

**CONSTRUCTION RECORD AND**  
**OPERATION MANUAL**  
**INTERIM REMEDIATION SYSTEM**  
**UPGRADE AND EXPANSION**

**AMOCO OIL COMPANY**  
**AMOCO TERMINAL**  
**2904 WINTER STREET**  
**SUPERIOR, WISCONSIN**

**DELTA NO. A088-457-1**

**Prepared by:**

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**(612) 486-8022**

**April 12, 1995**

**TABLE OF CONTENTS**

1.0 INTRODUCTION ..... 1

2.0 CONSTRUCTION RECORD ..... 1

    2.1 SVE System Description ..... 2

    2.2 Interim Product Recovery System ..... 3

    2.3 Settlement Plate ..... 4

3.0 SYSTEM OPERATION ..... 4

    3.1 Description of Operation ..... 4

    3.2 Operation & Maintenance ..... 5

4.0 REMARKS ..... 5

**List of Tables**

Table 1      Equipment List

**List of Figures**

Figure 1      Site Map

Figure 2      Soil Vent Locations

Figure P-1    SVE System Piping and Instrumentation Diagram

Figure E-1    Electrical Flow Diagram

**List of Appendices**

Appendix A    Photographic Log

Appendix B    Soil Borings/Well Logs

Appendix C    Equipment Manuals

Appendix D    Operation Data Sheet

Appendix E    Tank Registrations

**CONSTRUCTION RECORD AND OPERATION MANUAL**  
**INTERIM REMEDIATION SYSTEM UPGRADE AND EXPANSION**

AMOCO Oil Company  
Amoco Terminal  
Superior, Wisconsin  
DELTA NO. A088-457-1

**1.0 INTRODUCTION**

The purpose of this report is to provide documentation of the soil vapor extraction (SVE) system and the interim product recovery system upgraded and expanded at Amoco Oil Terminal in Superior, Wisconsin in 1994. The site is located on the north side of the terminal, adjacent to the main entrance. The terminal is at 2904 Winter Street, Superior, Wisconsin and is managed by Mr. Ed Heytens. The office telephone number is (715) 392-8294.

The report provides a construction record, documents system operation, and presents operation and maintenance (O&M) procedures. A site map is included as Figure 1.

The SVE system was purchased from Pro-Air Conveying, 70 West Woodlyn Avenue, St. Paul, Minnesota 55117, phone number (612) 490-1183 by Delta Environmental Inc. (Delta), 3900 Northwoods Drive, St. Paul, Minnesota, (612) 486-8022. The product recovery equipment was purchased from Clean Earth Technology, North Ferrisburg, Vermont 05473, (802) 425-3710. The SVE installation, trenching, and underground piping was completed by Stack Bros. Construction, P.O. Box 993, Superior, WI. 54880; (715) 392-2964. The well drilling was performed by Thein Well Co., P.O. Box 429, Clara City, MN, 56222. Construction management was provided by Delta Environmental Consultants. The contractors performed work according to plans and specifications prepared by Delta. The plans were provided in *Delta's Remedial Design Package* (RDP) dated June 15, 1994.

Following this introduction, Section 2.0 describes the SVE and Interim Product Recovery systems construction and gives a description of the SVE and Product Recovery systems. Section 3.0 describes O&M requirements. Appendices A, B, C, D, and E contain a photographic log, soil boring/well logs, equipment manuals, log sheets for operation and maintenance records, and tank registration forms respectively.

**2.0 CONSTRUCTION RECORD**

Construction of the SVE and Product Recovery systems was initiated on November 8, 1994. The construction process timeline and dates of completion of the major components are presented below:

- 9/22/94 Submitted proposal to Amoco for installation of SVE and Interim Product Recovery systems in accordance with RDP prepared by Delta.
- 10/24/94 - 11/01/94 Contracts awarded to subcontractors. Coordinated/planned field construction.
- 11/02/94 Pre-Construction Meeting on site.  
Bill Fellows - Delta  
John Egan - Delta  
Ed Heytens - Amoco  
Jim Tracy - Stack Bros. Const.  
Rollie Larson - Belknap Electric  
Tom Johnson - Four Star Const.
- 11/08/94 Mobilization to site.  
Trenching and installation of underground piping.
- 11/11/94 - 12/22/94 Placed concrete building slab.  
Erected treatment building.  
Obtained power service.  
Excavation, trenching ,and exterior plumbing.  
Conducted SVE pilot test on newly installed points.
- 12/29/94 Completed mechanical performance check.
- 12/30/94 Performed system start-up procedure. Collected all required data.

A series of photographs of the SVE and Product Recovery System construction is included in Appendix A. A Piping and Instrumentation Diagram (PID) drawing is included as Drawing P-1. Specification information on major components in the SVE system is found in Table 1. Sections 2.1 and 2.2 contain details on the construction of the SVE and Product Recovery systems.

### 2.1 SVE System Description

The SVE system is designed to remove air from 12 SVE points. The total system flow rate is based on a design of approximately 80 standard cubic feet per minute (scfm) at 60" water vacuum, being provided by a DuroFlow positive displacement blower. System design allows for manual valving of air flow from each point at the system manifold. Each SVE point is fitted with an annubar flow meter and differential pressure

gauge to record the air flow through each point. An inline condensate tank is used to remove water vapor from the lines to protect the blower from water damage. A noise silencer is provided to reduce equipment noise to background noise level. Additional controls required for system operation are:

- A control panel containing a hour meter, cycle counter, and amperage meter for the SVE blower.
- A high float that provides system shutdown in the event of a full condensate sump.

The following is a list of construction specifications and equipment:

- An insulated, 12 foot by 16 foot building with 8 foot high ceiling.
- A ceiling mounted, vapor tight light fixture.
- Four-inch-thick reinforced concrete floor.
- 6-foot wide double swing doors which open out.
- A Hand/Off/Auto switch for a 1/4 horsepower exhaust fan, controlled by a thermostat with remote sensing bulb.
- An automatic building ventilation fan.
- NEMA 4 control cabinet.
- Load center and controls mounted on the outside wall of the treatment building.
- All wiring and equipment in accordance with National Electrical Code Class I, Division II, group D.
- Health and safety plan holder.

## 2.2 Interim Product Recovery System

The Product Recovery System consists of three product recovery pumps in three wells; RW-1, MW-16, and RW-6. Two of the pumps working together, RW-1 and MW-16 make up a multi-well recovery system. A separate stand-alone pump at RW-6 defines the second system. A control panel on each system controls the operation of the pumps. The multi-well system cycles two pumps on a time shared basis, which can be independently adjusted for up to 30 minutes of operation time per cycle, while the stand alone system runs continuously. Each system includes an automatic level seek (ALS) which locates the product-water interface, via a motorized reel, and recovers the product during its cycle time. Each system collects the recovered

product into a 1000 gallon doubled-walled, above ground storage tank. One tank is adjacent to RW-1 and one tank is adjacent to RW-6. Tank registration documents are included in Appendix E.

### **2.3 Settlement Plate**

A settlement plate to enable surveying and measurement of potential settlement due to a possible reduction in the moisture content of the clay layer was installed near the Operations Building, as indicated in the photographic log (Appendix A).

## **3.0 SYSTEM OPERATION**

The general SVE system operation and maintenance requirements for the SVE and Product Recovery Systems is described in the following sections

### **3.1 Description of Operation**

The primary goal of the SVE system is to induce an air flow through the subsurface. The air flow volatilizes hydrocarbons and enhances the natural occurring biodegradation processes. Air flow is produced by applying a vacuum in the unsaturated zone, through a screened well. Contaminant-free air displaces soil vapor, creating a concentration gradient that causes free-phase compounds to evaporate, and dissolved compounds to diffuse and evaporate. The oxygen available to soil microorganisms also enhances naturally occurring biological degradation, which degrade the organic compounds.

The network of wells for the SVE system consists of soil vent points SV-1 through SV-10, RW-1, and RW-4. In addition, shallow vacuum monitoring points were installed adjacent to SV-7 through SV-10 to enable measurement of the influence of the vacuum points on the upper clay unit. A summary table of depths, elevations and observations noted during the vent installations, and soil boring logs for each point are included in Appendix B. The interior plumbing and blower selection has been designed to also operate as a bioventing system. Here, the air flow through the system is reversed to provide fresh air to the ground to elevate the oxygen content in the unsaturated soils. The Piping and Instrumentation Diagram is shown as Figure P-1. The location of all points is shown in Figure 2, and the electrical flow diagram for the SVE system is shown as Figure E-1.

**3.2 Operation & Maintenance**

Routine maintenance of the system will require monthly visits to the site to check system operation. During these monthly visits, operational data and air samples will be collected to ensure that the SVE system performance is in compliance with Wisconsin Department of Natural Resources (WDNR) air emission guidelines. An operational data collection sheet is attached in Appendix D.

The Duro-Flow positive displacement blower requires occasional replacement of the air-intake filter and oil changes every 500-1000 hours of operation.

During each monthly site visit, data will be collected from each vent point, including pressure and vapor monitoring. Temperature, air flow rates, and carbon dioxide measurements will also be taken. Water and product level measurements from operating and nearby wells, measurement of product recovered, and the vacuum on nearby wells will also be measured and recorded.

**4.0 REMARKS**

The recommendations contained in this report represent our professional opinions. These opinions are based on currently-available information and are arrived at in accordance with currently-accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by DELTA ENVIRONMENTAL CONSULTANTS, INC.

\_\_\_\_\_  
John H. Egan  
Staff Engineer

Date: \_\_\_\_\_

Reviewed by:

\_\_\_\_\_  
William E. Fellows  
Senior Engineer

Date: \_\_\_\_\_

## TABLES



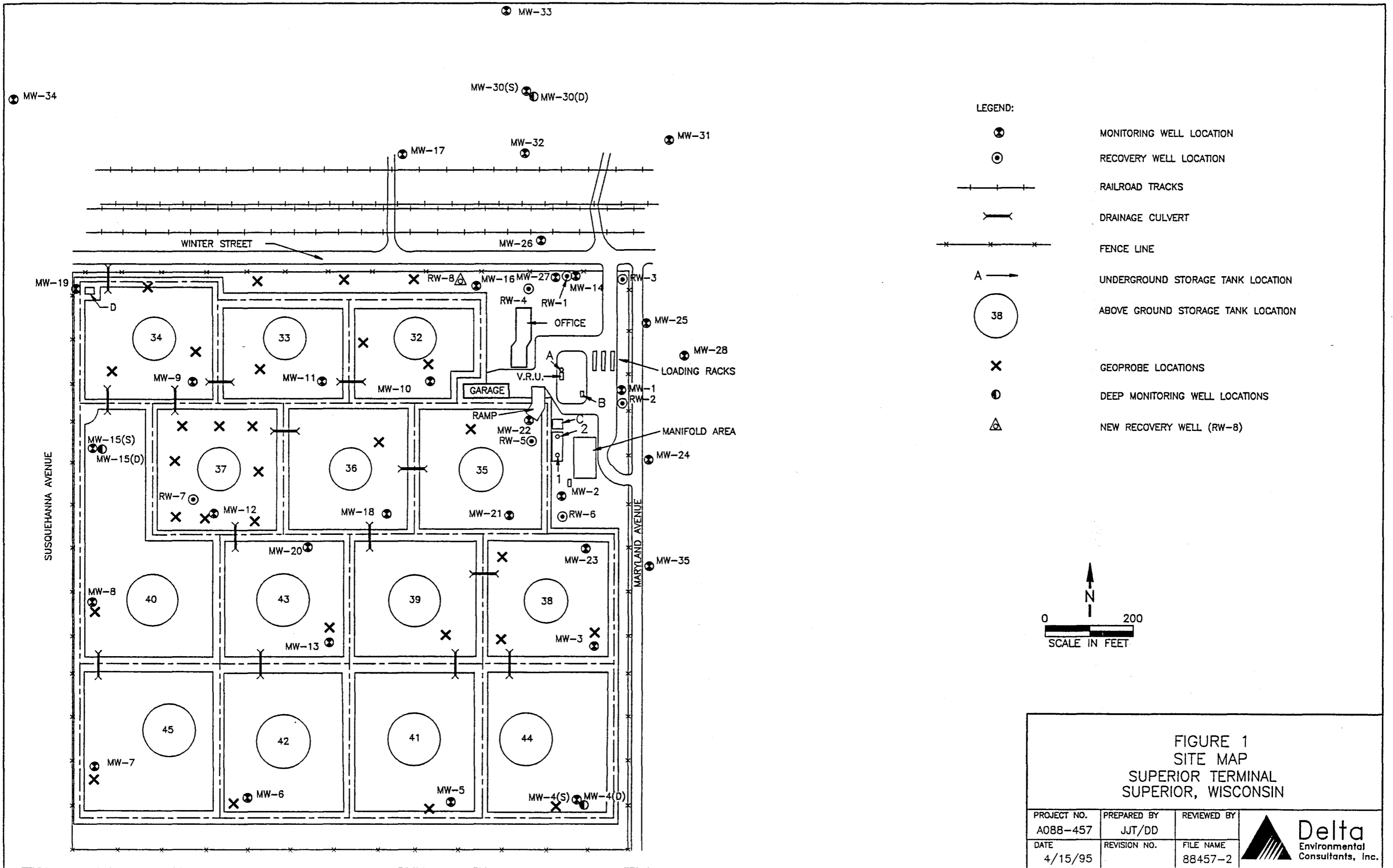
**Table 1**

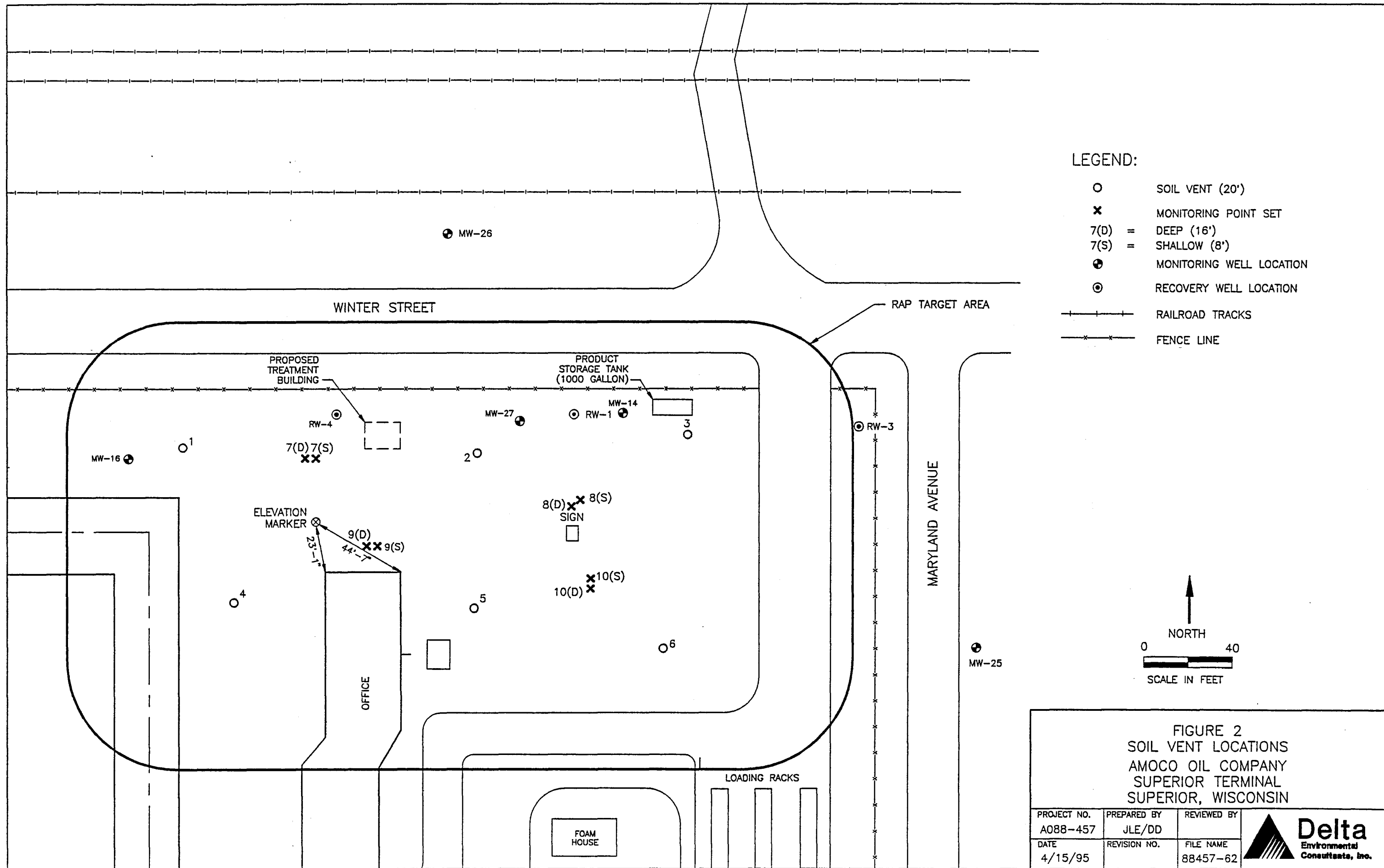
**Soil Vapor Extraction Systems Equipment List**

**SVE Equipment List**

Item	Description	Quantity
B-1	Duroflow 3004 positive displacement blower rated for continuous duty at 15 psi, providing 80 scfm at 60" H <sub>2</sub> O vacuum	1
DS-1	Discharge silencer reducing exhaust noise to 75 decibels	1
VRV-1	Vacuum relief valve sized to blower	1
PF-1	Particulate filter sized to blower	1
CS-1	Condensate sump (if necessary)	1
LSH-I	Appropriate float switch to send signal to panel to switch off SVE system on high levels in condensate sump	1
PI-1, PI-2	Appropriately sized magnehelic gauge or engineering approved equal.	2
TI-1	Bimetal temperature indicators	1
FI-1	"3 averaging pitot tube with appropriately sized magnehelic gauges, tubing and fittings.	1
FI-2 TO FI-13	3/4" averaging pitot tubes with appropriately sized magnehelic gauges, tubing and fittings	12
CV-1 - CV-12, CV-25	1/4" sample valves with barbed fitting	7
CV-13, CV-24, CV-26,27,28	Ball Valves	7
CV-15	Ball valve (drain)	1

## **FIGURES**





- LEGEND:**
- SOIL VENT (20')
  - ✕ MONITORING POINT SET
  - 7(D) = DEEP (16')
  - 7(S) = SHALLOW (8')
  - MONITORING WELL LOCATION
  - ⊙ RECOVERY WELL LOCATION
  - +—+—+ RAILROAD TRACKS
  - x—x—x FENCE LINE

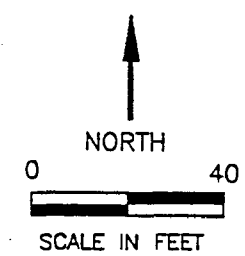
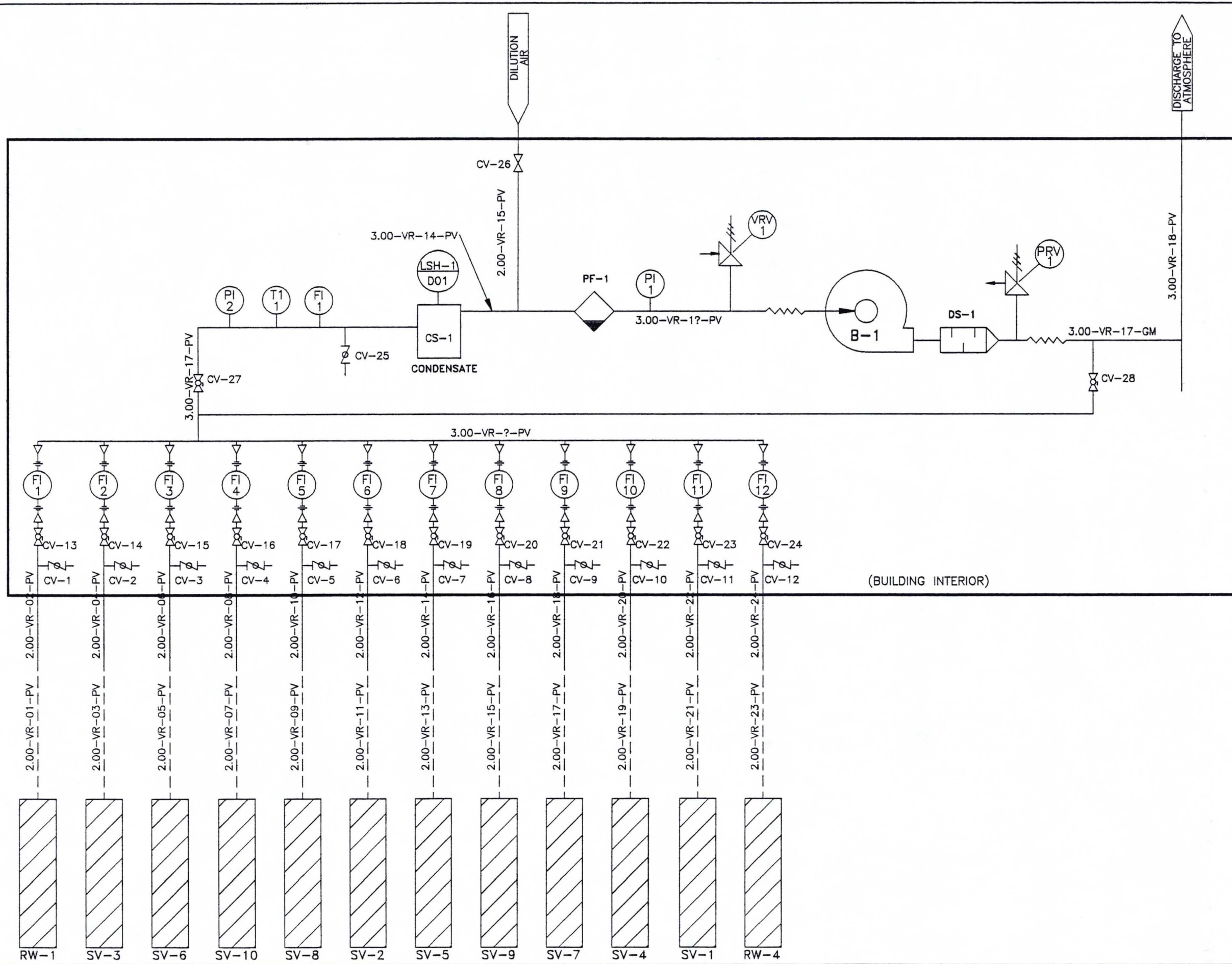


