discussion will be included detailing the system's performance against permit limits, remedial progress, and recommendations for modifications, repairs, or discontinuation of treatment. The reports will be delivered to the NYSDEC for distribution to other interested parties, repositories, or agencies.

3.0 AIR PERMIT REQUIREMENTS

An approved air permit application was not required according to Part 201-3.3 C29 because the Site is under an Order of Consent. However, a completed NYSDEC Air Permit Application is attached in **Appendix C**. The Screen 3 Model was used to illustrate that the PCE and hydrochloric acid emission rates did not exceed the Air Guide 1 for short term or annual limits. The air discharge model output is attached as **Appendix C**.

4.0 DESIGN MODIFICATIONS

The 100 Oser Avenue IRM was completed in conformance with the design plans and specifications. No variances were issued.

5.0 SCHEDULE AND START-UP

5.1 Schedule

Stage II of the 100 Oser Avenue IRM was completed on schedule. Electrical installation began on August 28, 2000 and was completed on August 29, 2000. The SVE and CATOX systems were installed on September 12, 2000, with start-up and shake-down completed by September 15, 2000.

5.2 Start-up

Stage II of the IRM construction was completed on September 12, 2000. Start-up began on September 12, 2000. The initial soil vapor extraction rate was 2.5 cubic feet per minute with make-up air totaling 25 cfm and an inlet concentration of 800 mg/m3, after 24 hours of operation the inlet concentration dropped to 210 mg/m^3. The system was monitored for three weeks, on September 28, 2000 the soil vapor extraction was increased to 3.5 cfm maintaining a 210 mg/m^3 influent concentration.

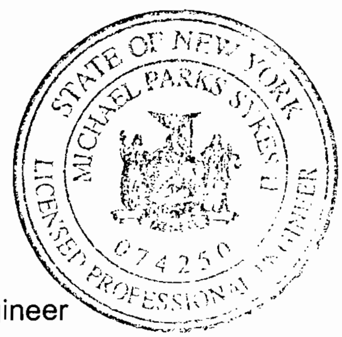
6.0 CERTIFICATION STATEMENT

I hereby certify as a Professional Engineer registered in the State of New York, that the as-built construction presented in this report conforms to or exceeds the requirements of the approved engineering plans and specifications. I also certify that the start-up sampling and analysis were conducted in accordance with accepted standards and practices.

The 100 Oser Avenue, Hauppauge, New York Interim Remedial Measure soil vapor extraction system and catalytic oxidation system has been installed and is operating within acceptable parameters.

Respectfully Submitted,

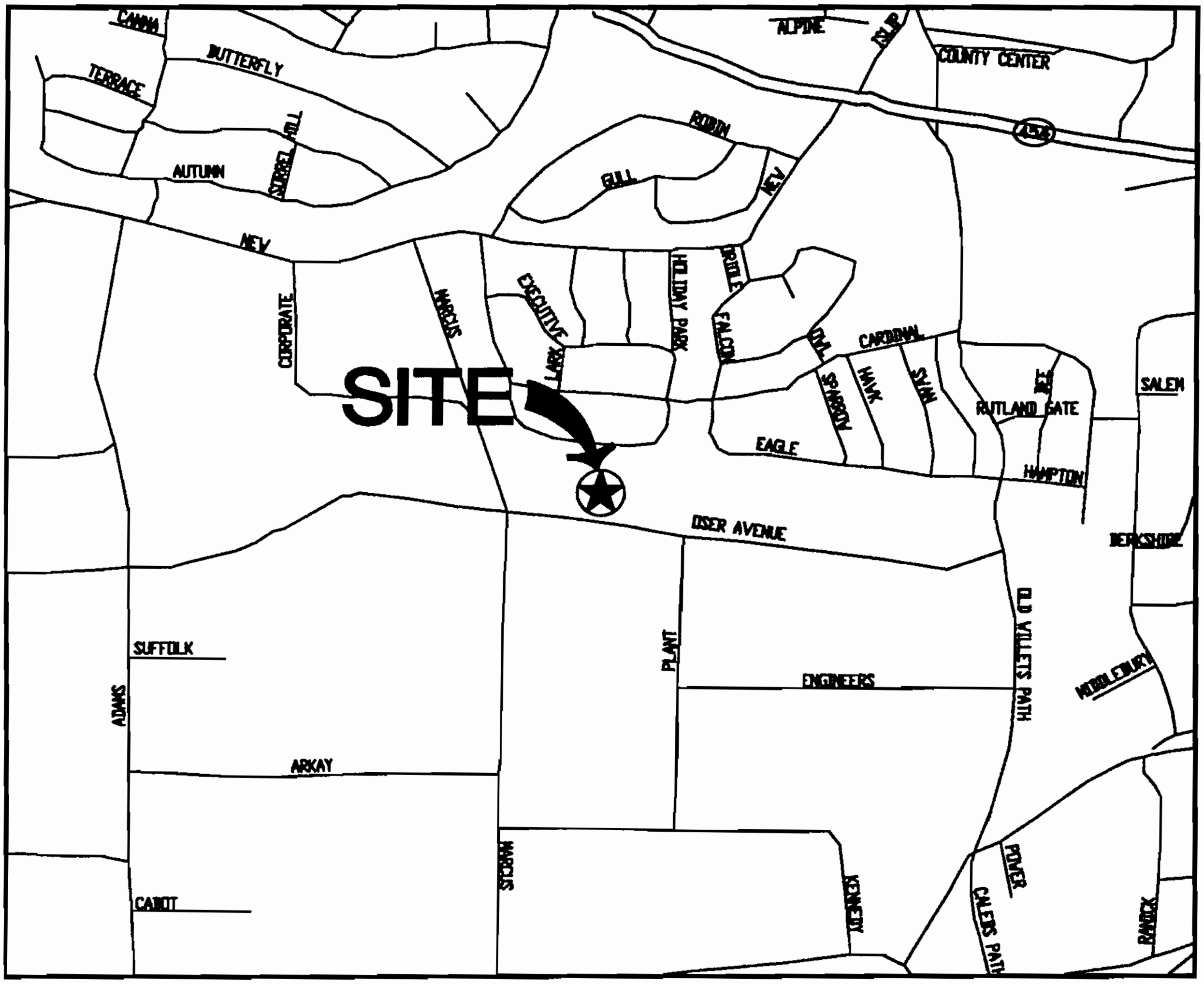
IT Corporation of Latham, New York

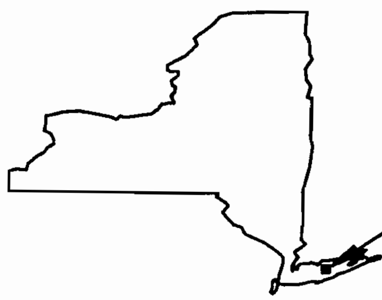


Michael P. Sykes, P.E.

Licensed Professional Engineer
New York License No. 074250

FIGURES





DRAWING NUMBER 1882-SLM

APPROVED BY

CHECKED BY

DRAWN BY 5-14-99 DEO

OFFICE ALB

X-REF ---

IMAGE ---

SCALE 1:15,625

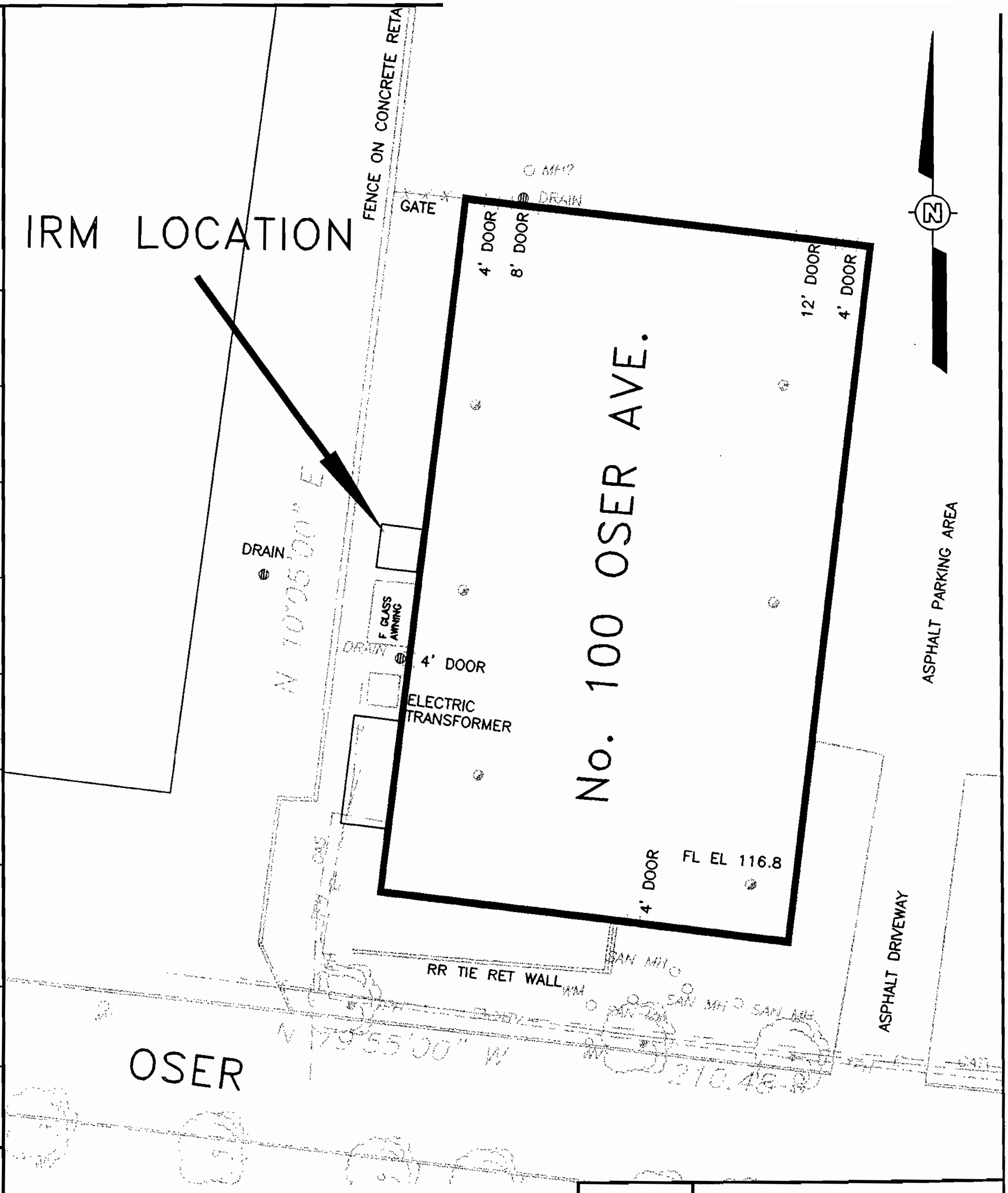
REFERENCE:
MAP FROM DELORME'S MAP EXPERT,
FREEPORT, MAINE.

IT CORPORATION

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION

FIGURE 1

SITE LOCATION MAP
100 OSER AVENUE
HAUPPAUGE, NEW YORK



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APPROVED BY	
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X-REF	--
IMAGE	--

PLOT DATE: 11/14/00
FORMAT REVISION 9/24/99

REFERENCE:
BASE MAP SOURCE: ALBERT W. TAY LLS.

DRAWING NOT TO SCALE

IT CORPORATION

NEW YORK STATE DEPTARTMENT OF ENVIRONMENTAL CONSERVATION

FIGURE 2
SITE MAP

100 OSER AVENUE
HAUPPAUGE, NEW YORK

VALVE AND PIPING SYMBOLS

- GLOBE VALVE
- GATE VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- PLUG VALVE
- 3-WAY VALVE
- ANGLE VALVE
- RELIEF OR SAFETY VALVE
- DIAPHRAGM VALVE
- BALL VALVE
- GLOBE VALVE
- SELF-CONTAINED PRESSURE REGULATING VALVE W/RELIEF
- KNIFE GATE VALVE
- BACKFLOW PREVENTER
- NO NORMALLY OPEN
- NC NORMALLY CLOSED
- SP SAMPLE PORT
- FLEXIBLE HOSE
- BASKET TYPE STRAINER
- Y-TYPE STRAINER
- DUPLEX STRAINER
- SLEEVE COUPLING (SC)
- FLOOR DRAIN
- EQUIPMENT DRAIN
- CLEANOUT (CO)
- REMOVABLE PLUG
- REMOVABLE CAP
- BLIND FLANGE
- EXHAUST TO ATMOSPHERE (INSIDE)
- EXHAUST TO ATMOSPHERE (OUTSIDE)
- REDUCER
- UNION
- QUICK DISCONNECT COUPLING
- GAUGE SEAL
- DAMPER

VALVE OPERATOR SYMBOLS

- SOLENOID
- MOTOR, ELECTRIC
- DIAPHRAGM
- DIAPHRAGM WITH POSITIONER
- HANDWHEEL OR LEVER
- CHAINWHEEL

PRIMARY ELEMENT SYMBOLS - FLOW

- ORIFICE PLATE
- PITOT TUBE
- AVERAGING PITOT TUBE
- VENTURI OR FLOW TUBE
- TOTALIZING FLOWMETER
- FLUME
- WEIR
- TURBINE OR PROPELLOR TYPE METER
- MAGNETIC FLOW METER
- ROTAMETER

EQUIPMENT SYMBOLS

- SUBMERSIBLE PUMP
- PUMP
- PNEUMATIC DIAPHRAGM PUMP
- MOV MOTOR OPERATED 3 WAY VALVE
- BLOWER
- AIR COMPRESSOR

GENERAL INSTRUMENT SYMBOLS

ONE VARIABLE / TWO VARIABLES

- LOCALLY MOUNTED
- PANEL MOUNTED
- REAR-OF-PANEL MOUNTED
- I INTERLOCK
- P PURGE

LINE SYMBOLS

- PROCESS PIPES OR CHANNELS
- CONNECTION TO PROCESS, MECHANICAL LINK OR INSTRUMENT SUPPLY
- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL
- CAPILLARY TUBING (FILLED SYSTEM)
- HYDRAULIC SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL NO WIRING OR TUBING

INSTRUMENT IDENTIFICATION TABLE

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME				
C	CONDUCTIVITY			CONTROL	
D	DENSITY (SP. GR.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGING (DIMENSIONAL)		GLASS		
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOISTURE OR HUMIDITY				MIDDLE
N					
O			ORIFICE		
P	PRESSURE OR VACUUM		POINT (TEST)		
Q	QUANT. OR EVENT	INTEGRATE			
R	RADIOACTIVITY		RECORD OR PRINT		
S	SPEED OR FREQ.	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION		
V	VACUUM			VALVE OR DAMPER	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED		
Y				RELAY OR COMPUTE	
Z	POSITION			DRIVE, ACTUATE	

PROCESS LINE ABBREVIATIONS

AIR	AIR, ATMOSPHERIC PRESSURE
AG	ABOVE GRADE
BG	BELOW GRADE
BW	BACKWASH
CA	COMPRESSED AIR
CGW	CONTAMINATED GROUNDWATER
D	DRAIN
EFF	EFFLUENT
EXH	EXHAUST
GW	GROUNDWATER
NPW	NON-POTABLE WATER
P	PRODUCT
PW	POTABLE WATER
S	SANITARY
SL	SLUDGE
SP	SAMPLE PORT
SS	STORM SEWER
TF	TOTAL FLUIDS
V	VENT
VAP	VAPOR

PIPING MATERIAL IDENTIFICATION

CPVC	CHLORINATED POLYVINYL CHLORIDE
CSP	CARBON STEEL PIPE
COP	COPPER
CMP	CORRUGATED METAL PIPE
CIP	CAST IRON PIPE
DIP	DUCTILE IRON PIPE
GAL	GALVANIZED STEEL PIPE
PE	POLYETHYLENE PIPE
PP	POLYPROPYLENE PIPE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RUB	RUBBER HOSE
SS	STAINLESS STEEL PIPE
VCP	VITRIFIED CLAY PIPE
SCH	SCHEDULE

PROCESS PIPING IDENTIFICATION

2" XXX-YY-Z

- PROCESS PIPE
- PIPE DIAMETER (INCHES)
- INSULATION CLASS
- PIPING DESIGN TABLE NUMBER
- PROCESS LINE ABBREVIATION

INSTRUMENT IDENTIFICATION

FIT 100A

FIT-100A

- SUFFIX (NOT NORMALLY USED)
- LOOP NUMBER
- SUCCEEDING LETTERS
- FIRST LETTER

FUNCTION ABBREVIATIONS

DO	DISSOLVED OXYGEN
FC	FAIL CLOSED
FI	FAIL INDETERMINATE
FL	FAIL LOCKED
FO	FAIL OPEN
HOA	HAND-OFF-AUTOMATIC
I/I	CURRENT-TO-CURRENT
I/P	CURRENT-TO-PNEUMATIC
LEL	LOWER EXPLOSIVE LIMIT
LR	LOCAL-REMOTE
OC	OPEN-CLOSE
OO	ON-OFF (MAINTAINED)
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE (MOMENTARY)
SS	START-STOP (MOMENTARY)
>	HIGH SELECT
<	LOW SELECT
√	SQUARE ROOT
Σ	ADD OR TOTALIZE

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
A	11/14/02	SSH			AS - BUILT SUBMITTAL

IT CORPORATION

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PIPING & INSTRUMENTATION DIAGRAM LEGEND
100 OSER AVENUE
HAUPPAUGE, NEW YORK

DESIGNED BY	---	---	CHECKED BY	
DRAWN BY	HD/SSH/JV	---	APPROVED BY	
SCALE: NTS	DRAWING NO. 1882-P1		SHEET NO. P-1	REVISION NO. A

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	ALB	1882-P1

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	ALB	1882PID2

(1) UPSTREAM CATOX THERMOCOUPLE
SHUT DOWN SYSTEM IF TEMPERATURE DEVIATES FROM SET POINTS (TI 124)

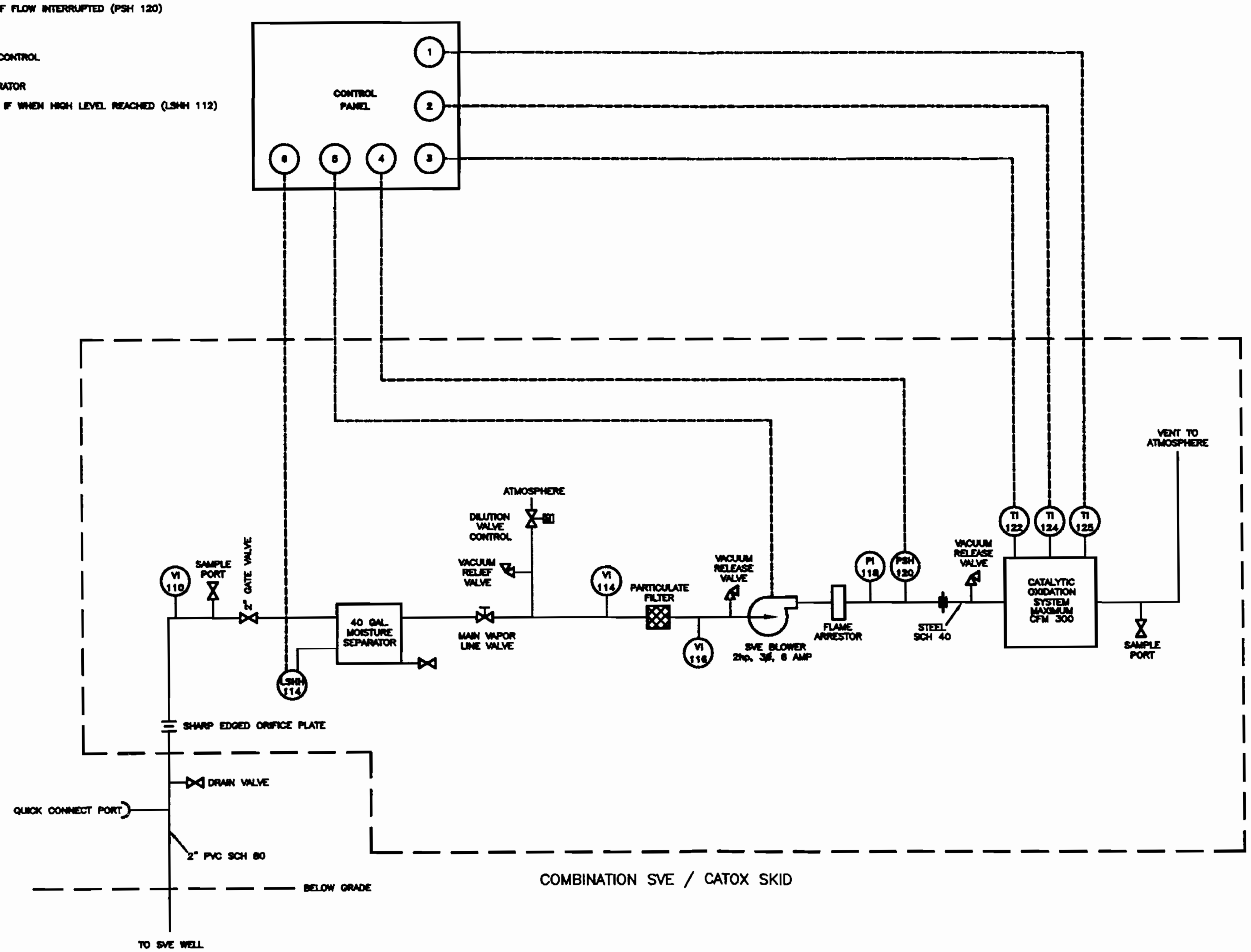
(2) DOWN STREAM CATOX THERMOCOUPLE
SHUT DOWN SYSTEM IF TEMPERATURE DEVIATES FROM SET POINTS (TI 125)

