



Report
Site Contamination Study
PACD Pump Facility
Oakland, California
For Amsted Industries, Inc.

August 12, 1987
Job No. 15215-008-43

Dames & Moore



Page 2 of 47
Schedule 4.16

PCC000924



DAMES & MOORE

A PROFESSIONAL LIMITED PARTNERSHIP

221 MAIN STREET, SUITE 600, SAN FRANCISCO, CALIFORNIA 94105-1917 (415) 596-5858

PRIVILEGED AND CONFIDENTIAL

August 12, 1987
Job No. 15215-008-43

Mr. Edward J. Brosius
Senior Attorney
Amsted Industries, Inc.
44th Floor Boulevard Towers South
205 North Michigan Avenue
Chicago, Illinois 60601

Dear Mr. Brosius:

Report
Site Contamination Study
PACO Pump Facility
Oakland, California
For Amsted Industries, Inc.

This letter report presents the results of a site investigation performed at the PACO Pump facility located at 9201 San Leandro Street, Oakland, California (Figure 1). The purpose of the study was to explore an area on the west side of the PACO Pump machinery shop for potential contamination. The study area is bound by a cyclone fence on the east and the machine shop foundation on the west (Figure 2). The scope of our investigation was limited to excavating four shallow exploratory pits across the area, examining the sidewalls of each pit for evidence of discolored or oily soil, and analyzing two soil samples collected from each pit for concentrations of volatile and semi-volatile organic compounds as well as volatile and extractable petroleum hydrocarbons. All work was conducted as proposed. The details of our investigation, as well as our findings and recommendations, are presented below.

FIELD INVESTIGATION

Four exploratory pits were excavated in the study area on Monday, July 27, 1987. Each pit, measuring approximately 3 feet by 3 feet in plan view, was excavated with a backhoe to a depth of about 3 feet (Figure 2). The work was performed by a licensed backhoe operator and monitored by a Dames & Moore geologist. Prior to beginning each excavation, the backhoe bucket was thoroughly steam cleaned to minimize the potential for cross contamination between pits.

Page 3 of 47
Schedule 4.16

Amsted Industries, Inc.
August 12, 1987
Page two

Soil samples were collected from the sidewall of each pit at depths of 1.5 and 3.0 feet. Samples were collected by scooping soil into 3-inch stainless steel tubes with a trowel. The rings were covered at each end with 2 mil Teflon sheets, capped, taped, labeled and placed on ice. Samples were transported under chain-of-custody to Anatec Laboratories in Santa Rosa, California for analysis. Once samples were collected and sidewall observations were completed, exploratory pits were backfilled.

A total of eight soil samples were delivered to Anatec Laboratories for analysis. Each sample was analyzed for volatile and semi-volatile organic compounds (E.P.A. Methods 8240 and 8270, respectively) and extractable petroleum hydrocarbons (EPA Method 3550/8015). In addition, two samples were analyzed for volatile petroleum hydrocarbons (EPA Method 5020/8015) as well as polychlorinated biphenyls (EPA Method 8080). One sample was also analyzed for heavy metals (EPA Method 6010). For quality control purposes, analytical results were duplicated for one soil sample. A summary of analytical results is provided in Tables 1.0 and 2.0 and the actual laboratory results are attached to this report.

CONCLUSIONS AND RECOMMENDATIONS

Data from the exploratory pits indicate that shallow soils in the study area consist of a dark brown to black gravelly fill material containing glass, bottles, bolts and garbage. At a depth of roughly 1.5 feet, the soil begins to increase in moisture, apparently the result of saturation with an oily substance. A visible oily sheen on the soil as well as a strong hydrocarbon odor was noted in each pit (Figure 3). At a depth of about three feet, the soil grades into a dark brown, stiff, silty clay. A hydrocarbon odor was still present. A free floating black oily looking substance was observed in pit number three at a depth of two feet.

Chemical analyses of the pit samples indicate that subsurface soils are contaminated with motor oil, creosote, and toluene. A variety of indentifiable, non-target organic compounds were also reported by the lab. Further analytical research of these compounds suggest they are various hydrocarbon residues typical of petroleum products.

Ansted Industries, Inc.
August 12, 1987
Page three

As shown on Table 1.0, creosote, a wood preservative, was detected at a concentration of 790 mg/kg (ppm) in pit "3" at a depth of 1.5 feet. Motor oil was found in exploratory pits "1", "3" and "4" at concentrations ranging from 130 mg/kg (pit "1" at 3 feet) to 1100 mg/kg (pit "4" at 3 feet). Toluene, a solvent, was found at concentrations ranging from 110 ug/kg (ppb) (pit "4" at 1.5 feet) to a maximum concentration of 600 ug/kg (pits "1" and "2" at depths of 1.5 and 3.0 feet, respectively) (Table 1.0). No concentrations of PCB's or other organic compounds were detected. Metal concentrations were below California Total Threshold Limit Concentration (TTL) and Soluble Threshold Limit Concentration (STLC), used to classify hazardous wastes (Table 2.0).

In summary, our investigation indicates that the nature of subsurface contamination at the site is motor oil, petroleum hydrocarbons and associated solvents used as additives to fuel products or solvents mixed with waste oils. Although creosote was identified in one sample, its presence may be isolated contamination linked to the adjacent railroad ties. The source and extent of hydrocarbon and solvent contamination is not known. However, the source may be attributed to spillage of waste oils. Further, the analytical results indicate that the northern portion of the study area (pits "3" and "4") have higher concentrations of extractable petroleum hydrocarbons than the southern area (pits "1" and "2").

To assess the extent of site soil contamination and the impact on groundwater (anticipated to be shallow), we recommend that additional site exploration be performed. Future activities should include the following:

- o Drill five to seven exploratory borings to a depth of approximately 15 feet. Samples should be collected at approximately 4, 8, 12, and 15 feet.
- o Complete one to two borings as groundwater monitoring wells. The wells should be screened at an appropriate depth to penetrate approximately the upper 10 feet of groundwater.
- o Inspect soil samples and groundwater wells for evidence of petroleum products.
- o Analyze selected soil and groundwater samples for total petroleum hydrocarbons, benzene, toluene and xylene.

