

SNP 469

March 22, 1990
SCI 447.010

Mr. Jonathan Redding
Fitzgerald, Abbott & Beardsley
1221 Broadway, 21st Floor
Oakland, California 94612-1837

Environmental Engineering Services
Connell Oldsmobile
3093 Broadway
Oakland, California

Dear Mr. Redding:

This letter records the results of environmental engineering services performed by Subsurface Consultants, Inc. (SCI) during underground tank removal activities at the referenced facility. Three (3) underground storage tanks were situated under the sidewalk along the Hawthorne Street side of the service department for the facility, as shown on the attached Site Plan. Tank descriptions are summarized below.

<u>Tank Contents</u>	<u>Capacity</u>	<u>Diameter</u>	<u>Length</u>	<u>Depth to Bottom</u>
Gasoline	2000 gal.	6'	9'	9.5'
Diesel	650 gal.	3'	12'	7.5'
Waste Oil	425 gal.	3'	8'	7.5'

Tank Removal

Prior to tank removal an underground tank closure/modification plan was submitted to and approved by Mr. Gilbert Wistar of the Alameda County Health Care Services Agency (ACHCSA). In addition, a tank removal permit was obtained from the Oakland Fire Department. An SCI field technician was on-site full time to observe removal activities and collect required soil and water samples for analyses. In addition, Mr. Wistar intermittently observed site activities.

■ Subsurface Consultants, Inc.

Mr. Jonathan Redding
Fitzgerald, Abbott & Beardsley
SCI 447.010
March 22, 1990
Page 2

Hazardous Substance Removal, Inc. (HSR) performed sidewalk demolition, excavation and tank removal activities from December 12 through 18, 1989. Initially, the tops of the tanks were exposed to determine tank orientations. Excavation revealed that a 2- to 4-inch high void existed beneath portions of the sidewalk above the tanks. We judge the void is likely the result of water forced under the sidewalk after a water line break. As a result, the water "washed" the sand backfill away. In addition, it was observed that rain gutter leaders extending from the building were situated below the sidewalk and exited into the concrete gutter.

The gasoline tank was empty at the time of tank removal. However, the diesel tank contained approximately 50 gallons of water and the waste oil tank contained some sludge. On December 18, 1989, the tanks were purged of vapors by adding dry ice. The tank atmospheres were checked by the ACHCSA using a combustible gas meter to confirm that the atmospheres were less than 10 percent of the lower explosive limit (LEL) prior to removal.

No visible deterioration of the gasoline and waste oil tanks nor their respective exposed piping was observed. However, numerous holes were observed in the top of the diesel tank and its bottom had been corroded through. The diesel tank fill inlet pipe also showed signs of corrosion and a visible section of piping had stripped threads. The tanks were transported under manifest from the site by H & H Ship Service Company.

Soil Excavation and Backfilling

Following tank removal, the excavation was widened and deepened in an attempt to remove visually contaminated soil and backfill materials. Excavated material was stockpiled and covered with plastic sheeting in a fenced portion of the property, as shown on the Site Plan.

Soil samples were obtained from the side walls and bottom of the excavation and submitted for analyses to document the extent of contaminated soil removal. Bottom sample locations were selected by the ACHCSA. In accordance with removal guidelines, a sample of water which had accumulated in the excavation was also collected and submitted for analysis.

The tank area is in a traffic sensitive area. Mr. Joseph Levine, Construction Inspector with the City of Oakland, required that the excavation be backfilled as soon as practical after the tanks

Mr. Jonathan Redding
Fitzgerald, Abbott & Beardsley
SCI 447.010
March 22, 1990
Page 3

were removed. Therefore, an attempt was made to remove as much of the contaminated soil as possible prior to backfilling. In this regard, the bottom of the excavation was deepened about 1.5 feet. The excavation was backfilled with CalTrans Class 2 aggregate base material on December 26, 1989. The material was placed in thin lifts (8 inch loose thickness) and compacted with a hydrohammer. Rain leaders which were removed during excavation activities were replaced with PVC leaders. The excavation and leaders were topped with a temporary asphalt concrete patch to match adjacent sidewalk grades.

Environmental Sampling

Several soil samples and one water sample were collected and analyzed from within the excavation. In addition, samples of the excavated stockpiled material were also collected and analyzed. Soil samples were retained in precleaned 2-inch-diameter brass sample liners. Sample liner ends were covered with Teflon sheeting and plastic caps, prior to sealing them with duct tape. The water sample was retained in a glass container, precleaned by the supplier in accordance with EPA protocol. Soil and water samples were refrigerated until delivery to the analytical laboratory.

Soil and water samples were transmitted to Curtis & Tompkins, Ltd., a laboratory certified by the California Department of Health Services, to conduct hazardous waste and water testing. The testing program for soil samples included analysis for total oil and grease (TOG), total volatile hydrocarbons (TVH), total extractable hydrocarbons (TEH), benzene, toluene, xylene, ethylbenzene (BTXE), volatile halocarbons, and heavy metals. The water sample was analyzed for volatile organic compounds.