FIGURE 2  
SOIL VENT LOCATIONS  
AMOCO OIL COMPANY  
SUPERIOR TERMINAL  
SUPERIOR, WISCONSIN

PROJECT NO. A088-457	PREPARED BY JLE/DD	REVIEWED BY	
DATE 4/15/95	REVISION NO.	FILE NAME 88457-62	



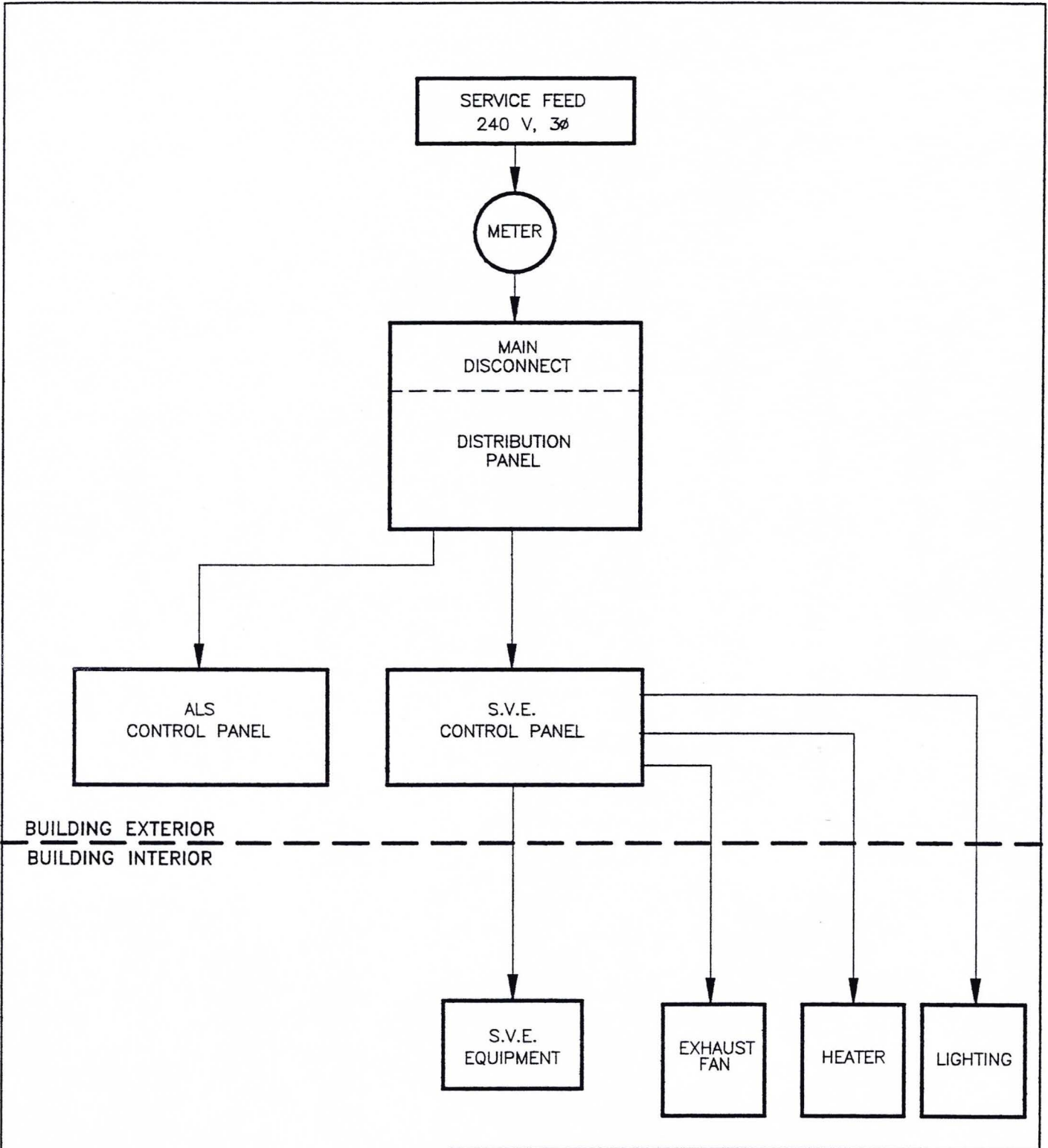
THIS DRAWING IS INTENDED TO SUPPLEMENT PROJECT DRAWINGS AND SPECIFICATIONS, WHICH TOGETHER SHALL BE USED FOR PERFORMING THE WORK. ALL BUILDING LAWS, RULES, AND REGULATIONS, HAVING JURISDICTION OVER THIS PROJECT, SHALL BE PART OF THE DRAWINGS AND SPECIFICATIONS PREPARED BY THE OWNER AND THE CONTRACTOR PERFORMING THE WORK AND SHALL BE COMPLIED WITH BY THE OWNER AND THE CONTRACTOR.

REV	DATE	DESCRIPTION	DRAWN	REVIEW

PREPARED BY	JHE/DD	REVIEWED BY	
DATE	4/15/95	DATE	

FIGURE P-1  
 PIPING & INSTRUMENTATION DIAGRAM  
 SVE SYSTEM  
 AMOCO SUPERIOR TERMINAL  
 SUPERIOR, WISCONSIN






BUILDING EXTERIOR  
-----  
BUILDING INTERIOR

DRAWING E-1  
ELECTRICAL FLOW DIAGRAM  
SOIL VAPOR EXTRACTION SYSTEM  
AMOCO TERMINAL  
SUPERIOR, WISCONSIN

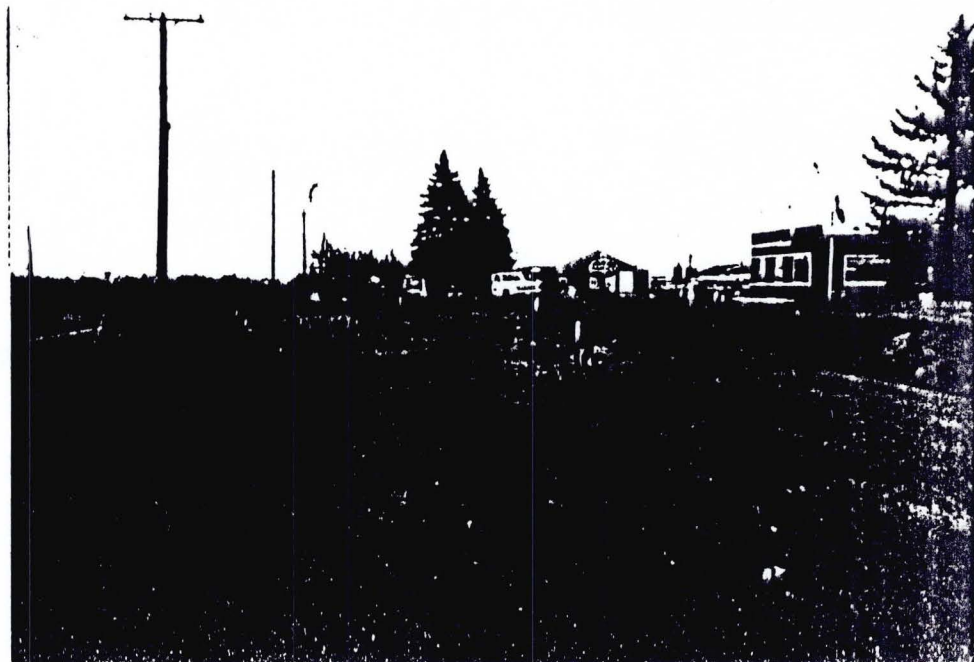
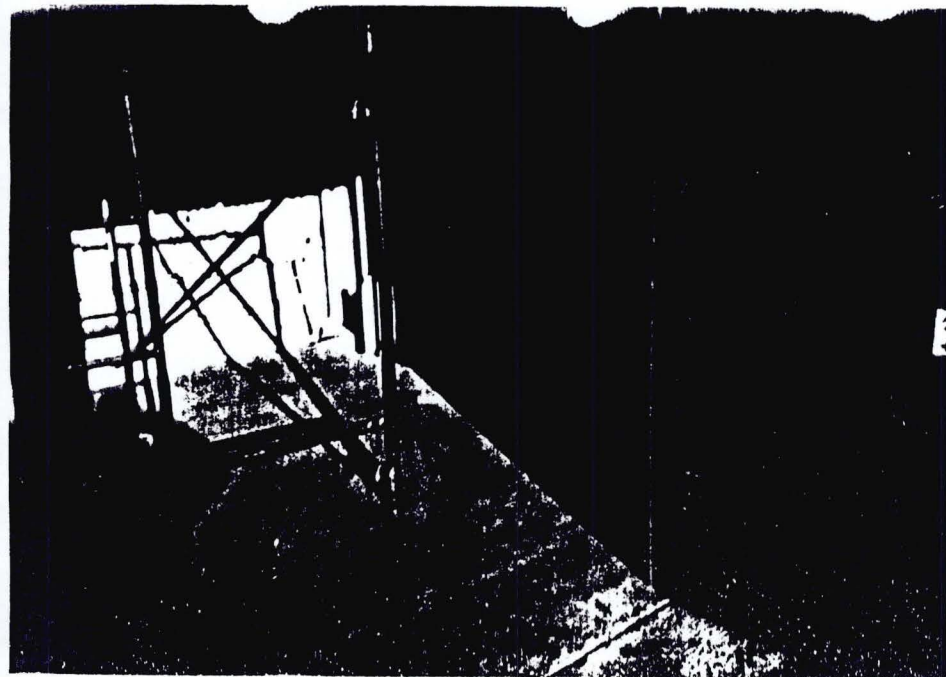
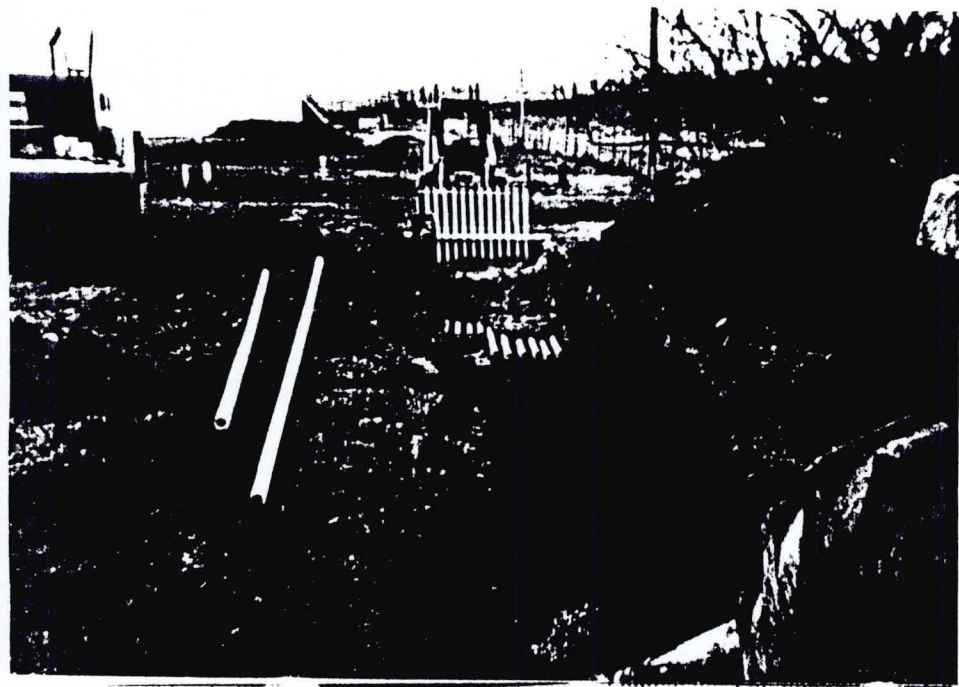
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PROJECT NO. A088-457	PREPARED BY JHE/DD	REVIEWED BY	 <b>Delta</b> Environmental Consultants, Inc.
DATE 4/15/94	REVISION NO.	FILE NAME 88457-E1	

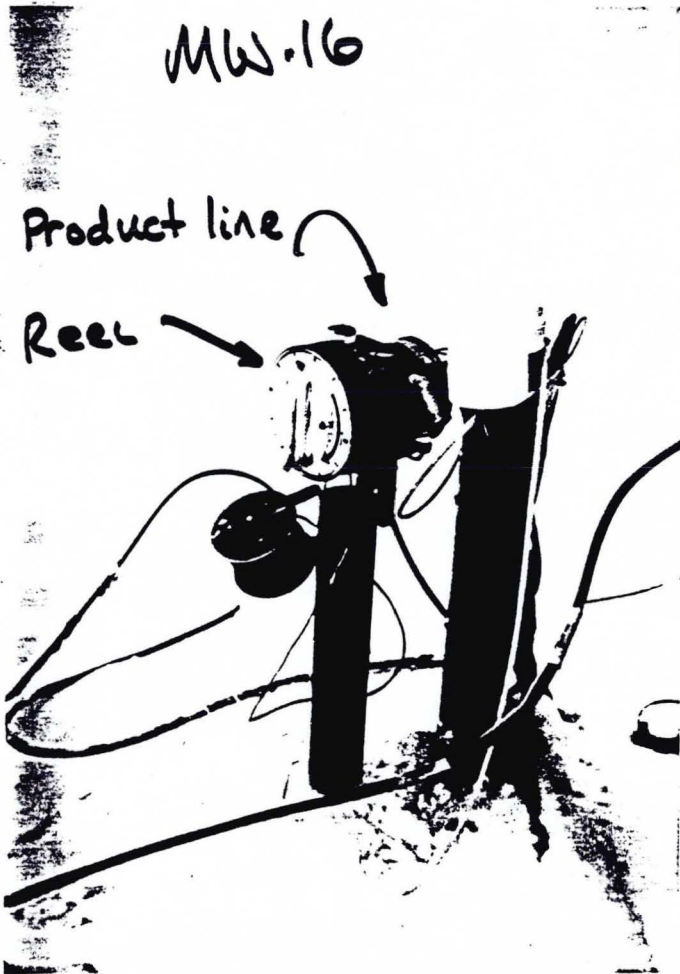
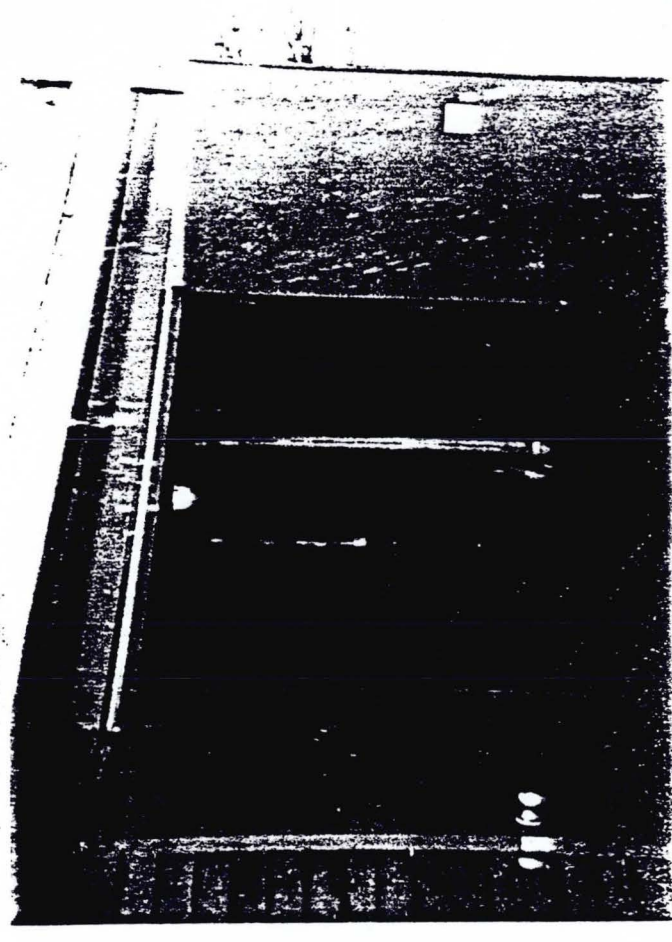
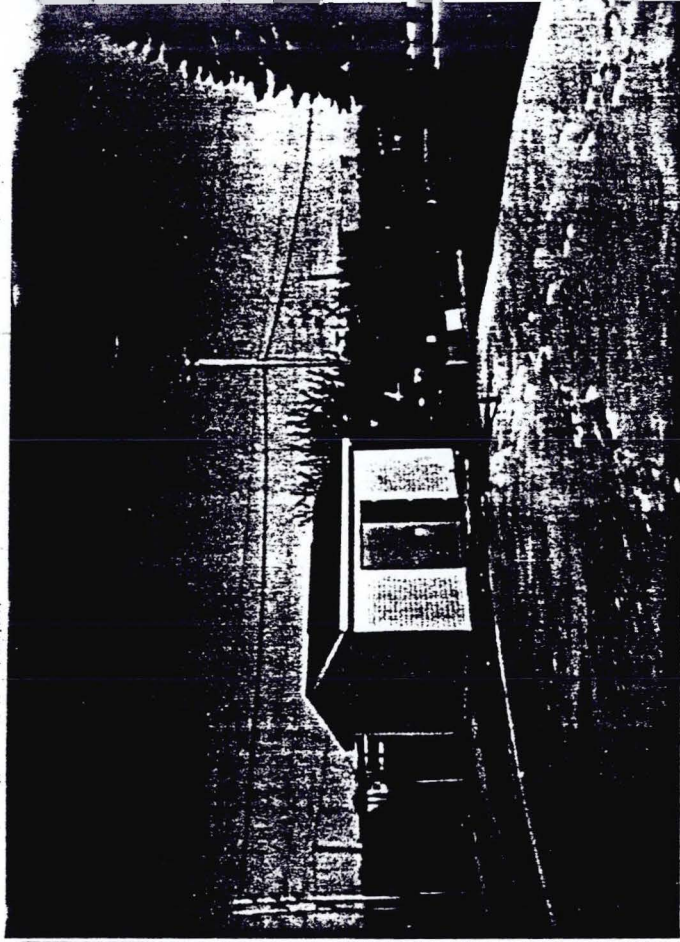
APPENDIX A

PHOTOGRAPHIC LOG

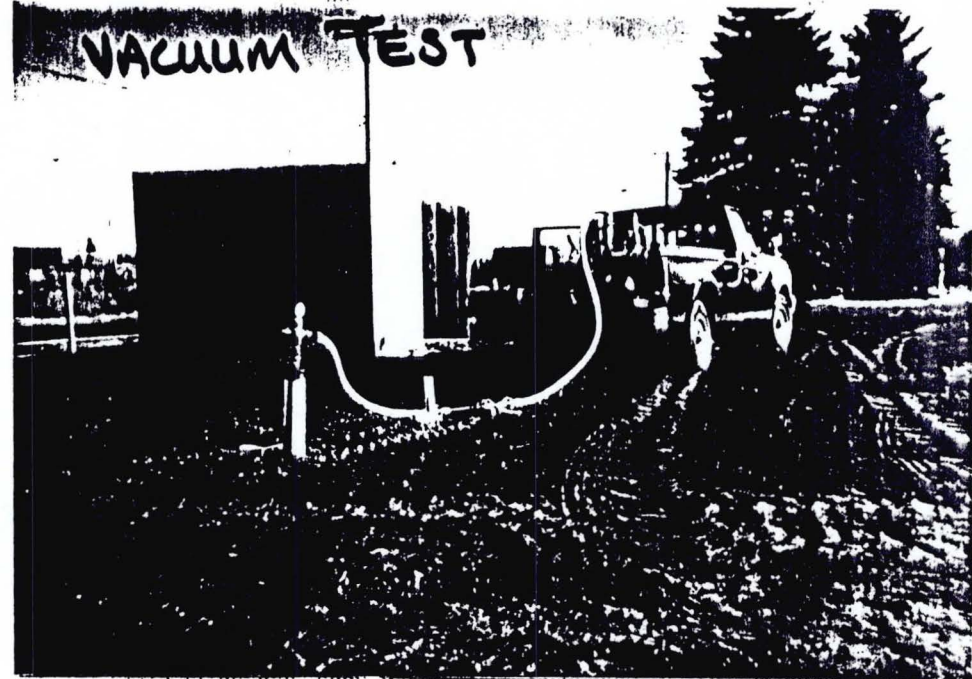
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35MM PRINTS