Ansted Industries, Inc.
August 12, 1987
Page four

If evidence of deeper soil or groundwater contamination is discovered, additional borings may be necessary. Once the horizontal and vertical extent of contamination are better understood, appropriate clean up measures can be recommended. In applying guidelines set forth by the California Regional Water Quality Control Board, we anticipate that soils contaminated with petroleum hydrocarbons in excess of 1000 mg/kg may have to be excavated and disposed of at a Class I disposal facility. On-site treatment and disposal at Class II facilities can be considered for those materials contaminated between 100 mg/kg and 1000 mg/kg. Remediation of groundwater contamination will depend on the beneficial uses of the ground water, the feasibility of remedial technologies, the potential environmental impact and agency approvals.

We have enjoyed the opportunity to assist you on this investigation. If you have any questions concerning our findings or desire that we further investigate your facility, please do not hesitate to contact me at 415/896-5858.

Very truly yours,

DAMES & MOORE

David M. Klimberg

David M. Klimberg
Associate

DMK:fs

Attachments: Table 1.0-Summary of Analytical Results.
Table 2.0-Summary of Metal Results
Plate 1-Site Location
Plate 2-Site Plan
Plate 3-Logs of Exploratory Pits
Anatec Laboratories Report of Analytical
Results, August 5, 1987.

cc: Mike Ander - Dames & Moore, Chicago

TABLE 1.0
Summary of Analytical Results
PACO Pump Facility
Oakland, California

<u>Analyte</u>	<u>Pit 1/1.5'</u>	<u>Pit 1/3.0'</u>	<u>Pit 2/1.5'</u>	<u>Pit 2/3.0'</u>	<u>Pit 3/1.5'</u>	<u>Pit 3/3.0'</u>	<u>Pit 4/1.5'</u>	<u>Pit 4/3.0'</u>
Extractable Petroleum Hydrocarbons ^b (mg/Kg) ^a EPA Method 3550/8015	250	130	<10	<10	780 ^d (800 ^d)	600	780	1,100
Volatile Petroleum Hydrocarbons (mg/Kg) EPA Method 5020/8015	NR ^c	NR	<10	NR	NR	<10	NR	NR
Toluene (ug/Kg) EPA Method 8240	600	470	420	600	230	380	110	45
Pyrene (ug/Kg) EPA Method 8270	59	ND ^e	ND	ND	ND	59	ND	ND

^a - mg/Kg - Data are expressed as milligrams analyte per kilogram sample,
as received basis

^b - Data are quantitated as motor oil, unless otherwise noted

^c - NR - Analysis not requested.

^d - Quantitated as creosote

^e - ND - not detected

() - Duplicate analysis

TABLE 2.0
 SUMMARY OF METAL RESULTS^c
 PIT #3 AT 3.0 FEET

<u>Parameter</u>	<u>Results (mg/Kg)^a</u>
Antimony	<50
Arsenic	14
Barium	190
Beryllium	<2
Cadmium	<3
Chromium (VI)	NA ^b
Chromium (total)	41
Cobalt	6
Copper	22
Lead	<20
Mercury	<0.05
Molybdenum	<20
Nickel	41
Selenium	<0.5
Silver	<1
Thallium	<30
Vanadium	36
Zinc	42

^a mg/Kg--Data are expressed as milligrams analyte per kilogram sample, as-received basis.

^b NA--Not applicable; total chromium level is below regulatory limit (Section 65699, Article II, California Administrative Code)

^c --Arsenic - EPA Method 7060
 Mercury - EPA Method 7471
 Selenium - EPA Method 7740
 Metals - all others - EPA Method 6010



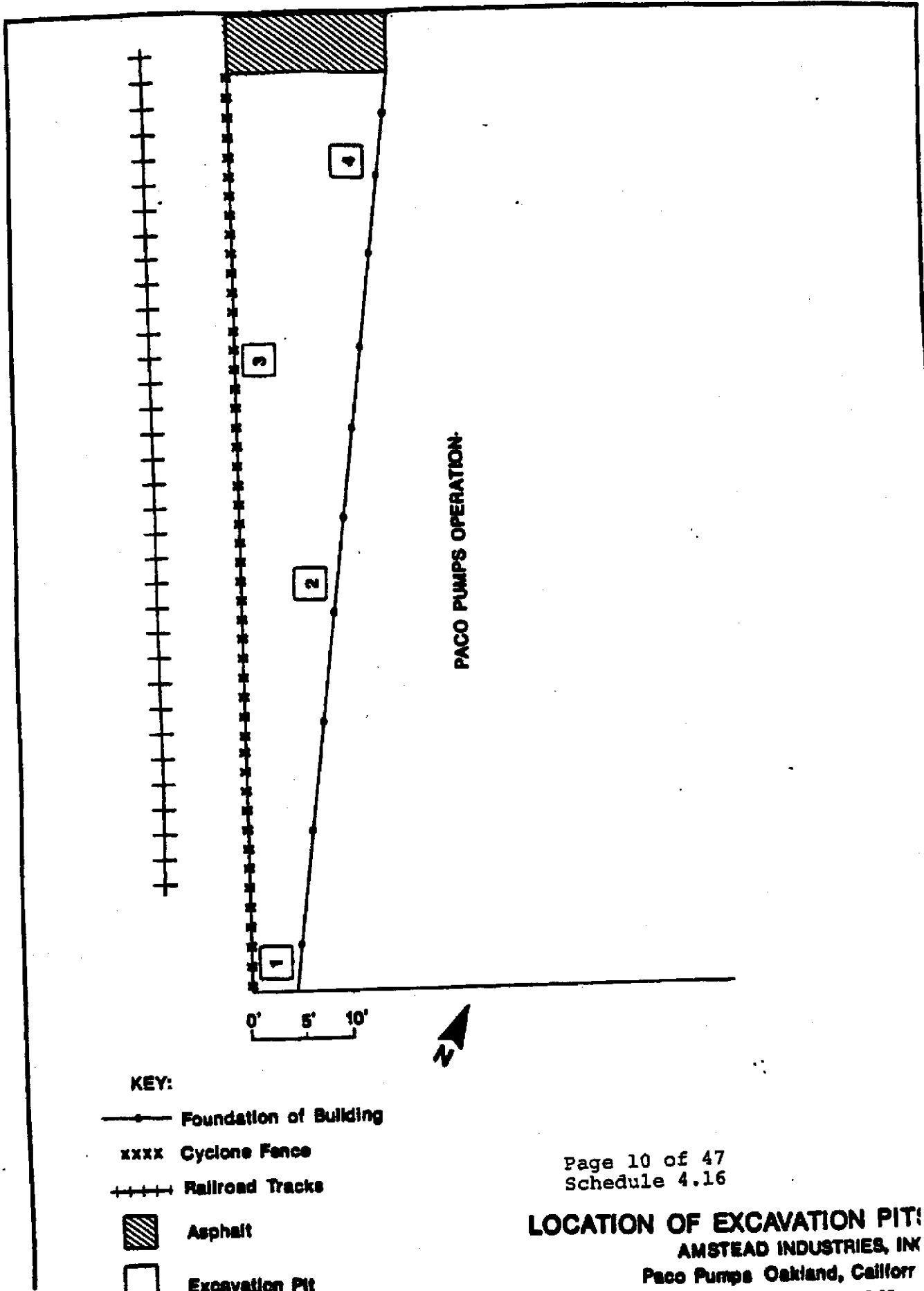
REFERENCE: California State Automobile Assoc. I