Samples of the soil and water from within the excavation were individually analyzed. Test results for samples 1 through 4 are representative of conditions 2 feet below the tanks. After sample collection, these materials were removed and stockpiled on-site. Additional samples of the resulting bottom were not obtained and analyzed prior to backfilling the excavation. }?

Results presented on Tables 5 and 6 are for composited samples of the excavated materials. Each composited sample contains 4 individual soil samples, representing a quantity of approximately 50 cubic yards of material.

Table 1. ORGANIC CHEMICAL CONCENTRATIONS IN SOIL BELOW TANKS¹

<u>Chemical/Chemical Analysis</u>	<u>Concentration (ppm)²</u>
<u>Sample 1 @ 12.0' - Waste Oil Tank</u>	
TOG ³	310
TVH ⁴	31000
TEH ⁵	ND ⁶
Benzene	190
Toluene	2000
Xylene	2600
Ethylbenzene	680
EPA Method 8010 Chemicals ⁷	ND
<u>Sample 2 @ 12.0' - Waste Oil/Diesel Tanks</u>	
TOG	570
TVH	490
TEH	ND
Benzene	1.4
Toluene	2.5
Xylene	23
Ethylbenzene	6.1
EPA Method 8010 Chemicals	ND
<u>Sample 3 @ 12.0' - Diesel/Gasoline Tanks</u>	
TOG	540
TVH	300
TEH	440 ⁸
Benzene	ND
Toluene	0.72
Xylene	12
Ethylbenzene	4.7
EPA Method 8010 Chemicals	ND
<u>Sample 4 @ 12.0' - Gasoline Tank</u>	
TVH	6.3
Benzene	ND
Toluene	ND
Xylene	29
Ethylbenzene	17

¹ Representative samples of soils 2 feet below tank bottoms. Excavation was deepened to remove this material.

² ppm = parts per million = milligrams per kilogram = mg/kg

³ TOG = Total oil and grease as determined by SMWW 503E

⁴ TVH = Total volatile hydrocarbons as determined by EPA Methods 5030 and 8015

⁵ TEH = Total extractable hydrocarbons as determined by EPA Methods 3550 and 8015

⁶ ND = Not detected, chemicals not present at concentrations above the detection limits

⁷ Method includes chemicals listed on the test reports in Appendix

⁸ Fingerprint pattern does not match hydrocarbon standard

Table 2. ORGANIC CHEMICAL CONCENTRATIONS IN WATER

<u>Chemical/Chemical Analysis</u>	<u>Contamination (ppm)¹</u>
EPA Method 624² Chemicals	
Benzene	2.1
Toluene	11
Xylene	30
Ethylbenzene	2.1
Other EPA 624 Chemicals	ND

Table 3. TOTAL HEAVY METAL CONCENTRATIONS IN SOIL BELOW TANKS³

<u>Metal</u>	<u>1 @ 12.0'</u>	<u>2 @ 12.0'</u>	<u>3 @ 12.0'</u>	<u>Regulatory Criteria TTLC⁴</u>
Cadmium(Cd)	0.5 ³	1.1	0.9	100
Chromium(Cr) ⁵	9.5	18	16	2500
Lead (Pb)	29	14	12	1000
Zinc (Zn)	10	19	23	5000

¹ Concentrations in ppm = parts per million = milligrams per kilogram = mg/kg

² Method includes chemicals listed on the test reports in the Appendix

³ Representative samples of soil 2 feet below tank bottoms. Excavation was deepened to remove this material

⁴ TTLC = Total Threshold Limit Concentrations (22 CAC 66699)

⁵ Total chromium compounds

Table 4. OIL AND GREASE CONCENTRATIONS IN SOIL

<u>Location</u>	<u>Sample</u>	<u>Concentration (ppm)¹</u>
East end waste oil tank	1 @ 12.0' ²	710
East end of diesel tank	2 @ 12.0'	570
West end of diesel tank	3 @ 12.0'	540
North side wall, east end of waste oil tank	5 @ 1.0'	160
	6 @ 5.5'	440
	7 @ 10'	460
East side wall, east end of waste oil tank	8 @ 1.0'	540
	9 @ 5.5'	1,100
	10 @ 10'	600
South side wall, east end of waste oil tank	11 @ 1.0'	530
	12 @ 5.5'	590
	13 @ 10'	200
Directly below sidewalk, east end of waste oil tank	14 @ 0.5'	440
	15 @ 0.5'	410
	16 @ 0.5'	650

¹ ppm = milligrams per kilogram

² samples 1, 2 and 3 were obtained 2 feet below tank bottoms.
Excavation was deepened to remove this material

