**UNDERGROUND TANK REMOVAL AND
GROUNDWATER INVESTIGATION
4055 HUBBARD STREET
OAKLAND, CALIFORNIA
SCI 609.001**

Prepared for:

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I INTRODUCTION

This report presents the results of environmental engineering services performed by Subsurface Consultants, Inc. (SCI) during underground tank removal and groundwater monitoring at 4055 Hubbard Street in Oakland, California. SCI was retained by Buttner Properties, the property owner, to 1) observe tank removal, 2) obtain samples as required by the Alameda County Health Care Services Agency (ACHCSA), 3) observe backfill placement and compaction, and 4) determine impacts to groundwater.

II TANK, PIPING, AND PUMP ISLAND REMOVAL

A. Tank 1

Cottle Engineering (CE) was retained by the property owner to perform tank removal activities in 1990. As shown on the Site Plan Plate 1, the tank area was situated along the west side of the 4055 Hubbard Street property. One diesel tank (Tank 1) was known to exist in this area.

The pump island was configured for two dispensers, however only one dispenser was present in 1990. The dispenser was connected to Tank 1. At the location for the second dispenser, only capped pipes were visible.

In July 1990, CE removed the diesel tank. Initially, approximately 200 gallons of residual product were removed from the tank. CE exposed the top of the tank and purged the tank of vapors

by adding dry ice. Mr. Dennis Byrne, a Hazardous Materials Specialist with the Alameda County Health Care Service Agency (ACHCSA), and Ms. Cathleen Myers, of the City of Oakland Fire Department (OFD) were on-site to observe tank removal activities. The tank and associated piping were transported from the site under manifest.

B. **Tank 2**

Due to the presence of a pipeline which was not connected to Tank 1, the contractor was directed to expose the pipeline. The pipeline was not connected to the dispenser, however, it was connected to a second tank situated south of the Tank 1 excavation as shown on Plate 1.

The second tank was removed from the site by CE, using the same protocol as outlined for Tank 1. Prior to tank removal, the tank contents were visually checked and it appeared that the tank contained water.

C. **Conditions Observed During Tank Removal**

No visible deterioration of the tanks nor pipelines was observed. However, soil above the tanks, around the fill inlets beneath the dispenser island, and at several pipeline joints was discolored (greenish gray) and possessed petroleum odors. In addition, the upper 2 to 3 feet of soil exposed in the excavation sidewalls was oil stained. Soil below the oil stained layer and at depth in the excavation did not appears discolored. Groundwater was observed in the excavation at a depth of 5 feet. A slight sheen was observed on the groundwater surface.

D. Excavation Backfilling

Soils generated during tank removal were stockpiled adjacent to the excavation area. Since the excavation was situated adjacent to the right-of-way, the excavation was temporarily backfilled with the excavated soil. Additional imported soil was brought to the site to bring the excavation up to grade.

E. Environmental Sampling and Analysis

Soil and groundwater samples were obtained following tank removal as directed by Mr. Byrne of the ACHCSA. A discussion of sampling procedures is presented in Appendix A. Soil and water samples were refrigerated until delivery to Curtis & Tompkins, Ltd., an analytical laboratory certified by the State of California Department of Health Services, for waste and water testing.

Nine soil samples were obtained from the sidewalls and bottom of the tank area excavation. One additional soil sample was obtained from about 8 inches below the dispenser island. Sample locations are shown on Plate 1. In addition, 2 groundwater samples were obtained from the tank pits. The samples were analyzed for the following:

1. Total extractable hydrocarbons (EPA 3550/8015 mod.),
2. Total oil and grease (SMWW 17:5520EF), and
3. Benzene, toluene, xylene, and ethylbenzene (EPA 5030/8020).

Additionally, four samples obtained from the excavated contaminated soil were composited into one sample and analyzed for the following:

1. Volatile Organics (EPA 5030/8240),
2. Semivolatile organics, including pesticides and PCBs (EPA 3550/8270), and
3. Title 26 Metals (EPA 600 and 7000 series).

The results of the analyses are summarized in Tables 1, 2 and 3. Test reports and Chain-of-Custody documents are presented in Appendix B.

II SUPPLEMENTAL EXCAVATION

A. General

In November 1992, Bay Area Tank and Marine (BATM) was retained by the property owner to remove the contaminated soils from the previous tank excavation, and 2) overexcavate soil within the dispenser area to remove contaminated materials within practical limits. The extent of the final excavations are shown on the Site Plan. The excavated soil was encapsulated in plastic and left on-site and the excavation was backfilled with imported material.

During excavation activities, soils which were sloughing off the east wall of the excavation caused a PVC water line to break. The line was repaired and the water which had filled the excavation

was removed by H & H Environmental Services and recycled at their China Basin treatment facility.

B. **Sampling and Analytical Testing**

Soil samples were obtained as directed by Ms. Susan Hugo of the ACHCSA. Six (6) soil samples were obtained from the excavation sidewalls and five (5) samples were obtained from the dispenser trench (4 sidewalls samples; 1 bottom sample). Sample locations are presented on Plate 1. The samples were analyzed for the following:

1. Total extractable hydrocarbons (EPA 3550/8015 mod.),
2. Total oil and grease (SMWW 17:5520EF),
3. Benzene, toluene, xylene, and ethylbenzene (EPA 5030/8020),
4. Total volatile hydrocarbons (EPA 5030/8015 mod.), and
5. Total lead (EPA 7420).

Eight (8) soil samples were obtained from the contaminated soil stockpile and combined to form two (2) composite samples. The composite samples were analyzed for the following:

1. Total extractable hydrocarbons (EPA 3550/8015 mod.),
2. Total oil and grease (SMWW 17:5520EF),
3. Total volatile hydrocarbons (EPA 5030/8015 mod.),
4. Benzene, toluene, xylene, and ethylbenzene (EPA 5030/8020),
5. Reactivity, corrosivity, and ignitability (RCI),

6. Volatile organics (EPA 8240),

7. Soluble lead (EPA 7420), and

8. Soluble Title 26 metals.

One (1) water sample was obtained from the tank excavation and one (1) from the dispenser excavation. The water samples were analyzed for the following:

1. Total extractable hydrocarbons (EPA 3550/8015 mod.),

2. Total oil and grease (SMWW 17:5520EF),

3. Total volatile hydrocarbons (EPA 5030/8015 mod.),

4. Benzene, toluene, xylene, and ethylbenzene (EPA 5030/8020), and

5. Dissolved lead (EPA 7421).

Test results are summarized in Tables 1, 2 and 3. Test reports and Chain-of-Custody documents are presented in Appendix B.

C. Excavation Backfilling

The excavation was backfilled with clean import material. The material was placed in thin lifts (8 inch loose thickness) and compacted with a backhoe equipped with a vibrating head. During fill placement, the relative compaction was periodically checked.

III GROUNDWATER INVESTIGATION

A. Well Installation

Three monitoring wells were installed to assess groundwater quality in the tank area. Given the close proximity of the tank area to Halleck Street, the downgradient wells, 1 and 3 were located in the parking strip along the west side of the street. The upgradient well, 2, was located on-site. The well locations are shown on Plate 1. The logs of the borings and well completion details are presented on Plates 3 through 5. A detailed discussion of field procedures is presented in Appendix A.

A level survey was performed to determine the top of casing elevation (TOC) for the wells. The elevation reference used was the top of the curb, located at the northwest corner of Beach and Halleck Streets with a known elevation of 4.22 feet as indicated by a map provided by the City of Oakland. The benchmark referenced is shown on the Site Plan.

B. Analytical Testing

Select soil and groundwater samples were transmitted to Curtis & Tompkins, Ltd. for analytical testing. The sampling program included the following:

1. Total extractable hydrocarbons (EPA 3550/8015 mod.),
2. Total oil and grease (SMWW 17:5520EF),
3. Total volatile hydrocarbons (EPA 5030/8015 mod.), and
4. Benzene, toluene, xylene and ethylbenzene (EPA 5030/8020).

The test results are summarized in Tables 4 and 5. Test reports and Chain-of-Custody documents are presented in Appendix B.

C. Subsurface Conditions

Based on conditions exposed during tank removal and in the test borings, it appears that the site is overlain by about 2 to 4 feet of fill. The fill consists of about 1 foot of loose gravel underlain by clay intermixed with sand and gravel. In the tank vicinity, the fill was oily and darkly stained. The fill is underlain by native alluvial soils consisting predominately of silty clays.

Groundwater is situated about 3 to 4 feet below the groundsurface. The flow direction is towards the southwest at a gradient of about 1.4 percent. Groundwater flow direction and contours are presented on Plate 2.

IV DISCUSSION AND CONCLUSIONS

A. Soil Contamination

Upon removal of the tanks and dispenser, petroleum hydrocarbon contaminated soil was observed. The contaminants of concern include total extractable and volatile hydrocarbons, total oil and grease, BTEX and a variety of heavy metals. Excavation activities have successfully removed significantly contaminated soils in the dispenser and tank areas. However, elevated concentrations still remain at the excavation limits at depths up to about 5 feet.

Given that the contaminant concentrations appear to decrease with depth, we judge that the contamination left in-place is predominately related with the shallow fill layer. The contamination sources is likely past site usage related to a previous railroad spur in the area.

B. **Groundwater Contamination**

Concentrations of volatile and extractable range hydrocarbons have been detected in the wells during both sampling events performed to date. Oil and grease and BTEX have not been detected in any of the wells.

The hydrocarbon concentrations appear to be relatively similar in each well. As a result, we judge the contamination is more indicative of a regional problem and not primarily the result of past tank releases.

C. **Recommendations**

Soil remediation performed to date has removed up to 150 cubic yards of effected soil. Excavations were extended up to the practical limits given the presence of a City Street right-of-way and numerous subsurface utilities. The contaminated soil which remains in place appears to be associated with the fill present at the site. Based on our studies to date it does not appear that the contaminated fill nor previous tank releases have significantly impacted groundwater quality.

Remediation of the contaminated fill by its physical removal would require removal of some roadway and site improvements, and utilities, resulting in the disruption of traffic and water service

in the area. Due to 1) the distribution of contaminants and 2) the minimal impact on groundwater quality, we believe that the most appropriate response will be to leave the contaminated soil in place and continue groundwater monitoring. The next monitoring event is scheduled for December 1993. We recommend that the wells be analyzed for the contaminants of concern including total volatile and extractable hydrocarbons, total oil and grease, and BTEX.

The 150 cubic yards of contaminated soil was stockpiled on-site and covered with plastic sheeting. Based on the analytical test results, it appears that the material could be disposed of at a Class II landfill directly, or it could be bioremediated on-site to reduce hydrocarbon concentrations and then disposed of at a Class III landfill. Remediation contractor bids are still being accepted and evaluated. Once a contractor is selected, their plan will be implemented. The details of remediation will be presented in a separate letter report.

V LIMITATIONS

This assessment was intended to provide a preliminary means of evaluating the risk of the property containing significant soil and groundwater contamination near the previous tanks. Contamination may exist in other areas not investigated by SCI.

The conclusions drawn from this assessment are an expression of our professional opinion, and do not constitute a warranty or guaranty, either expressed or implied. Additional investigative work, if undertaken, may modify the conclusions presented herein, as additional information is generated.

SCI has performed this assessment in accordance with generally accepted standards of care which exist in northern California at the time of this study. Please recognize that the definition and evaluation of environmental conditions is difficult and inexact. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and/or historic conditions applicable to the site. In addition, the conclusions made herein reflect site conditions at the time of the investigation. These conditions may change with time and as such the conclusion may also change.

The conclusions and opinions presented herein may also be affected by rapid changes in the field of environmental engineering and the laws governing hazardous waste. The reader is advised to consult with SCI prior to relying upon the information provided.