0 2.5 5 Miles

Page 9 of 47
Schedule 4.16

SITE LOCATION
AMSTEAD INDUSTRIES, I
 Paco Pumps,
 Oakland, Calif
 Dames & Moore

Figure 1

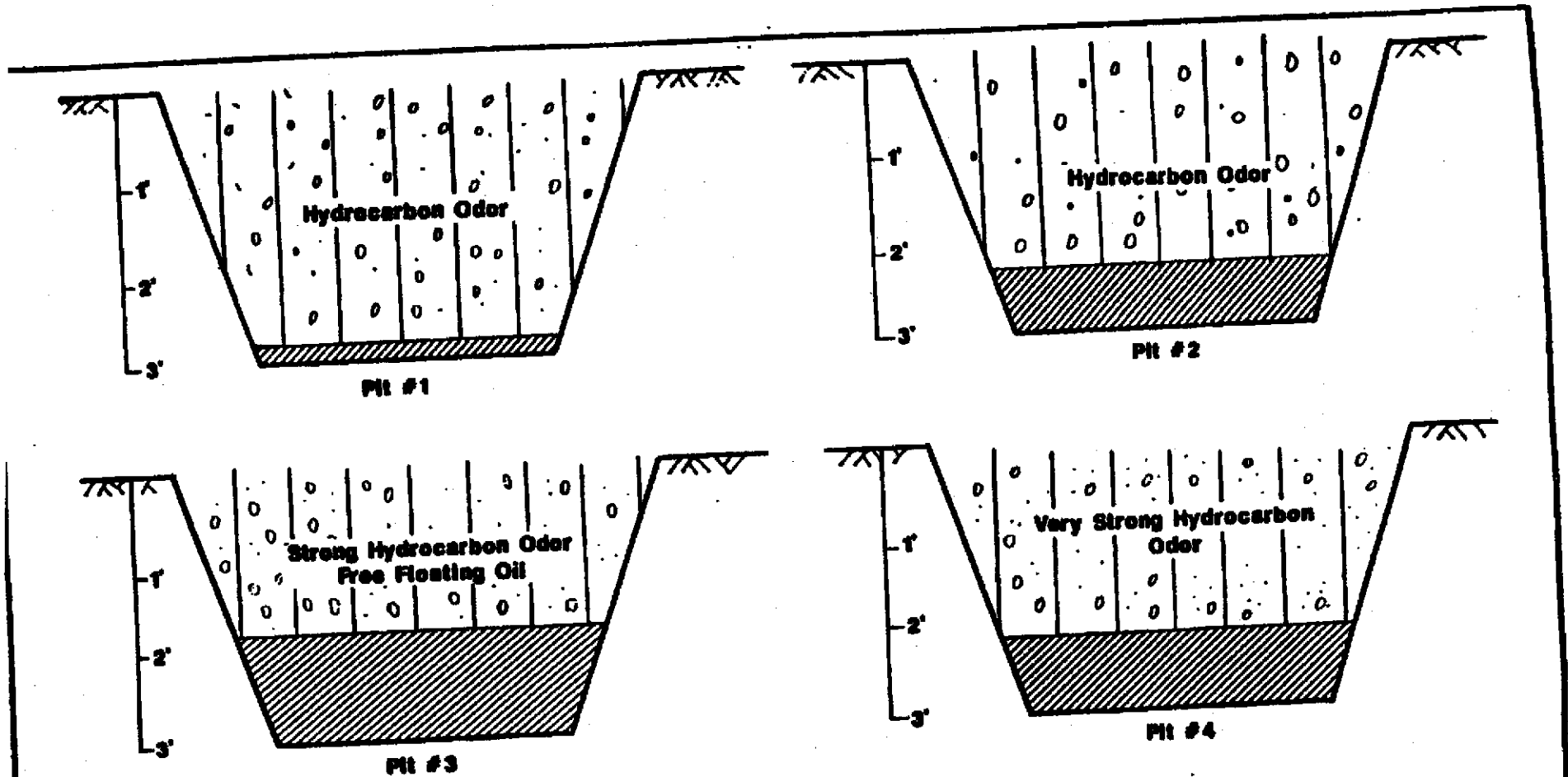


KEY:

- Foundation of Building
- xxxx Cyclone Fence
- + + + Railroad Tracks
- ▨ Asphalt
- Excavation Pit

Page 10 of 47
 Schedule 4.16

LOCATION OF EXCAVATION PIT:
AMSTEAD INDUSTRIES, INC
 Paco Pumps Oakland, Califorr
 Thomas & Mor



KEY:



Dark Brown to Black Gravelly Fill Material, Moist, with Pieces of Glass, Bottles, Bolts, Cans and Garbage.



Dark Grey Clay. V. Stiff, Hydrocarbon Odor.

LOGS OF EXCAVATION PITS

AMSTEAD INDUSTRIES, INC.

