W. A. CRAIG, INC.
Environmental Consulting and Contracting
P. O. Box 448
Napa, California 94559-0448
Contractor and Hazardous Substances License #455752
Cal/OSHA Statewide Annual Excavation Permit #559351
(800) 522-7244
Phone: (510) 525-2780 Berkeley **Napa (707) 252-3353**
Fax: (707) 252-3385

565

May 16, 1995

Mr. Terry Knox
Pacific Electric Motor
1009 66th Avenue
Oakland, CA 94621-3535

Project No. 3471C

Subject: **SUBSURFACE ENVIRONMENTAL INVESTIGATION AT:**
1009 66th Street - Oakland, California

Dear Terry:

We appreciate the opportunity to submit this Subsurface Investigation report to identify onsite and offsite potential point sources of the contamination, and to determine how the soil and groundwater underlying your property has been impacted.

The attached report summarizes the findings of W. A. Craig, Inc.'s (W. A. Craig's) field investigation and results of analytical testing, as well as conclusions and recommendations.

Sincerely,

W. A. Craig, Inc.

W. A. Craig, II
Owner

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SUBSURFACE ENVIRONMENTAL INVESTIGATION

AT

1009 66th Street - Oakland, California

by

W.A. Craig, Inc.
Napa, California

Submitted to

Mr. Terry Knox
Pacific Electric Motor
1009 66th Avenue
Oakland, CA 94621-3535

REGISTERED ENVIRONMENTAL ASSESSOR * WILLIAM A. CRAIG, II * No. 01414 Expires 6-96 * STATE OF CALIFORNIA *

W. A. Craig II, R.E.A. 0414

REGISTERED GEOLOGIST * FRANKLIN JEROME GOLDMAN * 5557 * STATE OF CALIFORNIA *

Frank Goldman, R.G. 5557

W.A. Craig, Inc.
Project No. 3471C

May 16, 1995

I. EXECUTIVE SUMMARY

This subsurface investigation was performed at the request of Pacific Electric Motors Co. (PEM). PEM is in the process of assessment and remediation of hydrocarbon contaminated soil which remains onsite after the removal of a 2,000 gallon gasoline underground storage tank (UST) on 2-16-95. The following is a chronological summary of onsite activities to date.

- On 2-16-95, 3 soil samples were collected from the UST excavation and associated piping trenches which identified gasoline contamination at levels high enough to justify further investigation.

- On 4-4-95 the over excavation of the tank pit began and one soil sample was collected in the fire shed area on 4-7-95.

- On 4-10-95 and 4-11-95, three exploratory trenches were excavated to determine the lateral extent of the soil contamination.

- On 4-11-95, the over excavation process culminated with the collection of eleven soil samples from the tank pit. These samples were analyzed for gasoline contamination and further defined the lateral extent of the plume and helped guide the geoprobe soil investigation which later ensued.

- On 4-24-95 and 4-25-95, the vertical and lateral extent of contamination was confirmed with a geoprobe subsurface soil investigation. Nine soil borings were excavated to depths between 20 and 30 feet below ground surface and soil samples were collected in the vadose zone and well below the water table. Water samples were not collected because the fine grained soils did not yield enough water in the borings for us to obtain representative groundwater samples.

Soil, waste soil, and wastewater have been generated and stored onsite as follows:

- Approximately 300 cubic yards of contaminated soil was excavated from the pit and trenches which has been stockpiled on plastic sheeting onsite, and has been segregated into discrete piles with specific ranges of contaminants in order to make soil waste disposal more efficient and cost effective.

- Approximately 18,000 gallons of contaminated water was pumped from the pit and was placed in a Baker tank onsite.

