USPCI
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Union Pacific Corporation

Remedial Services

July 21, 1992

Mr. Harry Patterson
Manager, Environmental Remediation
Union Pacific Railroad
1416 Dodge Street, Room 930
Omaha, Nebraska 68179

RE: As-Built Construction Report, Oakland TOFC

Dear Mr. Patterson:

To document as-constructed information about the hydrocarbon recovery and treatment system, the "**As-Built Construction Report**" has been prepared. Enclosed are two copies of the report. East Bay Municipal Utility District and California Regional Water Quality Control Board, San Francisco Bay Region, have not requested copies of an as-built report. However, an extra copy has been included for submittal to either agency, should they require it. Additionally, a copy of the "**Operation and Maintenance Manual**", has been enclosed for your file.

Two "Measurement of Quality" forms have been included for the enclosed report and the "**Quarterly Monitoring Report**", dated July 8, 1992. Please complete and return the forms to John Yellich of our office.

If you have any questions, please call me at (303) 938-5539.

Sincerely,

Denton Mauldin
Engineer II

Enclosures

DM/rjf

5665 Flatiron Parkway • Boulder, Colorado 80301 • 303/938-5500 • Fax 303/938-5520

UNION PACIFIC RAILROAD YARD
OAKLAND, CALIFORNIA
HYDROCARBON RECOVERY SYSTEM
AS-BUILT CONSTRUCTION REPORT
JULY 20, 1992

PREPARED FOR UNION PACIFIC RAILROAD
BY

USPCI
REMEDIAL SERVICES
5665 FLATIRON PARKWAY
BOULDER, COLORADO 80301

This report was prepared by:

Denton Mauldin Date 7/20/92

Denton Mauldin
Project Manager

Pat Spiles for Mike Klein Date 7/20/92

Michael Klein
Engineer

This report was reviewed and approved by:

Ted C. Borer Date 7/21/92

Ted C. Borer
Program Manager

CONTENTS

1. INTRODUCTION

This report was prepared by USPCI to provide as-constructed information pertaining to the hydrocarbon recovery and treatment system located in Union Pacific Railroad's (UPRR) Oakland Trailer On Freight Car (TOFC) Railyard at 1717 Middle Harbor Road in Oakland, California. The location of the UPRR site is indicated on Figure 1. Background information about the site is presented in the report, "**Hydrocarbon Investigation and Remedial Design**", dated June 10, 1991. The results of the hydrocarbon investigation and a conceptual design of the hydrocarbon recovery and treatment system are also presented in the report. The design system is presented in the "**Preliminary Design Report**", dated September 5, 1991. Manufacturer's information about the equipment is presented in the "**Hydrocarbon Recovery System Operation and Maintenance Manual**", dated June 24, 1992.

1.1 PURPOSE OF SYSTEM

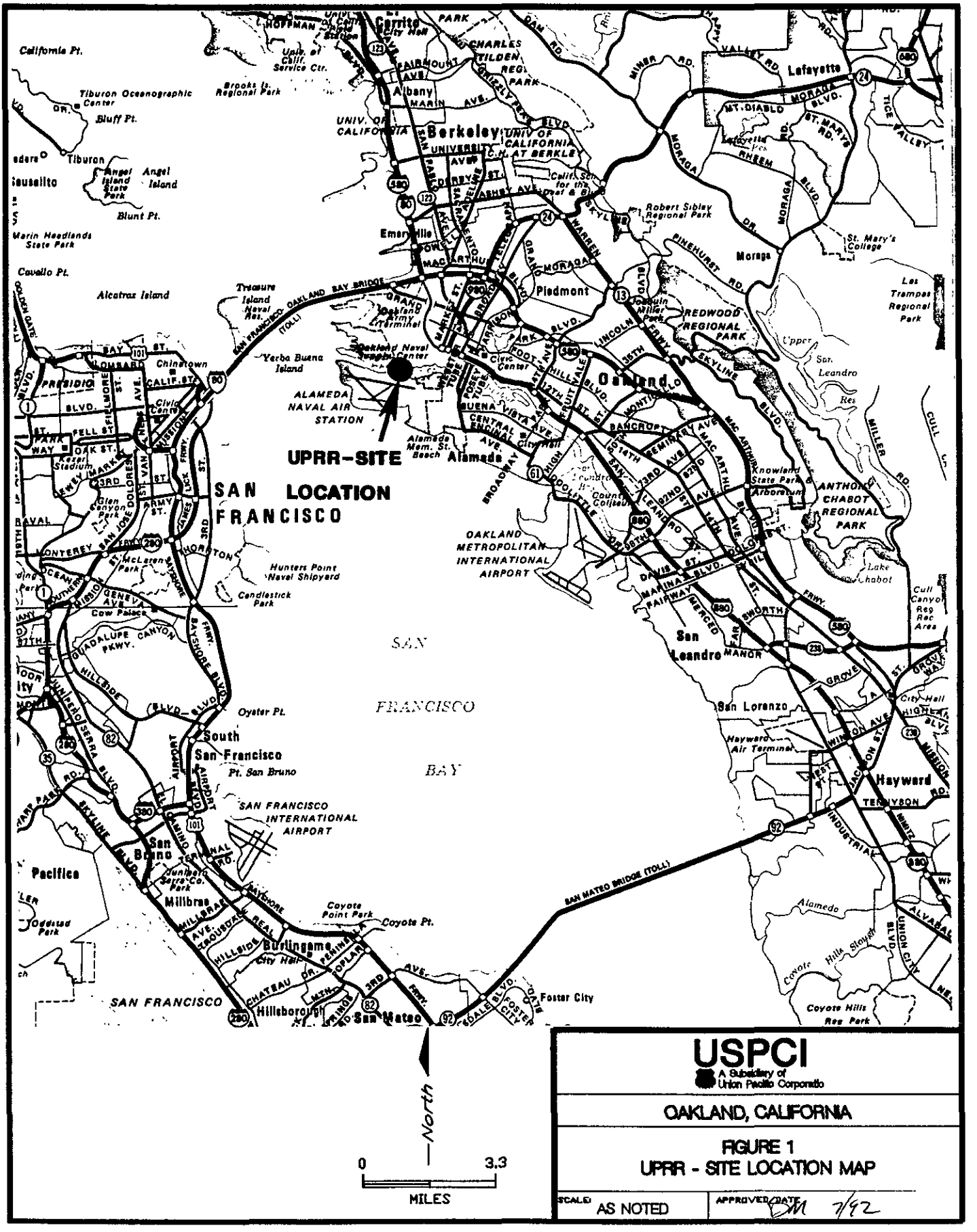
As discussed in the "**Hydrocarbon Investigation and Remedial Design**" report, a hydrocarbon investigation commenced after a release of diesel to the Oakland Estuary was discovered in February 1991. Results from the hydrocarbon investigation and subsequent monitoring of liquid-phase diesel in the groundwater monitoring wells indicated the need for hydrocarbon recovery. A hydrocarbon recovery and treatment system was installed to remove floating liquid-phase diesel product from groundwater. Due to the possibility of adding additional recovery wells, the treatment system has been designed to allow for additional flow capacity.

The recovery of liquid-phase diesel is accomplished by drawing down the groundwater table with total fluids pumps and creating a cone of depression near the recovery wells. The recovered groundwater is treated and discharged to the East Bay Municipal Utility District (EBMUD) sanitary sewer. The recovery and treatment system consists of three recovery wells, an oil/water separator, a recovered oil storage tank, and a granular activated carbon water treatment system.

1.2 SCOPE

The following sections present as-constructed information pertaining to the Oakland Hydrocarbon Recovery System:

- System Description
- System Installation
- Start-up and Operation
- Emergency Contacts



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OAKLAND, CALIFORNIA

FIGURE 1
UPRR - SITE LOCATION MAP

SCALE: AS NOTED | APPROVED/DATE: DM 7/92

2. SYSTEM DESCRIPTION

The Oakland Recovery System involves total fluid recovery, oil/water separation, oil storage, water treatment, and treated water discharge to the EBMUD.

Recovery wells ORW-1, ORW-2, and ORW-3 are located on UPRR property approximately 40 feet from the north property line. The wells are spaced 100 feet apart, along the northern edge of the inactive locomotive fueling area. The above ground portion of the system is located approximately 400 feet to the east on the southwest corner of the UPRR yard office parking lot. The location of the recovery wells and the above-ground equipment are indicated on Figure 2, Location and Details. Piping details and the above-ground equipment are indicated on Figures 3 and 4, respectively.

Groundwater is pumped using air displacement pumps from three recovery wells, located near the inactive locomotive fueling area. The fluids are transferred through 450 feet of 3-inch-diameter polyvinyl chloride (PVC) pipe to the oil/water separator. The treatment system involves oil/water separation, filtration and activated carbon treatment of the wastewater stream before discharge. The oil product from the oil/water separator is temporarily stored on site and then recycled.

2.1 RECOVERY SYSTEM CONSTRUCTION

The recovery wells and pumps were installed in June 1991. The remainder of the system was installed between April 9 and April 22, 1992. The pumps were initially operated as "skimmer" pumps that recovered and discharged product to the UPRR's product storage tank between October 1991 and April 1992. Since installation of the water treatment system the pumps are used to recover total fluids (groundwater and liquid phase oil). Various installation activities are discussed in the following sections.

2.1.1 Recovery Well Construction

The recovery wells are constructed of 8-inch diameter, PVC casing with the lower 10 feet being continuous slotted PVC pipe. Recovery well installation methods and boring logs for wells ORW-1, ORW-2 and ORW-3 were submitted with the "**Preliminary Design Report**".