Paco Pumps Site
Oakland, California

Dames & Moore

Figure 3



**ANATEC
LABORATORIES
INC.**

435 Tesconi Circle

Santa Rosa, California 95401

707-526-7200

Kris Franklin
Dames & Moore
221 Main Street, Ste 600
San Francisco, CA 94105

August 5, 1987
ANATEC Log No. 9853 (1-8)
Series No: 338/053
Client Proj No: 15215-008-043

**Subject: URGENT Priority Analysis of Eight Soil Samples
Identified as "PACO PUMPS, Project No. 15215-008-043"
Received July 28, 1987.**

Dear Ms. Franklin:

Analysis of the above referenced samples has been completed. This report provides details of analytical methodologies used to produce the results transmitted to you on August 4, 1987.

Sample Receipt and Log-in

Eight soil samples were received at the laboratory under documented chain-of-custody on July 28, 1987. Sample custody was transferred to ANATEC Sample Control staff who initiated the laboratory log-in process. The log-in process consisted of the following activities:

- (1) Inspection and notation of the condition of all samples received;
- (2) Inspection of sample label information and reconciliation with information submitted on sample custody documents;
- (3) Assignment of ANATEC laboratory log and sample numbers;
- (4) Matching of analyses to be performed with sample containers prepared by methods compatible with analyses;
- (5) Documentation of processes listed above and any irregularities on the laboratory log sheet; and
- (6) Inspection and approval of the documents package and testing protocols by the Project Manager.

Page 12 of 47.
Schedule 4.16

Biological Studies • Laboratory Analysis • Research

PCC000934



Subsequent to completion of log-in procedures, all samples were placed in secure storage where they were maintained at 4 OC until analysis commenced.

It was noted that all samples were in good condition on arrival (cold and labeled legibly and completely).

One sample "#6, 3/3' 7/27 1600" was analyzed to measure various metals. All samples were analyzed to measure volatile and semi-volatile organic compounds, volatile and extractable petroleum hydrocarbons, and polychlorinated biphenyls (PCBs). The methods used for these determinations are listed in Table 1 and are described in the following sections of this report.

Metals Measurements

Concentrations of seventeen metals ("project metals") were measured using several atomic spectroscopic techniques. Project metals other than arsenic, selenium and mercury were measured using inductively coupled argon plasma atomic emission spectroscopy (ICP). Samples were prepared for ICP analysis by acid dissolution in accord with requirements of Method 6010 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984. Briefly, 1-gram aliquots of samples were heated with nitric acid (without boiling) until the appearance of the digestate was constant. The solution was cooled, dilute hydrochloric acid added, and then warmed again. Reagent water was added to a final volume of 50 mL, and the solution filtered.

The filtered digestates were analyzed on a Perkin-Elmer Model 6500 Plasma Emission Spectrometer. The spectrometer operates by nebulizing a solution which is then transported to an argon-plasma torch where characteristic atomic-line emission spectra are generated and intensities of characteristic wavelengths measured by the optical system. The following wavelengths were monitored for each element:

<u>Element</u>	<u>Wavelength (nm)</u>	<u>Element</u>	<u>Wavelength (nm)</u>
Antimony	206.833	Lead	220.353
Barium	233.527	Molybdenum	202.030
Beryllium	313.042	Nickel	231.604
Cadmium	226.502	Silver	328.068
Chromium	267.716	Thallium	190.864
Cobalt	228.616	Vanadium	292.402
Copper	324.754	Zinc	213.856



The spectra were compared by computer to spectra obtained from calibration solutions containing the elements of interest.

Preparation of the sample for arsenic and selenium measurement was similar to that for other metals except that hydrochloric acid was omitted from the procedure; prior to analysis nickel nitrate was added to digestates to reduce analyte volatility. Arsenic and selenium were quantitated using the following atomization program:

Drying Time - Temperature - 30 sec at 125 °C
Ashing Time - Temperature - 30 sec at 1,200 °C
Atomizing Time - Temperature - 6 sec at 2,700 °C
Wavelength 193.7nm (arsenic), 196.0 nm (selenium)
Background correction: Deuterium arc

Mercury content of samples was measured using the "Manual Cold-Vapor" atomic absorption spectroscopic method. Procedural details are available as Method 7471 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984. Samples were prepared for mercury analysis by gentle heating with nitric and sulfuric acids and potassium permanganate and potassium persulfate. Analysis of digests involved reduction of mercuric ions generated during preparation to elemental mercury. Elemental mercury was swept from the reduction flask into an absorption cell on the optical bench of an atomic absorption spectrometer. Absorbance was monitored at 253.7nm with deuterium arc background correction.

Petroleum Hydrocarbons Testing - Volatile and Extractable

Volatile Petroleum Hydrocarbons

Samples were analyzed to measure volatile petroleum hydrocarbon (e.g. gasoline, jet fuel) residues by headspace sampling/flame ionization-gas chromatography. In performing the analysis a portion of sample was measured into and sealed in a septum-top glass vial. The vial was heated at 90 °C during which time volatile hydrocarbons equilibrated with headspace gases. A two-milliliter portion of headspace gas was removed through the septum with a gas-tight syringe and injected onto the analytical column of a gas chromatograph equipped with a flame-ionization detector. The analytical system was calibrated by analysis of standards treated as described for samples. The standards were prepared with commercial (regular) gasolines.



Interpretation of sample chromatograms consisted of first inspecting the chromatographic pattern or "fingerprint" and comparing it with those generated by calibration standards. Hydrocarbon mixtures if detected in samples were then quantitated using response factors generated by standards which match or approximate sample chromatograms.

Chromatographic operating conditions for measurement of volatile petroleum hydrocarbons were as follows:

Column: 6' x 1/8" SP1500
Carrier: Nitrogen at 20 mL/minute
Oven Program: Initial Temperature-Time 150 °C - 2 min
Program Rate - 10 °C/min
Final Temperature - 230 °C

Injector Temperature - 280 °C
FID Temperature - 300 °C

Details of the procedure are consistent with "Method I. Total Fuel Hydrocarbons Analysis (Low to Medium Boiling Point Hydrocarbons)" in "Guidelines for Addressing Fuel Leaks," Regional Water Quality Control Board, San Francisco Bay Region, revised 1986. Further information regarding chromatographic interpretation may be found in "Method D3328-78," in "Comparison of Waterborne Petroleum Oils by Gas Chromatography," ASTM Standards on Chromatography, 1st edition, 1981. Additional information pertaining to headspace techniques may be found as Method 5020 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984.