List of Attached Tables:

Table 1	Contaminant Concentrations in Soil
Table 2	Contaminant Concentrations in Water Soil
Table 3	Contaminant Concentrations in Stockpiled Soil
Table 4	Groundwater Elevation Data

List of Attached Plates:

Plate 1	Site Plan
Plate 2	Groundwater Data
Plates 3 through 5	Log of Test Borings
Plate 6	Unified Soil Classification System

Appendices:

Appendix A	Investigation Protocol
Appendix B	Laboratory Test Reports Chain-of-Custody Documents

Distribution:

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Table 1.
CONTAMINANT CONCENTRATIONS IN SOIL

Sample Designation	TVH (mg/kg)	TEH (mg/kg)	TOG (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Ethylbenzene (ug/kg)	Lead (mg/kg)
1990 Excavation								
1 @ 5'	ND	<10	<50	<5	<5	<5	<5	-
2 @ 5'	ND	<10	<50	<5	<5	23	<5	-
3 @ 10'	ND	24	<50	16	34	34	14	-
4 @ 3'	ND	<10	<50	<5	7.0	14	<5	-
5 @ 5'	ND	<10	<50	<5	<5	<5	<5	-
6 @ 10'	ND	27	<50	<5	<5	<5	<5	-
7 @ 5'	ND	<10	<50	<5	<5	<5	<5	-
8 @ 5'	ND	<10	<50	<5	<5	<5	<5	-
9 @ 5'	ND	<10	<50	<5	<5	<5	<5	-
Dispenser	ND	10,000	7,800	47	150	220	60	-
1992 Excavation								
10 @ 6'	<1	3	<50	<5	<5	<5	<5	3
11 @ 5'	<1	<1	<50	<5	<5	<5	<5	3
12 @ 4'	<1	3	<50	<5	<5	<5	<5	4
13 @ 4'	<1	5	<50	<5	<5	<5	<5	5
14 @ 3'	<1	220	190	<5	<5	<5	<5	120
15 @ 3'	<1	1,100	690	<5	<5	34	15	72
16 @ 3'	97	1,700	420	<5	27	45	99	9
17 @ 3'	44	490	190	<5	20	170	76	20
18 @ 5'	27	450	310	<5	<5	35	62	5
19 @ 5'	<1	4	<50	<5	<5	<5	<5	4
20 @ 7'	<1	3	<50	<5	<5	<5	<5	3
1993 Groundwater Investigation								
MW-1 @ 3.5'	<1	<1	<50	<5	<5	<5	<5	-
MW-2 @ 3.0'	<1	9	<50	<5	<5	<5	<5	-
MW-3 @ 2.5'	<1	10	<50	<5	<5	<5	<5	-

TEH = Total Volatile Hydrocarbons

TEH = Total Extractable Hydrocarbons

TOG = Total Oil and Grease

mg/kg = milligrams per kilogram = parts per million

ug/kg = micrograms per kilogram = parts per billion

<1 = chemical not present at a concentration greater than the detection limit stabled

- = analysis not performed

Table 2.

CONTAMINANT CONCENTRATIONS IN WATER

Sample Designation	Date	TVH (ug/l)	TEH Diesel (ug/l)	TOG (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (ug/l)	Ethylbenzene (ug/l)	Lead (ug/l)
Excavation Water									
Tank 1 Excavation	7/23/90	<500	**250,000**	<20	**3.1**	<1	<1	<1	-
Tank 2 Excavation	7/23/90	<500	**490,000**	<20	**4.0**	<1	<1	<1	-
Tank Excavation	11/25/92	**440**	**15,000**	**230**	**2.0**	**0.7**	**2.1**	<0.5	<3
Dispenser Pit	11/25/92	1700	**15,000**	**25**	<0.5	**0.9**	**8.2**	**2**	**6**
Monitoring Well Water									
MW-1	6/2/93	**160**	<50	<5	<0.5	<0.5	<0.5	<0.5	-
	9/15/93	**120**	<50	<5	<0.5	<0.5	<0.5	<0.5	-
MW-2	6/2/93	**210**	**150**	<5*	<0.5	<0.5	<0.5	<0.5	-
	9/15/93	**150**	**50**	<5	<0.5	<0.5	<0.5	<0.5	-
MW-3	6/2/93	**280**	**170**	<5	<0.5	<0.5	<0.5	<0.5	-
	9/15/93	**180**	<50	<5	<0.5	<0.5	<0.5	<0.5	-

TVH = Total Volatile Hydrocarbons

TEH = Total Extractable Hydrocarbons

TOG = Total Oil and Grease

mg/l = milligrams per liter = perts per million

ug/l = micrograms per liter = parts per billion

<0.5 = chemical not present at a concentration greater than the detection limit stated

Table 3.
CONTAMINANT CONCENTRATIONS IN STOCKPILED SOIL

Sample Designation	Gasoline (mg/kg)	Diesel (mg/kg)	TOG (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Total Xylenes (ug/kg)	Ethyl-Benzene (ug/kg)	EPA 8240 Compounds	2-Methyl-Napthalene (ug/kg)	Phenanthrene (ug/kg)	Other EPA 8270 Compounds (ug/kg)
1990 Investigation											
SP-1, 3, 5, 7	-	820	490	<5	<5	40	<5	ND	1,400	590	ND
1992 Investigation											
SP-A, B, C, D	11	930	800	-	-	-	-	ND	-	-	-
SP-E, F, G, H	2	500	640	<5	<5	<5	<5	-	-	-	-

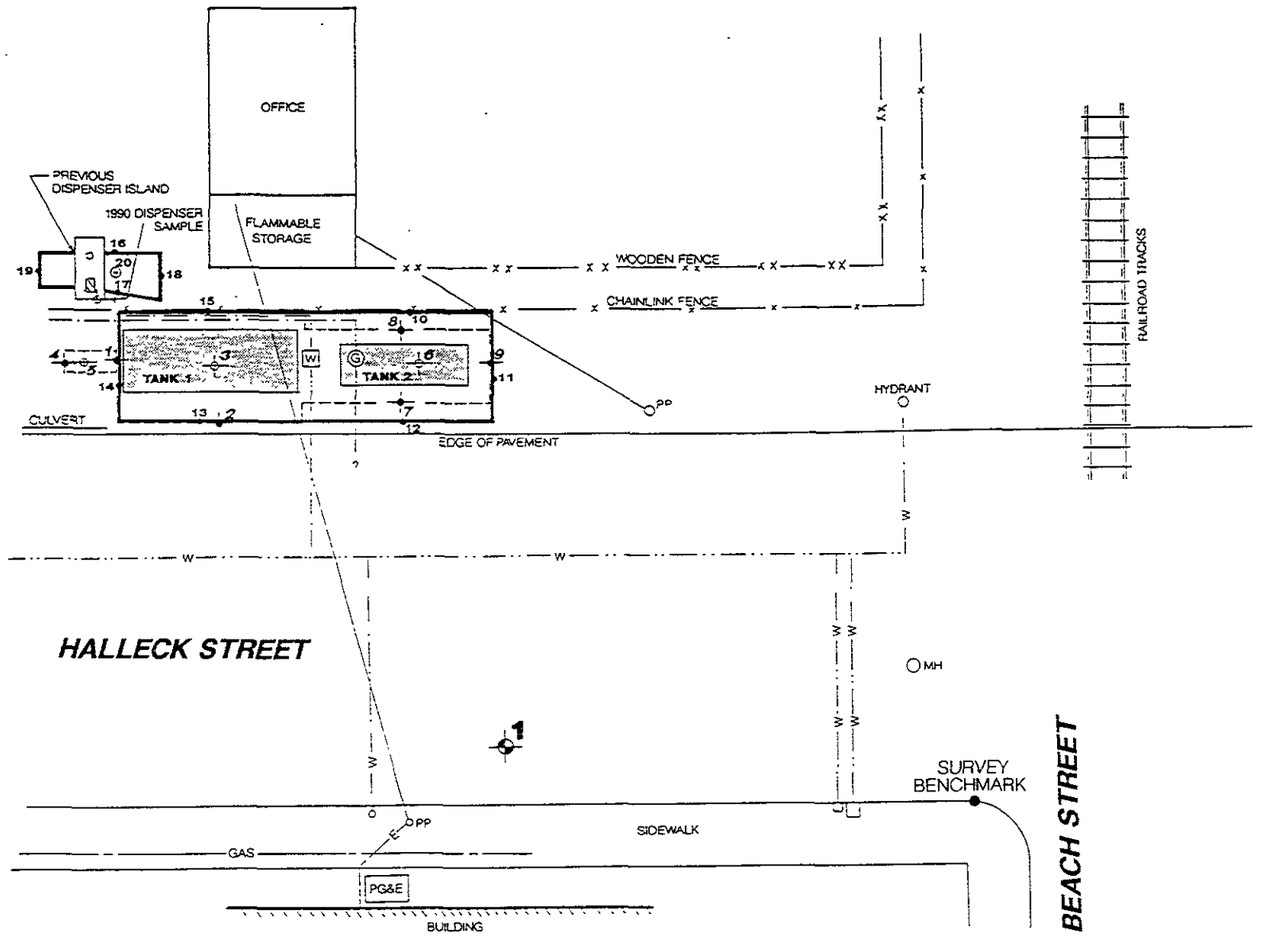
	Total Metal Concentrations SP-1, 3, 5, 7 (mg/kg)	Soluble Metal Concentrations SP-A, B, C, D (ug/l)
Antimony	<5	400
Arsenic	6.2	2,000
Barium	95	5,800
Beryllium	<0.5	20
Cadmium	3.8	<30
Chromium (total)	40	1,400
Cobalt	11	420
Copper	130	<50
Lead	67	1,000
Mercury	<0.1	<0.1
Molybdenum	<0.5	<70
Nickel	37	1,800
Selenium	<2.5	<30
Silver	<1	<50
Thallium	<5	<3,000
Vanadium	26	1,100
Zinc	200	12,000

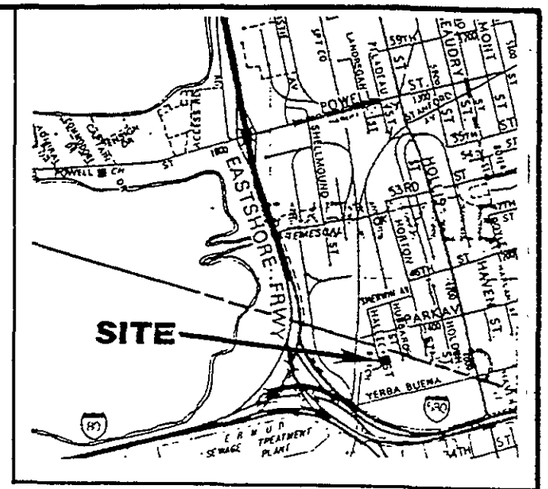
Table 4.
GROUNDWATER ELEVATION DATA

Well Number	TOC Elevation (feet)	Date	Groundwater Depth (feet)	Groundwater Elevation (feet)
MW-1	3.64	6/1/93 9/15/93	3.63 4.47	0.01 -0.83
MW-2	4.95	6/1/93 9/15/93	3.65 4.90	1.30 0.05
MW-3	3.61	6/1/93 9/15/93	3.29 4.32	0.32 -0.71

TOC = Top of casing

Reference elevation is the top of curb located at the northwest corner of Halleck and Beach Streets.





VICINITY MAP

- 1990 SIDEWALL SAMPLE
- 1990 BOTTOM SAMPLE
- PREVIOUS TANK
- LIMIT OF 1990 EXCAVATION
- W WATER VALVE
- G GAS VALVE
- G GAS LINE
- W WATER LINE
- MH MANHOLE
- PP POWER POLE
- 1992 SIDEWALL SAMPLE
- 1992 BOTTOM SAMPLE
- PREVIOUS DISPENSER
- LIMIT OF 1992 EXCAVATION
- WELL LOCATION
- GROUNDWATER ELEVATION CONTOURS (feet)