Gasoline contamination is the contaminant of principal concern onsite and it appears to be limited to a depth of approximately 18 feet below ground surface (**see Drawing 1** for concentration gradient contour map). The water table is generally at a depth of approximately 9 to 12 feet below ground surface, however it is not laterally continuous west of the tank pit. Perched water was encountered under the southeast corner of the small warehouse, adjacent to the tankpit, at a depth of 3 feet in old fill earthen materials. The plume of contaminated soil and groundwater is predominantly concentrated in the vicinity of the tank pit and greatly diminishes in concentration with depth below the water table due to the water table and clay soils which have greatly minimized the vertical migration of contamination.

The plume has spread laterally under the southwest corner of the small warehouse building and may have spread across the property line to the east to a minor extent. The plume of contamination reaches approximately half way between the west end of the tank pit and the west property line. This may be due to the fact that soil types and the water table are not laterally continuous towards the west. The site is located on the east side of San Francisco Bay (**See Drawing 2** for index map).

II. SUBSURFACE INVESTIGATION

A. Sampling of Soil and Groundwater (Geoprobe Investigation)

Nine geoprobe boring locations were chosen based on the location of the gasoline underground storage tank and associated piping identified onsite. Soil samples were collected at random depth intervals below ground surface at an average depth of every five feet based on the location of the capillary fringe, significant changes in soil stratigraphy, and on field screening for hydrocarbon vapors, and on field odors observed during sampling (**see Appendix A** for soil boring logs).

Soil samples were also collected, for hydrocarbon analyses, at specific depths below the water table based on the highest concentrations measured by the HNu and/or hydrocarbon odor.

No groundwater samples were collected from the geoprobe borings because the fine grained soils did not yield enough water to allow for collection of a Sample

Geoprobe Sampling Protocol

The Geoprobe has the capability of obtaining soil and groundwater samples without generating soil waste which would have to be properly manifested offsite. It allowed W. A. Craig personnel to obtain continuous cores in clear acetate liners to provide a high degree of accuracy for lithologic logging not possible with hollow-stem auger drilling.

The soil samples obtained from the Geoprobe provide an undisturbed soil sample in the same manner as is provided with the Shelby tube or split spoon sampler. The groundwater samples are collected *in situ* without any exposure to the atmosphere. Groundwater samples collected with Geoprobe are not obtained from a properly constructed groundwater monitoring well, however, it can produce laboratory results which can approach a representative picture of the whole aquifer if enough data points are utilized.

Soil samples are collected by use of the Geoprobe drive sampler, which is connected to the end of the probe rods. This device remains sealed by a piston tip until the probe rods are driven to the desired sampling depth. The tip is then released by means of a stop-pin and it retracts into the sample tube as the sample is taken. A Geoprobe Kansas sampler (1 1/8" diameter x 24" length) is used to obtain the soil samples.

Groundwater samples are collected at selected sampling locations using the Geoprobe Screen Point Water Sampler. Using this sampler, a stainless steel screen is sent to the desired depth, the screen is opened, and a groundwater sample is extracted to the surface using disposable polyethylene tubing.

Prior to sampling at each site, all sampling equipment is pressure washed with water and inorganic detergent to help prevent cross-contamination.

B. Soil Stratigraphy and Hydrogeology

The lateral changes in soil stratigraphy appear to be rather subtle because most of the soils on site are predominately silts ranging from sandy silt to clayey silt. Soils in the vicinity of the tank and under the small warehouse building are predominantly silts. Soils types trending from the tank pit to the west are predominantly silts which come to an abrupt change to poorly graded sands in GP2. The limits of the gasoline contamination also dissipate

to non-detectable levels at GP2. This abrupt change may be due to a vertical contact between old fill earthen materials as encountered in GP1 and natural soils as encountered in GP2. This indicated that the lateral spread of gasoline contamination is partially controlled by the non-laterally continuous pockets of fill soils.

Further to the west of GP2 is GP6, in which no water was encountered. This boring encountered no contamination indicating that the lateral spread of gasoline contamination is predominantly controlled by the lateral extent of the perched water.