Table 5. ORGANIC CHEMICAL CONCENTRATIONS IN EXCAVATED SOIL STOCKPILE

<u>Chemical/Chemical Analysis</u>	<u>Concentration (ppm)¹</u>
<u>Composite of Samples (17,18,19,20)</u>	
TVH ²	190
TEH ³	210 ⁴
TOG ⁵	150
Benzene	0.27
Toluene	0.13
Xylene	1.7
Ethylbenzene	0.15
EPA Method 8010 Chemicals	ND ⁷
<u>Composite of Samples (21,22,23,24)</u>	
TVH	62
TEH	900 ⁴
TOG	400
Benzene	ND
Toluene	ND
Xylene	0.83
Ethylbenzene	0.21
EPA Method 8010 Chemicals	ND
<u>Composite of Samples (25,26,27,28)</u>	
TVH	130
TEH	1600 ⁴
TOG	680
Benzene	ND
Toluene	0.068
Xylene	2.9
Ethylbenzene	0.12
EPA Method 8010 Chemicals	ND

-
- 1 ppm = parts per million - milligrams per kilogram = mg/kg
 - 2 TVH = Total volatile hydrocarbons as determined by EPA Methods 5030 and 8015
 - 3 TEH = Total extractable hydrocarbons as determined by EPA Methods 3550 and 8015
 - 4 Quantified as diesel by method
 - 5 TOG = Total oil and grease as determined by SMWW 503E
 - 6 Method includes chemicals listed on the test reports in Appendix
 - 7 ND = Not detected, chemicals not present at concentrations above the detection limits

Table 6. TOTAL HEAVY METAL CONCENTRATIONS IN EXCAVATED SOIL STOCKPILE

<u>Metal</u>	<u>Composite of Samples 17,18,19,20</u>	<u>Composite of Samples 21,22,23,24</u>	<u>Composite of Samples 25,26,27,28</u>	<u>Regulatory Criteria TTLC²</u>
Cadmium(Cd)	0.78 ³	0.89	0.90	100
Chromium(Cr) ⁴	15	18	18	2500
Lead (Pb)	5.5	13	12	1000
Zinc (Zn)	16	21	34	5000

-
- ¹ STLC = Soluble Threshold Limit Concentrations (22 CAC 66699)
² TTLC = Total Threshold Limit Concentrations (22 CAC 66699)
³ Concentrations in ppm = parts per million = milligrams per kilogram - mg/kg
⁴ Total Chromium compounds

Discussion and Conclusion

A. General

Our services to date indicate that detectable concentrations of petroleum hydrocarbons (oil, gasoline, diesel), volatile fuel constituents (benzene, toluene, xylene, ethylbenzene) and four heavy metals (cadmium, chromium, lead, zinc) are present in the soil within the previous tank area. Approximately 150 cubic yards of contaminated soil was removed during tank removal operations.

Our conclusions regarding the significance of the contaminant concentrations are presented in the following sections.

1. Light Petroleum Hydrocarbon Contamination

Light petroleum hydrocarbon and BTXE concentrations in soil below the tanks exceed regulatory guidelines. The concentrations appear highest on the east topographically low, side of the excavation. These materials were subsequently removed during excavation activities and stockpiled on-site.

Mr. Jonathan Redding
Fitzgerald, Abbott & Beardsley
SCI 447.010
March 22, 1990
Page 9

Regional Water Quality Control Board guidelines indicate that a soil and groundwater investigation be conducted whenever (1) an obvious tank system failure has occurred, or (2) petroleum hydrocarbon concentrations in soil exceed 100 ppm. Test borings and groundwater wells are to be installed and samples are to be analyzed to assess the vertical and lateral extent of the soil contamination and whether groundwater has been impacted.

Water within the excavation contained detectable concentrations of BTXE. We judge that the water likely represents that which had accumulated in the tank backfill as a result of spillage out of the corroded diesel tank during tank removal activities. Based on studies by others, groundwater is situated about 19 feet below the ground surface.

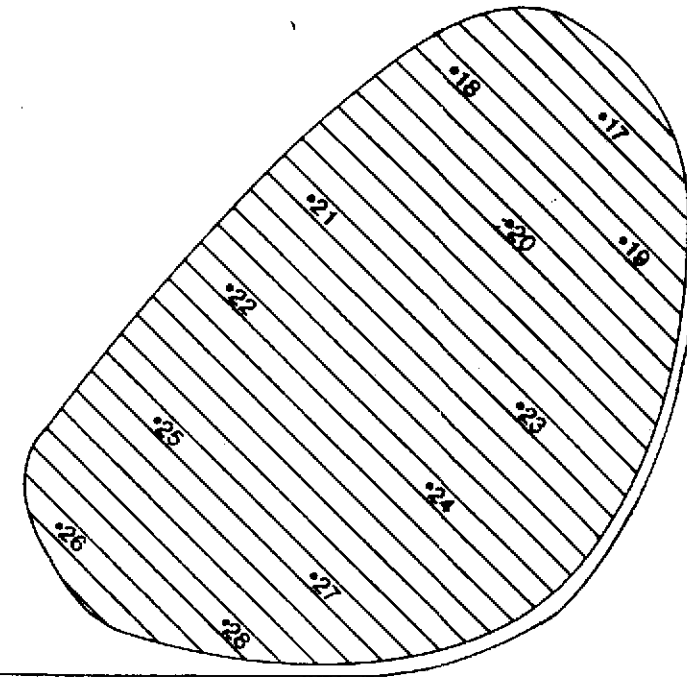
2. Oil and Grease

Elevated concentrations of oil and grease were detected in soil samples analyzed from the bottom of the excavation and from the side walls of the excavation adjacent to the east end of the waste oil tank. In addition, elevated concentrations were also detected directly below the sidewalk east of the waste oil tank. The source of the oil and grease is likely the waste oil tank. However, we judge there are at least two contributing means of discharge from the tank, including tank overfilling and releases caused by the water main break. In addition, vertical migration of the contamination could be a result of water from broken down spout leaders percolating through the soil backfill and transmitting contamination downward.