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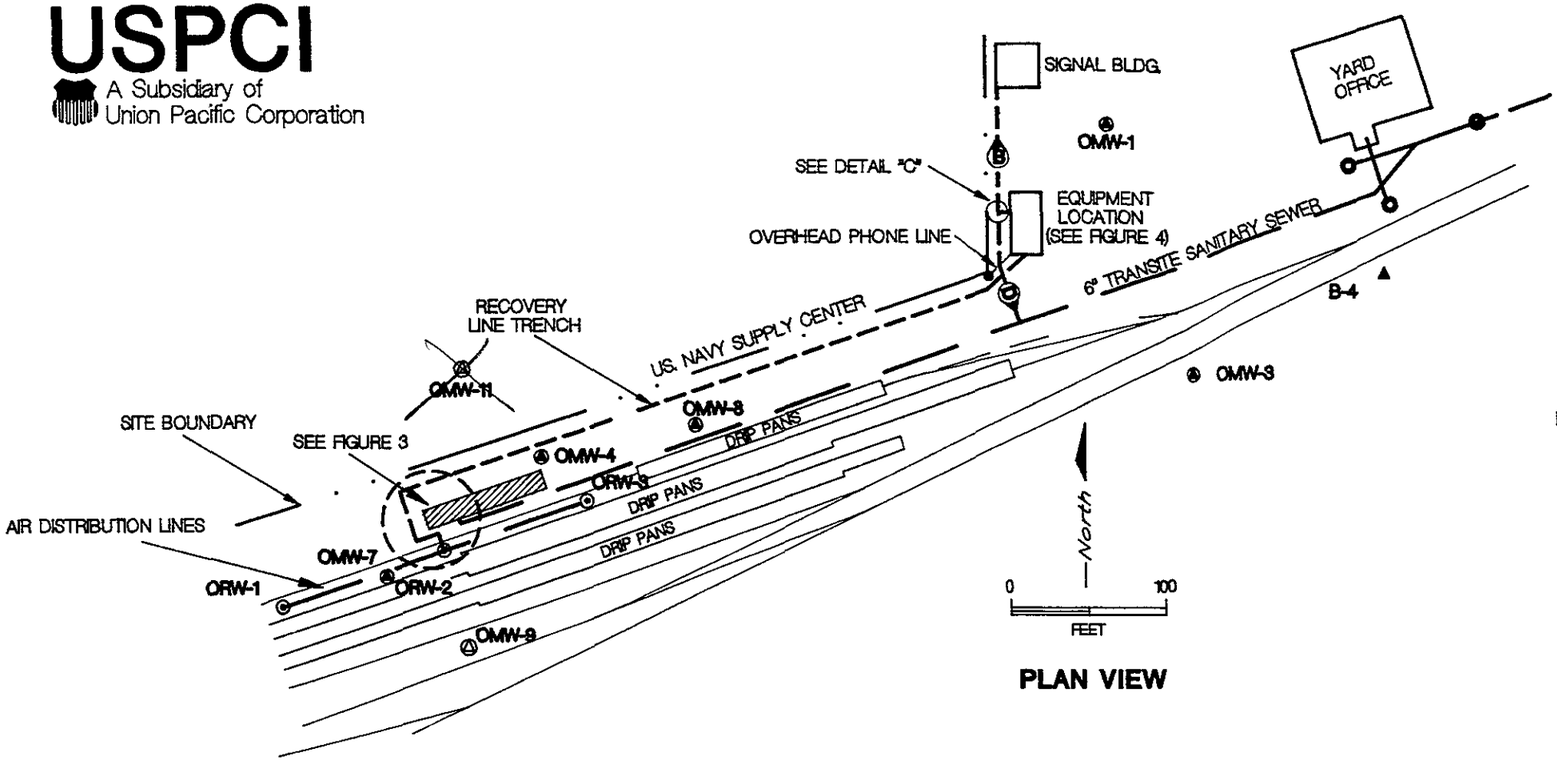
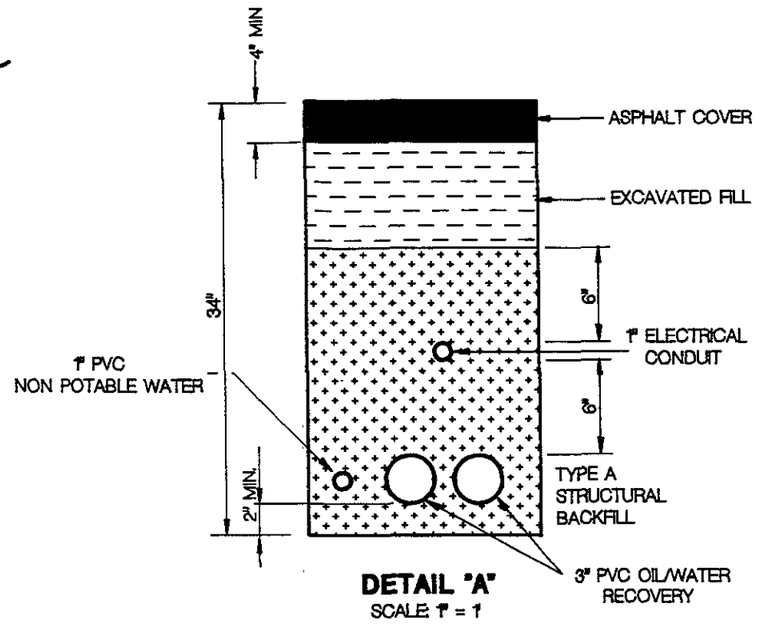


PLAN VIEW



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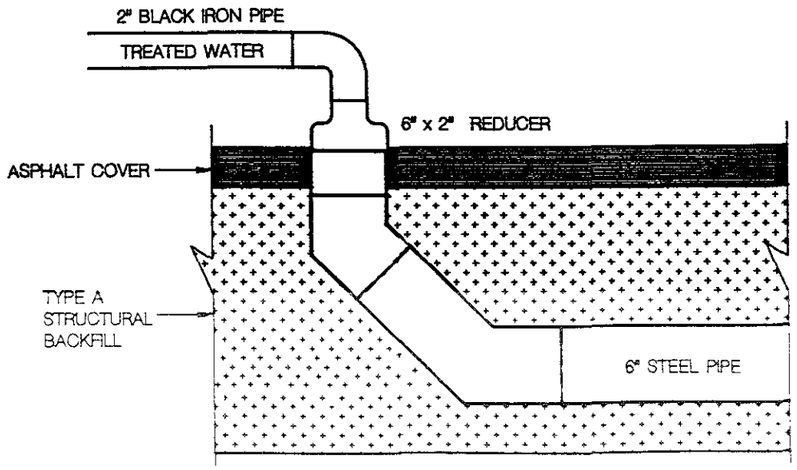

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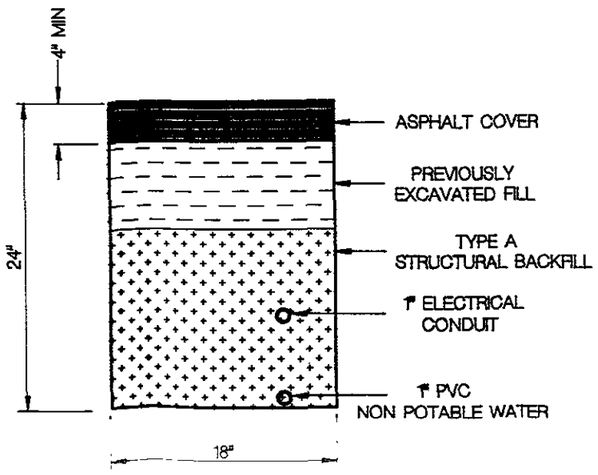

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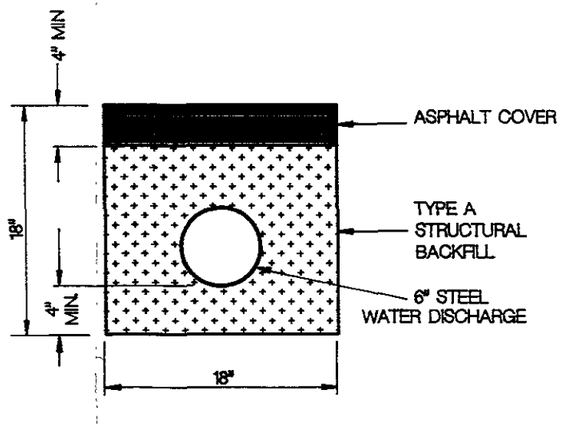

DETAIL "D"
SCALE: 1" = 1'

FIGURE 2

BY	DATE
CW	7-82
JM	7-82
DM	7-82

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OAKLAND, CALIFORNIA
GROUNDWATER RECOVERY AND TREATMENT SYSTEM
LOCATION AND DETAILS

SCALE: AS NOTED
DWG. NO. 96199-13

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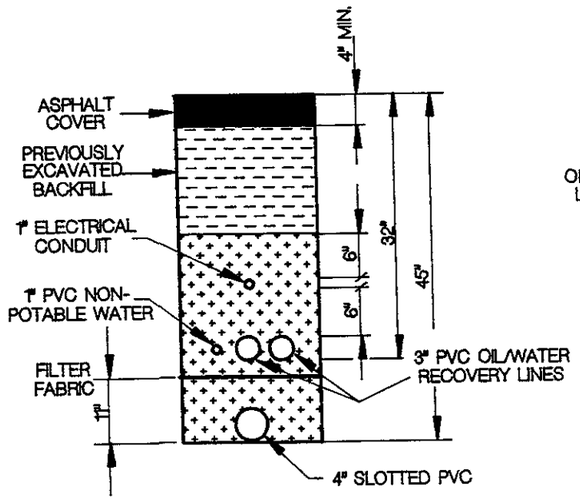