(3) INTERMEDIATE STREAM CATOX THERMOCOUPLE
SHUT DOWN SYSTEM IF TEMPERATURE DEVIATES FROM SET POINTS (TI 124)

(4) CATOX PRESSURE SWITCH
SHUT DOWN CATOX IF FLOW INTERRUPTED (PSH 120)

(5) SVE BLOWER
ON / OFF / AUTO CONTROL

(6) SVE MOISTURE SEPARATOR
SHUT DOWN SYSTEM IF WHEN HIGH LEVEL REACHED (LSHH 112)



COMBINATION SVE / CATOX SKID

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
A	11/14/00	SSH			AS BUILT SUBMITTAL

IT CORPORATION

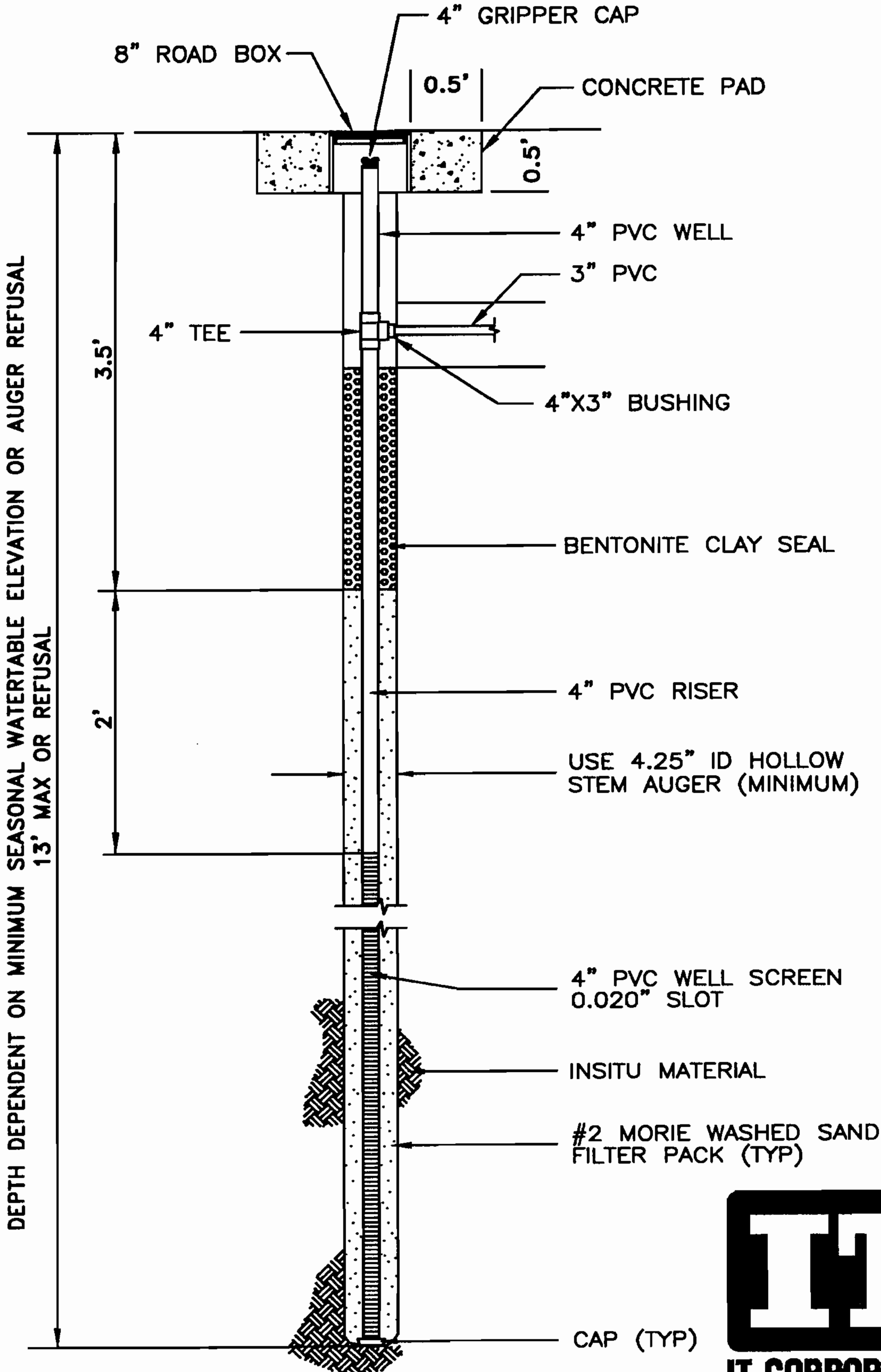
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PIPING AND
INSTRUMENTATION DIAGRAM
100 OSER AVENUE
HAUPPAUGE, NEW YORK

DESIGNED BY	DH	06/13/00	CHECKED BY
DRAWN BY	JV	06/16/00	APPROVED BY
SCALE: NTS	DRAWING NO. 1882PID2	SHEET NO. P-2	REVISION NO. A

APPENDIX A
DETAILS OF SOIL VAPOR EXTRACTION WELL

FIGURE 6C
TYPICAL VENT WELL SECTION



NOT TO SCALE

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A Member of The IT Group

TYP-SVE.DWG

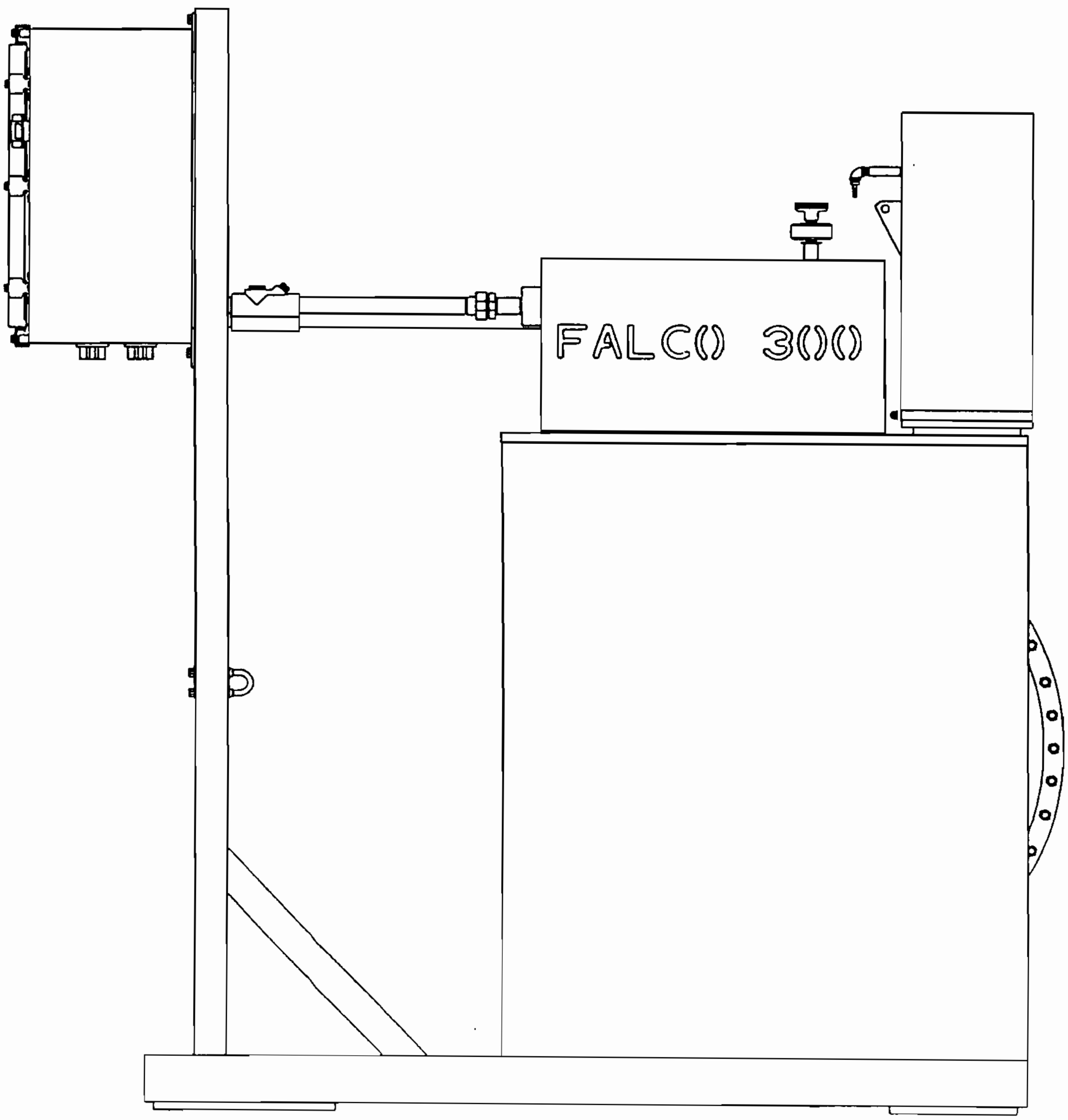
APPENDIX B
SVE/CATOX OPERATIONS MANUAL

NYSDEC Oser Ave

FALMOUTH PRODUCTS CATALYTIC OXIDIZER
FALCO 300
INSTALLATION AND OPERATIONS MANUAL

MANUAL 1997.300.01 LAST REVISION 10-10-97

TECHNICAL ASSISTANCE: 1-800-340-8125



$10.00

NOTICE

To: FALCO 300 owner

From: Falmouth Products

RE: Mercury Relay lifespan

The FALCO 300 Catalytic Oxidizer uses electric heat as a supplementary form of energy. The heaters are switched on and off by mercury relays.

Mercury relays have a finite life span (apx. 3 million cycles) and should be replaced after two years of use. Failure to replace these relays every two years may result in heater damage, which is expensive.

These mercury relays (3 used) are single pole, 100 Amp, normally open relays with 120 volt coils. They are mounted on the rear panel inside the FALCO 300 control box, and are easily replaced. Replacements may be purchased from Falmouth Products.

FALMOUTH PRODUCTS P.O. BOX 541 FALMOUTH, MA. 02541 PHONE 508 548 6686 FAX 508 548 8144

FALCO 300 CATALYTIC OXIDIZER INSTALLATION AND OPERATIONS MANUAL
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FALMOUTH PRODUCTS CATALYTIC OXIDIZER FALCO 300
INSTALLATION AND OPERATIONS MANUAL

FALMOUTH PRODUCTS CATALYTIC OXIDIZER (FALCO) converts hydrocarbon contaminates in an air stream to carbon dioxide and water vapor. Combustion occurs in the temperature range of 300°C-620°C. Heat is transferred from the hot exhaust stream to the incoming contaminated air, heating it to the catalytic oxidation temperature.

FALCO is equipped with three programmable temperature controllers. One controller (T1) monitors and responds to a thermocouple sensing the temperature at the upstream end of the catalyst. The second controller (T2) monitors and responds to a thermocouple sensing temperature downstream from the catalyst. The third controller (T3) senses the temperature at an intermediate position inside the catalyst. The T3 controller provides a rapid response to increasing vapor concentration by increasing dilution air and shutting the system off if necessary.

The T1 controller shuts down the system if the T1 thermocouple temperature moves above or below its set point by selected amounts. The T2 and T3 controllers will also shut down the system if corresponding thermocouple temperatures deviate from their set points by selected amounts. If the automatic dilution valve control (DVC) does not respond rapidly enough to an increase in vapor line concentration, T2 and T3 will increase to their HI alarm settings and turn off the system.

FALCO is also equipped with a pressure switch which interrupts the heater circuit if flow is interrupted, for example, due to a thermal protection cut out of the blower or frozen vapor line. This prevents overheating the electric heaters if the flow rate becomes too low.

If a short power interruption should occur, 1 minute for example, the unit will restart itself and resume normal operation. If the interruption persists long enough, T1 or T2 will fall below the selected shutdown limits, and the system will remain off until restarted by the operator.

The three controllers regulate the temperature of vapor entering the catalyst. The T1 controller regulates a bank of electric heaters, which add heat to the incoming flow when required. The three controllers cooperate in the regulation of dilution valves that control input vapor concentration to the catalytic unit. The controllers are programmed to automatically shut down the system if selected temperature limits are exceeded.

Heat recovery is adjustable. FALCO has a tunable heat exchanger, allowing the operator to adjust the amount of heat recovery desired. When vapor concentration is low, heat recovery should be maximized to save electric power costs. At high concentration sites, heat recovery should be reduced to maximize input concentrations and recovery rate.

Figures 1, 2, and 3 show the basic components of the FALCO 300 and a flow schematic.

TRANSPORTATION & STORAGE

FALCO-300 weighs approximately 850 pounds. Forklift pockets are provided for lifting. The unit should be transported and moved around on site carefully.

FALCO-300 is supplied with tires mounted on steel axles. These steel axles may be inserted into holes in the frame to ease in **manual** transportation around the site. (See figure 11)

CAUTION! UNDER NO CIRCUMSTANCES SHOULD THE UNIT BE TOWED BY A MOTORIZED VEHICLE.

FALCO is weather proof while in operation. When FALCO is in storage, however, it should be kept clean and dry.

CAUTION! WHEN FALCO IS NOT OPERATING, ALL OPENINGS MUST BE COVERED TO PREVENT RAIN, DIRT AND RODENTS FROM ENTERING.

INSTALLATION

Place FALCO on a level surface in a **secure** area. Figure 4 illustrates a plan view of a typical installation. Buried lines from the vapor recovery wells should emerge at the surface within a fenced area. In cold climates all vapor lines should be protected from freezing by heat tape and insulation.

PIPING FROM VAPOR WELLS TO VACUUM SIDE OF BLOWER

Beginning at the vapor lines, the **PVC** piping should be installed as follows:

1. Install valves on each separate vapor line. These lines should each be equipped with sample and vacuum ports.

2. Combine the vapor lines together into a single line, and if available, install a piece of clear PVC so water can be seen when it is being produced.

3. Run this main vapor line into and out of a large capacity water knockout (40 gallons minimum). On the discharge side of the water knockout install a 3 inch **gate** valve. This valve will control the combined vapor flow from the wells.

4. Install a 3 inch T downstream from the **gate** valve installed in step #3. Install the automatic dilution control valve with filter (DVC) into this T using 3" pipe. The connection into the bottom of the DVC should not be glued so this assembly may be easily disconnected and used again. (See figure 4 & 5)

5. Pipe into the vacuum side of the blower with 3 " PVC. Install a vacuum gauge between the DVC system and the blower. For operation in cold climates all piping on the vacuum side of the blower, including the water knockout, should be insulated and heat taped.

PIPING FROM PRESSURE SIDE OF BLOWER TO THE FALCO 300

Note: **Please do not use galvanized pipe or Teflon/silicone based pipe thread sealants, as they may damage the catalyst.**

Note: **Falmouth Products recommends using Rectorseal # 5 pipe thread sealant on all pipe threads.**

Recognizing that 3" steel pipe is difficult to work with and expensive, please adhere to the following guidelines in using PVC when installing the piping between the discharge of the blower and the inlet of the oxidizer.

Beginning at the blower, the piping should be installed as follows:

When the oxidizer is to be mounted close to the blower use steel 3" **non-galvanized** piping.

If the oxidizer is to be mounted more then 10'(total pipe length) away from the blower, use at least 5' of steel pipe for blower heat dissipation. Next install a steel coupling and a 3" schedule 80 PVC male adapter into this coupling. The piping may be finished off with schedule 80 PVC pipe to the oxidizer.

1. Adapt the discharge piping from the blower up to 3 inch pipe. For ease of installation and reduced time it is advantageous to locate the blower parallel to and next to the catalytic unit. (See figure 4).

2. Install a 3 " pipe nipple on the discharge side of the blower.
   Install a 3 " union so that the blower may be removed for service.
   Install a 3 " nipple into this union and a 3 " 90° elbow onto the nipple.

3. Screw the flame arrester onto the 4 " inlet pipe on the oxidizer.
   Screw a 4 " x 3 " reducer bushing into the flame arrester inlet.
   Install a 3 " nipple into the 4 " X 3 " reducer bushing. Screw a 3 " 45° elbow onto the 3 " nipple.

4. Install a short 3 " nipple onto the 45° elbow, and then install a 90° elbow onto the other end of the 3" nipple.

5. If the blower has been mounted parallel to the catalytic unit, the discharge piping from the blower will be able to swing up to the intake piping of the oxidizer.

6. Install 3 " steel pipe between the elbow on the flame arrester inlet to the elbow on the blower. Include in this steel piping (schedule 80 PVC piping in some cases as mentioned earlier) an influent sample port, a pressure gauge and another union if needed.

WATER

Most vapor recovery operations produce some water. While water vapor is not a problem, **take care not to allow liquid water to reach the catalytic unit.** Recognizing that conditions vary widely from site to site, the following strategies should be considered to minimize the transportation of water to the catalytic unit:

1. Slant vapor lines downhill toward the vapor wells.
2. Avoid low points that might accumulate slugs of water. If low points can't be avoided, provide a means for draining accumulations.
3. In cold climates, heat tape and insulate all pipe that is not buried.
4. Install a water knockout upstream from the blower. Install a vacuum gauge. A bouncing vacuum gauge often means that there is a slug of water in a vapor line.
5. Make sure that site check intervals do not exceed the time for water to fill the knockout.

ELECTRICAL POWER CONNECTIONS

CONTROL BOX TO BREAKER BOX.

FALCO control box is connected by rigid metal conduit to the breaker box (not supplied).
Two 1" holes are supplied with hubs on the bottom of the control box. Explosion proof seal fittings should be installed in line with the conduit just below the control box and the breaker box.

Three circuits feed power to FALCO through the rigid conduit.
All wires used should be stranded copper wire.

1. A 70 amp. three pole (208 volts three phase) breaker supplies power to the electric heaters (20,300 watts) through three #6 wires. (Optionally the heater can be wired for operation at lower power levels).
2. A second three pole breaker (size depends on blower horsepower) supplies power to the blower.
3. A third 15 amp single pole 120 volt breaker supplies power to the controllers and relays through two #12 wires.
   A #6 grounding wire is run from the FALCO control box grounding bar through the conduit and attached to the grounding rod at the base of the breaker box.

FEED CONDUIT

1. Remove the control panel retaining nuts and carefully lower the top of the control panel out of the box until it is horizontal. Take care not to pull on the wires. Slide the panel four inches inward so it is bearing on the bottom two studs and is face down on the foam pad.

Note: Do not allow controllers or inside of box to get wet !

2. Run rigid conduit with seals from the breaker box to the control box.

   Pull the following nine wires through the conduit:
   Three # 6 wires for the heaters.
   Three wires appropriately sized for the blower (usually three #8's).
   One pair of # 1 2 wires for the controls.
   One # 6 ground wire.

CONTROL CIRCUIT

The (120 volt) control circuit is wired as follows:
Neutral lead (white) is attached to terminal block #30 on the rear control panel.
Hot lead (colored) is attached to terminal block #31 on the rear control panel.

GROUND

FALCO is grounded as follows:
Locate the grounding bar inside the control box.
Run a grounding wire (Green#6) from the bar, through the 1" conduit and the breaker box to the grounding rod.

HEATER

Wire the heater as follows:
Locate terminal blocks # 21, 22, 23 on the rear control panel and install the three #6 feed wires to these terminals.

BLOWER

Wire the blower feed wires as follows:
Locate terminal blocks # 24, 25, 26 on the rear control panel and install the three blower feed wires to these terminals.

WIRE THE BLOWER AS FOLLOWS:

Run a 3/4" rigid metal conduit with explosion proof seal fittings between the blower and the FALCO control box. Install a 3/4" union at the blower end so that the blower may be removed for service. Pull the three load wires through the 3/4 conduit. Install the three blower load wires to terminal blocks # 27, 28, 29 on the rear control panel of FALCO.

GROUND THE BLOWER AS FOLLOWS:

Run a grounding wire (green) from the case of the blower through the 3/4" conduit and attach it to the grounding bar inside the control box.

DILUTION VALVE CONTROL SYSTEM (DVC)

The automatic dilution control (DVC) has two major components: a motor driven gate valve and a solenoid valve. These valves work together to regulate inlet vapor concentrations. The valves get their power from the FALCO 300 control box. The DVC adjusts a flow of atmospheric air into the source vapor stream. For FALCO 300 units supplied with the 10 horsepower blower package, the DVC is pre-mounted and wired on the blower package mounting frame.

For FALCO 300 units supplied **without** the blower package, the DVC is field wired as follows:

1. Install a 1/2" rigid conduit with a seal at the oxidizer control box end. This conduit should be run along the ground to below the DVC box. Next, extend the conduit upward at least 18" off the ground below the base of the plastic DVC box. A seal fitting should be installed at the end of the rigid conduit. Liquid tight conduit should be installed between the seal and the DVC box. The liquid tight will provide enough flexibility to adjust the box for drive belt tension.

2. Pull 4 #14 wires (white, yellow, brown and green) through the 1/2" rigid and liquid tight that is installed between the FALCO control box and the DVC. Starting at the control box make the following terminations:
   Connect the white wire to terminal block #30 (neutral side) on the rear control panel.
   Connect the two colored wires (yellow and brown) to the two wires secured to the right hand side of the FALCO control box (yellow and brown) marked DVC wires.
   Connect the green wire to the grounding bar inside the FALCO control box.
   At the DVC box end of the conduit, connect the four DVC wires to the corresponding colored wires inside the DVC box. (see figure #5)

Note: The solenoid dilution valve comes mounted and piped to the aluminum box that encloses the motorized gate valve. There is a piece of liquid tight conduit that connects the solenoid dilution valve to the DVC box located inside the aluminum enclosure. If this conduit gets disconnected, terminate the solenoid wires to the lead wires in the plastic DVC box as follows. (See figure # 5)

1. Connect the brown wire to the brown wire in the box (this is the opening circuit).

2. Connect the green wire to the green wire in the box (ground).

3. Connect the white wire to the white wire in the box (neutral).

Verify correct DVC operation as follows when you reach the INITIAL START UP section in this manual.