Extractable Petroleum Hydrocarbons

Measurement of extractable petroleum hydrocarbon (e.g., diesel, creosote, motor oil) residues is performed by analysis of methylene chloride sample extracts by gas chromatography with flame ionization detection. Fifteen gram portions of sample are extracted by sonication with 30 milliliters of methylene chloride using ultrasonic agitation. The organic layer is drawn off and the sample extracted two additional times. Extracts are combined, dried over sodium sulfate and concentrated in Kuderna-Danish apparatus by evaporation of solvent at 70 °C. Concentrated extracts are injected into a capillary-column gas chromatograph equipped with a flame ionization detector. Interpretation of



sample chromatograms is as described above for volatile petroleum hydrocarbons except that commercial diesel fuel, creosote and 10-40W motor oil are used as calibration standards. Chromatographic operating conditions are as follows.

Column dimensions:	30m x 0.25 mm fused silica capillary
Coating	SPB-1
Head pressure	12 psi helium
Temperature program	40°C for 6 min, 10°C/min to 270°C, hold for 11 min
Injection technique	Splitless
Temperature	260°C
Detector	FID at 250°C

Volatile Organic Compounds

Samples were tested in accord with U.S. EPA Method 8240 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984 to measure contents of 31 volatile organic priority pollutants and other purgeable compounds. Briefly, the method involves making a slurry of 1-gram of sample and deionized water, dosing the slurry with internal and surrogate standards, and bubbling inert gas through the mixture at ambient temperature. The volatile compounds are transferred to the vapor phase which is swept through a sorbent trap. After purging is complete, the trap is heated and backflushed with inert gas to desorb the compounds onto a gas chromatographic column. The column is then temperature programmed, and the compounds detected with a mass spectrometer. The following instrument parameters were used:

Purge and Trap Device:	Tekmar Model LSC-2
Trap packing	1 cm methyl silicone 15 cm 2,6-diphenylene oxide polymer (TENAX) 8 cm silica gel
Purge gas	Helium at 30 mL/min
Purge time	11 min
Desorb temp	180°C
Desorb time	4 min

(cont.)



GC/MS Unit:	HP 5970 MSD
Column dimensions	6' x 0.1" stainless steel
Coating	1% SP-1000 on 60/80 mesh Caropak B
Head pressure	50 psi helium
Temperature program	40°C for 4 min, 6°C/min to 220°C, hold 15 min
Mass spectrometer mode	Electron Impact
Electron energy	70 eV
Mass range	35 - 260 amu
Scan time	2.5 seconds
Calibration gas	Perfluorotributylamine (PFTBA)
Data system	HP-1000

Semi-volatile (Extractable) Organic Compounds

Samples were tested in accord with U.S. EPA Method 8270 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984 to measure contents of 66 semi-volatile (extractable) priority pollutants and other extractable compounds. Briefly, a fifteen gram aliquot of sample which has been dosed with internal and surrogate standards is extracted with methylene chloride using ultrasonic agitation. The organic layer is drawn off and the sample extracted two additional times. The extracts are combined, dried over sodium sulfate and concentrated by gentle evaporation in Kuderna-Danish apparatus to a final volume of one milliliter. An aliquot of the resulting extract is analyzed by GC/MS under the following conditions:

Column dimensions	30m x 0.25 mm
Coating	DB-5 at 0.25 micron thickness
Head pressure	12 psi helium
Temperature program	40°C for 2.5 min, 8°C/min to 310°C, hold for 5 min
Injection technique	Splitless
Volume	2 microliters
Temperature	275°C
Mass spectrometer mode	Electron Impact
Electron energy	70 eV
Scan range	35 - 450 amu
Scan time	0.5 sec
Calibration gas	Perfluorotributylamine (PFTBA)
Data system	HP-1000



It was noted that the total ion chromatograms for analyses of semi-volatile compounds by GC/MS contained peaks other than those specified by Method 8240 for most samples. A single sample was chosen (#8, 4/3' 7/27 1600) and the ten most prominent non-target compound peaks in the chromatogram were compared with the computer library of mass spectra, which contains data compiled by the National Bureau of Standards, the Environmental Protection Agency and the National Institutes of Health. The five most likely identities, if five were available, of each unknown compound peak are listed in Table 7.

Polychlorinated Biphenyls

Samples were tested in accord with U.S. EPA Method 8080 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA, SW-846, 2nd edition, revised 1984 to measure contents of seven common (Aroclor) mixtures of polychlorinated biphenyl compounds (PCBs). Briefly, 15-grams of sample were extracted with methylene chloride using ultrasonic agitation. The organic layer was decanted and the extraction repeated twice more. Solvent extracts were combined and dried over sodium sulfate, then exchanged to hexane by repeated concentration in a Kuderna-Danish apparatus and dilution with hexane. Extracts were then passed through a column of partially deactivated Florisil and compounds of interest subsequently eluted using 40% ethyl ether in n-pentane. The isolated extract was concentrated by gentle evaporation in Kuderna-Danish apparatus. Reduced extracts were stored at -20°C until analyzed.

Analysis was performed by injection of an aliquot of the final extract onto the column of a gas chromatograph equipped with electron capture detectors. Any positive results were considered presumptive until confirmed by reanalysis on a second chromatographic column of quite different chromatographic quality. The following instrument parameters were used:

Carrier gas	5% methane in argon
Column 1 dimensions	30m x 0.75 mm fused silica capillary
Coating	SPB-1 at 1 micron thickness
Temperature program	160°C for 2 min, 2°C/min to 220°C, hold for 17 min

(cont.)



ANATEC

338/053 LOG 9853

- 8 -

August 5, 1987

Column 2 dimensions	30m x 0.75 mm fused silica capillary
Coating	SPB-5 at 21 micron thickness
Temperature program	same as for column 1
Injection technique	Splitless
Volume	2 microliters
Temperature	200°C
Detector	ECD at 250°C

Presentation of Results

Results of all sample analyses are contained in the following tables:

TABLE 2 - Metals Analyses for "Sample 6, 3/3' 7/27 1600"

TABLE 3 - Volatile Organics Analyses

TABLE 4 - PCBs

TABLE 5 - Extractable and Volatile Petroleum Hydrocarbons

TABLE 6 - Semi-volatile Organics Analyses

TABLE 7 - Possible Identities of Non-target Compound Peaks Obtained During Analyses of Organic Compounds by GC/MS

APPENDIX A - Total Ion Chromatograms of Sample Analyses for Semi-volatile Organic Compounds by GC/MS

APPENDIX B - Chromatograms of Sample Analyses for Extractable Petroleum Hydrocarbons by GC/FID



ANATEC

338/053 LOG 9853

- 9 -


August 5, 1987

Quality Assurance


Analysis of samples was accompanied by various quality control procedures. These included preparation and analysis of method blanks and standards, and replicate and analyte-fortified ("spiked") sample portions. Results of quality control procedures are available on request but are not included in this report.