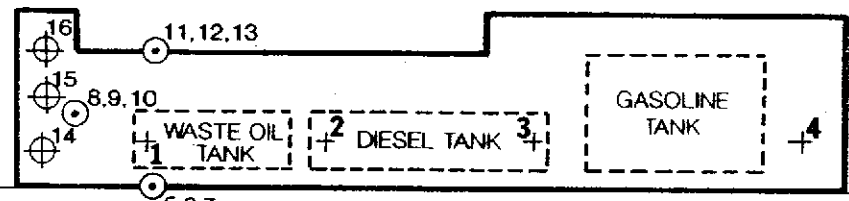
It is very difficult to determine which means of discharge is predominant. It is probably that lateral migration of oil and grease within the upper 1 to 2 feet of soil outside of the excavation limits is due to the water main break. Water from the break was under high pressure and flowed laterally in the pervious shallow soils beneath the sidewalk. As a result, the water likely carried oil laterally beneath the sidewalk. In contrast, oil from tank overfilling would migrate downward under gravity forces.

CONNELL OLDSMOBILE BUILDING

WEBSTER



SIDEWALK



160' TO BROADWAY

HAWTHORNE

- STOCKPILE SAMPLE
- + BOTTOM SAMPLE
- ⊕ BELOW SLAB SAMPLE
- ⊙ WALL SAMPLE
- EXTENT OF EXCAVATION
- ▨ SOIL STOCKPILE
- ⊡ PREVIOUS TANK LOCATION



NO SCALE
SCHEMATIC ONLY

SITE PLAN

Subsurface Consultants

CONNELL OLDSMOBILE - OAKLAND, CA		
JOB NUMBER 447.010	DATE 2/8/90	APPROVED <i>ja</i>

PLATE
1

Mr. Jonathan Redding
Fitzgerald, Abbott & Beardsley
SCI 447.010
March 22, 1990
Page 10

3. Heavy Metal Contamination

Cadmium, chromium, lead and zinc were detected in the soil samples at concentrations well below regulatory criteria. As a result, we conclude that the data to date does not indicate that heavy metal contamination represents a significant environmental concern at the site.

B. Future Studies

We recommend that the a soil and groundwater investigation be conducted at the site. A work plan detailing the investigation should be submitted to the ACHCSA for approval prior to implementing field work.

If you should have any questions or comments, please do not hesitate to contact us.

Yours very truly,

Subsurface Consultants, Inc.



R. William Rudolph

JNA:RWR:mb1

Attachment: Site Plan
 Analytical Test Reports



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 12/19/89
DATE REPORTED: 01/02/90
PAGE 1 OF 11

LAB NUMBER: 19001

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 16 SOIL SAMPLES &
1 WATER SAMPLE

PROJECT #: 447.010
LOCATION: CONNELL OLDSMOBILE

RESULTS: SEE ATTACHED

M. E. Priete

QA/QC Officer
C. S. Spohn

Laboratory Director

LAB NUMBER: 19001
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT # : 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/02/90
 PAGE 2 OF 11

ANALYSIS: OIL AND GREASE
 METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19001-1	SAMPLE #1	710	mg /Kg	50
19001-2	SAMPLE #2	570	mg /Kg	50
19001-3	SAMPLE #3	540	mg /Kg	50
19001-5	SAMPLE #5	160	mg /Kg	50
19001-6	SAMPLE #6	440	mg /Kg	50
19001-7	SAMPLE #7	460	mg /Kg	50
19001-8	SAMPLE #8	540	mg /Kg	50
19001-9	SAMPLE #9	1,100	mg /Kg	50
19001-10	SAMPLE #10	600	mg /Kg	50
19001-11	SAMPLE #11	530	mg /Kg	50
19001-12	SAMPLE #12	590	mg /Kg	50
19001-13	SAMPLE #13	200	mg /Kg	50
19001-14	SAMPLE #14	440	mg /Kg	50
19001-15	SAMPLE #15	410	mg /Kg	50
19001-16	SAMPLE #16	650	mg /Kg	50

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	92

LABORATORY NUMBER: 19001
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/28/89
 DATE REPORTED: 01/02/90
 PAGE 3 OF 11

Extractable Petroleum Hydrocarbons in Soils & Wastes
 EPA 8015 (Modified)
 Extraction Method: EPA 3550

