Subsurface Consultants, Inc.

LOP 6704

LETTER OF TRANSMITTAL

TO: Susan Hugo
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

DATE: October 11, 2000

FROM: Glenn Young

PROJECT: 655 12th Street (aka, MLK between 11th & 12th), Oakland

SCI JOB NUMBER: 272.054

OFFICE SENT FROM: Lafayette

00 OCT 12 PM 3:43

ENVIRONMENTAL PROTECTION

WE ARE SENDING YOU: 1 copy(ies)

- ☐ final report
- ☐ draft report
- ☐ Service Agreement
- ☐ proposed scope of services
- ☐ specifications
- ☐ grading/foundation plans
- ☐ soil samples/groundwater samples
- ☐ executed contract

- ☐ if you have any questions, please call
- ☐ for your review and comment
- ☐ please return an executed copy
- ☐ with our comments
- ☐ for your use
- ☒ as requested
- ☐
- ☐

REMARKS:

Susan - As discussed, please find attached a draft copy of the Soil Investigation and Tier 3 RBCA Evaluation for the Subject Site.

The City and Oakland Redevelopment Agency are facilitating the proposed development of this site as a 2 to 4 story, 92-unit residential structure with a ventilated, first level parking garage that will be one-half below grade. The Site previously included USTs for gasoline, diesel fuel, and possibly motor oil. The USTs were removed in 1971 when the service station was demolished. Several investigations have been conducted for this site. Details regarding site conditions encountered in the upper 6 feeet of soil are summarized in the attached report.

SCI understands that Alameda County has agreed to assist the City on this project and we look forward to discussing this project with you on October 25, 2pm at your office. In the meantime, if you have any questions, please contact myself (925.299.7960) or Mark Gomez (510.238.7314)

3736 Mt Diablo Boulevard ■ Suite 200 ■ Lafayette, California 94549-3659 ■ (925) 299-7960 ■ Fax (925) 299-7970
171 12th Street ■ Suite 202 ■ Oakland, California 94607-4911 ■ (510) 268-0461 ■ Fax (510) 268-0137
870 Market Street ■ Suite 716 ■ San Francisco, California 94102 ■ (415) 352-0900 ■ Fax (415) 352-0901
301 River Street ■ Suite 9 ■ Napa, California 94559-3416 ■ (707) 257-6993 ■ Fax (707) 257-6995

DRAFT

September 7, 2000
- SCI 272.054

Mr. Mark Gomez
City of Oakland Public Works Agency
Environmental Services Department
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, California 94612

Soil Investigation and Tier 3 RBCA Evaluation
MLK, Jr. Way between 11th and 12th Street
Oakland, California

Dear Mr. Gomez:

Subsurface Consultants, Inc. (SCI) has prepared this letter to document a soil investigation performed to characterize shallow soil conditions prior to the proposed development at the above facility (Site). SCI also conducted a Tier 3 Risk-Based Corrective Action (RBCA) evaluation to confirm that chemicals of potential concern at the Site would pose no significant risk to the future users of the proposed residential development. The activities and scope of work were completed in accordance with SCI's proposal to the City of Oakland (City) dated July 27, 2000.

BACKGROUND

The Site is located at Martin Luther King Way, between 11th and 12th Street in Oakland, California (Plate 1). SCI understands that the City is facilitating redevelopment of this Site with a 2- to 4-story, 92-unit residential structure with a ½-story belowground parking structure. We understand that the parking structure will be constructed with an 11-inch thick concrete floor and mechanical ventilation system consistent with City building requirements. Previous studies for this Site include:

- *Preliminary Environmental Assessment* dated June 19, 1991 by SCI, and
- *Final Phase II Environmental Site Assessment* dated June 23, 2000 by Tetra Tech EM Inc.

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SCOPE OF SERVICES

Fieldwork was conducted using standard industry practices regarding worker safety, equipment decontamination, and sample handling. On August 4, 2000, SCI excavated 12 test pits from locations shown on Plate 2. Test pits were excavated using a backhoe to depths of approximately 6 feet below ground surface (bgs). In general, the soil encountered included dry, loose, silty and/or clayey sand (Merritt Sand) with gravel and brick fragments to the maximum depth explored.

Samples were collected at the ground surface, as well as between 2 to 3 and 5 to 6 feet below ground surface (bgs). The samples the from 0 to 1 foot bgs interval were collected using hand auger equipment prior to excavating the pit. Samples from the 2 to 3 and 5 to 6 foot intervals were collected from the bucket of the backhoe. The samples were retained in stainless steel liners, capped with Teflon sheeting and plastic end caps, and placed in an ice filled cooler. SCI's field geologist screened soil samples in the field using a photoionization detector (PID), and logged samples in accordance with the Unified Soil Classification System (USCS). Logs of the test pits, including PID readings, are attached.

ANALYTICAL TESTING PROGRAM

A total of 36 soil samples were submitted under chain-of-custody procedures to Curtis & Tompkins, Ltd., a State-certified laboratory. Each sample was analyzed for total lead concentrations using EPA Test Method 6010. Additionally 12 soil samples (one from each test pit) were tested for total volatile hydrocarbons as gasoline (TVHg); benzene, toluene, ethylbenzene, and xylenes (BTEX); total extractable hydrocarbons as diesel fuel (TEHd); and TEH as motor oil (TEHo) using EPA Test Method 8015m.

To assist with offsite disposal evaluation, two composite soil samples (Comp-1 and Comp-2) were tested for soluble lead concentrations using the California Waste Extraction Test (WET) method. The testing laboratory created each composite sample. Comp-1 was comprised of soil from samples TP-4@6', TP-8@6', and TP-12@6'. Comp-2 was comprised of soil from samples TP-4@2.5', TP-8@2.5', and TP-12@2'.

ANALYTICAL RESULTS

The results of chemical testing on soil samples collected from the test pits are summarized in Table 1.

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Analyses detected lead in each soil samples ranging from 1.3 to 220 milligrams per kilogram (mg/kg). No detected total lead concentrations exceeded 350 mg/kg, one of the criteria listed in the California Health and Safety Code (Section 25157.8.) that would require disposal at a class I facility. Statistical evaluation of the data for the surface soil samples indicates a mean value of 157 mg/kg with a 95% upper confidence limit (UCL) of 197. For the remaining test pit samples, statistical evaluation indicates a mean value of 23 mg/kg and a 95% UCL of 42. Except for Test Pits 4, 8, and 12, lead concentrations exceeding 50 mg/kg appear limited to the surface samples.

Using the WET method, analyses detected 3.6 milligrams per liter (mg/l) of soluble lead in Comp-1 and 7.7 mg/l of soluble lead in Comp-2. The results for Comp-2 exceed the Soluble Threshold Limit Concentration (STLC) criterion of 5 mg/l, indicating that soil containing these levels of soluble record will likely be subject to disposal as a California hazardous waste.

Analyses on 12 of the 36 samples detected no BTEX concentrations. TEHd and TEHo were detected in only 3 of the 12 samples tested. Detected TEHd concentrations included 6.3 mg/kg in TP-4@2.5', 4.6 mg/kg in TP-8@2.5', and 6.6 mg/kg in TP-12@2.0'. Detected TEHo concentrations included 46 mg/kg in TP-4@2.5', 36 mg/kg in TP-8@2.5', and 81 mg/kg in TP-12@2.

TIER 3 RBCA EVALUATION

SCI contracted with SOMA Corporation (SOMA) to conduct the Tier 3 RBCA evaluation. SOMA compiled the previous and current environmental data; calculated the 95% upper confidence level for lead, BTEX, and other volatile organic compounds (VOCs); and performed the Tier 3 evaluation. Results of the BTEX and VOC analytes detected during environmental testing were evaluated using the City's Urban Land Redevelopment (ULR) RBCA spreadsheet (Tier 3) to evaluate future risk at the Site assuming a residential scenario. The potentially complete exposure pathways considered for that evaluation included the inhalation to indoor and outdoor air from chemicals in soil and groundwater. Results for total lead were compared to the residential Preliminary Remedial Goal (PRG) of 400 mg/kg established by Region IX of the USEPA.

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Results of the Tier 3 evaluation indicate that BTEX and VOC concentrations in soil and groundwater indicate estimated excess cancer risks for both indoor and outdoor air of less than 1E-05, and noncancer hazards of less than a value of 1 for the residential scenario, which are below the City's respective target cancer risk level of 1E-05 and noncancer hazard of 1, upon removal of the upper 6 feet of soil during the proposed development, the calculated 95% UCL for total lead in the remaining soil is 27 mg/kg with a maximum concentration of 91 mg/kg. These total lead concentrations are well below the PRG criterion for lead in a residential scenario. Details regarding the RBCA analysis are presented in SOMA's letter dated September 6, 2000 (attached).

CONCLUSIONS AND RECOMMENDATIONS

Based on the results presented above, SCI concludes that surface soil across the Site contains elevated total lead concentrations. Results of analyses suggest that soil excavated from the upper 1 foot of soil across the Site as well as from the upper 3 to 4 feet near TP-4, 8, and 12 contains soluble lead concentrations that exceed the STLC criterion for lead, and therefore will likely be subject to disposal as a California hazardous waste. Analyses suggest that soil excavated from the remaining areas will not likely exceed STLC criterion and, therefore, can be disposed as California non-hazardous waste. SCI recommends conducting further soluble lead analyses using the Federal Toxicity Characteristic Leaching Procedure (TCLP) to check that these soils can be disposed as a non-RCRA waste.

Assuming that the upper 6 feet of soil is removed during development, results of the Tier 3 RBCA evaluation indicate that lead and other chemicals detected in the soil and groundwater do not represent a threat to the future anticipated residential uses via indoor and outdoor inhalation pathways evaluated in the RBCA Study.

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CLOSING STATEMENT

We trust that this provides the information required at this time. If you have any questions, please call.

Yours very truly,

Subsurface Consultants, Inc.

Obiajulo Nzewa
Staff Geologist

Glenn S. Young, RG
Associate Geologist

ON: GSY:ae 272.054\MLK Report

3 copies submitted

Attachments: Table 1 – Soil Results
Plate 1 – Vicinity Map
Plate 2 – Test Pit Locations
Logs of Test Pits
Analytical Reports with Chain-of-Custody Documentation
SOMA letter dated September 6, 2000

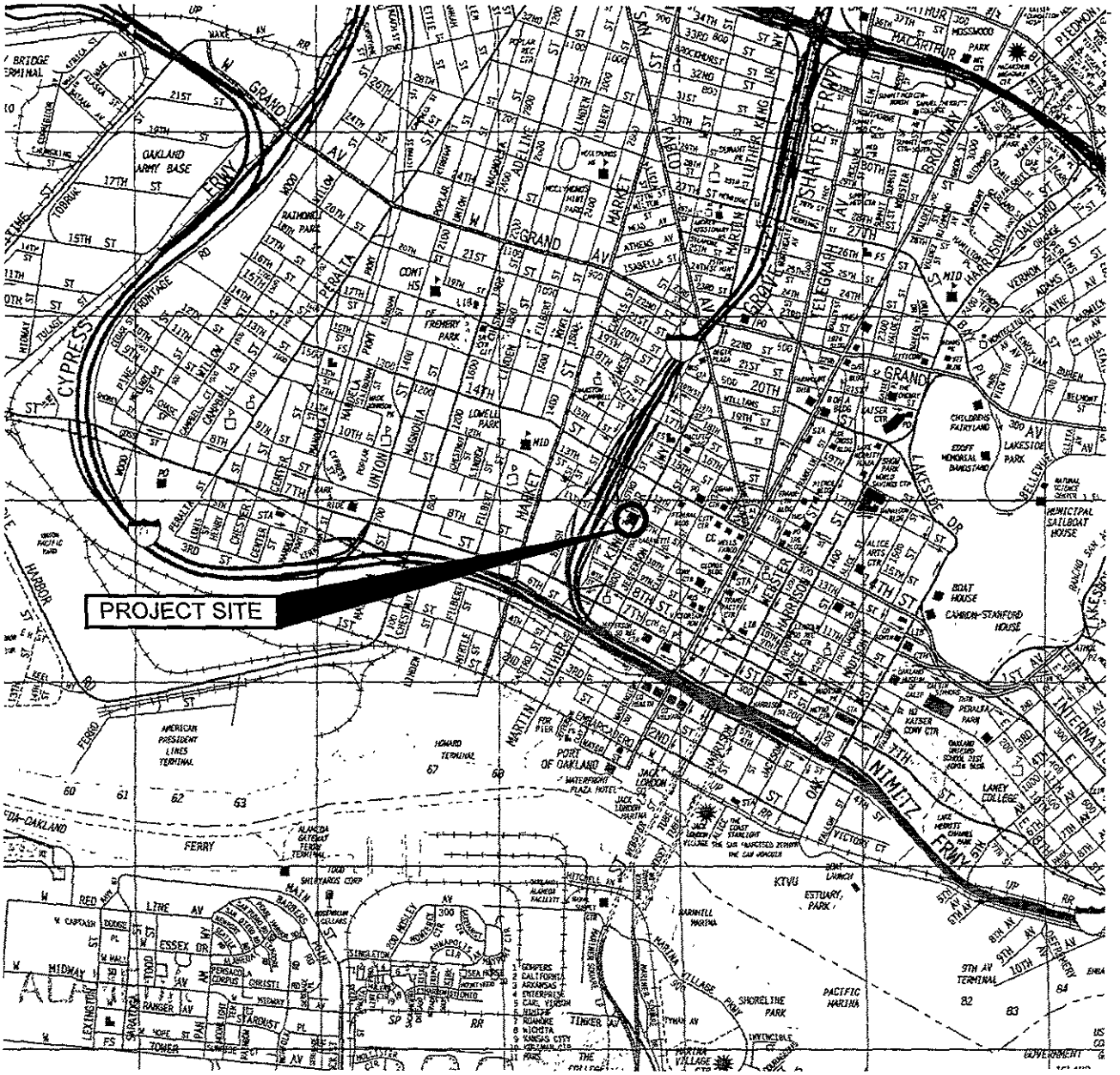
Table 1: Summary of Analytical Results - Soil Samples
Martin Luther King Jr. Way, Between 11th and 12th Street
Oakland, California

Sample ID	Units	TEHd *	TEHo *	TVHg	Benzene	Toluene	Ethyl benzene	Xylenes	Lead	WET Lead
TP-1@0.0	mg/kg	--	--	--	--	--	--	--	160	--
TP-1@2.0	mg/kg	--	--	--	--	--	--	--	3.1	--
TP-1@5.0	mg/kg	<1	<5	<0.97	<4.9	<4.9	<4.9	<4.9	3.6	--
TP-2@0.0	mg/kg	--	--	--	--	--	--	--	20	--
TP-2@2.0	mg/kg	<1	<5	<0.97	<4.9	<4.9	<4.9	<4.9	1.6	--
TP-2@5.0	mg/kg	--	--	--	--	--	--	--	2.1	--
TP-3@0.0	mg/kg	--	--	--	--	--	--	--	160	--
TP-3@3.0	mg/kg	--	--	--	--	--	--	--	1.8	--
TP-3@6.0	mg/kg	<.99	<5	<0.95	<4.8	<4.8	<4.8	<4.8	7.0	--
TP-4@0.0	mg/kg	--	--	--	--	--	--	--	170	--
TP-4@2.5	mg/kg	**6.3 h,y**	**46**	<0.97	<4.9	<4.9	<4.9	<4.9	86	--
TP-4@6.0	mg/kg	--	--	--	--	--	--	--	91	--
TP-5@0.0	mg/kg	--	--	--	--	--	--	--	110	--
TP-5@2.0	mg/kg	<1	<5	<0.93	<4.7	<4.7	<4.7	<4.7	4.5	--
TP-5@6.0	mg/kg	--	--	--	--	--	--	--	2.4	--
TP-6@0.0	mg/kg	--	--	--	--	--	--	--	190	--
TP-6@2.5	mg/kg	--	--	--	--	--	--	--	1.9	--
TP-6@6.0	mg/kg	<1	<5	<0.92	<4.6	<4.6	<4.6	<4.6	2.0	--
TP-7@0.0	mg/kg	--	--	--	--	--	--	--	220	--
TP-7@2.0	mg/kg	<1	<5	<0.93	<4.7	<4.7	<4.7	<4.7	2.1	--
TP-7@6.0	mg/kg	--	--	--	--	--	--	--	2.5	--
TP-8@0.0	mg/kg	--	--	--	--	--	--	--	220	--
TP-8@2.5	mg/kg	**4.6 h,y**	**36**	<0.95	<4.8	<4.8	<4.8	<4.8	180	--
TP-8@6.0	mg/kg	--	--	--	--	--	--	--	1.7	--
TP-9@0.0	mg/kg	--	--	--	--	--	--	--	220	--
TP-9@2.0	mg/kg	--	--	--	--	--	--	--	1.4	--
TP-9@5.0	mg/kg	<1	<5	<0.95	<4.8	<4.8	<4.8	<4.8	1.3	--
TP-10@0.0	mg/kg	--	--	--	--	--	--	--	150	--
TP-10@2.0	mg/kg	<1	<5	<0.94	<4.7	<4.7	<4.7	<4.7	1.9	--
TP-10@5.0	mg/kg	--	--	--	--	--	--	--	2.2	--
TP-11@0.0	mg/kg	--	--	--	--	--	--	--	200	--
TP-11@2.0	mg/kg	--	--	--	--	--	--	--	15	--
TP-11@5.0	mg/kg	<1	<5	<0.97	<4.9	<4.9	<4.9	<4.9	1.9	--
TP-12@0.0	mg/kg	--	--	--	--	--	--	--	72	--
TP-12@2.0	mg/kg	**6.6 h,y**	**81**	<0.94	<4.7	<4.7	<4.7	<4.7	110	--
TP-12@5.0	mg/kg	--	--	--	--	--	--	--	19	--
COMP-1	mg/l	--	--	--	--	--	--	--	--	3.6
COMP-2	mg/l	--	--	--	--	--	--	--	--	7.7