APPROXIMATE SCALE (feet)
0 15 30

SITE PLAN

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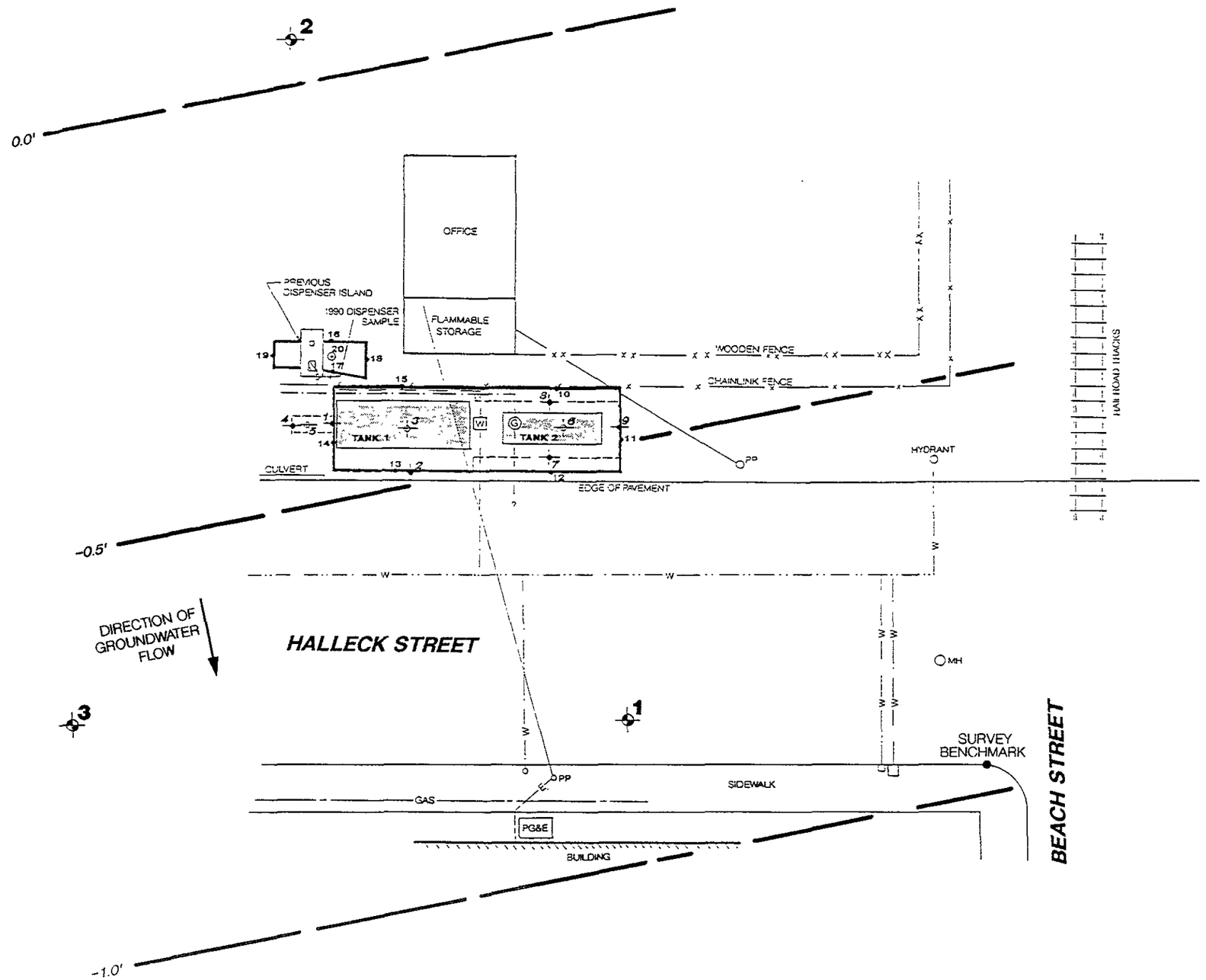
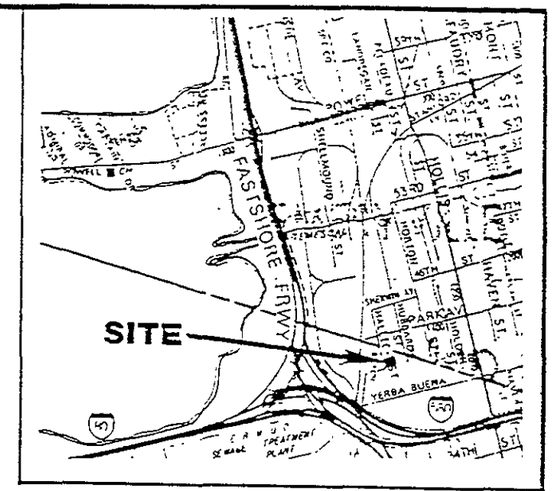
4055 HUBBARD STREET - OAKLAND CA

JOB NUMBER	DATE	APPROVED
609.001	6/7/93	—

PLATE 1





VICINITY MAP

- 1990 SIDEWALL SAMPLE
- 1990 BOTTOM SAMPLE
- PREVIOUS TANK
- LIMIT OF 1990 EXCAVATION
- W — WATER VALVE
- G — GAS VALVE
- G — GAS LINE
- W — WATER LINE
- MH — MANHOLE
- PP — POWER POLE
- 1992 SIDEWALL SAMPLE
- 1992 BOTTOM SAMPLE
- PREVIOUS DISPENSER
- LIMIT OF 1992 EXCAVATION
- WELL LOCATION
- GROUNDWATER ELEVATION CONTOURS (feet)

APPROXIMATE SCALE (feet)
0 15 30

GROUNDWATER DATA SEPTEMBER 1993

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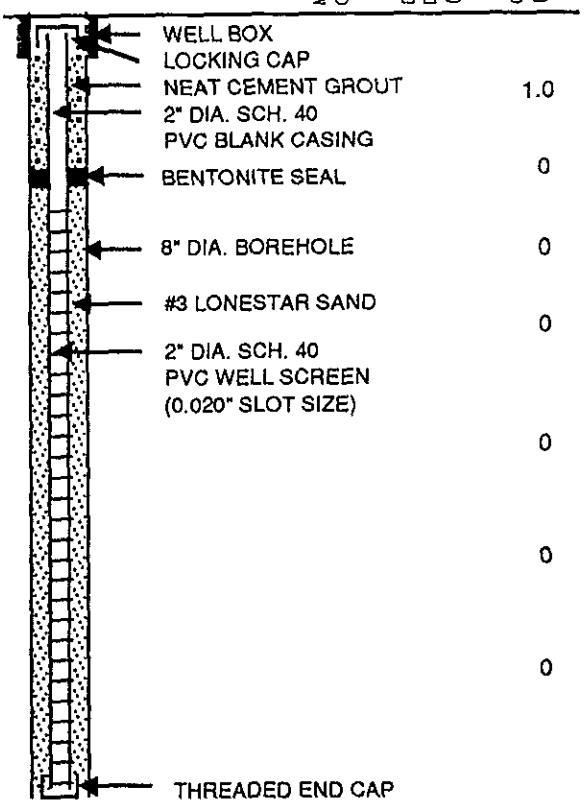
JOB NUMBER	DATE	APPROVED
609.001	6/7/93	

PLATE 2

LOG OF TEST BORING 1

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 5/27/93
TOC ELEVATION 3.64 feet *



MOISTURE CONTENT %	DRY DENSITY (PCF)	OVM (ppm)	DEPTH (feet)	SAMPLE	BLOWS PER FOOT	
		1.0	0			ASPHALTIC CONCRETE - 6" thick
					14	BLACK SILTY CLAY (CL) medium stiff, moist
		0			20	GROUNDWATER LEVEL DURING DRILLING
			5			LIGHT GRAY SILTY CLAY (CL) medium stiff, moist, with some sand
		0			13	
		0			13	LIGHT BROWN SILTY SANDY CLAY (CL) stiff, moist, with some small rounded rocks
			10			
		0			30	
		0			19	
			15			increase in silt and sand content
		0			12	
			20			increase in clay content
		0			22	
			25			
			30			
			35			
			40			

SAMPLER TYPE:
CALIFORNIA DRIVE
O.D.: 2.5 inches
I.D.: 2.0 inches

HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

* ELEVATON REFERENCE: TOP OF CURB AT NORTH WEST CORNER OF INTERSECTION OF HALLECK AND BEACH STREETS.

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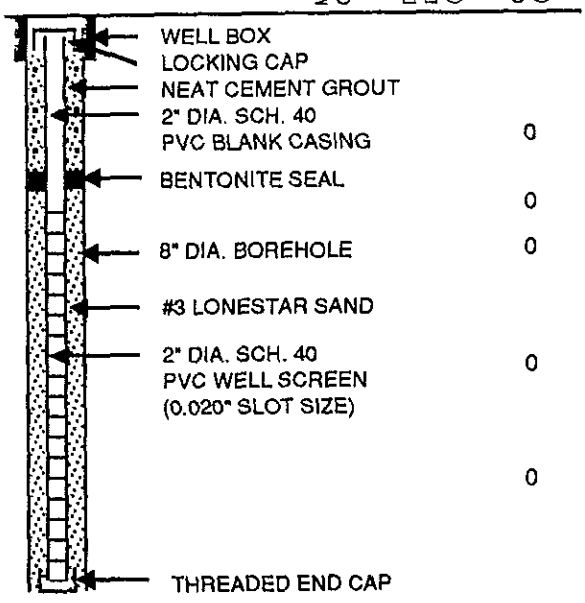
4055 HUBBARD STREET - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
609.001	6/9/93	

PLATE 3

LOG OF TEST BORING 2

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 5/28/93
TOC ELEVATION 4.95 feet



MOISTURE CONTENT %	DRY DENSITY (PCF)	OVM (ppm)	DEPTH (feet)	SAMPLE	BLOWS PER FOOT	
			0			MOTTLED SILTY GRAVEL (GC) loose, dry, with broken asphalt concrete fragments (fill)
		0			15	GRAY SILTY CLAY (CL) medium stiff, moist, with some sand (fill)
		0	5		15	GROUNDWATER LEVEL DURING DRILLING
		0			16	BLACK SILTY CLAY (CL) medium stiff, moist
		0	10		16	LIGHT GRAY SILTY CLAY (CL) medium stiff, moist
		0			20	LIGHT BROWN SILTY SANDY CLAY (CL) medium stiff, moist, with some small rock fragments
		0	15		17	
			20			
			25			
			30			
			35			
			40			

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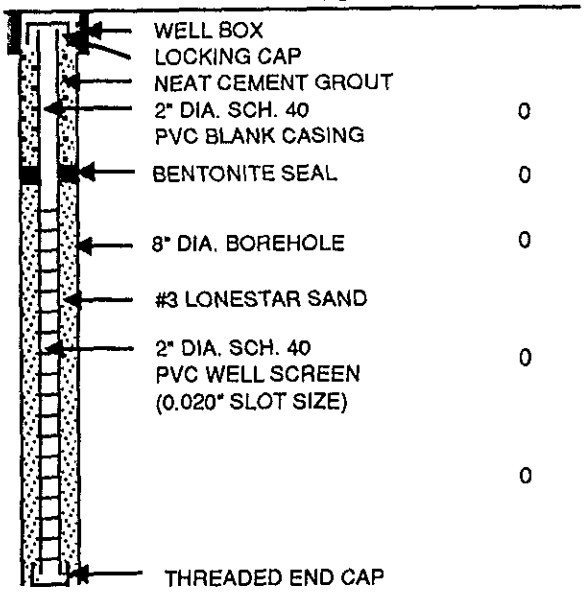
PLATE 4

LOG OF TEST BORING 3

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 5/28/93
TOC ELEVATION 3.61 feet



MOISTURE CONTENT %	DRY DENSITY (PCF)	OVM (ppm)	DEPTH (feet)	SAMPLE	BLOWS PER FOOT	
			0			ASPHALTIC CONCRETE - 8" thick
						BLACK SILTY CLAY (CL)
						medium stiff, moist
		0			13	
		0	5		11	
		0			9	MOTTLED GRAY SILTY CLAY (CL)
						medium stiff, moist
		0			12	GROUNDWATER LEVEL DURING DRILLING
			10			
		0			19	color change to light brown at 11.5 feet
			15			
		0			20	
			20			
			25			
			30			
			35			
			40			

Subsurface Consultants

4055 HUBBARD STREET - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
609.001	6/9/93	

PLATE 5

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 seive	GRAVEL More than half coarse fraction is larger than No. 4 seive size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
			GP	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 seive size	Clean Sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 seive	SILT AND CLAY Liquid Limit Less than 50%		ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity
			CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay
			OL	Organic Clay and Organic Silty Clay of Low Plasticity
	SILT AND CLAY Liquid Limit Greater than 50%		MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt
			CH	Inorganic Clay of High Plasticity, Fat Clay
			OH	Organic Clay of Medium to High Plasticity, Organic Silt
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

4055 HUBBARD STREET - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
609.001	6/9/93	

PLATE 6

APPENDIX A

INVESTIGATION PROTOCOL

A. Excavation Sampling

Soil samples from the sidewalls and bottom of the excavation were obtained using a backhoe bucket. Once the bucket was brought to rest at the groundsurface, approximately 3 inches of soil was scraped away and a clean 2-inch-diameter brass liner was driven into the material with a mallet. The liner was withdrawn and Teflon sheeting was placed over the liner ends. The ends were then capped and sealed with duct tape. The samples were refrigerated on-site and remained refrigerated until delivery to the analytical laboratory.

Groundwater and perched water which filled the excavations was sampled using new disposable bailers. The samples were retained in glass containers supplied by the laboratory. The samples were refrigerated on-site and remained refrigerated until delivery to the analytical laboratory.

B. Test Borings

Prior to drilling, a drilling permit was obtained from the Alameda County Flood Control and Water Conservation District, Zone 7 and an encroachment permit was obtained from the City of Oakland. Additionally, Underground Service Alert was notified in order to clear the drilling locations for underground utilities. Test borings were drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. Our field engineer observed drilling operations, prepared detailed logs of conditions

encountered and obtained samples of representative materials. Test boring logs are presented on Plates 3 through 5. Soils have been field classified in accordance with the Unified Soil Classification System, as presented on Plate 6.