Soils to the south of the tank pit are predominantly clay as encountered in GP8. This may be the predominant factor in limiting the migration of contaminants to the south. The same clay materials encountered in GP8 were also encountered in Test Pit No. 7, as represented by soil sample 7TB-10, located at a depth of 10 feet below ground surface, along the east property line. This soil appears to have limited the spread of gasoline across the east property line.

The vertical extent of contamination is predominantly controlled by the perched water table located in and around the tank pit and the predominance of silty clays and clayey silts which are the predominant soil type between the depths of 10 and 15 feet below ground surface. The majority of the contamination exists between 4.5 and 10.5 feet below ground surface and dissipates, in most locations, to non-detectable concentrations at a depth of 15 feet below ground surface.

The water table was first encountered in the tank pit excavation in most of the soil borings between 10 and 13 feet below ground surface. Water was also encountered at a depth of three feet below ground surface under the building due to a unique hydrogeologic control composed of fill soils which impeded downward migration of water. Also, water was encountered in GP7 at the tank pit at a depth of 23 feet and in GP2 ~~east~~ west of the tank pit at a depth of 19 feet below ground surface indicating that there may be another water table with a very slow recharge rate just below the water tabled encountered in the tank pit.

C. **Laboratory Results (e.g., Soil and Groundwater)**

The concentrations of gasoline as represented in **Drawing I** were generated by contouring around gasoline concentration data points, based on the highest concentration encountered in that boring or test pit location for samples obtained between 4.5 and 10.5 feet below ground surface. The contouring was constructed by "Surfer", a contouring computer model, and was later checked for accuracy by hand calculations.

Soil samples were obtained within the saturated and unsaturated zones and were analyzed for gasoline by EPA Method 8015 Modified for gasoline ranged organics and EPA Method 8020 for BTEX.

Benzene concentrations in soil, between 10 and 18 PPM appear to be located in soils predominantly between 6 and 10.5 feet below ground surface consistent with GP1 borings and test pit samples. These levels of benzene in soil were encountered in the capillary fringe and dissipate significantly with depth (**see Appendix B** for laboratory analyses, QA/QC, and chains-of-custody). Even though no water samples were collected and analyzed we can expect that benzene concentrations in soil may be considered a potential threat to water quality. The distribution of benzene within the capillary fringe indicates that it migrates on the water table and doesn't appear to have migrated vertically downward.

III. CONCLUSIONS

Gasoline contamination in soil is located at depths between 5 and 15 feet below ground surface, centered around the former underground tank location. The majority of the perched water along with very low concentrations of benzene in soil are located between 10 and 15 feet below ground surface. Floating product is present in the tank pit.