Notes:
Soil samples collected on August 4, 2000
Detected concentrations shown in bold
TEHd Total Extractable Hydrocarbons as diesel
TEHo Total Extractable Hydrocarbons as motor oil
TVHg Total Volatile Hydrocarbons as gasoline
* Using silica gel cleanup
WET Waste Extraction Test

mg/kg milligrams per kilogram
mg/l milligrams per liter
-- Sample not analyzed
< Not detected at or above the laboratory reporting limit
COMP - 1 is a composite of TP-4@6', TH-8@6' and TP-12@5'
COMP - 2 is a composite of TP-4@2.5', TH-8@2.5', and TP-12@2'

Based on review of the chromatograms
h heavier hydrocarbons contributed to the quantitation
y sample exhibits fuel pattern which does not resemble standard



NOTE:

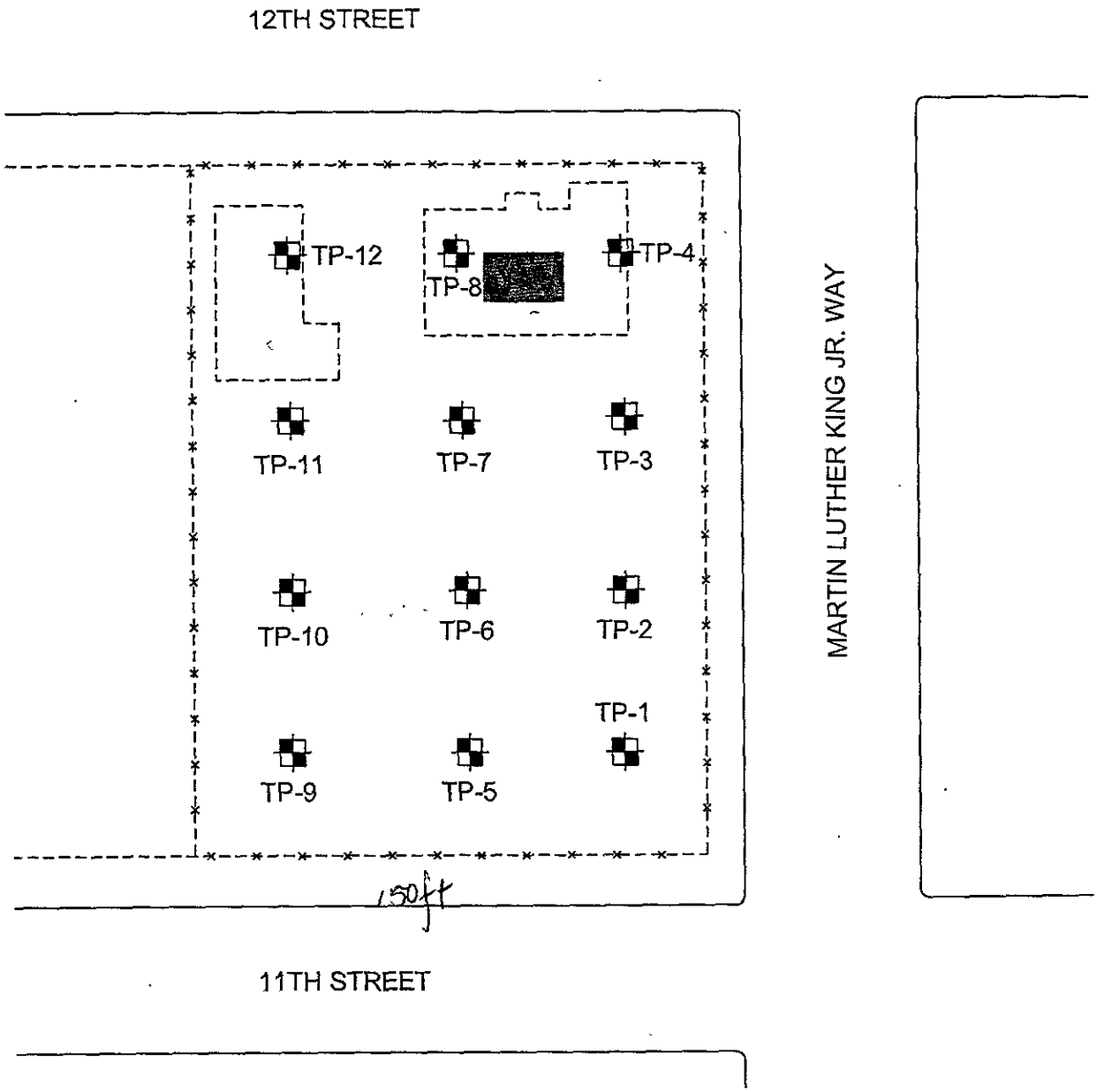
THIS VICINITY MAP IS BASED ON A THOMAS GUIDE MAP FOR SAN FRANCISCO, ALAMEDA AND CONTRA COSTA COUNTIES, CALIFORNIA, MAP 649, YEAR 2000

VICINITY MAP

MLK. JR. WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

SCI
Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

DRAWN BY	DATE	PLATE
CFY	9/12/00	1
JOB NUMBER	FILE NUMBER	
272 054	A272.054.03	



LEGEND:

TP-10 — APPROXIMATE LOCATION OF TEST PIT EXCAVATED ON 8/4/00

FENCE

APPROXIMATE LOCATION OF PREVIOUS BASEMENTS

APPROXIMATE LOCATION OF FORMER TANKS

APPROXIMATE SCALE IN FEET

0 50 100

N

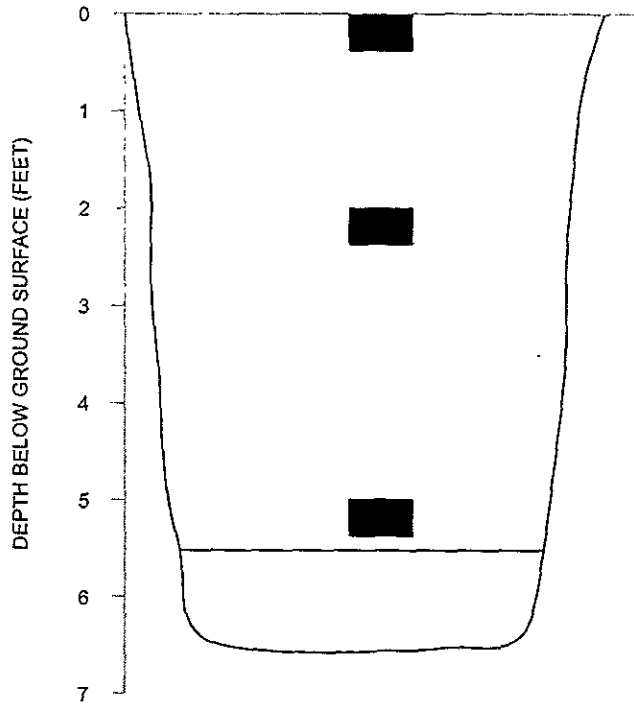
TEST PIT LOCATIONS

12TH STREET AND MARTIN LUTHER KING JR. WAY
WALNUT CREEK, CALIFORNIA

DRAWN BY	DATE	PLATE
CFY	08/21/00	2
JOB NUMBER	FILE NUMBER	
272.054	A272.054 02	

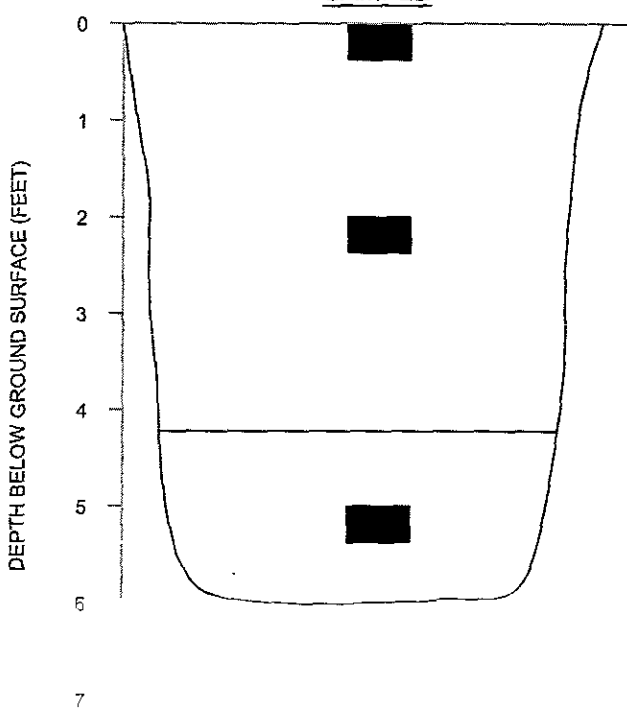
SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

TP-1



DESCRIPTION	OVM
SILTY SAND WITH GRAVEL (SM) Brown, loose, dry	7.3
Grades to poorley graded silty sand (SM), Brown, loose, dry	7.0
Color Change to tannish brown	
CLAYEY SAND (SC)	7.5
Test pit terminated at 6.5 feet	

TP-2



DESCRIPTION	OVM
SILTY SAND WITH GRAVEL (SM) Brown, loose, dry	4.1
SILTY SAND (SM) Poorly graded, brown, loose	5.2
CLAYEY SAND (SC) Brown with mottled orange brown, loose, moist	5.6
Test pit terminated at 6.0 feet	

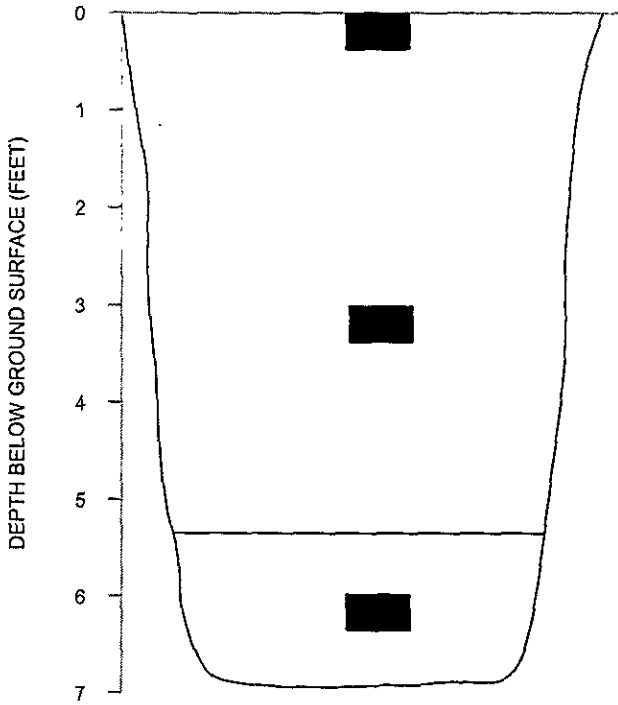
TEST PIT LOGS

MLK. JR. WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

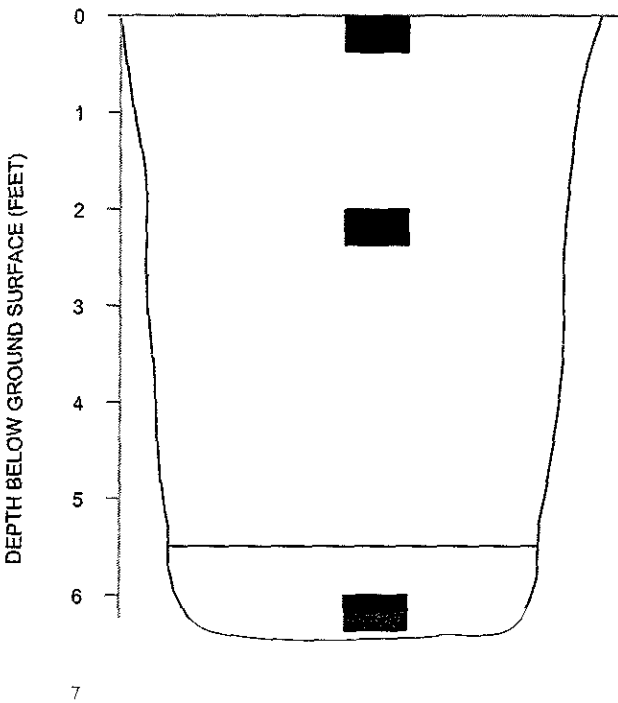
DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-1 & TP-2
JOB NUMBER	FILE NUMBER	
272.054	A272.054.04	

TP-3



SAMPLE	DESCRIPTION	OVM
	SILTY SAND WITH GRAVEL (SM) Brown, loose, dry, bricks in upper 1 feet	4.1
	Grades to poorley graded silty sand, brown, loose, dry, soft	11.3
	CLAYEY SAND (SC) Brown, mottled, tan, moist, loose, soft	13.9
	Test pit terminated at 7.0 feet	

TP-4



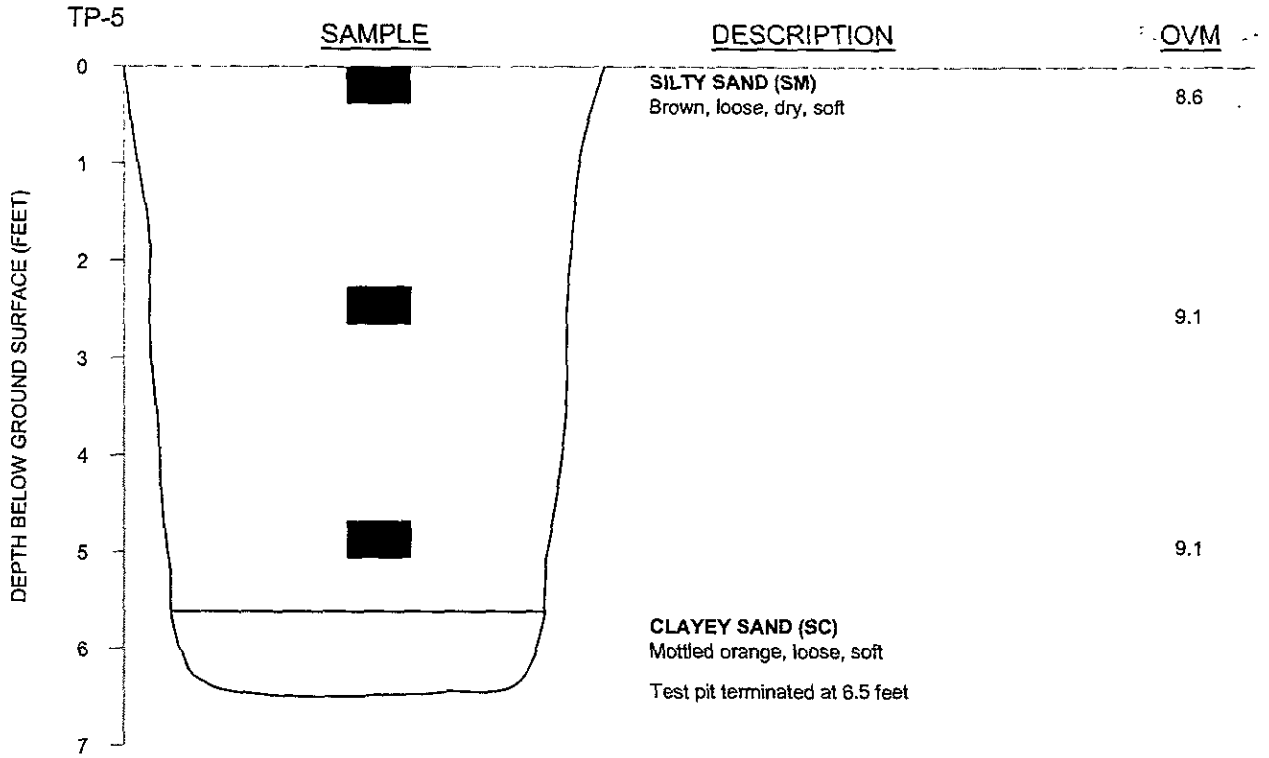
SAMPLE	DESCRIPTION	OVM
	SILTY SAND (SM) Brown, loose, dry, very soft	6.5
	SILTY SAND (SM) Poorly graded, brown, loose	13.9
	CLAYEY SAND (SC) Brown with mottled orange brown, loose, moist	13.4
	Test pit terminated at 6.5 feet	