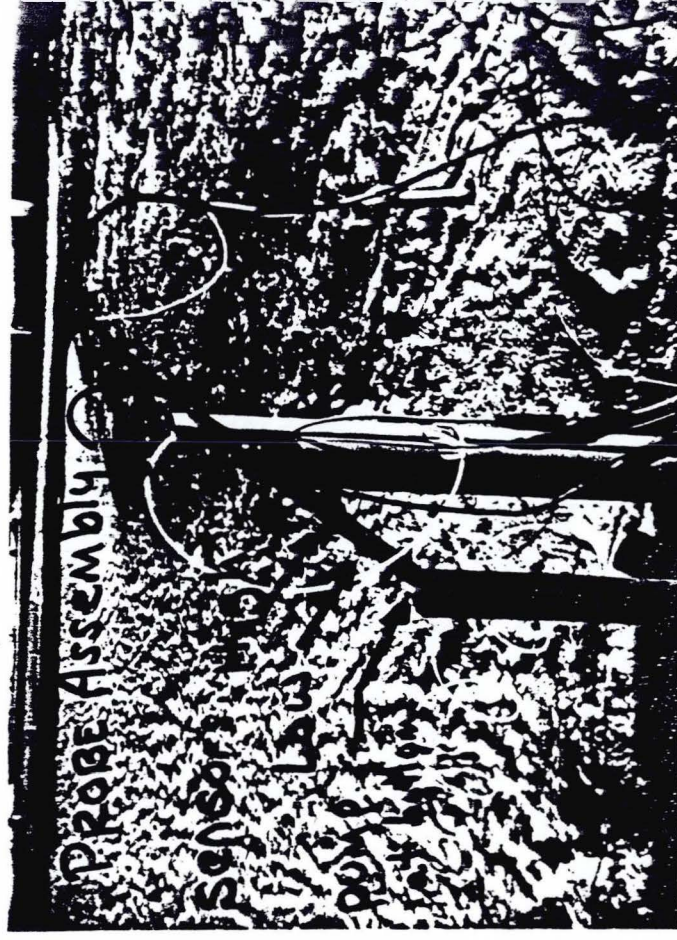




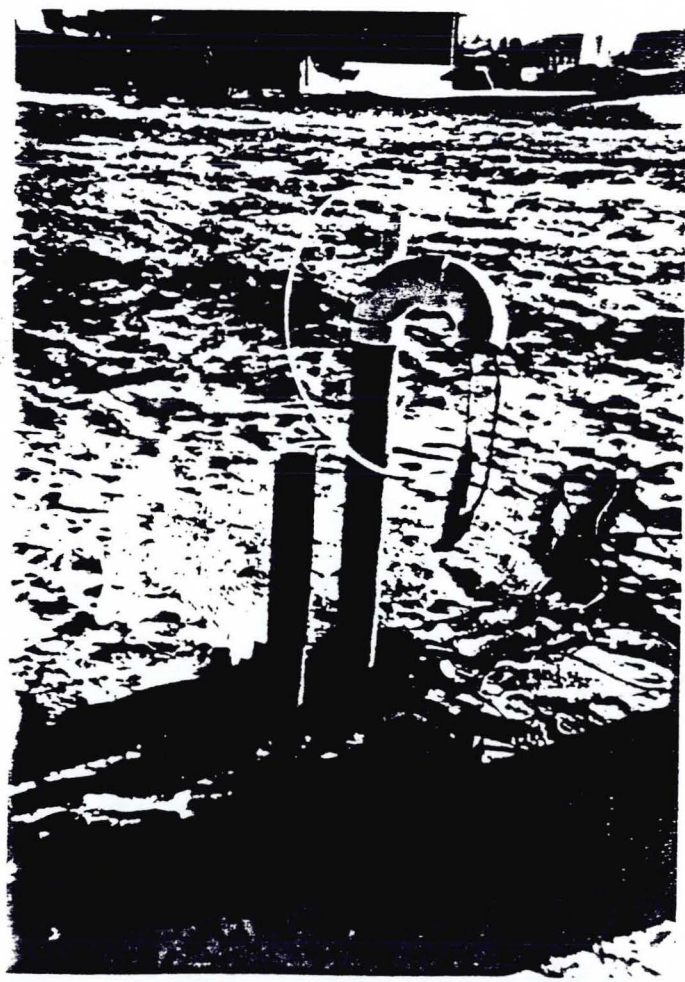
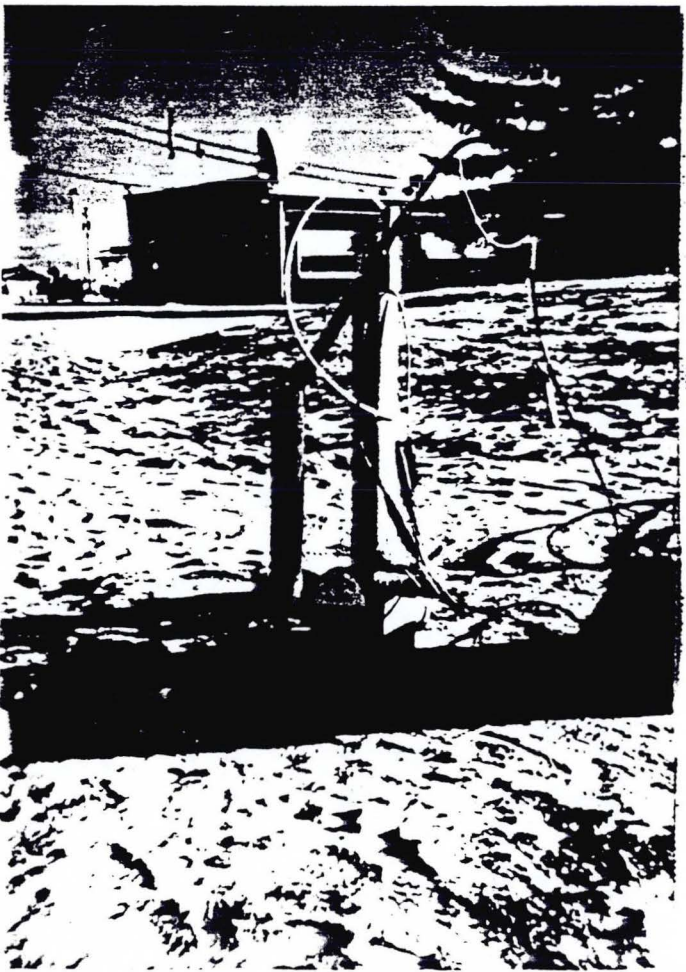


C-LINE #52584  
35MM PRINTS





C-LINE #52584  
35MM PRINTS





**APPENDIX B**

**SV Point Installation Observations  
Soil Boring Logs  
SV and Monitoring Point Construction Details**



**Delta**  
Environmental  
Consultants, Inc.

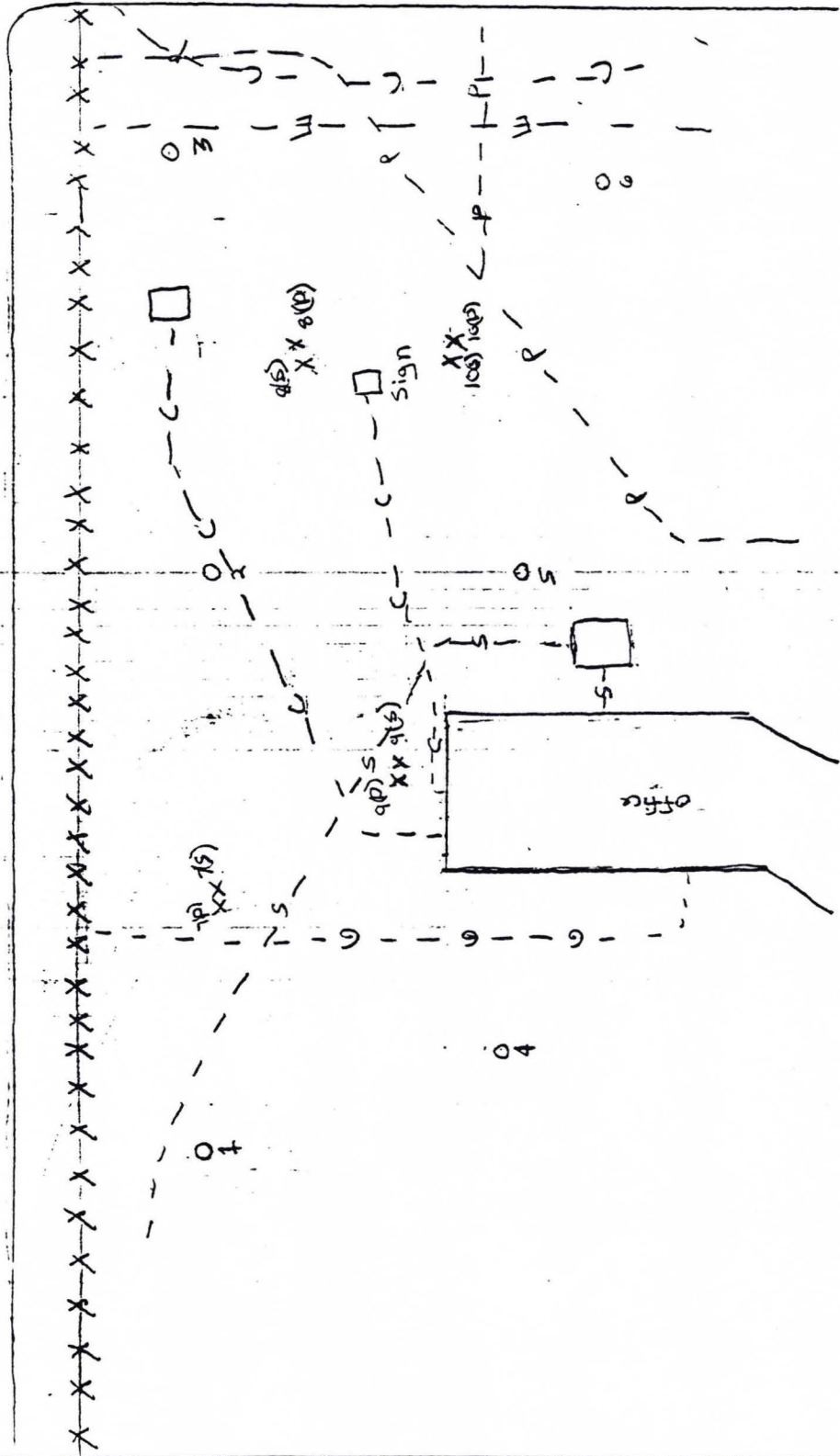
3900 Northwoods Drive, Suite 200  
St. Paul, MN 55112  
612/486-8022 FAX: 612/486-8021

PROJECT NO. A033-457 SHEET 1 OF 1  
PROJECT NAME Area 1  
BY MGT DATE 3-27-94  
SUBJECT Site map  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

O Vapor point(20')  
VP-1  
X Monitoring Point  
MP-7(D) = deep (16')  
MP-7(S) = shallow (8')

40'  
1" = 40'

← N





**Delta**  
Environmental  
Consultants, Inc.

3900 Northwoods Drive, Suite 200  
St. Paul, MN 55112  
612/486-8022 FAX: 612/486-8021

Approximate

PROJECT NO A093-457 SHEET 1 OF 1  
PROJECT NAME Amoro Terminal Superfund  
BY MOT DATE 9/29/94  
SUBJECT Water Levels / Product Thickness  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

	Water Level (BGS)	Water Level (TOC)	Total Depth (TOC)	Amount of water in point (feet)	Product thickness in point (feet)	Time	Comments
VP-1	16.0	17.31	21.30	3.99	ND	1:00	Strong petroleum odor on prod vapors
VP-2	19.38	20.68	21.30	0.62	(19.1-20.68) 1.58	1:35	"
VP-3	16.23	17.71	20.40	3.19	ND	1:46	"
VP-4	17.5	19.07	21.55	2.48	ND	1:06	"
VP-5	18.80	19.97	21.05	1.08	(19.64-19.97) 0.33	1:30	Strong petroleum odor/vapor
VP-6	17.44	14.15	21.2	2.07	ND	2:04	"
MP-7	(S) NA	NA	9.25	0	ND	1:20	Vapors
	(D) NA	NA	17.50	0	ND	1:15	Vapors in point
MP-8	(S) NA	NA	9.76	0	ND	1:40	Vapors
	(D) NA	NA	17.45	0	ND	1:42	"
MP-9	(S) NA	NA	9.66	0	ND	1:26	No vapors odor
	(D) NA	NA	17.03	0	ND	1:25	"
MP-10	(S) 1.20	2.52	9.25	6.73	(3.1-9.25) (?) 6.15	1:51	Vapors/odor
	(D) NA	NA	17.29	0	ND	1:58	"

VP = Vapor point set at 20 feet BGS  
MP = Monitoring point set at 8 feet BGS (S) = shallow  
16 feet BGS (D) = deep

Note: Checked with trailer. Seen and black specks but no visible free product/water line. Fuel oil smell.

PROJECT NAME / LOCATION Amoco Superfund		PROJECT NUMBER: A-1187	BORING NUMBER: 10-1	SHEET 1 OF 1
CONTRACTOR: Thorn		DRILLING METHOD: CAS to install		
DRILLER: Mark / Dave		DRILLING RIG: Mobil Drill 5157		
START: 11/28/84		COMPLETED: 1/27/84		
LAND OWNER: Amoco		SURFACE ELEVATION:		LOGGED BY: MGT

S P E C I F I C A T I O N N U M B E R	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	S A M P L E D E L E M E N T	DEPTH SCALE 1" = 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS	
												INSTRUMENT: Mantip UNITS: DOM	NOTES: SS: Split spoon
										1			
										2			
										3			
										4			
										5		Field headspace	
SS 1										6	Clay with lenses of sand/gravel red (Cl/SP) moist to wet	-	no odor
										7			
										8			
										9			
										10			
SS 2										11	as above	-	437
										12			
										13			
										14			
										15			
SS 3										16	Silty fine grained sand (SM/SP) brown, wet	-	397
										17			odor
										18			
										19			
										20			
										21			
										22			
										23			

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				



PROJECT NAME / LOCATION Amoco Terminal Superior WI	PROJECT NUMBER: 22-107	BORING NUMBER: 2-2	SHEET 1 OF 1
	CONTRACTOR: <i>Ther</i>	DRILLING 2.25 - Sample METHOD: 4.25 to inst	
	DRILLER: <i>Martha Rave</i>	DRILLING RIG: Mobile Drill B-57	
	START: 9/27/94 2:30	COMPLETED: 9/27/94 5:00	

LAND OWNER: <i>Amoco</i>	SURFACE ELEVATION:	LOGGED BY: <i>MGT</i>
--------------------------	--------------------	-----------------------

S A M P L E N U M B E R	S A M P L E D E P T H (F T)	S A M P L E D E P T H (F T)	S A M P L E D E P T H (F T)	S A M P L E D E P T H (F T)	S A M P L E D E P T H (F T)	DEPTH SCALE 1" = 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS		
								INSTRUMENT: M. C. T. P. UNITS: ppm	NOTES: SS = split spoon	
SS 1						6	Clay with trace sand and gravel (G) red, moist	-	164	No odor
						8				
						10				
SS 2						11				
						12	Silty sand, clay layers (cl/sm) brown, moist		227	
						14				
SS 3						16	as above, wet		217	odor
						17				
						18				
						19				
						20				
						21				
						22				
						23				

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				

PROJECT NAME / LOCATION Amoco Terminal Superior WI		PROJECT NUMBER: 457	BORING NUMBER:	SHEET 1 OF 1
CONTRACTOR: rein		DRILLING METHOD:		
DRILLER: Mark / Dave		DRILLING RIG: 2001-2-57		
START: 11-199		COMPLETED: 11-199 3:30		
LAND OWNER: Amoco		SURFACE ELEVATION:		LOGGED BY: MGT

SAMPLING DEPTH (ft)	SAMPLING NUMBER	SAMPLING METHOD	SAMPLING VOLUME (cc)	SAMPLING POINT (ft)	SAMPLING POINT (ft)	DEPTH SCALE 1" = 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS	
								INSTRUMENT: Microtip UNITS: ppm	NOTES: SS = split screen
			Total						
						1			
						2			
						3			
						4			
						5		Field headspace	
SS	1	25	5-7	1.7		6	Clay with trace sand and gravel (cl) red, moist	2500*	189A Odor
						7			
						8			
						9			
						10			
SS	2	30	10-12	1.7		11	as above	34	110 no odor
						12			
						13			
						14			
						15			
SS	3	25	15-17	2.0		16	Fine grained sand (sm/so) moist to wet, brown	1318	2500* Strong odor
						17			
						18			
						19		*overrange	
						20			
						21			
						22			
						23			

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				

PROJECT NAME / LOCATION <i>Superior</i>	PROJECT NUMBER: <i>15515</i>	BORING NUMBER: <i>15515</i>	SHEET 1 OF 1
	CONTRACTOR: <i>Thwin</i>		DRILLING METHOD: <i>2 1/2" wire line</i>
	DRILLER: <i>Mark Dora</i>		DRILLING RIG: <i>1 1/2" Drill 5-57</i>
	START: <i>July 2002</i>		COMPLETED: <i>7/28/02</i>
LAND OWNER: <i>Amoco</i>	SURFACE ELEVATION:	LOGGED BY: <i>MST</i>	

SAMPLER TYPE	SAMPLING METHOD	NUMBER OF SAMPLES	SAMPLING DEPTH (ft)	SAMPLING METHOD (ft)	DEPTH SCALE 1"=4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS	
							INSTRUMENT: <i>Micro-p</i>	NOTES: <i>S = soil + spec</i>
							UNITS: <i>ppm</i>	
		Total			1			
					2			
					3			
					4			
					5		<i>field</i>	
<i>SS</i>	<i>1</i>	<i>25</i>	<i>5-7</i>	<i>1.0</i>	6	<i>Clay with trace sand and gravel (CL) red moist</i>	<i>682</i>	<i>No odor</i>
					7			
					8			
					9			
					10			
<i>SS</i>	<i>2</i>	<i>31</i>	<i>10-12</i>	<i>1.0</i>	11	<i>as above</i>	<i>50</i>	<i>"</i>
					12			
					13			
					14			
					15			
<i>SS</i>	<i>3</i>		<i>15-17</i>		16	<i>Silty fine grained sand red, wet (SM)</i>	<i>*2500</i>	<i>"</i>
					17			
					18			
					19		<i>overrange</i>	
					20			
					21			
					22			
					23			

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				

PROJECT NAME / LOCATION Amoco Terminal Superior WI	PROJECT NUMBER: <u>Amoco - 457</u>	BORING NUMBER: <u>VP-5</u>	SHEET 1 OF 1
	CONTRACTOR: <u>Thru</u>		DRILLING 3.2 = Sampling METHOD: 6.25 install
	DRILLER: <u>Mark / Daine</u>		DRILLING 111001 2 UNIT RIG: <u>2-57</u>
	START: <u>9/27 7:30 AM</u>		COMPLETED: <u>9/27 10:00 AM</u>

LAND OWNER: <u>Amoco</u>	SURFACE ELEVATION:	LOGGED BY: <u>MGT</u>
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SAMPLE	TYPE	NUMBER	BLOW COUNTS	SAMPLER (ft)	RECOVERY (%)	DEPTH SCALE 1"=4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS		
								INSTRUMENT: Micanip UNITS: dpm	NOTES: SS = split spoon	
			Total							
						1				
						2				
						3				
						4				
						5			Field headspace	
SS		1	20	5-7	1.0	6	clay with trace sand/gravel red (CL)	1068	2011	Strong odor
						7				
						8				
						9				
						10	as above, moist			
SS		2	25	10-12	1.9	11		1223	1575	"
						12	grades into a silty fine grained sand with clay (SM/CL) red			
						13				
						14				
						15				
SS		3	47	15-17		16	as above	2011	2500	"
						17				
						18				
						19				
						20				
						21	4 foot diameter vapor point set at 20' with 13 foot PVC			
						22	Screen.			
						23				

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				

PROJECT NAME / LOCATION Amoco Terminal Superior WI		PROJECT NUMBER: A000-45	BORING NUMBER: P-2	SHEET 1 OF 1
CONTRACTOR: <i>Ther</i>		DRILLING METHOD: <i>2 1/2" to 3" hole</i>		
DRILLER: <i>Marty/Dave</i>		DRILLING RIG: <i>Mobile Unit 3-37</i>		
START: <i>9/27/84 10<sup>30</sup></i>		COMPLETED: <i>9/27/84 12<sup>15</sup></i>		
LAND OWNER: <i>Amoco</i>		SURFACE ELEVATION:		LOGGED BY: <i>MGT</i>

S P A L I E L	F T M P U P	S A M P L E N U M B E R	B O R E C O D E	S I Z E I N D E X ( <i>1/2</i> )	S P A C E C O D E ( <i>1/2</i> )	DEPTH SCALE 1" = 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS		
								INSTRUMENT: <i>Minotip</i>	NOTES:	
			<i>total</i>			1				
						2				
						3				
						4				
						5			<i>Field headspace</i>	
<i>SS</i>	<i>1</i>	<i>20</i>	<i>5-7</i>	<i>1.5</i>		6	<i>medium grained sand, (SP) brown, silty</i>	<i>27.5</i>	<i>355</i>	<i>no odor</i>
						7	<i>Clay (cl) with sand, rd, moist</i>			
						8				
						9				
						10				
<i>SS</i>	<i>2</i>	<i>36</i>	<i>10-12</i>	<i>1.6</i>		11	<i>as above</i>	<i>34.0</i>	<i>364</i>	<i>11</i>
						12				
						13				
						14				
						15				
<i>SS</i>	<i>3</i>	<i>37</i>	<i>15-17</i>	<i>1.5</i>		16	<i>silty sand with clay layers (sm)(cl) moist</i>	<i>162</i>	<i>2500</i>	<i>Gas odor</i>
						17				
						18				
						19				
						20				
						21				
						22				
						23				