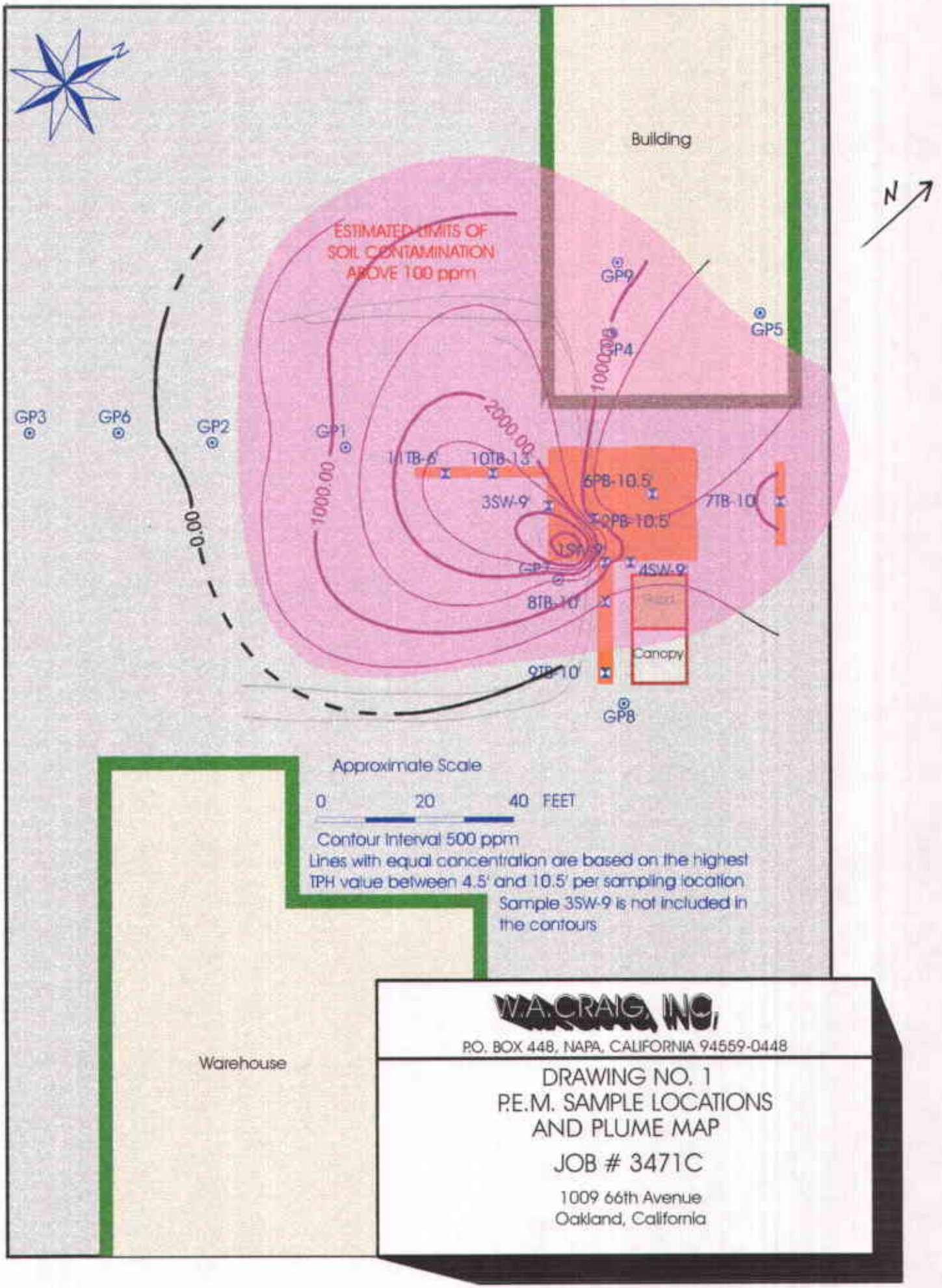
IV. RECOMMENDATIONS

The highest concentrations of gasoline should be removed by excavation and stock piling onsite. The contaminated soil in stockpiles can be properly manifested offsite or covered and infiltrated with a vapor extraction piping network which can be adapted to remediate the excavated soil onsite. Soil removal and treatment should

be performed in three or four phases to minimize exposure of gasoline vapors to neighboring properties and maximize space to allow ongoing business operations to continue without interruption.

Contamination under the building is trapped within silty earthen materials and may be remediated by the use of vapor extraction wells. If not, the soil will have to be removed by horizontal well excavators or stabilized in-place to prevent future migration to groundwater.

Groundwater should not be removed and pumped with groundwater pumping wells because the yield is too low. [redacted] during tank over-excavation would be the premier choice for remediating the groundwater onsite as a significantly greater amount of water can be recovered per unit of time, allowing for greater flexibility in treatment options. The water should be run through carbon drums to acceptable levels and a temporary NPDES permit should be obtained from the Regional Water Board to discharge the treated water to a nearby storm drain.