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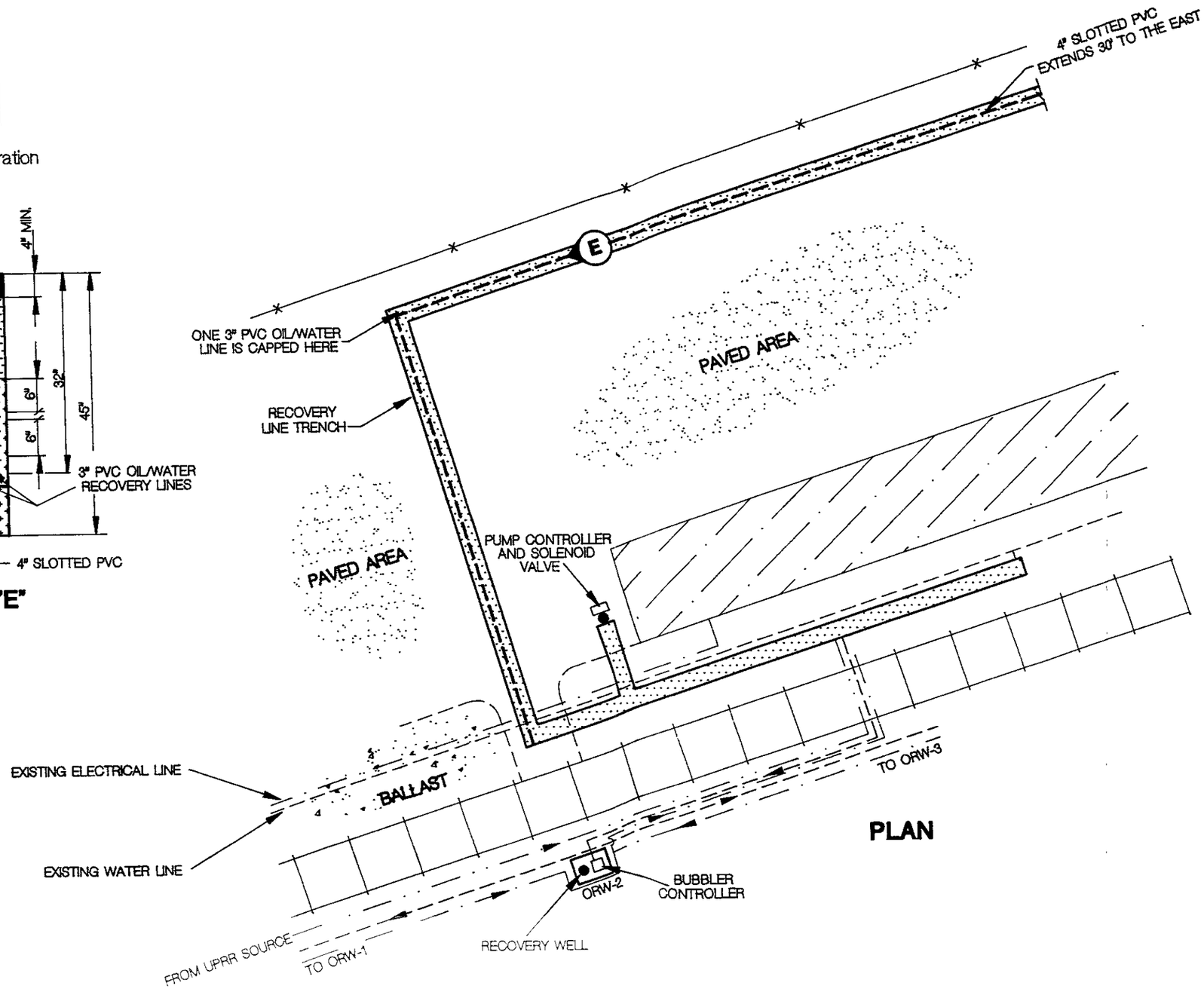
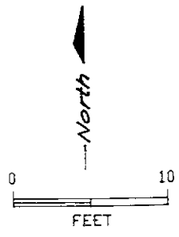


PLAN



LEGEND

SUPPLY AIR LINE

CONTROL AIR LINE

OIL WATER RECOVERY LINE

FIGURE 3

BY	DATE
CW	6-92
DM	7/12
DM	7/12

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OAKLAND, CALIFORNIA
HYDROCARBON RECOVERY AND TREATMENT SYSTEM
PIPING DETAILS

SCALE: AS NOTED
DWG. NO.: 96199-16

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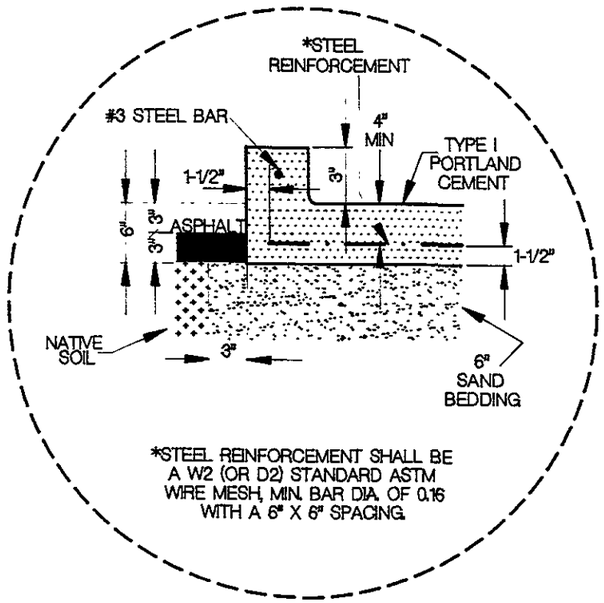
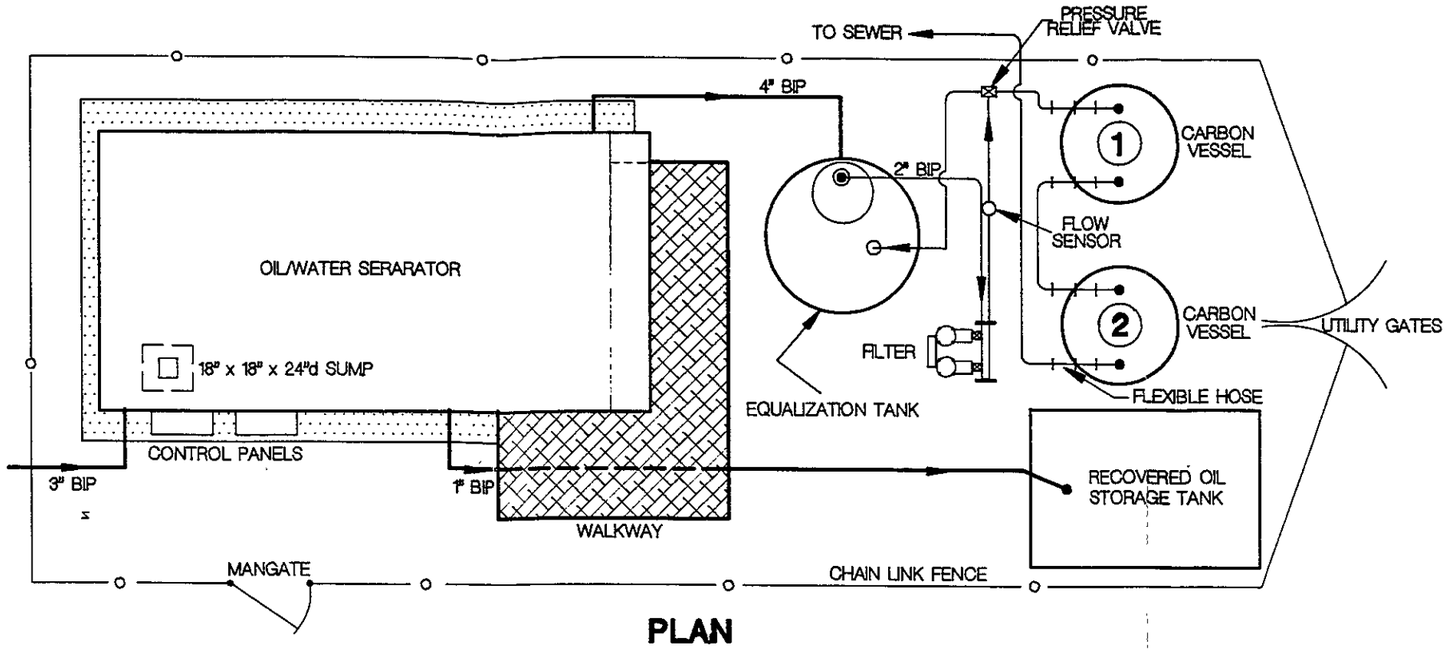
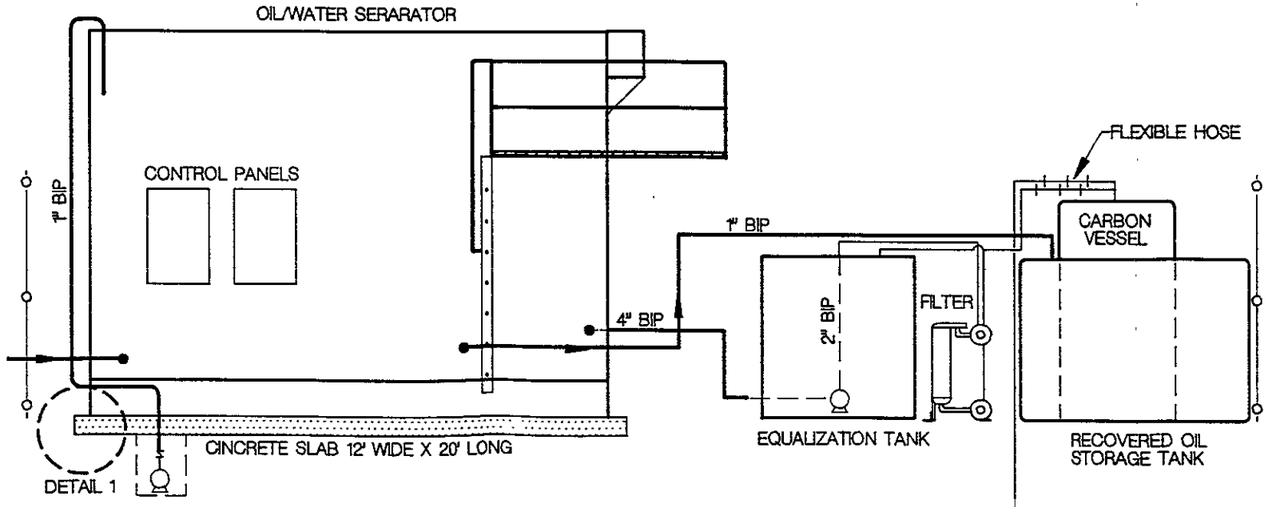


DETAIL 1



PLAN

0 5
FEET



ELEVATION

NOTE: ALL ABOVE GROUND PIPING SHALL BE BLACK IRON

BIP = BLACK IRON PIPE

BY	DATE
CJW	6-92
DM	7/92
DM	7/92

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FIGURE 4
OAKLAND, CALIFORNIA
HYDROCARBON RECOVERY AND TREATMENT SYSTEM
ABOVE GROUND EQUIPMENT

SCALE: AS NOTED
DWG. NO.: 96199-12

2.1.2 Pipe Trench Construction

The pipe trench was constructed using a backhoe. The trench is 18 inches in width with an average depth of 32 inches below grade. There is a 4-inch layer of tamped sand under the two 3-inch diameter PVC recovery pipes and the 1-inch diameter PVC non-potable water line. These lines were covered with an additional 6 inches of tamped sand. The 1-inch diameter PVC electrical control conduit is then placed and covered with another 6 inches of tamped sand. The remainder of the trench was backfilled with previously excavated soil. This soil was tamped and a 4-inch layer of asphalt was emplaced to bring the finished surface flush with the existing surface. A piping detail of the west end of the trench is included as Figure 3.