BOREHOLE WATER LEVEL DATA					
DATE					
TIME					
GWL					
CASING DEPTH					

PROJECT NAME / LOCATION Amoco Terminal Superior WI	PROJECT NUMBER: A058-457	BORING NUMBER: MP-7	SHEET 1 OF 1
CONTRACTOR: <i>Ther</i>		DRILLING METHOD: 2.25 to sample 6.25 to install	
DRILLER: <i>Mark / Dave</i>		DRILLING RIG: Mobile Drill 3-57	
START: 9/25/94		COMPLETED: 1/25/94	

LAND OWNER: Amoco	SURFACE ELEVATION:	LOGGED BY: <i>MGT</i>
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S A M P L E N U M B E R	S A M P L E D E P T H ( <del>ft</del> )	S A M P L E D E P T H ( <del>ft</del> )	C O U N T S	S I Z E ( <del>mm</del> )	S A M P L E D E P T H ( <del>ft</del> )	D E P T H S C A L E 1"=4'	D E S C R I P T I O N S O F M A T E R I A L S A N D C O N D I T I O N S	C O N T A M I N A N T O B S E R V A T I O N S	
								I N S T R U M E N T : M i c r o t i p U N I T S : P P M	N O T E S : S S S p l i t s p o o n
			Total						
						1			
						2			
						3			
						4		Field headspace	
SS	1	16	4-6	1.0		5	Clay with trace sand and gravel (cl) moist, red	-	905 Slight odor
						6			
						7			
						8			
						9			
SS	2	32	9-11	2.0		10	as above	-	495 "
						11			
						12			
						13			
						14			
SS	3	28	14-16	1.3		15	Silty sand, fine gravel (SM) Moist to wet, brown	-	626 Strong odor
						16			
						17			
						18			
						19			
						20			
						21			
						22			
						23			

BOREHOLE WATER LEVEL DATA					
DATE					
TIME					
GWL					
CASING DEPTH					

PROJECT NAME / LOCATION Amoco Terminal Superior WI	PROJECT NUMBER: A-88-45-	BORING NUMBER: 112-8	SHEET 1 OF 1
CONTRACTOR: Thrie		DRILLING LOGS to sample METHOD: 2.25" install	
DRILLER: Markus Dave		DRILLING RIG: Mobile Drill B-57	
START: 9/29/94 7:00		COMPLETED: 9/29/94 9:15	

LAND OWNER: Amoco	SURFACE ELEVATION:	LOGGED BY: MGT
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S A M P L E N U M B E R	F U Y T N U M B E R	S A M P L E N U M B E R	N U M B E R	B L O C K N U M B E R	C O D E S	S A M P L E N U M B E R ( <del>1-1</del> )	I N T E R N A T I O N A L S A M P L E N U M B E R ( <del>1-1</del> )	S A M P L E N U M B E R ( <del>1-1</del> )	D E P T H S C A L E 1" = 4'	D E S C R I P T I O N S O F M A T E R I A L S A N D C O N D I T I O N S	C O N T A M I N A N T O B S E R V A T I O N S	
											I N S T R U M E N T : M i c r o s t p U N I T 	N O T E S : S S = S P 1 1 + S P 0 0 9
				Total					1			
									2			
									3			
									4		Headspace	
SS	1			30	1-16				5	Clay with trace sand and gravel (GL) med, moist.	0	No odor
									6			
									7			
									8			
									9			
SS	2			33	9-11				10	as above	0	"
									11			
									12			
									13			
									14			
SS	3			37	14-16				15	Silty fine grained sand with clay layers (5m) gray brown, med to moist	1362	Strong odor
									16			
									17			
									18			
									19			
									20			
									21			
									22			
									23			

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				

PROJECT NAME / LOCATION Amoco Terminal Superior WI	PROJECT NUMBER: A-89-457	BORING NUMBER: M-0-0	SHEET 1 OF 1
CONTRACTOR: <i>Thn</i>		DRILLING METHOD: <i>Gas to install</i>	
DRILLER: <i>Marky / Dave</i>		DRILLING RIG: <i>Mobile Drill E-57</i>	
START: <i>9/24/84 2:50</i>		COMPLETED:	

LAND OWNER: <i>Amoco</i>	SURFACE ELEVATION:	LOGGED BY: <i>MGT</i>
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S P E C I F I C I D E N T I F I C A T I O N	S A M P L E N U M B E R	B L O W C O U N T S	S A M P L E D I E (in)	S A M P L E R E (in)	DEPTH SCALE 1"=	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS	
							INSTRUMENT: Micro tip UNITS: ppm	NOTES: SS = split spoon
					1			
					2			
					3			
					4			
SS	1	25	4-6	1.0	5	Clay with trace sand and gravel (CG) red, moist	0	no odor
					6			
					7			
					8			
					9			
SS	2	36	9-11	2.0	10	As above.	6	11
					11			
					12			
					13			
					14			
SS	3	40	14-16	1.5	15	Silty sand (SM) gray wet	143	strong odor
					16			
					17			
					18			
					19			
					20			
					21			
					22			
					23			

BOREHOLE WATER LEVEL DATA				
DATE				
TIME				
GWL				
CASING DEPTH				



PROJECT NAME / LOCATION Aqua Superior, WI	PROJECT NUMBER: 100-10	BORING NUMBER: 100-10	SHEET 1 OF 1
CONTRACTOR: Trio	DRILLING METHOD: 225 - install	DRILLING RIG: Mobile Drill	
DRILLER: Marty/Dave	START: 9/26/94 9:20	COMPLETED: 9/29/94 11:15	

LAND OWNER: Amcor	SURFACE ELEVATION:	LOGGED BY: MGT
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S E R I A L N U M B E R	F I L T E R N U M B E R	S T A M P N U M B E R	C O D E S N U M B E R	L I N E I D N U M B E R	S T A M P N U M B E R	D E P T H S C A L E 1"=4'	DEPTHS	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATIONS	
									INSTRUMENT: Micro-tip UNITS: ppm	NOTES: SS: split core
							1			
							2			
							3			
							4		Headspace	
45	1	17	A-6	1.0			5	Clay with trace sand and gravel (cl) med. moist.	50	no odor
							6			
							7			
							8			
							9			
55	2	29	9-11	1.0			10	as above, possible gray staining	61	odor
							11			
							12			
							13			
							14			
55	3	33	1A-14	1.0			15	Silty fine grained sand with clay layers (sm/cl) brown, moist to wet	1474	strong odor
							16			
							17			
							18			
							19			
							20			
							21			
							22			
							23			

BOREHOLE WATER LEVEL DATA					
DATE					
TIME					
GWL					
CASING DEPTH					

# FLUSH GRADE SOIL VENT CONSTRUCTION DETAIL

PROJECT Amoco Terminal  
Superior WI

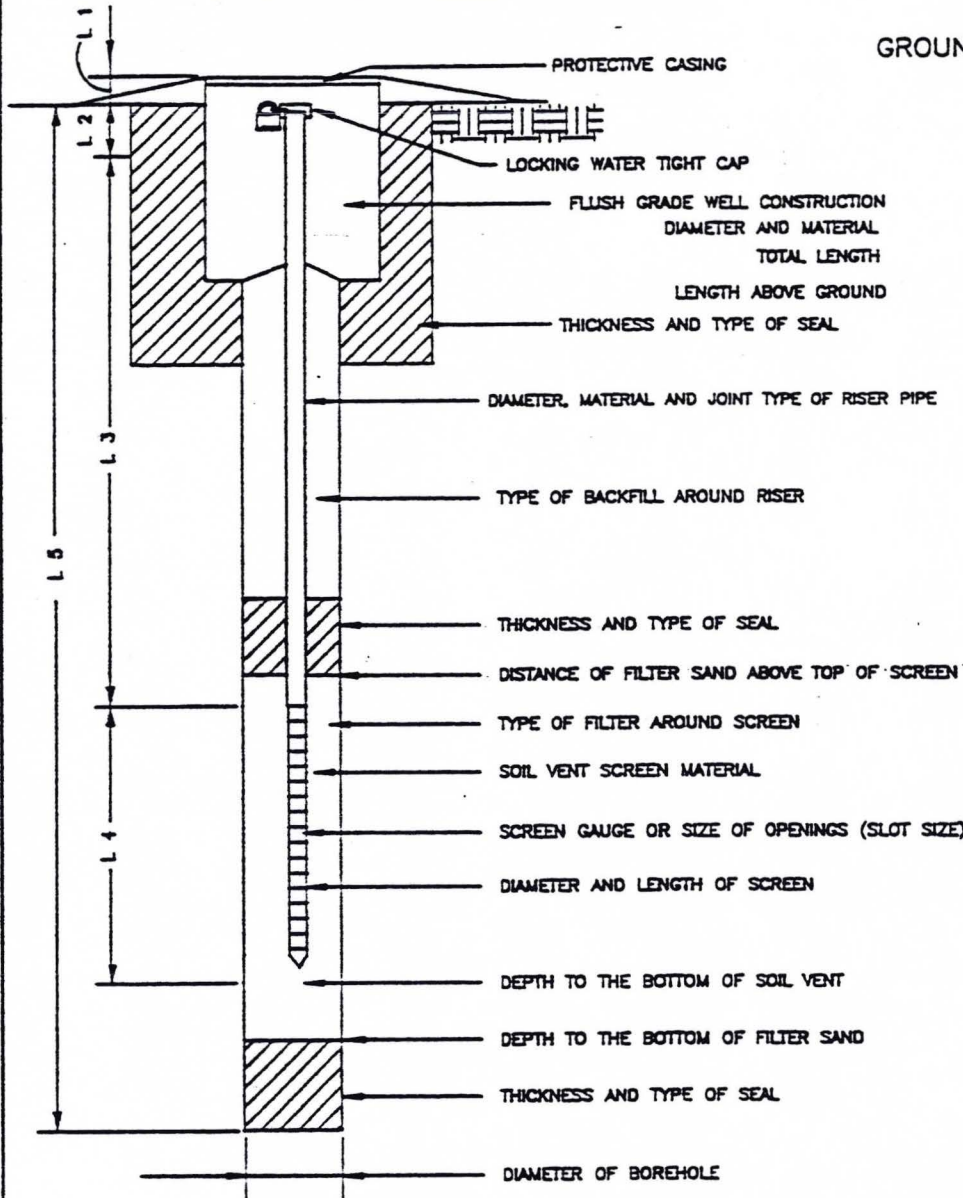
PROPOSED \_\_\_\_\_  
INSTALLED X

PROJECT NO. A088-457

SOIL VENT NO. 1-6

TOP OF RISER \_\_\_\_\_

GROUND SURFACE ~ 635



\_\_\_\_\_  
\_\_\_\_\_  
~ 1 foot with cap  
\_\_\_\_\_  
\_\_\_\_\_  
2 inch PVC, flush with ground  
\_\_\_\_\_  
sand  
\_\_\_\_\_  
2 feet bentonite  
Silica sand (1/2 foot)  
#30 Red Flint (1/2 foot)  
PVC  
10 slot  
4 inch x 13 feet  
20 feet  
20 feet  
\_\_\_\_\_  
\_\_\_\_\_  
(6.25 HSA)

L 1 = \_\_\_\_\_ FT.  
L 2 = \_\_\_\_\_ FT.  
L 3 = 7 FT.  
L 4 = 13 FT.  
L 5 = 20 FT.

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# FLUSH GRADE SOIL VENT CONSTRUCTION DETAIL

PROJECT Amerco Terminal  
Superior Wt

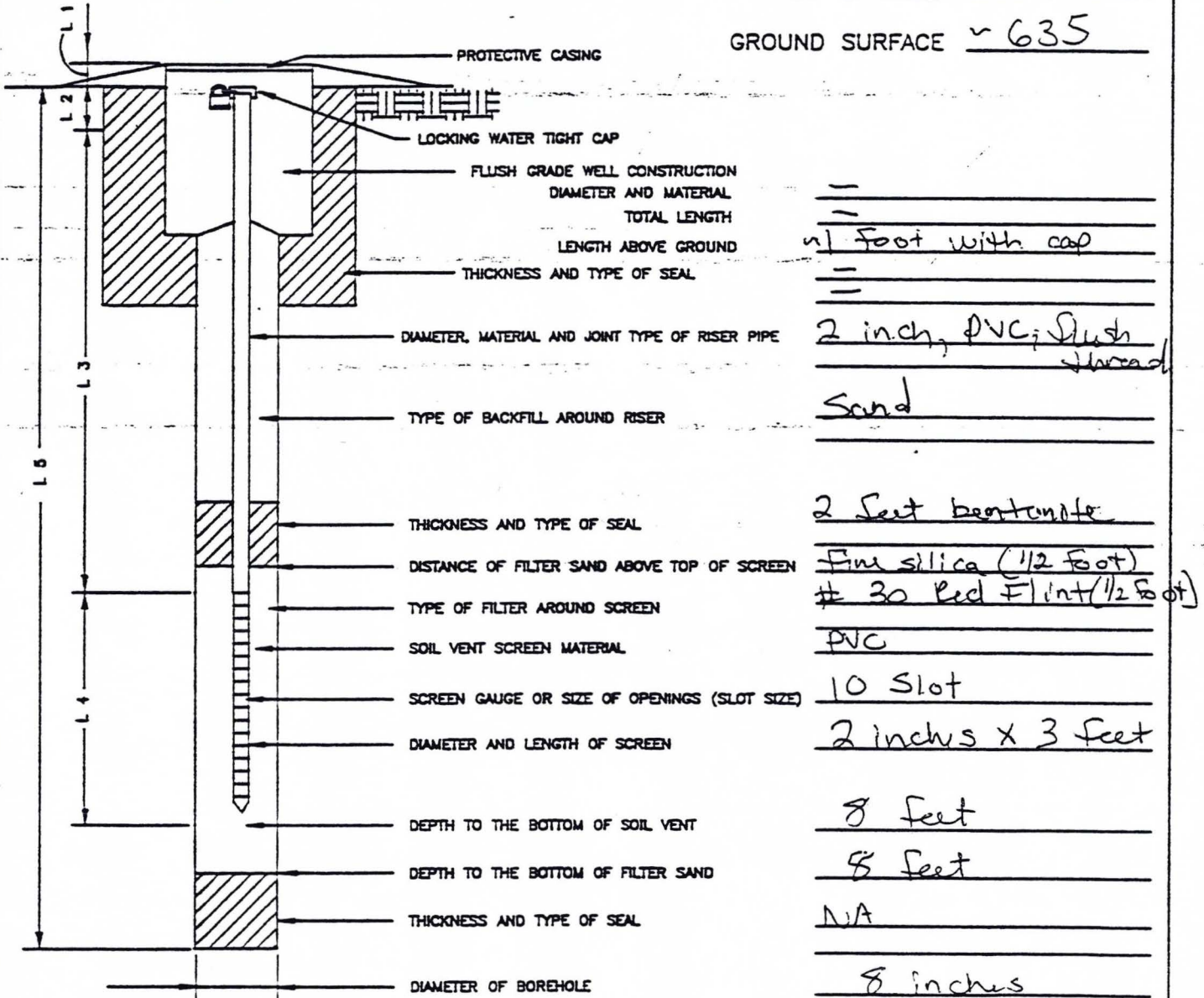
PROPOSED \_\_\_\_\_  
INSTALLED X

PROJECT NO. A088-457

SOIL VENT NO. 1-4 (shallow)

TOP OF RISER \_\_\_\_\_

GROUND SURFACE ~ 635



\_\_\_\_\_  
\_\_\_\_\_  
~1 foot with cap  
\_\_\_\_\_  
\_\_\_\_\_  
2 inch, PVC; Flush Thread  
Sand  
\_\_\_\_\_  
2 feet bentonite  
Fine silica (1/2 foot)  
# 30 Red Flint (1/2 foot)  
\_\_\_\_\_  
PVC  
\_\_\_\_\_  
10 Slot  
2 inches x 3 feet  
\_\_\_\_\_  
8 feet  
8 feet  
\_\_\_\_\_  
NA  
\_\_\_\_\_  
8 inches

L 1 = 1 FT.  
L 2 = 1 FT.  
L 3 = 5 FT.  
L 4 = 3 FT.  
L 5 = 8 FT.

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# FLUSH GRADE SOIL VENT CONSTRUCTION DETAIL

PROJECT Amoco Terminal  
Superior WI

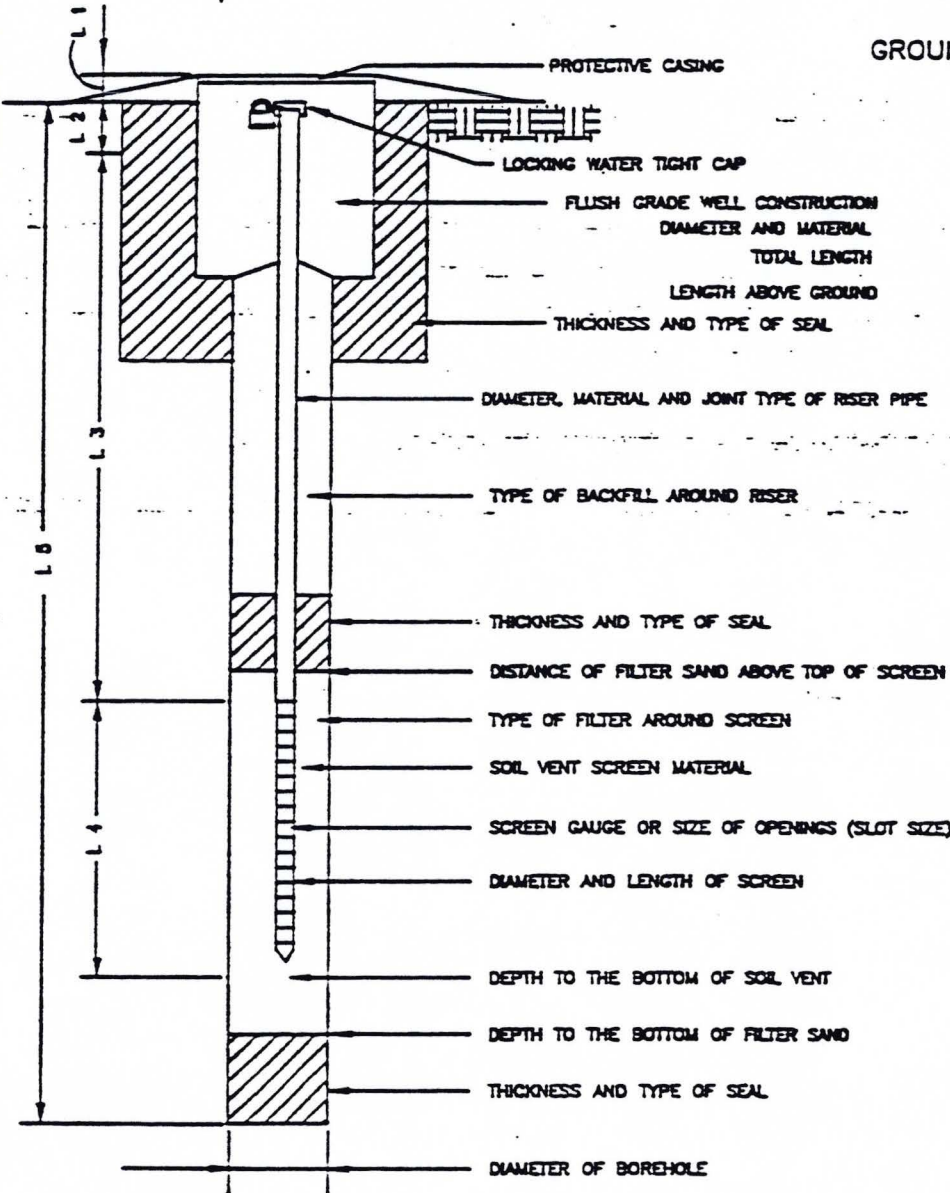
PROPOSED \_\_\_\_\_  
INSTALLED X

PROJECT NO. A088-457

SOIL VENT NO. 1-4 (Deep)

TOP OF RISER \_\_\_\_\_

GROUND SURFACE v 635



\_\_\_\_\_

\_\_\_\_\_

1 foot with cap

\_\_\_\_\_

4 inch, PVC, flush thread

\_\_\_\_\_

sand

\_\_\_\_\_

4 feet bentonite

\_\_\_\_\_

1 foot fine silt

1 foot #30 silica sand

\_\_\_\_\_

PVC

\_\_\_\_\_

10 slot

\_\_\_\_\_

4 inch x 5 feet

\_\_\_\_\_

16 feet

\_\_\_\_\_

16 feet

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(6.25 HSA)

- L 1 = \_\_\_\_\_ FT.
- L 2 = \_\_\_\_\_ FT.
- L 3 = 11 FT.
- L 4 = 5 FT.
- L 5 = 16 FT.