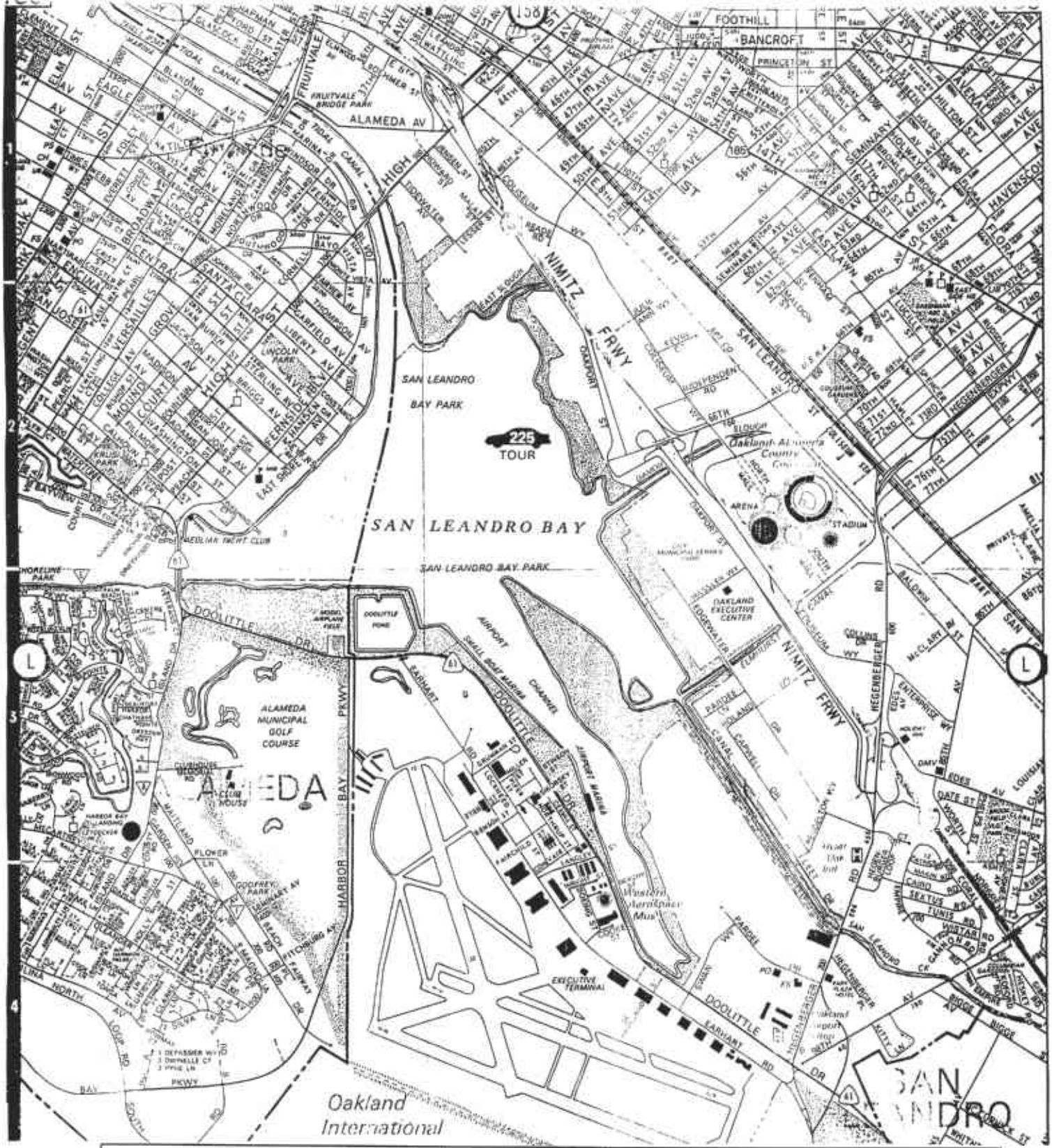
W.A. CRAIG, INC.

