- Greg Zontnet -

8767

TETRA TECH, INC.
3746 MT. DIABLO BOULEVARD
LAFAYETTE, CALIFORNIA 94549
(415) 283-3771

October 14, 1986
File No. 3335

Mr. Jim Halladay
ABF Freight System, Inc.
301 South 11th Street
Fort Smith, AR 72902

Re: Underground Storage Tank Investigation -Oakland Facility

Dear Mr. Halladay:

Please find enclosed our report on the field investigation conducted at the truck maintenance facility located at 4575 Tidewater in Oakland, California. The conclusions from this work are that hydrocarbon contamination appears to be local. The highest level of total fuel hydrocarbons (TFH) found in the soil was 34 mg/Kg. This is below the 100 mg/Kg action level for TFH used by the Regional Water Quality Control Board. The results from the two monitoring wells show that hydrocarbons are present close to the site but that they decrease markedly midway between the site and the estuary. Given the clay soil and reversing hydraulic gradient due to the tidal influence of the estuary, high levels of hydrocarbons are unlikely to reach the estuary. These results indicate that remedial actions are not needed at this time. The excavation made by removing the waste oil tank can be filled in. Continued monitoring of the two wells (MW-1 and MW-2) is recommended on a biannual basis.

If we can be of any further assistance, please call me at (415) 283-3771.

Sincerely,

Karen Summers

Karen Summers
Principal Hydrogeologist
Environmental Systems Engineering

KS:tr
Enclosure

ccs: Fritz Kohler

Dale Boyer
RWQCB
San Francisco Bay Region
1111 Jackson
Oakland, CA
(415) 464-1255

Ted Gerow
ALCO Dept. of Environmental Health
470-27th Street, Rm 324
Oakland, CA 94612

Underground Storage Tank Investigation

ABF Freight Maintenance Facility in Oakland, California

Prepared by

Tetra Tech, Inc. Staff

Prepared for

Jim Halladay
ABF Freight System, Inc.
P.O. Box 48
Fort Smith, Arkansas 72902

Tetra Tech, Inc.
3746 Mt. Diablo Boulevard, Suite 300
Lafayette, California 94549

Underground Storage Tank Investigation for ABF Freight

INTRODUCTION

In June, 1986, ABF Freight System, Inc. initiated a tank testing and monitoring program at its facility located at 4575 Tidewater in Oakland. This field investigation program was designed to comply with the State of California Underground Storage Tank regulations. The work was done in two phases. Phase 1 was done by Azonic and included tank testing, soil sampling, and groundwater monitoring. Phase 2 was directed by Tetra Tech and involved additional soil and groundwater monitoring. This report describes the field work done under Phase 2 and the results of the laboratory analyses.

SITE DESCRIPTION

The ABF Freight facility is located on San Leandro Bay. The facility includes a maintenance garage and gas station. Originally, there were four fuel tanks at the site:

- two 10,000 gallon diesel tanks
- one 800 gallon waste oil tank
- one 800 gallon new oil tank.

A map showing the location of the tanks relative to the garage and San Leandro Bay is shown in Figure 1. Prior to three years ago, one of the 10,000 gallon tanks was used for gasoline. A leak in the gasoline piping was discovered three years ago and repaired.

The geologic materials in the general vicinity of the site consist of up to 10 ft of compacted fill underlain by tidal marsh deposits and then bay mud. At the location of the underground storage tanks, there appears to be shallow fill with gray, sandy clay and clay tidal deposits overlying the bay mud.