- Turn the FALCO power switch on.
- With the blower now running, and airflow through the system, turn on the heater switch.
- Adjust the T1 setpoint so that the L1 light is lit on the T1 controller. (See initial startup section in the manual).
- Turn on the DVC switch.
- Verify that the DVC sprocket on the side of the DVC box turns clockwise as you face it when the L1 light is lit on the T1 controller. The solenoid valve will not operate under this condition as it only responds to the opening circuit.
- Lower the T3 setpoint to 10° below the actual temperature.
- Verify that the DVC sprocket on the side of the DVC box turns counterclockwise as you face it when the L1 light is lit on the T3 controller. When L1 lights on the T3 controller a snap will be heard as the solenoid valve opens.

The DVC valve moves toward open (Counterclockwise rotation) and the solenoid valve opens, when L1 is lit on either the T2 or T3 temperature controllers. The controller setpoints may need to be adjusted downward to observe this. Once proper rotation, solenoid valve operation, and switch control have been verified, make final connections with crimp connectors.

Optional sparge compressor output

The FALCO 300 has a fused output (terminal block # 0) to control the coil on a contactor for an additional treatment system such as a sparge compressor. This output is only energized when the extraction blower is operating.

Secure control panel with 3/8 nuts.

CONTROLLER OPERATION

The control parameters have been set by FALMOUTH PRODUCTS before delivery. With the exception of temperature setpoints, control settings will normally not be changed by the operator. If circumstances indicate a need to change controller programming, please consult with Falmouth Products before changing any programming. The setpoints are adjusted on the controllers by pressing the up or down buttons. Holding down either button produces a continuous, **accelerating** change. Pressing either button momentarily produces a 1° change (see figure 9).

There are alarms that turn off the system (blower and heater) if the catalyst temperatures exceed the setpoints by set limits:

The T1 controller alarm settings are +175°C and -60°C. (Deviation alarm)
The T2 controller alarm settings are +20° C and -300°C. (Deviation alarm)
The T3 controller alarm setting is 600°C. (Process alarm).

The AUTO/MAN button, the middle button on the right side of the controller, is used to reset the alarm after it has tripped. To reset an alarm, the temperature must be within the alarm limit.

DILUTION VALVE CONTROL

Some vapor recovery systems supply stable input concentrations which decrease slowly over time. Other systems yield concentrations which fluctuate up and down. The DVC is designed to respond to **gradual** increases or decreases in vapor line concentrations, to maintain nearly constant input concentration. When vapor line concentrations are high or fluctuating, the automatic dilution valve (DVC) maintains the selected input concentration by adjusting dilution air.

A sprocket on the DVC drives a belt, which in turn drives a sheave on the gate valve. The DVC is assembled with the dilution valve on an aluminum plate. (See figure 5). The assembly includes an **L** bracket that is mounted inside an aluminum box that protects the DVC from the elements. The DVC assembly should be fastened to a post, wall or fence using the four holes in the back of the **L** bracket and box. Mount the DVC at shoulder level so that it can be easily seen and adjusted. In cases where the blower package is supplied with the oxidizer, the DVC is factory mounted on the blower package frame.

Grease the sheave and the belt on the DVC so the belt may slip when the DVC valve is fully closed or fully open.

The solenoid valve works with the DVC by increasing dilution air rapidly in the event of a sudden increase in vapor concentration.

DILUTION CONTROL OPERATION

The automatic dilution control (DVC) is a motor driven valve controlled by the three temperature controllers. The DVC regulates a flow of atmospheric air into the source vapor stream, thus bringing the concentrations to the proper level.
The DVC valve controls the inlet vapor concentration to the oxidizer to minimize heater load. Heater load will be minimal until the DVC valve is closed.

The T1 controller responds to a thermocouple, T1, at the upstream end of the catalyst. The T1 controller cycles the heaters and adjusts the dilution valve toward closed when the temperature at the T1 thermocouple falls close to its set point.
The T1 set point is typically 330°C.

The T2 controller responds to a thermocouple, T2, measuring the temperature at the downstream end of the catalyst. The T2 controller makes incremental adjustments in the dilution valve toward open when the temperature at the T2 thermocouple rises close to its set point. The T2 set point is normally 600°C.

The T3 controller responds to a thermocouple, T3, embedded in the catalyst about one quarter of the catalyst depth from the inlet end. The T3 controller has a rapid response to changes in vapor concentration. If the vapor line concentration increases rapidly, it is the T3 controller that responds by adjusting the dilution valve toward open, and by opening the solenoid valve. The T3 set point is 580°C.

The solenoid valve responds to either the T2 or T3 controllers by cycling open, increasing dilution air when the vapor concentration increases.

MANUAL BYPASS

The purpose of the heat exchanger bypass is to allow the operator to manually adjust inlet vapor concentration when the FALCO 300 is operating with dilution control.

The heat exchanger bypass is an adjustable valve in the passage connecting the discharge side of the catalyst to the exhaust stack. Flow of hot exhaust gas through the bypass provides a corresponding reduction in flow through the heat exchanger. In this way, the heat exchanger bypass regulates heating of the inlet vapor stream.

As the heat exchanger bypass is adjusted toward open, the flow of hot exhaust gas through the heat exchanger is reduced, thus reducing heat recovery. During operation with low vapor line concentration, when electric heat is needed to help preheat the vapor being treated, the heat exchanger bypass should be kept closed to minimize energy use. The heat exchanger bypass is also kept closed during warm-up.

For adjustment refer to Figures 6, 7, and 8.
The top portion of the bypass valve assembly projects through the top of the heat shield.
In figure 6 the bypass valve is in the **closed** position. The ballast nut has been run upward so that several threads are visible above the ballast nut.

In figure 7 the bypass valve is adjusted to a partially **open** position. The ballast nut supports the valve off its seat. The bypass knob is now approximately one inch higher than the top of the bypass weight. The distance between the bypass knob and the ballast nut represents the amount of heat exchanger bypass.

CAUTION: **If the oxidizer has been running with the bypass open, it will be hot; wear gloves to make adjustments.**

The closing force on the bypass valve is the weight of the valve assembly. Therefore, the bypass valve also serves as a pressure relief valve limiting pressure in the catalyst chamber.

EXAMPLES OF BYPASS ADJUSTMENT AND CONTROL RESPONSE

Case 1.
Initial conditions: DVC partially open, and vapor concentration is relatively high.
The objective is to increase input concentrations.

Heat recovery is **reduced** by adjusting the bypass valve toward **open.**
Control system responds by **increasing** inlet vapor concentration.
The control mechanism is as follows:

1. Reduction in heat recovery results in a drop in the temperature of vapors entering the catalyst. The T1 thermocouple senses the new temperature, at or below the T1 set point.

2. The T1 controller responds to the drop in temperature by signaling the dilution control to start making small adjustments of the dilution valve toward close.
   As a result, the inlet vapor concentration is increased.

3. The increased inlet vapor concentration makes more heat available. In this way, the temperature of the inlet vapor is raised to or above the T1 set point, despite the lower heat recovery efficiency.

Further adjustments of the bypass valve toward open result in a repetition of the above control cycle, with further increases in concentration.

Increases in inlet vapor concentration result in temperature increases at T3 and T2. The maximum allowable inlet vapor concentration is reached when the temperature rise through the catalyst results in T2 approaching its setpoint temperature of 600°C.

Case 2 .
Initial conditions: Concentrations have dropped over time and the heater has started to cycle.
Objective is to increase heat recovery (reducing heater load).

Heat recovery is **increased** by adjusting the bypass valve toward **close.**
The control mechanism is as follows:

1. The increase in heat recovery results in an increase in the temperature of vapors entering the catalyst. This temperature increase propagates through the catalyst as a temperature wave, increasing the temperatures at T2 and T3.

2. After approximately five minutes the T1 temperature will increase and the heater load will be reduced. The T1 temperature may drift above its setpoint.

3. If the effect of the adjustment is great enough, all three temperatures will drift upward after about ten minutes. The T2 or T3 controller may respond by signaling the dilution control to start making small adjustments of the dilution valve toward open. The solenoid valve also cycles during these DVC opening adjustments.

DISCUSSION OF COLD STARTUP

The FALCO 300 is first heated up (using the electric heaters) to the reaction temperature for hydrocarbons within the catalyst. Once the unit has achieved reactive temperatures, vapors are slowly fed in. The oxidation of vapors results in a temperature rise across the catalyst. The temperature entering the catalyst (untreated vapors) is lower then the temperature exiting the catalyst (treated vapors). The greater the concentration of hydrocarbon vapor entering the unit, the greater the temperature rise (ΔT) across the catalyst. To achieve proper start up of the oxidizer, the temperature rise across the catalyst must be carefully controlled. If the concentrations entering the oxidizer are too high, the control systems will not be able to regulate the resulting temperature increase. The alarms on the temperature controllers will shut down the system if set temperature limits are exceeded.

The following start-up procedure must be followed to avoid the danger of costly damage to the system. Vapors initially recovered may be very high in concentration. Keep in mind that a substantial period of time is required to reach new equilibrium temperatures after a valve adjustment has been made. About four minutes are required after an adjustment in the dilution valve or the vapor line valve to see an effect on T2. T3 responds much more quickly, and provides an early indication of increased concentration. During a relatively rapid rise in vapor line concentration, T3 responds early by opening the DVC valve.

Note: References to hydrocarbon concentration in this manual refer to total hydrocarbon concentrations in the air stream, excluding methane.

ALARM SETTINGS

Note: The process temperature (which is the temperature the thermocouple is reading) appears in the upper display on the controller, and the setpoint appears in the lower display (see figure 9).

It is helpful during the startup to be familiar with the alarm settings:

T1 alarms are **+175°** and **-60° C**, relative to the setpoint.

T2 alarms are **+20°** and **-300°C**, relative to the setpoint.

T3 alarm is tripped if the **T3** process temperature reaches **600°C.**

If the process temperatures exceed these limits the system will shut down:

T1 setpoint = 330°C,	alarm +175 (shutdown at 505°C) alarm - 60 (shutdown at 270°C)
T2 setpoint = 600°C,	alarm + 20 (shutdown at 620°C) alarm - 300 (shutdown at 300°C)
T3 setpoint = 580°C,	alarm 600 (shutdown at 600°C) this is a process alarm

For example:

If the T2 setpoint is 600° and the temperature drops to 299° or lower, the system will shut down and the alarm will flash 600°/LO. To clear the alarm, lower the setpoint to within the alarm limit, and push the AUTO/MAN key.

INITIAL WARM-UP

NOTE: The concentration from the vapor source may not be known at the time of start up. Actual concentrations will become more evident as the start up progresses through the steps below.

NOTE: FALCO must be warmed up to the reaction temperature (200°C) before hydrocarbons are introduced.

VALVE AND SWITCH POSITIONS.

1. **CLOSE** the main vapor line valve.
   This main vapor line **gate** valve should have been installed for collective control of the vapor wells.

2. Loosen the DVC belt by pushing the bottom of the plastic DVC box to the right.
   Remove the belt from the sprocket.
   Open the DVC valve completely.
   Turn **ON** the DVC switch.

3. Adjust the heat exchanger bypass to the **closed** position (wear gloves and see figure 6).
   If the bypass is open, warm-up time will be excessive.

4. Turn **OFF** the heater switch.

5. Turn **ON** the power switch.
   The controller displays should light and, depending on the initial temperatures and temperature settings, the blower may or may not start. The initial temperatures will frequently deviate from the setpoint enough to cause an alarm condition. If this is the case, the lower display will alternately flash the nature of the alarm HI (high) or LO (low), and back to the setpoint. If the blower does not come on because an alarm limit has been exceeded, change the setpoint to be within the alarm limit and press the AUTO/MAN button to reset the alarm. (See figure 9).

CAUTION ! **VERIFY THAT THE BLOWER IS TURNING IN THE CORRECT DIRECTION, AND THERE IS FLOW THROUGH THE OXIDIZER. CHECK FOR FLOW BY OPENING THE INFLUENT SAMPLE PORT.**

6. Adjust the T1 controller setpoint to 330° C.
   This may trip a LO alarm.
   The T1 controller has a ramping feature: if the Auto/Man key is pushed, the low alarm is bypassed during startup. The alarm condition will still display, but the blower will start. Push the Auto/Man key if the alarm tripped. The alarm can also be cleared by cycling the power switch, in this case the alarm condition does not display.

7. To stay within the alarm limit, adjust the T2 setpoint 250° C greater than the current temperature displayed in the upper window, but not more than 600°C.
   Keep the T2 setpoint 100° or more above the T1 setpoint.

8. Set the T3 set point to 580°.

   The blower should now be running and there should be airflow through the unit.
   If the blower does not start, it may be necessary to push the auto/man key.

9. Turn **ON** the heater switch. The T1 temperature will begin to rise.

Bringing FALCO up to temperature involves adjusting setpoints to stay within alarm limits.
It may take more than 25 minutes before FALCO warms up to **200° on T1, T2, and T3**
(The T2 temperature will lag behind the T3 temperature on warm up).
This is the minimum temperature (**200°C**) required before introducing hydrocarbons.

After T1, T2 and T3 exceed 200 °C, proceed cautiously with the next step in the operation, which is to gradually begin feeding hydrocarbon vapors to FALCO. At the startup (or early in a recovery operation after wells have been shut for an extended period), vapors from a recovery well may be at very high concentrations.

The belt should still be removed from the DVC sprocket with the DVC switch ON.
Confirm that the bypass is in the closed position. (See figure 6).

DISPLAY KEY

Push the display key on the T1 temperature controller to familiarize yourself with its operation. Observe the effect on the lower window of the temperature controller where the setpoint appears. (See figure 9) The display window will scroll through the following:

- Setpoint

- Deviation from setpoint.
  The light (DEV) will be lit. This lets the operator know how much the process temperature is deviating from the setpoint.

- Percent of relay load.
  The light (% OUT) will be lit. This lets the operator know what percentage of the time the output relay is closed. On the T1 controller, for example, this lets the operator know what percent of time the heater is on.

- Units used (°C) Note: If ° **F** is shown then the controller has deprogrammed -Contact Falmouth Products for reprogramming instruction.

LOW CONCENTRATION STARTUP

After the preceding initial warm-up, T1, T2, and T3 are now above 200°C.

Begin opening the gate valve on the vapor line in quarter turn adjustments, waiting a full minute between each adjustment, and observe the rate of rise of T3.
Roughly 45 seconds after an adjustment, T3 will start increasing more rapidly.

Limit the rate of temperature rise of T3 to about 3 seconds per degree by spacing the intervals between valve adjustments.

After a delay of roughly 4 minutes, T2 will also begin increasing. The catalyst weighs over 100 lb., giving it a large thermal inertia. Consequently, substantial time is required for T2 to respond to changes in vapor line concentration.

When making valve adjustments, always move in small increments and take time to observe the effect. If temperatures rise too rapidly, restrict the vapor line, and wait for the temperatures to become more stable.

CAUTION! **IF THE VAPOR LINE IS OPENED TOO QUICKLY THE AUTOMATIC CONTROLS MAY NOT RESPOND FAST ENOUGH TO PREVENT OVERHEATING, AND COSTLY DAMAGE TO THE CATALYST. DO NOT SUDDENLY SHUT DOWN LEAN WELLS.**

CAUTION ! **IF THE T3 OR T2 TEMPERATURES BEGIN TO RISE VERY RAPIDLY, OR APPEAR TO BE OUT OF CONTROL, TURN SYSTEM OFF IMMEDIATELY USING THE POWER SWITCH. CLOSE ALL VAPOR WELLS AND OPEN THE DILUTION VALVE FULLY. START AGAIN USING SMALLER INCREMENTS. HOWEVER, DO NOT RESTART UNTIL THE T3 TEMPERATURE DROPS BELOW 575° OR TO ITS SETPOINT, WHICHEVER IS LOWER. UPON RESTART, OBSERVE THE TEMPERATURES CLOSELY: IF T3 IS INCREASING INSTEAD OF DECREASING SHUT DOWN AGAIN AND WAIT LONGER TO RESTART THE SYSTEM.**

The vapor line valve is opened in small adjustments, observe the temperatures on T1, T2, and T3.
The T1 setpoint should be 330°C
After T2 reaches 310°C, increase the T2 setpoint to 600°C.
The T3 set point should already be 580°C.

The final setpoints for start up are:
T1 = 330°C
T2 = 600°C
T3 = 580°C

Do not allow T3 to increase faster than 3 seconds per degree. 5 seconds per degree is a reasonable rate of change for T2. If temperatures rise too rapidly, reduce concentrations by opening the DVC valve or closing the vapor line valve.

The sequence of events during startup will depend on the concentration of the vapor source. If the concentration of the vapor source is moderate, it will be possible to continue adjusting the vapor line valve until it is fully open, while the T2 and T3 temperatures remain below their set points.

If the vapor line has been fully opened, and T2 and T3 are below their set points, start closing the dilution valve in quarter turn increments, waiting a minute between adjustments.
Observe the effect on the temperatures.

If the concentration of the vapor source is low enough, it will be possible, in a series of adjustments, to close the DVC valve completely, while T2 and T3 remain below their set points and T1 remains close to its set point. When closing the DVC valve make 1/4 turn adjustments and carefully watch the T2 and T3 temperatures.

The DVC valve is a six turn valve. Its position may be confirmed by looking at the pin protruding from the valve body. Each mark equals one turn. If the DVC valve can not be closed without exceeding 550°C on the T3 controller, proceed to the INTERMEDIATE CONCENTRATION STARTUP section below.

After closing the DVC valve, the start up is completed by connecting the DVC belt to the sprocket and valve pulley. The T1 temperature should be close to or above its setpoint before putting the DVC belt on. The DVC switch should be in the **ON** position.
After the temperatures reach equilibrium a rough estimate of the concentration of input vapor in ppmv is obtained by multiplying the temperature difference between T2 and T1 by 8.
For example if ΔT equals 100°C, the input concentration is approximately 800 ppmv.

INTERMEDIATE CONCENTRATION STARTUP

If the concentration of the vapor source is somewhat higher than in the above case, 1800 ppmv for example, the same startup sequence would be followed as described above. However, the T1 temperature will begin rising above its set point before the DVC valve is completely closed. As before, the DVC is gradually adjusted toward closed. Before the DVC is completely closed the T1 temperature will drift slowly upward above setpoint. The T2 and T3 temperatures should be below 550 °C, but may be drifting upward slowly.

HEAT EXCHANGER BYPASS VALVE

When T1 increases above its setpoint, adjust the heat exchanger bypass toward open about 3/4" Refer to figure #7 and wear gloves when adjusting the bypass.

To adjust the bypass, grasp the bypass knob and lift the bypass assembly. Rotate the ballast nut downward on the threaded rod about 3/4". When the assembly is lowered, there will be about 3/4" of exposed thread showing between the bypass nut and the bypass knob at the top.

Observe that the upward drift of T1 has been reversed. If the T1 temperature does not begin decreasing toward its setpoint after five minutes, make an additional opening adjustment in the bypass valve, and again observe T1.

The slow downward movement of T1 will, after a substantial delay, be accompanied by a slowing in the rise of T3. After further delay, the advance of T2 will also slow. Continue opening the bypass to the degree necessary to keep T1 moving downward slowly toward its setpoint.

Adjust the DVC manually in small adjustments toward close (belt disconnected).
If T1 drifts above its setpoint, adjust the heat exchanger bypass to the 1.5" open position.

During these adjustments, the T2 and T3 temperatures may be increasing toward their setpoints. If they increase to a point where the solenoid valve begins to cycle, stop adjusting the DVC valve toward close. Open the DVC valve a turn if the temperatures seem to be rising too rapidly. Reconnect the belt to the DVC and allow time for equilibrium to be reached.

If the concentration is around 1800 ppmv, as we assumed, it should be possible to completely close the DVC valve after adjusting the heat exchanger bypass. Startup will now be completed by putting the DVC belt on. The T1 temperature should be close to or above its setpoint before putting the DVC belt on.

A substantial period of time (perhaps 15 minutes) may be required before temperatures stabilize due to the large thermal mass of the system.

If the DVC valve can not be closed without exceeding 550°C on the T3 controller, proceed to the HIGH CONCENTRATION STARTUP section below.

HIGH CONCENTRATION STARTUP

In the case where the vapor line concentration is very high the same procedures will be followed as with the INTERMEDIATE CONCENTRATION STARTUP discussed previously. However in the present high concentration case T1 temperature will begin to drift above set point much earlier in the procedure.

At sites with very high vapor source concentration and low flow resistance in the vapor system, the catalytic unit may reach full operating temperature and maximum input concentration without fully opening the vapor line. The gate valve on the vapor line may then be restricted to provide sufficient flow through the DVC valve. The DVC valve will still be partly if not fully open when the maximum input concentration adjustment is reached.

As before, the heat exchanger bypass is adjusted open to reverse the upward drift of T1. If the solenoid valve begins to cycle before the vapor line valve is fully open, adjust the vapor line valve toward close just enough to stop the solenoid valve from cycling. In some cases, it will be necessary to leave the vapor line valve slightly restricted when the heat exchanger bypass is adjusted.

If the vapor line valve can be opened completely, proceed with closing adjustments of the DVC valve. The heat exchanger bypass may be opened until the maximum allowable input concentration is reached. Do not open the heat exchanger bypass more than 2 inches.