P.O. BOX 448, NAPA, CALIFORNIA 94559-0448

DRAWING NO. 1
P.E.M. SAMPLE LOCATIONS AND PLUME MAP

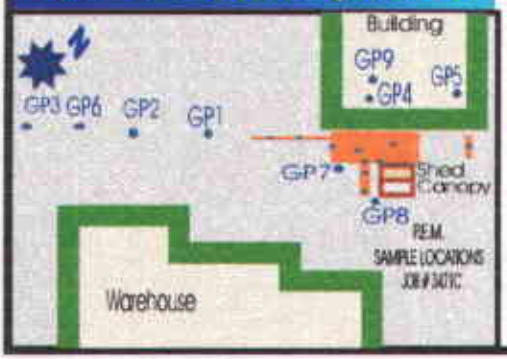
JOB # 3471C

1009 66th Avenue
Oakland, California



Date: MAY 23, 1995	**W. A. Craig, Inc.** 707-252-3353	
Job # :		
Tel:	PACIFIC ELECTRIC MOTORS	Figure No.
Drawn:	1009 - 66TH AVENUE	**2**
Checked:	OAKLAND, CA. 94621-3535	
Approved:	INDEX MAP	

W. A. CRAIG, INC.



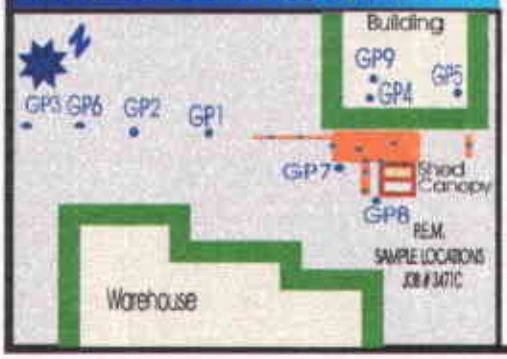
DRILLING LOG

BORING NO. GP1

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 24, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5			4			ML	***Clayey silt,*** *yellow brown, firm, slightly moist; with sand and rounded pebbles (shale particles). Mild hydrocarbon odor, gasoline*
10			105			ML	***Clayey silt,*** *medium brown, firm, moist. Strong gasoline odor*
						GW	***Water*** *at 14 1/2', possibly capillary fringe. Lost samples, very wet slipped out of tube*
15						ML	***Clayey silt,*** *medium brown, firm, very moist. Mild odor*
			0			SP	***Silty sand,*** *medium brown, dense, medium to coarse, moist, no odor.*
20							End of boring at 17'. Boring backfilled with bentonite chips. Note: Soils in this boring may be old fill and therefore not correlative with soils in natural encountered in GP2.
25							
30							
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

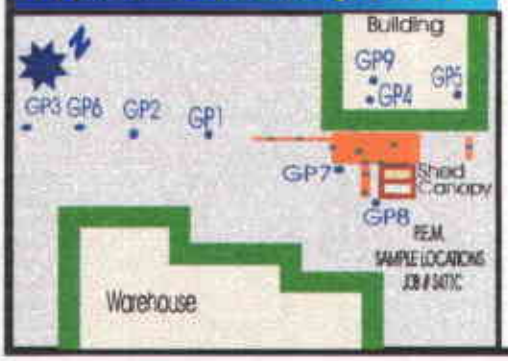
PAGE OF

BORING NO. GP2

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 24, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5							
			110			SP	***Clayey sand,*** *medium brown, medium dense, coarse to very coarse, moist. Moderate odor*
10							
			170			SP	***Coarsens*** *with depth, very coarse, fragments more angular*
15							
			25			SP	***Water*** *at approximately 19', Water sample attempted, recharge too slow*
						GW	
20							
			140			SM/ ML	***Sandy silt,*** *medium brown, medium dense, fine, very moist to wet odor of gasoline*
25							End of boring at 23 Groundwater first encounted at around 15' Boring backfilled with bentonite chips.
30							
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