A California Drive Sampler (outside diameter of 2.5 inches, inside diameter of 2.0 inches) was used to obtain soil samples. The number of blows required to drive the sampler the final 12 inches of each 18-inch penetration was recorded. Drilling and sampling equipment was steam-cleaned prior to each use to reduce the likelihood of cross-contamination between samples and/or borings. Steam cleaning water was collected and stored on-site in 55-gallon drums for later disposal by others.

Soil samples were retained in 2.0-inch-diameter brass liners. Teflon sheeting was placed over the ends of the soil liners prior to capping and sealing with duct tape. The sealed liners were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-custody records accompanied the samples to the laboratory.

The shoe sample from each drive was retained in a plastic bag and screened for volatile organics using an Organic Vapor Meter (OVM). OVM readings are recorded on the Boring Logs.

The test borings were completed as groundwater monitoring wells, as detailed in the following section. Soil cuttings generated during drilling were added to the existing soil stockpile.

C. Groundwater Monitoring Wells

At the completion of drilling, a monitoring well was installed in each of the test borings. Well details are shown on the test boring logs. In general, the wells consist of 2-inch diameter, Schedule 40 PVC pipe having flush-threaded joints. All pipe was steam-cleaned prior to being placed in the boreholes.

The lower 10 to 15 feet of the wells consist of machine-slotted well screen having 0.02-inch slots. The remaining portion of the wells consist of blank pipe. The wells were provided with a threaded bottom cap and locking top cap. The well screen was encased in a filter composed of Lonestar No. 3 washed sand. The filter sand was placed by carefully pouring it through the annulus between the hollow stem of the auger and the well casing. Periodically, the augers were raised to allow the sand to fill the annulus between the casing and the borehole. The filter extends from just below the bottom of the well to one-half foot above the top of the screened section. A one-half foot thick bentonite pellet seal was placed above the sand filter. The annulus above the seal was backfilled with cement grout. The grout mixture consisted of portland cement mixed with clean water. Each monitoring well was completed below grade and protected by a traffic-rated valve box.

The wells were developed 4 days after installation in order to allow the grout seal to set. Initially, the depth to water was measured below the top of the well casing using an electric sounder. The well was also checked for free floating product. The wells were then developed by removing water with a new disposable

bailer until the measurements of pH, temperature and conductivity had stabilized. When the wells had recharged to within 80 percent of their initial level they were sampled with a new disposable bailer. Well development water was stored in 55 gallon drums and left on-site.

Groundwater samples were retained in glass containers pre-cleaned by the laboratory. Container types were as specified by the laboratory for the analysis requested. Water samples were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-custody records accompanied the samples to the laboratory, copies of which are presented in Appendix B.

1990 TANK REMOVAL

ANALYTICAL TEST RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 07/23/90
DATE REPORTED: 08/07/90

LAB NUMBER: 101151

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 10 SOIL SAMPLES
1 SOIL COMPOSITE
2 WATER SAMPLES

PROJECT #: 609.001
LOCATION: HUBBARD TANK

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins Ltd

LAB NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
PROJECT # : 609.001
LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE ANALYZED: 07/27/90
DATE REPORTED: 08/07/90

ANALYSIS: HYDROCARBON OIL AND GREASE
METHOD: SMWW 17:5520F (503E)

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
101151-1	6 @ 10	ND	mg/Kg	50
101151-2	7 @ 5	ND	mg/Kg	50
101151-3	8 @ 5	ND	mg/Kg	50
101151-4	9 @ 5	ND	mg/Kg	50
101151-5	DISPENSER	7,800	mg/Kg	50
101151-12	1 @ 5	ND	mg/Kg	50
101151-13	2 @ 5	ND	mg/Kg	50
101151-14	3 @ 10	ND	mg/Kg	50
101151-15	4 @ 3	ND	mg/Kg	50
101151-16	5 @ 5	ND	mg/Kg	50
101151-17	SP1,3,5,7	490	mg/Kg	50

ND = Not detected at or above reporting limit

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	87

Curtis & Tompkins Ltd

LAB NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
PROJECT # : 609.001
LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE ANALYZED: 08/02/90
DATE REPORTED: 08/07/90

ANALYSIS: HYDROCARBON OIL AND GREASE
METHOD: SMWW 17:5520F (503E)

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
101151-6	DIESEL EXCAVATION WATER	ND	mg/L	20
101151-7	GAS EXCAVATION WATER	ND	mg/L	20

ND = Not detected at or above reporting limit

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	85

Curtis & Tompkins Ltd

LABORATORY NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
JOB #: 609.001
LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE EXTRACTED: 07/24/90
DATE ANALYZED: 07/26/90
DATE REPORTED: 08/07/90

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	GASOLINE RANGE (mg/Kg)	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT (mg/Kg)
101151-1	6 @ 10	ND	ND	27	10
101151-2	7 @ 5	ND	ND	ND	10
101151-3	8 @ 5	ND	ND	ND	10
101151-4	9 @ 5	ND	ND	ND	10
101151-5	DISPENSER	ND	ND	10,000	100
101151-12	1 @ 5	ND	ND	ND	10
101151-13	2 @ 5	ND	ND	ND	10
101151-14	3 @ 10	ND	ND	24	10
101151-15	4 @ 3	ND	ND	ND	10
101151-16	5 @ 5	ND	ND	ND	10
101151-17	SP1,3,5,7	ND	ND	820	10

ND = Not Detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	87

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
JOB #: 609.001
LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE EXTRACTED: 07/25/90
DATE ANALYZED: 07/26/90
DATE REPORTED: 08/07/90

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	GASOLINE RANGE (mg/L)	KEROSENE RANGE (mg/L)	DIESEL RANGE (mg/L)	REPORTING LIMIT (mg/L)
101151-6	DIESEL EXCAVATION WATER	ND	ND	250	5.0
101151-7	GAS EXCAVATION WATER	ND	ND	490	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
JOB NUMBER: 609.001
JOB LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE ANALYZED: 07/25/90
DATE REPORTED: 08/07/90

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	TOTAL XYLENES (ug/kg)	ETHYL BENZENE (ug/kg)	REPORTING LIMIT * (ug/kg)
101151-1	6 @ 10	ND	ND	ND	ND	5.0
101151-2	7 @ 5	ND	ND	ND	ND	5.0
101151-3	8 @ 5	ND	ND	ND	ND	5.0
101151-4	9 @ 5	ND	ND	ND	ND	5.0
101151-5	DISPENSER	47	150	220	60	5.0
101151-12	1 @ 5	ND	ND	ND	ND	5.0
101151-13	2 @ 5	ND	ND	23	ND	5.0
101151-14	3 @ 10	16	34	34	14	5.0
101151-15	4 @ 3	ND	7.0	14	ND	5.0
101151-16	5 @ 5	ND	ND	ND	ND	5.0
101151-17	SP1,3,5,7	ND	ND	40	ND	5.0

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	88

Curtis & Tompkins Ltd

LABORATORY NUMBER: 101151
CLIENT: SUBSURFACE CONSULTANTS
JOB NUMBER: 609.001
JOB LOCATION: HUBBARD TANK

DATE RECEIVED: 07/23/90
DATE ANALYZED: 07/26/90
DATE REPORTED: 08/07/90

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)	REPORTING LIMIT * (ug/L)
101151-6	DIESEL EXCAVATION WATER	3.1	ND	ND	ND	1.0
101151-7	GAS EXCAVATION WATER	4.0	ND	ND	ND	1.0

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	18
RECOVERY, %	98

Curtis & Tompkins Ltd

LABORATORY NUMBER: 101151-17
CLIENT: SUBSURFACE CONSULTANTS
JOB #: 609.001
SAMPLE ID: SP1,3,5,7

DATE RECEIVED: 07/23/90
DATE ANALYZED: 08/02/90
DATE REPORTED: 08/07/90

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/kg	Reporting Limit (ug/kg)
chloromethane	ND	500
bromomethane	ND	500
vinyl chloride	ND	500
chloroethane	ND	500
methylene chloride	ND	250
acetone	ND	500
carbon disulfide	ND	250
trichlorofluoromethane	ND	250
1,1-dichloroethene	ND	250
1,1-dichloroethane	ND	250
1,2-dichloroethene (total)	ND	250
chloroform	ND	250
freon 113	ND	250
1,2-dichloroethane	ND	250
2-butanone	ND	500
1,1,1-trichloroethane	ND	250
carbon tetrachloride	ND	250
vinyl acetate	ND	500
bromodichloromethane	ND	250
1,2-dichloropropane	ND	250
cis-1,3-dichloropropene	ND	250
trichloroethylene	ND	250
dibromochloromethane	ND	250
1,1,2-trichloroethane	ND	250
benzene	ND	250
trans-1,3-dichloropropene	ND	250
2-chloroethylvinyl ether	ND	500
bromoform	ND	250
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
1,1,2,2-tetrachloroethane	ND	250
tetrachloroethylene	ND	250
toluene	ND	250
chlorobenzene	ND	250
ethyl benzene	ND	250
styrene	ND	250
total xylenes	ND	250

ND = Not detected at or above reporting limit

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	101%
Toluene-d8	106%
Bromofluorobenzene	114%

LABORATORY NUMBER: 101151-17
CLIENT: SUBSURFACE CONSULTANTS
JOB #: 609.01
SAMPLE ID: SP1,3,5,7

DATE RECEIVED: 07/23/90
DATE EXTRACTED: 07/25/90
DATE ANALYZED: 07/30/90
DATE REPORTED: 08/07/90

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

	RESULT ug/kg	REPORTING LIMIT ug/kg
ACID COMPOUNDS		
Phenol	ND	330
2-Chlorophenol	ND	330
Benzyl Alcohol	ND	330
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
Benzoic Acid	ND	1650
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4,5-Trichlorophenol	ND	1650
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Aniline	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
4-Chloroaniline	ND	330
Hexachlorobutadiene	ND	330
2-Methylnaphthalene	1,400	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
2-Nitroaniline	ND	1650

LABORATORY NUMBER: 101151-17
SAMPLE ID: SP1,3,5,7

EPA 8270

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	REPORTING LIMIT ug/kg
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
3-Nitroaniline	ND	1650
Acenaphthene	ND	330
Dibenzofuran	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4-Nitroaniline	ND	1650
N-Nitrosodiphenylamine	ND	330
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	590	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

ND = Not detected at or above reporting limit.

LABORATORY NUMBER: 101151-17
SAMPLE ID: SP1,3,5,7

EPA 8270

COMPOUND	RESULT ug/kg	REPORTING LIMIT ug/kg
CHLORINATED PESTICIDES		
alpha-BHC	ND	330
beta-BHC	ND	330
gamma-BHC	ND	330
delta-BHC	ND	330
Heptachlor	ND	330
Aldrin	ND	330
Heptachlor Epoxide	ND	330
Endosulfan I	ND	330
4,4'-DDE	ND	330
Dieldrin	ND	330
Endrin	ND	330
Endosulfan II	ND	330
4,4'-DDD	ND	330
Endrin Aldehyde	ND	330
Endosulfan Sulfate	ND	330
4,4'-DDT	ND	330
Chlordane	ND	1650
Toxaphene	ND	1650
Methoxychlor	ND	1650
Aroclor 1016	ND	1650
Aroclor 1221	ND	1650
Aroclor 1232	ND	1650
Aroclor 1242	ND	1650
Aroclor 1248	ND	1650
Aroclor 1254	ND	1650
Aroclor 1260	ND	1650

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	32	Nitrobenzene-d5	84
Phenol-d5	67	2-Flourobiphenyl	72
2,4,6-Tribromophenol	37	Terphenyl	48

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 101151-17
CLIENT: SUBSURFACE CONSULTANTS
PROJECT #: 609.001
LOCATION: HUBBARD TANK
SAMPLE ID: SP1,3,5,7

DATE RECEIVED: 07/23/90
DATE ANALYZED: 07/26/90
DATE REPORTED: 08/07/90

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	REPORTING LIMIT mg/Kg	METHOD
Antimony	ND	5	EPA 6010
Arsenic	6.2	2.5	EPA 7060
Barium	95	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	3.8	0.5	EPA 6010
Chromium (total)	40	0.5	EPA 6010
Cobalt	11	0.5	EPA 6010
Copper	130	1	EPA 6010
Lead	67	2.5	EPA 6010
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	37	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1	EPA 6010
Thallium	ND	5	EPA 6010
Vanadium	26	1	EPA 6010
Zinc	200	0.5	EPA 6010

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	2	93	Mercury	4	100
Arsenic	16	109	Molybdenum	<1	91
Barium	7	103	Nickel	1	110
Beryllium	2	104	Selenium	<1	108
Cadmium	2	75	Silver	<1	82
Chromium	<1	122	Thallium	<1	94
Cobalt	2	99	Vanadium	2	109
Copper	3	102	Zinc	3	77
Lead	6	99			