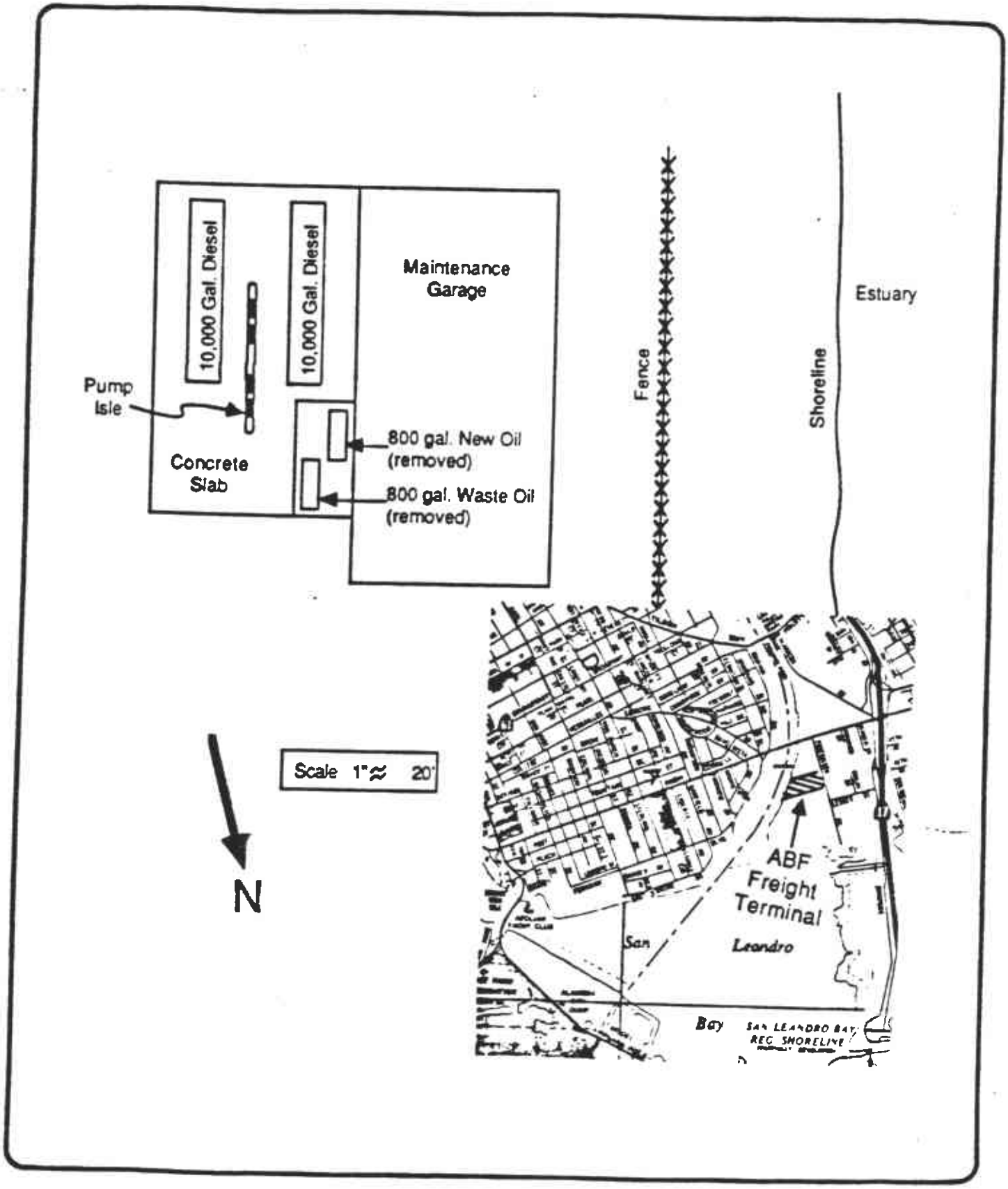

Figure 1. Location of Tanks at ABF Freight Terminal

PREVIOUS SITE INVESTIGATION

Field work performed by Azonic Technology included the following activities:

- Removal of two 800 gallon tanks and removal of sludge beneath the leaking tank
- Drilling of 4 soil borings
- Collection of soil samples from each boring and analysis for total hydrocarbons
- Collection of water samples from the bottom of each boring and analysis for total hydrocarbons.

The location of the soil borings (A1-A4) drilled by Azonic are shown in Figure 2. The total hydrocarbon levels in the soil samples ranged from less than 10 mg/Kg to 14 mg/Kg. The total hydrocarbon levels in grab water samples taken from the bottom of the soil borings ranged from 0.7 mg/l to 100 mg/l. No information was available regarding the methods used to collect or preserve the samples.