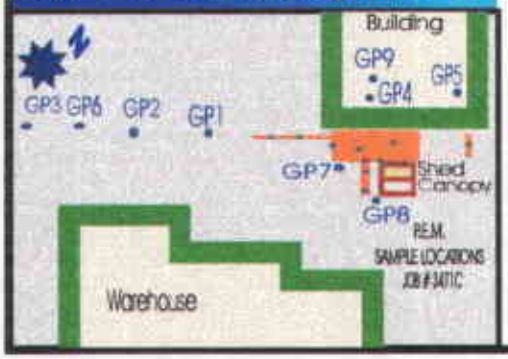
PAGE OF

BORING NO. GP3

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 24, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5			0			ML	***Sandy silt,*** *light brown and green, medium dense, fine, slightly moist; mottled, brick, fill, no odor*
10			0			SP/ CL	***Clayey sand,*** *red brown, dense,coarse to very coarse,moist, no odor*
							Sandy silt, *at 14 1/2' to 15', green and brown dense, fine, moist, coarsens with depth*
15			0				***Clayey sand,*** *red brown, dense,coarse to very coarse,moist, no odor*
20			0			SP/ SM	***Silty sand,*** *brown, dense, medium moist*
							End of boring at 20'. Boring backfilled with bentonite chips. No water
25							
30							
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

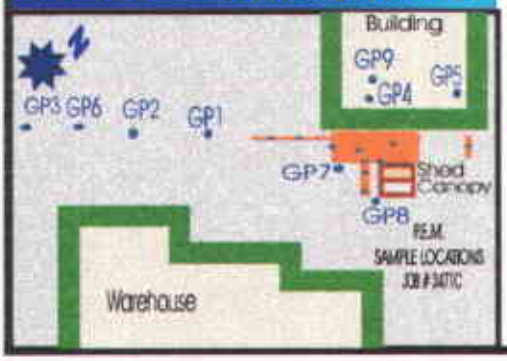
PAGE OF

BORING NO. GP4

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 24, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5			80			GC	***Clayey gravel,*** *green, loose, very coarse, moist; odor*
10			190			ML	***Clayey silt,*** *yellow brown, firm, moist; odor*
15			5			ML	***Clayey silt,*** *yellow brown and green, firm to stiff, moist; mottled, some gravel, no odor*
20			3				***Clayey silt,*** *yellow brown (green and black), firm to stiff. No odor, some sparce gravel* End of boring at 20'. Boring backfilled with bentonite chips. No water
25							
30							
35							
40							

W. A. CRAIG, INC.



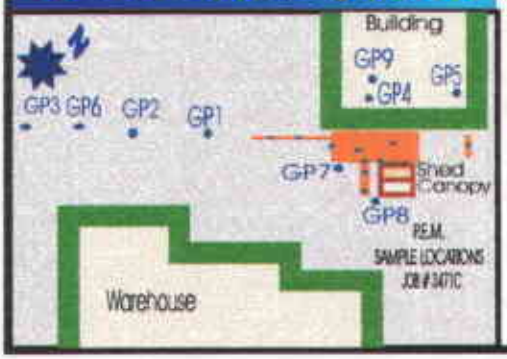
DRILLING LOG

BORING NO. GP5

PROJECT NAME:	PEM	PROJECT NO.	3471
ADDRESS:	1009 66TH AVE. OAKLAND	BORING DIAMETER:	1.25"
FIELD GEOLOGIST:	GEORGE PAVLOV RUSSEL GENTRY	REG. GEOLOGIST:	FRANK GOLDMAN
DRILLING COMPANY:	GEOCORE	DATE:	APRIL 24, 1995
DRILLING METHOD:	GEOPROBE		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
							Perch Water *at 3'*
5			0			SW	
10			0			ML	***Clayey silt,*** *at 12 - 12 1/4', yellow brown, soft to moderately firm, wet*
15							
20			0				End of boring at 20'. Boring backfilled with bentonite chips. Perch water encountered at 3'
25							
30							
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