Subsurface Consultants

10115|

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: Hibbard Tank

SCI Job Number: 609.001

Project Contact at SCI: J. Alexander

Sampled By: J Lopez

Analytical Laboratory: Curtis & Tompkins

Analytical Turnaround: Normal

	Sample ID	Sample Type[1]	Container Type[2]	Sampling Date	Hold	Analysis	Analytical Method
1	6at10	S	T	7/20	TOG,	TEH w/gas,	BTXE
2	7at5	S	"	"	TOG,	TEH w/gas	BTXE
3	8at5	S	"	"	TOG	TEH w/gas	BTXE
4	9at5	S	"	"	TOG	TEH w/gas	BTXE
5	Dispenser	S	T	7/17	TOG,	TEH w/gas	BTXE
6	Diesel Excavation Water			7/17/90	TOG,	TEH w/gas,	BTXE
7	GAS Excavation Water			7/20/90	TOG,	TEH w/gas,	BTXE

* * * * * *

Released by: [signature] Date: July-23-90

Released by Courier: _____ Date: _____

Received by Laboratory: [signature] Date: 7/23/90 1130a

Relinquished by Laboratory: _____ Date: _____

Received by: _____ Date: _____

[1] Sample Type: W = water, S = soil, O = other (specify)
[2] Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)

Notes to Laboratory:
-Notify SCI if there are any anomalous peaks on GC or other scans
-Questions/clarifications...contact SCI at (415) 268-0461

Subsurface Consultants 10115

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: Hubbard Tank

SCI Job Number: 669.001

Project Contact at SCI: J. Alexander

Sampled By: J. Lopez

Analytical Laboratory: Curtis & Tompkins

Analytical Turnaround: Normal

	Sample ID	Sample Type[1]	Container Type[2]	Sampling Date	Hold	Analysis	Analytical Method
8	SP1	S	T	7/17			
9	SP3	S	T	7/17	Composite for EPA 8240, 8270 + pests + PCBs		CAM metals
10	SP5	S	T	7/20			
11	SP7	S	T	7/20	TOG, TEH with gas, BTXE		
12	1 at 5'	S	T	7/17	TOG,	TEH w/gas	BTXE
13	2 at 5'	"	"	"	TOG,	TEH w/gas,	BTXE
14	3 at 10'	"	"	"	TOG	TEH w/gas	BTXE
15	4 at 3'	"	"	"	TOG	TEH w/gas	BTXE
16	5 at 5'	"	"	"	TOG	TEH w/gas	BTXE

* * * * * *

Released by: [signature] Date: 7/24-23-9D

Released by Courier: _____ Date: _____

Received by Laboratory: [signature] Date: 7/24/90 1130

Relinquished by Laboratory: _____ Date: _____

Received by: _____ Date: _____

[1] Sample Type: W = water, S = soil, O = other (specify)
Container Type: V = VOA, P = plastic, G = glass, T = brass tube, O = other (specify)

Notes to Laboratory:
-Notify SCI if there are any anomalous peaks on GC or other scans
-Questions/clarifications...contact SCI at (415) 268-0461

1992 SUPPLEMENTAL EXCAVATION

ANALYTICAL TEST RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 11/30/92
DATE REPORTED: 12/08/92

LABORATORY NUMBER: 109380

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 609.001

LOCATION: HUBBARD TANK

RESULTS: SEE ATTACHED

Reviewed by

Reviewed by

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/5,6/92
DATE REPORTED: 12/08/92

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
109380-001	10 @ 6'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-002	11 @ 5'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-003	12 @ 4'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-004	13 @ 4'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-005	14 @ 3'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-006	15 @ 3'	7*	ND(5)	ND(5)	15	34
109380-008	17 @ 3'	44*	ND(5)	20	76	170
109380-009	18 @ 5'	27*	ND(5)	ND(5)	62	35
109380-010	19 @ 5'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
109380-011	20 @ 7'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.
* Chromatogram does not match the gasoline standard pattern.

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	93

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/5-8/92
DATE REPORTED: 12/08/92

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
109380-007	16 @ 3'	97*	ND(5)	27	99	45
109380-018	COMPOSITE SP-A,B,C,D	11*	N/R	N/R	N/R	N/R
109380-023	COMPOSITE SP-E,F,G,H	2*	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.
* Chromatogram does not match the gasoline standard pattern.

QA/QC SUMMARY

RPD, %	6
RECOVERY, %	85

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/2,3/92
DATE REPORTED: 12/08/92

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
109380-012	TANK PIT WATER	440*	2.0	0.7	ND(0.5)	2.1
109380-013	DISPENSER PIT WATER	1,700*	ND(0.5)	0.9	2.0	8.2

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.
* Chromatogram does not match the gasoline standard pattern.

QA/QC SUMMARY

RPD, %	7
RECOVERY, %	105

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE EXTRACTED: 12/02/92
DATE ANALYZED: 12/5-12/7/92
DATE REPORTED: 12/08/92

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
109380-001	10 @ 6'	ND	3	1
109380-002	11 @ 5'	ND	ND	1
109380-003	12 @ 4'	**	3	1
109380-004	13 @ 4'	**	5	1
109380-005	14 @ 3'	**	220	1
109380-006	15 @ 3'	**	1,100	10
109380-007	16 @ 3'	**	1,700	10
109380-008	17 @ 3'	**	490	10
109380-009	18 @ 5'	**	450	10
109380-010	19 @ 5'	**	4	1
109380-011	20 @ 7'	**	3	1
109380-018	COMPOSITE SP-A,B,C,D	**	930	10
109380-023	COMPOSITE SP-E,F,G,H	**	500	10

ND = Not Detected at or above reporting limit.

* Reporting limit applies to all analytes.
** Quantitated as diesel due to overlap of hydrocarbon ranges.

QA/QC SUMMARY: LABORATORY CHECK SAMPLE

RECOVERY, %	98

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE EXTRACTED: 12/03/92
DATE ANALYZED: 12/06/92
DATE REPORTED: 12/08/92

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
109380-012	TANK PIT WATER	**	15,000	50
109380-013	DISPENSER PIT WATER	**	15,000	50

* Reporting limit applies to all analytes.
** Quantitated as diesel due to overlap of hydrocarbon ranges.

QA/QC SUMMARY: BS/BSD

RPD,%	1
RECOVERY, %	98

Curtis & Tompkins, Ltd

Client: **Subsurface Consultants**

Laboratory Login Number: 109380

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 08 December 92

ANALYSIS: pH

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	Method	Analyst	QC Batch
109380-018	SP-A,B,C,D COMPOSITE	Soil	25-NOV-92	30-NOV-92	07-DEC-92	7.7	SU *	EPA 9045	TR	7662

* Soil pH measured as water

Curtis & Tompkins, Ltd

Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 109380
Report Date: 08 December 92

ANALYSIS: pH

QC Batch Number: 7662

Calibration Verification Results

Sample	Result	TV	Difference	Limit	Analyzed
ICV	10.02	10.00	.02	< 0.10	07-DEC-92
CCV	7.02	7.00	.02	< 0.10	07-DEC-92
CCV	7.00	7.00	.00	< 0.10	07-DEC-92

Sample Duplicate Results

Sample	Duplicate	RPD	Analyzed
7.74	7.74	0%	07-DEC-92

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380-018
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK
SAMPLE ID: COMPOSITE SP-A,B,C,D

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/2,7/92
DATE REPORTED: 12/07/92

PARAMETER	RESULT	UNITS	REPORTING LIMIT	METHOD
RELEASABLE CYANIDE	ND	mg/Kg	1	SW-846 SECTION 7.3.3.2
RELEASABLE SULFIDE	ND	mg/Kg	1	SW-846 SECTION 7.3.4.1
IGNITABILITY	DOES NOT IGNITE			SW-846 SECTION 7.1
FREE LIQUID	NO FREE LIQUID PRESENT			EPA 9095

ND = Not detected at or above reporting limit.

QA/QC SUMMARY	RPD, %	RECOVERY, %
CYANIDE	<1	97
SULFIDE	<1	74

Curtis & Tompkins, Ltd

Client: Subsurface Consultants

Laboratory Login Number: 109380

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 07 December 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520BF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
109380-012	TANK PIT WATER	Water	25-NOV-92	30-NOV-92	02-DEC-92	230	mg/L	5	TR	7605
109380-013	DIPENSER PIT WATER	Water	25-NOV-92	30-NOV-92	02-DEC-92	25.	mg/L	5	TR	7605

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd

QC Batch Report

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 109380
Report Date: 07 December 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **QC Batch Number: 7605**

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	5	mg/L	SMWW 17:5520BF	02-DEC-92

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	87%	SMWW 17:5520BF	02-DEC-92
BSD	86%	SMWW 17:5520BF	02-DEC-92

		Control Limits
Average Spike Recovery	86%	80% - 120%
Relative Percent Difference	1.2%	< 20%

Curtis & Tompkins, Ltd.

Client: Subsurface Consultants

Laboratory Login Number: 109380

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 07 December 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
109380-001	10 @ 6'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-002	11 @ 5'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-003	12 @ 4'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-004	13 @ 4'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-005	14 @ 3'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	190	mg/Kg	50	TR	7651
109380-006	15 @ 3'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	690	mg/Kg	50	TR	7651
109380-007	16 @ 3'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	420	mg/Kg	50	TR	7651
109380-008	17 @ 3'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	190	mg/Kg	50	TR	7651
109380-009	18 @ 5'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	310	mg/Kg	50	TR	7651
109380-010	19 @ 5'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-011	20 @ 7'	Soil	25-NOV-92	30-NOV-92	04-DEC-92	ND	mg/Kg	50	TR	7651
109380-018	SP-A,B,C,D COMPOSITE	Soil	25-NOV-92	30-NOV-92	04-DEC-92	800	mg/Kg	50	TR	7651
109380-023	SP-E,F,G,H COMPOSITE	Soil	25-NOV-92	30-NOV-92	04-DEC-92	640	mg/Kg	50	TR	7651

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd

Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 109380
Report Date: 07 December 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **QC Batch Number: 7651**

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	50	mg/Kg	SMWW 17:5520EF	04-DEC-92

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	88%	SMWW 17:5520EF	04-DEC-92
BSD	84%	SMWW 17:5520EF	04-DEC-92

		Control Limits
Average Spike Recovery	86%	80% - 120%
Relative Percent Difference	4.4%	< 20%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/07/92
DATE REPORTED: 12/07/92

ANALYSIS: TOTAL LEAD
ANALYSIS METHOD: EPA 7420

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
109380-001	10 @ 6'	3	mg/Kg	3
109380-002	11 @ 5'	3	mg/Kg	3
109380-003	12 @ 4'	4	mg/Kg	3
109380-004	13 @ 4'	5	mg/Kg	3
109380-005	14 @ 3'	120	mg/Kg	3
109380-006	15 @ 3'	72	mg/Kg	3
109380-007	16 @ 3'	9	mg/Kg	3
109380-008	17 @ 3'	20	mg/Kg	3
109380-009	18 @ 5'	5	mg/Kg	3
109380-010	19 @ 5'	4	mg/Kg	3
109380-011	20 @ 7'	3	mg/Kg	3

QA/QC SUMMARY:

RPD, %	3
RECOVERY, %	93

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/01/92
DATE REPORTED: 12/07/92

ANALYSIS: DISSOLVED LEAD
ANALYSIS METHOD: EPA 7421

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
109380-012	TANK PIT WATER	ND	ug/L	3
109380-013	DISPENSER PIT WATER	6	ug/L	3

ND = Not detected at or above reporting limit.