Please feel welcome to contact us should you have questions regarding procedures or results.

Submitted by:


David Hirano
Project Chemist

Approved by:


Greg Anderson, Director
Analytical Laboratories

Enc: Custody Documentation



TABLE 1. SUMMARY OF ANALYTICAL METHODS AND METHOD REFERENCES
FOR "PROJECT NO. 15215-008-043, PACO PUMPS"
SOIL SAMPLES RECEIVED JULY 28, 1987

<u>Parameter</u>	<u>Method Description¹</u>	<u>Method Number</u>	<u>Method Reference²</u>
Arsenic	AAS-HGA	7060	1
Mercury	AAS-CV	7471	1
Selenium	AAS-HGA	7740	1
Metals- all others	ICPAES	6010	1
Organic compounds-			
Semi-volatile	GC/MS	8270	1
Volatile	GC/MS (purge & trap)	8240	1
Petroleum hydrocarbons-			
Extractable	GC-FID	3550/8015	1
Volatile	GC-FID (headspace)	5020/8015	1
PCBs	GC-EC	8080	1

¹Abbreviations:

- AAS-- Atomic absorption spectrophotometry
- HGA-- Heated graphite atomization
- CV-- Cold-vapor generation
- ICPAES--Inductively coupled argon plasma atomic emission spectroscopy
- GC-EC-- Gas chromatograph with electron capture detector
- GC-FID--Gas chromatography with flame ionization detection.
- GC/MS-- Gas chromatography/mass spectrometry

²References:

- 1--"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,"
U.S. EPA, SW-846, 2nd edition, revised 1984.



TABLE 2. SUMMARIZED RESULTS OF METALS ANALYSES FOR
"SAMPLE 6, 3/3' 7/27 1600" SOIL SAMPLE
RECEIVED JULY 28, 1987

<u>Parameter</u>	<u>Results (mg/Kg)^a</u>
Antimony	<50
Arsenic	14
Barium	190
Beryllium	<2
Cadmium	<3
Chromium (total)	41
Cobalt	6
Copper	22
Lead	<20
Mercury	<0.05
Molybdenum	<20
Nickel	41
Selenium	<0.5
Silver	<1
Thallium	<30
Vanadium	36
Zinc	42

^amg/Kg--Data are expressed as milligrams
analyte per kilogram sample, as-received
basis.



TABLE 3. SUMMARIZED RESULTS OF VOLATILE ORGANICS ANALYSES FOR "PROJECT NO. 15215-008-043, PACO PUMPS" SOIL SAMPLES RECEIVED JULY 28, 1987

Analyte	MCL ^b (ug/Kg)	Descriptor, Lab No. & Results (ug/Kg) ^a									
		1/1.5'		2/1.5'		3/1.5'		4/1.5'		1/3'	
		7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600	7/27 1600
		Sample #1 (9853-1)	Sample #3 (9853-2)	Sample #5 (9853-3)	DUPLICATE (9853-3R)	Sample #7 (9853-4)	Sample #2 (9853-5)	Sample #4 (9853-6)			
Benzene	25	ND ^c	ND	ND	ND	ND	ND	ND	ND	ND	
Bromodichloromethane	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromoform	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromomethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon tetrachloride	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chlorobenzene	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2-Chloroethylvinyl ether	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibromochloromethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-Dichlorobenzene	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,3-Dichlorobenzene	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,4-Dichlorobenzene	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-Dichloroethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-Dichloroethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-Dichloroethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans-1,2-Dichloroethane	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-Dichloropropane	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1,3-Dichloropropane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans-1,3-Dichloropropane	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethyl benzene	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methylene chloride	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1,2,2-Tetrachloroethane	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene	25	600	420	230	300	110	470	600			
1,1,1-Trichloroethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1,2-Trichloroethane	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethane	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vinyl chloride	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	

^aug/Kg—Data are expressed as milligrams analyte per kilogram sample, as-received basis.

^bMCL—Method detection limit.

^cND—Not detected at the method detection limit.



TABLE 3. (cont.)

Analyte	MDL ² (ug/Kg)	Descriptor, Lab No. & Results (ug/Kg) ¹	
		3/3' 7/27 1600 Sample #6 (9853-7)	4/3' 7/27 1600 Sample #8 (9853-8)
Benzene	25	ND ³	ND
Bromodichloromethane	10	ND	ND
Bromoform	25	ND	ND
Bromomethane	15	ND	ND
Carbon tetrachloride	15	ND	ND
Chlorobenzene	25	ND	ND
Chloroethane	15	ND	ND
2-Chloroethylvinyl ether	35	ND	ND
Chloroform	10	ND	ND
Chloromethane	15	ND	ND
Dibromochloromethane	15	ND	ND
1,2-Dichlorobenzene	25	ND	ND
1,3-Dichlorobenzene	25	ND	ND
1,4-Dichlorobenzene	25	ND	ND
1,1-Dichloroethane	20	ND	ND
1,2-Dichloroethane	15	ND	ND
1,1-Dichloroethene	15	ND	ND
trans-1,2-Dichloroethene	10	ND	ND
1,2-Dichloropropane	25	ND	ND
cis-1,3-Dichloropropene	20	ND	ND
trans-1,3-Dichloropropene	25	ND	ND
Ethyl benzene	30	ND	ND
Methylene chloride	15	ND	ND
1,1,2,2-Tetrachloroethane	30	ND	ND
Tetrachloroethane	20	ND	ND
Toluene	25	380	45
1,1,1-Trichloroethane	20	ND	ND
1,1,2-Trichloroethane	25	ND	ND
Trichloroethane	10	ND	ND
Trichlorofluoromethane	15	ND	ND
Vinyl chloride	15	ND	ND

¹Data expressed in units of micrograms analyte per liter sample.