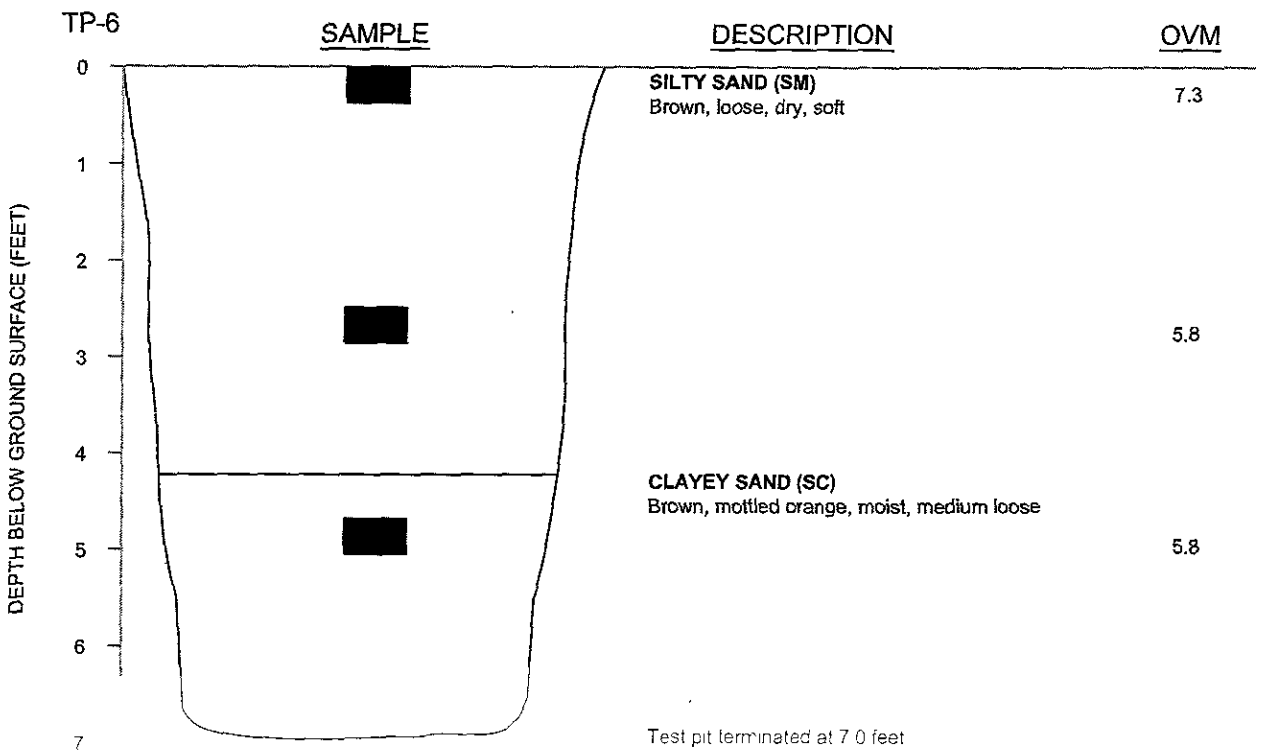
TEST PIT LOGS

MLK. JR WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-3 & TP-4
JOB NUMBER	FILE NUMBER	
272 054	A272.054 04	





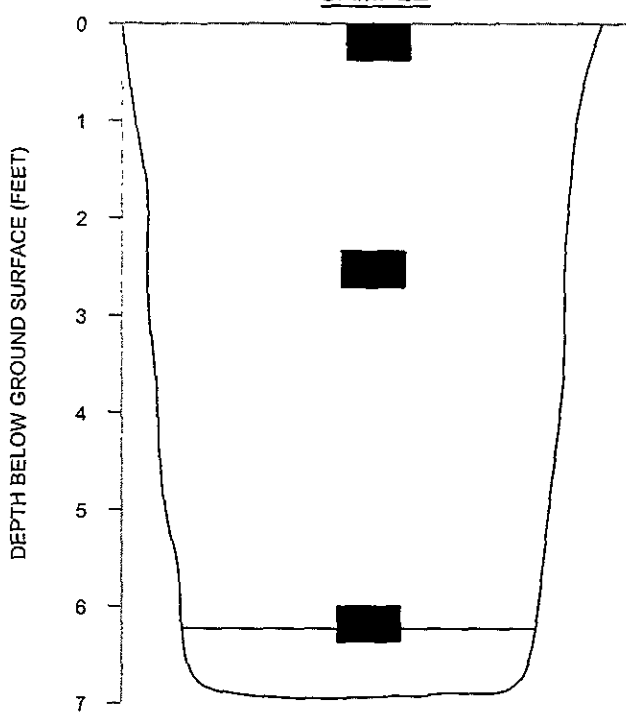
TEST PIT LOGS

MLK JR WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

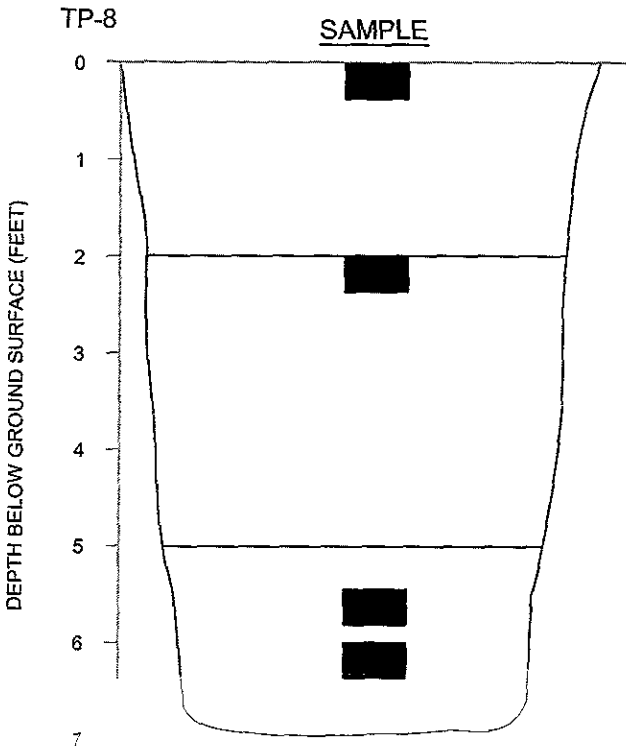
Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-5 & TP-6
JOB NUMBER	FILE NUMBER	
272 054	A272 054.04	

TP-7



TP-8



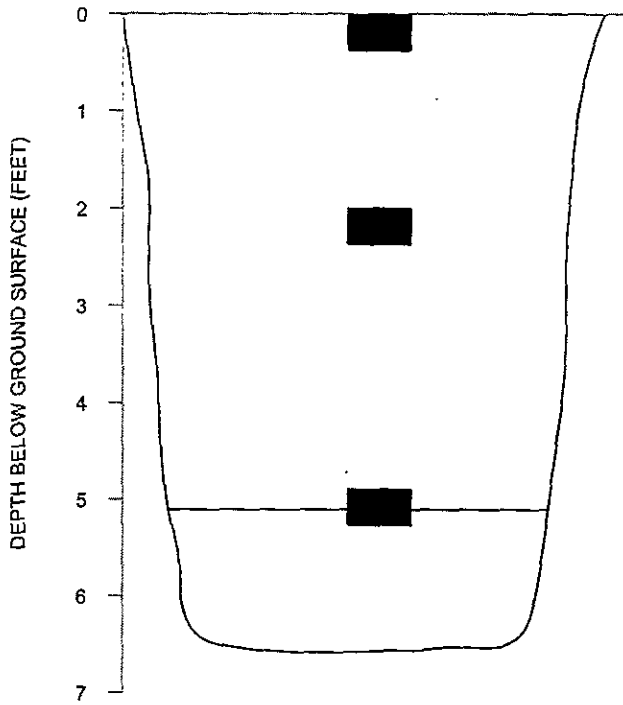
TEST PIT LOGS

MLK JR. WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

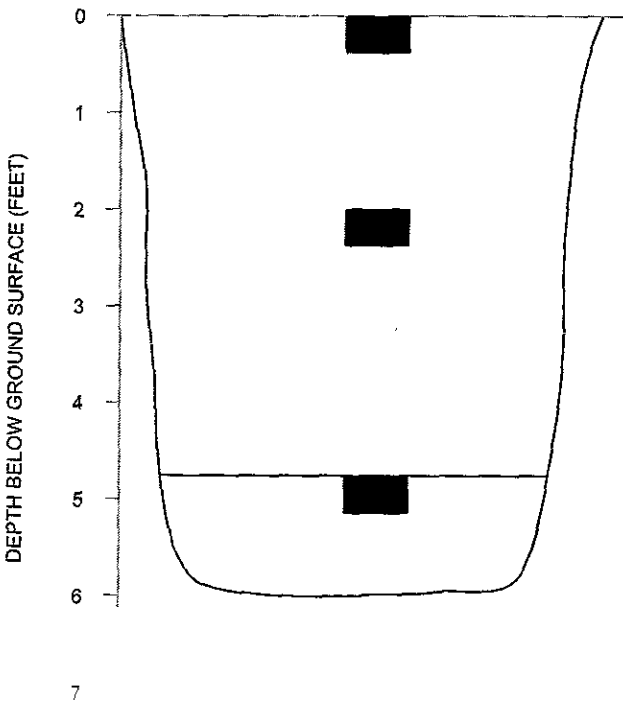
DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-7 & TP-8
JOB NUMBER	FILE NUMBER	
272 054	A272 054 04	

TP-9



SAMPLE	DESCRIPTION	OVM
	SILTY SAND WITH GRAVEL (SM) Brown, loose, dry, bricks	7.5
	Grades to silty sand (SM)	
		5.1
	CLAYEY SAND (SC) Brown - mottled orange, moist, medium stiff	5.1
	Test pit terminated at 6.5 feet	

TP-10



SAMPLE	DESCRIPTION	OVM
	SILTY SAND WITH GRAVEL (SM) Brown, loose, dry	7.5
	Grades to a poorly graded, silty sand	7.3
	CLAYEY SAND (SC) Brown - mottled orange, moist, medium stiff	7.2
	Test pit terminated at 6 0 feet	

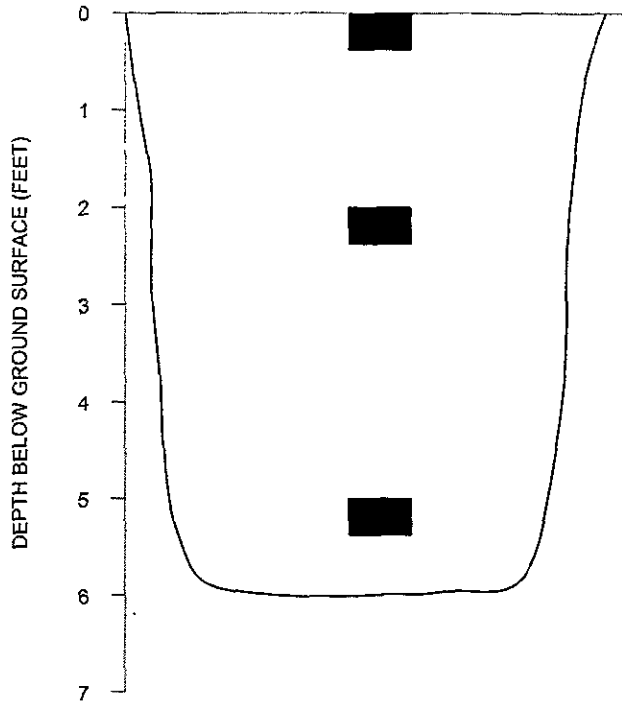
TEST PIT LOGS

MLK. JR WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

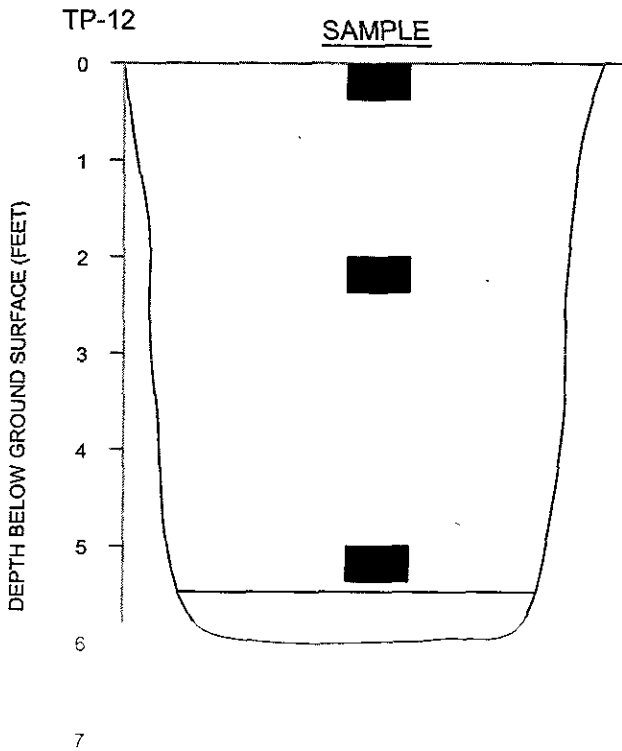
Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-9 & TP-10
JOB NUMBER	FILE NUMBER	
272.054	A272.054 04	

TP-11



TP-12



TEST PIT LOGS

MLK JR. WAY BETWEEN 11TH AND 12TH STREETS
OAKLAND, CALIFORNIA

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

DRAWN BY	DATE	TEST PIT
CFY	9/13/00	TP-11 & TP-12
JOB NUMBER	FILE NUMBER	
272 054	A272.054 04	

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

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
3736 Mt. Diablo Blvd.
Suite 200
Lafayette, CA 94549

Date: 25-AUG-00
Lab Job Number: 146924
Project ID: 272.054
Location: MLK Between 11th&12th

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis.

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

Curtis & Tompkins, Ltd.

Laboratory Number: **146924**
Client: **Subsurface Consultants, Inc.**
Project Name: **MLK between 11th & 12th**

Receipt Date: **08/07/00**

CASE NARRATIVE

This hardcopy data package contains sample results and batch QC results for thirty-six soil samples received from the above referenced project. The samples were received cold and intact.

Total Volatile Hydrocarbons: The trifluorotoluene surrogate recoveries for the blank spikes from batch number 57639 were outside acceptance limits due to coelution of the surrogate peak with hydrocarbon peaks. The associated bromofluorobenzene surrogate recoveries were acceptable. No other analytical problems were encountered.

Total Extractable Hydrocarbons: The matrix spike recoveries were not meaningful. The concentration of analyte in the spiked sample rendered the spike amount insignificant. No other analytical problems were encountered.

Metals: No analytical problems were encountered.

14624

CHAIN OF CUSTODY FORM

PROJECT NAME: Mack between 11th & 12th

JOB NUMBER: 272.054 LAB: Curtis & Tompkins

PROJECT CONTACT: G. Young TURNAROUND: Standard

SAMPLED BY: E. Silverman REQUESTED BY: E. Silverman

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: Total Lead (6010)	TVH-g, BTEX (8015m)	TEH-d, TEH-o (w/ silica gel) (8015)								
1	TP-1 @0.0		X								1						X		08	04	00	0750		X										
2	TP-1 @2.0		X								1						X		08	04	00	0843		X										
3	TP-1 @5.0		X								1						X		08	04	00	0844		X	X	X	X							
4	TP-2 @0.0		X								1						X		08	04	00	0752		X										
5	TP-2 @2.0		X								1						X		08	04	00	0904		X	X	X	X							
6	TP-2 @5.0		X								1						X		08	04	00	0910		X										
7	TP-3 @0.0		X								1						X		08	04	00	0754		X										
8	TP-3 @3.0		X								1						X		08	04	00	0919		X										
9	TP-3 @6.0		X								1						X		08	04	00	0923		X	X	X	X							
10	TP-4 @0.0		X								1						X		08	04	00	0758		X										
11	TP-4 @2.5		X								1						X		08	04	00	0933		X	X	X	X							
12	TP-4 @6.0		X								1						X		08	04	00	0941		X										

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
E. Silverman	8/4/00 5:00	[signature]	8/4/00 5:00
[signature]	8/7/00 10:20	[signature]	8/7/00 10:20

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 - 12th Street, Suite 202, Oakland, CA 94607
(510) 268-0461 - FAX: (510) 268-0137
3736 Mt. Diablo Blvd., Ste. 200, Lafayette, CA 94549
(925) 299-7960 - (925) 299-7970

CHAIN OF CUSTODY FORM

PROJECT NAME: Mark between 11th & 12th

JOB NUMBER: 272.054 LAB: Curtis & Tompkins

PROJECT CONTACT: G. Young TURNAROUND: Standard

SAMPLED BY: E. Silverman REQUESTED BY: E. Silverman

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: Total Lead (6010)	TVH-g, BTEX (8020)	TEH-d, TEH-o (w/ silica gel) (8015)									
13	TP-5 @0.0		X								1						X		08	04	00	0810		X											
14	TP-5 @2.0		X								1						X		08	04	00	0956		X	X	X	X								
15	TP-5 @6.0		X								1						X		08	04	00	1012		X											
16	TP-6 @0.0		X								1						X		08	04	00	0804		X											
17	TP-6 @2.5		X								1						X		08	04	00	1032		X											
18	TP-6 @6.0		X								1						X		08	04	00	1038		X	X	X	X								
19	TP-7 @0.0		X								1						X		08	04	00	0807		X											
20	TP-7 @2.0		X								1						X		08	04	00	1044		X	X	X	X								
21	TP-7 @6.0		X								1						X		08	04	00	1053		X											
22	TP-8 @0.0		X								1						X		08	04	00	0810		X											
23	TP-8 @2.5		X								1						X		08	04	00	1112		X	X	X	X								
24	TP-8 @6.0		X								1						X		08	04	00	1118		X											