At the west end of the trench, coarse rubble and oily sand were encountered during excavation. Approximately 80 cubic yards of this material was temporarily stockpiled and later transported for final disposal at USPCI's Grassy Mountain Treatment and Disposal facility in Utah. On April 17, 1992, two soil samples were collected from the stockpiled soil and analyzed for the toxicity characteristic leaching potential of benzene. Both samples had benzene leachate concentrations of less than 0.025 milligrams per liter (mg/L). The analytical reports are included as Appendix A.

As indicated on Figure 3, a slotted 4-inch diameter PVC pipe was placed at the west end of the recovery line trench where the oily sand was encountered. The pipe is backfilled with 6 to 7 inches of gravel and filter fabric. The pipe may be used to recover groundwater and diesel production in the future.

2.2 RECOVERY PUMPS

Each recovery well is equipped with an Ejector System air displacement, total fluids pump and U-3000 bubbler controller. Each controller is mounted locally in the vault boxes of the recovery wells. The controller allows the empty and fill cycle of each pump to be set and can override the cycling of a pump when an insufficient water level above the pump is detected.

A pump controller for all three recovery wells is mounted above-ground near recovery well ORW-2 (Figure 3). The pump controller regulates the air pressure supplied to each bubbler controller and provides a manual reset feature, which prevents the pumps from re-starting automatically.

The pump housings are top-filling to ensure the highest amount of floating product recovery. This pumping method is inherently low shear and reduces oil emulsification in the production stream. The flow lines from the three pumps are manifolded together in the vault of recovery well ORW-2 and the combined flow is carried by 3-inch diameter PVC pipe to the oil/water separator.

2.3 OIL/WATER SEPARATOR

The oil/water separator is a simple gravity separation tank that has been used by UPRR at other sites. It is designed to have an average residence time of 60 minutes with a 130 gallon per minute (gpm) flowrate. At the Oakland site, the combined wellfield production maximum of 21 gpm is considerably below the 130 gpm design flowrate. This permits an average residence time of 390 minutes, which will allow the oil to separate from the water and rise to the surface more effectively.

When the oil layer on the separator surface builds to a sufficient thickness (≈ 2"), the oil will overflow into an adjustable skimming pipe and then flow by gravity to the double walled, 1,000 gallon oil storage tank. The detailed separator drawings are enclosed in Appendix B.

2.4 ACTIVATED CARBON WATER TREATMENT SYSTEM

The water recovered from the oil/water separator will have low levels of dissolved organic compounds. Before discharging the recovered water to EBMUDs sanitary sewer, it is necessary to lower the concentration of these constituents to discharge levels. The discharge levels are listed in Table 1.

Table 1
EBMUD Discharge Limits(mg/L)

Chlorinated Hydrocarbons	0. 50
Benzene	0.005 = 5ppb
Toluene	0.012
Ethylbenzene	0.005
Xylenes	0.011
Phenolic Compounds	100
Oil and Grease	100

Water from the oil/water separator flows to a 1,000 gallon temporary holding tank equipped with a submersible pump. The float controlled pump transfers the water through a bag filter into two, 2,000 pound activated carbon vessels connected in series. The flowrate through the carbon can be adjusted using a 2-inch gate valve. A high pressure bypass valve will allow water to flow back to the holding tank in case the carbon vessel pressure rises above 12 pounds per square inch (psig). Sample ports are located at the discharge outlets of the two carbon vessels to sample the discharge for organic compound breakthrough.

2.5 PROCESS CONTROLS

The hydrocarbon recovery and treatment system is equipped with process controls that shut-off the operation of the recovery pumps and notifies the person responsible for site maintenance via an automatic phone dial up system. The process and instrumentation diagram is included as Figure 5. The alarm conditions that will cause the recovery pumps to shutdown include:

- o Electrical power outage;
- o High holding tank water level (Alarm Condition one);
- o Oil in separator discharge (Alarm Condition two); and,
- o High oil tank level (Alarm Condition three).

Operation of the recovery pumps is disrupted by the use of a normally closed (open when power is supplied) solenoid valve, which is connected to the air supply of the pump controller. When one of the four alarm conditions exist, power is disrupted to the solenoid; thereby, shutting off the air supply to the recovery pumps.

2.5.1 Electrical Power Outage

In the event of a power outage, power to the solenoid valve will be disrupted and the recovery pumps will shut-off. Additionally, the phone monitoring system will switch to battery powered operation and notify the maintenance personnel that the power is off.

2.5.2 High Holding Tank Water Level

The discharge water filtration and activated carbon treatment systems are both passive and the only control necessary is a high pressure bypass valve which will prevent the internal pressure in the carbon vessels from exceeding their 12 psig rating. When the high pressure bypass valve is activated, the water flows back to the holding tank where the resulting high water level float position will disconnect power to the solenoid valve on the pump controller and shut down the recovery pumps. Additionally, the phone monitoring system will notify the maintenance personnel that alarm condition "one" exists.

2.5.3 Oil in Separator Discharge

The oil/water separator discharge is monitored by use of a conductivity probe that is located in the water discharge reservoir. The reservoir has a bottom discharge, which allows a layer of oil to collect prior to flowing to the holding tank if oil is discharged over the water overflow weir. If a sufficiently thick oil layer forms on the surface of the water in the reservoir, the conductivity probe

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RW-1
RECOVERY WELL
1 OF 3

OW-1
OIL/WATER SEPARATER
P-2
SUMP PUMP

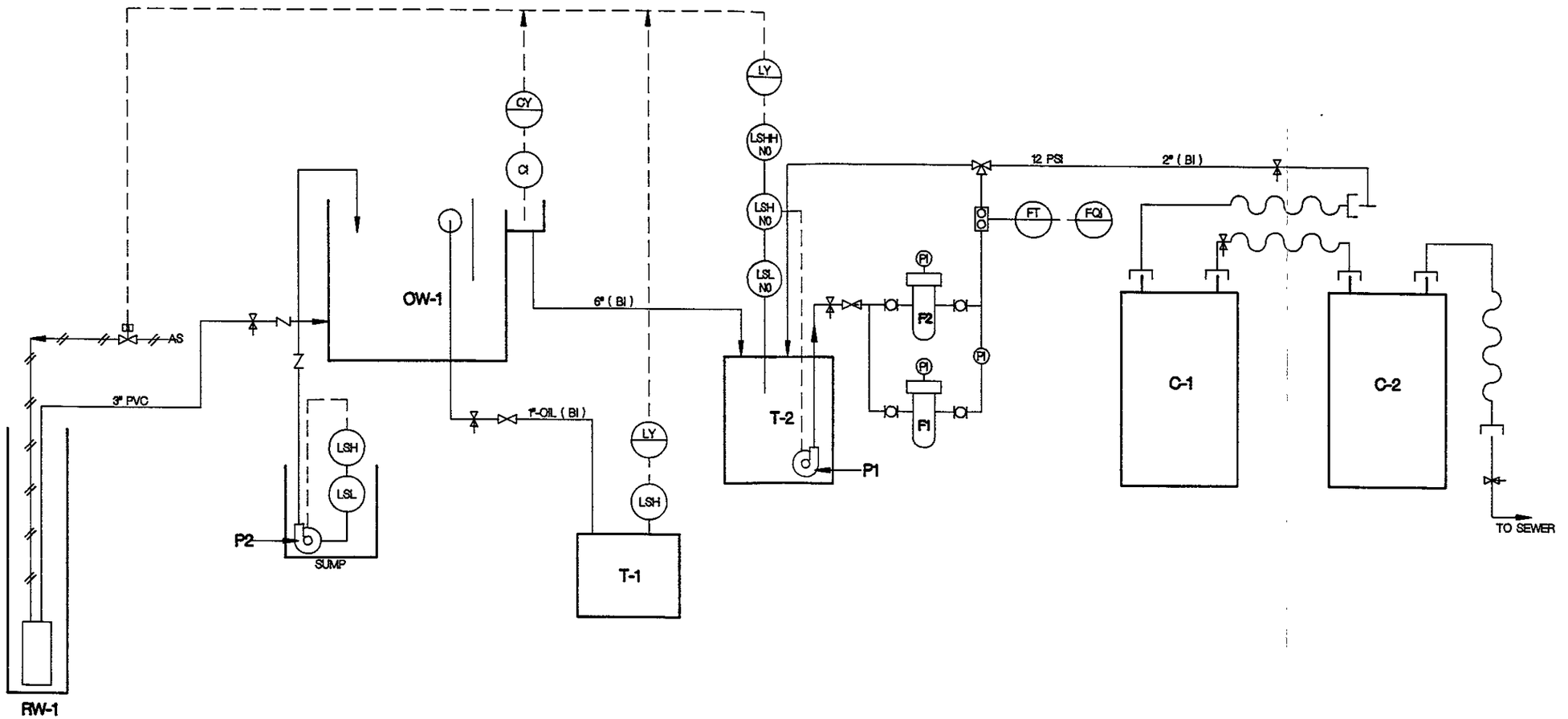
T-1
RECOVERED
OIL TANK

T-2
DISCHARGE
EQUILIZATION TANK
P-1
TRANSFER PUMP

F1 AND F2
BAG FILTER
ASSEMBLY

C-1
#2000 ACTIVATED
CARBON VESSEL

C-2
#2000 ACTIVATED
CARBON VESSEL



◯	LOCALLY MOUNTED INTRUMENT	⫽	INTRUMENT SIGNAL AIRLINE	AS	AIR SUPPLY
⊖	FRONT PANEL MOUNTED INTRUMENT	⋈	MANUAL GATE VALVE OR CONTROLLING GLOBE VALVE	PI	PRESSURE INDICATOR
	TURBINE METER	○	BALL VALVE	LSL	LEVEL SWITCH LOW
	FILTER	⋈	CHECK VALVE	LSH	LEVEL SWITCH HIGH
	FLEXBLE HOSE	⋈	3-WAY VALVE	LSHH	LEVEL SWITCH HIGH HIGH
	HOSE CONNECTION	⋈	SOLENOID OPERATED VALVE	C	CONDUCTIVITY INDICATOR
— —	INSTRUVENT ELECTRICAL SIGNAL	⋈	SAMPLING PORT	CY	CONDUCTIVITY RELAY