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# 2.0 System Specifications

## Power Requirements:

Control box: 115 VAC with ground (220 VAC standard option) 20 Amp service

## Circuit Protection:

15 Amp main breaker on system power switch

7 Amp Slow-Blow fuse for product pump

## Environmental Operating Limits:

Minimum Operating Temperature: -30 degrees F (ambient)

Maximum Operating Temperature: 150 degrees F (ambient)

## Probe/Product Pump Specifications:

Probe Dimensions: 1 3/4" diameter X 24" long

Probe Weight: 2 1/2 pounds

Pump Performance: .3 GPM (500 gallons per day) - "type 1" viscosity - see below  
100 ft. max. pumping head capacity

Probe/Product Pump Cable Length: 50 ft. standard (up to 500 ft optional)

## Well Requirements:

Well Diameter: 2 inch minimum for product recovery only

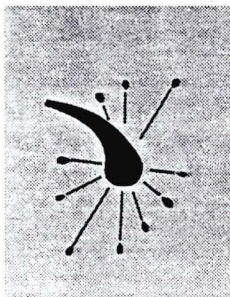
Well Depth For Product Only Pumping: Minimum of 2 feet of water below product level

## Product Viscosity - Standard Product Pump:

"Type 1." Product (Viscosity of less than 10 Cp at 70 degrees f): gasoline  
diesel fuel  
#2 heating oil  
JP-4  
JP-5  
paint thinners

## Product Viscosity - High Viscosity Pump:

"Type 2." Product (Viscosity of less than 100 Cp at 70 degrees f): SAE 10 oil  
Olive Oil  
Polyurethane



Please call with your requirements for alternate product chemistries and viscosities.

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# 3.0 Equipment List

## STANDARD EQUIPMENT:

- NEMA 4 weatherproof main control panel
- Product tank level sensor w/25 foot signal cable
- Product pump/probe w/50 foot probe cabling & pull rope
- 100 foot product discharge line
- 25 foot probe power cable extension
- Product tank discharge bung
- Well head cam cleat and bracket

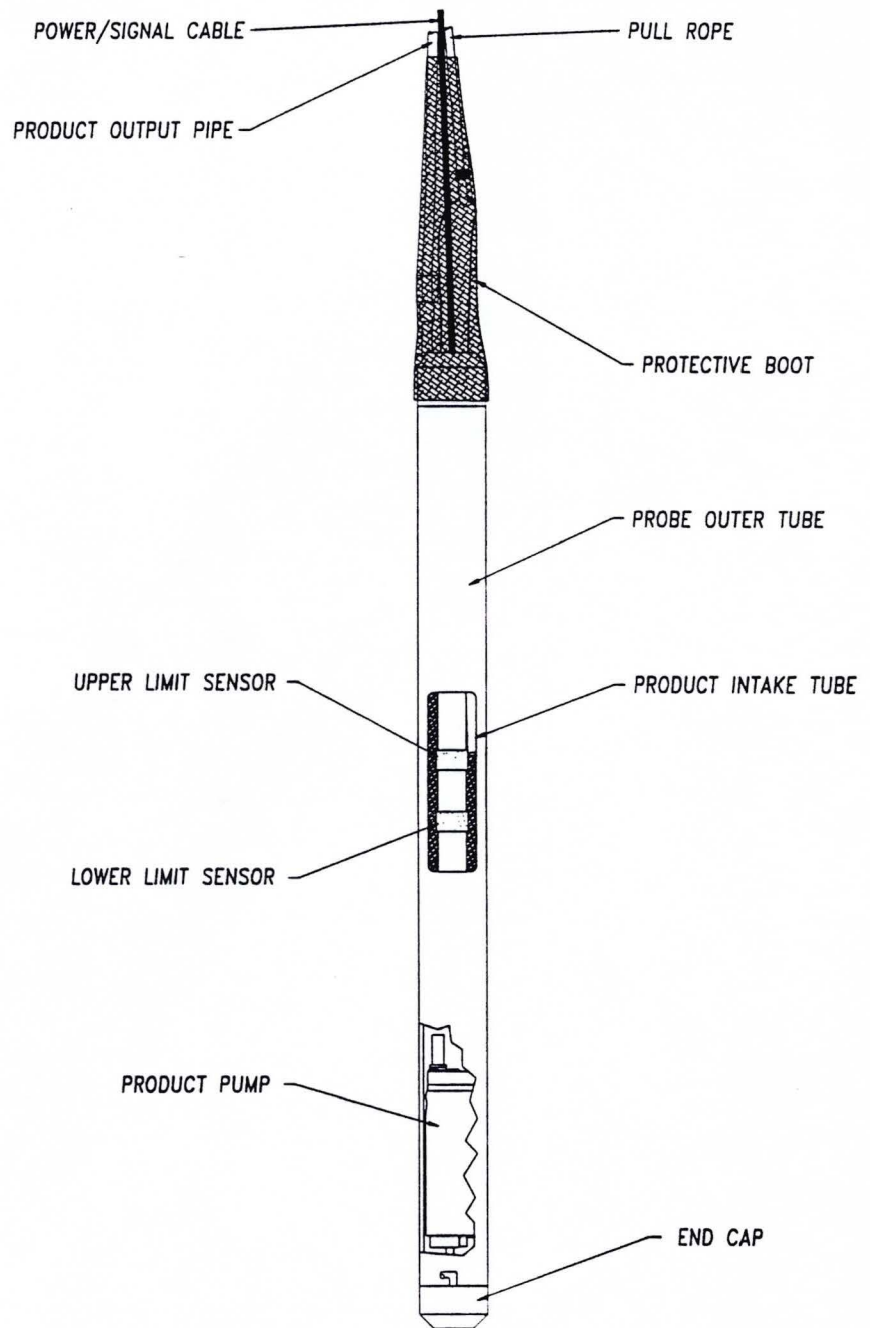
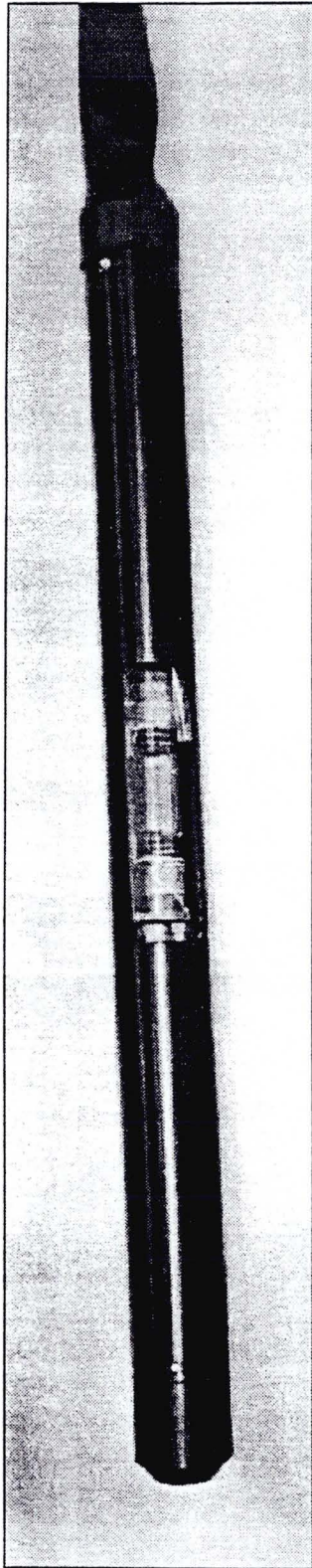
## STANDARD OPTIONS:

- Automatic Level Seek (ALS) System (for product only system)
- Multi-well System (operates up to eight wells)
- Immediate Response box (portable recovery system)
- 12 VDC battery cables (25')
- Batteries with Solar Charger
- Extension cables - Product pump/probe to control panel available in 25, 50, 75, and 100 foot lengths (non-standard lengths also available).

# 4.0 System Components

## Probe/Product Pump

The probe/product pump contains circuits for sensing the product/water interface as well as housing the product pump. Sensors insure that water will never be pumped into the product tank. The probe/product pump assembly is constructed of corrosion and chemical resistant metals and plastics. The probe is shown in a photo at the left and below in a cutaway view.

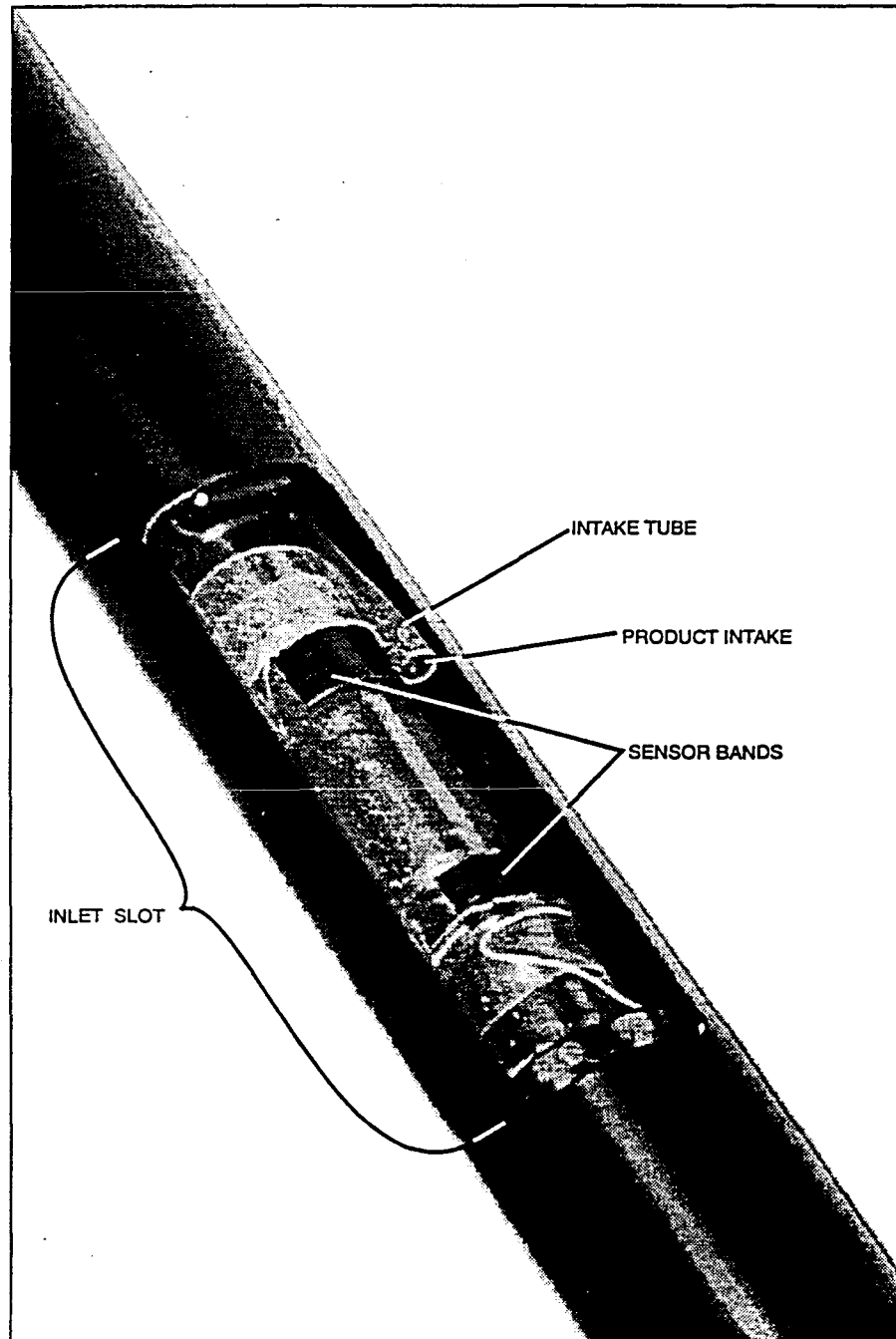


## 4.0 SYSTEM COMPONENTS - PROBE

### Inlet Slots

The probe inlet slots in the middle of the probe body allow water and product to enter into the interior of the probe. Care must be taken when cleaning the inlet slots to avoid damaging the black sensor bands and their attaching wires. Use of sharp tools such as screwdrivers, knives, etc. to clean the probe inlet slots should be strictly avoided. Proper cleaning of the inlet slots and sensor bands is described in Section 8 - Service and Maintenance.

There are two inlet slots in the middle of the probe on opposite sides. The slots are approximately 5" tall and 1.2" wide. The slots allow the product to flow into the product inlet and around the sensor bands.

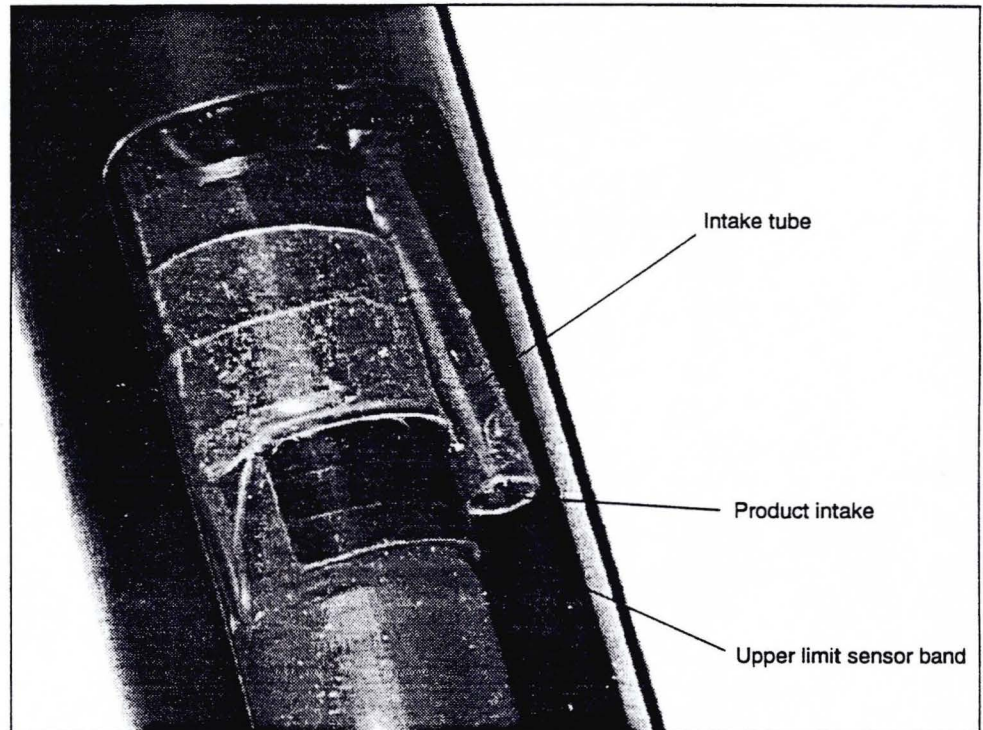
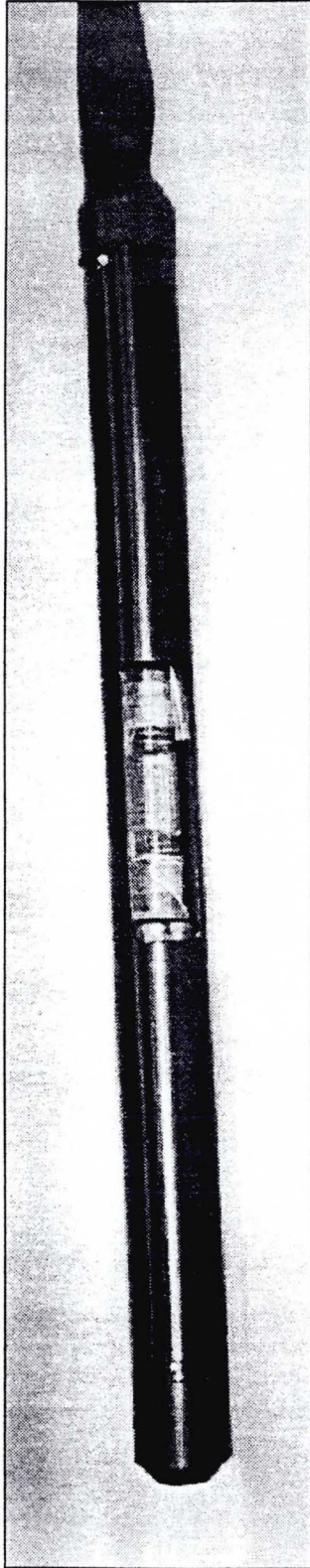




## 4.0 SYSTEM COMPONENTS - PROBE

### Inlet Tube

The pump inlet tube is located about midway up the probe, just above the high limit sensor. Product is drawn up into the intake tube and is directed to the pump in the bottom of the probe. The product inlet is shown below.



### Sensors

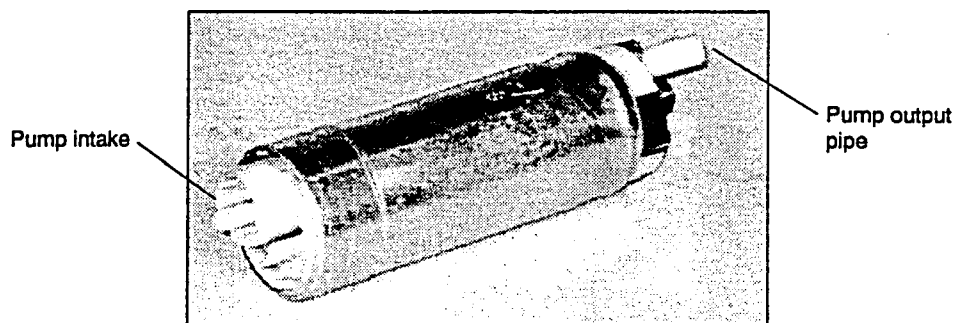
There are two sensor bands; one lower band and one upper band. The sensors use a low frequency signal to sense the product/water interface. The sensors operate on the phenomena that signal transmission varies significantly due to the transmission characteristics of the fluid surrounding the antenna. The variation in signal transmission is used to determine the interface location to an accuracy of  $\pm .1$ " relative to the product inlet. The sensors are constructed of "state of the art" polymer materials for corrosion resistance and long life.

## 4.0 SYSTEM COMPONENTS - PROBE

### Product Pump

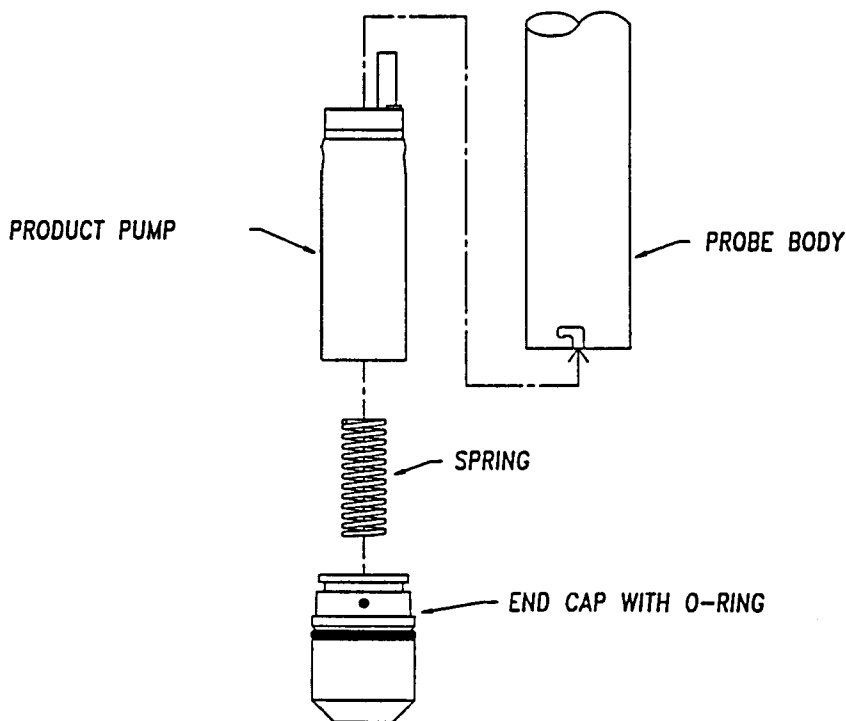
The product pump is a very rugged and chemical resistant unit capable of pumping 500 gallons per day, and will provide a 150 foot head. In addition, it can withstand a certain amount of small solids such as dirt or sand passing through it. A modified version is available that can pump higher viscosity fluids (up to 100 centipoise) such as polyurethane varnish, SAE 10 oil, and olive oil.

Standard product pump



The product pump is easily accessible and is located in the bottom of the probe. The pump is spring loaded into the probe body by the pump cap (end cap) and is held in place by the pump cap and spring. Pump removal is described in detail in Section 8 - Maintenance and Service..