LAB ID	CLIENT ID	KEROSENE (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
19001-1	SAMPLE #1	ND(1000)	ND(1000)	ND(1000)
19001-2	SAMPLE #2	ND(10)	ND(10)	ND(10)
19001-3	SAMPLE #3	ND(10)	440*	ND(10)

*Fingerprint pattern does not match hydrocarbon standards. Quantitation based on area sum within C12-C26 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

Duplicate: Relative % Difference	1
Spike: % Recovery	117

LABORATORY NUMBER: 19001
 CLIENT: SUBSURFACE CONSULTANTS
 JOB NUMBER: 447.010
 JOB LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/29/89
 DATE REPORTED: 01/02/90
 PAGE 4 OF 11

Total Volatile Hydrocarbons (TVH) by EPA 8015
 Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
19001-1	SAMPLE #1	31,000	190,000	2,000,000	680,000	2,600,000
19001-2	SAMPLE #2	490	1,400	2,500	6,100	23,000
19001-3	SAMPLE #3	300	ND(100)	720	4,700	12,000
19001-4	SAMPLE #4	630	ND(200)	ND(200)	17,000	29,000

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	1
%RECOVERY	100

LABORATORY NUMBER: 19001-1
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 SAMPLE ID: SAMPLE #1

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/02/90
 PAGE 5 OF 11

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
CADMIUM	0.5	mg / Kg	0.5	EPA 6010
CHROMIUM	9.5	mg / Kg	0.5	EPA 6010
LEAD	29	mg / Kg	2.5	EPA 7420
ZINC	10	mg / Kg	0.5	EPA 6010

QA/QC

	%RPD	%Recovery
Cadmium	7	82
Chromium	3	94
Lead	1	111
Zinc	1	94

LABORATORY NUMBER: 19001-2
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 SAMPLE ID: SAMPLE #2

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/02/90
 PAGE 6 OF 11

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
CADMIUM	1.1	mg/Kg	0.5	EPA 6010
CHROMIUM	18	mg/Kg	0.5	EPA 6010
LEAD	14	mg/Kg	2.5	EPA 7420
ZINC	19	mg/Kg	0.5	EPA 6010

QA/QC

	%RPD	%Recovery
Cadmium	7	82
Chromium	3	94
Lead	1	111
Zinc	1	94

LABORATORY NUMBER: 19001-3
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 SAMPLE ID: SAMPLE #3

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/02/90
 PAGE 7 OF 11

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
CADMIUM	0.9	mg/Kg	0.5	EPA 6010
CHROMIUM	16	mg/Kg	0.5	EPA 6010
LEAD	12	mg/Kg	2.5	EPA 7420
ZINC	23	mg/Kg	0.5	EPA 6010

QA/QC

	%RPD	%Recovery
Cadmium	7	82
Chromium	3	94
Lead	1	111
Zinc	1	94

LABORATORY NUMBER: 19001-1
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 SAMPLE ID: SAMPLE #1

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/27/89
 DATE REPORTED: 01/02/90
 PAGE 8 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	100
bromomethane	ND	100
vinyl chloride	ND	100
chloroethane	ND	100
methylene chloride	ND	100
trichlorofluoromethane	ND	100
1,1-dichloroethene	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethene (total)	ND	100
chloroform	ND	100
freon 113	ND	100
1,2-dichloroethane	ND	100
1,1,1-trichloroethane	ND	100
carbon tetrachloride	ND	100
bromodichloromethane	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trichloroethylene	ND	100
1,1,2-trichloroethane	ND	100
trans-1,3-dichloropropene	ND	100
dibromochloromethane	ND	100
2-chloroethylvinyl ether	ND	100
bromoform	ND	100
tetrachloroethylene	ND	100
1,1,2,2-tetrachloroethane	ND	100
chlorobenzene	ND	100
1,3-dichlorobenzene	ND	100
1,2-dichlorobenzene	ND	100
1,4-dichlorobenzene	ND	100

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

=====
 Duplicate: Relative % Difference 3
 Spike: Average % Recovery 88

LABORATORY NUMBER: 19001-2
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 SAMPLE ID: SAMPLE #2

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/27/89
 DATE REPORTED: 01/02/90
 PAGE 9 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	100
bromomethane	ND	100
vinyl chloride	ND	100
chloroethane	ND	100
methylene chloride	ND	100
trichlorofluoromethane	ND	100
1,1-dichloroethene	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethene (total)	ND	100
chloroform	ND	100
freon 113	ND	100
1,2-dichloroethane	ND	100
1,1,1-trichloroethane	ND	100
carbon tetrachloride	ND	100
bromodichloromethane	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trichloroethylene	ND	100
1,1,2-trichloroethane	ND	100
trans-1,3-dichloropropene	ND	100
dibromochloromethane	ND	100
2-chloroethylvinyl ether	ND	100
bromoform	ND	100
tetrachloroethylene	ND	100
1,1,2,2-tetrachloroethane	ND	100
chlorobenzene	ND	100
1,3-dichlorobenzene	ND	100
1,2-dichlorobenzene	ND	100
1,4-dichlorobenzene	ND	100