LY	LEVEL RELAY				
NO	NORMALLY OPEN				
FT	FLOW RATE TRANSMT				
FQI	FLOW RATE QUANTITY INDICATOR				

BY	DATE
CJW	7-92
VM	7/92
VM	7/92

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FIGURE 5
OAKLAND, CALIFORNIA
HYDROCARBON RECOVERY AND TREATMENT SYSTEM P&ID

SCALE: AS NOTED
DWG. NO. 96199-17

will shutoff power to the solenoid valve; thereby, shutting down the recovery pumps. The layer of oil will remain in the water discharge reservoir and the system will remain off until the problem is remedied. The phone monitoring system will notify the maintenance personnel that alarm condition "two" exists.

2.5.4 High Oil Tank Level

The recovered oil is stored in a horizontal, double walled, 1,000 gallon tank that is located north of the oil/water separator. This tank is equipped with a high level float switch that will shut down the recovery pumps and notify maintenance personnel that alarm condition "three" exists. Upon receipt of this message, a local oil recycler will be notified to empty the storage tank. Once the oil has been removed, the system will restart.

3. STARTUP AND OPERATION

The hydrocarbon recovery and treatment system commenced operation on May 8, 1992. During the first week of operation, a groundwater pumping test was performed. Results of the pump test will be submitted at a later date with a workplan to conduct an additional hydrogeologic investigation. After one month of operation the system recovered approximately 150 gallons of liquid-phase diesel product and recovered and treated 103,000 gallons of groundwater. Subsequent monitoring results will be submitted in the quarterly monitoring reports due to EBMUD. The first quarterly report is due July 15, 1992.

4. EMERGENCY CONTACTS

4.1 UPRR CONTACTS

Jack Dishman	Water Service Operator	(209) 942-5224
Harry Patterson	Manager, Environmental Remediation	(402) 271-4078

4.2 USPCI CONTACTS

Denton Mauldin	Project Manager	(303) 938-5539
Steve Brinkman	Project Geologist	(303) 938-5535
Ted Borer	Program Manager	(303) 938-5532
Mike Klein	Engineer	(303) 938-4940

4.3 REGULATORY CONTACTS

Molly Ong	East Bay MUD	(510) 287-1618
Ray Balkin	California Regional Water Quality Control Board, San Francisco Bay Region	(415) 464-1255

Appendix A
Stockpiled Soil Analytical Results
April 17, 1992

SwL SOUTHWESTERN LABORATORIES

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services

2575 LONE STAR DRIVE * P.O. BOX 224227, DALLAS,TEXAS 75222 * 214/631-2700

Client U.S. POLLUTION CONTROL, INC.
5665 FLATIRON PARKWAY
BOULDER, CO 80301

Attn: DENTON MAULDEN

Client No.
Report No. D2-04-261
Report Date 04/30/92 10:38

Project CHEMWEST SPLIT

OAKLAND

Date Sampled 04/17/92

Sampled By UNKNOWN

Sample Type SOIL

Transported by FEDERAL EXPRESS

P.O. # CALL FOR P.O.#

Date Received 04/24/92

Lab No.	Sample Identification
D2-04-261-01	A-1
D2-04-261-02	A-2

SOUTHWESTERN LABORATORIES

Reviewed By

Bob Garrett, Mgr., EAS

TEST RESULTS BY SAMPLE

Sample: 01A A-1 Collected: 04/17/92 12:45

Test Name	Method	Result	Units	Detection Limit	Date Started	Analyst
TCLP Benzene	ZHE EXTRACT	<0.025	MG/L		04/29/92	LK
Zero Headspace Extraction	TCLP	04/29/92	Date		04/29/92	LK

Sample: 02A A-2 Collected: 04/17/92 12:50

Test Name	Method	Result	Units	Detection Limit	Date Started	Analyst
TCLP Benzene	ZHE EXTRACT	<0.025	MG/L		04/29/92	LK
Zero Headspace Extraction	TCLP	04/29/92	Date		04/29/92	LK

COMPUCHEM LABORATORIES
WESTERN DIVISION

Chain of Custody Record

CW ID: _____

Date 4-23-92 Page 1 Of 1

PROJECT NAME Chemwest

~~PROJECT NO.~~ PO # to follow

PROJECT CONTACT: Debbie Pearce

SAMPLERS (SIGNATURE)

SAMPLERS PRINTED NAME

SAMPLE NO.	DATE	TIME	LOCATION	GC: TPH/EXTN	GC: BTEX/TFH	GC: 601/8010	GC: 602/8020	GC: 608/8080	GC: PCB'S	GC/MS: 624-8240	GC/MS: 625-8270	GC/MS: 2,3,7,8-TCDD	GC/MS: CL4 - CL8	INORGANICS: METALS	INORGANICS: WET CHEM	OTHER	NUMBER OF CONTAINERS	REMARKS
A-1	4/17/92	12:45	Oakland													4X TCLP Benzene	1	Rcvd intact & in good condition. Due Thurs. April 30 1992
A-2	4/17/92	12:50	"														1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Susan Gilbert	4/23/92	Signature		Signature		Signature	
Printed Name: SUSAN GILBERT	TIME: 16:45	Printed Name	TIME	Printed Name	TIME	Printed Name	TIME
Company: CHEMWEST LAB		Company		Company		Company	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECD BY (LABORATORY)	DATE
Signature		Signature		Signature		Signature: Debra Koch	4-24-92
Printed Name	TIME	Printed Name	TIME	Printed Name	TIME	Printed Name: DEBRA KOCH	TIME: 8:30 AM
Company		Company		Company		Company: SWL - DALLAS	

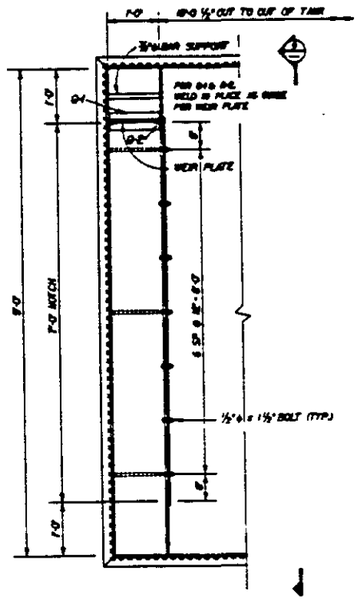
TOTAL NUMBER OF CONTAINERS: 2

METHOD OF SHIPMENT: Federal Express

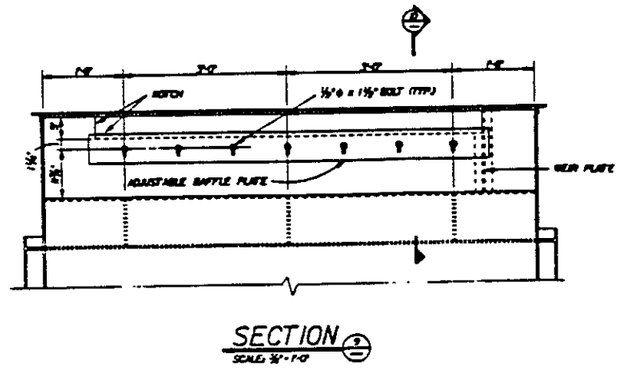
SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: Cool 4° C

600W North Market Boulevard • Sacramento, CA 95834 • Phone (916) 923-0840

Appendix B
Oil/Water Separator Drawings



PARTIAL PLAN @ BAFFLE
SCALE: ¾" = 1'-0"



SECTION 3/3
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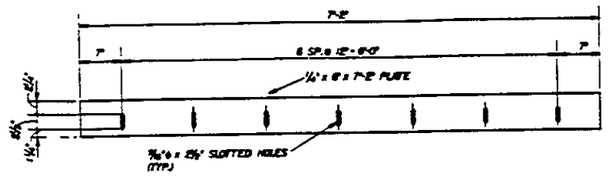
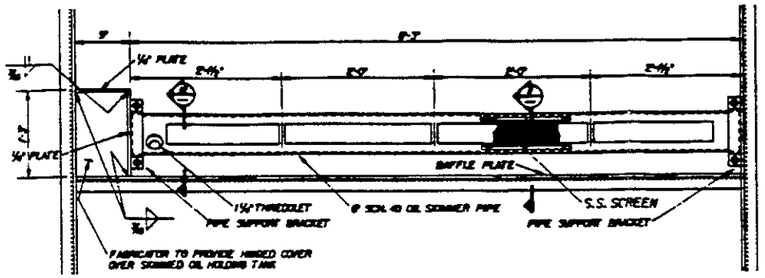
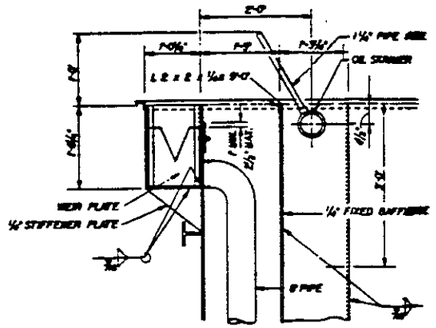