Product pump assembly



**APPENDIX C**

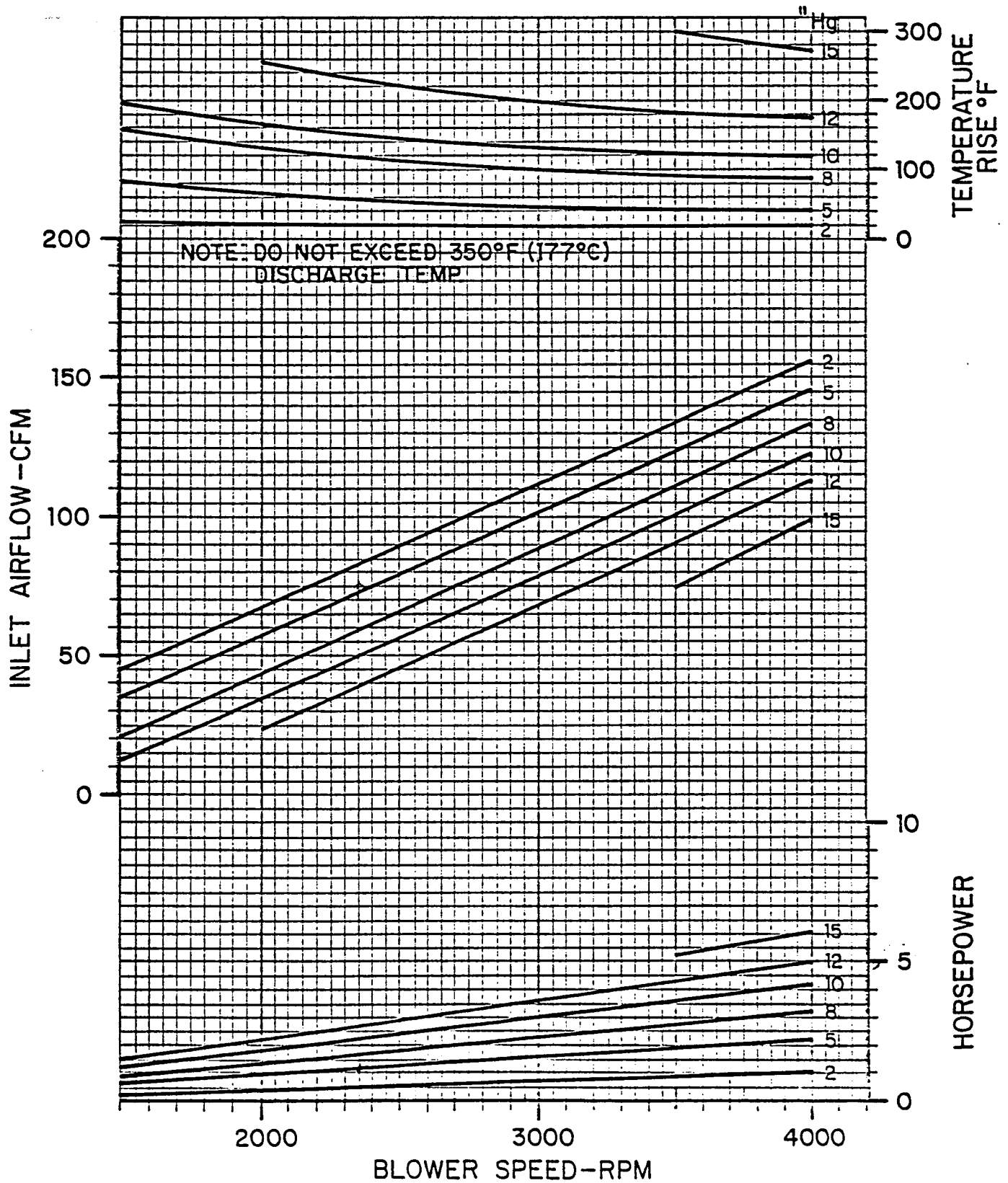
**Equipment Manuals and Specifications**

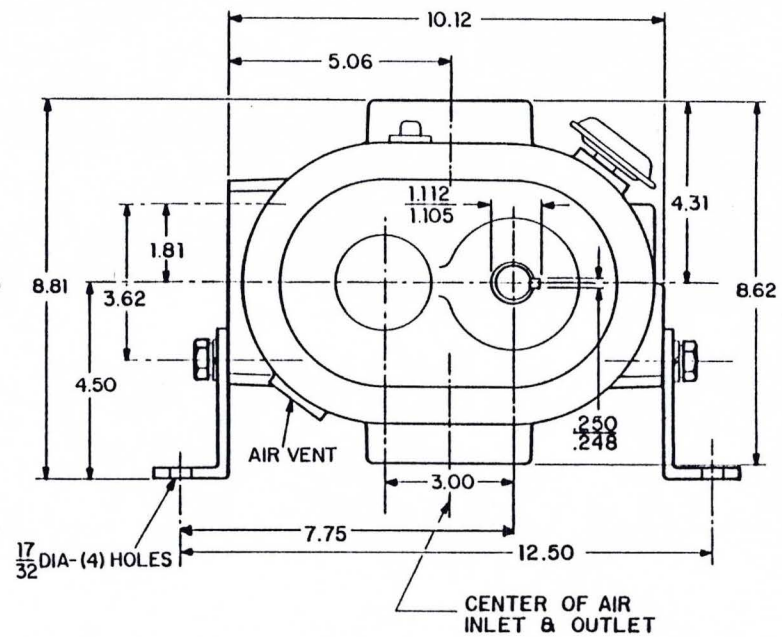
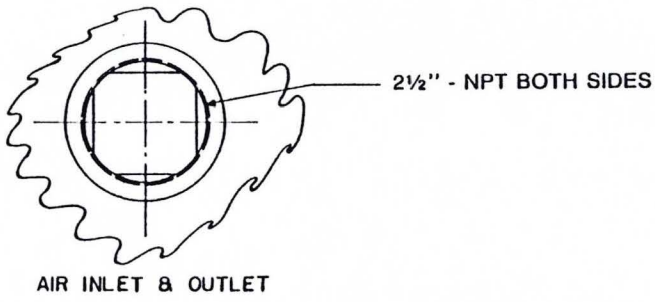
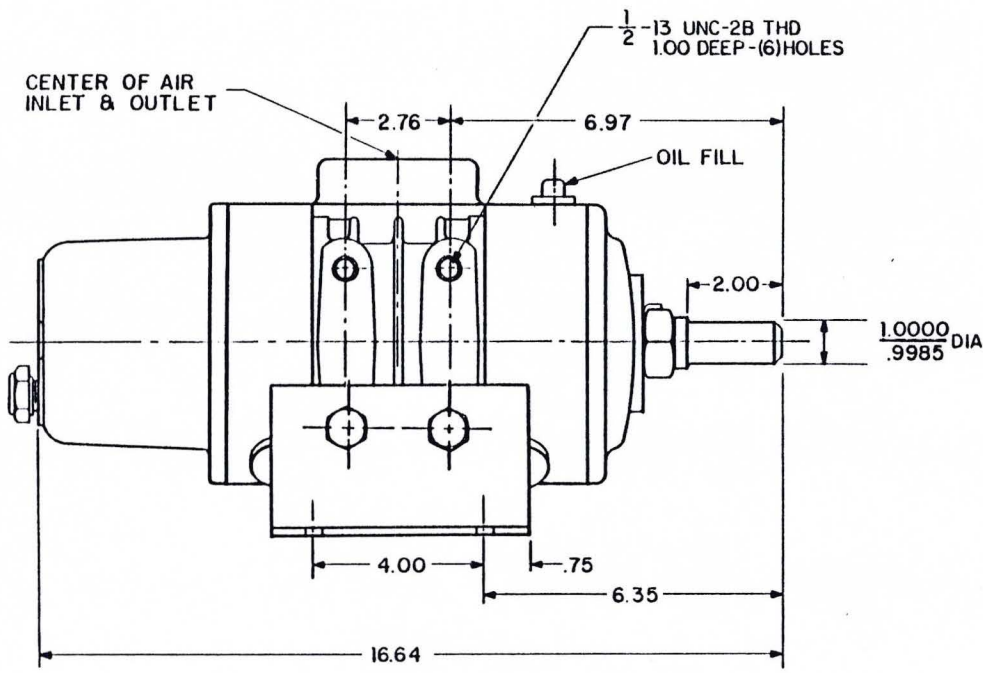
# TYPICAL VACUUM PERFORMANCE

at 29.92 "Hg Discharge Pressure & 70°F Inlet Temperature

# DuroFlow<sup>®</sup> Model 3004 Blower

DISP. .045 CFR  
Temperature Rise, Airflow & Horsepower

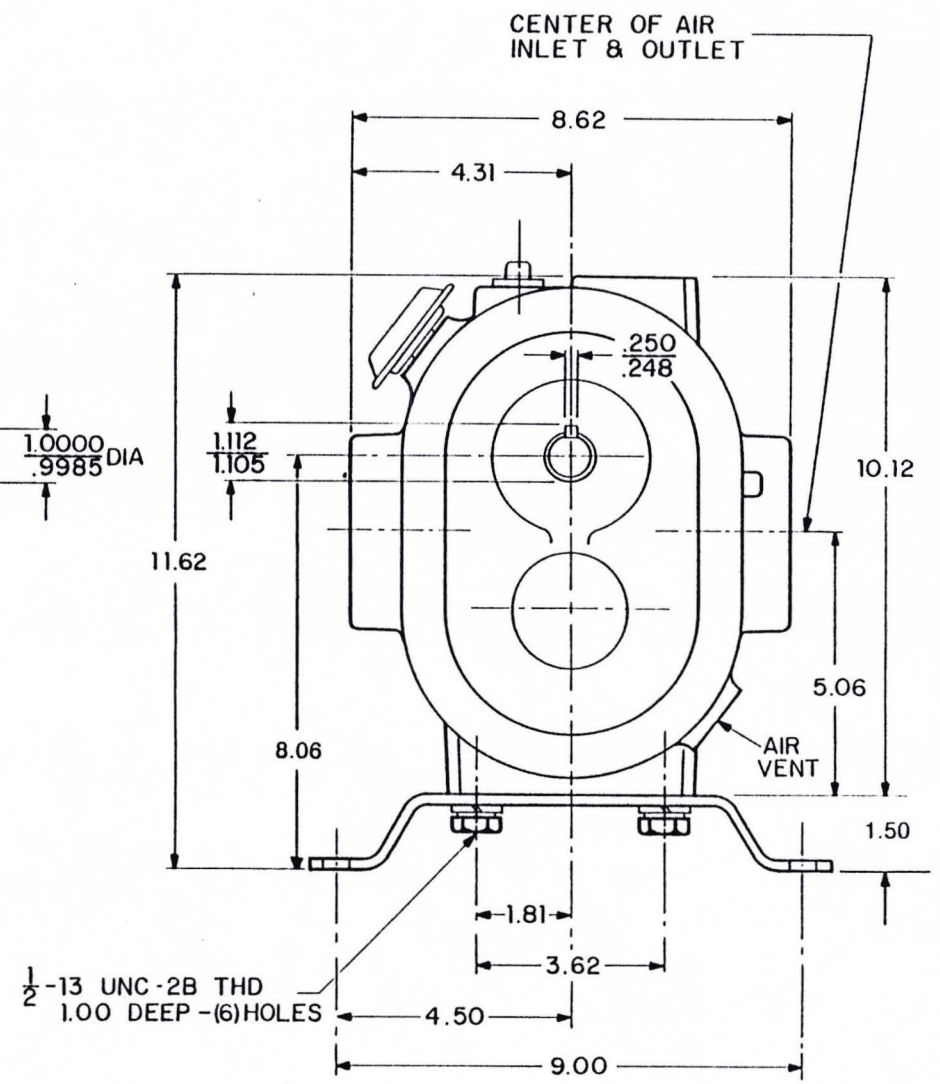
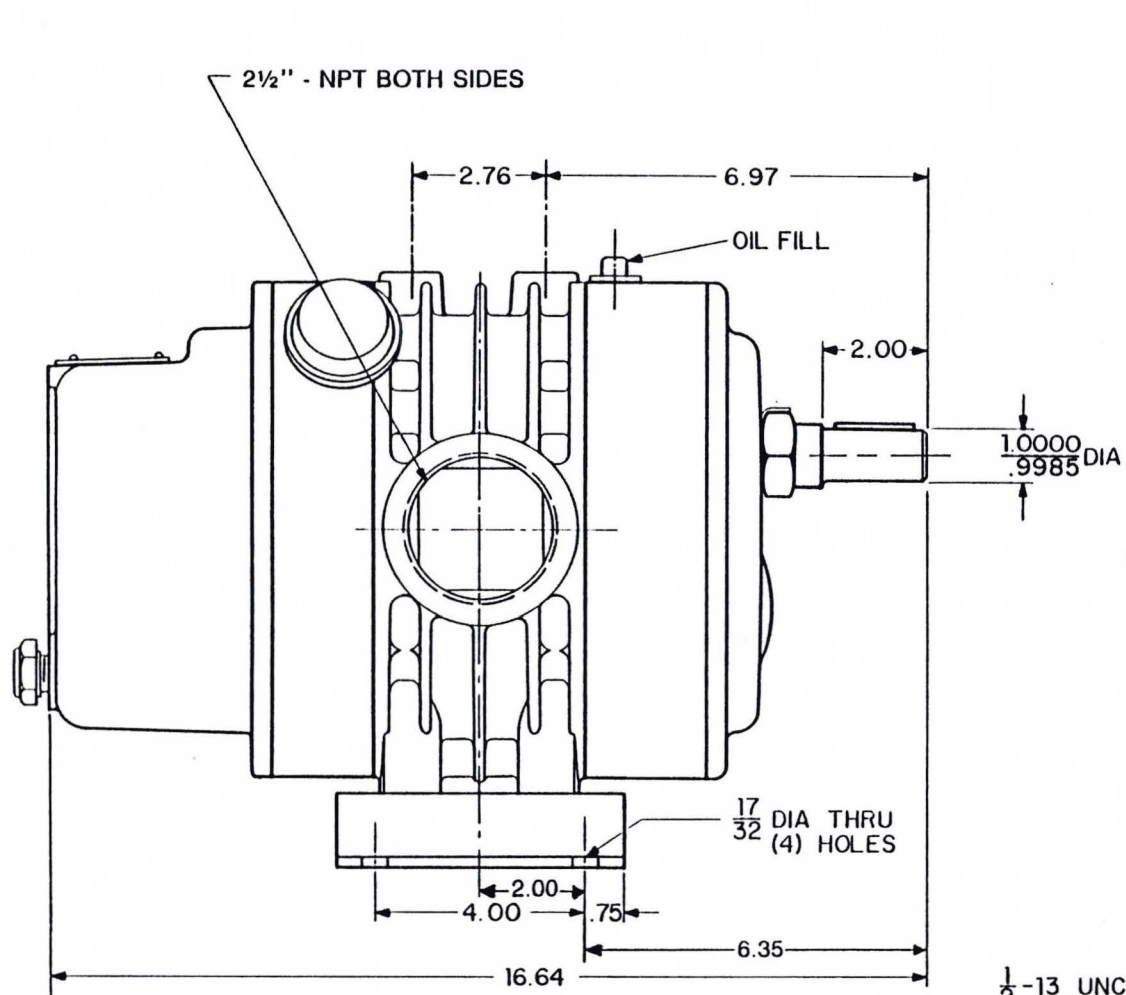




**Duroflow**<sup>®</sup>

**MODEL 3004 BLOWER**

HORIZONTAL RIGHT CONFIGURATION  
MOUNTING BRACKETS OPTIONAL

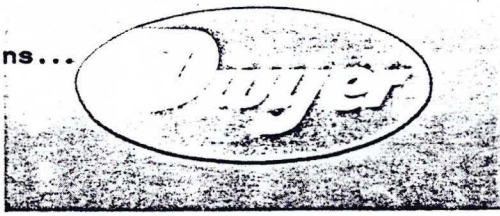


**Duroflow®**

**MODEL 3004 BLOWER**

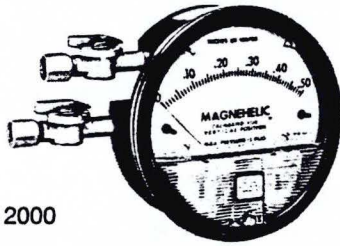
VERTICAL TOP CONFIGURATION

Specifications...



**SERIES 2000 MAGNEHELIC®  
SERIES 2-5000 MINIHELIC®  
AIR FILTER GAGES**

**DIAPHRAGM ACTUATED DIAL TYPE. ACCURATE TO ± 2% OF FULL SCALE**



SERIES 2000

Fig. 4-1. MAGNEHELIC gage with molded plastic vent valves for easy zeroing. Available with adjustable signal flag (Not shown; option "ASF" at extra cost) for immediate visual reference to maximum allowable pressure drop: External front screw for zero adjustment. Red and green scale overlays to highlight safe and dangerous readings are also available.

**STANDARD ACCESSORIES FURNISHED**

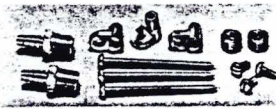


Fig. 4-2. Standard gage mounting accessories furnished are two 1/8" SPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapters, and flush mounting adapters with screws.

**OPTIONAL AIR FILTER KIT**

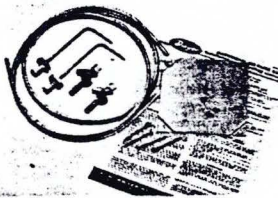


Fig. 4-3. Air Filter accessories furnished are mounting panel with screws, two static pressure tips with integral compression fittings, two five foot lengths of 1/4" aluminum tubing and two molded plastic vent valves (see Fig. 4-1). To order separately, specify No. A-605 Air Filter Kit.

**SPECIFICATIONS**

**Weight:** 1 pound, 8 ounces.  
**Housing:** Die cast aluminum, Iridite dipped.  
**Finish:** Baked dark gray hammeroid.  
**Connections:** 1/8" NPTF pressure taps, one pair on side and one pair on back.  
**Dimensions:** Bezel dia., 4 3/4", body dia., 4 1/2", body depth to bezel, 1 1/16".  
**Accuracy:** ± 2% of full scale at 70°F.  
**Ambient Temperature Range:** 20° to 140°F.

**OPERATING RANGES AVAILABLE**

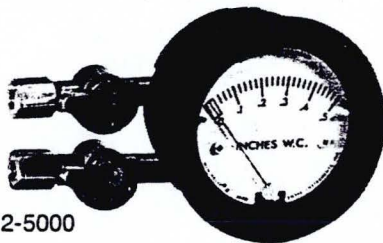
Model No.	Range	Minor Divisions
2000-0	0-5" water	0.01"
2001	0-1" water	0.02"
2002	0-2" water	0.05"
2003	0-3" water	0.10"
2004	0-4" water	0.10"

**SUGGESTED SPECIFICATION for Architects and Engineers**

An air filter gage for measuring resistance to air flow through the filters shall be installed, one for each bank of filters. The gage shall be diaphragm actuated with pointer zero adjustment and have 3 7/8" dia. white dial with black figures and graduations. Accessories shall include surface mounting bracket and two each, static pressure tips, 5' lengths aluminum tubing and vent valves. Gage shall be Catalog No. \_\_\_ with Air Filter Kit, No. A-605 as manufactured by Dwyer Instruments, Inc.

**DIAPHRAGM ACTUATED DIAL TYPE. ACCURATE TO ± 5% OF FULL SCALE**

**SPECIFICATIONS**



SERIES 2-5000

Fig. 4-4. MINIHELIC gage with molded plastic vent valves. Specially designed adapter for valve snaps onto barbed pressure connections without tools. Internal zero adjust screw discourages tampering yet is easily reached by removing front cover. Hardware is included for surface mounting, flush mounting in panel or in bracket supplied with optional Air Filter Kit below.

**Weight:** 6 ounces.  
**Housing:** Glass filled nylon; polycarbonate cover  
**Finish:** Black  
**Connections:** Barbed, for 3/16" I.D. tubing  
**Dimensions:** Bezel dia., 2 29/32", body dia., 2 19/32", body depth to bezel, 1 17/32".  
**Accuracy:** ± 5% of full scale at 70°F.  
**Rated Total Pressure:** 50 PSIG surge, 30 PSIG continuous.  
**Ambient Temperature Range:** 20° to 120°F.

**OPERATING RANGES AVAILABLE**

Model No.	Range	Minor Divisions
2-5000-0	0-5" water	0.02"
2-5001	0-1" water	0.05"
2-5002	0-2" water	0.10"
2-5003	0-3" water	0.10"
2-5005	0-5" water	0.20"

**SUGGESTED SPECIFICATION for Architects and Engineers**

An air filter gage for measuring resistance to air flow through the filters shall be installed, one for each bank of filters. The gage shall be diaphragm actuated with pointer zero adjustment and have 2 1/16" dia. white dial with black figures and graduations. Accessories shall include surface mounting bracket and two each, static pressure tips, 5' lengths aluminum tubing and vent valves. Gage shall be Catalog No. \_\_\_ with Air Filter Kit, No. A-609 as manufactured by Dwyer Instruments, Inc.

**OPTIONAL AIR FILTER KIT**

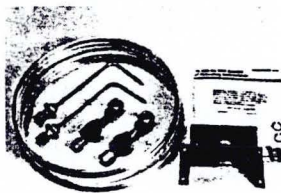


Fig. 4-5. Air Filter accessories in optional kit include surface mounting bracket with screws, two static pressure tips with integral compression fittings, two five foot lengths of 1/4" aluminum tubing and two molded plastic vent valves. To order, specify No. A-609 Air Filter Kit.

the application of...



## AIR FILTER GAGES AND SWITCHES

Air filters used in ventilating systems are called upon to remove an extremely wide variety of contaminants from the air, ranging from soot and smoke and the common dusts to mold spores, bacteria and pollen. Particle sizes vary from less than a micron (.000039") to insects and leaves. The concentration will vary hourly, daily and seasonally.

These variables combined with filtering requirements that range from the simple needs of a household furnace to the absolute filtration required for a clean room make air cleaning a complex science. Filter selection should, therefore, be made by a qualified engineer or in cooperation with the filter manufacturer.