QA/QC SUMMARY:

RPD, %	3
RECOVERY, %	89

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380
CLIENT: SUBSURFACE CONSULTANTS
PROJECT: 609.001
LOCATION: HUBBARD TANK

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/03/92
DATE REPORTED: 12/07/92

ANALYSIS: STLC LEAD
EXTRACTION METHOD: WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
109380-023	COMPOSITE SP-E,F,G,H	1000	ug/L	60

QA/QC SUMMARY:

RPD, %	2
RECOVERY, %	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 109380-018
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK
SAMPLE ID: COMPOSITE SP-A,B,C,D

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/03/92
DATE REPORTED: 12/07/92

Soluble Title 26 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT ug/L	REPORTING LIMIT ug/L	METHOD
Antimony	400	300	EPA 6010
Arsenic	2000	2000	EPA 6010
Barium	5800	50	EPA 6010
Beryllium	20	10	EPA 6010
Cadmium	ND	30	EPA 6010
Chromium (total)	1400	50	EPA 6010
Cobalt	420	90	EPA 6010
Copper	ND	50	EPA 6010
Lead	1000	1000	EPA 6010
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	70	EPA 6010
Nickel	1800	200	EPA 6010
Selenium	ND	30	EPA 7740
Silver	ND	50	EPA 6010
Thallium	ND	3000	EPA 6010
Vanadium	1100	50	EPA 6010
Zinc	12000	100	EPA 6010

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	4	106	Mercury	4	102
Arsenic	2	98	Molybdenum	<1	106
Barium	1	108	Nickel	<1	111
Beryllium	2	108	Selenium	4	109
Cadmium	3	96	Silver	<1	107
Chromium	3	110	Thallium	<1	99
Cobalt	1	108	Vanadium	<1	109
Copper	<1	105	Zinc	1	105
Lead	<1	92			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 109380-018
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK
SAMPLE ID: COMPOSITE SP-A,B,C,D

DATE SAMPLED: 11/25/92
DATE RECEIVED: 11/30/92
DATE ANALYZED: 12/04/92
DATE REPORTED: 12/07/92

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/Kg	Reporting * Limit (ug/Kg)
Chloromethane	ND	500
Bromomethane	ND	500
Vinyl chloride	ND	500
Chloroethane	ND	500
Methylene chloride	ND	1,000
Acetone	ND	1,000
Carbon disulfide	ND	300
Trichlorofluoromethane	ND	300
1,1-Dichloroethene	ND	300
1,1-Dichloroethane	ND	300
cis-1,2-Dichloroethene	ND	300
trans-1,2-Dichloroethene	ND	300
Chloroform	ND	300
Freon 113	ND	300
1,2-Dichloroethane	ND	300
2-Butanone	ND	500
1,1,1-Trichloroethane	ND	300
Carbon tetrachloride	ND	300
Vinyl acetate	ND	500
Bromodichloromethane	ND	300
1,2-Dichloropropane	ND	300
cis-1,3-Dichloropropene	ND	300
Trichloroethene	ND	300
Dibromochloromethane	ND	300
1,1,2-Trichloroethane	ND	300
Benzene	ND	300
trans-1,3-Dichloropropene	ND	300
Bromoform	ND	300
2-Hexanone	ND	500
4-Methyl-2-pentanone	ND	500
1,1,2,2-Tetrachloroethane	ND	300
Tetrachloroethene	ND	300
Toluene	ND	300
Chlorobenzene	ND	300
Ethyl benzene	ND	300
Styrene	ND	300
Total xylenes	ND	300

ND = Not detected at or above reporting limit
* High reporting limit due to high concentration of hydrocarbons.

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	84 %
Toluene-d8	81 %
Bromofluorobenzene	87 %

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: METHOD BLANK
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD TANK
SAMPLE ID: n/a

DATE ANALYZED: 12/04/92
DATE REPORTED: 12/07/92

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/Kg	Reporting Limit (ug/Kg)
Chloromethane	ND	200
Bromomethane	ND	200
Vinyl chloride	ND	200
Chloroethane	ND	200
Methylene chloride	ND	500
Acetone	ND	500
Carbon disulfide	ND	100
Trichlorofluoromethane	ND	100
1,1-Dichloroethene	ND	100
1,1-Dichloroethane	ND	100
cis-1,2-Dichloroethene	ND	100
trans-1,2-Dichloroethene	ND	100
Chloroform	ND	100
Freon 113	ND	100
1,2-Dichloroethane	ND	100
2-Butanone	ND	200
1,1,1-Trichloroethane	100	100
Carbon tetrachloride	ND	100
Vinyl acetate	ND	200
Bromodichloromethane	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
Trichloroethene	ND	100
Dibromochloromethane	ND	100
1,1,2-Trichloroethane	ND	100
Benzene	ND	100
trans-1,3-Dichloropropene	ND	100
Bromoform	ND	100
2-Hexanone	ND	200
4-Methyl-2-pentanone	ND	200
1,1,2,2-Tetrachloroethane	ND	100
Tetrachloroethene	ND	100
Toluene	ND	100
Chlorobenzene	ND	100
Ethyl benzene	ND	100
Styrene	ND	100
Total xylenes	ND	100

ND = Not detected at or above reporting limit

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	101 %
Toluene-d8	93 %
Bromofluorobenzene	94 %

MS/MSD SUMMARY SHEET FOR EPA 8240

Curtis & Tompkins, Ltd.

Matrix Sample Number: 109380-018
Lab No.: QC37819 QC37820
Sample type: SOIL
Batch No.: 7627

Date Analyzed: 04-DEC-92
Spike File: BL407
Spike Dup File: BL408

MATRIX SPIKE DATA (spiked at 25 ppb)

SPIKE COMPOUNDS	READING	RECOVERY	STATUS	LIMITS *
1,1-Dichloroethene	21.94	88 %	OK	59 - 172
Trichloroethene	21.72	87 %	OK	62 - 137
Benzene	21.29	85 %	OK	66 - 142
Toluene	23.34	93 %	OK	59 - 139
Chlorobenzene	22.53	90 %	OK	60 - 133
SURROGATES				
1,2-Dichloroethane-d4	21.23	85 %	OK	70 - 121
Toluene-d8	19.84	79 %	NOT OK	81 - 117
Bromofluorobenzene	23.56	94 %	OK	74 - 121

MATRIX SPIKE DUP DATA (spiked at 25 ppb)

SPIKE COMPOUNDS	READING	RECOVERY	STATUS	LIMITS
1,1-Dichloroethene	21.65	87 %	OK	59 - 172
Trichloroethene	20.11	80 %	OK	62 - 137
Benzene	20.50	82 %	OK	66 - 142
Toluene	21.98	88 %	OK	59 - 139
Chlorobenzene	20.36	81 %	OK	60 - 133
SURROGATES				
1,2-Dichloroethane-d4	22.97	92 %	OK	70 - 121
Toluene-d8	19.58	78 %	NOT OK	81 - 117
Bromofluorobenzene	22.74	91 %	OK	74 - 121

RPD DATA

SPIKE COMPOUNDS	SPIKE	SPIKE DUP	RPD	STATUS	LIMITS *
1,1-Dichloroethene	21.94	21.65	1 %	OK	< 22
Benzene	21.72	20.11	8 %	OK	< 21
Trichloroethene	21.29	20.50	4 %	OK	< 24
Toluene	23.34	21.98	6 %	OK	< 21
Chlorobenzene	22.53	20.36	10 %	OK	< 21

* Limits from CLP SOW 2/88

Curtis & Tompkins, Ltd.

LCS SUMMARY SHEET FOR EPA 8240

Lab No.: QC37818
Sample type: SOIL
Batch No.: 7627

Date Analyzed: 04-DEC-92
Spike File: BL409

BLANK SPIKE DATA (spiked at 50 ppb)

SPIKE COMPOUNDS	READING	RECOVERY	STATUS	LIMITS *
1,1-Dichloroethene	53.93	108 %	OK	59 - 172
Trichloroethene	43.93	88 %	OK	62 - 137
Benzene	45.93	92 %	OK	66 - 142
Toluene	47.72	95 %	OK	59 - 139
Chlorobenzene	45.28	91 %	OK	60 - 133
SURROGATES				
1,2-Dichloroethane-d4	55.93	112 %	OK	70 - 121
Toluene-d8	49.41	99 %	OK	81 - 117
Bromofluorobenzene	51.78	104 %	OK	74 - 121

* Limits from CLP SOW 2/88

CHAIN OF CUSTODY FORM

PAGE _____ OF _____

PROJECT NAME: Hubbard Tank

JOB NUMBER: 609.001 LAB: Curtis & Tompkins

PROJECT CONTACT: Jeri Alexander TURNAROUND: Normal

SAMPLED BY: Dennis Alexander REQUESTED BY: Jeri Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE			METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME				NOTES	ANALYSIS REQUESTED: TVH	BTXE	TEH	TOG	RAT	8240	STLC Lead	STLC Title 22 Metals	Free Liquids
	SP-A (composite)																																
	SP-B (composite)		X								X						X		11	25	92					X			X	X	X	X	X	X
	SP-C (composite)																																
	SP-D (composite)																																
	SP-E (composite)																																
	SP-F (composite)		X								X						X		11	25	92					X	X	X	X			X		
	SP-G (composite)																																
	SP-H (composite)																																

COMMENTS & NOTES:

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Dennis Alexander	11/30/92 2:05 pm		
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
			11-30-92 1405

Subsurface Consultants, Inc.

171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607

(510) 268-0461 · FAX: 510-268-0137

CHAIN OF CUSTODY FORM

PAGE _____ OF _____

PROJECT NAME: Hubbard Tank

JOB NUMBER: 609.001 LAB: Curtis & Tompkins

PROJECT CONTACT: Jeri Alexander TURNAROUND: Normal

SAMPLED BY: Dennis Alexander REQUESTED BY: Jeri Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE	Jar		METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME				NOTES	ANALYSIS REQUESTED: TVH	BTXE	TOG	TEH	Total Lead	Dissolved Lead (Please Filter)				
	20@7'		X								X						X		11	25	92						X	X	X	X	X				
	Tank Pit Water	X						X	X			X		X			X										X	X	X	X		X			
	Dispenser Pit WATER	X						X	X	X				X			X										X	X	X	X		X			

COMMENTS & NOTES:

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Dennis Alexander	11/30/92 2:05pm		
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
			11-30-92 1405

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171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607

(510) 268-0461 · FAX: 510-268-0137

CHAIN OF CUSTODY FORM

PAGE _____ OF _____

PROJECT NAME: Hubbard Tank

JOB NUMBER: 609.001 LAB: Curtis & Tompkins

PROJECT CONTACT: Jeri Alexander TURNAROUND: Normal

SAMPLED BY: Dennis Alexander REQUESTED BY: Jeri Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE			METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME	NOTES	ANALYSIS REQUESTED: TVH	BTXE	TEH	TOG	Total Lead					
	10@6'		X								X						X		11	12	92			X	X	X	X	X					
	11@5'		X								X						X							X	X	X	X	X					
	12@4'		X								X						X							X	X	X	X	X					
	13@4'		X								X						X							X	X	X	X	X					
	14@3'		X								X						X							X	X	X	X	X					
	15@3'		X								X						X							X	X	X	X	X					
	16@3'		X								X						X							X	X	X	X	X					
	17@3'		X								X						X							X	X	X	X	X					
	18@5'		X								X						X							X	X	X	X	X					
	19@5'		X								X						X		11	12	92			X	X	X	X	X					

COMMENTS & NOTES:

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
Dennis Alexander	11/30/92 2:05pm		
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
			11-30-92 1405

Subsurface Consultants, Inc.

171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607

(510) 268-0461 · FAX: 510-268-0137

JUNE 1993 MONITORING EVENT

ANALYTICAL TEST RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 06/02/93
DATE REPORTED: 06/09/93

LABORATORY NUMBER: 111081

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 609.001

LOCATION: HUBBARD STREET TANK PROJECT

RESULTS: SEE ATTACHED

Reviewed by

Reviewed by

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 111081
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET TANK PROJECT

DATE SAMPLED: 06/01/93
DATE RECEIVED: 06/02/93
DATE ANALYZED: 06/05/93
DATE REPORTED: 06/09/93

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
111081-1	MW-1	160*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
111081-2	MW-2	210*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
111081-3	MW-3	280*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

*Does not match gasoline standard.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	7
RECOVERY, %	107

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 111081
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET TANK PROJECT

DATE SAMPLED: 05/27/93
DATE RECEIVED: 06/02/93
DATE ANALYZED: 06/07/93
DATE REPORTED: 06/09/93

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
111081-4	MW-1 at 3.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	100

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 111081
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET TANK PROJECT

DATE SAMPLED: 05/28/93
DATE RECEIVED: 06/02/93
DATE ANALYZED: 06/04/93
DATE REPORTED: 06/09/93

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
111081-5	MW-2 at 3.0	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
111081-6	MW-3 at 2.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	100

Curtis & Tompkins, Ltd.

Client: Subsurface Consultants

Laboratory Login Number: 111081

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 09 June 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520BF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
111081-001	MW-1	Water	01-JUN-93	02-JUN-93	08-JUN-93	ND	mg/L	5	TR	9490
111081-002	MW-2	Water	01-JUN-93	02-JUN-93	08-JUN-93	ND	mg/L	5	TR	9490
111081-003	MW-3	Water	01-JUN-93	02-JUN-93	08-JUN-93	ND	mg/L	5	TR	9490

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 111081
Report Date: 09 June 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **QC Batch Number: 9490**

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	5	mg/L	SMWW 17:5520BF	08-JUN-93

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	88%	SMWW 17:5520BF	08-JUN-93
BSD	85%	SMWW 17:5520BF	08-JUN-93

		Control Limits
Average Spike Recovery	86%	80% - 120%
Relative Percent Difference	2.6%	< 20%

Curtis & Tompkins, Ltd.