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

Duplicate: Relative % Difference 3
 Spike: Average % Recovery 88

LABORATORY NUMBER: 19001-3
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 SAMPLE ID: SAMPLE #3

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/27/89
 DATE REPORTED: 01/02/90
 PAGE 10 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	100
bromomethane	ND	100
vinyl chloride	ND	100
chloroethane	ND	100
methylene chloride	ND	100
trichlorofluoromethane	ND	100
1,1-dichloroethene	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethene (total)	ND	100
chloroform	ND	100
freon 113	ND	100
1,2-dichloroethane	ND	100
1,1,1-trichloroethane	ND	100
carbon tetrachloride	ND	100
bromodichloromethane	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trichloroethylene	ND	100
1,1,2-trichloroethane	ND	100
trans-1,3-dichloropropene	ND	100
dibromochloromethane	ND	100
2-chloroethylvinyl ether	ND	100
bromoform	ND	100
tetrachloroethylene	ND	100
1,1,2,2-tetrachloroethane	ND	100
chlorobenzene	ND	100
1,3-dichlorobenzene	ND	100
1,2-dichlorobenzene	ND	100
1,4-dichlorobenzene	ND	100

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

=====
 Duplicate: Relative % Difference 3
 Spike: Average % Recovery 88

LABORATORY NUMBER: 19001-17
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 SAMPLE ID: WATER 1

DATE RECEIVED: 12/19/89
 DATE ANALYZED: 12/28/89
 DATE REPORTED: 01/02/90
 PAGE 11 OF 11

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	1000
bromomethane	ND	1000
vinyl chloride	ND	1000
chloroethane	ND	1000
methylene chloride	ND	500
trichlorofluoromethane	ND	500
1,1-dichloroethene	ND	500
1,1-dichloroethane	ND	500
trans-1,2-dichloroethene	ND	500
chloroform	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
carbon tetrachloride	ND	500
bromodichloromethane	ND	500
1,2-dichloropropane	ND	500
cis-1,3-dichloropropene	ND	500
trichloroethylene	ND	500
dibromochloromethane	ND	500
1,1,2-trichloroethane	ND	500
benzene	2,100	500
trans-1,3-dichloropropene	ND	500
2-chloroethylvinyl ether	ND	1000
bromoform	ND	500
1,1,2,2-tetrachloroethane	ND	500
tetrachloroethylene	ND	500
toluene	11,000	500
chlorobenzene	ND	500
ethyl benzene	2,100	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
carbon disulfide	ND	500
2-butanone	ND	1000
vinyl acetate	ND	1000
2-hexanone	ND	1000
4-methyl-2-pentanone	ND	1000
styrene	ND	500
total xylenes	30,000	500

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	105%
Toluene-d8	100%
Bromofluorobenzene	102%

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: CONNELL Oldsmobile
 SCI Job Number: 447.010
 Project Contact at SCI: JERRIANN ALEXANDER / BILL RUDOLPH
 Sampled By: TOM Tebb
 Analytical Laboratory: CURTIS & TOMPKINS, Ltd.
 Analytical Turnaround: Normal turnaround

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
sample #1	S	T	12-19-89		TEH, TVH, BTX+E	0.1G. + Cd, Cr, Pb, Zn
sample #2	↓	↓	↓		↓	↓
sample #3	↓	↓	↓		↓	↓
sample #4	↓	↓	↓		TVH + BTX+E	
sample #5	↓	↓	↓		Oil & Grease	
sample #6	↓	↓	↓		Oil & Grease	
sample #7	↓	↓	↓		Oil & Grease	
sample #8	↓	↓	↓		Oil & Grease	
sample #9	↓	↓	↓		Oil & Grease	
sample #10	↓	↓	↓		Oil & Grease	
sample #11	↓	↓	↓			
sample #12 *	↓	↓	↓			

Resubmitted 12/20/89 Bg of P.P.

Released by: J. Thomas Tebb / Bill Rudolph Date: 12-19-89 / 12/21/89
 Released by Courier: _____ Date: _____
 Received by Laboratory: Nancy Webb / Billinda Peters Date: 12/21/89 / 12-21-89
 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

CHAIN OF CUSTODY RECORD
& ANALYTICAL TEST REQUEST

Project Name: CONNELL Oldsmobile
 SCI Job Number: 447.010
 Project Contact at SCI: Jessie Ann Alexander / Bill Ruelofek
 Sampled By: Tom Tebb
 Analytical Laboratory: Curtis & Tompkins, Ltd
 Analytical Turnaround: NORMAL

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
Sample #13	S	T	12-19-89		Oil & Grease	
Sample #14	↓	↓	↓		↓	
Sample #15	↓	↓	↓		↓	
Sample #16	↓	↓	↓		↓	
Water 1	W	V	12-18-89		624	
Water 1	↓	V	↓		↓	
Water 1	↓	G	↓		↓	

* * * * *

Released by: J. Thomas Tebb / [Signature] Date: 12-19-89 / 21:10
 Released by Courier: _____ Date: _____