The same variables that affect filter selection also contribute to the problem of determining when a filter has reached the tolerable limit of its effective life span as a result of the accumulation of contaminants. Because of wide variation in contaminant load in the air being filtered, time is an uncertain measurement. Visual inspection of the condition of the filter tells little or nothing. The most widely used method of checking filter condition is to measure pressure drop across the filter by means of an air filter gage.

### The Function of the Air Filter Gage

A clarification of terminology is essential to understanding the function of an air filter gage. The air filter gage measures pressure drop across the filter for the purpose of determining whether or not the filter is operating within its design range of effective utilization. It *does not* measure filter efficiency.

*Filter efficiency* as defined by the ASHRAE GUIDE, "is synonymous with the term *arrestance* and measures the ability of the air cleaner to remove particulate matter from an air stream." Several methods of determining filter efficiency exist, because of variations in filters and application requirements. One method is by weight, in which a carefully compounded

mixture of standardized dust is fed into the air stream and the amount trapped by the filter related to the amount released in the test determines the filter efficiency in percentage. A second method, the dust spot method originated by the National Bureau of Standards, compares the opacity of the dust collected on filter paper from two air samples of equal flow rate, one of which samples filtered air. The efficiency of the filter is thus evaluated on the basis of the darkness of the dust spots. A third method measures arrestance of DOP (Dioctyl-phthalate) smoke, a homogenous aerosol of 0.3 micron size, to test a special class of high efficiency filters used to control particulate matter of high toxicity or where extreme cleanliness is required.

The "dust holding capacity" of an air filter is defined by ASHRAE GUIDE as, "the amount of a particular dust that an air filter can hold and *determines the operating life of the air cleaner which is fixed mainly by some figure of tolerable resistance.*" Thus, an air filter gage, sensing the differential in static pressure across an air filter, will permit the air filter to be used to its maximum dust holding capacity as determined by the filter manufacturer and specified in terms of maximum filter resistance. It should be noted that servicing a filter when it has reached its point of specified maximum resistance is the only method which will guarantee that the filters are being used to their full dust holding capacity and at the same time not being used beyond the point where their increased resistance could affect balance of the system, increase air leakage and, for some types of filters, begin to pass contaminants.

### Type of Filters and Recommended Resistance for Servicing

All filter manufacturers supply technical data which will permit full utilization of their filters. This data will include initial resistance in inches of water column for the filter at its rated air flow and a recommended resistance at which point the

## HOW TO INSTALL DWYER AIR FILTER GAGES AND SWITCHES

Dwyer Air Filter Gages and Switches are offered in a variety of types to meet the needs of your system. All types are customarily mounted on the outside of the air handling duct or plenum near the filter bank.

The type of static pressure tips used and their location is of primary importance in securing reliable readings. For maximum accuracy, it is essential that the influence of the velocity of the air be eliminated to permit sensing the true static pressure. Note that some filter installations do not provide a straight duct approach to the filter bank which may cause air to swirl and eddy.

Right angle static pressure tips give the most accurate sensing and are furnished with 2000 Series Magnehelic and 250-AF Series Gages. Flush static pressure fittings inserted at right angles to the flow are lower in cost and less likely to plug up, but are more susceptible to velocity and turbulence influence.

Tips should be located as recommended by the specifying engineer or by the filter manufacturer. In the absence of such recommendations, locate the tips at least 12" upstream and downstream from the filters in a zone of minimum turbulence.

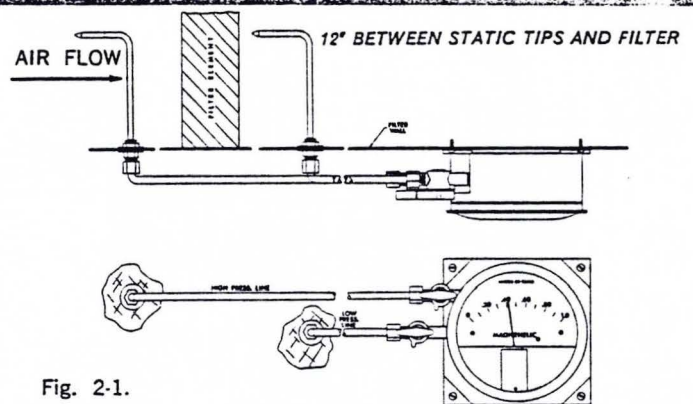


Fig. 2-1.

Fig. 2-1. 2000 SERIES MAGNEHELIC GAGES are diaphragm actuated pointer type gages. The gage is attached to the mounting plate which is furnished and the mounting plate screwed to the wall of the air duct. The static pressure tips are installed through 7/16" holes in the filter wall with tips pointing into air flow. The static tips are connected to the plastic vent valves using the 1/4" aluminum tubing and compression fittings which are furnished. Zeroing is accomplished by turning the vent valves to venting position and then turning the zero adjustment screw in the face of the gage with a screwdriver. For detailed instructions, see Bulletins A-27 and A-28.



filter should be replaced or serviced. The following describes the broad classifications of air filters:

**Viscous Impingement Filters** have the filter element treated with an oil or adhesive which holds dust particles coming in contact. The initial resistance of a typical filter will usually run from .08 to .15" water, and servicing will be called for at .50" water. In the automatic moving curtain type, resistance will usually be maintained between .40 and .50" water by means of a pressure actuated switch or timer with overriding pressure switch operating an electric drive.

**Dry Type Filters** are available in a multiplicity of materials, in varying thicknesses, in batts, woven or bonded materials, natural or synthetic, and in pleated form or in tubes or bags to obtain greater filter area. Efficiencies are usually at least equivalent to the viscous impingement type and may run to virtually 100%. Dust holding capacity is high and resistance values vary so widely no rule of thumb figures are possible. The manufacturer should always be consulted for proper initial and final pressure drop figures for these filters.

**Electronic Air Cleaners** using the electrostatic precipitation principle have no characteristic increase in pressure drop as they accumulate dust and must therefore be serviced on a pre-set schedule. The mechanical filter normally used with such equipment should, however, be serviced on the basis of increased pressure drop.

### Significance of High or Low Initial Resistance Readings

Due to the many variables inherent in an air distribution system, the initial pressure drop in some systems may be found to be below that specified by the filter manufacturer. If the system has been carefully checked over and found to be in order, this need not be a source of concern, as it simply indicates that less than rated air volume is passing through the filter. Generally, this will mean increased filter life before the filter requires servicing. Conversely, if initial pressure drop exceeds the filter manufacturer's rating, it indicates that a greater volume of air is being handled than the filter is rated for and filter life will be shortened.

Excessive variation from the filter manufacturer's published initial resistance figure will probably indicate one or more of the following problems:

### Low Pressure Drop

1. Less than rated air volume being handled due to over design of filter area, improper air balancing of system, open bypasses, etc.
2. Incorrect filter installed.
3. Velocity influence.
4. Air leakage around filters, past frames, and possibly through damaged filter.

*IMPORTANT. An initial pressure drop 30% to 40% or more below the rated value for the filter means that approach velocities may be sufficiently low to impair the efficiency of some types of filters.*

### High Pressure Drop

1. Incorrect filter installed.
2. System handling more than rated air volume. Suggest thorough check of system to be certain all controls are properly set and operating. If unable to reduce pressure drop to less than ten percent or fifteen percent above rated value additional filter area should be provided or air volume reduced.

*IMPORTANT. An initial pressure drop 10% to 15% or more above the rated value for the filter, means that approach velocities may be sufficiently high to impair the efficiency of some types of filters.*

### Installation Check and Trouble Shooting

Before putting your air filter gage into service or in the event of initial pressure drop readings that don't agree with the filter manufacturer's specified pressure drop, make the following checks:

1. Check zero adjustment of the gage. Remove both tubing leads or open vent valves to atmosphere.
2. Check all tubing connections for tightness from gage to the static tip or fitting connection.
3. Check static pressure tips or fittings to be sure they are not plugged.
4. Check installation of static tips or fittings. Angle type static pressure tips must point directly into the air stream. Flange type static pressure fittings should be mounted on a duct wall in such a location that the opening is at a right angle to the moving air stream. A velocity pressure error can be created if the air blows directly into the opening.

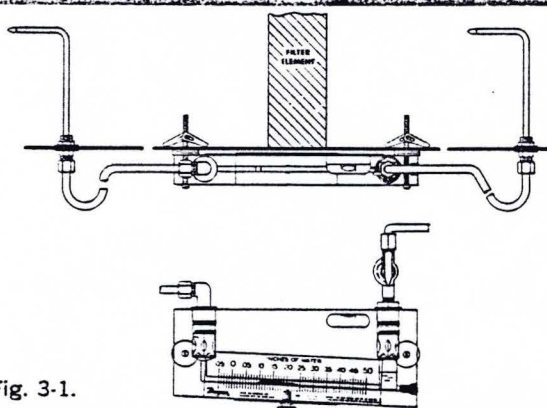


Fig. 3-1.

Fig. 3-1. 250-AF SERIES SOLID PLASTIC GAGES are manometer type gages which are customarily mounted directly on the wall of the filter housing. The static pressure tips are installed through 7/16" holes in the filter wall with tips pointing into the air flow using the 1/4" aluminum tubing and compression fittings which are furnished. Zeroing is accomplished by turning the vent valves (optional at extra cost) to "vent" position—or by pulling the connections from the gage body if vent valves are not used—and sliding the adjustable scale until the zero mark lies directly behind the indicating fluid meniscus. For detailed instructions, see Bulletin C-11.

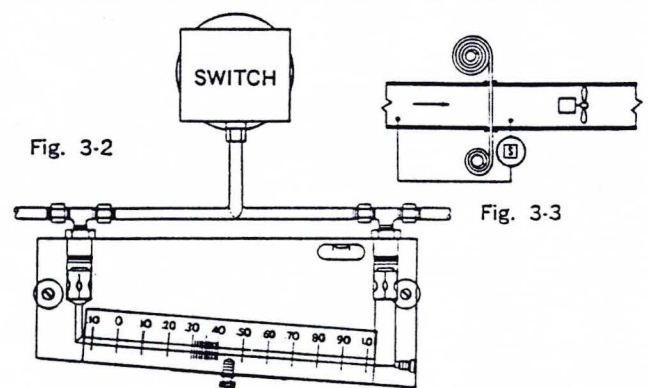


Fig. 3-2

Fig. 3-3

Fig. 3-2 shows a typical hook-up of a Model 1823 compact, diaphragm actuated differential pressure switch in parallel with a gage using tees. The switch is set to energize an electric circuit when the maximum allowable pressure drop is reached.

Fig. 3-3 shows schematically how a Model 1638 switch with visual set point adjustment can be hooked up to trigger the advancement of an automatic roll filter when the segment in use becomes too dirty for efficient service.

For detailed instructions, see Bulletins E-52 (Model No. 1638), E-53 (Model No. 1823) and E-55 (Air filter switch service).

**APPENDIX D**

**Operation Data Sheet**

**AMOCO SUPERIOR  
SUPERIOR, WISCONSIN  
DELTA NO. A088-457-1**

NW - Not working  
NA - Not applicable  
[Hatched Box] - do not measure

Date: \_\_\_/\_\_\_/19\_\_\_

Site Personnel: \_\_\_\_\_

	Amps	Hours	Cycles
Arrival			
Departure			

	Pre-Filter 4"	Post-Filter 4"	2" RW-1	2" SV-3	2" SV-6	2" SV-10	2" SV-8	2" SV-2	2" SV-5	2" SV-9	2" SV-7	2" SV-4	2" SV-1	2" RW-4	Dilution Open/Closed
Vacuum (°H2O)															
Diff. Press. - (P1) (°H2O)															
PID (ppm)															
CO2 (%)															
Temp. (°F)															
Dilution (Open/Closed)															
?															
?															

Outside Monitoring

	RW-1	MW-16	RW-4	MW-27	MW-14	RW-6
Water level (ft)						
Product Level (ft)						
Vacuum (°H2O)						
Depth to pump intake						

SVE Maintenance:

Last Oil Change (Hours) \_\_\_\_\_  
 Next Oil Change (Hours) 500  
 Filter (OK/Not) \_\_\_\_\_  
 Condensate (Quantity) \_\_\_\_\_

SpillBuster Panel Settings:

Well #1 (RW-1) \_\_\_\_\_ (minutes)  
 Well #2 (MW-16) \_\_\_\_\_ (minutes)

Recovery Tank Product Levels:

RW-1 ft to product \_\_\_\_\_ volume of product \_\_\_\_\_  
 RW-6 ft to product \_\_\_\_\_ volume of product \_\_\_\_\_

volume in tank = 193 x depth of product in tank measured in feet

Comments:

**APPENDIX E**

**Tank Registrations**

A 05137

ABOVEGROUND STORAGE TANK  
INSTALLATION CHECKLIST

Department of Industry, Labor & Human Relations  
Safety & Buildings Division  
Fire Protection & Storage Tank Section  
P. O. Box 7969, Madison, WI 53707

Tank ID #: For Office Use Only

Complete one form for each tank and related piping.

Vapor Recovery

Covers installation of:  Tank;  Piping;  Secondary Containment;  Overfill Protection;  Leak Detection

A. IDENTIFICATION: (Please Print) The Original Aboveground Tank Inventory Form SBD-8731 Signed by the Owner Must be Submitted with Each Installation Checklist

1. Establishment Name (same as approval letter) <u>AMOCO OIL BULK PLANT</u>			2. Owner Name <u>AMOCO OIL CO.</u>		
Project Location (number and street) <u>2904 WINTER ST</u>			Owner Street Address <u>2904 WINTER ST.</u>		
<input checked="" type="checkbox"/> City	<input type="checkbox"/> Village	<input type="checkbox"/> Town of:	<input type="checkbox"/> City	<input type="checkbox"/> Village	<input type="checkbox"/> Town of:
<u>SUPERIOR</u>			<u>SUPERIOR</u>		
State <u>WI</u>	Zip Code <u>54880</u>	County <u>DOUGLAS</u>	County <u>DOUGLAS</u>	State <u>WI</u>	Zip Code <u>54880</u>
		Telephone No. (include area code) <u>(715) 392-8294</u>			

INSTALLER CERTIFICATION: I certify that the tank and related piping was installed according to the manufacturer's instructions, conditionally approved plans and comply with ILHR 10.

Installer Name (print): RON TATTINEN SR. Installer Cert. No.: 00099

Installer signature: Ronald Tattinen Sr. Date signed: 1-07-95

B. PLAN APPROVAL

1. Plan approval date: 11-14-94 Plan number: \_\_\_\_\_

2. Tank capacity: 1000 Gal, 14A

INSPECTOR INFORMATION

Inspection Company Name (Print): SUPERIOR FIRE DEPT

Inspector Signature: Ronald Tattinen Sr. Inspector #: TIC113 Local Operator #: \_\_\_\_\_

Date Signed: 1-27-94 Fire department providing coverage: SUPERIOR FDID #: 1401

C. TANK CONTENTS

1.  Diesel 2.  Leaded 3.  Unleaded 4.  Fuel Oil 5.  Gasohol 6.  Other 7.  Empty 9.  Unknown 10.  Premix 11.  Waste Oil  
13.  Chemical (If checked, indicate chemicals/wastes by name or #) GAS WATERWASH TUB 14.  Kerosene 15.  Aviation

D. TYPE OF USER (check one)

1.  Gas Station (any resale) 2.  Bulk Storage 3.  Utility 4.  Mercantile/Commercial 5.  Industrial 6.  Government 7.  School  
8.  Residential 9.  Agriculture 10.  Other (specify) \_\_\_\_\_

E. TANK CONSTRUCTION

	INSTALLER VERIFIED	INSPECTOR VERIFIED	NA
1. Tank is new and carries national testing label for aboveground use. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Tank is used and has been tested for leaks. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Tank is coated to inhibit corrosion. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Tank labels provided. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Class I normal pressure/vacuum vent discharges upward at least 12 feet above ground level, does not terminate under eaves or less than 5 feet from any building opening, and higher than fill. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Class II or III A normal vents are at least 4 feet above ground level and higher than fill. ....	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Emergency relief vent is provided. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. All normal and emergency vents terminate outside. ....	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Overfill protection provided? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, identify type: <u>LEVEL ELECTRONIC</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Tank gauge is provided. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F. TANK HANDLING AND PRE-TESTING

1. Tank was lifted using lifting lugs, no chains or slings were placed around the tank shell. ....  

2. Tank was tested for leakage per the manufacturer's recommendations. ....

G. TANK SITE

1. Tank located per approved plans (walls, bldgs., P/L, streets, etc.). ....  

2. Tank is spaced a minimum of 3 feet from any other tank. ....  

3. Tank foundation designed to minimize settling ....

H. PROJECT SITE

1. Collision protection provided. ....  

2. Vehicle fueling tank is secured by non combustible enclosure. ....  

3. Warning signs posted for dispensing area. ....  

4. A 20 BC rated fire extinguisher provided. ....

PIPING MATERIAL IS  Fiberglass  Steel or  Other (type) \_\_\_\_\_

Check one of the types below before proceeding to answer questions 1-4 and/or 1-14.

Piping System Type: 1.  Pressurized Piping with: A.  auto shutoff; B.  alarm; or C.  flow restrictor 2.  Suction Piping with Check Valve at Tank  
3.  Suction Piping with Check Valve at Pump and Inspectable

	INSTALLER VERIFIED	INSPECTOR VERIFIED	NA
<b>Aboveground Pipe</b>			
1. Coated .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Supported and protected against physical damage and stress .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Check applicable boxes: <input type="checkbox"/> Emergency Fire Valve <input type="checkbox"/> Gate Valve .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Piping was isolated from the tank and dispenser and air tested at 150% of operating pressures of the system (but not less than 50 P.S.I.) for 1 hour. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Underground Pipe</b>			
1. Piping is sloped back to tank (1/8 INCH per foot). ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Piping is evenly and adequately supported by at least 6 inches of backfill bedding. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Piping trench provides at least 18 inches of compacted backfill and paving on top of piping. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Pipes are separated by at least twice the pipe diameter. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Pipes are separated from the trench excavation sidewalls by at least 6 inches. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Piping inspected for damage to pipe or coating. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Metal piping is at least schedule 40 black steel or galvanized pipe, and is wrapped or coated. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Fittings and couplings are extra-heavy malleable iron screw-type, schedule 40 or better. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Piping was isolated from the tank and dispenser and air tested at 150% of operating pressure of the system (but not less than 50 psi) for 1 hour prior to backfilling. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. After backfilling, piping passed a tightness test prior to placing the system into service. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Metal piping is protected from corrosion by <input type="checkbox"/> cathodic protection or <input type="checkbox"/> impressed current. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Test stations have been installed for monitoring cathodic protection on piping. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Approved flexible connectors are used below the dispenser. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Dispensers, pumps, check valves, etc., not cathodically protected are electrically isolated from metallic piping. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECONDARY CONTAINMENT / LEAK DETECTION (Check which applies under both TANK and PIPING)**

1. Tank <input type="checkbox"/> Diked <input checked="" type="checkbox"/> Double Wall			
<input type="checkbox"/> Visual (vehicle fueling minimum 1' clearance dike walls and floor) .....	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
<input checked="" type="checkbox"/> Interstitial .....	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
<input type="checkbox"/> Automatic (verified as operative) .....	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
<input type="checkbox"/> Other .....	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
2. Piping Leak Detection Method: used if pressurized or check valve at tank: 1. <input type="checkbox"/> Vapor monitoring 2. <input type="checkbox"/> Interstitial monitoring			
3. <input type="checkbox"/> Groundwater monitoring 4. <input type="checkbox"/> Tightness testing 5. <input type="checkbox"/> Line leak detector 6. <input type="checkbox"/> Not required (visual)			

**LIQUID HANDLING, TRANSFER AND USE**

1. Product is identified and secured. ....	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
2. Dispensing device is listed. ....	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
3. Dispensing device has proper setback clearances and vehicle protection. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Electrically operated solenoid valve provided. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Anti siphon device provided on tank mounted pump. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. All electrical equipment and wiring is installed in accordance with ILHR 16 (NFPA 70). ....	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/>
7. Emergency shutoff is identified and accessible. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Where required, listed dispensing, emergency breakaway, and nozzle devices are provided. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Manual shutoff device. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Hose length _____			

**COMMENTS**

THIS TANK STORES GAS WATER MIXTURE WHICH IS DUMPED OUT OF THE GROUND BY MONITORING WELLS IN THE GROUND. DELTA ENVIRONMENTAL INC. INSTALLED THIS SPECIAL TUBE PIPING FROM WELLS TO TANK TOO FACTORY SPEC. AND IS APPROVED BY THE STATE OF WI. FOR FURTHER INFORMATION IF NEEDED CONTACT Bill Fellows AT DELTA ENVIRONMENTAL INC. PHONE NO. 612-486-5849.  
VENTILURST PETROLIUM-INSTALLED TANK ONLY

# ABOVEGROUND PETROLEUM PRODUCT TANK INVENTORY

Send Completed Form To:  
Safety & Buildings Division  
P.O. Box 7969  
Madison, WI 53707  
Telephone (608) 267-5280

For Office Use Only:  
Tank ID #

This form must be completed pursuant to s. 101.142, Wis. Stats., to register an above ground petroleum product storage system. An aboveground petroleum product storage system is an aboveground tank, used to store petroleum products, together with an on-site integral piping or dispensing system. Not included are pipeline facilities, tanks of 110 gallons or less capacity, farm and residential tanks of 1,100 gallons or less capacity, tanks used for storing heating oil for consumptive use on the premises where stored or tanks owned by the state or federal government. A separate form is needed for each tank. Send each completed form to the address in the top right corner.