²MDL--Method detection limit.

³ND--Not detected at the method detection limit.



ANATEC

338/053 LOG 9853

- 14 -

August 5, 1987

TABLE 4. SUMMARIZED RESULTS FOR PCBS ANALYSIS FOR "PROJECT NO. 15215-008-043, PACO PUMPS" SOIL SAMPLES RECEIVED JULY 28, 1987

Parameter	Descriptor, Lab No. & Results (mg/Kg) ¹		
	MDL ² (mg/Kg)	2/1.5'	3/3'
		7/27 1600 Sample #3 (9853-2)	7/27 1600 Sample #6 (9853-7)
PCB-1016	0.2	ND ³	ND
PCB-1221	0.2	ND	ND
PCB-1232	0.2	ND	ND
PCB-1242	0.2	ND	ND
PCB-1248	0.2	ND	ND
PCB-1254	0.2	ND	ND
PCB-1260	0.2	ND	ND

¹mg/Kg--Data are expressed as milligrams analyte per kilogram sample, as-received basis. liter sample.

²MDL--Method detection limit.

³ND--Not detected at the listed method detection limit.



TABLE 5. SUMMARIZED RESULTS FOR SEMI-VOLATILE AND VOLATILE PETROLEUM HYDROCARBON ANALYSES FOR "PROJECT NO 15215-008-043, PACO PUMPS" SOIL SAMPLES RECEIVED JULY 28, 1987

ANATEC Lab No.	Sample Descriptor				Results (mg/Kg) ^a	
					Semi-volatile Petroleum Hydrocarbons ^b	Volatile Petroleum Hydrocarbons
9853-1	1/1.5'	7/27	1600	Sample #1	250	NR ^c
9853-2	2/1.5'	7/27	1600	Sample #3	<10	<10
9853-3	3/1.5'	7/27	1600	Sample #5	780 ^d	NR
9853-3R	3/1.5'	DUPLICATE			800 ^d	NR
9853-4	4/1.5'	7/27	1600	Sample #7	780	NR
9853-5	1/3'	7/27	1600	Sample #2	130	NR
9853-6	2/3'	7/27	1600	Sample #4	<10	NR
9853-7	3/3'	7/27	1600	Sample #6	600	<10
9853-8	4/3'	7/27	1600	Sample #8	1,100	NR

^amg/Kg--Data are expressed as milligrams analyte per kilogram sample, as-received basis.

^bData are quantitated as motor oil, unless otherwise noted.

^cNR--Analysis not requested.

^dQuantitated as creosote.



TABLE 6. SUMMARIZED RESULTS OF SEMI-VOLATILE ORGANIC COMPOUNDS ANALYSES FOR "PROJECT NO. 15215-008-043, PACO PUMPS" SOIL SAMPLES RECEIVED JULY 28, 1987

Analyte	MIX 2 (ug/Kg)	Descriptor, Lab No. & Results (ug/Kg) ¹						
		1/1.5' Sample 1 (9853-1)	2/1.5' Sample 3 (9853-2)	3/1.5' Sample 5 (9853-3)	3/1.5' DUPLICATE (9853-3R)	4/1.5' Sample 7 (9853-4)	1/3' Sample 2 (9853-5)	2/3' Sample 4 (9853-6)
Acenaphthene								
Acenaphthylene								
Aldrin								
Anthracene								
Benazidina								
Benzo(a)anthracene								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Benzo(ghi)perylene								
Benzyl butyl phthalate								
Calciferol								
Camphor								
Bis(2-chloroethyl)ether								
Bis(2-chloroethoxy)methane								
Bis(2-chloroisopropyl)ether								
Bis(2-ethylhexyl)phthalate	3.30							
4-Bromophenyl phenyl ether								
2-Chloronaphthalene								
2-Chlorophenyl phenyl ether								
Chrysene								
4,4'-DDB								
4,4'-DDE								
4,4'-DDT								
Dibenz(a,h)anthracene	1.6							
Dibutyl phthalate								
1,2-Dichlorobenzene								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
3,3'-Dichlorobenzidine								
Dieldrin								
Diethyl phthalate								
Dimethyl phthalate								
2,4-Dinitrotoluene								
2,6-Dinitrotoluene								
Di-n-octylphthalate								
Endosulfan sulfate								
Endrin aldehyde								
Fluoranthene								
Fluorene								
Heptachlor								
Heptachlor epoxide								
Hexachlorobenzene								
Hexachlorobutadiene								
Hexachlorocyclopentadiene								
Hexachlorophene								
Indeno(1,2,3-cd)pyrene								
Isophorone								
Naphthalene								
Nitrobenzene								
n-Nitrosodi-n-propylamine	1.3							
PCB-1260								
Phenanthrene								
Pyrene								
1,2,4-Trichlorobenzene								
2-Chloro-3-methylphenol								
2-Chlorophenol								
2,4-Dichlorophenol	1.0							
2,4-Dimethylphenol								
2,4-Dinitrophenol								
2-Methyl-4,6-dinitrophenol								
2-Nitrophenol								
4-Nitrophenol								
Pentachlorophenol								
Phenol								
2,4,6-Trichlorophenol								

¹Data expressed in units of micrograms analyte per kilogram sample.
²DL - Method detection limit.
³ND - Not detected at the method detection limit.



Table 6, (cont.)