Received by Laboratory: [Signature] / [Signature] Date: 12/19/89 / 15:58
 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



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street Berkeley CA 94710. Phone (415) 486-0900

DATE RECEIVED: 12/21/89
DATE REPORTED: 01/05/90
PAGE 1 OF 11


LAB NUMBER: 19014

CLIENT: SUBSURFACE CONSULTANTS

REPORT ON: 3 SOIL COMPOSITE SAMPLES

PROJECT #: 447.010
LOCATION: CONNELL OLDSMOBILE

RESULTS: SEE ATTACHED



QA/QC Officer


Laboratory Director

LABORATORY NUMBER: 19014
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 01/02/90
 DATE REPORTED: 01/05/90
 PAGE 2 OF 11

Extractable Petroleum Hydrocarbons in Soils & Wastes
EPA 8015 (Modified)
Extraction Method: EPA 3550

LAB ID	CLIENT ID	KEROSENE (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
19014- 1, 2, 3, 4	COMPOSITE: SAMPLE #- 17, 18, 19, 20	ND(10)	210	ND(10)
19014- 5, 6, 7, 8	COMPOSITE: SAMPLE #- 21, 22, 23, 24	ND(10)	900	ND(10)
19014- 9, 10, 11, 12	COMPOSITE SAMPLE #- 25, 26, 27, 28	ND(100)	1,600	ND(100)

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES

QA/QC SUMMARY

.....

Duplicate: Relative % Difference	10
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LABORATORY NUMBER: 19014
CLIENT: SUBSURFACE CONSULTANTS
JOB NUMBER: 447.010
JOB LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
DATE ANALYZED: 01/04/90
DATE REPORTED: 01/05/90
PAGE 3 OF 11

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
19014- 1,2,3,4	COMPOSITE: SAMPLE #- 17,18,19,20	190	270	130	150	1,700
19014- 5,6,7,8	COMPOSITE: SAMPLE #- 21,22,23,24	62	ND(50)	ND(50)	210	830
19014- 9,10,11,12	COMPOSITE SAMPLE #- 25,26,27,28	130	ND(50)	68	120	2,900

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES

QA/QC SUMMARY

%RPD	<1
%RECOVERY	97

LAB NUMBER: 19014
CLIENT: SUBSURFACE CONSULTANTS
PROJECT # : 447.010
LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
DATE ANALYZED: 12/28/89
DATE REPORTED: 01/05/90
PAGE 4 OF 11

ANALYSIS: OIL AND GREASE
METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19014- 1,2,3,4	COMPOSITE: SAMPLE #- 17,18,19,20	150	mg /Kg	50
19014- 5,6,7,8	COMPOSITE: SAMPLE #- 21,22,23,24	400	mg /Kg	50
19014- 9,10,11,12	COMPOSITE SAMPLE #- 25,26,27,28	680	mg /Kg	50

QA/QC SUMMARY

=====
 RPD, % 2
 RECOVERY, % 89
 =====

LABORATORY NUMBER: 19014-1,2,3,4
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 LOCATION: CONNELL OLDSMOBILE
 SAMPLE ID: COMPOSITE OF SAMPLE #-
 17,18,19,20

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 01/02/90
 DATE REPORTED: 01/05/90
 PAGE 5 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	5
bromomethane	ND	5
vinyl chloride	ND	5
chloroethane	ND	5
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
freon 113	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
1,1,2-trichloroethane	ND	5
trans-1,3-dichloropropene	ND	5
dibromochloromethane	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
tetrachloroethylene	ND	5
1,1,2,2-tetrachloroethane	ND	5
chlorobenzene	ND	5
1,3-dichlorobenzene	ND	5
1,2-dichlorobenzene	ND	5
1,4-dichlorobenzene	ND	5

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

=====
 Duplicate: Relative % Difference 8
 Spike: Average % Recovery 93

LABORATORY NUMBER: 19014-5,6,7,8
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 LOCATION: CONNELL OLDSMOBILE
 SAMPLE ID: COMPOSITE OF SAMPLE #-
 21,22,23,24

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 01/02/90
 DATE REPORTED: 01/05/90
 PAGE 6 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	5
bromomethane	ND	5
vinyl chloride	ND	5
chloroethane	ND	5
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
freon 113	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
1,1,2-trichloroethane	ND	5
trans-1,3-dichloropropene	ND	5
dibromochloromethane	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
tetrachloroethylene	ND	5
1,1,2,2-tetrachloroethane	ND	5
chlorobenzene	ND	5
1,3-dichlorobenzene	ND	5
1,2-dichlorobenzene	ND	5
1,4-dichlorobenzene	ND	5

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

=====
 Duplicate: Relative % Difference 8
 Spike: Average % Recovery 93

LABORATORY NUMBER: 19014-9,10,11,12
 CLIENT: SUBSURFACE CONSULTANTS
 JOB #: 447.010
 LOCATION: CONNELL OLDSMOBILE
 SAMPLE ID: COMPOSITE OF SAMPLE #-
 25,26,27,28

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 01/02/90
 DATE REPORTED: 01/05/90
 PAGE 7 OF 11

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	Result ug/Kg	LOD ug/Kg
chloromethane	ND	5
bromomethane	ND	5
vinyl chloride	ND	5
chloroethane	ND	5
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
freon 113	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
1,1,2-trichloroethane	ND	5
trans-1,3-dichloropropene	ND	5
dibromochloromethane	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
tetrachloroethylene	ND	5
1,1,2,2-tetrachloroethane	ND	5
chlorobenzene	ND	5
1,3-dichlorobenzene	ND	5
1,2-dichlorobenzene	ND	5
1,4-dichlorobenzene	ND	5

ND = None Detected. Limit of detection (LOD) in last column.