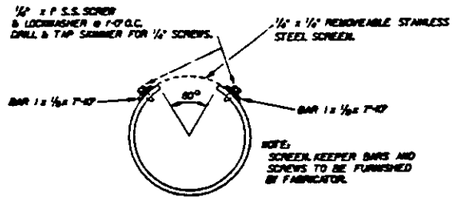
ADJUSTABLE BAFFLE PLATE
SCALE: 1"=1'-0"



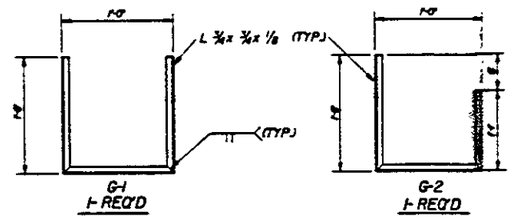
OIL SKIMMER DETAIL
SCALE: 1"=1'-0"



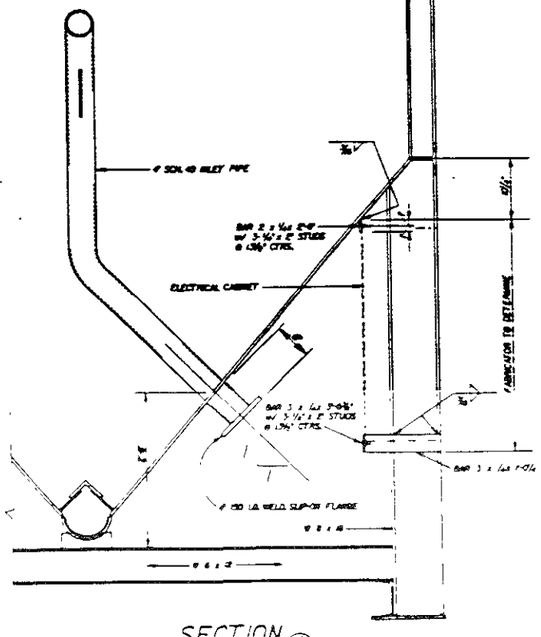
SECTION 12/3
SCALE: ½" = 1'-0"



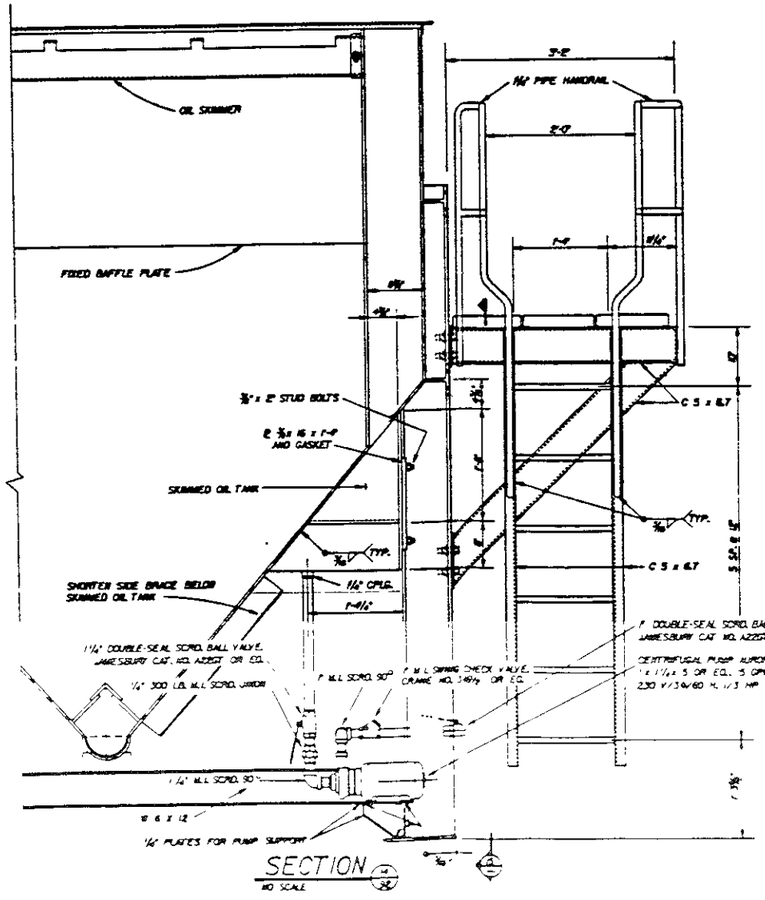
SECTION 11/3
SCALE: 3" = 1'-0"



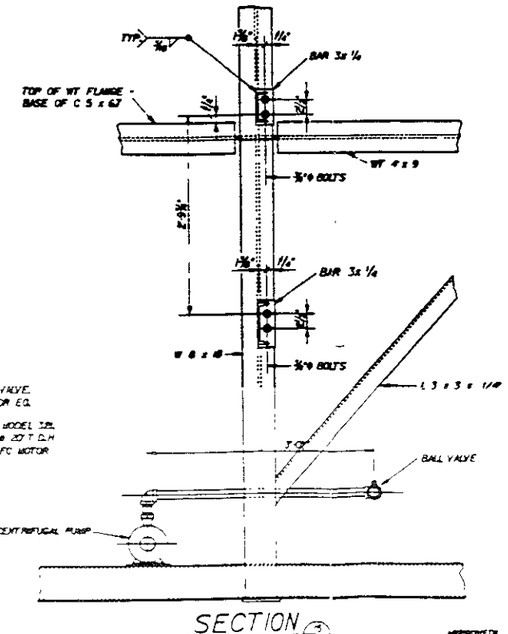
WEIR PLATE GUIDE
SCALE: 1½" = 1'-0"



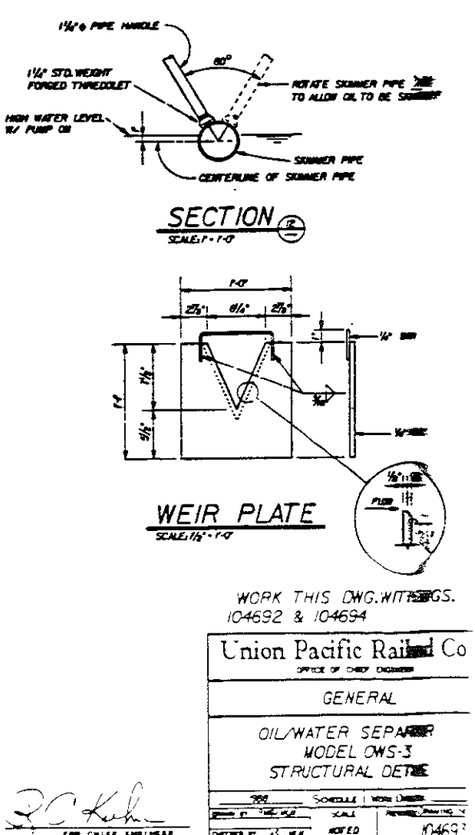
SECTION 2/3
SCALE: 1" = 1'-0"



SECTION 3/3
NO SCALE



SECTION 3/3
SCALE: ¾" = 1'-0"



SECTION
SCALE: 1" = 1'-0"

WEIR PLATE
SCALE: 1½" = 1'-0"

WORK THIS DWG. WITH DWGS. 104692 & 104694

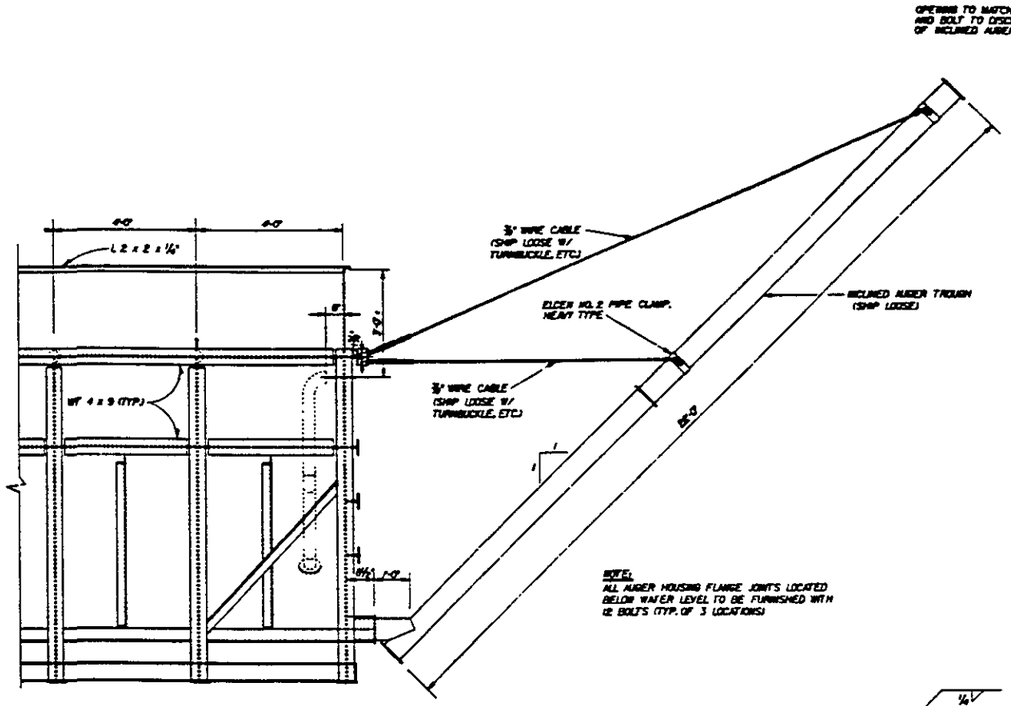
Union Pacific Railroad Co
OFFICE OF CHIEF ENGINEER