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
	8/4/00 5:00		8/4/00 5:00
	8/7/00 10:20		8/7/00 10:20

COMMENTS & NOTES:

SCI
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(925) 299-7960 - (925) 299-7970

CHAIN OF CUSTODY FORM

PROJECT NAME: MLK between 11th & 12th

JOB NUMBER: 272.054 LAB: Curtis & Tompkins

PROJECT CONTACT: G. Young TURNAROUND: Standard

SAMPLED BY: E. Silverman REQUESTED BY: E. Silverman

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: Total Lead (6010)	TVH-g, BTEX (8015m)	TEH-d, TEHo(w) silica gel (8015)
25	TP-9 @0.0		X						1				X		08	04	00			X		
26	TP-9 @2.0		X						1				X		08	04	00			X		
27	TP-9 @5.0		X						1				X		08	04	00			X	X	X
28	TP-10 @0.0		X						1				X		08	04	00			X		
29	TP-10 @2.0		X						1				X		08	04	00			X	X	X
30	TP-10 @5.0		X						1				X		08	04	00			X		
31	TP-11 @0.0		X						1				X		08	04	00			X		
32	TP-11 @2.0		X						1				X		08	04	00			X		
33	TP-11 @5.0		X						1				X		08	04	00			X	X	X
34	TP-12 @0.0		X						1				X		08	04	00			X		
35	TP-12 @2.0		X						1				X		08	04	00			X	X	X
36	TP-12 @5.0		X						1				X		08	04	00			X		

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
E. Silverman	8/4/00 5:00	[signature]	8/4/00 5:00
[signature]	8.7.00 10:20	[signature]	8/7/00 10:20

COMMENTS & NOTES:

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Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID:	TP-1@5.0	Batch#:	57546
Type:	SAMPLE	Analyzed:	08/09/00
Lab ID:	146924-003		

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.97	mg/Kg	EPA 8015M
Benzene	ND	4.9	ug/Kg	EPA 8021B
Toluene	ND	4.9	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.9	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.9	ug/Kg	EPA 8021B
o-Xylene	ND	4.9	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	98	62-138	EPA 8015M
Bromofluorobenzene (FID)	101	46-150	EPA 8015M
Trifluorotoluene (PID)	99	65-134	EPA 8021B
Bromofluorobenzene (PID)	102	55-138	EPA 8021B

Field ID:	TP-2@2.0	Batch#:	57639
Type:	SAMPLE	Analyzed:	08/12/00
Lab ID:	146924-005		

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.97	mg/Kg	EPA 8015M
Benzene	ND	4.9	ug/Kg	EPA 8021B
Toluene	ND	4.9	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.9	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.9	ug/Kg	EPA 8021B
o-Xylene	ND	4.9	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	112	62-138	EPA 8015M
Bromofluorobenzene (FID)	108	46-150	EPA 8015M
Trifluorotoluene (PID)	130	65-134	EPA 8021B
Bromofluorobenzene (PID)	127	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID: TP-3@6.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-009

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.95	mg/Kg	EPA 8015M
Benzene	ND	4.8	ug/Kg	EPA 8021B
Toluene	ND	4.8	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.8	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.8	ug/Kg	EPA 8021B
o-Xylene	ND	4.8	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	107	62-138	EPA 8015M
Bromofluorobenzene (FID)	109	46-150	EPA 8015M
Trifluorotoluene (PID)	107	65-134	EPA 8021B
Bromofluorobenzene (PID)	109	55-138	EPA 8021B

Field ID: TP-4@2.5 Batch#: 57585
Type: SAMPLE Analyzed: 08/11/00
Lab ID: 146924-011

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.97	mg/Kg	EPA 8015M
Benzene	ND	4.9	ug/Kg	EPA 8021B
Toluene	ND	4.9	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.9	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.9	ug/Kg	EPA 8021B
o-Xylene	ND	4.9	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	111	62-138	EPA 8015M
Bromofluorobenzene (FID)	115	46-150	EPA 8015M
Trifluorotoluene (PID)	111	65-134	EPA 8021B
Bromofluorobenzene (PID)	115	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID: TP-5@2.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-014

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.93	mg/Kg	EPA 8015M
Benzene	ND	4.7	ug/Kg	EPA 8021B
Toluene	ND	4.7	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.7	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.7	ug/Kg	EPA 8021B
o-Xylene	ND	4.7	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	106	62-138	EPA 8015M
Bromofluorobenzene (FID)	110	46-150	EPA 8015M
Trifluorotoluene (PID)	108	65-134	EPA 8021B
Bromofluorobenzene (PID)	111	55-138	EPA 8021B

Field ID: TP-6@6.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-018

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.92	mg/Kg	EPA 8015M
Benzene	ND	4.6	ug/Kg	EPA 8021B
Toluene	ND	4.6	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.6	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.6	ug/Kg	EPA 8021B
o-Xylene	ND	4.6	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	106	62-138	EPA 8015M
Bromofluorobenzene (FID)	109	46-150	EPA 8015M
Trifluorotoluene (PID)	105	65-134	EPA 8021B
Bromofluorobenzene (PID)	109	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID: TP-7@2.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-020

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.93	mg/Kg	EPA 8015M
Benzene	ND	4.7	ug/Kg	EPA 8021B
Toluene	ND	4.7	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.7	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.7	ug/Kg	EPA 8021B
o-Xylene	ND	4.7	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	109	62-138	EPA 8015M
Bromofluorobenzene (FID)	110	46-150	EPA 8015M
Trifluorotoluene (PID)	110	65-134	EPA 8021B
Bromofluorobenzene (PID)	112	55-138	EPA 8021B

Field ID: TP-8@2.5 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-023

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.95	mg/Kg	EPA 8015M
Benzene	ND	4.8	ug/Kg	EPA 8021B
Toluene	ND	4.8	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.8	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.8	ug/Kg	EPA 8021B
o-Xylene	ND	4.8	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	109	62-138	EPA 8015M
Bromofluorobenzene (FID)	113	46-150	EPA 8015M
Trifluorotoluene (PID)	110	65-134	EPA 8021B
Bromofluorobenzene (PID)	113	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID: TP-9@5.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-027

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.95	mg/Kg	EPA 8015M
Benzene	ND	4.8	ug/Kg	EPA 8021B
Toluene	ND	4.8	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.8	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.8	ug/Kg	EPA 8021B
o-Xylene	ND	4.8	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	110	62-138	EPA 8015M
Bromofluorobenzene (FID)	112	46-150	EPA 8015M
Trifluorotoluene (PID)	112	65-134	EPA 8021B
Bromofluorobenzene (PID)	114	55-138	EPA 8021B

Field ID: TP-10@2.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-029

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.94	mg/Kg	EPA 8015M
Benzene	ND	4.7	ug/Kg	EPA 8021B
Toluene	ND	4.7	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.7	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.7	ug/Kg	EPA 8021B
o-Xylene	ND	4.7	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	105	62-138	EPA 8015M
Bromofluorobenzene (FID)	104	46-150	EPA 8015M
Trifluorotoluene (PID)	108	65-134	EPA 8021B
Bromofluorobenzene (PID)	109	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Field ID: TP-11@5.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-033

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.97	mg/Kg	EPA 8015M
Benzene	ND	4.9	ug/Kg	EPA 8021B
Toluene	ND	4.9	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.9	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.9	ug/Kg	EPA 8021B
o-Xylene	ND	4.9	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	109	62-138	EPA 8015M
Bromofluorobenzene (FID)	114	46-150	EPA 8015M
Trifluorotoluene (PID)	111	65-134	EPA 8021B
Bromofluorobenzene (PID)	114	55-138	EPA 8021B

Field ID: TP-12@2.0 Batch#: 57546
Type: SAMPLE Analyzed: 08/09/00
Lab ID: 146924-035

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	0.94	mg/Kg	EPA 8015M
Benzene	ND	4.7	ug/Kg	EPA 8021B
Toluene	ND	4.7	ug/Kg	EPA 8021B
Ethylbenzene	ND	4.7	ug/Kg	EPA 8021B
m,p-Xylenes	ND	4.7	ug/Kg	EPA 8021B
o-Xylene	ND	4.7	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	113	62-138	EPA 8015M
Bromofluorobenzene (FID)	115	46-150	EPA 8015M
Trifluorotoluene (PID)	114	65-134	EPA 8021B
Bromofluorobenzene (PID)	117	55-138	EPA 8021B

Type: BLANK Batch#: 57546
Lab ID: QC122256 Analyzed: 08/08/00

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	1.0	mg/Kg	EPA 8015M
Benzene	ND	5.0	ug/Kg	EPA 8021B
Toluene	ND	5.0	ug/Kg	EPA 8021B
Ethylbenzene	ND	5.0	ug/Kg	EPA 8021B
m,p-Xylenes	ND	5.0	ug/Kg	EPA 8021B
o-Xylene	ND	5.0	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	95	62-138	EPA 8015M
Bromofluorobenzene (FID)	94	46-150	EPA 8015M
Trifluorotoluene (PID)	95	65-134	EPA 8021B
Bromofluorobenzene (PID)	96	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000		

Type: BLANK
Lab ID: QC122406
Batch#: 57585
Analyzed: 08/10/00

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	1.0	mg/Kg	EPA 8015M
Benzene	ND	5.0	ug/Kg	EPA 8021B
Toluene	ND	5.0	ug/Kg	EPA 8021B
Ethylbenzene	ND	5.0	ug/Kg	EPA 8021B
m,p-Xylenes	ND	5.0	ug/Kg	EPA 8021B
o-Xylene	ND	5.0	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	107	62-138	EPA 8015M
Bromofluorobenzene (FID)	109	46-150	EPA 8015M
Trifluorotoluene (PID)	106	65-134	EPA 8021B
Bromofluorobenzene (PID)	109	55-138	EPA 8021B

Type: BLANK
Lab ID: QC122614
Batch#: 57639
Analyzed: 08/11/00

Analyte	Result	RL	Units	Analysis
Gasoline C7-C12	ND	1.0	mg/Kg	EPA 8015M
Benzene	ND	5.0	ug/Kg	EPA 8021B
Toluene	ND	5.0	ug/Kg	EPA 8021B
Ethylbenzene	ND	5.0	ug/Kg	EPA 8021B
m,p-Xylenes	ND	5.0	ug/Kg	EPA 8021B
o-Xylene	ND	5.0	ug/Kg	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	113	62-138	EPA 8015M
Bromofluorobenzene (FID)	109	46-150	EPA 8015M
Trifluorotoluene (PID)	130	65-134	EPA 8021B
Bromofluorobenzene (PID)	126	55-138	EPA 8021B

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Type:	LCS	Basis:	wet
Lab ID:	QC122257	Diln Fac:	1.000
Matrix:	Soil	Batch#:	57546
Units:	mg/Kg	Analyzed:	08/08/00

Analyte	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12	10.00	8.781	88	75-123	EPA 8015M
Benzene		NA			
Toluene		NA			
Ethylbenzene		NA			
m,p-Xylenes		NA			
o-Xylene		NA			

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	106	62-138	EPA 8015M
Bromofluorobenzene (FID)	111	46-150	EPA 8015M
Trifluorotoluene (PID)	107	65-134	EPA 8021B
Bromofluorobenzene (PID)	106	55-138	EPA 8021B

NA= Not Analyzed

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Diln Fac:	1.000
Units:	ug/Kg	Batch#:	57546
Basis:	wet	Analyzed:	08/08/00

Type: BS Lab ID: QC122258

Analyte	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12		NA			
Benzene	100.0	74.77	75	68-117	EPA 8021B
Toluene	100.0	83.44	83	70-120	EPA 8021B
Ethylbenzene	100.0	91.77	92	67-124	EPA 8021B
m,p-Xylenes	200.0	193.0	96	72-124	EPA 8021B
o-Xylene	100.0	90.94	91	72-123	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	81	62-138	EPA 8015M
Bromofluorobenzene (FID)	86	46-150	EPA 8015M
Trifluorotoluene (PID)	81	65-134	EPA 8021B
Bromofluorobenzene (PID)	86	55-138	EPA 8021B

Type: BSD Lab ID: QC122259

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
Gasoline C7-C12		NA					
Benzene	100.0	75.32	75	68-117	1	20	EPA 8021B
Toluene	100.0	84.59	85	70-120	1	20	EPA 8021B
Ethylbenzene	100.0	92.98	93	67-124	1	20	EPA 8021B
m,p-Xylenes	200.0	196.0	98	72-124	2	20	EPA 8021B
o-Xylene	100.0	91.74	92	72-123	1	20	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	90	62-138	EPA 8015M
Bromofluorobenzene (FID)	90	46-150	EPA 8015M
Trifluorotoluene (PID)	90	65-134	EPA 8021B
Bromofluorobenzene (PID)	91	55-138	EPA 8021B

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054	Analysis:	EPA 8015M
Type:	LCS	Basis:	wet
Lab ID:	QC122405	Diln Fac:	1.000
Matrix:	Soil	Batch#:	57585
Units:	mg/Kg	Analyzed:	08/10/00

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	10.00	10.27	103	75-123
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		129	62-138
Bromofluorobenzene (FID)		130	46-150
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054	Analysis:	EPA 8021B
Matrix:	Soil	Diln Fac:	1.000
Units:	ug/Kg	Batch#:	57585
Basis:	wet	Analyzed:	08/10/00

Type: BS Lab ID: QC122407

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12		NA		
Benzene	100.0	76.65	77	68-117
Toluene	100.0	75.38	75	70-120
Ethylbenzene	100.0	76.69	77	67-124
m,p-Xylenes	200.0	163.6	82	72-124
o-Xylene	100.0	78.33	78	72-123

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		103	65-134
Bromofluorobenzene (PID)		105	55-138

Type: BSD Lab ID: QC122408

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12		NA				
Benzene	100.0	76.91	77	68-117	0	20
Toluene	100.0	75.30	75	70-120	0	20
Ethylbenzene	100.0	76.79	77	67-124	0	20
m,p-Xylenes	200.0	163.3	82	72-124	0	20
o-Xylene	100.0	78.97	79	72-123	1	20

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		103	65-134
Bromofluorobenzene (PID)		107	55-138

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Matrix:	Soil	Diln Fac:	1.000
Units:	mg/Kg	Batch#:	57639
Basis:	wet		

Type: BS Analyzed: 08/11/00
Lab ID: QC122615

Analyte	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12	10.00	10.56	106	75-123	EPA 8015M
Benzene		NA			
Toluene		NA			
Ethylbenzene		NA			
m,p-Xylenes		NA			
o-Xylene		NA			

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	151 *	62-138	EPA 8015M
Bromofluorobenzene (FID)	113	46-150	EPA 8015M
Trifluorotoluene (PID)	161 *	65-134	EPA 8021B
Bromofluorobenzene (PID)	130	55-138	EPA 8021B

Type: BSD Analyzed: 08/12/00
Lab ID: QC122616

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
Gasoline C7-C12	10.00	10.50	105	75-123	1	20	EPA 8015M
Benzene		NA					
Toluene		NA					
Ethylbenzene		NA					
m,p-Xylenes		NA					
o-Xylene		NA					

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	154 *	62-138	EPA 8015M
Bromofluorobenzene (FID)	116	46-150	EPA 8015M
Trifluorotoluene (PID)	161 *	65-134	EPA 8021B
Bromofluorobenzene (PID)	131	55-138	EPA 8021B

* = Value outside of QC limits, see narrative
NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Type:	LCS	Basis:	wet
Lab ID:	QC122623	Diln Fac:	1.000
Matrix:	Soil	Batch#:	57639
Units:	ug/Kg	Analyzed:	08/11/00

Analyte	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12		NA			
Benzene	100.0	78.95	79	68-117	EPA 8021B
Toluene	100.0	85.89	86	70-120	EPA 8021B
Ethylbenzene	100.0	99.14	99	67-124	EPA 8021B
m,p-Xylenes	200.0	201.5	101	72-124	EPA 8021B
o-Xylene	100.0	97.71	98	72-123	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	112	62-138	EPA 8015M
Bromofluorobenzene (FID)	107	46-150	EPA 8015M
Trifluorotoluene (PID)	131	65-134	EPA 8021B
Bromofluorobenzene (PID)	127	55-138	EPA 8021B

NA= Not Analyzed

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Field ID:	TP-1@5.0	Diln Fac:	1.000
MSS Lab ID:	146924-003	Batch#:	57546
Matrix:	Soil	Sampled:	08/04/00
Units:	mg/Kg	Received:	08/07/00
Basis:	wet	Analyzed:	08/09/00

Type: MS Lab ID: QC122260

Analyte	MSS Result	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12	0.2433	9.709	8.843	89	41-132	EPA 8015M
Benzene			NA			
Toluene			NA			
Ethylbenzene			NA			
m,p-Xylenes			NA			
o-Xylene			NA			

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	117	62-138	EPA 8015M
Bromofluorobenzene (FID)	129	46-150	EPA 8015M
Trifluorotoluene (PID)	120	65-134	EPA 8021B
Bromofluorobenzene (PID)	124	55-138	EPA 8021B

Type: MSD Lab ID: QC122261

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
Gasoline C7-C12	9.709	8.904	89	41-132	1	25	EPA 8015M
Benzene		NA					
Toluene		NA					
Ethylbenzene		NA					
m,p-Xylenes		NA					
o-Xylene		NA					