The startup is completed by putting the belt on the DVC and observing that the adjustments have achieved an equilibrium condition with the solenoid valve **not** cycling. The T1 temperature should be close to or above its setpoint before putting the DVC belt on.

The maximum input concentration adjustment is defined in terms of the set points.
For maximum input concentrations a 310°C minimum setpoint for T1 and a 620°C maximum setpoint for T2 may be used. This allows the maximum spread between the T1 and T2 temperatures.

Note: If the heat exchanger bypass valve is opened too much, the heater (L1 lit on the T1 controller) will turn on at the same time as the DVC and solenoid valves open (L1 lit on the T2 or T3 controllers). This condition should be avoided because it may cause temperature oscillations.

If the heat exchanger bypass has been opened too far, the spread between T1 and T2 must be reduced.
This may be done as follows:

1. Open the dilution valve 1/2 a turn.

2. Close the heat exchanger bypass 1/2".

3. Wait for the DVC to automatically adjust the oxidizer to a new equilibrium.

EXAMPLE OF CONTROL RESPONSE:
Initial conditions: Concentrations are increasing and the oxidizer responds automatically.

1. The increased inlet vapor concentration makes more combustion heat available increasing the temperatures at T3 and T2. With sufficient increase in inlet concentration, the temperature at either T2 or T3 will approach the setpoints.
If the increase in concentration of the supply vapor is very gradual, the T2 set point will normally be reached first and the T2 controller will respond. If the increase in concentration is relatively rapid, the T3 controller will respond to the rising T3 temperature, and start control action well before the temperature reaches the T3 set point. The main purpose of the T3 controller is to provide a rapid response to rapid increases in vapor concentration.

2. Either the T2 or T3 controllers respond by signaling the dilution control to begin adjusting the dilution valve toward open. The solenoid valve also cycles in response to

the signal from either the T2 or T3 controller. This will reduce vapor concentrations.

3. The decreased inlet vapor concentration makes less heat available, and the T2 and T3 temperatures decline. When both temperatures are below their setpoints the dilution control stops opening.

DECLINING VAPOR CONCENTRATIONS

The DVC valve will close automatically over time. If the dilution valve fully closes with the main vapor line valve open only one turn, the blower may overheat. To avoid this problem when vapor concentrations are declining, make opening adjustments of the vapor line valve each time the site is visited. Alternatively, a manual dilution valve may be installed.

During the course of a vapor recovery operation, declining input concentrations are accompanied by automatic closure of the DVC valve. At the end of the dilution phase, if the input concentrations have continued to decline, the heater light will be on for increasing portions of its 10 second cycle. After the heater is on for more than 2 seconds per cycle, the heat exchanger bypass should be gradually adjusted towards close, assuming it was opened earlier. This will reduce electric power use.

Closing the heat exchanger bypass may increase the T1 temperature. Allow time to reach a new equilibrium. After the adjustment is made, the heater will stop cycling. When the bypass is completely closed, the continuing decline in concentration will result in a gradual increase in the time that the heater is on.

OPERATION AT LOW CONCENTRATIONS

At low input concentration (below 400 ppm for example), the T1 setpoint may need to be increased in order to maintain high conversion efficiency. If the catalyst is damaged, a higher T1 temperature setpoint may be required. Higher temperatures will increase power use and may shorten heater life, therefore the T1 setpoint should not exceed 370°C. To minimize power use when operating at low vapor concentrations, operate at the lowest T1 setpoint that will yield satisfactory destruction efficiency, but not below 310 °C or above 370°C. This limitation refers to the T1 setpoint, not the temperature, which will exceed the T1 setpoint under certain conditions.

TROUBLESHOOTING

**CAUTION: ELECTRICAL WORK SHOULD BE PERFORMED BY QUALIFIED PERSONNEL ONLY.
THIS EQUIPMENT HAS MULTIPLE SOURCES OF ELECTRICAL SUPPLY.
FOLLOW LOCK OUT AND TAG OUT SAFETY PROCEDURES.**

BLOWER PROBLEMS:

1. Problem: FALCO controls turn on and flash LO or HI, but blower will not start.

Possible solution: An alarm limit has been exceeded, interrupting the blower relay. The controllers flash the alarm condition. Bring unit to within alarm limits and clear alarms. When unit starts a snap will be heard. This is the blower relay closing.

2. Problem: FALCO controls turn on, with no alarms present, but blower will not start.

Possible cause: The thermal protection on blower or on blower motor starter has stopped blower, or a float switch on water knockout, if present, may have interrupted the blower motor relay. Thermal cutout on the motor starter may trip due to the high vacuum when the dilution valve closes. As the dilution valve closes, the amperage draw on the blower motor increases. If the blower trips its thermal overload, flow is stopped to FALCO and the heater turns off. Temperatures then drop until a low alarm is shown on the T1 and T2 controllers. Make sure the blower is not exceeding its maximum vacuum and pressure ratings. Check that air is allowed to circulate freely across the blower motor.

Check amperage draw on the blower motor.

If a motor starter has been used, check the adjustment of the overload relay on the starter and adjust or size appropriately for motor horsepower (check trip out current for motor starter). The FALCO-300 uses an adjustable Allen Bradley motor starter located on the rear control panel of the control box. The cut out amperage for the starter may need to be adjusted for blower size.

Make sure the line voltage to the blower is within manufactures specifications. Low line voltage may cause the blower to overheat.

3. Problem: FALCO controls turn on, no alarms present, blower will not start and blower circuit breaker has tripped.

Possible cause: Confirm that the blower will spin over freely by hand. Blowers that have been outside for long periods without operating may freeze up. Ice or corrosion may have accumulated preventing a restart, and tripping the circuit breaker.

4. Problem: Blower starts but no flow gets to FALCO.

Possible causes: Vapor line and dilution valve closed
Very tight soil conditions.
Improper blower rotation.
Piping from blower discharge to FALCO is broken or plugged.
Broken drive belt or couplings on blower.

HEATER PROBLEMS:

1. Problem: FALCO starts but will not warm up.

Possible causes: Heater switch in off position.
Breaker for heater in off position.
Improperly adjusted controller setpoints. If controller setpoints are not adjusted properly FALCO will not warm up. Confirm that the T2 setpoint is at least 100°C greater than the T1 set point.

No or low air flow to unit. Check for air flow at sample port . FALCO is equipped with a pressure switch that disables the heater circuit, protecting the heater from no or low flow conditions.

Remove the stainless steel pressure switch tube (see figure 1) that runs from the intake manifold to the pressure switch. This tube should be free of obstructions.

High and low pressure ports on the pressure switch should be unobstructed.

2. Problem: FALCO warms up but not all the way to 200° C. System needs to be up to this temperature before feeding in hydrocarbon vapors.

Possible causes: Heat exchanger bypass open. Be sure the bypass is closed

Improper adjustment of controller setpoints. Setpoints need to be gradually increased during the warm-up period.

High flow rate entering FALCO. Flows exceeding 300 CFM may make warm up difficult. It may be necessary to **partially** restrict the DVC valve to achieve 200° C. If 200°C still cannot be achieved, start-up may proceed from 180° C. However, adjustments should be made more **slowly** to the vapor line valve allowing **two** minutes between adjustments until temperatures are up to 230°C. Do not introduce hydrocarbon vapors into FALCO if input temperatures are less then 180°C

CONTROLLER PROBLEMS

The controllers may exhibit unusual behavior if they are too cold. The control box has a thermostat controlled electric heater inside that will keep the controllers at the appropriate temperatures for proper operation (above 30° F). **In very cold conditions (outside temperatures of less then 25° F) the outside of the control box must be insulated.**

1. Problem: Alarm can not be cleared with the Auto/Man key.

Possible cause: Process temperatures are not within alarm limits.

2. Controllers will not turn on.

Possible cause: Circuit breakers are not turned on at the breaker box. If the controllers still will not turn on, turn off the main circuit breaker and check the 2 fuses (1.5 Amp.) on the rear control panel (tip - out fuse holders # 1and #2.) If the fuses have blown and the breakers are on, small lights will light up on these terminal blocks.

3. Controller is reading in °F rather than °C

Possible cause: Controller has deprogrammed. This can be verified by pushing the display key. This key will show the following in succession:

- Setpoint
- Deviation from setpoint
- Percent of relay load
- Units used (this should read °C)

If units used reads in °F the controller has deprogrammed and FALCO should not be run until the controller has been reprogrammed. Contact Falmouth Products for a programming sheet and technical assistance.

PROBLEMS WITH CONVERSION EFFICIENCY

FALCO does not destroy methane completely at its normal operating temperatures. Therefore, when using a Flame Ionization Detector methane may show up in the output emissions. Methane tends to be present at older gasoline spills. By taking two output samples, one with an activated carbon tip, and one without, the true emissions may be determined. If conversion efficiency is being determined based on input and output concentrations, it will be necessary to subtract the methane from concentrations entering FALCO as well as exiting.

At low input concentrations the percentage destruction efficiency is generally lower then the destruction at high input concentrations. This is due to the lower average treatment temperature at low input concentration. However the absolute emission while operating at low input concentration is generally lower then while operating at high input concentrations.

For example: assume the input concentrations are 2000 PPM and emissions are 10 PPM. Then conversion is 10/2000=.005 or 99.5% conversion. However, if the input concentration is 100 PPM and the emissions are 10 PPM, then the conversion is 10/100= .1 or 90% conversion. The conversion efficiency may then be lower, but the overall emissions are the same.

HIGH OUTPUT EMISSIONS

Possible causes:

1. High methane concentrations in the influent stream.
   Check for methane with a carbon tip if using an FID.
   Check calibration of your test instrument.

2. Low influent temperature.
   Check T1 setpoint if you are operating at low concentrations with the heater on. Normal setpoint is 310°. This setpoint may be increased in increments of 5°C to a maximum of 370°C. Check emissions after FALCO has reached equilibrium after each increase in setpoint. Increasing input temperatures generally will increase conversion.

3. High influent flow rate.
   Check flow rate in CFM going into FALCO. The FALCO - 300 is designed for flow rates up to 300 CFM. High input flow rates decrease hydrocarbon residence time within the catalyst, making complete conversion more difficult. At high input concentrations, slightly higher flow rates may yield acceptable conversion because of higher operating temperatures. At low input concentrations and high flow rate, the electric heater may have trouble maintaining high enough input temperatures for good conversion.

4. Catalyst settling.
   The catalyst in the FALCO 300 is comprised of 1/8" ceramic spheres with a platinum catalyst deposited on them. This catalyst is contained in a chamber which is screened on two sides to allow the vapors to flow through horizontally. Excessive catalyst bed settling may reduce conversion efficiency. The fill level may be checked and topped off through the fill plugs (see figures 1 and 2 for component locations).
   Caution: Before opening these fill plugs make sure that all flow through the unit has stopped. Use lockout on breaker box. The catalyst will be hot. Wear gloves, protective clothing, and safety glasses.
   Remove the rectangular heat guard on the top of the unit.
   Remove fill plugs on the top of the catalyst chamber. The plugs are under the pressure switch and thermocouple conduit body.
   Pour new catalyst into the catalyst chamber. A **clean** flathead screwdriver may be used to gently distribute catalyst toward the ends of the chamber.

5. Catalyst poisoning, masking, and overheating.
   The FALCO 300 catalyst can be deactivated by certain poisons and contaminants. Vapor streams should be analyzed before operation. If poisoning is suspected, a catalyst sample may be removed from the fill tubes discussed in section 4 for analysis. Avoid running water into the oxidizer. Water can transport solids and mineral salts that may mask or poison the catalyst. Always install a filter on the vapor line prior to the blower to capture particulate. The platinum catalyst used on the FALCO 300 can be poisoned by certain compounds. Poisons such as phosphorus and silicone coat the catalyst. Halogens such as chlorine will attack the platinum deposited on the catalyst converting it to an inactive form. Sulfur may mask the catalyst. Operation of the unit at temperatures lower than 300°C may cause incomplete combustion. Deposits of carbon on the catalyst may result in reduced efficiency. Overheating must be prevented. Temperatures exceeding 640°C will reduce catalyst activity by reduction of active surface area. If necessary, the catalyst may be changed by vacuuming the old catalyst out through the fill tubes, and pouring in new catalyst.

FALMOUTH PRODUCTS P.O. BOX 541 FALMOUTH, MA. 02541 PHONE 508 548 6686 FAX 508 548 8144

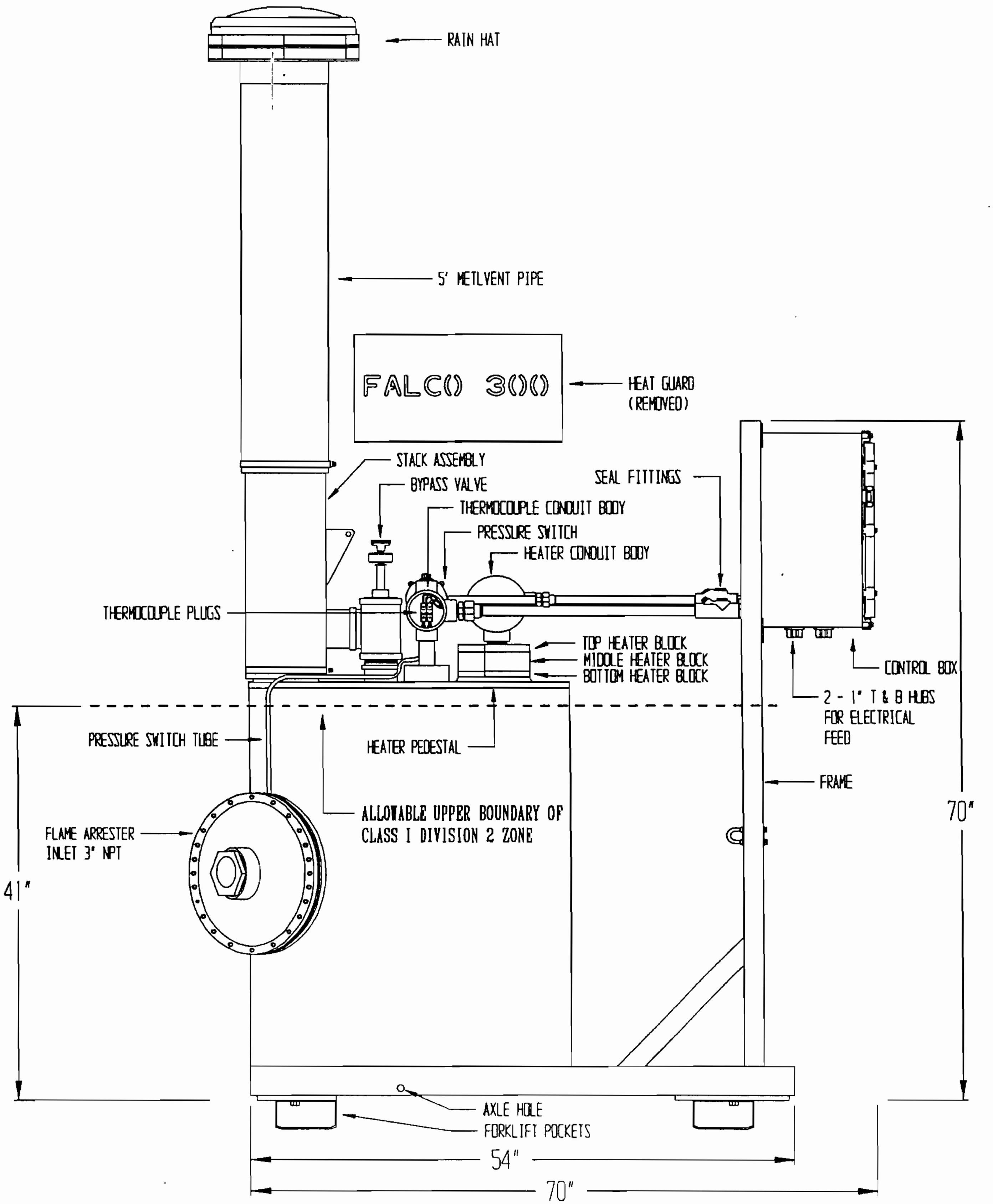

FIGURE 1
FALCO 300 MAJOR COMPONENTS - SIDE VIEW

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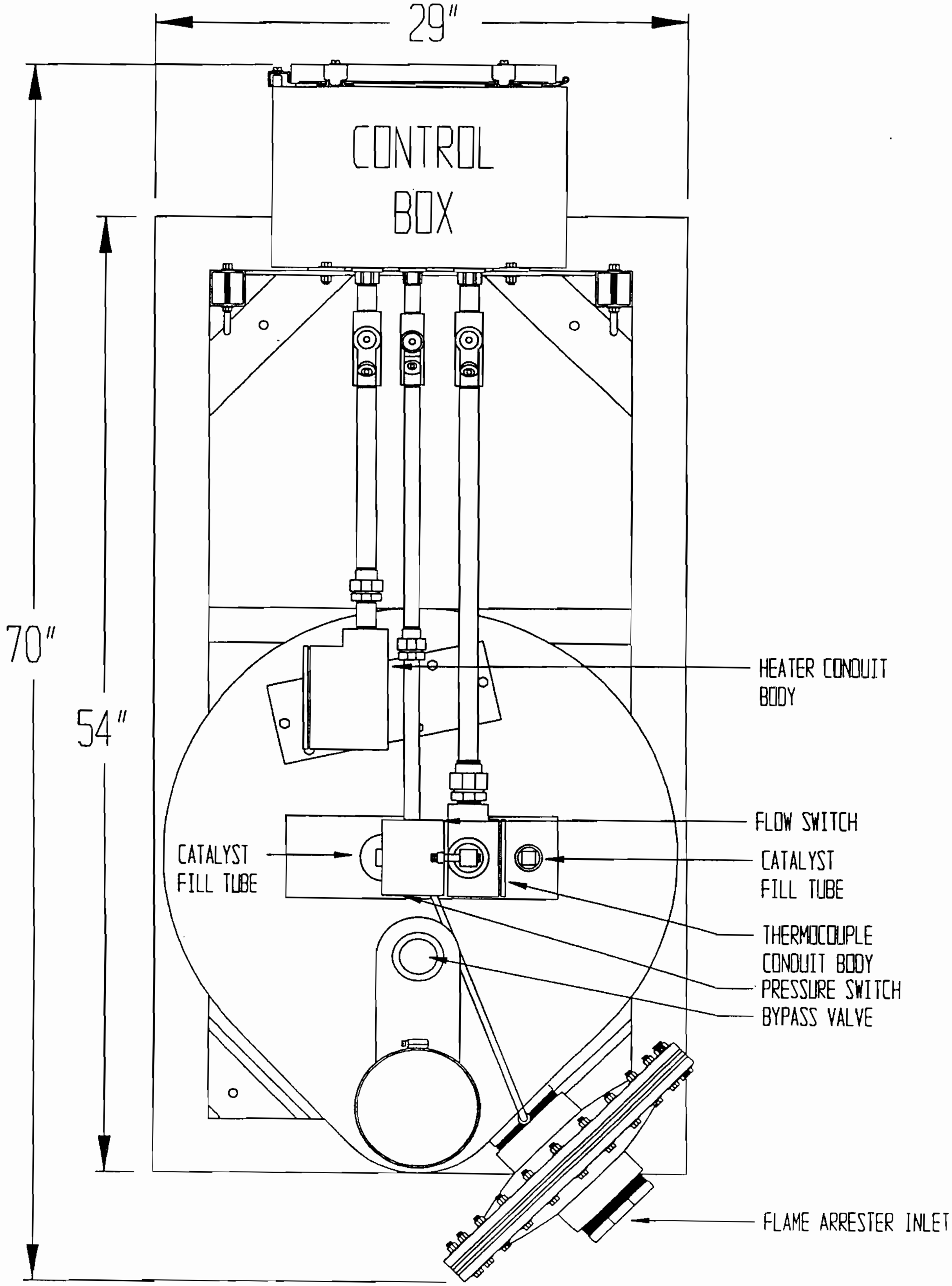