GENERAL

OIL/WATER SEPARATOR MODEL OWS-3 STRUCTURAL DETAILS

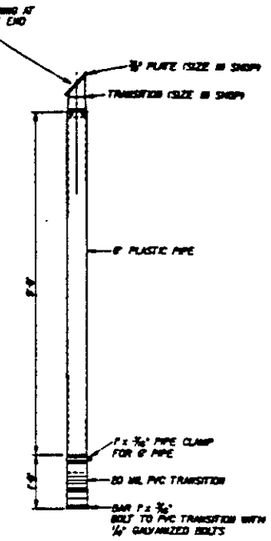
1994	SCHEDULE	WORK ORDER
DESIGNED BY	SCALE	APPROVED DRAWING NO.
CHECKED BY	NOTED	104693
DATE		

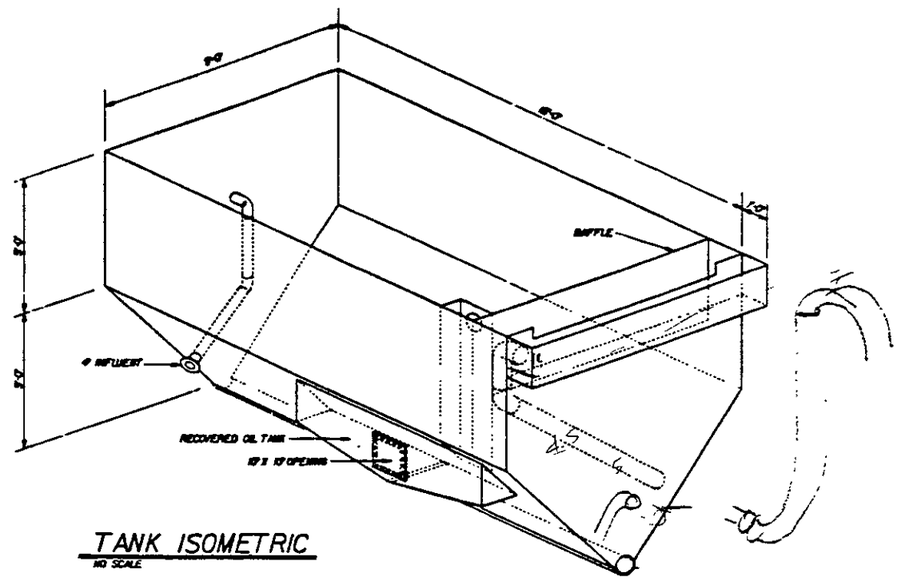
APPROVED: R C Kuhn
FOR CHIEF ENGINEER



ELEVATION - INCLINED AUGER

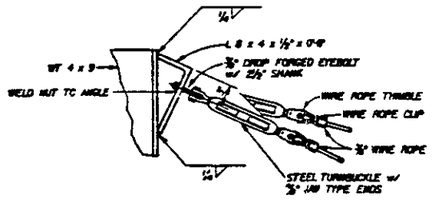
SCALE: 1/2" = 1'-0"





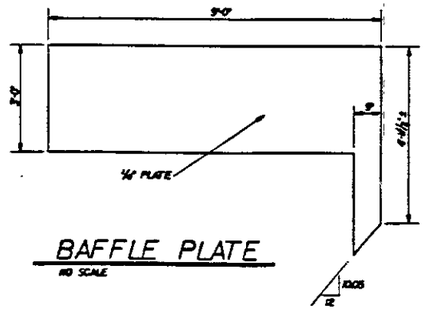
TANK ISOMETRIC

NO SCALE



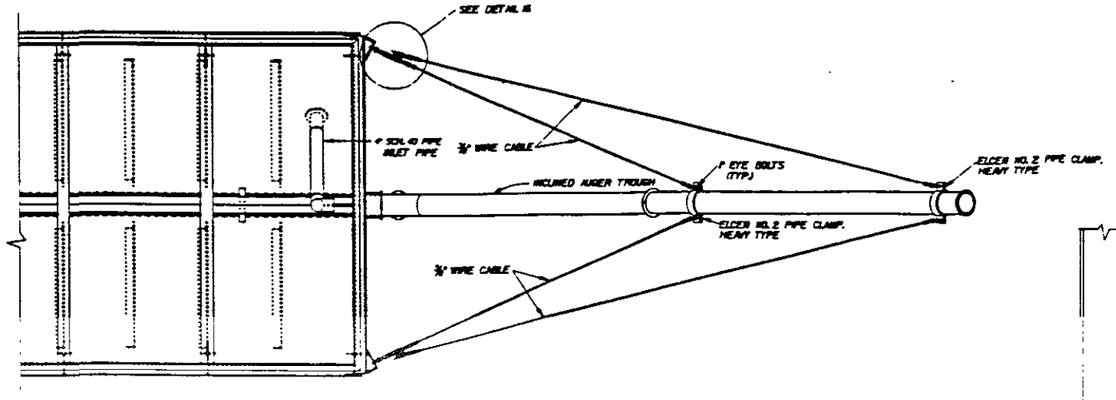
DETAIL (15)

SCALE: 1 1/2" = 1'-0"



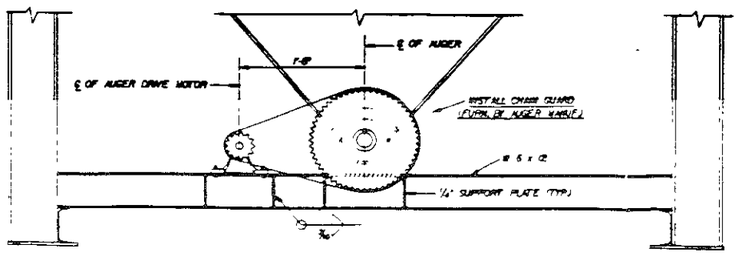
BAFFLE PLATE

NO SCALE



PLAN - INCLINED AUGER

SCALE: 1/2" = 1'-0"



ELEVATION - AUGER DRIVE

SCALE: 1" = 1'-0"

GENERAL NOTES:

DESIGN AND WORKMANSHIP - PER AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS, CURRENT EDITION.

MATERIAL - STRUCTURAL STEEL PER CURRENT ASTM A-36 SPECIFICATIONS.

PAINT (INSIDE TANK):
- SURFACE PREPARATION: SSPC-SP10 NEAR-WHITE METAL BLAST CLEANING.
- PRIME COAT: HEAVY DUTY POLYAMIDE EPOXY, RUST-OLEUM "ZINC-SEAL" 9334 ZINC PRIMER OR EQUAL, 1½ TO 3 MILS DFT.
- INTERMEDIATE COAT: HEAVY DUTY POLYAMIDE EPOXY, RUST-OLEUM 9339 WHITE PRIMER OR EQUAL, 1½ TO 2½ MILS DFT.
- FINISH COAT: HEAVY DUTY POLYAMIDE EPOXY, RUST-OLEUM 9338 LIGHT GRAY OR EQUAL, 1½ TO 2½ MILS DFT

PAINT (ALL OTHER METAL):
- SURFACE PREPARATION: SSPC-SP6 COMMERCIAL GRADE BLAST CLEAN.
- PRIME COAT: FISH OIL MODIFIED ALKYD, RUST-OLEUM 1080 HEAVY DUTY RED PRIMER OR EQUAL, 2 TO 3 MILS DFT.
- INTERMEDIATE COAT: FISH OIL MODIFIED ALKYD, RUST-OLEUM 1080 HEAVY DUTY RUST INHIBITIVE PRIMER OR EQUAL, 2 TO 3 MILS DFT.
- FINISH COAT: MODIFIED ALKYD ENAMEL, RUST-OLEUM 906 HIGH GLOSS SILVER GRAY OR EQUAL, 1 TO 2 MILS DFT.

WELDING - ARC PROCESS PER CURRENT "STRUCTURAL WELDING CODE", A.W.S. D1.1, UNLESS OTHERWISE NOTED. ALL COMPONENTS TO BE WELDED NEAR AND FAR SIDE W/ 3/16" CONTINUOUS FILLET WELD.

FABRICATOR TO FURNISH ALL MATERIALS AS SHOWN OR DENOTED, UNLESS THEIR OMISSION.

SHOP DRAWINGS - THE STEEL FABRICATOR SHALL, UPON RECEIPT OF ORDER, FURNISH MR. J.A. BERAN, CHIEF ENGINEER-DESIGN, U.P.R.R. CO., OMAHA, NEBR., 2 SETS OF SHOP PLANS FOR APPROVAL BY RAILROAD PRIOR TO UNDERTAKING FABRICATION.

FABRICATOR TO ASSEMBLE ENTIRE UNIT IN HIS SHOP FOR WITNESSED OPERATION AND FLOWTEST BY U.P.R.R. PERSONNEL PRIOR TO SHIPMENT. AFTER ACCEPTANCE DESIGNATED "SHIPPED LOOSE" MATERIAL TO BE DETACHED AND SECURED TO SEPARATOR FOR SHIPMENT.