All four tanks were precision tested. The two 800 gallon oil tanks underlying the northwest corner of the concrete slab were found to have leaked and were excavated and removed by Azonic. Upon excavation, sludge was found underlying the tank site which was also removed by Azonic.

PRESENT SITE INVESTIGATION

Objectives

The objectives of the present field investigation were to determine if hydrocarbons were present in the shallow groundwater underlying the site, and if so, the extent of contamination.

Description of Field Work Conducted

On September 12, 1986, two shallow groundwater monitoring wells were installed and three shallow soil borings were drilled. An eight-inch hollow

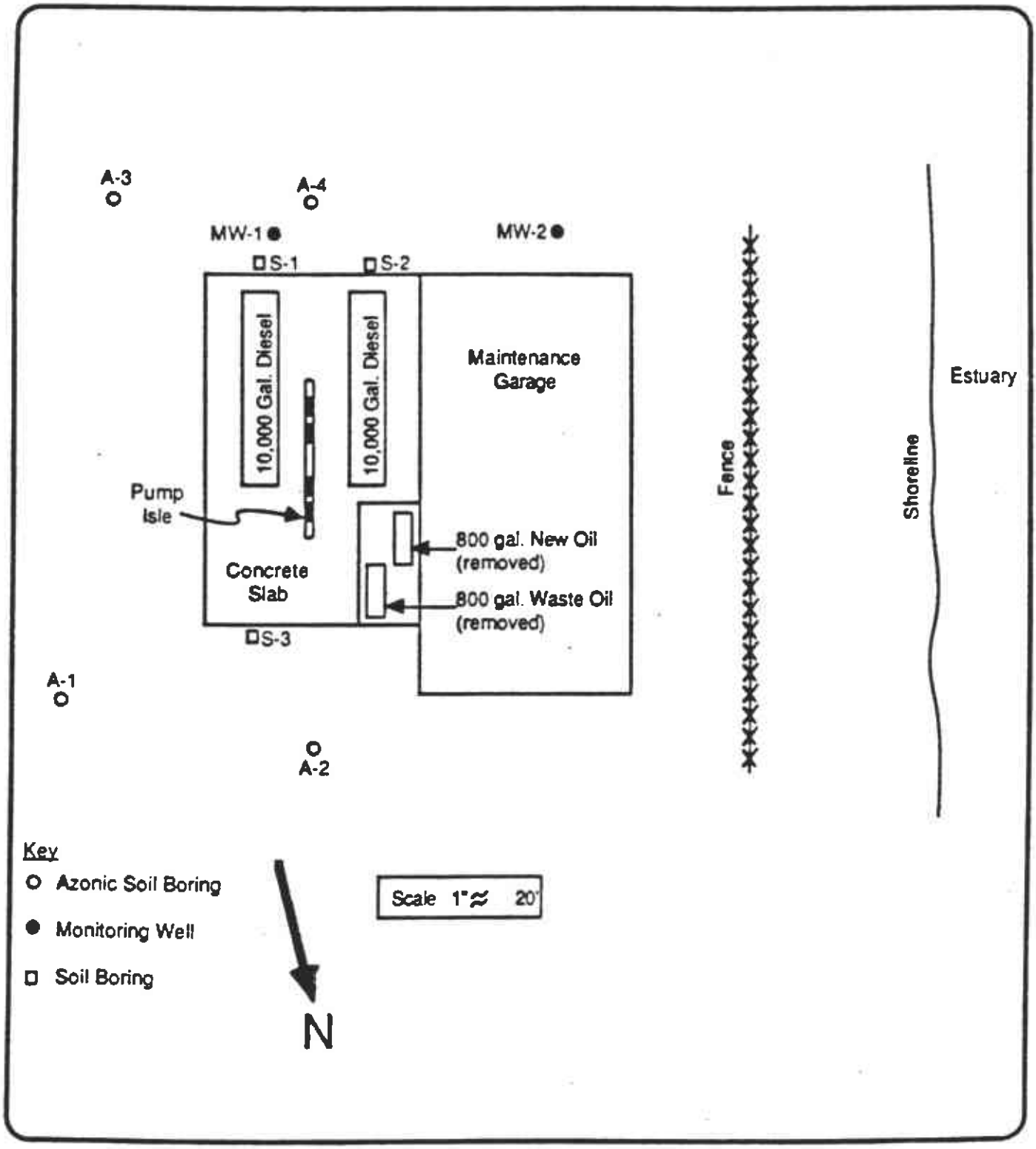

Figure 2. Location of Monitoring Wells and Soil Borings

stem auger with an 11-inch drill head was used to drill the wells. Soil samples were obtained with a steel split barrel sampler containing three brass liners inside of the core barrel. The split barrel was driven into the soils to the desired depth. The brass liners containing the soil samples were then removed from the core barrel and the bottommost liner immediately sealed with a cap. The samples were immediately placed in an ice chest and kept at approximately 4°C until delivered to the laboratory for analysis. All samples were shipped in accordance with chain-of-custody procedures. The split barrel was steam-cleaned between sampling and the auger was steam-cleaned between wells.

The two monitoring wells, MW-1 and MW-2, were drilled to depths of 20 ft and 15 ft, respectively. MW-1 is located approximately 10 ft south of the concrete slab and MW-2 is located approximately mid distance between MW-1 and the estuary (a total distance of approximately 90 ft) as shown in Figure 2. Both wells were constructed of 4 inch PVC casing and screen with the screen extending up to within 4 ft of the ground surface. Details of well construction and soils encountered are presented in the well logs (see Appendix).

The wells were developed immediately following completion on September 12 by bailing six bore volumes from each well. Water level measurements were taken on September 15. The depth to water at both wells was 6.2 ft. The ground surface at this portion of the site is also flat suggesting that there is a minimal hydraulic gradient to the shallow groundwater system. The hydraulic gradient at this location is most likely a reversing gradient in response to tidal changes in the estuary.