FIGURE 2
FALCO 300 MAJOR COMPONENTS - TOP VIEW

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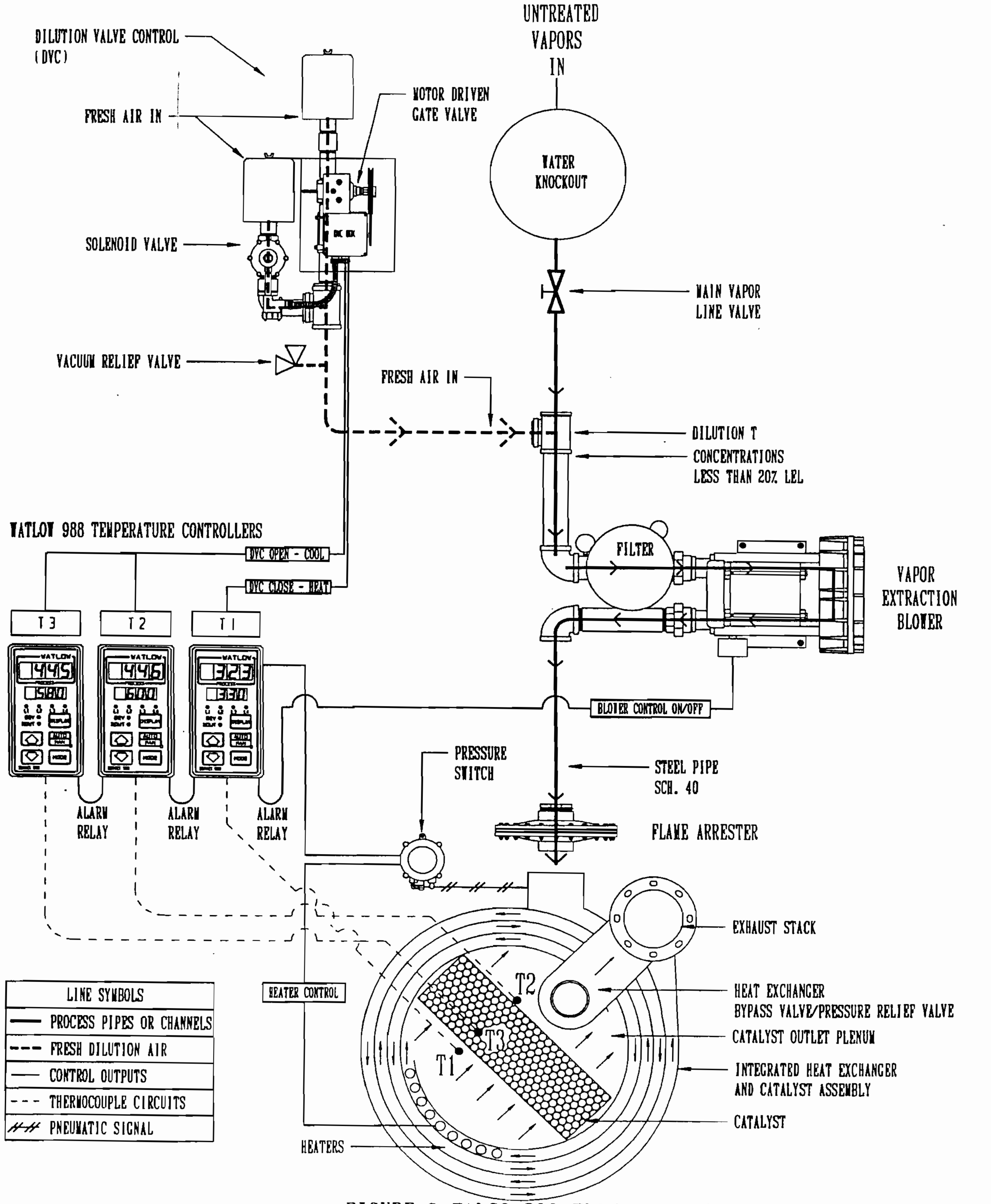

FIGURE 3 FALCO 300 FLOW AND CONTROL

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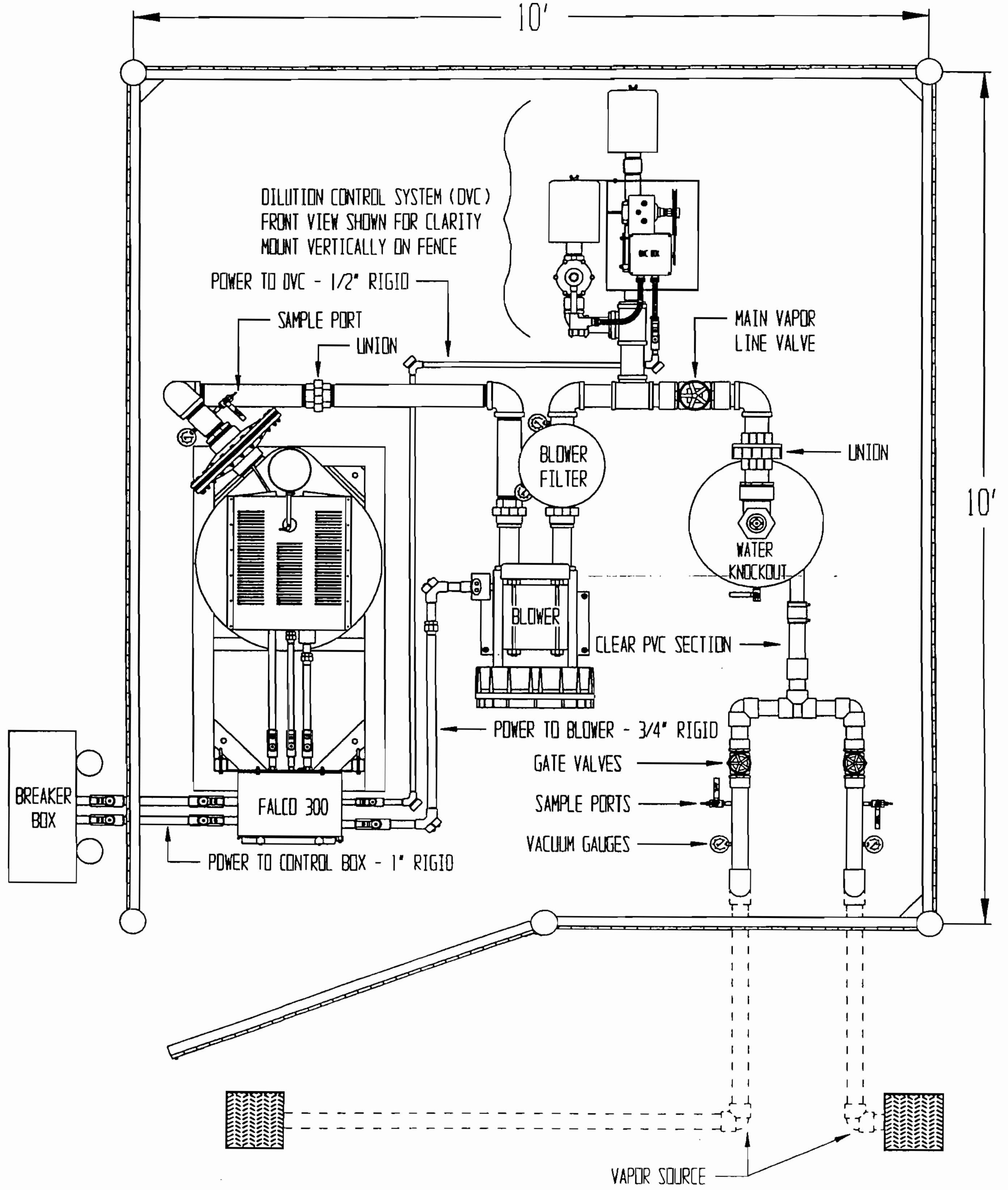

FIGURE 4
PLAN VIEW OF INSTALLATION

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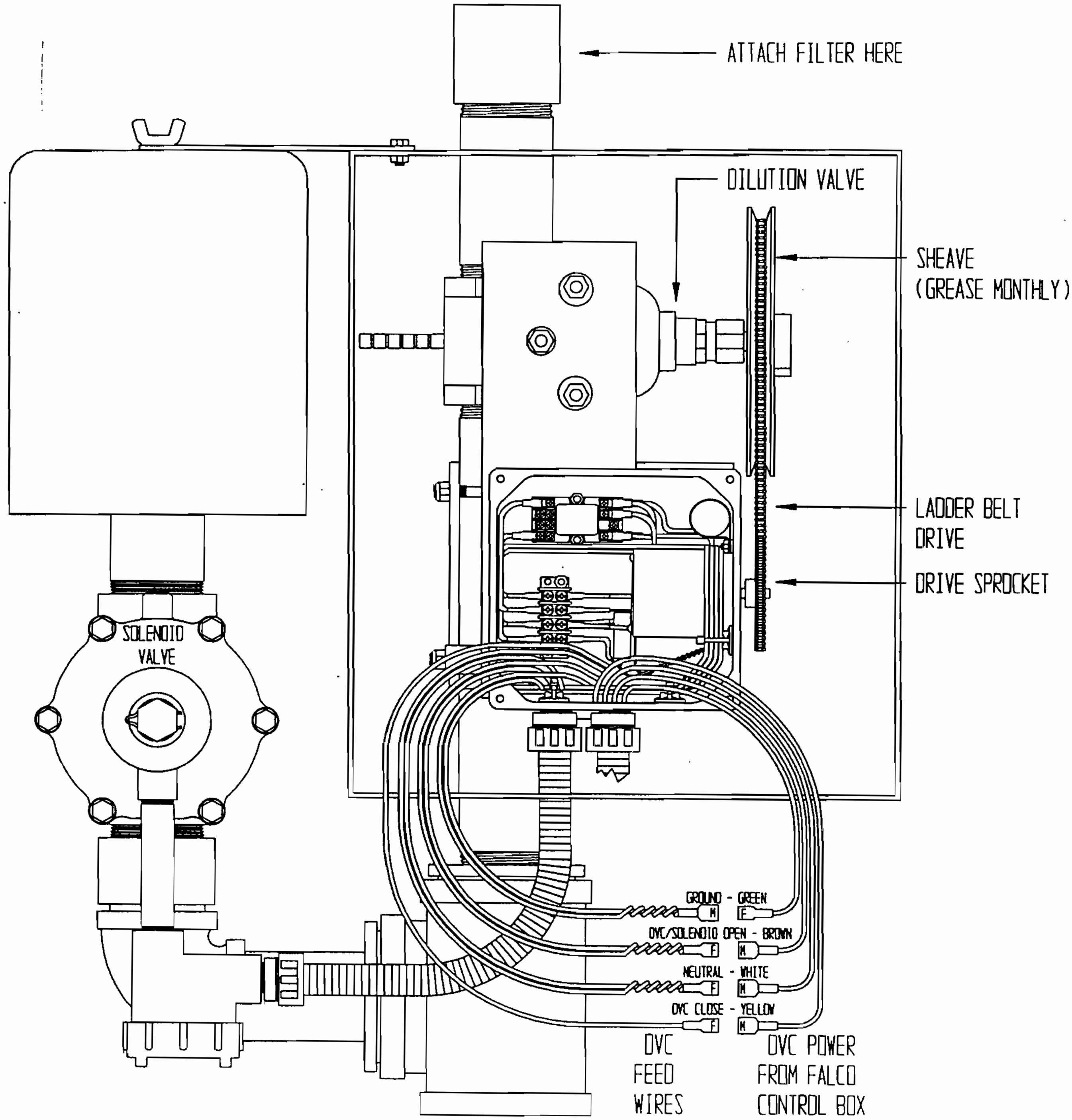

DO NOT CEMENT THIS JOINT
SO IT MAY BE USED AGAIN.
PIPE TO VACUUM SIDE OF BLOWER
AFTER WATER KNOCKOUT

FIGURE 5
DILUTION VALVE CONTROL

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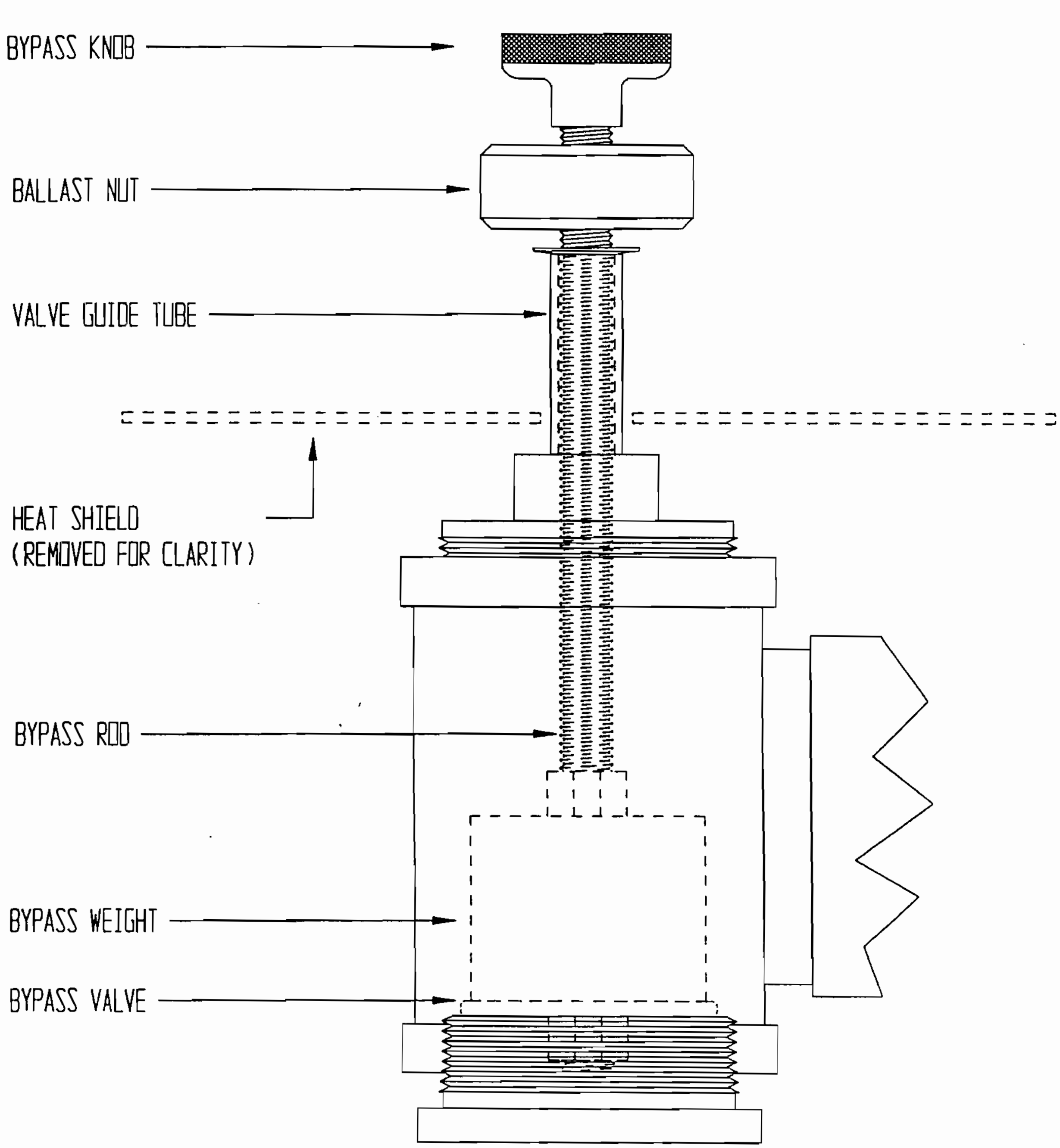

FIGURE 6
BYPASS VALVE - CLOSED POSITION

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ADJUSTMENT:

1. PUT ON GLOVES, COMPONENTS SHOULD BE ADJUSTED BY HAND AND MAY BE HOT.
2. GRASP BYPASS KNOB AND LIFT ASSEMBLY UPWARD
3. TURN BALLAST NUT CLOCKWISE BY HAND TO INCREASE BYPASS, COUNTERCLOCKWISE BY HAND TO DECREASE BYPASS. (MUST HOLD BYPASS KNOB BY HAND WHILE TURNING BALLAST NUT)
4. LOWER VALVE ASSEMBLY AND OBSERVE EFFECT OF ADJUSTMENT ON CATALYST TEMPERATURES.

IMPORTANT:

ADJUSTMENTS, EITHER OPEN OR CLOSED, SHOULD NOT EXCEED 1/2" VALVE MOVEMENT AT A TIME. WAIT AT LEAST 15 MINUTES BETWEEN ADJUSTMENTS.

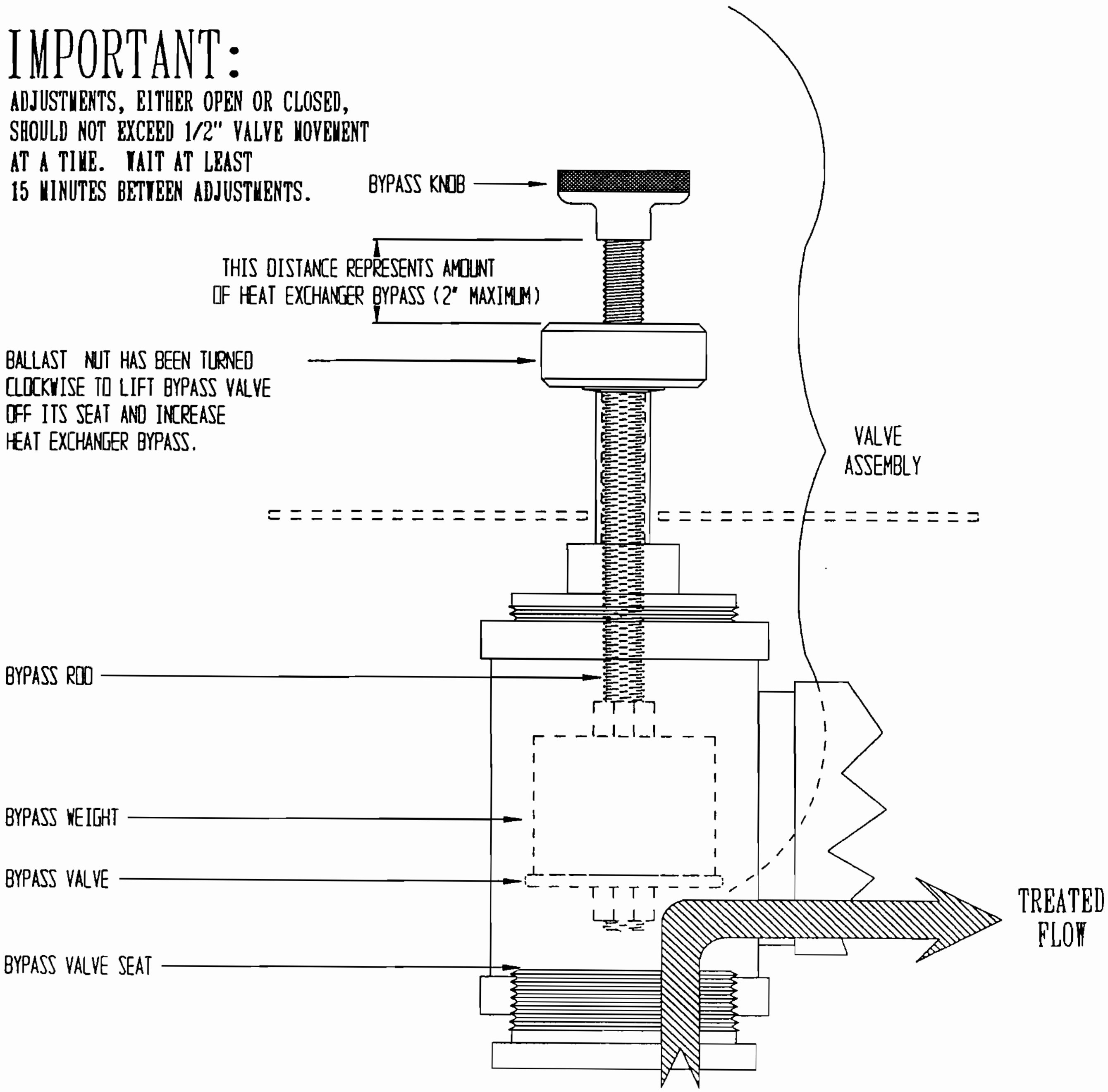

FIGURE 7
BYPASS VALVE - PARTIALLY OPEN POSITION

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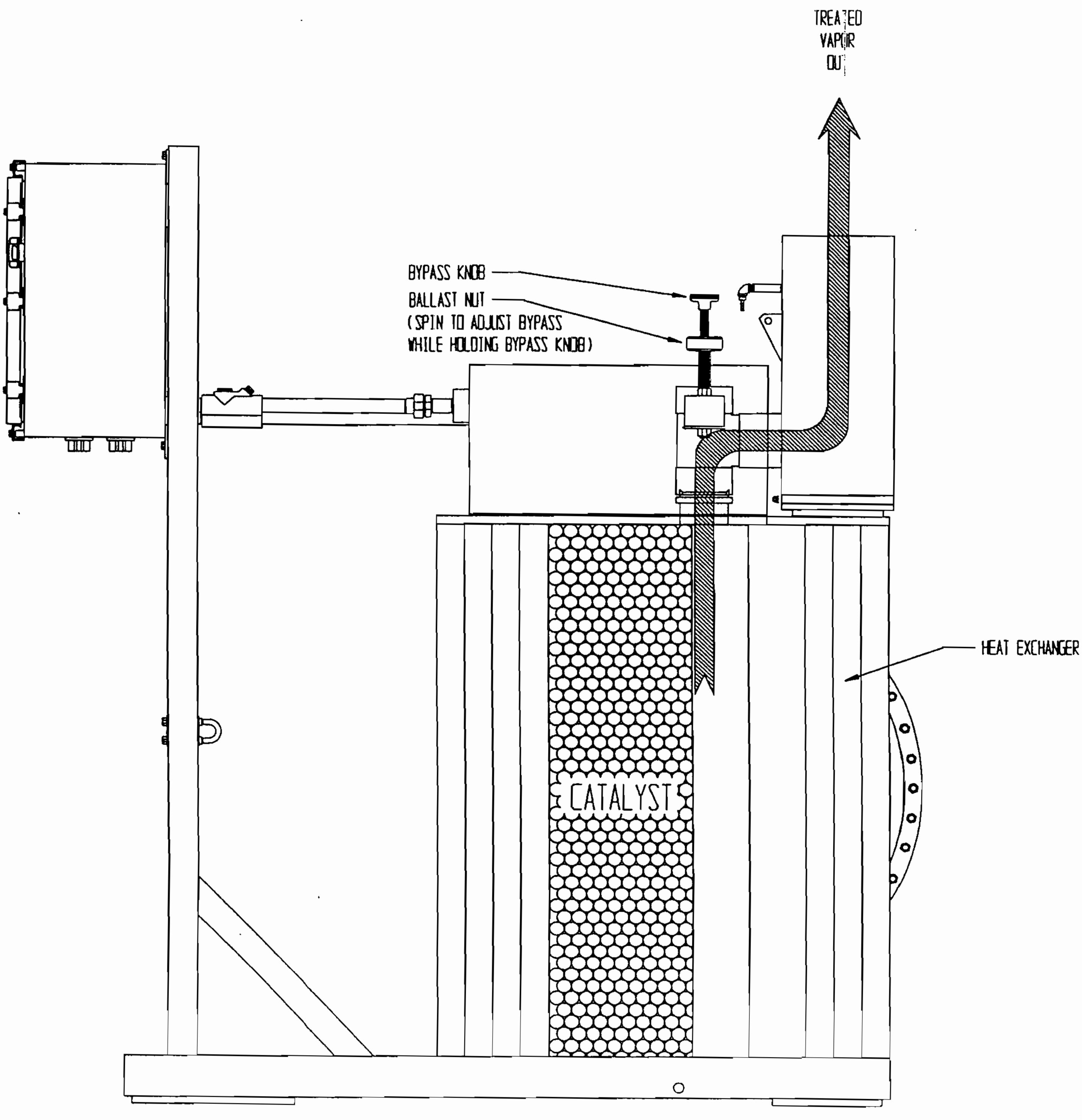