Analyte	Descriptor, Lab No. & Results (ug/Kg) ¹		
	MDL ² (ug/Kg)	3/3' Sample 6 (9853-7)	4/3' Sample 8 (9853-8)
Acenaphthene			
Acenaphthylene			
Aldrin			
Anthracene			
Benzidine			
Benzo(a)anthracene			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Benzo(g,h)perylene			
Benzyl butyl phthalate			
delta-BHC			
gamma-BHC			
Bis(2-chloroethyl)ether			
Bis(2-chloroethoxy)methane			
Bis(2-chloroisopropyl)ether	3,300		
Bis(2-ethylhexyl)phthalate			
4-Bromophenyl phenyl ether			
2-Chloronaphthalene			
4-Chlorophenyl phenyl ether			
Chrysene			
4,4'-DDD			
4,4'-DDE			
4,4'-DDT			
Dibenzo(a,h)anthracene	1,6		
Di-n-butyl phthalate			
1,2-Dichlorobenzene			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
3,3'-Dichlorobenzidine			
Dieldrin			
Diethyl phthalate	7		
Dimethyl phthalate			
2,4-Dinitrotoluene			
2,6-Dinitrotoluene			
Di-n-octylphthalate			
Endosulfan sulfate			
Endrin aldehyde			
Fluoranthene			
Fluorene			
Heptachlor			
Heptachlor epoxide			
Hexachlorobenzene			
Hexachlorobutadiene			
Hexachlorocyclopentadiene			
Hexachloroethane			
Indeno(1,2,3-cd)pyrene			
Isophorone			
Naphthalene			
Nitrobenzene			
N-Nitrosodi-n-propylamine	1,320		
PCB-1260			
Phenanthrene			
Pyrene			
1,2,4-Trichlorobenzene			
4-Chloro-3-methylphenol			
2-Chlorophenol			
2,4-Dichlorophenol	76		
2,4-Dimethylphenol	1,650		
2,4-Dinitrophenol	76		
2-Methyl-4,6-dinitrophenol			
2-Nitrophenol			
4-Nitrophenol			
Pentachlorophenol			
Phenol			
2,4,6-Trichlorophenol			

¹Data expressed in units of micrograms analyte per kilogram sample.
²MDL--Method detection limit.
³ND--Not detected at the method detection limit.



TABLE 7. POSSIBLE IDENTITIES OF THE TEN MOST-PROMINENT
NON-TARGET PEAKS OBTAINED DURING GC/MS ANALYSIS OF
"SAMPLE #8, 4/3' 7/27 1600" RECEIVED JULY 28, 1987

Peak No. ¹	Possible Identity of Compounds	Percent Probability ²	Molecular Weight	Molecular Formula
1	17-Pentatriacontene	61	490	C35H70
	NEOPHYTADIENE	60	278	C20H38
	Heptadecane, 9-(2-cyclohexylethyl)-	55	350	C25H50
	Nonacosanol	52	424	C29H600
	OLEIC ACID, PROPYL ESTER	48	324	C21H40O2
	2	Nonacosanol	59	424
OLEIC ACID, PROPYL ESTER		58	324	C21H40O2
CYCLODOCOSANE, ETHYL-		53	336	C24H48
.alpha.-Humulene		53	204	C15H24
1-Hexacosene		44	364	C26H52
3		17-Pentatriacontene	69	490
	CYCLODOCOSANE, ETHYL-	67	336	C24H48
	1-Pentacontanol	53	718	C50H1020
	3,4-Octadiene, 7-methyl-	49	124	C9H16
	Nonacosanol	49	424	C29H600
	4	1-Pentacontanol	65	718
Octadecanal		60	268	C18H36O
Oxirane, [(dodecyloxy)methyl]-		59	242	C15H30O2
17-Pentatriacontene		50	490	C35H70
Dodecane, 1,2-dibromo		47	326	C12H24Br2
5		1-Pentacontanol	46	718
	Heptadecane	38	240	C17H36
	17-Pentatriacontene	37	490	C35H70
	TRIDECANE, 6-CYCLOHEXYL-	36	266	C19H38
	Tetradecane, 1-chloro-	35	232	C14H29Cl

¹Number of compound peak in decreasing order of prominence.

²Probability of correct identity of unknown compound, expressed as percentage.



Table 7, (con.t)

Peak No. ¹	Possible Identity of Compounds	Percent Probability ²	Molecular Weight	Molecular Formula
6	17-Pentatriacontene	30	490	C35H70
	Cyclopentane, 1,1'-[3-(2-cyclopentylethyl- idene)-1,5-pentanediy]bis-	29	302	C22H38
	Heptadecane, 9-(2-cyclohexylethyl)-	28	350	C25H50
	3-METHOXY-2-METHYLPYRROL	28	111	C6H9NO
	3-Octadecene, (E)-	25	252	C18H36
7	17-Pentatriacontene	47	490	C35H70
	7-CYCLOHEXYLTRIDECANE	47	266	C19H38
	Heptadecane, 9-(2-cyclohexylethyl)-	43	350	C25H50
	1-Pentacontanol	42	718	C50H102O
	1-Dotriacontanol	39	466	C32H66O
8	5-Ethylbornane	42	124	C9H16
	ENDOISOCAMPHANE	40	138	C10H18
	CIS-1-ETHINYL-2-METHYL-1-CYCLOHEXANOLE	35	138	C9H14O
	8-EPIAMBREINOLIDE	30	264	C17H28O2
	3,8-Nonadien-2-one, (E)-	25	138	C9H14O
9	Pentalene, octahydro-1-(2-octyldecyl)-	69	362	C26H50
	1-Pentacontanol	66	718	C50H102O
	Cyclopentane, (4-octyldodecyl)-	47	350	C25H50
	7-CYCLOHEXYLTRIDECANE	36	266	C19H38
	1,1':3',1''-Tercyclopentane, 2'-dodecyl-	35	374	C27H50
10	1,5,9-DECATRIENE, 2,3,5,8-TETRAMETHYL-	85	192	C14H24
	Phenanthrene, 2-dodecyltetradecahydro-	36	360	C26H48
	2-N-BUTYL-3-N-HEXYLDECAHYDRONAPHTHALENE	34	278	C20H38
	2-N-BUTYL-8-N-HEXYLDECAHYDRONAPHTHALENE	34	278	C20H38
	Pentalene, octahydro-1-(2-octyldecyl)-	31	362	C26H50

¹Number of compound peak in decreasing order of prominence.

²Probability of correct identity of unknown compound, expressed as percentage.

SAN FRANCISCO

OFFICE MEMORANDUM

ACTION	INFO	FILE:
TO: CCS		
RDD		
SD		
BDD		
AMH		
KJH		
DCK		
WTL		
MKP		
AFR		
S. SAUNDERS		
JRT		
MJV		
MCY		
		DATE: AUGUST 12, 1987
FROM: BILLY VILLET		REPLY REQUIRED BY:
SUBJECT: MINI-CONE & EARTH TECHNOLOGY		

The moment you have been eagerly awaiting!! Without even knowing it!!!

Earth Technology will be displaying their mini-cone (a CPT unit on a four-wheel drive truck) in our very own parking lot (Howard & Beale) at 4:30 pm, Thursday, August 13. The unit can be used for rapid exploration to 20-foot depths.