Three soil borings (S-1 through S-3 shown in Figure 2) were drilled to depths of approximately 5 ft to evaluate potential for soil contamination in the immediate vicinity of the underground storage tanks. One set of soil samples was taken at the bottom of each of the soil borings. Drilling techniques and sampling methodology were as previously described.

Sampling Results

Soil samples were taken at the 5 ft level in MW-1, 5 and 10 ft depths in MW-2, and at the 5 ft level in the three soil borings, S-2, S-2, and S-3. Soil samples were analyzed for total fuel hydrocarbons (TFH), benzene, toluene and xylene (BTX). The results of the analyses are presented in Table 1. A copy of the laboratory report and chain-of-custody form is included in the Appendix. The highest level of fuel hydrocarbons, 34 mg/Kg, was detected in soil boring S-3. While indicating the presence of hydrocarbons, this level of concentration is still quite low. Fuel hydrocarbons in other soil samples were less than 1 mg/Kg. BTX levels were less than 0.1 mg/Kg in all the soil samples. The highest BTX levels were in the sample from S-3.

Ground water samples were collected at both MW-1 and MW-2. These samples were also analyzed for TFH and BTX. The results of the laboratory analysis are also shown in Table 1. Concentrations in the groundwater at well MW-1 were TFH at 4.5 mg/l, Benzene at 1.6 mg/l and Xylene at 1.0 mg/l. These concentrations are most likely a residual effect from the gasoline piping leak that occurred prior to 3 years ago. Samples from well MW-2 showed detectable levels only for benzene at 0.009 mg/l. TFH at well MW-2 was below detection (<0.05 mg/l).

CONCLUSIONS

- Contamination of soil and shallow groundwater at the site by hydrocarbons appears to be local and contained within the site boundaries.

- The groundwater at MW-1 showed detectable levels of BTX, apparently caused by a gasoline source. This source is most likely the piping leak which was repaired 3 years ago. Since that time, gasoline has been replaced by diesel and thus, a continuous source of gasoline is no longer present.