WORK THIS DWG. WITH DWGS. 104692 & 104693

Union Pacific Railroad C.
OFFICE OF CHIEF ENGINEER

GENERAL

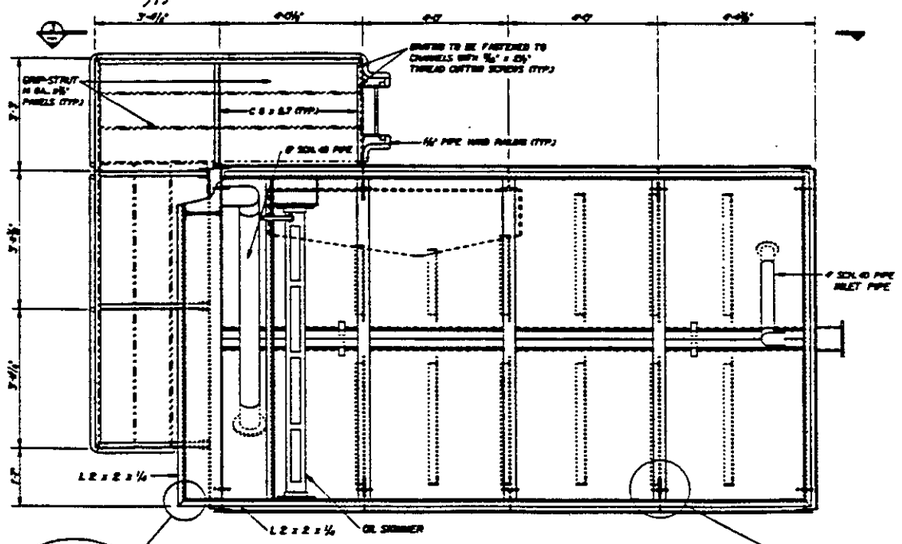
OIL/WATER SEPARATOR MODEL OWS-3 STRUCTURAL DETAILS

19	SCHEDULE	WORK ORDER NO.
DRAWN BY	SCALE	REVISED
CHECKED BY	NOTED	10469

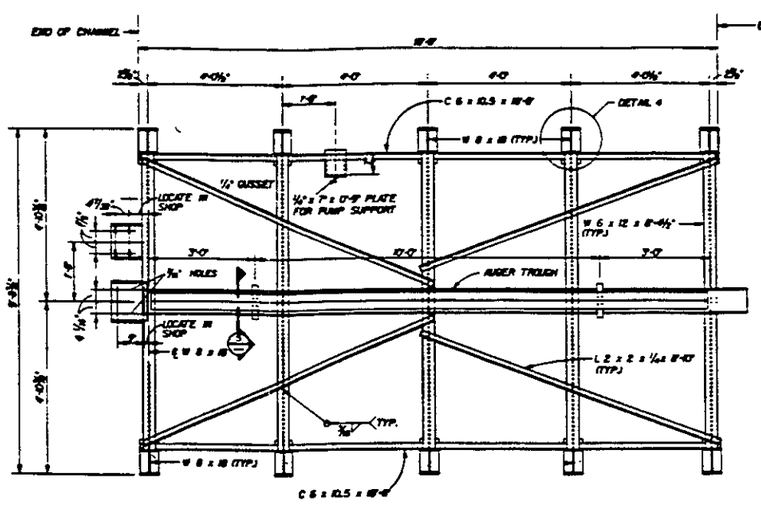
APPROVED

FOR CHIEF ENGINEER

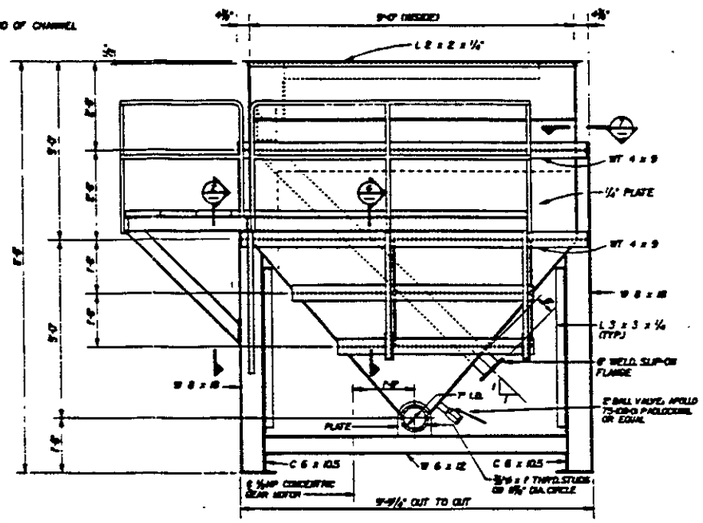
3.5'



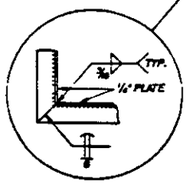
PLAN VIEW
SCALE: ½" = 1'-0"

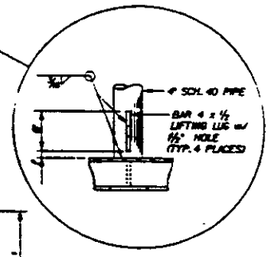


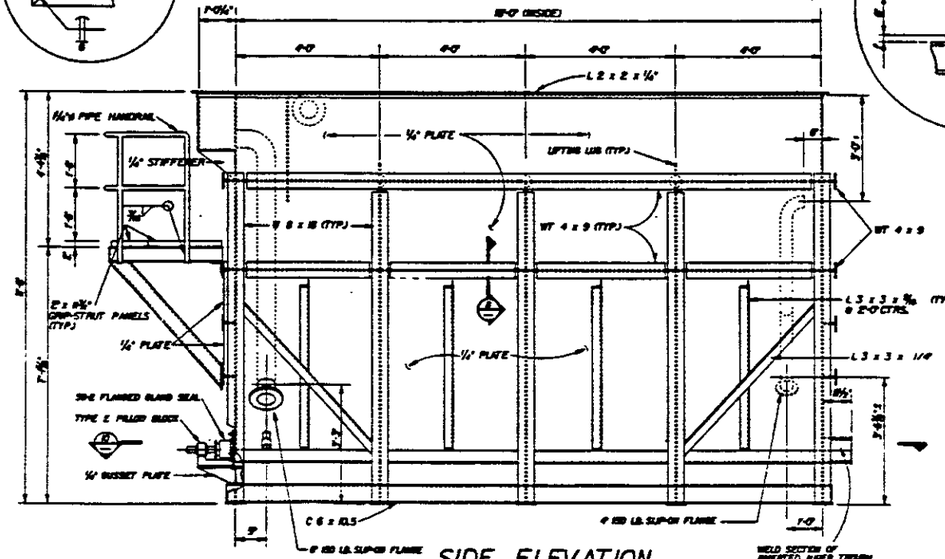
SECTION
SCALE: ½" = 1'-0"



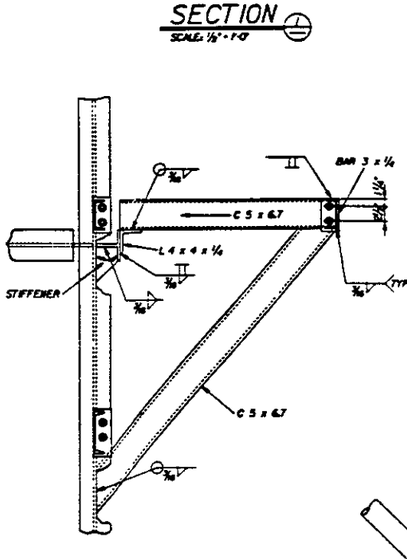
END ELEVATION
SCALE: ½" = 1'-0"



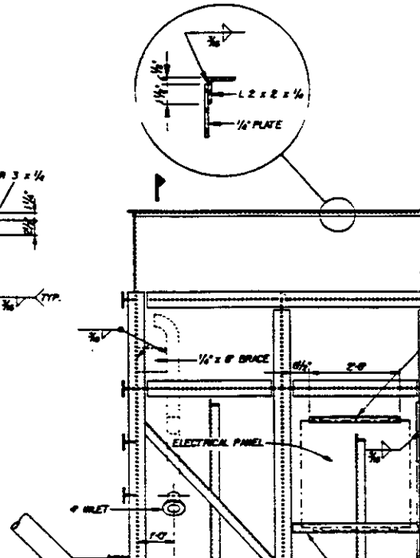




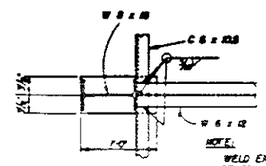
SIDE ELEVATION
SCALE: ½" = 1'-0"



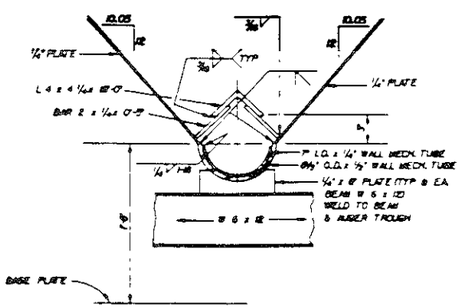
SECTION
SCALE: 1" = 1'-0"



ELEVATION
SCALE: ½" = 1'-0"



DETAIL
SCALE: 1" = 1'-0"



SECTION
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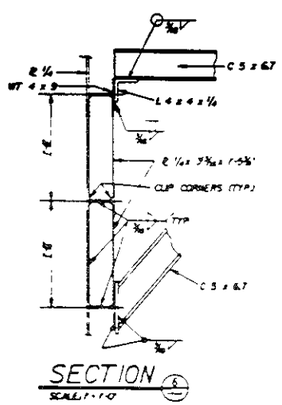
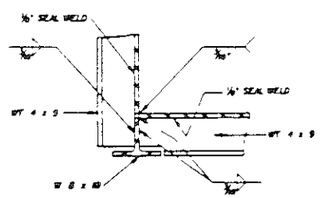
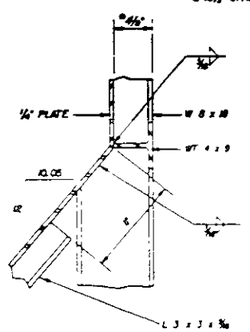


SECTION
SCALE: 1" = 1'-0"



SECTION
SCALE: 1½" = 1'-0"



SECTION
SCALE: 1½" = 1'-0"

NOTE:
① THIS DIMENSION OF WIDE FLANGE TO MATCH DEPTH OF WT 4 x 9

WORK THIS DWG. WITH DWGS. 104693 & 104694

Union Pacific Railroad Co.
OFFICE OF CHIEF ENGINEER

GENERAL

OIL/WATER SEPARATOR
MODEL OWS-3
STRUCTURAL DETAILS

1998	SCHEDULE	WORK ORDER NO.	
DRAWN BY [illegible]	SCALE: AS NOTED	REVISED	DRAWING NO. 104692
CHECKED BY [illegible]			
DATE [illegible]			

APPROVED: R.C. [illegible]
CHIEF ENGINEER