This registration applies to a tank that is (check one):

1. <input checked="" type="checkbox"/> In Use	4. <input type="checkbox"/> Closed - Tank Removed	Fire Department Providing Fire Coverage Where Tank Is Located: <input checked="" type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town of: <u>SUPERIOR</u>
2. <input type="checkbox"/> Out of Service With Product	5. <input type="checkbox"/> Closed - Tank Cleaned	
3. <input type="checkbox"/> Out of Service With No Product (Empty)	6. <input type="checkbox"/> Changed Ownership (Indicate new owner in section A. 3. below)	

**A. IDENTIFICATION (Please Print)**

1. Tank Site Name: Amoco Oil Bulk Plant Site Address: 2904 WINTER ST. Site Telephone Number: (715) 392-8294

City  Village  Town of: SUPERIOR State: WI Zip Code: 54880 County: DOUGLAS

2. Owner Name (mail sent here unless indicated otherwise in #3): Amoco Oil Co Owner Mailing Address (mail sent here unless indicated otherwise in #3): 2904 WINTER ST

City  Village  Town of: SUPERIOR State: WI Zip Code: 54880 County: DOUGLAS

3. Alternate Mailing Name If Different Than #2: \_\_\_\_\_ Alternate Mailing Street Address If Different Than #2: \_\_\_\_\_

City  Village  Town of: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ County: \_\_\_\_\_

4. Tank Age (date installed, if new; years old, if used): 11-18-94 5. Tank Capacity (gal.): 1000 6. Tank Manufacturer's Name (if known): LUBE CUBE DOUBLE WALL

7. If more than 1 tank is being reported at a facility, provide an 8 1/2 x 11 plot plan drawn to scale (1" = 20 ft.), numbering and indicating the location of the tanks being reported. If a plot plan is being submitted, this form is for tank number: 14-A

**B. TYPE OF USER (check one):**

1. <input type="checkbox"/> Gas Station (any resale)	2. <input checked="" type="checkbox"/> Bulk Storage	3. <input type="checkbox"/> Utility	4. <input type="checkbox"/> Mercantile / Commercial
5. <input type="checkbox"/> Industrial	6. <input type="checkbox"/> Government	7. <input type="checkbox"/> School	8. <input type="checkbox"/> Residential
9. <input type="checkbox"/> Agricultural	10. <input type="checkbox"/> Other (specify): _____		

**C. TANK CONSTRUCTION (check one):**

1. <input type="checkbox"/> Bare Steel	2. <input type="checkbox"/> FRP Clad Steel	3. <input type="checkbox"/> Steel With Lining	4. <input type="checkbox"/> Concrete
5. <input checked="" type="checkbox"/> Other (specify): <u>COATED STEEL</u>			

Tank is built to:  National Standard \_\_\_\_\_ or  UL Approval or  Other \_\_\_\_\_

**D. ROOF (Check one):**

1. <input checked="" type="checkbox"/> Fixed Roof	2. <input type="checkbox"/> Floating External	3. <input type="checkbox"/> Floating Internal	4. <input type="checkbox"/> Other _____
---	---	---	---

**E. TANK BASE:**

1. <input type="checkbox"/> On Ground	2. <input type="checkbox"/> On Supports	3. <input checked="" type="checkbox"/> On Cement	4. <input type="checkbox"/> On Liner
5. <input type="checkbox"/> Double Bottom	6. <input type="checkbox"/> Other _____		

**F. PIPING:**  Aboveground  Underground  Both

Above Ground Piping Construction:  Steel  Other \_\_\_\_\_

Underground Piping Construction:

1. <input type="checkbox"/> Bare Steel	2. <input type="checkbox"/> Cathodically Protected and coated or Wrapped Steel (a. <input type="checkbox"/> Sacrificial Anodes or b. <input type="checkbox"/> Impressed Current)	3. <input type="checkbox"/> Coated Steel
4. <input type="checkbox"/> Fiberglass	5. <input type="checkbox"/> Other (specify): _____	6. <input type="checkbox"/> Unknown

**G. CONTAINMENT:**

Dike Side Material: 1.  Block 2.  Concrete 3.  Earth 4.  Synthetic 5.  Double Wall 930081-U  
Material Approval # \_\_\_\_\_

Dike Base Material: 1.  Concrete 2.  Engineered Clay - Thickness \_\_\_\_\_ 3.  Earth 4.  Synthetic - Make & Model #:

Remote Impounding?  Yes  No

**H. DISTANCE FROM DIKE WALL TO NEAREST:**

1. Well \_\_\_\_\_ Ft. 2. Property Line \_\_\_\_\_ Ft. 3. Surface Water \_\_\_\_\_ Ft. 4. Nearest Building On Property \_\_\_\_\_ Ft.

**I. TANK CONTENTS**

1. <input type="checkbox"/> Diesel	2. <input type="checkbox"/> Leaded	3. <input type="checkbox"/> Unleaded	4. <input type="checkbox"/> Fuel Oil
5. <input type="checkbox"/> Gasohol	6. <input checked="" type="checkbox"/> Other <u>GAS-WATER MIXTURE</u>	7. <input type="checkbox"/> Empty	9. <input type="checkbox"/> Unknown
10. <input type="checkbox"/> Premix	11. <input type="checkbox"/> Waste Oil	13. <input type="checkbox"/> Chemical *	
14. <input type="checkbox"/> Kerosene	15. <input type="checkbox"/> Aviation		

\* If # 13 is checked, indicate the chemical name(s) or number(s) of the chemical or waste.

If Tank Was Removed or Cleaned For Other Use, Give Date (mo/day/yr): \_\_\_\_\_ Owner's Signature: Ed Hysta Date Signed: 1-27-95

# ABOVEGROUND PETROLEUM PRODUCT TANK INVENTORY

Send Completed Form To:  
Safety & Buildings Division  
P.O. Box 7969  
Madison, WI 53707  
Telephone (608) 267-5280

For Office Use Only:

Tank ID # \_\_\_\_\_

This form must be completed pursuant to s. 101.142, Wis. Stats., to register an above ground petroleum product storage system. An aboveground petroleum product storage system is an aboveground tank, used to store petroleum products, together with an on-site integral piping or dispensing system. Not included are pipeline facilities, tanks of 110 gallons or less capacity, farm and residential tanks of 1,100 gallons or less capacity, tanks used for storing heating oil for consumptive use on the premises where stored or tanks owned by the state or federal government. A separate form is needed for each tank. Send each completed form to the address in the top right corner.

This registration applies to a tank that is (check one): 1. <input checked="" type="checkbox"/> In Use 2. <input type="checkbox"/> Out of Service With Product 3. <input type="checkbox"/> Out of Service With No Product (Empty) 4. <input type="checkbox"/> Closed - Tank Removed 5. <input type="checkbox"/> Closed - Tank Cleaned 6. <input type="checkbox"/> Changed Ownership (Indicate new owner in section A. 3. below)	Fire Department Providing Fire Coverage Where Tank Is Located: <input checked="" type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town of: <u>SUPERIOR</u>
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**A. IDENTIFICATION (Please Print)**

1. Tank Site Name <u>Amoco Oil Bulk Plant</u> <input checked="" type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town of:	Site Address <u>2904 WINTER ST.</u>	Site Telephone Number <u>(715) 392-8794</u>
State <u>WI</u>	Zip Code <u>54880</u>	County <u>DOUGLAS</u>
2. Owner Name (mail sent here unless indicated otherwise in #3) <u>Amoco Oil Co</u> <input checked="" type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town of:	Owner Mailing Address (mail sent here unless indicated otherwise in #3) <u>2904 WINTER ST</u>	
State <u>WI</u>	Zip Code <u>54880</u>	County <u>DOUGLAS</u>
3. Alternate Mailing Name If Different Than #2 <input type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town of:	Alternate Mailing Street Address If Different Than #2 _____	
State _____	Zip Code _____	County _____
4. Tank Age (date installed, if new; years old, if used) <u>11-18-94</u>	5. Tank Capacity (gal.) <u>1000</u>	6. Tank Manufacturer's Name (if known) <u>LUBE CUBE DOUBLE WALL</u>
7. If more than 1 tank is being reported at a facility, provide an 8 1/2 x 11 plot plan drawn to scale (1" = 20 ft.), numbering and indicating the location of the tanks being reported. If a plot plan is being submitted, this form is for tank number: <u>13-A</u>		

**B. TYPE OF USER (check one):**

1. <input type="checkbox"/> Gas Station (any resale)	2. <input checked="" type="checkbox"/> Bulk Storage	3. <input type="checkbox"/> Utility	4. <input type="checkbox"/> Mercantile / Commercial
5. <input type="checkbox"/> Industrial	6. <input type="checkbox"/> Government	7. <input type="checkbox"/> School	8. <input type="checkbox"/> Residential
9. <input type="checkbox"/> Agricultural	10. <input type="checkbox"/> Other (specify): _____		

**C. TANK CONSTRUCTION (check one):**

1. <input type="checkbox"/> Bare Steel	2. <input type="checkbox"/> FRP Clad Steel	3. <input type="checkbox"/> Steel With Lining	4. <input type="checkbox"/> Concrete
5. <input checked="" type="checkbox"/> Other (specify): <u>COATED STEEL</u>			

Tank is built to:  National Standard or  UL Approval or  Other \_\_\_\_\_

**D. ROOF (Check one):**

1. <input checked="" type="checkbox"/> Fixed Roof	2. <input type="checkbox"/> Floating External	3. <input type="checkbox"/> Floating Internal	4. <input type="checkbox"/> Other _____
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**E. TANK BASE:**

1. <input type="checkbox"/> On Ground	2. <input type="checkbox"/> On Supports	3. <input checked="" type="checkbox"/> On Cement	4. <input type="checkbox"/> On Liner
5. <input type="checkbox"/> Double Bottom			
6. <input type="checkbox"/> Other _____			

**F. PIPING:**

<input type="checkbox"/> Aboveground	<input type="checkbox"/> Underground	<input type="checkbox"/> Both
--------------------------------------	--------------------------------------	-------------------------------

Above Ground Piping Construction:  Steel  Other \_\_\_\_\_

Underground Piping Construction:

1. <input type="checkbox"/> Bare Steel	2. <input type="checkbox"/> Cathodically Protected and coated or Wrapped Steel (a. <input type="checkbox"/> Sacrificial Anodes or b. <input type="checkbox"/> Impressed Current)	3. <input type="checkbox"/> Coated Steel
4. <input type="checkbox"/> Fiberglass	5. <input type="checkbox"/> Other (specify): _____	6. <input type="checkbox"/> Unknown

**G. CONTAINMENT:**

Dike Side Material: 1.  Block 2.  Concrete 3.  Earth 4.  Synthetic 5.  Double Wall 930081-U  
Material Approval #

Dike Base Material: 1.  Concrete 2.  Engineered Clay - Thickness \_\_\_\_\_ 3.  Earth 4.  Synthetic - Make & Model #: \_\_\_\_\_

Remote Impounding?  Yes  No

**H. DISTANCE FROM DIKE WALL TO NEAREST:**

1. Well \_\_\_\_\_ Ft. 2. Property Line \_\_\_\_\_ Ft. 3. Surface Water \_\_\_\_\_ Ft. 4. Nearest Building On Property \_\_\_\_\_ Ft.

**I. TANK CONTENTS**

1. <input type="checkbox"/> Diesel	2. <input type="checkbox"/> Leaded	3. <input type="checkbox"/> Unleaded	4. <input type="checkbox"/> Fuel Oil
5. <input type="checkbox"/> Gasohol	6. <input checked="" type="checkbox"/> Other <u>GAS + WATER MIXTURE</u>	7. <input type="checkbox"/> Empty	9. <input type="checkbox"/> Unknown
10. <input type="checkbox"/> Premix	11. <input type="checkbox"/> Waste Oil	13. <input type="checkbox"/> Chemical *	
14. <input type="checkbox"/> Kerosene	15. <input type="checkbox"/> Aviation		

\* If # 13 is checked, indicate the chemical name(s) or number(s) of the chemical or waste.

If Tank Was Removed or Cleaned For Other Use, Give Date (mo/day/yr):	Owner's Signature: <u>Ed Hyster</u>	Date Signed: <u>1-27-95</u>
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The information you provide may be used by other agency programs (Privacy Law, s. 15.04(1)(m)).



ABOVEGROUND STORAGE TANK  
INSTALLATION CHECKLIST

Department of Industry, Labor & Human Relations  
Safety & Buildings Division  
Fire Protection & Storage Tank Section  
P. O. Box 7969, Madison, WI 53707

Tank ID #: Fo: Office Use Only

Complete one form for each tank and related piping.

Vapor Recovery

Covers installation of:  Tank;  Piping;  Secondary Containment;  Overfill Protection;  Leak Detection

A. IDENTIFICATION: (Please Print) The Original Aboveground Tank Inventory Form SBD-8731 Signed by the Owner Must be Submitted with Each Installation Checklist

1. Establishment Name (same as approval letter) <u>AMOCO OIL BULK PLANT</u>			2. Owner Name <u>AMOCO OIL CO.</u>		
Project Location (number and street) <u>2904 WINTER ST</u>			Owner Street Address <u>2904 WINTER ST.</u>		
<input checked="" type="checkbox"/> City	<input type="checkbox"/> Village	<input type="checkbox"/> Town of:	<input checked="" type="checkbox"/> City	<input type="checkbox"/> Village	<input type="checkbox"/> Town of:
<u>SUPERIOR</u>			<u>SUPERIOR</u>		State <u>WI</u>
State <u>WI</u>	Zip Code <u>54880</u>	County <u>DOUGLASS</u>	County <u>DOUGLASS</u>	Telephone No. (include area code) <u>1715 1398-8294</u>	

INSTALLER CERTIFICATION: I certify that the tank and related piping was installed according to the manufacturer's instructions, conditionally approved plans and comply with ILHR 10.

Installer Name (print): RON TATTINEN Installer Cert. No.: 00099  
 Installer signature: Ronald S Tattinen S-u Date signed: 1-27-95

B. PLAN APPROVAL

1. Plan approval date: 11-14-94 Plan number: \_\_\_\_\_  
 2. Tank capacity: 1001 GAL. 13A

INSPECTOR INFORMATION

Inspection Company Name (Print): SUPERIOR FIRE DEPT  
 Inspector Signature: Bradley Bunn Inspector #: TIC0113 Local Operator #: \_\_\_\_\_  
 Date Signed: 1-27-95 Fire department providing coverage: SUPERIOR FDID #: 1601

C. TANK CONTENTS

1.  Diesel 2.  Leaded 3.  Unleaded 4.  Fuel Oil 5.  Gasohol 6.  Other 7.  Empty 9.  Unknown 10.  Premix 11.  Waste Oil  
 13.  Chemical (If checked, indicate chemicals/wastes by name or #) GAS - WINTER MIXTURE 14.  Kerosene 15.  Aviation

D. TYPE OF USER (check one)

1.  Gas Station (any resale) 2.  Bulk Storage 3.  Utility 4.  Mercantile/Commercial 5.  Industrial 6.  Government 7.  School  
 8.  Residential 9.  Agriculture 10.  Other (specify) Gas Station

E. TANK CONSTRUCTION

	INSTALLER VERIFIED	INSPECTOR VERIFIED	NA
1. Tank is new and carries national testing label for aboveground use.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Tank is used and has been tested for leaks.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Tank is coated to inhibit corrosion.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Tank labels provided.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Class I normal pressure/vacuum vent discharges upward at least 12 feet above ground level, does not terminate under eaves or less than 5 feet from any building opening, and higher than fill.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Class II or III A normal vents are at least 4 feet above ground level and higher than fill.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Emergency relief vent is provided.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. All normal and emergency vents terminate outside.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Overfill protection provided? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, identify type: <u>Gauge - electronic</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Tank gauge is provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F. TANK HANDLING AND PRE-TESTING

1. Tank was lifted using lifting lugs, no chains or slings were placed around the tank shell.

2. Tank was tested for leakage per the manufacturer's recommendations.

G. TANK SITE

1. Tank located per approved plans (walls, bldgs., P/L, streets, etc.).

2. Tank is spaced a minimum of 3 feet from any other tank.

3. Tank foundation designed to minimize settling.

H. PROJECT SITE

1. Collision protection provided.

2. Vehicle fueling tank is secured by non combustible enclosure.

3. Warning signs posted for dispensing area.

4. A 20 BC rated fire extinguisher provided.

PIPING MATERIAL IS  Fiberglass  Steel or  Other (type) \_\_\_\_\_

Check one of the types below before proceeding to answer questions 1-4 and/or 1-14.

Piping System Type: 1.  Pressurized Piping with: A.  auto shutoff; B.  alarm; or C.  flow restrictor 2.  Suction Piping with Check Valve at Tank  
 3.  Suction Piping with Check Valve at Pump and Inspectable

**Aboveground Pipe**

- |   | INSTALLER<br>VERIFIED    | INSPECTOR<br>VERIFIED    | NA                       |
|---|--------------------------|--------------------------|--------------------------|
| 1. Coated .....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Supported and protected against physical damage and stress .....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Check applicable boxes: <input type="checkbox"/> Emergency Fire Valve <input type="checkbox"/> Gate Valve .....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Piping was isolated from the tank and dispenser and air tested at 150% of operating pressures of the system (but not less than 50 P.S.I.) for 1 hour. .... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Underground Pipe**

- |  |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|
| 1. Piping is sloped back to tank (1/8 INCH per foot). ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Piping is evenly and adequately supported by at least 6 inches of backfill bedding. ....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Piping trench provides at least 18 inches of compacted backfill and paving on top of piping. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Pipes are separated by at least twice the pipe diameter. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Pipes are separated from the trench excavation sidewalls by at least 6 inches. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Piping inspected for damage to pipe or coating. ....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Metal piping is at least schedule 40 black steel or galvanized pipe, and is wrapped or coated. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Fittings and couplings are extra-heavy malleable iron screw-type, schedule 40 or better. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Piping was isolated from the tank and dispenser and air tested at 150% of operating pressure of the system (but not less than 50 psi) for 1 hour prior to backfilling. .... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. After backfilling, piping passed a tightness test prior to placing the system into service. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Metal piping is protected from corrosion by <input type="checkbox"/> cathodic protection or <input type="checkbox"/> impressed current. ....                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Test stations have been installed for monitoring cathodic protection on piping. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Approved flexible connectors are used below the dispenser. ....  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Dispensers, pumps, check valves, etc., not cathodically protected are electrically isolated from metallic piping. ....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**SECONDARY CONTAINMENT / LEAK DETECTION (Check which applies under both TANK and PIPING)**

- |   |                                       |                            |                          |
|---|---------------------------------------|----------------------------|--------------------------|
| 1. Tank <input type="checkbox"/> Diked <input checked="" type="checkbox"/> Double Wall  |                                       |                            |                          |
| <input type="checkbox"/> Visual (vehicle fueling minimum 1' clearance dike walls and floor) .....   | <input type="checkbox"/> Y            | <input type="checkbox"/> N | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Interstitial .....  | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N | <input type="checkbox"/> |
| <input type="checkbox"/> Automatic (verified as operative) .....  | <input type="checkbox"/> Y            | <input type="checkbox"/> N | <input type="checkbox"/> |
| <input type="checkbox"/> Other .....  | <input type="checkbox"/> Y            | <input type="checkbox"/> N | <input type="checkbox"/> |
| 2. Piping Leak Detection Method: used if pressurized or check valve at tank: 1. <input type="checkbox"/> Vapor monitoring 2. <input type="checkbox"/> Interstitial monitoring                     |                                       |                            |                          |
| 3. <input type="checkbox"/> Groundwater monitoring 4. <input type="checkbox"/> Tightness testing 5. <input type="checkbox"/> Line leak detector 6. <input type="checkbox"/> Not required (visual) |                                       |                            |                          |

**LIQUID HANDLING, TRANSFER AND USE**

- |  |                                       |                            |                          |
|--|---------------------------------------|----------------------------|--------------------------|
| 1. Product is identified and secured. ....   | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N | <input type="checkbox"/> |
| 2. Dispensing device is listed. ....   | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N | <input type="checkbox"/> |
| 3. Dispensing device has proper setback clearances and vehicle protection. ....                  | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 4. Electrically operated solenoid valve provided. ....   | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 5. Anti siphon device provided on tank mounted pump. ....  | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 6. All electrical equipment and wiring is installed in accordance with ILHR 16 (NFPA 70). ....   | <input checked="" type="checkbox"/> Y | <input type="checkbox"/> N | <input type="checkbox"/> |
| 7. Emergency shutoff is identified and accessible. ....  | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 8. Where required, listed dispensing, emergency breakaway, and nozzle devices are provided. .... | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 9. Manual shutoff device. ....   | <input type="checkbox"/>              | <input type="checkbox"/>   | <input type="checkbox"/> |
| 10. Hose length _____  |                                       |                            |                          |

**COMMENTS**

THIS TANK STORES GAS & WATER MIXTURE WHICH IS PUMPED OUT OF THE GROUND  
 BY MONITORING WITHIN THE GROUND. DELTA ENVIRONMENTAL INC. INSTALLED  
 THIS SPECIAL TUBE PIPING FROM WELL TO TANK TO FACILITY SHUT-OFF AND IS  
 APPROVED BY THE STATE OF WI. FOR FURTHER INFORMATION PLEASE  
 CONTACT BILL FELLOWS AT DELTA ENVIRONMENTAL INC. PHONE NO 612-486-5249  
 SOUTH WEST PETROLEUM INSTALLED TANK ONLY