Table 1

RESULTS OF SOIL AND WATER SAMPLING

Water Samples

Well No.	Sample Date/Time	Sample Depth, ft	Motor Fuel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Xylene (mg/l)	Fuel Type
MW-1	9/15 11:30 am	5-10	4.52	1.59	0.012	1.0	Gasoline
MW-2	9/15 11:45 am	5-10	<0.05	0.009	<0.001	<0.001	Gasoline

Soil Samples

Well No.	Sample Date/Time	Sample Depth, ft	Motor Fuel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Xylene (mg/l)	Fuel Type
MW-1	9/12	4.5-5	<0.05	<0.001	<0.001	<0.001	Gasoline
MW-2	9/12	4.5-5	<0.05	<0.001	<0.001	<0.001	Gasoline
MW-2	9/12	9.5-10	<0.05	<0.001	<0.001	<0.001	Gasoline
S-1	9/12	4.5-10	<0.05	<0.001	<0.001	0.022	Gasoline
S-2	9/12	4.5-5	0.44	<0.001	<0.001	<0.001	Aged Gas
S-3	9/12	4.5-5	34	0.012	0.010	0.056	Aged Gas
	Detection Limit		0.050	0.001	0.001	0.001	Gasoline

Laboratory analytical methods were EPA 5020/8015 for total motor fuel and fuel type and EPA 8020 for benzene, toluene and xylene.

- Levels of hydrocarbon concentrations drop markedly from MW-1 to MW-2. This is most likely the result of attenuation by the clay soil, the short duration of the gasoline piping leak, and the presence of a reversing gradient.

- In order to further substantiate these conclusions, it is recommended that groundwater samples be taken for total fuel hydrocarbon analysis at MW-1 and MW-2 on a biannual basis.

- Levels of hydrocarbon concentrations drop markedly from MW-1 to MW-2. This is most likely the result of attenuation by the clay soil, the short duration of the gasoline piping leak, and the presence of a reversing gradient.

- In order to further substantiate these conclusions, it is recommended that groundwater samples be taken for total fuel hydrocarbon analysis at MW-1 and MW-2 on a biannual basis.

WATER WELL DRILL LOG

WELL NUMBER MW-2 | REF POINT | DATE 9-12-86 11:00am
WELL TYPE Monitoring well | LOCATION ABF Terminal, | NAME P. Castro
DRILL METHOD Hollow Stem Auger | Oakland, CA | PAGE 1 OF 1
WATER LEVEL encountered | while drilling | final 6.2 ft

DEPTH in	LITH. SOIL SAMPLE	LITHOLOGIC DESCRIPTION	OBSERVATIONS
0		Asphalt	
1		Aggregate Base	
2		Dark Gray Sandy Clay (SC) soft, moist	
3		Gray Clayey Gravel (GC) Moist Loose	
4		Dark Gray Clayey Sand (SW)	SPT Sample Blows 3, 11 and 13 Bottom section of 3 piece brass sleeve was used for analysis - sample # MW2-1
5		moist, Dense	
6		↓ clay increases with depth	
7		Dark Gray Sandy Clay (SC) wet, soft	
8		Brown silty clay (CL) wet, soft	
9		Gray Sandy Clay (SC) wet, very soft	SPT Sample Blows 1, 1 and 1 Bottom section of 3 piece brass sleeve was used for analysis - Sample # MW2-2
10			
11		Brown Sandy Clay (SC)	
12		very wet, very soft	
13		Dark Gray Silty clay (CL) very wet, very soft	
14			
15		Terminated at 15 ft	

WELL DESIGN: Cement Grout; 4" Blank PVC Casing; Bentonite; 4" PVC Screen (20 slot); Gravel Pack Monterey #3 Sand

Reviewed 25 Sep BC
CR Comstock
CEG 1010

WATER WELL DRILL LOG

WELL NUMBER MW-1
WELL TYPE Monitoring Well
DRILL METHOD Hollow Stem auger
WATER LEVEL encountered ____ while drilling ____ final 6.2 ft