Client: Subsurface Consultants

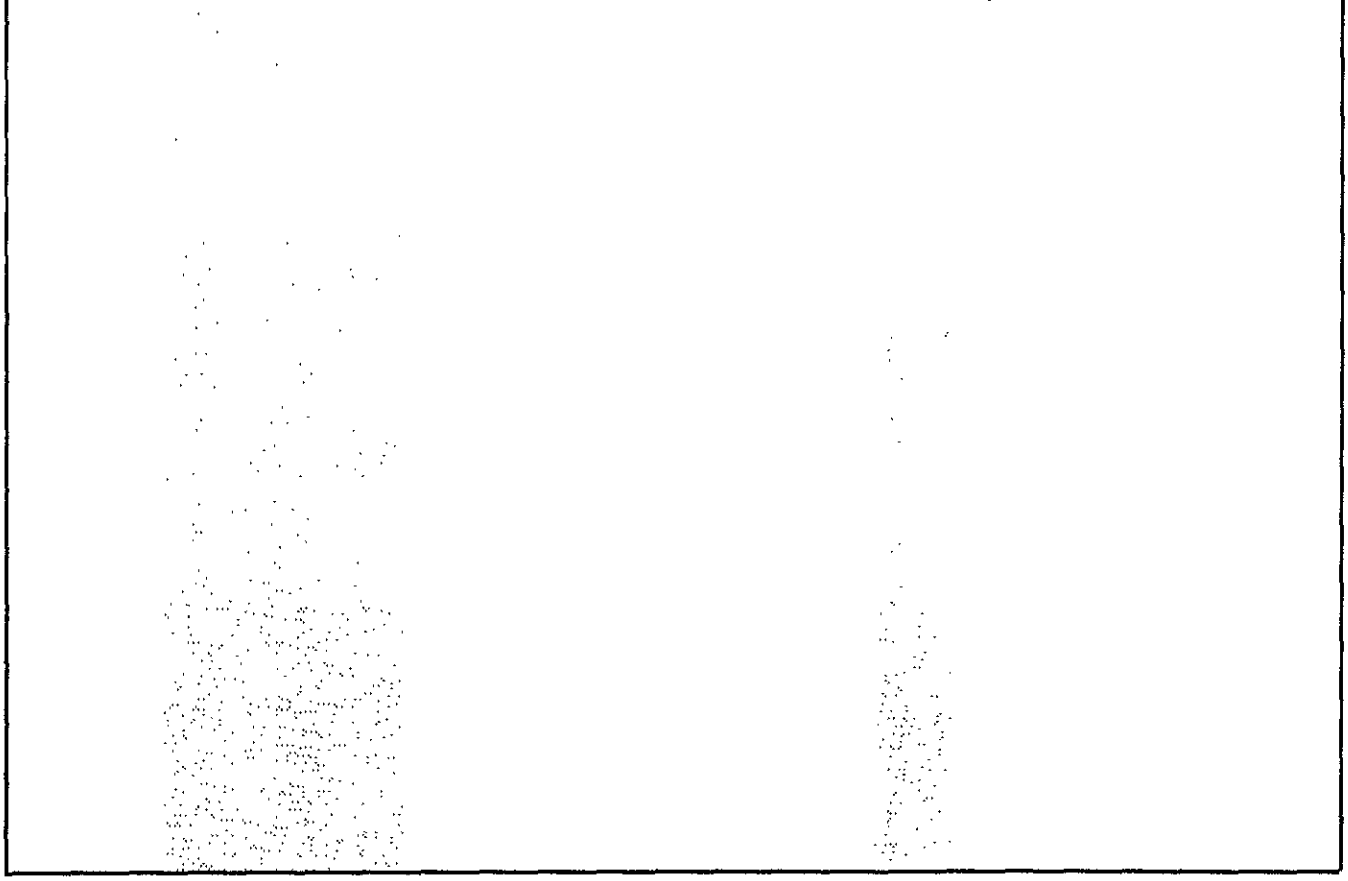
Laboratory Login Number: 111081

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 09 June 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
111081-004	MW-1 @ 3.5	Soil	27-MAY-93	02-JUN-93	04-JUN-93	ND	mg/Kg	50	TR	9472
111081-005	MW-2 @ 3.0	Soil	27-MAY-93	02-JUN-93	04-JUN-93	ND	mg/Kg	50	TR	9472
111081-006	MW-3 @ 2.5	Soil	27-MAY-93	02-JUN-93	04-JUN-93	ND	mg/Kg	50	TR	9472



ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins Ltd.

Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 111081
Report Date: 09 June 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **QC Batch Number: 9472**

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	50	mg/Kg	SMWW 17:5520EF	04-JUN-93

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	85%	SMWW 17:5520EF	04-JUN-93
BSD	84%	SMWW 17:5520EF	04-JUN-93

		Control Limits
Average Spike Recovery	85%	80% - 120%
Relative Percent Difference	.9%	< 20%

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 111081
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET TANK PROJECT

DATE SAMPLED: 06/01/93
DATE RECEIVED: 06/02/93
DATE EXTRACTED: 06/03/93
DATE ANALYZED: 06/04/93
DATE REPORTED: 06/09/93

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
111081-1	MW-1	ND	ND	50
111081-2	MW-2	ND	150 +	50
111081-3	MW-3	ND	170 +	50

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

+ Pattern does not match standard

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	84

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 111081
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET TANK PROJECT

DATE SAMPLED: 05/27,28/93
DATE RECEIVED: 06/02/93
DATE EXTRACTED: 06/03/93
DATE ANALYZED: 06/05/93
DATE REPORTED: 06/09/93

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
111081-4	MW-1 at 3.5	ND	ND	1
111081-5	MW-2 at 3.0	**	9 +	1
111081-6	MW-3 at 2.5	**	10 +	1

ND = Not Detected at or above reporting limit.

* Reporting limit applies to all analytes.

+ Pattern does not match standard

QA/QC SUMMARY

RPD, %	5
RECOVERY, %	89

CHAIN OF CUSTODY FORM

PAGE 1 OF 1

PROJECT NAME: Hubbard Street Tank Project - Oakland, CA

JOB NUMBER: 609.001 LAB: C & T

PROJECT CONTACT: J. Alexander TURNAROUND: Normal

SAMPLED BY: F. Velez REQUESTED BY: J. Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	MATRIX: SOIL	MATRIX: WASTE	MATRIX: AIR	CONTAINERS: VOA	CONTAINERS: LITER	CONTAINERS: PINT	CONTAINERS: TUBE	METHOD PRESERVED: HCL	METHOD PRESERVED: H_2SO_4	METHOD PRESERVED: HNO_3	METHOD PRESERVED: ICE	METHOD PRESERVED: NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME	NOTES	ANALYSIS REQUESTED: TVH + BTEX	TEH	TOG SMWW 17:5520 EF
111081 -1	MW-1	X				3	2			X			X		06	01	93	1345		X	X	X
-2	MW-2	X				3	2			X			X		06	01	93	1430		X	X	X
-3	MW-3	X				3	2			X			X		06	01	93	1545		X	X	X
-4	MW-1 at 3.5		X					1	X				X		05	27	93			X	X	X
-5	MW-2 at 3.0		X						X				X		05	28	93			X	X	X
-6	MW-3 at 2.5		X						X				X		05	28	93			X	X	X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
[signature] J. Alexander	6/2/93 2:45	[signature]	6/2/93 2:45

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

WELL DEVELOPMENT FORM

Project Name: HUBBARD TANK

Job No.: 609.001

Developed By: [illegible]

TOC Elevation: _____

Well Number: [illegible]

Well Casing Diameter: [illegible] inches

Date: [illegible]

Weather: [illegible]

Depth to Casing Bottom (below TOC) _____ feet

Depth to Groundwater (below TOC) 3.68-0.05=3.63 +/- [illegible] 3.6[illegible] feet

Feet of Water in Well 16.70 feet

Casing Volume (feet of water x Casing DIA ² x 0.0408) 2.73 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Development Method _____

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
3	7.96	70.2	2.73X1000		Muddy
6	7.29	67.4	2.16X1000		
9	7.20	66.0	1.89X1000		"
12	7.14	65.6	1.85X1000		"
15	7.14	65.3	1.71X1000		"
18	7.15	65.1	1.46X1000		"
21	7.17	65.6	1.47X1000		"
23	7.19	65.4	1.46X1000		"
26	7.18	65.3	1.40X1000		"
29	7.19	65.4	1.43X1000		"

Total Gallons Removed 29 gallons

Depth to Groundwater After Development (below TOC) 6.42 feet

Subsurface Consultants	HUBBARD TANK - OAKLAND, CA			PLATE
	JOB NUMBER	DATE	APPROVED	
	609.001	6/1/93		

WELL DEVELOPMENT FORM

Project Name: HUBBARD TANK

Well Number: MW-2

Job No.: 609.001

Well Casing Diameter: 2 inches

Developed By:

Date:

TOC Elevation:

Weather: Clear

Depth to Casing Bottom (below TOC) 15.13 feet

Depth to Groundwater (below TOC) 3.70 feet

Feet of Water in Well feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Development Method

no free product

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
0	7.10	67.1	2.10 X 1000		Clear
3	7.13	65.6	2.02 X 1000		Murky
6	7.15	65.7	1.88 X 1000		"
9	7.14	65.4	1.70 X 1000		"
12	7.19	64.8	1.50 X 1000		"
15	7.16	64.3	1.48 X 1000		"
18	7.17	64.1	1.36 X 1000		"
21	7.20	64.1	1.36 X 1000		"

Total Gallons Removed 21 gallons

Depth to Groundwater After Development (below TOC) 7.25 feet

Subsurface Consultants	HUBBARD TANK - OAKLAND, CA			PLATE
	JOB NUMBER	DATE	APPROVED	
	609.001	6/1/93		

WELL DEVELOPMENT FORM

Project Name: HUBBARD TANK | Well Number: M-3

Job No.: 609.001 | Well Casing Diameter: 2 inches

Developed By: FU | Date: 5/ [illegible]

TOC Elevation: | Weather: [illegible]

Depth to Casing Bottom (below TOC) 15' 1½" 15.13 feet

Depth to Groundwater (below TOC) 3.34-0.05=3.29 4'-8½ = 3.29 feet

Feet of Water in Well 11.84 feet

Casing Volume (feet of water x Casing DIA ² x 0.0408) 1.93 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Development Method [illegible]

no [illegible] [illegible]

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°F)	Conductivity (micromhos/cm)	Salinity S%	Comments
0	7.02	75.3	2.36 X 1000		[illegible]
1	6.96	68.8	2.00 X1000		[illegible]
3	6.96	66.2	2.05 X 1000		"
5	7.04	64.9	1.88X1000		"
7	7.03	64.9	1.90 X1000		"
9	7.09	64.4	1.69X100		"
12	7.08	64.1	1.55X1000		"
15	7.08	64.8	1.45X1000		"
18	7.06	64.8	1.43 X1000		"
21	7.04	64.2	1.39 X1000		"

Total Gallons Removed ______ gallons

Depth to Groundwater After Development (below TOC): 7.12 feet

25	7.04	63.7	1.35X1000		"

Subsurface Consultants

HUBBARD TANK - OAKLAND, CA

JOB NUMBER	DATE	APPROVED	PLATE
609.001	6/1/93		

WELL SAMPLING FORM

Project Name: HUBBARD TANK
Well Number: M-1

Job No.: 609.001
Well Casing Diameter: 2 inch

Sampled By: FV
Date: 6/1/93

TOC Elevation: _____
Weather: Clear

Depth to Casing Bottom (below TOC) 20.4 feet

Depth to Groundwater (below TOC) 6.3 feet

Feet of Water in Well 13.30 feet

Depth to Groundwater When 80% Recovered _____ feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.22 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Free Product None

Purge Method DISPOSABLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
2.3	7.19	65.4	1.46 x 1000		very cloudy
2.6	7.18	65.3	1.40 x 1000		"
2.9	7.19	65.4	1.43 x 1000		"

Total Gallons Purged _____ gallons

Depth to Groundwater Before Sampling (below TOC) 6.42 feet

Sampling Method DISPOSABLE BAILER

Containers Used 7 (40 ml) 2 (liter) _____ (pint)

Subsurface Consultants	HUBBARD TANK - OAKLAND, CA			PLATE
	JOB NUMBER	DATE	APPROVED	
	609.001	6/1/93		

WELL SAMPLING FORM

Project Name: HUBBARD TANK
Well Number: _____
Job No.: 609.001
Well Casing Diameter: _____ inch
Sampled By: _____
Date: _____
TOC Elevation: _____
Weather: _____