FIGURE 8
MANUAL BYPASS VALVE - OPEN POSITION

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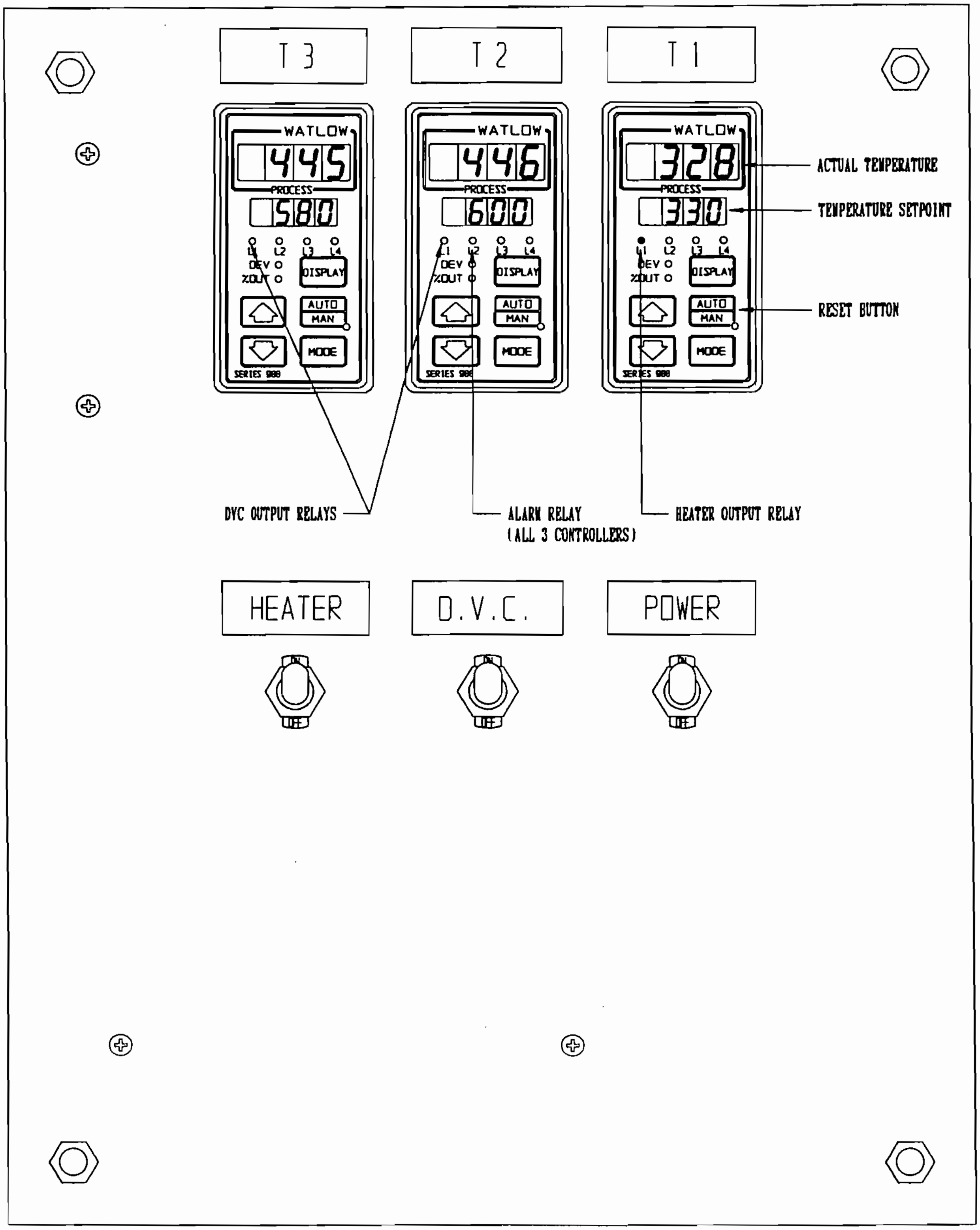

FIGURE 9
CONTROL PANEL

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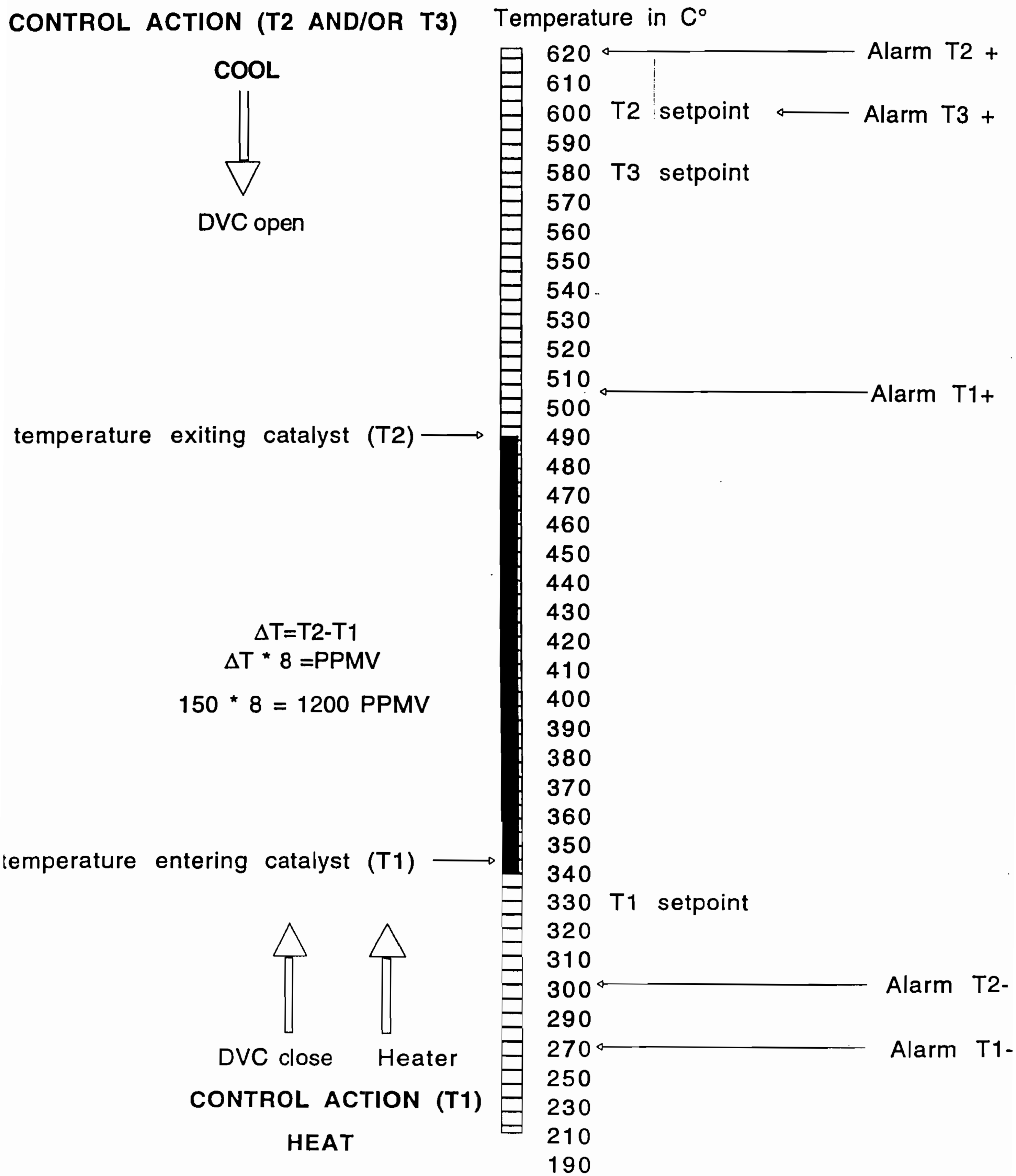

FIGURE 10 OPERATING LIMITS

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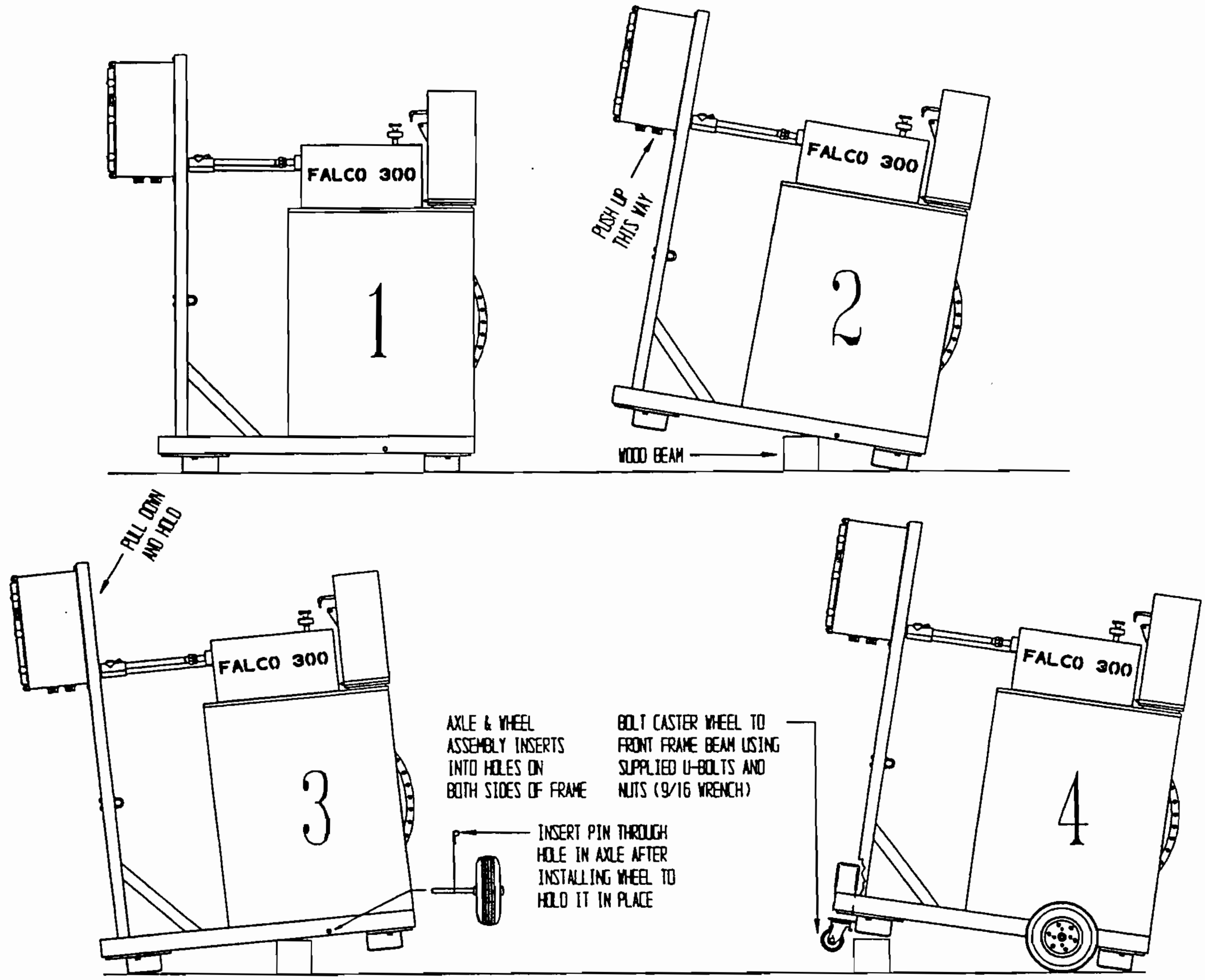

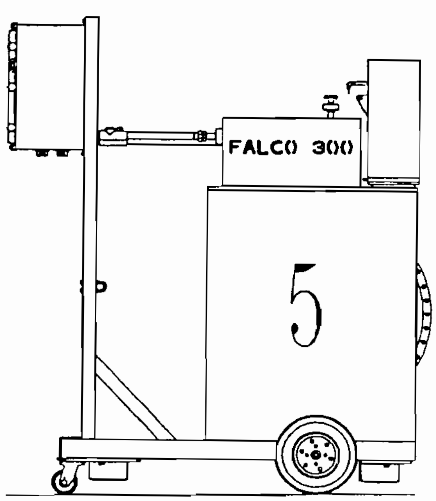

1. FALCO ON GROUND
2. PICK UP FRONT OF FALCO, AND HAVE HELPER PLACE WOODEN BEAM AS FAR BACK AS POSSIBLE UNDER FRAME.
3. PULL FRONT OF FALCO DOWN, AND HOLD. HAVE HELPER INSERT AXLES INTO HOLES IN FRAME, AND PIN IN PLACE.
4. REMOVE WOODEN BEAM, AND PLACE UNDER FRONT FORKLIFT POCKET. FASTEN CASTER WHEEL ON FRONT BEAM OF FRAME.
5. FALCO READY FOR MOVING.

FIGURE 11
FALCO 300 WHEELS FOR MOVING SHORT DISTANCES BY HAND

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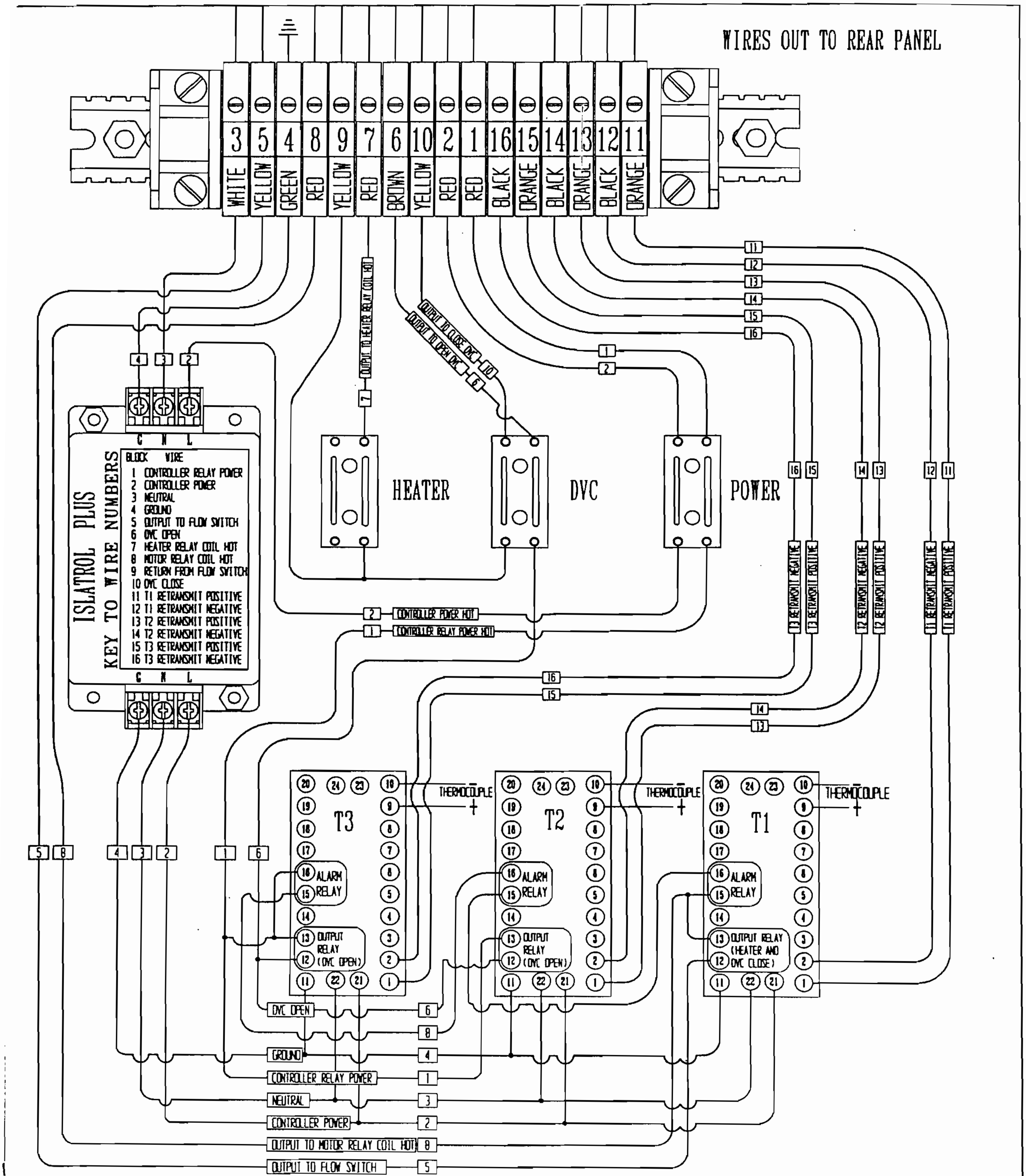

FIGURE 12 WIRING FALCO 300 FRONT PANEL

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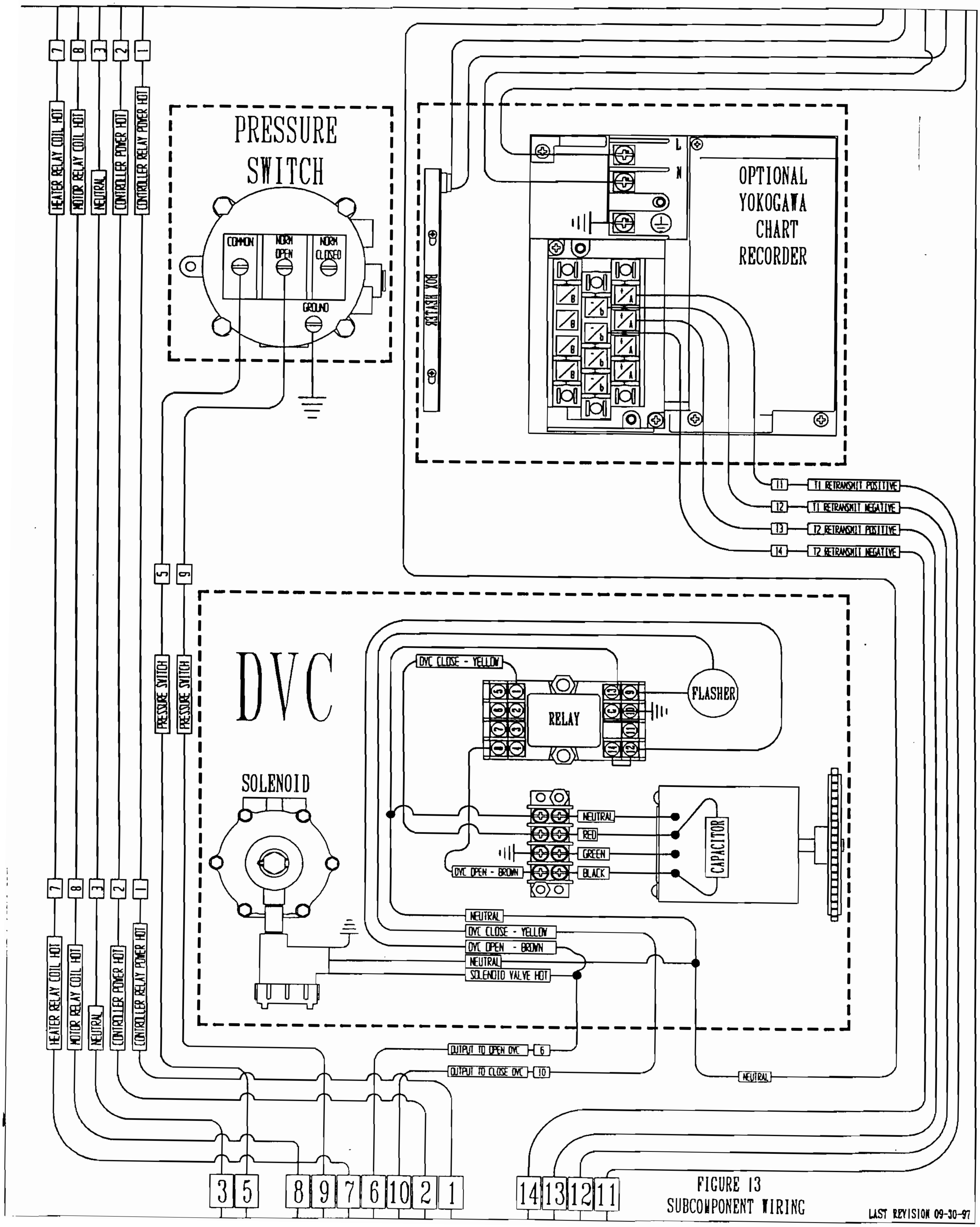