REF POINT ____
LOCATION ABF Terminal, Oakland, CA

DATE 9-12-86 8:30a
NAME P. Castro
PAGE 1 OF 1

DEPTH in ft	TYPE & SAMPLE	LITHOLOGIC DESCRIPTION	OBSERVATIONS	WELL DESIGN
0		Asphalt		
1		Aggregate Base		Cement Grout
		Brown Silty Sand (SW)		4" Blank PVC Casing
2		Wet, loose		
		Dark Gray Sandy Clay (SC)		Bentonite
3		Moist, Soft		
4			SPT Sample Blows 4, 6 and 7	
5			Bottom section of 3 piece brass sleeve was used for analysis - Sample # MW1-1	
6				
7		Dark Gray Clayey Sand (SC/SM) Wet, Soft		4" PVC Screen (20 slot)
8				
9		More clay with depth		
10		Gray Sandy Clay (SC)		Gravel Pack
11		Wet, Soft		Monterey #3 Sand
12				
13				
14		Dark Gray Sandy Silt (ML)		
15		Very Wet, Very Soft		
16				
17		Gradational Contact		
18		Dark Gray Silty Clay (CH)		
19		Very Wet, Very Soft		
20		Terminated at 20 ft		

Reviewed 25 Sep 86
CR Comstock
CEG 1010

WATER WELL DRILL LOG

3 ing

~~WELL~~ NUMBER SJ | REF. POINT | DATE 9.12.96 1:16 p

WELL TYPE Sample Boring #1 | LOCATION ABF Terminal, | NAME P. Castro

DRILL METHOD Hollow stem Auger | Oakland, CA | PAGE 1 OF 1

WATER LEVEL encountered | while drilling | final

DEPTH in FT	LOG OF SAMPLE	LITHOLOGIC DESCRIPTION	OBSERVATIONS	WELL DESIGN
0		Asphalt (4 inches)		
		Brown Gravelly Sand (SW) Moist, Loose		
		Brown Sand Wet, Loose (SP)		
		Gray Sandy Clay (CL) Wet, Soft		
3				
4			SPT Sample Blows 2, 4 and 6.	
		Gray Clayey Sand (SC) very Soft, wet	Bottom Section of 3 piece brass sleeve was used for analysis - Sample # SJ-1	
5		Terminated at 5.0 ft		

Reviewed 25 Sep 96
CR Comments
CEG 1010

WATER WELL DRILL LOG

Boring

WELL NUMBER S-2 | REF. POINT | DATE 9.12.86 1:11 p

WELL TYPE Sample Boring #2 | LOCATION ARE Terminal | NAME P. Castro

DRILL METHOD Hollow Stem Auger | Oakland CA | PAGE 1 OF 1

WATER LEVEL encountered | while drilling | final

DEPTH in	LITH COL SAMPLE	LITHOLOGIC DESCRIPTION	OBSERVATIONS	WELL DESIGN
0		Asphalt (4 inches)		
1		Aggregate Base		
		Brown Sand (SW) Wet, Loose		
2		Gray Clayey Sand (SC) wet, Loose		
3		Gray Sandy Clay (CL) Wet, Soft		
4			SPT Sample Blows 5, 6 and 8 Bottom Section of 3 piece brass sleeve was used for analysis - Sample # S2-2	
		Gray, Clayey Sand (SC) Wet, Loose		
5		Terminated at 5.0 ft		

Removed 25 Sp BC
CR Contacts
LEG 1010

WATER WELL DRILL LOG

boring
WELL NUMBER S-3 REF. POINT _____ DATE 9.12.86 1:00p

WELL TYPE Sample Boring #3 LOCATION AGF Terminal, NAME P. Castro

DRILL METHOD Hollow Stem Auger Oakland, CA PAGE 1 OF 1

WATER LEVEL encountered _____ while drilling _____ final _____

DEPTH in	LITHOLOGIC DESCRIPTION	OBSERVATIONS	WELL DESIGN
0	Asphalt (4 inches)		
	Aggregate Base		
1	Brown Silty Sand (SM) Wet, Loose		
2	Dark Gray Sandy Clay (SC) Wet, Soft		
3	Dark Gray Sand (SM) Wet Loose Petroleum Odor	SPT Sample Blows 7, 4 and 4 Bottom Section of 3 piece brass sleeve was used for analysis - Sample # S3-1	
4			
5	Terminated at 5.0 ft.		