QA/QC SUMMARY

=====
 Duplicate: Relative % Difference 8
 Spike: Average % Recovery 93

LABORATORY NUMBER: 19014
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/05/90
 PAGE 8 OF 11

=====
 ANALYSIS: CADMIUM
 PREPARATION METHOD: EPA 3050
 METHOD REFERENCE: EPA 6010
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19014- 1, 2, 3, 4	COMPOSITE: SAMPLE #- 17, 18, 19, 20	0.78	mg /Kg	0.5
19014- 5, 6, 7, 8	COMPOSITE: SAMPLE #- 21, 22, 23, 24	0.89	mg /Kg	0.5
19014- 9, 10, 11, 1	COMPOSITE SAMPLE #- 25, 26, 27, 28	0.90	mg /Kg	0.5

QA/QC:

=====
 RPD, % 7
 RECOVERY, % 82
 =====

LABORATORY NUMBER: 19014
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/05/90
 PAGE 9 OF 11

=====
 ANALYSIS: CHROMIUM
 PREPARATION METHOD: EPA 3050
 METHOD REFERENCE: EPA 6010
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19014- 1, 2, 3, 4	COMPOSITE: SAMPLE #- 17, 18, 19, 20	15	mg / Kg	0.5
19014- 5, 6, 7, 8	COMPOSITE: SAMPLE #- 21, 22, 23, 24	18	mg / Kg	0.5
19014- 9, 10, 11, 1	COMPOSITE SAMPLE #- 25, 26, 27, 28	18	mg / Kg	0.5

QA/QC:

=====
 RPD, % 3
 RECOVERY, % 94
 =====

LABORATORY NUMBER: 19014
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/05/90
 PAGE 10 OF 11

=====
 ANALYSIS: LEAD
 PREPARATION METHOD: EPA 3050
 METHOD REFERENCE: EPA 7420
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19014- 1,2,3,4	COMPOSITE: SAMPLE #- 17,18,19,20	5.5	mg /Kg	2.5
19014- 5,6,7,8	COMPOSITE: SAMPLE #- 21,22,23,24	13	mg /Kg	2.5
19014- 9,10,11,1	COMPOSITE SAMPLE #- 25,26,27,28	12	mg /Kg	2.5

QA/QC:

=====
 RPD, % 1
 RECOVERY, % 111
 =====

LABORATORY NUMBER: 19014
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT #: 447.010
 LOCATION: CONNELL OLDSMOBILE

DATE RECEIVED: 12/21/89
 DATE ANALYZED: 12/22/89
 DATE REPORTED: 01/05/90
 PAGE 11 OF 11

=====
 ANALYSIS: ZINC
 PREPARATION METHOD: EPA 3050
 METHOD REFERENCE: EPA 6010
 =====

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
19014- 1, 2, 3, 4	COMPOSITE: SAMPLE #- 17, 18, 19, 20	16	mg /Kg	0.5
19014- 5, 6, 7, 8	COMPOSITE: SAMPLE #- 21, 22, 23, 24	21	mg /Kg	0.5
19014- 9, 10, 11, 1	COMPOSITE SAMPLE #- 25, 26, 27, 28	34	mg /Kg	0.5

QA/QC:

=====
 RPD, % 1
 RECOVERY, % 94
 =====

Subsurface Consultants

CHAIN OF CUSTODY RECORD & ANALYTICAL TEST REQUEST

Project Name: Connell Oldsmobile
 SCI Job Number: 447.010
 Project Contact at SCI: Tom Tebb / Bill Rudolph
 Sampled By: Tom Tebb
 Analytical Laboratory: Curtis & Tompkins, Ltd.
 Analytical Turnaround: normal

Sample ID	Sample Type ¹	Container Type ²	Sampling Date	Hold	Analysis	Analytical Method
Sample #17	S	T			TEH, TVH, BTX&E, BOD + O.G. + Cd, Cr, Pb, Zn	
Sample #18	Composite					
Sample #19						
Sample #20						
Sample #21						
Sample #22	Composite				↓	
Sample #23						
Sample #24						
Sample #25	Composite				↓	
Sample #26						
Sample #27						
Sample #28			*	*		*

Released by: [Signature] Date: 10/14/81
 Released by Courier: _____ Date: _____
 Received by Laboratory: Balena Petro Date: 10-30-81
 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