FIGURE 13
SUBCOMPONENT WIRING

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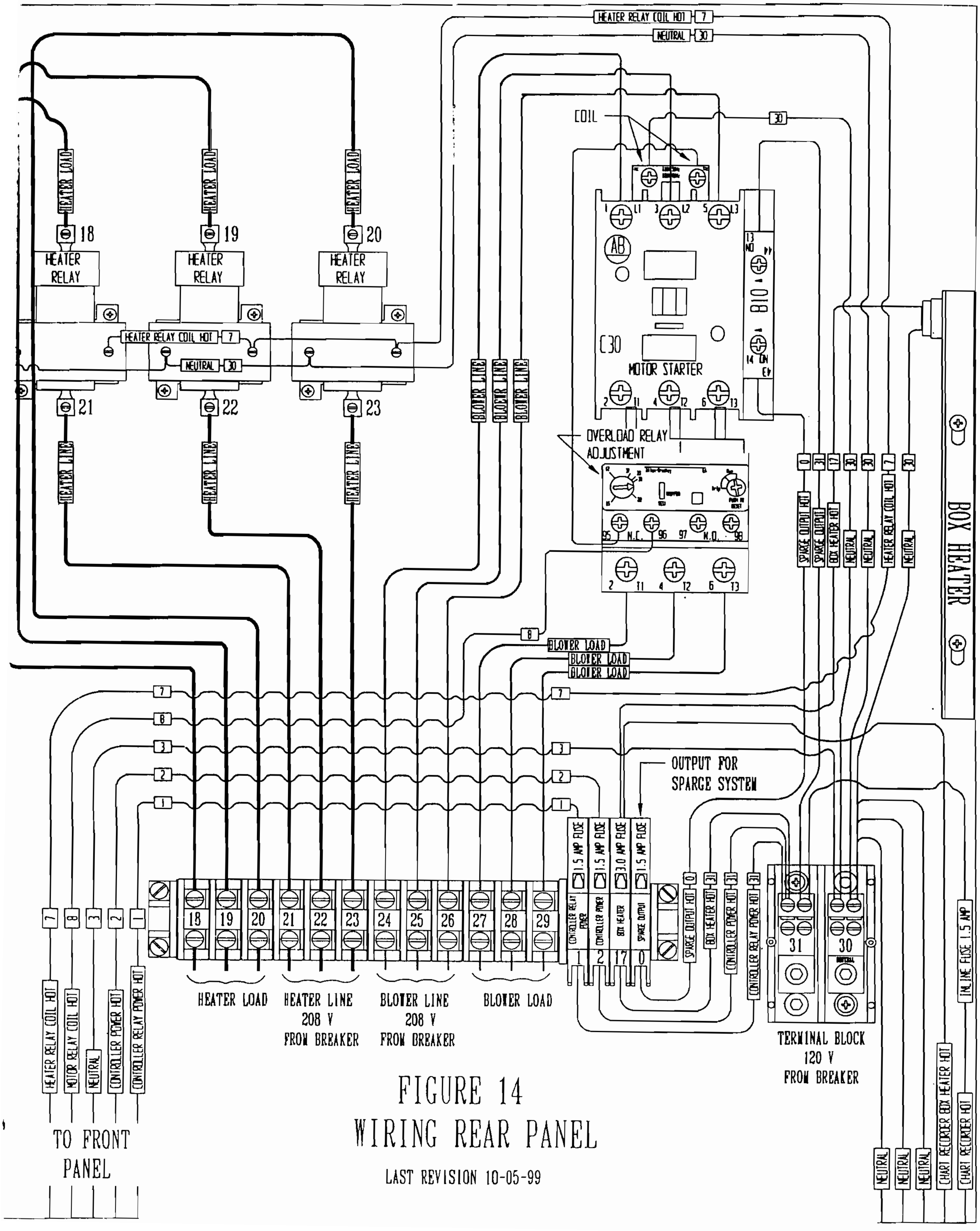

FIGURE 14
WIRING REAR PANEL

LAST REVISION 10-05-99

IT Corporation Flow Meter

Flow rate of air scfm through sharp edged orifice

Orifice diameter, d =	1.376	inches
Pipe ID , D =	3	inches
d/D =	0.459	
discharge coefficient	0.615	

(2g x 832/12)^.5 = 66.82115

Orifice area, 0.01032 square feet

Head difference "H2O	velocity feet/min.	Flow rate scfm
0.5	1743.5	18.0
1	2465.7	25.4
1.5	3019.9	31.2
2	3487.0	36.0
2.5	3898.6	40.2
3	4270.7	44.1
3.5	4612.9	47.6
4	4931.4	50.9
4.5	5230.5	54.0
5	5513.5	56.9
5.5	5782.6	59.7
6	6039.7	62.3
6.5	6286.3	64.9
7	6523.6	67.3
7.5	6752.6	69.7
8	6974.1	72.0
8.5	7188.7	74.2
9	7397.1	76.3
9.5	7599.8	78.4
10	7797.2	80.5
10.5	7989.8	82.5
11	8177.8	84.4
11.5	8361.6	86.3
12	8541.4	88.2
12.5	8717.6	90.0
13	8890.2	91.8
13.5	9059.6	93.5
14	9225.8	95.2
14.5	9389.1	96.9
15	9549.6	98.6
15.5	9707.5	100.2
16	9862.8	101.8
16.5	10015.7	103.4
17	10166.3	104.9
17.5	10314.8	106.5
18	10461.1	108.0
18.5	10605.4	109.5
19	10747.7	110.9
19.5	10888.2	112.4
20	11026.9	113.8

Temperature correction factor

T deg. F	
40	1.025
45	1.020
50	1.015
55	1.010
60	1.005
65	1.000
70	0.995
75	0.991
80	0.986
85	0.981
90	0.977
95	0.973
100	0.968
105	0.964
110	0.960
115	0.956
120	0.951
125	0.947
130	0.943
135	0.939
140	0.935
145	0.932
150	0.928
155	0.924
160	0.920
165	0.917
170	0.913
175	0.909
180	0.906

APPENDIX C

AIR PERMIT AND SCREEN 3 AIR MODEL RESULTS

New York State Department of Environmental Conservation
Air Permit Application

DEC ID	APPLICATION ID	OFFICE USE ONLY
- -	- - /	

Section I - Certification

Title V Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information [required pursuant to 6 NYCRR 201-6.3(d)] I believe the information is, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Responsible Official	Title
Signature	Date ___/___/___

State Facility Certification

I certify that this facility will be operated in conformance with all provisions of existing regulations.

Responsible Official	Title
Signature	Date ___/___/___

Section II - Identification Information

Title V Facility Permit
☐ New ☐ Significant Modification ☐ Administrative Amendment
☐ Renewal ☐ Minor Modification General Permit Title: ___

State Facility Permit
☐ New ☐ Modification
General Permit Title: ___

☐ Application involves construction of new facility ☒ Application involves construction of new emission unit(s)

Owner/Firm

Name: Anwar Chitayat			
Street Address: 100 Oser Avenue			
City: Hauppauge	State: NY	Country: US	Zip:

Owner Classification: ☐ - Federal ☐ - Corporation/Partnership ☐ - State ☒ - Individual ☐ - Municipal Taxpayer ID:

Facility

☐ Confidential

Name: ANORAD	
Location Address: 100 OseR Avenue	
☐ City / ☐ Town / ☒ Village: Hauppauge	Zip:

Project Description

☐ Continuation Sheet(s)

This project includes the installation and operation of an interim remedial measure using soil vapor extraction and catalytic oxidation, for remediation of PCE-impacted soil. The purpose of this application is to provide a record of the technical specifications and proposed emmissions of the system.

Owner / Firm Contact Mailing Address

Name (Last, First, Middle Initial): Chitayat, ANWAR		Phone No. (631) 231-1990
Affiliation: ANORAD	Title: Owner	Fax No. (X)
Street Address: 100 Oser Avenue		
City: Hauppauge	State: NY Country: USA	Zip:

Facility Contact Mailing Address

Name (Last, First, Middle Initial): Antonoff, Thomas		Phone No. (518) 783-1996
Affiliation: IT Corporation	Title: Proj. Manager	Fax No. (518) 783-8397
Street Address: 13 British American BlVD		
City: Latham	State: NY Country: USA	Zip: 12110

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Section III - Facility Information

Classification

☐ Hospital ☐ Residential ☐ Educational/Institutional ☒ Commercial ☐ Industrial ☐ Utility

Affected States (Title V Only)

☐ Vermont ☐ Massachusetts ☐ Rhode Island ☐ Pennsylvania Tribal Land: ______
☐ New Hampshire ☐ Connecticut ☐ New Jersey ☐ Ohio Tribal Land: ______

SIC Codes

3577												

Facility Description

☐ Continuation Sheet(s)

This site is currently operated as Light Industry. The Site is currently listed as a Class 2 Site in the New York State Registry of Inactive Hazardous Waste Disposal Sites due to PCE-impacted soil and groundwater.

Compliance Statements (Title V Only)

For all emission units at this facility that are operating in compliance with all applicable requirements including any compliance certification requirements under section 114 (a) (3) of the clean air act amendments of 1990, complete the following:

- ☐ This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those units referenced in the compliance plan portion of Section IV of this application.
- ☐ For all emission units, subject to any applicable requirements that will become effective during the term of the permit, this facility will meet all such requirements on a timely basis.
- ☐ Compliance certification reports will be submitted at least once a year. Each report will certify compliance status with respect to each requirement, and the method used to determine the status.

Facility Applicable Federal Requirements

☐ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause

Facility State Only Requirements

☐ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
6	NYCRR	201	3.3	C	29	–	–	–	–

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Section III - Facility Information (continued)

Facility Compliance Certification

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause

☐ Applicable Federal Requirement ☐ State Only Requirement	☐ Capping	CAS No.	Contaminant Name
		- -	

Monitoring Information

☐ Ambient Air Monitoring ☐ Work Practice Involving Specific Operations ☐ Record Keeping/Maintenance Procedures

Description

Activities associated with the IRM are to be conducted monthly for the first 6-months and Quarterly thereAfter. Tasks include O&M of equipment and influent & effluent sampling. Quarterly reports will be submitted to the Division of Environmental Remediation - Eastern Bureau.

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements Description

Facility Emissions Summary

☐ Continuation Sheet(s)

CAS No.	Contaminant Name	PTE (lbs/yr)	PTE Range Code	Actual (lbs/yr)
NY075 - 00 - 5	PM-10			
NY075 - 00 - 0	PARTICULATES			
7446 - 09 - 5	SULFUR DIOXIDE			
NY210 - 00 - 0	OXIDES OF NITROGEN			
630 - 08 - 0	CARBON MONOXIDE			
7439 - 92 - 1	LEAD			
NY998 - 00 - 0	VOC		A	
NY100 - 00 - 0	HAP		Y	
00127 - 18 - 4	Tetrachloroethylene		Y	
07647 - 01 - 0	Hydrochloric Acid		Y	
- -				
- -				
- -				

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Section IV - Emission Unit Information

Emission Unit Description ☐ Continuation Sheet(s)

EMISSION UNIT: 0 - 1 R M Ø 1

The emission unit is part of the Interim Remedial Measure at the Site. Combusted soil vapors will be discharged from the catalytic oxidation system.

Building ☐ Continuation Sheet(s)

Building	Building Name	Length (ft)	Width (ft)	Orientation
1	100 Oser Ave	12Ø ft	210 ft	Screens worst case

Emission Point ☐ Continuation Sheet(s)

EMISSION PT.:

Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
0	20	20	6in	500	—	—

Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal
5	60	X	X	yes	50	—

EMISSION PT.:

Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)

Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Source/Control ☐ Continuation Sheet(s)

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.
CATOX	K	9/00	9/00		039	Catalytic Oxidation	Falmouth Products

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
300	118	MAX Capacity	—	—	—	—

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

DEC ID
- -

Section IV - Emission Unit Information (continued)

Process Information

☐ Continuation Sheet(s)

EMISSION UNIT 0 - 1 R M 0 1 | PROCESS S V E

Description

The SVE/CATOX system will pull 5cfm soil vapor from the subsurface and 20 cfm make-up air through the catalytic oxidation system. PCE will catalytically oxidized with hydrochloric acid discharge.

Source Classification Code (SCC)	Total Thruput Quantity/Hr	Total Thruput Quantity/Yr	Thruput Quantity Units Code	Thruput Quantity Units Description
	1500		0156	Average 25 cfm inlet

	Operating Schedule Hrs/Day	Operating Schedule Days/Yr	Building	Floor/Location
☐ Confidential ☐ Operating at Maximum Capacity ☐ Activity with Insignificant Emissions	24	365		

Emission Source/Control Identifier(s) (continued)

EMISSION UNIT - | PROCESS

Description

Source Classification Code (SCC)	Total Thruput Quantity/Hr	Total Thruput Quantity/Yr	Thruput Quantity Units Code	Thruput Quantity Units Description

	Operating Schedule Hrs/Day	Operating Schedule Days/Yr	Building	Floor/Location
☐ Confidential ☐ Operating at Maximum Capacity ☐ Activity with Insignificant Emissions				

Emission Source/Control Identifier(s) (continued)

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Section IV - Emission Unit Information (continued)

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements ☐ Continuation Sheet(s)									
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-													
-													
-													
-													
-													
-													

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements ☐ Continuation Sheet(s)									
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
0-1RM01	STACK	SVE	VGAC	6	NYCRR	201	3.3	C	29				
-													
-													
-													
-													
-													

Emission Unit Compliance Certification

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause

☐ Applicable Federal Requirement ☐ State Only Requirement ☐ Capping

Emission Unit	Emission Point	Process	Emission Source	CAS. No.	Contaminant Name
-				- -	

Monitoring Information

☐ Continuous Emission Monitoring
☒ Intermittent Emission Testing
☐ Ambient Air Monitoring
☐ Monitoring of Process or Control Device Parameters as Surrogate
☐ Work Practice Involving Specific Operations
☐ Record Keeping/Maintenance Procedures

Description

Monthly monitoring for 1st 6-months of influent + effluent, Quarterly thereafter. Quarterly reports will be submitted to the New York State Department of Environmental Conservation - Eastern Bureau

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements Description

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Section IV - Emission Unit Information (continued)

Determination of Non-Applicability (Title V Only)

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause

Emission Unit	Emission Point	Process	Emission Source	
				☐ Applicable Federal Requirement ☐ State Only Requirement

Description

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause

Emission Unit	Emission Point	Process	Emission Source	
				☐ Applicable Federal Requirement ☐ State Only Requirement

Description

Process Emissions Summary

☐ Continuation Sheet(s)

EMISSION UNIT	0-1RMØ1				PROCESS	SVE
CAS No.	Contaminant Name	% of Thruput	% Capture	% Control	ERP (lb/hr)	ERP How Determined
NY998-ØØ-Ø	VOC			98	0.181	04

PTE (lb/hr)	PTE (lb/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lb/hr)	Actual (lb/yr)
5.23E-3	45.8			04		

EMISSION UNIT	0-1RMØ1				PROCESS	
CAS No.	Contaminant Name	% of Thruput	% Capture	% Control	ERP (lb/hr)	ERP How Determined
00127-18-4	~~tet~~ tetrachloroethylene			97	0.174	Ø4

PTE (lb/hr)	PTE (lb/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lb/hr)	Actual (lb/yr)
5.23E-3	45.8			04		

EMISSION UNIT	-				PROCESS	SVE
CAS No.	Contaminant Name	% of Thruput	% Capture	% Control	ERP (lb/hr)	ERP How Determined
07647-Ø1-0				0	0	04

PTE (lb/hr)	PTE (lb/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lb/hr)	Actual (lb/yr)
7.67E-2	672			04		

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Section IV - Emission Unit Information (continued)

EMISSION UNIT: 0-1RM00

Emission Unit Emissions Summary

☐ Continuation Sheet(s)

CAS. No.	Contaminant Name			
NY998-00-0	VOC			
ERP (lb/yr)	PTE Emissions (lb/hr)	PTE Emissions (lb/yr)	Actual (lb/hr)	Actual (lb/yr)
	5.23E-3	45.8	—	—
00127-18-4				
ERP (lb/yr)	PTE Emissions (lb/hr)	PTE Emissions (lb/yr)	Actual (lb/hr)	Actual (lb/yr)
	5.23E-3	45.8	—	—
07647-01-0	Hydrogen Chloride			
ERP (lb/yr)	PTE Emissions (lb/hr)	PTE Emissions (lb/yr)	Actual (lb/hr)	Actual (lb/yr)
	7.67E-2	672	—	—
- -				
ERP (lb/yr)	PTE Emissions (lb/hr)	PTE Emissions (lb/yr)	Actual (lb/hr)	Actual (lb/yr)

Compliance Plan

☐ Continuation Sheet(s)

For any emission units which will not be in compliance at the time of permit issuance, complete the following:

☐ This facility meets all applicable requirements except for those units listed below. This facility will achieve compliance for those units according to the following schedule:

Consent Order

Certified progress reports are to be submitted every 6 months beginning __/__/__

Emission Unit	Process	Emission Source	Applicable Federal Requirement: Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-												

Remedial Measure/Intermediate Milestones	R/I	Date Scheduled
N/A		

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Section IV - Emission Unit Information (continued)

Request for Emission Reduction Credits

☐ Continuation Sheet(s)

EMISSION UNIT -

Emission Reduction Description

N/A

Contaminant Emission Reduction Data

Baseline Period ___/___/___ to ___/___/___		Reduction	
		Date	Method
		___/___/___	
		ERC (lbs/yr)	
CAS No.	Contaminant Name	Netting	Offset
- -	N/A		
- -			
- -			

Facility to Use Future Reduction

Name	APPLICATION ID - - /
Location Address	
☐ City / ☐ Town / ☐ Village	State	Zip

Use of Emission Reduction Credits

☐ Continuation Sheet(s)

EMISSION UNIT -

Proposed Project Description

N/A

Contaminant Emissions Increase Data

CAS No.	Contaminant Name	PEP (lbs/yr)
- -	N/A	

Statement of Compliance

☐ All major facilities under the ownership of this "ownership/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under section 114 (a) (3) of the clean air act amendments of 1990, or are meeting the schedule of a consent order.

Source of Emission Reduction Credit-Facility

N/A

Name	PERMIT ID - - /
Location Address	
☐ City / ☐ Town / ☐ Village	State	Zip

Emission Unit	CAS No.	Contaminant Name	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset
-	- -			
-	- -			
-	- -			

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Supporting Documentation

- ☐ P.E. Certification (form attached)
- ☐ List of Exempt Activities (form attached)
- ☐ Plot Plan
- ☐ Calculations
- ☒ Air Quality Model (8 / 9 / 00) AirGuide I / Screen 3
- ☐ Confidentiality Justification
- ☐ Ambient Air Monitoring Plan (___/___/___)
- ☐ Stack Test Protocols/Reports (___/___/___)
- ☐ Continuous Emissions Monitoring Plans/QA/QC (___/___/___)
- ☐ MACT Demonstration (___/___/___)
- ☐ Operational Flexibility: Description of Alternative Operating Scenarios and Protocols
- ☐ Title IV: Application/Registration
- ☐ ERC Quantification (form attached)
- ☐ Use of ERC(s) (form attached)
- ☐ Baseline Period Demonstration
- ☐ Analysis of Contemporaneous Emission Increase/Decrease
- ☐ LAER Demonstration (___/___/___)
- ☐ BACT Demonstration (___/___/___)
- ☐ Other Document(s): ____________________
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
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  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)
  - ____________________ (___/___/___)

Oser1.Out

08/09/00
07:31:29

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

(0.1155e5 ug/m³/g/s) × 0.00966 g/sec
⇓
111.62 ug/m³

DEC Oser Ave. - Hauppauge, NY

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	6.1000
STK INSIDE DIAM (M)	=	.1020
STK EXIT VELOCITY (M/S)	=	1.5240
STK GAS EXIT TEMP (K)	=	533.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	6.1000
MIN HORIZ BLDG DIM (M)	=	36.6000
MAX HORIZ BLDG DIM (M)	=	64.0000