Reviewed 25 Sep 86
CR Comments
CRG 1010

WESCO Laboratories

Date: September 23, 1986

Client: Groundwater Technology

Submitted by: Eric

Report to: Chuck Constock

WESCO Job #: GWT 8616

Client Job/P.O. #: 20-8154/0586

Date collected: 9-15-86

Date submitted: 9-15-86

& type of sample(s): 2 Water
6 Soil

Lab No.	Client ID	Motor Fuel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Xylene (mg/l)	Fuel Type	
5408	Water Monitor Well #1 - 9/15 @ 11:30	4.52	1.59	0.012	1.0	Gasoline	
5409	Water Monitor Well #2 - 9/15 @ 11:45	< 0.05	0.009	< 0.001	< 0.001	Gasoline	

Lab No.	Client ID	Motor Fuel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Xylene (mg/kg)	Fuel Type	
5410	Soil MW1-1 @ 4-1/2-5 feet	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
5411	Soil MW2-1 @ 4-1/2-5 feet	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
5412	Soil MW2-2 @ 9-1/2-10 feet	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
5413	Soil S1-1 @ 4-1/2-5 feet	< 0.05	< 0.001	< 0.001	0.022	Gasoline	
5414	Soil S2-1 @ 4-1/2-5 feet	< 0.44	< 0.001	< 0.001	< 0.001	Aged Gas	
5415	Soil S3-1 @ 4-1/2-5 feet	34	0.012	0.010	0.058	Aged Gas	
	Detection Limit	0.050	0.001	0.001	0.001	Gasoline	
	METHOD(S): Note 1						

NOTES:

Note 1 - EPA Methods 5020/8015/8020.

Analytical Supervisor

14 Galli Drive Suite A
Novato, California 94947 415 883-6425
A Division of Western Ecological Services Company

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Oil Recovery Systems

PROJ. NO	PROJECT NAME
20-9154	ABF FREIGHT

SAMPLERS: (Signature)

I.D. NO	DATE	TIME	COMP	GRAB	STATION & LOCATION	NO. OF CONTAINERS	ANALYSIS TYPE REQUESTED: BTX THC	REMARKS
MW1	9/12/91	0905		✓	MONITOR WELL #1 @ 4½-5FT	1	✓	
MW2-1	9/12/91	1120		✓	MONITOR WELL #2 @ 4½-5FT	1	✓	
MW2-2	9/12/91	1145		✓	MONITOR WELL #2 @ 9½-10FT	1	✓	
S1-1	9/12/91	1:30		✓	SOIL BORING #1 @ 4½-5FT	1	✓	
S2-1	9/12/91	1:15		✓	SOIL BORING #2 @ 4½-5FT	1	✓	
S3-1	9/12/91	1:00		✓	SOIL BORING #3 @ 4½-5FT	1	✓	

Send To: GROUNDWATER TECHNOLOGY LABORATORY
Division of Oil Recovery Systems
4 Mill Street
Greenville, NH 03048
(603) 878-2500

Groundwater Technology Laboratory

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	9/15/91	1200	[signature] WEED				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:	Date	Time	REMARKS (Shipping Related):	

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Oil Recovery Systems Inc.

PROJ. NO	PROJECT NAME
20-854	ABF FREIGHT

SAMPLERS: (Signature)

I.D. NO.	DATE	TIME	COMP	GRAB	STATION & LOCATION	NO. OF CONTAINERS	ANALYSIS TYPE REQUESTED: EPA 602 (BTX + THC)	REMARKS
MW1	9/15/86	11:30		✓	MONITOR WELL #1	3	✓	No Preservative
MW2	9/15/86	11:45		✓	MONITOR WELL #2	3	✓	

Send To: GROUNDWATER TECHNOLOGY LABORATORY
Division of Oil Recovery Systems
4 Mill Street
Greenville, NH 03048
(603) 878-2500

Groundwater Technology Laboratory

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	9/15/86	12:00	[signature] UTXO				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:	Date	Time	REMARKS (Shipping Related):	