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	122	62-138	EPA 8015M
Bromofluorobenzene (FID)	140	46-150	EPA 8015M
Trifluorotoluene (PID)	123	65-134	EPA 8021B
Bromofluorobenzene (PID)	129	55-138	EPA 8021B

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054	Analysis:	EPA 8015M
Field ID:	TP-4@2.5	Diln Fac:	1.000
MSS Lab ID:	146924-011	Batch#:	57585
Matrix:	Soil	Sampled:	08/04/00
Units:	mg/Kg	Received:	08/07/00
Basis:	wet	Analyzed:	08/11/00

Type: MS Lab ID: QC122459

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	0.1848	9.709	7.810	79	41-132
Benzene			NA		
Toluene			NA		
Ethylbenzene			NA		
m,p-Xylenes			NA		
o-Xylene			NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		124	62-138
Bromofluorobenzene (FID)		141	46-150
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

Type: MSD Lab ID: QC122460

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	9.709	7.298	73	41-132	7	25
Benzene		NA				
Toluene		NA				
Ethylbenzene		NA				
m,p-Xylenes		NA				
o-Xylene		NA				

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		121	62-138
Bromofluorobenzene (FID)		137	46-150
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 5030
Project#:	272.054		
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.000
MSS Lab ID:	146958-010	Batch#:	57639
Matrix:	Soil	Sampled:	08/08/00
Units:	ug/Kg	Received:	08/09/00
Basis:	wet	Analyzed:	08/12/00

Type: MS Lab ID: QC122617

Analyte	MSS Result	Spiked	Result	%REC	Limits	Analysis
Gasoline C7-C12		NA				
Benzene	ND	96.15	75.32	78	62-117	EPA 8021B
Toluene	ND	96.15	82.52	86	55-121	EPA 8021B
Ethylbenzene	ND	96.15	93.25	97	46-128	EPA 8021B
m,p-Xylenes	ND	192.3	189.4	99	33-141	EPA 8021B
o-Xylene	ND	96.15	92.42	96	40-136	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	115	62-138	EPA 8015M
Bromofluorobenzene (FID)	106	46-150	EPA 8015M
Trifluorotoluene (PID)	129	65-134	EPA 8021B
Bromofluorobenzene (PID)	126	55-138	EPA 8021B

Type: MSD Lab ID: QC122618

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
Gasoline C7-C12		NA					
Benzene	96.15	75.30	78	62-117	0	20	EPA 8021B
Toluene	96.15	80.08	83	55-121	3	20	EPA 8021B
Ethylbenzene	96.15	92.23	96	46-128	1	20	EPA 8021B
m,p-Xylenes	192.3	185.7	97	33-141	2	20	EPA 8021B
o-Xylene	96.15	91.26	95	40-136	1	20	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	113	62-138	EPA 8015M
Bromofluorobenzene (FID)	109	46-150	EPA 8015M
Trifluorotoluene (PID)	131	65-134	EPA 8021B
Bromofluorobenzene (PID)	129	55-138	EPA 8021B

ND = Not Detected
NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Matrix:	Soil	Batch#:	57677
Units:	mg/Kg	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000	Prepared:	08/14/00

Field ID: TP-1@5.0 | Lab ID: 146924-003
Type: SAMPLE | Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	74	60-136

Field ID: TP-2@2.0 | Lab ID: 146924-005
Type: SAMPLE | Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	71	60-136

Field ID: TP-3@6.0 | Lab ID: 146924-009
Type: SAMPLE | Analyzed: 08/16/00

Analyte	Result	RL
Diesel C10-C24	ND	0.99
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	81	60-136

Field ID: TP-4@2.5 | Lab ID: 146924-011
Type: SAMPLE | Analyzed: 08/16/00

Analyte	Result	RL
Diesel C10-C24	6.3 H Y	1.0
Motor Oil C24-C36	46	5.0

Surrogate	%REC	Limits
Hexacosane	76	60-136

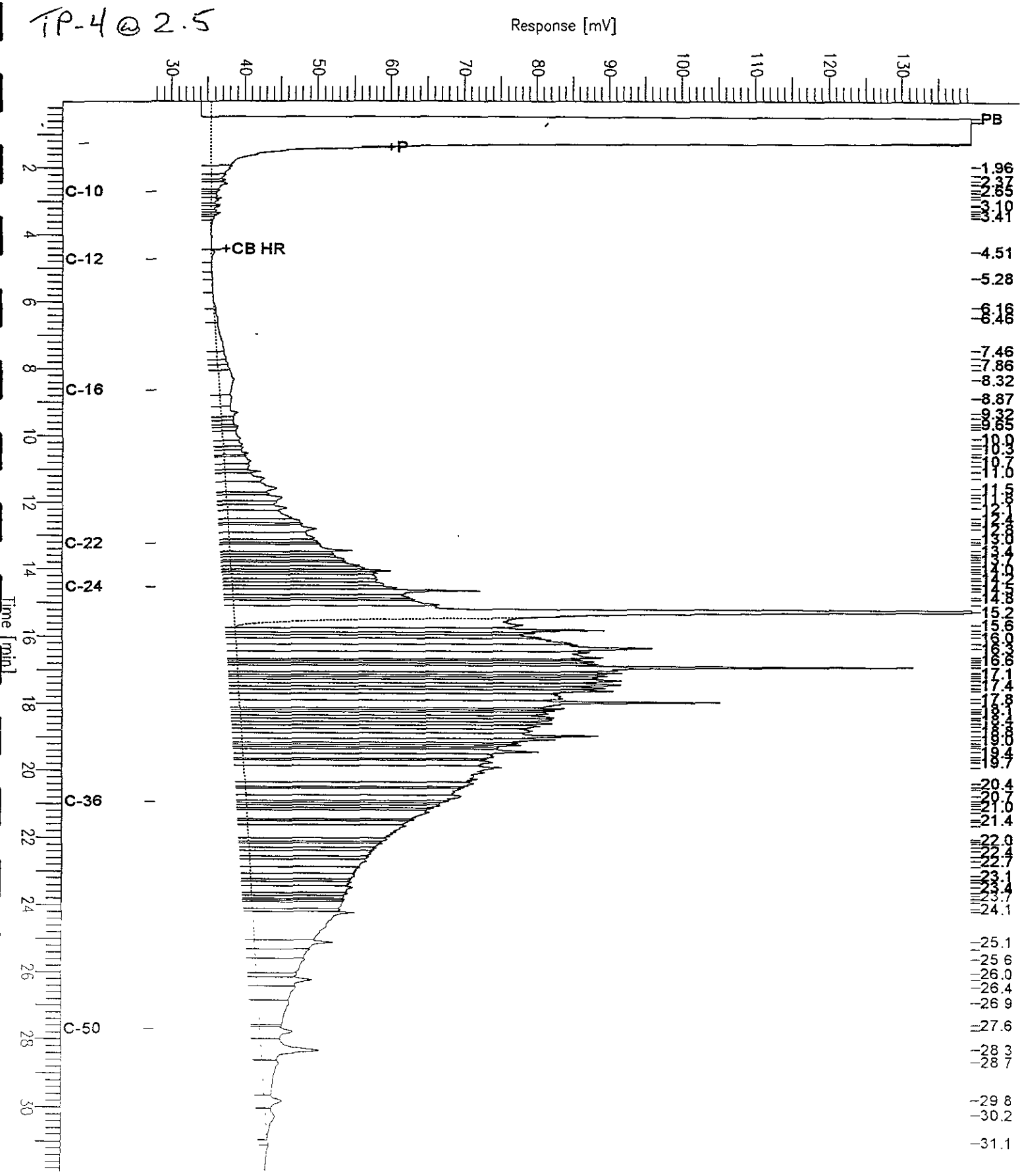
H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits fuel pattern which does not resemble standard
ND = Not Detected
RL = Reporting Limit

Chromatogram

Sample Name : 146924-011sg,57677
FileName : G:\GC15\CHB\226B090.RAW
Method : BTEH216.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 28 mV

Sample #: Page 1 of 1
Date : 08/16/2000 10:50 AM
Time of Injection: 08/16/2000 08:37 AM
Low Point : 27.73 mV High Point : 139.52 mV
Plot Scale: 111.8 mV

TP-4 @ 2.5



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Matrix:	Soil	Batch#:	57677
Units:	mg/Kg	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000	Prepared:	08/14/00

Field ID: TP-5@2.0 Lab ID: 146924-014
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	86	60-136

Field ID: TP-6@6.0 Lab ID: 146924-018
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	112	60-136

Field ID: TP-7@2.0 Lab ID: 146924-020
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	66	60-136

Field ID: TP-8@2.5 Lab ID: 146924-023
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	4.6 H Y	1.0
Motor Oil C24-C36	36	5.0

Surrogate	%REC	Limits
Hexacosane	68	60-136

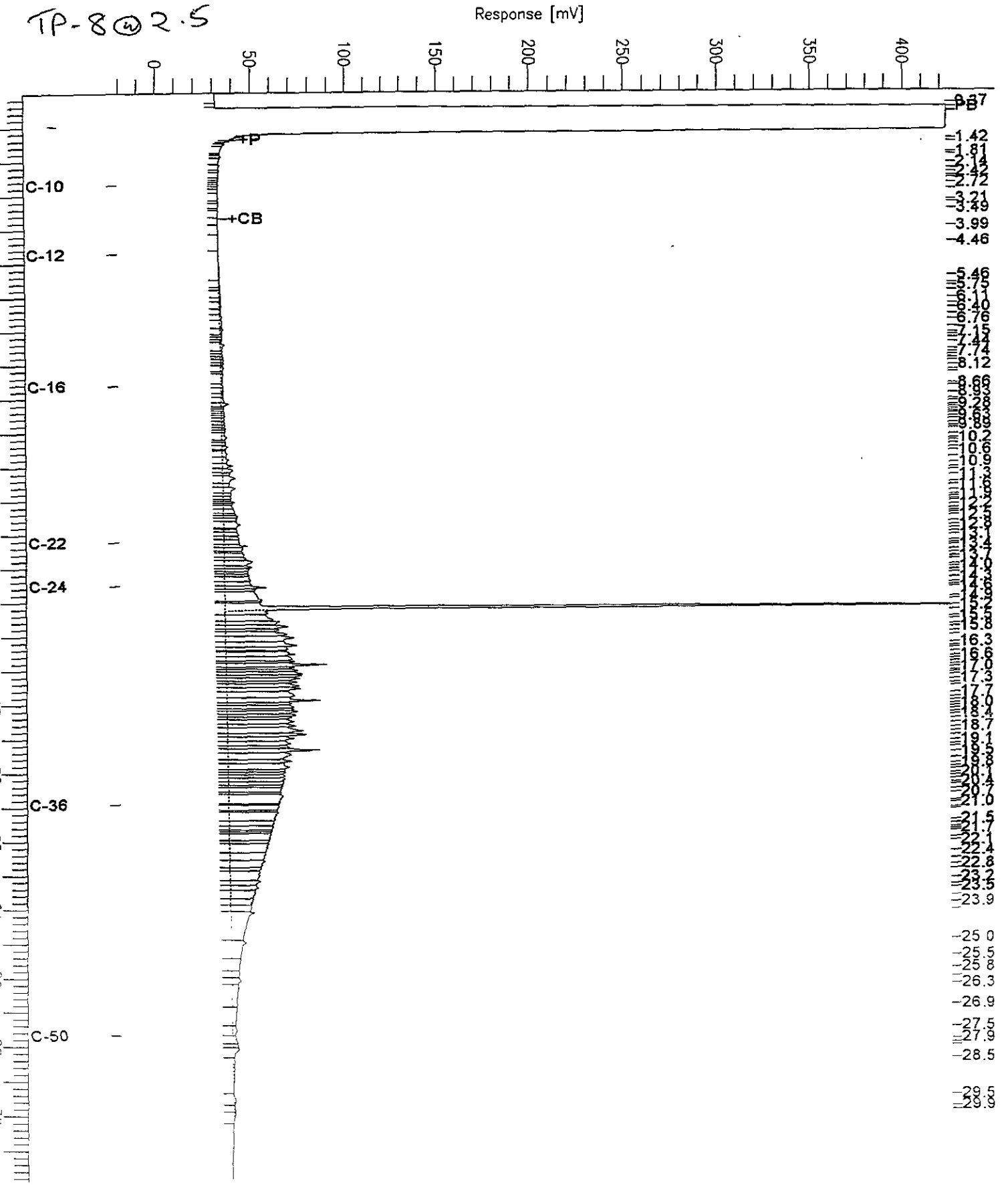
H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits fuel pattern which does not resemble standard
ND = Not Detected
RL = Reporting Limit

Chromatogram

Sample Name : 146924-023sg,57677
FileName : G:\GC15\CHB\230B028.RAW
Method : BTEH216.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: -21 mV

Sample #: 57677 Page 1 of 1
Date : 08/18/2000 08:50 AM
Time of Injection: 08/18/2000 05:51 AM
Low Point : -20.84 mV High Point : 423.05 mV
Plot Scale: 443.9 mV

TP-802.5



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Matrix:	Soil	Batch#:	57677
Units:	mg/Kg	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Dilñ Fac:	1.000	Prepared:	08/14/00

Field ID: TP-9@5.0 Lab ID: 146924-027
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	70	60-136

ield ID: TP-10@2.0 Lab ID: 146924-029
ype: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	83	60-136

ield ID: TP-11@5.0 Lab ID: 146924-033
ype: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	111	60-136

Field ID: TP-12@2.0 Lab ID: 146924-035
Type: SAMPLE Analyzed: 08/18/00

Analyte	Result	RL
Diesel C10-C24	6.6 H Y	1.0
Motor Oil C24-C36	81	5.0

Surrogate	%REC	Limits
Hexacosane	83	60-136

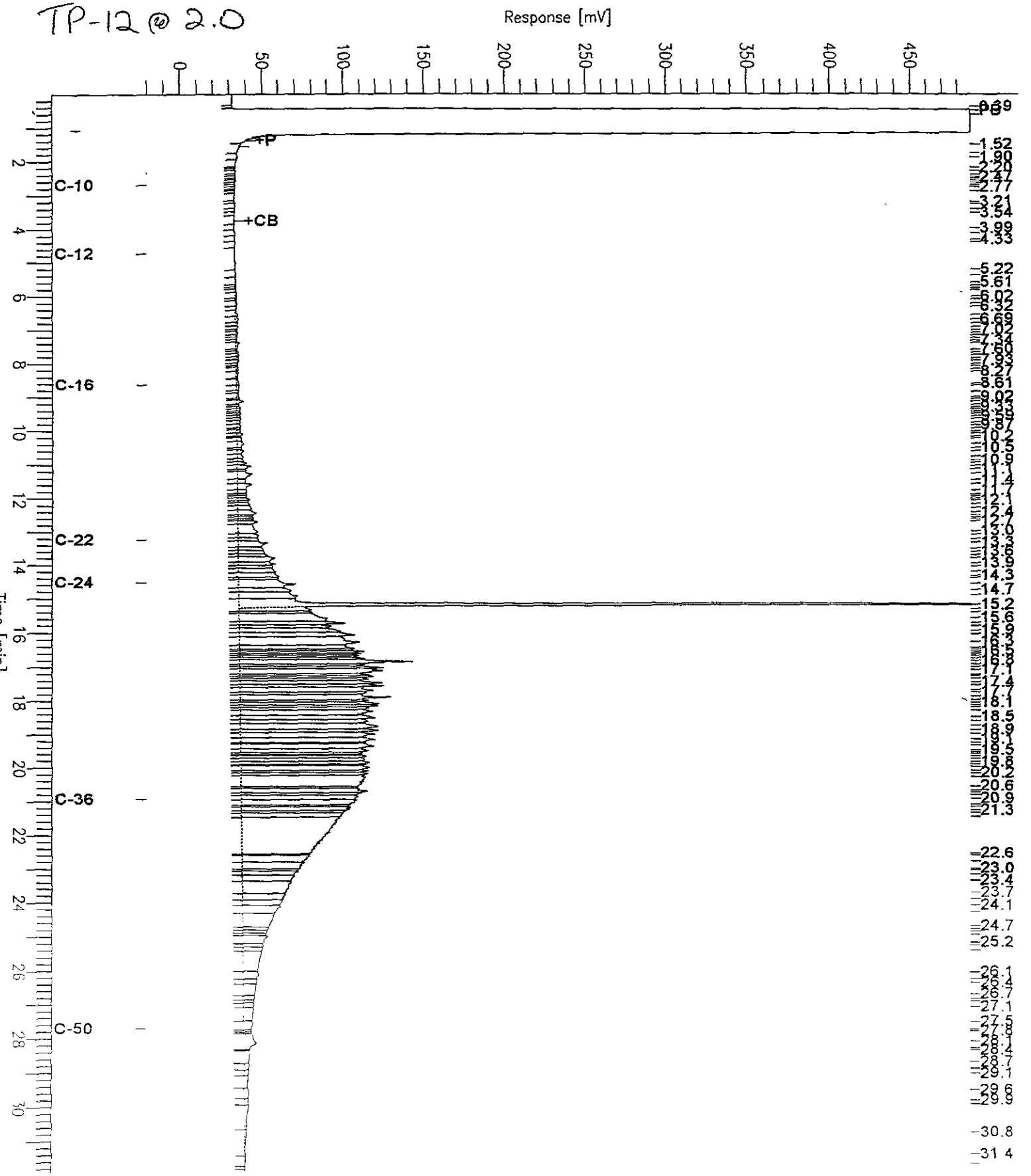
H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits fuel pattern which does not resemble standard
D = Not Detected
L = Reporting Limit