NYSDEC SGC for HCl
⇓
150 ug/m3

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .018 M**4/S**3; MOM. FLUX = .003 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
15.	.0000	0	.0	.0	.0	.00	.00	.00	NA
100.	2358.	6	1.0	1.0	10000.0	6.92	10.79	9.72	SS
200.	854.0	6	1.0	1.0	10000.0	6.92	21.17	16.05	SS
300.	446.1	6	1.0	1.0	10000.0	6.92	31.18	21.76	SS
400.	279.5	6	1.0	1.0	10000.0	6.92	40.85	26.97	SS
500.	194.8	6	1.0	1.0	10000.0	6.92	50.21	31.79	SS
600.	145.4	6	1.0	1.0	10000.0	6.92	59.27	36.27	SS
700.	113.9	6	1.0	1.0	10000.0	6.92	68.06	40.47	SS
800.	92.41	6	1.0	1.0	10000.0	6.92	76.59	44.43	SS
900.	77.02	6	1.0	1.0	10000.0	6.92	84.89	48.19	SS
1000.	65.57	6	1.0	1.0	10000.0	6.92	92.97	51.76	SS
1100.	56.77	6	1.0	1.0	10000.0	6.92	100.83	55.17	SS
1200.	49.85	6	1.0	1.0	10000.0	6.92	108.50	58.43	SS
1300.	44.29	6	1.0	1.0	10000.0	6.92	115.99	61.57	SS
1400.	39.74	6	1.0	1.0	10000.0	6.92	123.30	64.60	SS
1500.	35.95	6	1.0	1.0	10000.0	6.92	130.44	67.52	SS
1600.	32.77	6	1.0	1.0	10000.0	6.92	137.43	70.34	SS
1700.	30.06	6	1.0	1.0	10000.0	6.92	144.27	73.07	SS
1800.	27.73	6	1.0	1.0	10000.0	6.92	150.97	75.73	SS
1900.	25.70	6	1.0	1.0	10000.0	6.92	157.54	78.31	SS
2000.	23.93	6	1.0	1.0	10000.0	6.92	163.98	80.82	SS
2100.	22.37	6	1.0	1.0	10000.0	6.92	170.30	83.27	SS
2200.	20.99	6	1.0	1.0	10000.0	6.92	176.50	85.66	SS
2300.	19.75	6	1.0	1.0	10000.0	6.92	182.59	87.99	SS
2400.	18.65	6	1.0	1.0	10000.0	6.92	188.57	90.27	SS
2500.	17.65	6	1.0	1.0	10000.0	6.92	194.45	92.50	SS
2600.	16.74	6	1.0	1.0	10000.0	6.92	200.24	94.68	SS
2700.	15.92	6	1.0	1.0	10000.0	6.92	205.93	96.82	SS
2800.	15.17	6	1.0	1.0	10000.0	6.92	211.54	98.92	SS

```
  2900.   14.49        6     1.0     1.0 10000.0     6.92  217.05  100.98    SS
  3000.   13.86        6     1.0     1.0 10000.0     6.92  222.49  103.00    SS
  3500.   11.35        6     1.0     1.0 10000.0     6.92  248.52  112.61    SS
  4000.   9.584        6     1.0     1.0 10000.0     6.92  272.88  121.52    SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    15. M:
    19.   .1155E+05    5     1.0     1.0 10000.0     6.20    2.25    4.22    SS

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 ********************************************
 *  SUMMARY OF TERRAIN HEIGHTS ENTERED FOR  *
 *    SIMPLE ELEVATED TERRAIN PROCEDURE     *
 ********************************************

      TERRAIN        DISTANCE RANGE (M)
       HT (M)       MINIMUM     MAXIMUM
      -------       --------    --------
          0.            15.       4000.

****************************************
     *** REGULATORY (Default) ***
   PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
         (BRODE, 1988)
****************************************


 *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)      =    1486.        CONC (UG/M**3)      =    2598.
  CRIT WS @10M (M/S) =      2.30        CRIT WS @10M (M/S) =      2.30
  CRIT WS @ HS (M/S) =      2.30        CRIT WS @ HS (M/S) =      2.30
  DILUTION WS (M/S)  =      1.15        DILUTION WS (M/S)  =      1.15
  CAVITY HT (M)      =      6.10        CAVITY HT (M)      =      6.10
  CAVITY LENGTH (M)  =     30.91        CAVITY LENGTH (M)  =     25.62
  ALONGWIND DIM (M)  =     36.60        ALONGWIND DIM (M)  =     64.00

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION          MAX CONC     DIST TO    TERRAIN
  PROCEDURE          (UG/M**3)     MAX (M)     HT (M)
--------------       -----------   -------    -------
SIMPLE TERRAIN        .1155E+05       19.         0.

BLDG. CAVITY-1        1486.           31.        --  (DIST = CAVITY LENGTH)

BLDG. CAVITY-2        2598.           26.        --  (DIST = CAVITY LENGTH)


***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

Oser2.OUT

08/09/00
07:47:08

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

NYSDEC Oder Ave. - Hauppauge, NY

Simple Terrain (0.1779e5 ug/m³·g/s) * 0.00966 g/s → 171.85 ug/m³

Cavity (2598 ug/m³·g/s) * 0.00966 g/s → 25.09 ug/m³

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	6.1000
STK INSIDE DIAM (M)	=	.1020
STK EXIT VELOCITY (M/S)	=	1.5240
STK GAS EXIT TEMP (K)	=	533.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	6.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	6.1000
MIN HORIZ BLDG DIM (M)	=	36.6000
MAX HORIZ BLDG DIM (M)	=	64.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .018 M**4/S**3; MOM. FLUX = .003 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
15.	.0000	0	.0	.0	.0	.00	.00	.00	NA
100.	2140.	6	1.0	1.0	10000.0	6.92	10.79	9.72	SS
200.	806.7	6	1.0	1.0	10000.0	6.92	21.17	16.05	SS
300.	431.1	6	1.0	1.0	10000.0	6.92	31.18	21.76	SS
400.	273.2	6	1.0	1.0	10000.0	6.92	40.85	26.97	SS
500.	191.5	6	1.0	1.0	10000.0	6.92	50.21	31.79	SS
600.	143.5	6	1.0	1.0	10000.0	6.92	59.27	36.27	SS
700.	112.7	6	1.0	1.0	10000.0	6.92	68.06	40.47	SS
800.	91.59	6	1.0	1.0	10000.0	6.92	76.59	44.43	SS
900.	76.44	6	1.0	1.0	10000.0	6.92	84.89	48.19	SS
1000.	65.14	6	1.0	1.0	10000.0	6.92	92.97	51.76	SS
1100.	56.45	6	1.0	1.0	10000.0	6.92	100.83	55.17	SS
1200.	49.60	6	1.0	1.0	10000.0	6.92	108.50	58.43	SS
1300.	44.08	6	1.0	1.0	10000.0	6.92	115.99	61.57	SS
1400.	39.57	6	1.0	1.0	10000.0	6.92	123.30	64.60	SS
1500.	35.81	6	1.0	1.0	10000.0	6.92	130.44	67.52	SS
1600.	32.65	6	1.0	1.0	10000.0	6.92	137.43	70.34	SS
1700.	29.96	6	1.0	1.0	10000.0	6.92	144.27	73.07	SS
1800.	27.64	6	1.0	1.0	10000.0	6.92	150.97	75.73	SS
1900.	25.63	6	1.0	1.0	10000.0	6.92	157.54	78.31	SS
2000.	23.86	6	1.0	1.0	10000.0	6.92	163.98	80.82	SS
2100.	22.31	6	1.0	1.0	10000.0	6.92	170.30	83.27	SS
2200.	20.94	6	1.0	1.0	10000.0	6.92	176.50	85.66	SS
2300.	19.71	6	1.0	1.0	10000.0	6.92	182.59	87.99	SS
2400.	18.60	6	1.0	1.0	10000.0	6.92	188.57	90.27	SS
2500.	17.61	6	1.0	1.0	10000.0	6.92	194.45	92.50	SS
2600.	16.71	6	1.0	1.0	10000.0	6.92	200.24	94.68	SS
2700.	15.89	6	1.0	1.0	10000.0	6.92	205.93	96.82	SS
2800.	15.15	6	1.0	1.0	10000.0	6.92	211.54	98.92	SS

2900.	14.46	6	1.0	1.0	10000.0	6.92	217.05	100.98	SS
3000.	13.84	6	1.0	1.0	10000.0	6.92	222.49	103.00	SS
3500.	11.34	6	1.0	1.0	10000.0	6.92	248.52	112.61	SS
4000.	9.572	6	1.0	1.0	10000.0	6.92	272.88	121.52	SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 15. M:

19.	.1779E+05	5	1.0	1.0	10000.0	6.20	2.25	4.22	SS

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
* SUMMARY OF TERRAIN HEIGHTS ENTERED FOR *
* SIMPLE ELEVATED TERRAIN PROCEDURE *
****

TERRAIN HT (M)	DISTANCE RANGE (M) MINIMUM	MAXIMUM
0.	15.	4000.

****
*** REGULATORY (Default) ***
PERFORMING CAVITY CALCULATIONS
WITH ORIGINAL SCREEN CAVITY MODEL
(BRODE, 1988)
****

*** CAVITY CALCULATION - 1 ***

CONC (UG/M**3)	=	1486.
CRIT WS @10M (M/S)	=	2.30
CRIT WS @ HS (M/S)	=	2.30
DILUTION WS (M/S)	=	1.15
CAVITY HT (M)	=	6.10
CAVITY LENGTH (M)	=	30.91
ALONGWIND DIM (M)	=	36.60

*** CAVITY CALCULATION - 2 ***

CONC (UG/M**3)	=	2598.
CRIT WS @10M (M/S)	=	2.30
CRIT WS @ HS (M/S)	=	2.30
DILUTION WS (M/S)	=	1.15
CAVITY HT (M)	=	6.10
CAVITY LENGTH (M)	=	25.62
ALONGWIND DIM (M)	=	64.00

****
END OF CAVITY CALCULATIONS
****

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)	
SIMPLE TERRAIN	.1779E+05	19.	0.	
BLDG. CAVITY-1	1486.	31.	--	(DIST = CAVITY LENGTH)
BLDG. CAVITY-2	2598.	26.	--	(DIST = CAVITY LENGTH)

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

APPENDIX D
ANALYTICAL RESULTS

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	024F0101.D
		Instr. #:	GC #1
		Date Coll:	9/12/00 15:15
		Date Analyzed:	9/12/00 16:42
		Dilution Factor:	40
Sample ID:	Influent 1	Method:	STL0911E.MTH
GC Sample ID:	Influent 1 40x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.800	ND
1,1-Dichloroethene	0.800	ND
Methylene Chloride	0.800	ND
t-1,2-Dichloroethene	0.800	ND
1,1-Dichloroethane	0.800	ND
c-1,2-Dichloroethene	0.800	ND
1,1,1-Trichloroethane	0.800	ND
Carbon Tetrachloride	0.800	ND
1,2-Dichloroethane	0.800	ND
Trichloroethene	0.800	1.1
Tetrachloroethene	0.800	820.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020 from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A. Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 108 %

Signed [signature] 9/12/00

Reviewed____________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	074R0101.D
		Instr. #:	GC #1
		Date Coll:	9/12/00 15:15
		Date Analyzed:	9/12/00 16:42
		Dilution Factor:	40
Sample ID:	Influent 1	Method:	STL0911P.MTH
GC Sample ID:	Influent 1 40x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.800	ND
Toluene	0.800	ND
Chlorobenzene	0.800	ND
Ethylbenzene	0.800	ND
m&p-Xylene	0.800	ND
o-Xylene	0.800	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 101 %

Signed 9.1200

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	Analyst:	tjs
		File #:	023F0101.D
		Instr. #:	GC #1
		Date Coll:	9/12/00 15:45
		Date Analyzed:	9/12/00 16:22
		Dilution Factor:	10
		Method:	STL0911E.MTH
Sample ID:	Influent 2		
GC Sample ID:	Influent 2 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.200	ND
1,1-Dichloroethene	0.200	ND
Methylene Chloride	0.200	ND
t-1,2-Dichloroethene	0.200	ND
1,1-Dichloroethane	0.200	ND
c-1,2-Dichloroethene	0.200	4.0
1,1,1-Trichloroethane	0.200	ND
Carbon Tetrachloride	0.200	ND
1,2-Dichloroethane	0.200	ND
Trichloroethene	0.200	8.8
Tetrachloroethene	0.200	370.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 109 %

Signed 9/12/00

Reviewed

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	073R0101.D
		Instr. #:	GC #1
		Date Coll:	9/12/00 15:45
		Date Analyzed:	9/12/00 16:22
		Dilution Factor:	10
Sample ID:	Influent 2	Method:	STL0911P.MTH
GC Sample ID:	Influent 2 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.200	ND
Toluene	0.200	ND
Chlorobenzene	0.200	ND
Ethylbenzene	0.200	ND
m&p-Xylene	0.200	ND
o-Xylene	0.200	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 103 %

Signed 91200

Reviewed__________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	008F0101.D
		Instr. #:	GC #1
		Date Coll:	9/13/00 10:00
		Date Analyzed:	9/13/00 10:30
		Dilution Factor:	10
Sample ID:	Influent 3	Method:	STL0911E.MTH
GC Sample ID:	Influent 3 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.200	ND
1,1-Dichloroethene	0.200	ND
Methylene Chloride	0.200	ND
t-1,2-Dichloroethene	0.200	ND
1,1-Dichloroethane	0.200	ND
c-1,2-Dichloroethene	0.200	0.3
1,1,1-Trichloroethane	0.200	ND
Carbon Tetrachloride	0.200	ND
1,2-Dichloroethane	0.200	ND
Trichloroethene	0.200	ND
Tetrachloroethene	0.200	210.0

Notes:

Volatile Organic Compounds analyzed using EPA methods 8010/8020 from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A. Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 112 %

Signed 9-13-00

Reviewed

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	058R0101.D
		Instr. #:	GC #1
		Date Coll:	9/13/00 10:00
		Date Analyzed:	9/13/00 10:30
		Dilution Factor:	10
Sample ID:	Influent 3	Method:	STL0911P.MTH
GC Sample ID:	Influent 3 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.200	ND
Toluene	0.200	ND
Chlorobenzene	0.200	ND
Ethylbenzene	0.200	ND
m&p-Xylene	0.200	ND
o-Xylene	0.200	ND

Notes:

Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 98 %

Signed [signature] 9/13/00

Reviewed ______________

Severn Trent Laboratories OST Division

(413)572-4000

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	Analyst:	tjs
		File #:	008F0101.D
		Instr. #:	GC #1
		Date Coll:	9/14/00 8:30
		Date Analyzed:	9/14/00 11:21
		Dilution Factor:	10
Sample ID:	Influent 4	Method:	STL0914E.MTH
GC Sample ID:	Influent 4 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.200	ND
1,1-Dichloroethene	0.200	ND
Methylene Chloride	0.200	ND
t-1,2-Dichloroethene	0.200	ND
1,1-Dichloroethane	0.200	ND
c-1,2-Dichloroethene	0.200	3.6
1,1,1-Trichloroethane	0.200	ND
Carbon Tetrachloride	0.200	ND
1,2-Dichloroethane	0.200	ND
Trichloroethene	0.200	6.4
Tetrachloroethene	0.200	270.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 103 %

Signed 9/14/00

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	005F0101.D
		Instr. #:	GC #1
		Date Coll:	9/18/00 10:55
		Date Analyzed:	9/18/00 13:01
		Dilution Factor:	10
Sample ID:	Influent 5	Method:	STL0914E.MTH
GC Sample ID:	Influent 5 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.200	ND
1,1-Dichloroethene	0.200	ND
Methylene Chloride	0.200	ND
t-1,2-Dichloroethene	0.200	ND
1,1-Dichloroethane	0.200	ND
c-1,2-Dichloroethene	0.200	4.0
1,1,1-Trichloroethane	0.200	ND
Carbon Tetrachloride	0.200	ND
1,2-Dichloroethane	0.200	ND
Trichloroethene	0.200	5.5
Tetrachloroethene	0.200	240.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 109 %

Signed 9/18/00

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	tjs
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	055R0101.D
		Instr. #:	GC #1
		Date Coll:	9/18/00 10:55
		Date Analyzed:	9/18/00 13:01
		Dilution Factor:	10
Sample ID:	Influent 5	Method:	STL0914P.MTH
GC Sample ID:	Influent 5 10x		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.200	ND
Toluene	0.200	ND
Chlorobenzene	0.200	ND
Ethylbenzene	0.200	ND
m&p-Xylene	0.200	ND
o-Xylene	0.200	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020 from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A. Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 101 %

Signed [signature] 9-18-00

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	Analyst:	KS
		File #:	013F0101.D
		Instr. #:	GC #1
		Date Coll:	9/21/00 10:25
		Date Analyzed:	9/21/00 12:20
		Dilution Factor:	1
Sample ID:	EFFLUENT 921	Method:	STL0914E.MTH
GC Sample ID:	EFFLUENT 921 5mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.020	ND
1,1-Dichloroethene	0.020	ND
Methylene Chloride	0.020	ND
t-1,2-Dichloroethene	0.020	ND
1,1-Dichloroethane	0.020	ND
c-1,2-Dichloroethene	0.020	ND
1,1,1-Trichloroethane	0.020	ND
Carbon Tetrachloride	0.020	ND
1,2-Dichloroethane	0.020	ND
Trichloroethene	0.020	ND
Tetrachloroethene	0.020	0.5

Notes:

Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 89 %

Signed KS 9/21/00

Reviewed____________________

Severn Trent Laboratories OST Division

(413)572-4000

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	KS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	063R0101.D
		Instr. #:	GC #1
		Date Coll:	9/21/00 10:25
		Date Analyzed:	9/21/00 12:20
		Dilution Factor:	1
Sample ID:	EFFLUENT 921	Method:	STL0914P.MTH
GC Sample ID:	EFFLUENT 921 5mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.020	ND
Toluene	0.020	ND
Chlorobenzene	0.020	ND
Ethylbenzene	0.020	ND
m&p-Xylene	0.020	ND
o-Xylene	0.020	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 106 %

Signed KS 9/21/00

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	Analyst:	KS
		File #:	014F0101.D
		Instr. #:	GC #1
		Date Coll:	9/21/00 10:20
		Date Analyzed:	9/21/00 12:39
		Dilution Factor:	5
Sample ID:	INFLUENT 921	Method:	STL0914E.MTH
GC Sample ID:	INFLUENT 921 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.100	ND
1,1-Dichloroethene	0.100	ND
Methylene Chloride	0.100	ND
t-1,2-Dichloroethene	0.100	ND
1,1-Dichloroethane	0.100	ND
c-1,2-Dichloroethene	0.100	3.0
1,1,1-Trichloroethane	0.100	ND
Carbon Tetrachloride	0.100	ND
1,2-Dichloroethane	0.100	ND
Trichloroethene	0.100	3.4
Tetrachloroethene	0.100	160.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed
BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 107 %

Signed ~~KS~~ 9/21/00

Reviewed________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	KS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	064R0101.D
		Instr. #:	GC #1
		Date Coll:	9/21/00 10:20
		Date Analyzed:	9/21/00 12:39
		Dilution Factor:	5
Sample ID:	INFLUENT 921	Method:	STL0914P.MTH
GC Sample ID:	INFLUENT 921 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020

Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.100	ND
Toluene	0.100	ND
Chlorobenzene	0.100	ND
Ethylbenzene	0.100	ND
m&p-Xylene	0.100	ND
o-Xylene	0.100	ND

Notes:

Volatile Organic Compounds analyzed using EPA methods 8010/8020 from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A. Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 111 %

Signed KS 9/21/00

Reviewed____________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	Analyst:	KS
		File #:	008F0101.D
		Instr. #:	GC #1
		Date Coll:	9/26/00 7:35
		Date Analyzed:	9/26/00 10:46
		Dilution Factor:	5
Sample ID:	INFLUENT 926	Method:	STL0926E.MTH
GC Sample ID:	INFLUENT 926 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.100	ND
1,1-Dichloroethene	0.100	ND
Methylene Chloride	0.100	ND
t-1,2-Dichloroethene	0.100	ND
1,1-Dichloroethane	0.100	ND
c-1,2-Dichloroethene	0.100	5.0
1,1,1-Trichloroethane	0.100	ND
Carbon Tetrachloride	0.100	ND
1,2-Dichloroethane	0.100	ND
Trichloroethene	0.100	4.6
Tetrachloroethene	0.100	170.0

Notes:

Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 96 %

Signed KS 9/26/00

Reviewed________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	KS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	058R0101.D
		Instr. #:	GC #1
		Date Coll:	9/26/00 7:35
		Date Analyzed:	9/26/00 10:46
		Dilution Factor:	5
Sample ID:	INFLUENT 926	Method:	STL0926P.MTH
GC Sample ID:	INFLUENT 926 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.100	ND
Toluene	0.100	ND
Chlorobenzene	0.100	ND
Ethylbenzene	0.100	ND
m&p-Xylene	0.100	ND
o-Xylene	0.100	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020 from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A. Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 106 %

Signed KS 9/26/00

Reviewed____________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	KS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	007F0101.D
		Instr. #:	GC #1
		Date Coll:	9/28/00 9:00
		Date Analyzed:	9/28/00 9:48
		Dilution Factor:	5
Sample ID:	INFLUENT 928	Method:	STL0926E.MTH
GC Sample ID:	INFLUENT 928 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Vinyl Chloride	0.100	ND
1,1-Dichloroethene	0.100	ND
Methylene Chloride	0.100	ND
t-1,2-Dichloroethene	0.100	ND
1,1-Dichloroethane	0.100	ND
c-1,2-Dichloroethene	0.100	8.0
1,1,1-Trichloroethane	0.100	ND
Carbon Tetrachloride	0.100	ND
1,2-Dichloroethane	0.100	ND
Trichloroethene	0.100	7.3
Tetrachloroethene	0.100	200.0

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 103 %

Signed KS 9/28/00

Reviewed________________

Severn Trent Laboratories OST Division *(413)572-4000*

Field Report

PROJECT :	NYSDEC/ 100 Oser Avenue Hauppauge, LI, NY	Matrix:	SOIL GAS
		Analyst:	KS
CLIENT:	IT Corporation 13 British American Blvd Latham, New York 12110	File #:	057R0101.D
		Instr. #:	GC #1
		Date Coll:	9/28/00 9:00
		Date Analyzed:	9/28/00 9:48
		Dilution Factor:	5
Sample ID:	INFLUENT 928	Method:	STL0926P.MTH
GC Sample ID:	INFLUENT 928 1mL		
W.O. #:	NA		

RESULTS:

EPA Method 8010/8020
Gas Chromatography for Volatile Organics

COMPOUND	DET. LIMIT mg/cu. m	RESULT mg/cu. m.
Benzene	0.100	ND
Toluene	0.100	ND
Chlorobenzene	0.100	ND
Ethylbenzene	0.100	ND
m&p-Xylene	0.100	ND
o-Xylene	0.100	ND

Notes:
Volatile Organic Compounds analyzed using EPA methods 8010/8020
from Test Methods for Evaluating Solid Waste, SW 846, U.S. E.P.A.
Office of Solid Waste and Emergency Response, Washington, D.C., November 1986.

ND = Not Detected
NA = Not Analyzed

BQL = Detected below the minimum quantitation limit
B = Detected in the laboratory blank

Comments: Surrogate Recovery = 112 %

Signed KS 9/28/00

Reviewed

Severn Trent Laboratories OST Division *(413)572-4000*