Depth to Casing Bottom (below TOC) 15.13 feet
Depth to Groundwater (below TOC) 5.65 feet
Feet of Water in Well 9.5 feet
Depth to Groundwater When 80% Recovered 5.05 feet
Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) _____ gallons
Depth Measurement Method Tape & Paste / Electronic Sounder / Other
Free Product None
Purge Method DISPOSABLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
15	7.16	64.3	1.45 x1000		slightly
18	7.12	64.1	1.36 x1000		slightly
21	7.20	64.1	1.36 x1000		slightly

Total Gallons Purged 21 gallons
Depth to Groundwater Before Sampling (below TOC) 5.74 feet
Sampling Method DISPOSABLE BAILER
Containers Used 3 (40 ml) 2 (liter) _____ (pint)

Subsurface Consultants	HUBBARD TANK - OAKLAND, CA			PLATE
	JOB NUMBER	DATE	APPROVED	
	609.001	6/1/93		

WELL SAMPLING FORM

Project Name: HUBBARD TANK
Well Number: MW-3
Job No.: 609.001
Well Casing Diameter: 2 inch
Sampled By: TI
Date: 6/1/93
TOC Elevation: _____
Weather: Clear

Depth to Casing Bottom (below TOC) 15.15 feet
Depth to Groundwater (below TOC) 5.20 feet
Feet of Water in Well 10.24 feet
Depth to Groundwater When 80% Recovered 7.43 feet
Casing Volume (feet of water x Casing DIA ² x 0.0408) 1.03 gallons
Depth Measurement Method Tape & Paste / Electronic Sounder / Other
Free Product none
Purge Method DISPOSABLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°F) (°C)	Conductivity (micromhos/cm)	Salinity S%	Comments
15	7.08	64.8	1.45x1000		new CY
18	7.06	64.8	1.43x1000		"
21	7.04	64.2	1.34x1000		"
25	7.04	63.9	1.35x1000		"

Total Gallons Purged 25 gallons
Depth to Groundwater Before Sampling (below TOC) 5.70 feet
Sampling Method DISPOSABLE BAILER
Containers Used 3 (40 ml) 2 (liter) _____ (pint)

Subsurface Consultants	HUBBARD TANK - OAKLAND, CA			PLATE
	JOB NUMBER	DATE	APPROVED	
	609.001	6/1/93		

SEPTEMBER 1993 MONITORING EVENT

ANALYTICAL TEST RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
171 12th Street
Suite 201
Oakland, CA 94608

Date: 30-SEP-93
Lab Job Number: 112301
Project ID: 609.001
Location: Hubbard Tank

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 112301
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET

DATE SAMPLED: 09/15/93
DATE RECEIVED: 09/15/93
DATE ANALYZED: 09/17/93
DATE REPORTED: 09/30/93

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
112301-1	MW-1	120*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
112301-2	MW-2	150*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
112301-3	MW-3	180*	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

*Single peak, does not match gasoline standard.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	97

Curtis & Tompkins, Ltd.

Client: Subsurface Consultants

Laboratory Login Number: 112301

Project Name: Hubbard Tank
Project Number: 609.001

Report Date: 30 September 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520BF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
112301-001	MW-1	Water	15-SEP-93	15-SEP-93	23-SEP-93	ND	mg/L	5	TR	10656
112301-002	MW-2	Water	15-SEP-93	15-SEP-93	23-SEP-93	ND	mg/L	5	TR	10656
112301-003	MW-3	Water	15-SEP-93	15-SEP-93	23-SEP-93	ND	mg/L	5	TR	10656

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Hubbard Tank
Project Number: 609.001

Laboratory Login Number: 112301
Report Date: 30 September 93

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **QC Batch Number: 10656**

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	5	mg/L	SMWW 17:5520BF	23-SEP-93

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	89%	SMWW 17:5520BF	23-SEP-93
BSD	85%	SMWW 17:5520BF	23-SEP-93

		Control Limits
Average Spike Recovery	87%	80% - 120%
Relative Percent Difference	4.7%	< 20%

CHAIN OF CUSTODY FORM

PAGE ____ OF ____

PROJECT NAME: Hubbard Street

JOB NUMBER: 609.001 LAB: Curtis & Tompkins

PROJECT CONTACT: Mariam Watada TURNAROUND: normal

SAMPLED BY: _____ REQUESTED BY: M. Watada

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR	CONTAINERS: VOA	LITER	PINT	TUBE	METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME	NOTES: TVH/BTEX	Oil & Grease	TEH
112391 -1	MW-1	X				3	1			X			X		09	15	93	1150	X		
	"	X					1				X		X		09	15	93	1150		X	
	"	X					1						X		09	15	93	1150			X
-2	MW-2	X				3				X			X		09	15	93	1700	X		
	"	X					1				X		X		09	15	93	1700		X	
	"	X					1						X		09	15	93	1700			X
-3	MW-3	X				3				X			X		09	15	93	1600	X		
	"	X					1				X		X		09	15	93	1600		X	
	"	X					1						X		09	15	93	1600			X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
[signature]	9-15-93 5:75 pm		
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
		[signature]	9/5/93 5:25 pm

COMMENTS & NOTES:

Subsurface Consultants, Inc.

171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607

(510) 268-0461 • FAX: 510-268-0137

CHAIN OF CUSTODY FORM

PAGE 1 OF 1

PROJECT NAME: Hubbard Street
JOB NUMBER: 609.001 LAB: Curtis & Tompkins
PROJECT CONTACT: Jeriann Alexander TURNAROUND: Normal
SAMPLED BY: Fernando Vélez REQUESTED BY: Jeriann Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE			METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE		SAMPLING DATE: MONTH	DAY	YEAR	TIME		NOTES	ANALYSIS REQUESTED: TEH
	MW-1	X							X								X	X							X	
	MW-2	X							X								X	X							X	
	MW-3	X							X								X	X							X	

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
[signature]	10-19-93 14:08pm		
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
		Teresa K. Morrison	10/19/93 4:08pm

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

2323 5th Street
Berkeley, CA 94710
Phone: (510) 486-0900
FAX: (510) 486-0532

FAX TRANSMISSION

To:

NAME Erin Alexander

COMPANY (FAX NUMBER

From:

NAME Lourida Brown

Reference:

Message:

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Date:_____

OCT 28 '93 11:08 CURTIS & TOMPKINS BERKELEY

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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Subsurface Consultants
171 12th Street
Suite 201
Oakland, CA 94608

Date: 28-OCT-93
Lab Job Number: 112797
Project ID: 609.001
Location: Hubbard Tank

Reviewed by: Linda B

Reviewed by: Teresa K. Morrison

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 112797
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET

DATE RECEIVED: 10/19/93
DATE EXTRACTED: 10/21/93
DATE ANALYZED: 10/23/93
DATE REPORTED: 10/28/93

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
112797-1	MW-1	ND	ND	50
112797-2	MW-2	**	50	50
112797-3	MW-3	ND	ND	50

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

** Kerosene range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RECOVERY, %	95

CHAIN OF CUSTODY FORM

PROJECT NAME: Hubbard Street
JOB NUMBER: 609-001
PROJECT CONTACT: Jeriann Alexander
SAMPLED BY: Fernando Vélez
LAB: Curtis & Tompkins
TURNAROUND: Normal
REQUESTED BY: Jeriann Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE			METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME	NOTES	ANALYSIS REQUESTED: TPH
112797-1	MW-1	X							X								X	X						X
-2	MW-2	X							X								X	X						X
-3	MW-3	X							X								X	X						X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
[signature]	10-19-93 4:08p		
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
		[signature]	10/19/93 4:08p

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
171 12th Street
Suite 201
Oakland, CA 94608

Date: 28-OCT-93
Lab Job Number: 112797
Project ID: 609.001
Location: Hubbard Tank

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 112797
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 609.001
LOCATION: HUBBARD STREET

DATE RECEIVED: 10/19/93
DATE EXTRACTED: 10/21/93
DATE ANALYZED: 10/23/93
DATE REPORTED: 10/28/93

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
112797-1	MW-1	ND	ND	50
112797-2	MW-2	**	50	50
112797-3	MW-3	ND	ND	50

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

** Kerosene range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RECOVERY, %	95

CHAIN OF CUSTODY FORM

PAGE 1 OF 1

PROJECT NAME: Hubbard Street
JOB NUMBER: 609-001
PROJECT CONTACT: Jeriann Alexander
SAMPLED BY: Fernando Vélez
LAB: Curtis & Tompkins
TURNAROUND: Normal
REQUESTED BY: Jeriann Alexander

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX						CONTAINERS						METHOD PRESERVED					SAMPLING DATE				NOTES	ANALYSIS REQUESTED
		WATER	SOIL	WASTE	AIR			VOA	LITER	PINT	TUBE			HCL	H_2SO_4	HNO_3	ICE	NONE	MONTH	DAY	YEAR	TIME		TPH
112797-1	MW-1	X							X								X	X						X
-2	MW-2	X							X								X	X						X
-3	MW-3	X							X								X	X						X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
	10-19-93 4:08pm		
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RELEASED BY: (Signature)	DATE / TIME
		Teresa K. Morrison	10/19/93 4:08pm

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

WELL SAMPLING FORM

Project Name: 4055 Hubbard Street

Well Number: MW-1

Job No.: 609.001

Well Casing Diameter: 2 inch

Sampled By: Fernando Velez

Date:

TOC Elevation: ~~20.25'~~

Weather:

Depth to Casing Bottom (below TOC) 20.25 feet

Depth to Groundwater (below TOC) 4.47' feet

Feet of Water in Well 15.78 feet

Depth to Groundwater When 80% Recovered 7.63 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.55 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Free Product [illegible]

Purge Method [illegible]

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
2	7.22	[illegible]	1.36x1000		[illegible]
4	6.78	68.6	1.13x1000		[illegible]
6	6.76	67.5	1.12x1000		"
8	6.77	67.3	1.19x1000		"
10	6.77	67.3	1.18x1000		"
12	6.77	67.5	1.18x1000		"

Total Gallons Purged 12 gallons

Depth to Groundwater Before Sampling (below TOC) 6.32 feet

Sampling Method disposable bailer

Containers Used 3 40 ml, 2 liter, pint

Subsurface Consultants

4055 HUBBARD STREET - OAKLAND, CA

JOB NUMBER	DATE	APPROVED	PLATE
609.001			

WELL SAMPLING FORM

Project Name: 4055 Hubbard Street
Well Number: ~~MW-3~~ MW-2

Job No.: 609.001
Well Casing Diameter: 2 inch

Sampled By: Fernando Velez
Date: 9-7-05

TOC Elevation: ~~15.13~~
Weather: sunny

Depth to Casing Bottom (below TOC) 15.13 feet
Depth to Groundwater (below TOC) 4.90 feet
Feet of Water in Well 10.23 feet
Depth to Groundwater When 80% Recovered 5.97 feet
Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 1.67 gallons
Depth Measurement Method Tape & Paste / Electronic Sounder / Other
Free Product None
Purge Method disposable bailer

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
	6.72	68.7	1.03x1000		clear
2	6.70	67.6	1.05x1000		Semi-clear
4	6.71	68.0	1.05x1000		"
6	6.73	67.1	1.05x1000		"

Total Gallons Purged 8 gallons
Depth to Groundwater Before Sampling (below TOC) 5.42 feet
Sampling Method 5.42 disposable bailer
Containers Used 3 (40 ml) 2 (liter) (pint)

Subsurface Consultants	4055 HUBBARD STREET - OAKLAND, CA	PLATE
	JOB NUMBER 609.001 / DATE / APPROVED	

WELL SAMPLING FORM

Project Name: 4055 Hubbard Street

Well Number: ~~MW-2~~ MW-5

Job No.: 609.001

Well Casing Diameter: 2 inch

Sampled By: Fernando Velez

Date: [illegible]

TOC Elevation: ~~15.13~~

Weather: [illegible]

Depth to Casing Bottom (below TOC) 15.2 feet

Depth to Groundwater (below TOC) 4.32 feet

Feet of Water in Well 10.61 feet

Depth to Groundwater When 80% Recovered 6.48 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 1.76 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Free Product none

Purge Method [illegible]

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°F)	Conductivity (micromhos/cm)	Salinity S%	Comments
2	6.81	65.3	1.07x1000		Clear
4	6.72	65.1	1.14x1000		Semi-clear
6	6.73	65.2	1.12x1000		"
8	6.70	65.3	1.13x1000		Semi-murky

Total Gallons Purged 8 gallons

Depth to Groundwater Before Sampling (below TOC) 6.40' feet

Sampling Method disposable bailer

Containers Used 3 (40 ml) 2 (liter) ___ (pint)

Subsurface Consultants	4055 HUBBARD STREET - OAKLAND, CA			PLATE
	JOB NUMBER 609.001	DATE	APPROVED	