Chromatogram

Sample Name : 146924-035sg,57677
FileName : G:\GC15\CHB\230B032.RAW
Method : BTEH216.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: -21 mV

Sample #: 57677 Page 1 of 1
Date : 08/18/2000 09:18 AM
Time of Injection: 08/18/2000 08:43 AM
Low Point : -20.60 mV High Point : 488.23 mV
Plot Scale: 508.8 mV

TP-12 @ 2.0

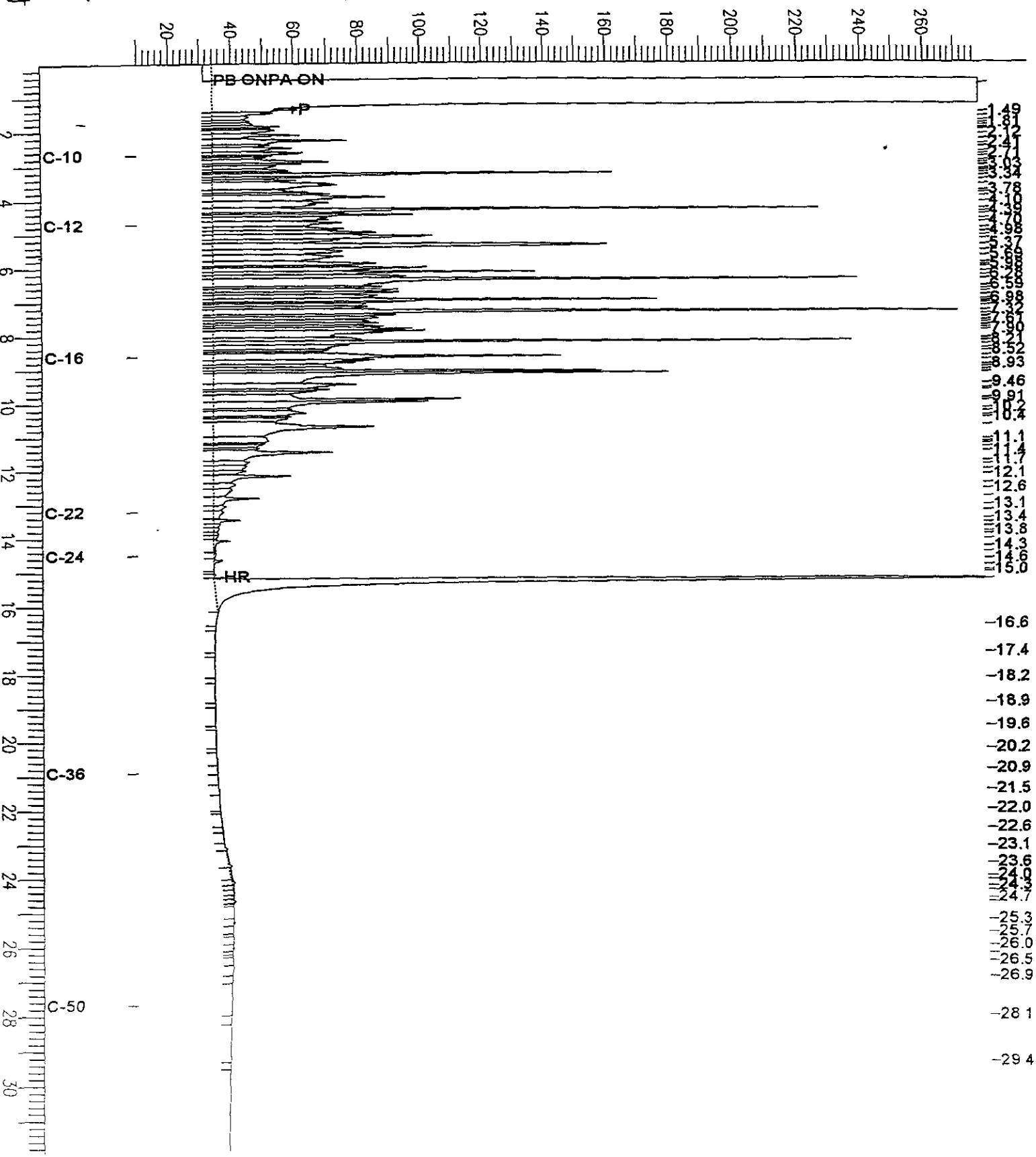


Chromatogram

Sample Name : ccv,00ws9475,dsl
FileName : G:\GC15\CHB\226B002.RAW
Method : BTEH216.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 10 mV

Sample #: 500mg/l Page 1 of 1
Date : 08/13/2000 12:52 PM
Time of Injection: 08/13/2000 12:15 PM
Low Point : 9.79 mV High Point : 277.71 mV
Plot Scale: 267.9 mV

Diesel Standard

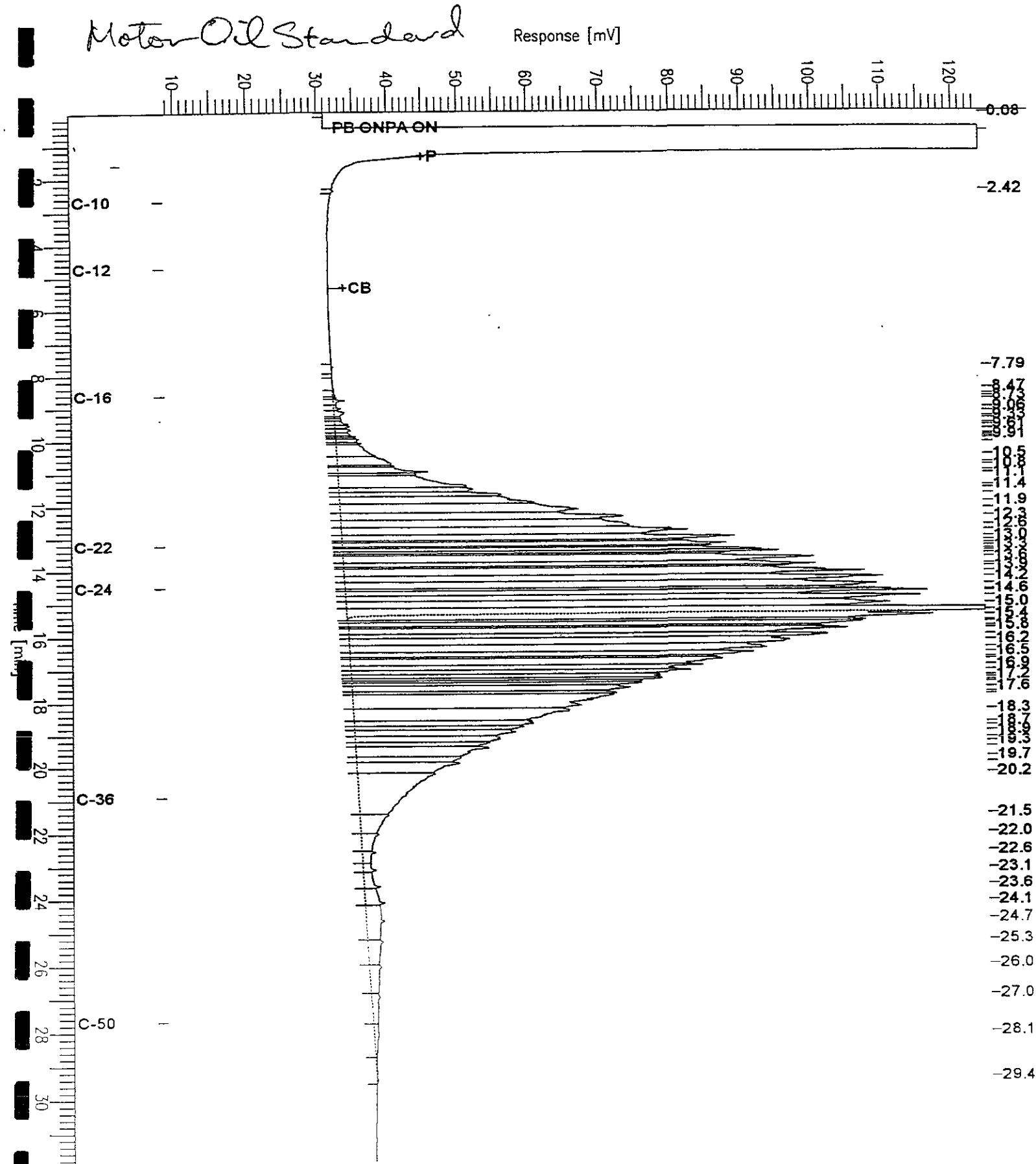


Chromatogram

[redacted]ample Name : ccv,00ws9491,mo
[redacted]ileName : G:\GC15\CHB\226B003.RAW
[redacted]od : BTEH216.MTH
[redacted]t Time : 0.01 min End Time : 31.91 min
[redacted]e Factor: 0.0 Plot Offset: 9 mV

Sample #: 500mg/l Page 1 of 1
Date : 08/13/2000 01:31 PM
Time of Injection: 08/13/2000 12:58 PM
Low Point : 8.53 mV High Point : 123.79 mV
Plot Scale: 115.3 mV

Motor Oil Standard



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Matrix:	Soil	Batch#:	57677
Units:	mg/Kg	Sampled:	08/04/00
Basis:	wet	Received:	08/07/00
Diln Fac:	1.000	Prepared:	08/14/00

Type:	BLANK	Analyzed:	08/16/00
Lab ID:	QC122754		

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0

Surrogate	%REC	Limits
Hexacosane	73	60-136

H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits fuel pattern which does not resemble standard
ND = Not Detected
RL = Reporting Limit

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Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC122755	Batch#:	57677
Matrix:	Soil	Prepared:	08/14/00
Units:	mg/Kg	Analyzed:	08/15/00
Basis:	wet		

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	47.09	36.28	77	67-121

Surrogate	%REC	Limits
Hexacosane	92	60-136

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Total Extractable Hydrocarbons

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	SHAKER TABLE
Project#:	272.054	Analysis:	EPA 8015M
Field ID:	ZZZZZZZZZZ	Batch#:	57677
MSS Lab ID:	146977-008	Sampled:	08/07/00
Matrix:	Soil	Received:	08/09/00
Units:	mg/Kg	Prepared:	08/14/00
Basis:	wet	Analyzed:	08/16/00
Diln Fac:	1.000		

ype: MS Lab ID: QC122756

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	848.1	46.74	697.8 >LR	-322 NM	35-146

Surrogate	%REC	Limits
Hexacosane	76	60-136

ype: MSD Lab ID: QC122757

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	46.75	423.9	-907 NM	35-146	NC	48

Surrogate	%REC	Limits
Hexacosane	78	60-136

NC = Not Calculated
NM = Not Meaningful
LR= Response exceeds instrument's linear range
PD= Relative Percent Difference

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Lead

Lab #:	146924	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	EPA 3050
Project#:	272.054	Analysis:	EPA 6010B
Analyte:	Lead	Sampled:	08/04/00
Matrix:	Soil	Received:	08/07/00
Units:	mg/Kg	Prepared:	08/08/00
Basis:	wet	Analyzed:	08/09/00
Diln Fac:	1.000		

Field ID	Type	Lab ID	Result	RL	Batch#
TP-1@0.0	SAMPLE	146924-001	160	0.15	57540
TP-1@2.0	SAMPLE	146924-002	3.1	0.15	57540
TP-1@5.0	SAMPLE	146924-003	3.6	0.15	57540
TP-2@0.0	SAMPLE	146924-004	20	0.14	57540
TP-2@2.0	SAMPLE	146924-005	1.6	0.15	57540
TP-2@5.0	SAMPLE	146924-006	2.1	0.15	57540
TP-3@0.0	SAMPLE	146924-007	160	0.15	57540
TP-3@3.0	SAMPLE	146924-008	1.8	0.15	57540
TP-3@6.0	SAMPLE	146924-009	7.0	0.15	57540
TP-4@0.0	SAMPLE	146924-010	170	0.15	57540
TP-4@2.5	SAMPLE	146924-011	86	0.15	57540
TP-4@6.0	SAMPLE	146924-012	91	0.14	57540
TP-5@0.0	SAMPLE	146924-013	110	0.15	57540
TP-5@2.0	SAMPLE	146924-014	4.5	0.15	57540
TP-5@6.0	SAMPLE	146924-015	2.4	0.15	57540
TP-6@0.0	SAMPLE	146924-016	190	0.15	57540
TP-6@2.5	SAMPLE	146924-017	1.9	0.15	57540
TP-6@6.0	SAMPLE	146924-018	2.0	0.15	57540
TP-7@0.0	SAMPLE	146924-019	220	0.15	57540
TP-7@2.0	SAMPLE	146924-020	2.1	0.15	57540
TP-7@6.0	SAMPLE	146924-021	2.5	0.15	57541
TP-8@0.0	SAMPLE	146924-022	220	0.14	57541
TP-8@2.5	SAMPLE	146924-023	180	0.15	57541
TP-8@6.0	SAMPLE	146924-024	1.7	0.15	57541
TP-9@0.0	SAMPLE	146924-025	220	0.15	57541
TP-9@2.0	SAMPLE	146924-026	1.4	0.15	57541
TP-9@5.0	SAMPLE	146924-027	1.3	0.15	57541
TP-10@0.0	SAMPLE	146924-028	150	0.14	57541
TP-10@2.0	SAMPLE	146924-029	1.9	0.15	57541
TP-10@5.0	SAMPLE	146924-030	2.2	0.15	57541
TP-11@0.0	SAMPLE	146924-031	200	0.15	57541
TP-11@2.0	SAMPLE	146924-032	15	0.15	57541
TP-11@5.0	SAMPLE	146924-033	1.9	0.14	57541
TP-12@0.0	SAMPLE	146924-034	72	0.14	57541
TP-12@2.0	SAMPLE	146924-035	110	0.15	57541
TP-12@5.0	SAMPLE	146924-036	19	0.15	57541
	BLANK	QC122233	0.19	0.15	57540
	BLANK	QC122238	ND	0.15	57541

ND = Not Detected
RL = Reporting Limit

Lead

Lab #:	146924	Location:	MLK Between 11th&12th
Client	Subsurface Consultants	Prep:	EPA 3050
Project#	272.054	Analysis:	EPA 6010B
Analyte	Lead	Diln Fac:	1.000
Matrix	Soil	Sampled:	08/04/00
Units	mg/Kg	Received:	08/07/00
Basis.	wet	Prepared:	08/08/00

Field ID	Type	MSS Lab ID	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Batch#	Analyzed
	BS		QC122234		100.0	90.50		91	70-110			57540	08/11/00
	BSD		QC122235		100.0	94.00		94	70-110	4	20	57540	08/11/00
[illegible]	SDUP	146924 001	QC122236	161.1		167.8	0.15			4	40	57540	08/09/00
TP-[illegible]	SSPIKE	146924 001	QC122237	161.1	96.62	231.9		73	31-133			57540	08/09/00
	BS		QC122239		100.0	79.00		79	70-110			57541	08/09/00
	BSD		QC122240		100.0	76.00		76	70-110	4	20	57541	08/09/00
TP-[illegible]	SDUP	146924-021	QC122241	2.488		2.593	0.14			4	40	57541	08/09/00
TP-[illegible]	SSPIKE	146924 021	QC122242	2.488	100.0	72.00		70	31-133			57541	08/09/00

RL = Reporting Limit
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

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

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
3736 Mt. Diablo Blvd.
Suite 200
Lafayette, CA 94549

Date: 13-SEP-00
Lab Job Number: 147277
Project ID: 272.054
Location: MLK Between 11th&12th

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis.

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

CURTIS & TOMPKINS, LTD. BERKELEY LOGIN CHANGE FORM

Reason for change ___X___ Client Request: By: G. Young Date/Time: 8/28 4:00 PM Initials: SES
_____ Login Review _____ Data Review

Current Lab ID	Previous Lab ID	Client ID	Matrix	Add/Cancel	Analysis	Duedate
147277-001	146924-012	TP-4@6'	Soil		—	9/5
-002	-024	TP-8@6'			—	
-003	-036	TP-12@5'			—	
-004	—	COMP 1		Add	COMP3, WET Pb	
-005	146924-011	TP-4@2.5'			—	
-006	-023	TP-8@2.5'			—	
-007	-035	TP-12@2'			—	
-008	—	COMP 2	↓	Add	COMP3, WET Pb	↓

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Lead

Lab #:	147277	Location:	MLK Between 11th&12th
Client:	Subsurface Consultants	Prep:	METHOD
Project#:	272.054	Analysis:	EPA 6010B
Analyte:	Lead	Sampled:	08/04/00
Matrix:	WET Leachate	Received:	08/07/00
Units:	ug/L	Prepared:	09/01/00
Diln Fac:	10.00	Analyzed:	09/05/00
Batch#:	58065		

Field ID	Type	Lab ID	Result	RL
COMP 1	SAMPLE	147277-004	3,600	150
COMP 2	SAMPLE	147277-008	7,700	150
	BLANK	QC124280	240	150

RL = Reporting Limit

Lead

Lab #:	147277	Location:	MLK Between 11th&12th
Client	Subsurface Consultants	Prep:	METHOD
Project#	272.054	Analysis:	EPA 6010B
Analyte	Lead	Batch#:	58065
Field ID	ZZZZZZZZZZ	Sampled:	06/16/00
MSS Lab ID:	147214-001	Received:	06/19/00
Matrix:	WET Leachate	Prepared:	09/01/00
Units:	ug/L	Analyzed:	09/05/00

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Dilu Fac
[illegible]	[illegible]		2,000	1,810		91	78-120			1.000
[illegible]	[illegible]		2,000	1,830		92	78-120	1	20	1 000
[illegible]	[illegible]	3,700		3,740	300			4	29	20.00
[illegible]	[illegible]	3,700	10,000	12,300		84	66-128			20.00

RL = Reporting Limit
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

September 6, 2000

SOMA 98-2164

Glenn Young
Subsurface Consultants, Inc.
3736 Mt. Diablo Boulevard, Suite 200
Lafayette, CA 94549-3659

Subject: Tier 3 Risk-Based Corrective Action Evaluation for Property at Martin Luther King Jr. Way, Between 11th and 12th Street, Oakland, California

Dear Glenn,

Pursuant to your request, SOMA Corporation (SOMA) has completed a Tier 3 Risk-Based Corrective Action (RBCA) Evaluation for Property at Martin Luther King Jr. Way, between 11th and 12th Street, Oakland, California ("the Site") using the approach developed by the Oakland Urban Land Redevelopment (ULR) Program Technical Advisory Committee. This letter report outlines the assumptions used in the evaluation and presents the results of the evaluation. In addition to the text presented herein, tables are attached as referenced throughout the letter report.

Overall Approach

The overall approach was to use the Oakland RBCA spreadsheet available from the City of Oakland as the basis for the human health evaluation of chemical concentrations in soil and groundwater at the Site under a future land use assumption. It is our understanding that the Site is to be redeveloped and will include residential housing with below grade parking on the first floor. The upper 6 feet of soil currently present at the Site will be excavated from the Site for construction purposes.

The Oakland RBCA approach includes a three tier process of comparing site concentrations to various levels:

- Tier 1 is a comparison to Risk-Based Screening Levels (RBSL) that may be applied to all sites in Oakland
- Tier 2 is a comparison to site-specific target levels (SSTL) that incorporate consideration of three predominant soil types found in Oakland
- Tier 3 is comparison to SSTLs that are generated by modification of the Tier 2 calculations to account for additional site-specific factors

The approach used for this evaluation was to develop representative chemical concentrations in soil and groundwater and develop Tier 3 SSTLs by incorporating site-specific information into the calculations, including redevelopment information for the Site. This approach was used for organic chemicals, but lead was evaluated separately from the Tier 3 approach.

Chemical Data and Calculation of Representative Concentrations

Previous environmental investigations have included the collection of soil and groundwater samples for analyses for chemicals including total petroleum hydrocarbon as gasoline (TPHg), total petroleum hydrocarbons as diesel (TPHd), total petroleum hydrocarbons as oil (TPHo), benzene, toluene, ethylbenzene, xylenes, 1,2-dichloroethane, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and lead. Chemical data available for this Tier 3 evaluation included:

- Results from soil and groundwater samples collected in 1998 by Tetra Tech EM Inc. ("Oakland Redevelopment Project Phase II Environmental Site Assessment Summary Report, Preservation Park 3 Site, Oakland, California")
- Results from soil samples collected in 2000 by Subsurface Consultants, Inc. (SCI) which have not been presented yet in a formal report.

In order to evaluate future land use conditions, soil samples collected from a depth less than 6 feet below ground surface (bgs) were assumed to be excavated and were not included in the data considered further in this evaluation. The remaining soil and groundwater data were tabulated and a summary of statistical parameters was generated. Potential human health effects from exposure to TPH mixtures detected in soil and groundwater were evaluated by assuming that the benzene, toluene, ethylbenzene, and total xylenes (BTEX) components and other organic chemicals detected represent the toxic components of the TPH mixtures. Consequently, TPHg, TPHd, and TPHo were not evaluated further.

The 95 percent upper confidence level (95% UCL) of the arithmetic mean assuming a normal distribution using the Student-t statistic was used as the representative concentration for the chemicals of potential concern. For both soil and groundwater, if the number of samples used to calculate a particular 95% UCL was less than 5, the maximum concentration was used as the representative concentration. The use of sample results reported as not detected was conducted by taking one-half of the sample quantitation limit (SQL) and using the value as a proxy concentration (U.S. EPA 1989). Table 1 presents the soil data and summary statistics. Table 2 presents the groundwater data and summary statistics. For chemicals detected in only one sample (i.e., naphthalene, 1,2,4-trimethylbenzene, 1,2-dichlorothane, 1,3,5-trimethylbenzene, and organic lead), the single concentration was used as the representative concentration.

Variations from Default Parameters in the Oakland RBCA Model

Selected parameters were revised from the Oakland RBCA model default parameters. These parameters included the depth to groundwater, foundation thickness, indoor air exchange rate, building air volume/floor area ratio, and the selected oral and inhalation verified reference doses. With the exception of the reference doses, the revised parameters accounted for known depth to groundwater at the Site and for the configuration of the proposed redevelopment at the Site.

It is our understanding that the Site is to be redeveloped and will include residential housing with below grade parking on the first floor. The upper 6 feet of soil presently at the Site will be excavated for construction purposes and will be covered with 11 inches of concrete for the garage. The garage height will be 8.5 feet and the structure will cover the entire site of approximately 150 feet by 200 feet. Based upon conversations with Mr. Donald Alexander with the City of Oakland Building Services Operations Division, a parking garage facility is considered an S3 occupancy. According to the 1997 Uniform Building Code, Chapter 12, Section 1202.2, ventilation for a closed parking structure is 1.5 $feet^3$/minute/$feet^2$. It is assumed that this will be the minimum ventilation rate for the first floor of the garage. Because the vapor transport model incorporated into the Oakland RBCA spreadsheet does not include a ventilated garage compartment beneath occupied structures, it was assumed that the first floor of the garage would represent the first full-time occupied floor of the building. This is a very conservative screening-level assumption and results in an overestimate of the potential indoor air inhalation exposure to the future users of the building. However, if estimates of exposure and risk based upon a first garage floor occupancy assumption are relatively low, estimates of exposure and risk for users in the actual building would be significantly less. This is primarily due to dilution of vapor concentrations in the garage as a result of mechanical ventilation required for the construction of the garage. Table 3 presents the variations from the default exposure parameters used in the evaluation. Table 4 presents all of the input parameters used in the evaluation. Table 5 presents the chemical properties used in the evaluation.

Although the Oakland RBCA model includes a wide array of potential exposure pathways that may be evaluated, the exposure pathways considered complete for this Tier 3 evaluation are the following:

- Inhalation of outdoor air vapors from chemicals in soil
- Inhalation of indoor air vapors from chemicals in soil
- Inhalation of outdoor air vapors from chemicals in groundwater
- Inhalation of indoor air vapors from chemicals in groundwater

It was assumed that inhalation of indoor air vapors and outdoor air vapors were not additive, but that vapors from soil and groundwater for a given air-type were additive. Because a building will be constructed over the Site, the exposure pathways of ingestion of surface soil, inhalation of particulates from surface soil, and dermal contact with surface soil were not considered complete. Direct contact with groundwater as drinking water was also not considered a complete exposure pathway.

Although 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected in one groundwater sample, these chemicals are not included in the Oakland RBCA Model. These chemicals were added to the spreadsheet model with the appropriate chemical properties (Table 5) so that the model generated the corresponding RBSLs

Tier 3 Evaluation Results

This Tier 3 evaluation assumed a future use of the Site that included a residential scenario as a point of reference. Table 6 presents the Tier 3 RBSLs. The comparison of representative chemical concentrations to RBSLs included the estimation of total excess cancer risk and total noncancer hazard. Risk and hazard were estimated by calculating the ratio of representative concentration to the RBSL and multiplying by the Oakland RBCA target risk (1E-05) and target hazard (hazard of 1), respectively. Soil and groundwater risks and hazards were calculated and summed to yield total hazard and risk. As noted previously, risks and hazards from indoor and outdoor air inhalation exposure pathways were evaluated separately. For the residential scenario, the estimated indoor air total excess cancer risk was 4.5E-06 and the total noncancer hazard was 0.08 (Table 7). The estimated outdoor air total excess cancer risk was 7.9E-06 and the total noncancer hazard was 0.1 (Table 8).

The outdoor air estimated excess cancer risks and noncancer hazards were less than the indoor air estimates due to the ventilation requirements for the parking garage. In slab on-grade foundation exposure scenarios, the outdoor air dilution and dispersion of vapors from subsurface volatilization is generally assumed to be greater than indoor air dilution dispersion. The presence of the parking garage at the ground level of the proposed building changes this assumption. The factoring of the parking garage ventilation requirements for the Site into the Oakland RBCA model resulted in indoor air inhalation RBSLs higher than the outdoor air inhalation RBSLs. Consequently, indoor air inhalation risks and hazards were less than outdoor air inhalation risks and hazards.

As noted in Tables 7 and 8, the RBSLs for toluene, ethylbenzene, total xylenes, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene are noted as either "SAT" for soil or "SOL" for groundwater. The term "SAT" indicates that the calculated RBSL exceeds the saturated soil concentration of the chemical. Because the Site soil concentrations of toluene, ethylbenzene, and total xylene are significantly less than the saturation concentrations for those chemicals, potential noncancer hazards from these chemicals in soil are considered insignificant. The term "SOL" indicates that the calculated RBSL exceeds the solubility of the chemical in water. Because the Site groundwater concentrations of toluene, ethylbenzene, total xylene, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene are significantly less than the water solubility concentrations for those chemicals, potential noncancer hazards from these chemicals in groundwater are considered insignificant.

Lead Evaluation

The potential for health effects from residential exposure to lead was addressed by comparing the representative lead concentrations in soil to the U.S. EPA Region 9 1999 residential Preliminary Remediation Goal (PRG) of 400 mg/kg. The PRG was developed to protect the children exposed to lead in a residential setting. The PRG is based on the results of an EPA analysis that used the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children that estimates soil lead concentrations corresponding to a blood-lead concentration of 10 ug/dL, the threshold level of concern. The model reflects exposure to lead by ingestion of soil, dermal contact with soil;

and inhalation of dusts from site-related sources, and by ingestion of water, food, and air from background sources.

Using the 95% UCL calculations previously described, the representative concentration of lead in soil was 27 mg/kg, while the maximum concentration of lead in soil was 91 mg/kg. Organic lead was detected in one sample at a concentration of 0.53 mg/kg. These concentrations are significantly less than the PRG and are not considered to represent a threat to human health.

Summary

The results of the Tier 3 Oakland RBCA evaluation for the Site indicate that soil and groundwater chemical concentrations yield estimated excess cancer risks for both indoor and outdoor air of less than 1E-05 and noncancer hazards less than a value of 1 for a residential scenario. The Tier 3 Oakland RBCA evaluation included an assumption that the first floor parking garage of the proposed building at the Site was occupied by potential receptors, but that ventilation requirements for the enclosed parking structure are factored into the calculations. Actual future users in the parking garage would be subject to significantly less exposure from chemicals in soil and groundwater due to limited exposure time per day. Although not completed for this evaluation, more detailed transport modeling of the potential vapor intrusion of chemicals into the garage from soil and groundwater into the residential areas of the building is expected to yield significantly lower estimates of exposure and associated risks and hazards. This is because of the additional barrier that the vapors must infiltrate (garage ceiling/residential floor) and the additional vapor dilution and dispersion from the building ventilation systems.

Thank you for the opportunity to work with you on this project. If you have any questions, please call me at (510) 654-3900.

Sincerely,

Glenn M. Leong
Vice President and Senior Scientist

attachments (Tables 1 through 8)

Table 1. Soil Data and Summary Statistics

Sample ID	Boring ID	Depth (feet)	Sample Date	Units	Benzene	Toluene	Ethylbenzene	Xylenes	Lead	Organic Lead	Source
TP-1	NA	0.0	8/4/00	mg/kg	--	--	--	--	160	--	Subsurface Consultants, Inc.
TP-1	NA	2.0	8/4/00	mg/kg	--	--	--	--	3.1	--	Subsurface Consultants, Inc.
TP-1	NA	5.0	8/4/00	mg/kg	<4.9	<4.9	<4.9	<4.9	3.6	--	Subsurface Consultants, Inc.
TP-2	NA	0.0	8/4/00	mg/kg	--	--	--	--	20	--	Subsurface Consultants, Inc.
TP-2	NA	2.0	8/4/00	mg/kg	<4.9	<4.9	<4.9	<4.9	1.6	--	Subsurface Consultants, Inc.
TP-2	NA	5.0	8/4/00	mg/kg	--	--	--	--	2.1	--	Subsurface Consultants, Inc.
TP-3	NA	0.0	8/4/00	mg/kg	--	--	--	--	160	--	Subsurface Consultants, Inc.
TP-3	NA	3.0	8/4/00	mg/kg	--	--	--	--	1.8	--	Subsurface Consultants, Inc.
TP-3	NA	6.0	8/4/00	mg/kg	<4.8	<4.8	<4.8	<4.8	7.0	--	Subsurface Consultants, Inc.
TP-4	NA	0.0	8/4/00	mg/kg	--	--	--	--	170	--	Subsurface Consultants, Inc.
TP-4	NA	2.5	8/4/00	mg/kg	<4.9	<4.9	<4.9	<4.9	86	--	Subsurface Consultants, Inc.
TP-4	NA	6.0	8/4/00	mg/kg	--	--	--	--	91	--	Subsurface Consultants, Inc.
TP-5	NA	0.0	8/4/00	mg/kg	--	--	--	--	110	--	Subsurface Consultants, Inc.
TP-5	NA	2.0	8/4/00	mg/kg	<4.7	<4.7	<4.7	<4.7	4.5	--	Subsurface Consultants, Inc.
TP-5	NA	6.0	8/4/00	mg/kg	--	--	--	--	2.4	--	Subsurface Consultants, Inc.
TP-6	NA	0.0	8/4/00	mg/kg	--	--	--	--	190	--	Subsurface Consultants, Inc.
TP-6	NA	2.5	8/4/00	mg/kg	--	--	--	--	1.9	--	Subsurface Consultants, Inc.
TP-6	NA	6.0	8/4/00	mg/kg	<4.6	<4.6	<4.6	<4.6	2.0	--	Subsurface Consultants, Inc.
TP-7	NA	0.0	8/4/00	mg/kg	--	--	--	--	220	--	Subsurface Consultants, Inc.
TP-7	NA	2.0	8/4/00	mg/kg	<4.7	<4.7	<4.7	<4.7	2.1	--	Subsurface Consultants, Inc.
TP-7	NA	6.0	8/4/00	mg/kg	--	--	--	--	2.5	--	Subsurface Consultants, Inc.
TP-8	NA	0.0	8/4/00	mg/kg	--	--	--	--	220	--	Subsurface Consultants, Inc.
TP-8	NA	2.5	8/4/00	mg/kg	<4.8	<4.8	<4.8	<4.8	180	--	Subsurface Consultants, Inc.
TP-8	NA	6.0	8/4/00	mg/kg	--	--	--	--	1.7	--	Subsurface Consultants, Inc.
TP-9	NA	0.0	8/4/00	mg/kg	--	--	--	--	220	--	Subsurface Consultants, Inc.
TP-9	NA	2.0	8/4/00	mg/kg	--	--	--	--	1.4	--	Subsurface Consultants, Inc.
TP-9	NA	5.0	8/4/00	mg/kg	<4.8	<4.8	<4.8	<4.8	1.3	--	Subsurface Consultants, Inc.
TP-10	NA	0.0	8/4/00	mg/kg	--	--	--	--	150	--	Subsurface Consultants, Inc.
TP-10	NA	2.0	8/4/00	mg/kg	<4.7	<4.7	<4.7	<4.7	1.9	--	Subsurface Consultants, Inc.
TP-10	NA	5.0	8/4/00	mg/kg	--	--	--	--	2.2	--	Subsurface Consultants, Inc.
TP-11	NA	0.0	8/4/00	mg/kg	--	--	--	--	200	--	Subsurface Consultants, Inc.
TP-11	NA	2.0	8/4/00	mg/kg	--	--	--	--	15	--	Subsurface Consultants, Inc.
TP-11	NA	5.0	8/4/00	mg/kg	<4.9	<4.9	<4.9	<4.9	1.9	--	Subsurface Consultants, Inc.
TP-12	NA	0.0	8/4/00	mg/kg	--	--	--	--	72	--	Subsurface Consultants, Inc.
TP-12	NA	2.0	8/4/00	mg/kg	<4.7	<4.7	<4.7	<4.7	110	--	Subsurface Consultants, Inc.
TP-12	NA	5.0	8/4/00	mg/kg	--	--	--	--	19	--	Subsurface Consultants, Inc.

Table 1. Soil Data and Summary Statistics

Sample ID	Boring ID	Depth (feet)	Sample Date	Units	Benzene	Toluene	Ethylbenzene	Xylenes	Lead	Organic Lead	Source
9850N001	SB2	9.5-10.0		mg/kg	--	--	--	--	2.9	--	Tetra Tech EM Inc.
9850N002	SB2	16.5-17.0		mg/kg	--	--	0.01	0.03	78.6	--	Tetra Tech EM Inc.
9850N003	SB2	23.5-24.0		mg/kg	1.9	24.0	14.0	89.0	2.3	--	Tetra Tech EM Inc.
9850N007	SB1	9.5-10.0		mg/kg	0.021	0.96	2.9	12.8	6.6	--	Tetra Tech EM Inc.
9850N008	SB1	16.5-17.0		mg/kg	--	0.03	0.12	1.0	27.4	--	Tetra Tech EM Inc.
9850N009	SB1	23.5-24.0		mg/kg	3.2	26.0	19.0	156.0	4.9	0.53	Tetra Tech EM Inc.
9850N017	SB3	9.0-10.0		mg/kg	--	--	--	--	2.4	--	Tetra Tech EM Inc.
9850N018 Duplicate	SB3	16.5-17.0		mg/kg	--	--	--	--	2.8	--	Tetra Tech EM Inc.
9850N019	SB3	16.0-16.5		mg/kg	--	--	--	--	2.3	--	Tetra Tech EM Inc.
9850N020	SB3	23.5-24.0		mg/kg	--	--	--	--	0.88	--	Tetra Tech EM Inc.
				Minimum	0.021	0.03	0.01	0.03	0.88	0.53	
				Maximum	3.2	26	19	156	91	0.53	
				Average	1.9642	9.281667	5.818571429	37.64714	14.855	--	
				Standard Deviation	1.184275	12.22355	7.522013092	61.25322	28.10435	--	
				Count	5	6	7	7	16	1	
				t-value	2.132	2.015	1.943	1.943	1.753	--	
				95 UCL	3.09	19.34	11.34	82.63	27.17	--	

Notes:

Statistics only include data above 6 feet. ? ok only use TP1 – TP12 ? & not SB1 to SB3

NA - Not applicable

-- Sample not analyzed

Table 2. Groundwater Data and Summary Statistics

Sample ID	Boring ID	Depth (feet)	Sample Date	Units	Benzene	Toluene	Ethylbenzene	Xylenes	Lead	1,2,4-Trimethyl-benzene	1,2-Dichloro-ethane	1,3,5-Trimethyl-benzene	Naphthalene	Source
9850N010	SB1	36.0-40.0		mg/L	0.35	1.8	0.64	4.7	0.43	--	--	--	--	Tetra Tech EM Inc.
9850N013	SB2	36.0-40.0		mg/L	0.02	0.026	0.0031	0.02	0.18	0.0056	0.0014	0.0017	0.0014	Tetra Tech EM Inc.
9850N015	SB3	36.0-40.0		mg/L	--	--	--	--	0.04	--	--	--	--	Tetra Tech EM Inc.
				Minimum	0.02	0.026	0.0031	0.02	0.04	0.0056	0.0014	0.0017	0.0014	
				Maximum	0.35	1.8	0.64	4.7	0.43	0.0056	0.0014	0.0017	0.0014	
				Average	0.185	0.913	0.32155	2.36	0.216667	--	--	--	--	
				Standard Deviation	0.233345	1.254407	0.450356309	3.30926	0.197569	--	--	--	--	
			2	Count	2	2	2	2	3	1	1	1	1	
			0	t-value	6.314	6.314	6.314	6.314	2.92	--	--	--	--	
				95 UCL	--	--	--	--	--	--	--	--	--	

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Notes

-- Sample not analyzed

Table 3. Tier 3 Parameter Variations

Parameter	Units	Tier 2 Value	Tier 3 Value	Notes
Depth to Groundwater	cm	300	548.64	Depth is approximately 24 feet below ground surface (bgs), but soil to be excavated 6 feet bgs, resulting in depth to groundwater from bottom of concrete floor of 18 feet bgs (548.64 cm)
Foundation Thickness	cm	15	27.94	Construction specifications indicate 11" floor beneath parking structure
Indoor Air Exchange Rate	sec^{-1}	5.6E-04 Residential	2.90E-03	Assume indoor air compartment where exposure may occur is a subsurface parking garage - 1997 Uniform Building Code Chapter 12, Section 1202.2.7 - ventilation for closed parking garage (S3 occupancy) is 1.5 $feet^3/minute/feet^2$ - Height of garage is 8.5 feet and approximate floor area is 150 feet by 200 feet
Building Air Volume/floor area	cm^3/cm^2	229	259	Assumed first floor garage dimensions - 8.5 feet x 150 feet x 200 feet / 150 feet x 250 feet
Benzene Oral Verified Reference Dose (RfD)	mg/kg-day	1.70E-03	3.00E-03	From 1999 U.S. EPA Region IX Preliminary Remediation Goal Tables - value from National Center for Environmental Assessment (NCEA)
Benzene Oral Verified Reference Dose (RfD)	mg/kg-day	1.70E-03	3.00E-03	From 1999 U.S. EPA Region IX Preliminary Remediation Goal Tables - value from National Center for Environmental Assessment (NCEA)
1,2 Dichloroethane Oral Verified Reference Dose (RfD)	mg/kg-day	2.90E-03	3.00E-02	From 1999 U.S. EPA Region IX Preliminary Remediation Goal Tables - value from National Center for Environmental Assessment (NCEA)
1,2-Dichloroethane Inhalation Verified Reference Dose (RfD)	mg/kg-day	2.90E-03	1.40E-03	From 1999 U.S. EPA Region IX Preliminary Remediation Goal Tables - value from National Center for Environmental Assessment (NCEA)
Naphthalene Oral Verified Reference Dose (RfD)	mg/kg-day	4.00E-02	2.00E-02	From 2000 Integrated Risk Information System (IRIS)
Naphthalene Inhalation Verified Reference Dose (RfD)	mg/kg-day	4.00E-02	8.57E-04	From Reference Concentration (3E-3 mg/m^3) referenced in 2000 Integrated Risk Information System (IRIS)
1,2,4-Trimethylbenzene and 1,3,5-Trimethybenzene Oral Verified Reference Dose (RfD)	mg/kg-day	Not Available	5.00E-02	From 1999 U.S. EPA Region IX Preliminary Remediation Goal Tables - value from National Center for Environmental Assessment (NCEA)

Notes

cm = centimeters

cm2 = square centimeters

cm3 = cubic centimeters

sec = seconds

Table 4. Tier 3 Input Parameters

		Risk Scenario		
		Residential		Commercial
TARGET RISK LEVELS	Units	Value for ADULT	Value for CHILD	Value for Industrial
Target cancer risk (TCR)	unitless	1.0E-05	= adult res.	1.0E-05
Target hazard quotient	unitless	1.0	= adult res.	1.0

		Residential		Commercial
EXPOSURE PARAMETERS	Units	Value for ADULT	Value for CHILD	Value for Industrial
Averaging time for carcinogens	yr	70	= adult res.	= adult res.
Averaging time for non-carcinogens	yr	24	6	25
Body weight	kg	70	15	70
Exposure duration	yr	24	6	25
Exposure frequency	d/yr	350	350	250
Exposure time for indoor air	hr/d	24	24	9
Exposure time for outdoor air	hr/d	16	16	9
Soil ingestion rate	mg/d	100	200	50
Indoor inhalation rate	m^3/d	15	10	20
Outdoor inhalation rate	m^3/d	20	10	20
Groundwater ingestion rate	L/d	2	1	1
Soil to skin adherence factor	mg/cm^2	0.2	0.2	0.2
Skin surface area exposed to soil	cm^2	5000	2000	5000
Exp. freq. for water used for recreation	d/yr	120	120	0
Exp. time for water used for recreation	hr/d	1.0	1.0	0
Skin surface area exposed to water used for recreation	cm^2	8000	8000	0
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0

		Residential		Commercial
SATURATED ZONE PARAMETERS	Units	Value for ADULT	Value for CHILD	Value for Industrial
Groundwater Darcy velocity	cm/yr	600	=adult res.	=adult res.
Groundwater mixing zone thickness	cm	305	=adult res	=adult res.

Table 4. Tier 3 Input Parameters

VADOSE ZONE PARAMETERS	Units	Residential Value for ADULT	Residential Value for CHILD	Commercial Value for Industrial
Lower depth of surficial soil zone	cm	100.0	=adult res.	=adult res.
Fraction organic carbon in soil	g oc/g soil	0.01	=adult res.	=adult res.
Vadose zone thickness	cm	538.64	=adult res.	=adult res.
Infiltration rate through the vadose zone	cm/yr	9	=adult res.	=adult res.
Depth to groundwater	cm	548.64	=adult res.	=adult res.
Depth to subsurface soil sources	cm	100	=adult res.	=adult res.
Vadose zone soil density	cm^3/cm^3	0.2	=adult res.	=adult res.
Total soil porosity	cm^3/cm^3	0.35	=adult res.	=adult res.
Vadose zone water content	cm^3/cm^3	0.15	=adult res.	=adult res.
Soil bulk density	g/cm^3	1.72	=adult res.	=adult res.
Capillary fringe thickness	cm	10.1	=adult res.	=adult res.
Capillary fringe air content	cm^3/cm^3	0.025	=adult res.	=adult res.
Capillary fringe water content	cm^3/cm^3	0.325 ✓	=adult res.	=adult res.

OUTDOOR AND INDOOR VOLATILIZATION/BUILDING PARAMETERS	Units	Residential Value for ADULT	Residential Value for CHILD	Commercial Value for Industrial
Indoor air exchange rate	1/s	2.90E-03	=adult res.	2.90E-03
Building air volume/floor area	cm^3/cm^2	259	=adult res.	259
Foundation thickness	cm	27.94	=adult res.	27.94
Areal fraction of cracks in building foundation	cm^2/cm^2	0.001	=adult res.	0.001
Foundation air content	cm^3/cm^3	0.25	=adult res.	=adult res.
Foundation water content	cm^3/cm^3	0	=adult res.	=adult res.
Particulate emission rate	g/cm^2-s	1.38E-11	=adult res.	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s	322	=adult res.	=adult res.
Width of source area parallel to wind or groundwater flow direction	cm	1500	=adult res.	=adult res.
Outdoor air mixing zone height	cm	200	=adult res.	=adult res.
Averaging time for vapor flux	s	9.46E+08	=adult res.	7.88E+08

Table 5. Chemical Properties

Parameter	Units	Benzene	Dichloroethane (1,2-) (EDC)	Ethyl-benzene	Naphthalene	Tetraethyl Lead	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes
Toxicity Data										
Slope Factor Oral	1/(mg/kg-d)	1.00E-01	7.00E-02	ND	ND	ND	ND	ND	7.20E-02	ND
Slope Factor Inhalation	1/(mg/kg-d)	1.00E-01	7.00E-02	ND	ND	ND	ND	ND	7.20E-02	ND
RfD Oral	mg/kg-d	1.70E-03	3.00E-02	1.00E-01	2.00E-02	1.00E-07	2.00E-01	5.00E-02	4.00E-03	2.00E+00
RfD Inhalation	mg/kg-d	3.00E-03	1.40E-03	2.90E-01	8.57E-04	ND	1.14E-01	1.70E-03	4.00E-03	2.00E-01
Absorption Adjustment Factor: Oral-Soil	-	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Absorption Adjustment Factor: Oral-Water	-	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Absorption Adjustment Factor: Dermal-Soil	-	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Absorption Adjustment Factor: Dermal-Water	-	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Absorption Adjustment Factor: Inhalation	-	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Skin Permeability Coefficient	cm/hr	2.10E-02	5.30E-03	7.40E-02	6.90E-02	1.50E-02	4.50E-02	2.10E-02	2.10E-02	8.00E-02
Maximum Contaminant Levels (MCLs)	mg/L	1.00E-03	5.00E-04	7.00E-01	2.00E-02	1.50E-02	1.50E-01	ND	ND	1.75E+00
Fate and Transport Parameters										
Solubility	mg/L	1.75E+03	8.52E+03	1.69E+02	3.10E+01	2.10E-01	5.26E+02	2.50E+01	5.00E+01	1.98E+02
Henry's Law Constant (no NDs)	-	2.28E-01	4.01E-02	3.23E-01	1.98E-02	2.33E+01	2.72E-01	2.30E-01	3.20E-01	2.90E-01
Koc (for organics, ND for inorganics)	ml/g	5.89E+01	1.74E+01	3.63E+02	2.00E+03	4.90E+03	1.82E+02	3.70E+03	8.20E+02	2.40E+02
Kd (partition coefficient for inorganics)	ml/g	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diffusion Coeff. in Air	cm2/s	8.80E-02	1.04E-01	7.50E-02	5.90E-02	5.70E-02	8.70E-02	7.50E-02	7.50E-02	7.20E-02
Diffusion Coefficient in Water	cm2/s	9.80E-06	9.90E-06	7.80E-06	7.50E-06	6.40E-06	8.60E-06	7.10E-06	7.10E-06	8.50E-06
Other Data (not used in RBCA equations)										
CAS Number	-	71-43-2	107-06-2	100-41-4	91-20-3	78-00-2	108-88-3	95-63-6	99-35-4	1330-20-7
Molecular Weight	g/mol	78	99.0	106.2	128.2	323	92.1	120	120	106.2

Table 6. Tier 3 Risk-Based Screening Levels

Medium	Exposure Pathway	Land Use	Type of Risk	Benzene	Dichloro ethane (1,2-) (EDC)	Ethyl-benzene	Naphthalene	Tetraethyl Lead	Toluene	*1,2,4-Trimethylbenzene*	*1,3,5-Trimethylbenzene*	*Xylenes*
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	3.9E+00	1.0E+01						5.4E+01	
			Hazard	2.8E+01	2.3E+01	SAT	SAT		SAT	SAT	3.6E+02	SAT
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.3E+00	1.9E+01						1.0E+02	
			Hazard	4.3E+01	3.7E+01	SAT	SAT		SAT	SAT	SAT	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.3E+01	7.8E+01						1.6E+01	
			Hazard	7.7E+01	1.5E+02	>Sol	>Sol		>Sol	>Sol	>Sol	>Sol
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.0E+02	5.1E+02						>Sol	
			Hazard	1.4E+03	1.2E+03	>Sol	>Sol		>Sol	>Sol	>Sol	>Sol

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Table 7. Summary of **Risk and Hazard for Indoor Air - Residential Scenario**

Chemical	Representative Concentration (mg/kg or mg/L)	Tier 3 RBSL Inhalation of Indoor Air Vapors - Cancer at 1 x 10^{-5} (mg/kg or mg/L)	Excess Cancer Risk	Tier 3 RBSL Inhalation of Indoor Air Vapors - Noncancer at Hazard of 1 (mg/kg or mg/L)	Noncancer Hazard
Soil					
Benzene	3.09	7.30E+00	4.2E-06	4.30E+01	7.E-02
Toluene	19.34	--	NA	SAT	NA
Ethylbenzene	11.34	--	NA	SAT	NA
Xylene	82.63	--	NA	SAT	NA
Groundwater					
Benzene	0.35	1.30E+01	2.7E-07	7.70E+01	5.E-03
Toluene	1.8	--	NA	>SOL	NA
Ethylbenzene	0.64	--	NA	>SOL	NA
Xylene	4.7	--	NA	>SOL	NA
1,2-Dichloroethane	0.0014	7.80E+01	1.8E-10	1.50E+02	9.E-06
Naphthalene	0.0014	--	NA	>SOL	NA
1,2,4-Trimethylbenzene	0.0056	--	NA	>SOL	NA
1,3,5-Trimethylbenzene	0.0017	1.60E+01	1.1E-09	>SOL	NA
	Total Excess Cancer Risk		4.5E-06	**Total Hazard**	0.08

Notes:
RBSL = Risk-Based Screening Level
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water
NA = Not applicable

Table 8. Summary of **Risk and Hazard for Outdoor Air - Residential Scenario**

Chemical	Representative Concentration (mg/kg or mg/L)	Tier 3 RBSL Inhalation of Outdoor Air Vapors - Cancer at 1 x 10^{-5} (mg/kg or mg/L)	Excess Cancer Risk	Tier 3 RBSL Inhalation of Outdoor Air Vapors - Noncancer at Hazard of 1 (mg/kg or mg/L)	Noncancer Hazard
Soil					
Benzene	3.09	3.90E+00	7.9E-06	2.80E+01	1.E-01
Toluene	19.34	--	NA	SAT	NA
Ethylbenzene	11.34	--	NA	SAT	NA
Xylene	82.63	--	NA	SAT	NA
Groundwater					
Benzene	0.35	2.00E+02	1.8E-08	1.40E+03	3.E-04
Toluene	1.8	--	NA	>SOL	NA
Ethylbenzene	0.64	--	NA	>SOL	NA
Xylene	4.7	--	NA	>SOL	NA
1,2-Dichloroethane	0.0014	5.10E+02	2.7E-11	1.20E+03	1.E-06
Naphthalene	0.0014	--	NA	>SOL	NA
1,2,4-Trimethylbenzene	0.0056	--	NA	>SOL	NA
1,3,5-Trimethylbenzene	0.0017	>SOL	NA	>SOL	NA
		Total Excess Cancer Risk	7.9E-06	**Total Hazard**	0.1

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Notes:
RBSL = Risk-Based Screening Level
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water
NA = Not applicable