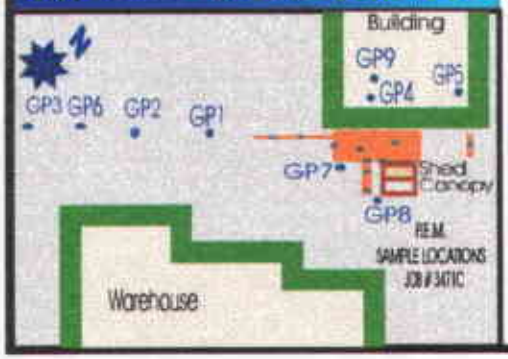
PAGE OF

BORING NO. GP6

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 25, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5						GC	***Clayey gravel,*** *red brown, loose, very coarse, slightly moist; no odor*
10						ML	***Clayey silt,*** *red brown, firm to stiff, moist; no odor*
15						SC	***Sandy clay,*** *red brown, firm, moist to very moist; no odor* *Brick fill*
20						SC	***Sandy clay,*** *red brown, firm, moist to very moist; no odor* *Brick fill, coarsens with depth; some silt balls, mottled*
25						CL	***Clay,*** *brown stiff; moist, no odor*
30							End of boring at 25'. Boring backfilled with bentonite chips. No water
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

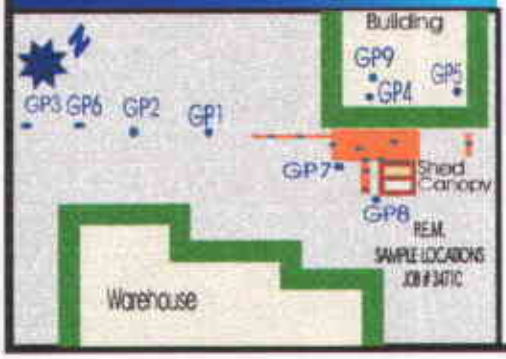
PAGE OF

BORING NO. GP7

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 25, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
						CL	***Clay,*** *green, soft to medium firm, moist*
5						ML	***Clayey silt,*** *green, firm, moist, odor moderately strong*
10						ML/ SM	***Clayey silt,*** *with sand, olive green, firm, moist; moderately strong odor*
15						SM	***Silty sand,*** *to sandy silt with clay, yellow brown. Slight odor, no water*
20						GW ▽	***Silty sand,*** *medium brown, medium-dense, fine to medium grain, wet. Faint odor.*
25						SW	26' - 27' Coarse sand ***Gravelly sand,*** *red brown, dense to very dense, medium to very coarse, moist; rounded pebbles. No odor*
30						SG	End of boring at 29'. Groundwater encountered around 23 1/2'. Boring backfilled with bentonite chips.
35							
40							

W. A. CRAIG, INC.



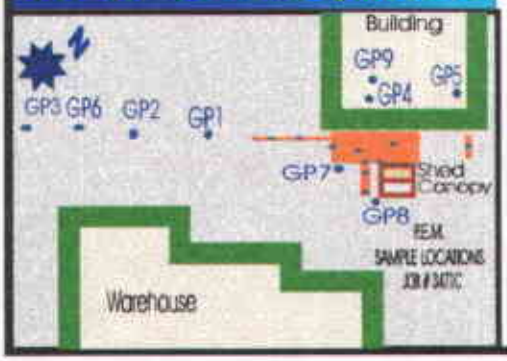
DRILLING LOG

BORING NO. GP8

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 25, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5						CL	***Silty clay,*** *with gravel and sand, greenish brown, moist, firm, slight odor*
10						SM/ ML	***Sandy silt,*** *yellow brown, soft to firm, fine grain, moist*
						CL	***Silty clay,*** *with sand, medium brown, fine grain sand, moist, firm, no odor*
15							
						CL	***Silty clay,*** *medium brown, firm, moist, with fine grain sand, green and black speckled, no odor. Silty sand at 19' - 20' with gravel, yellow brown*
20							End of boring at 20'. Boring backfilled with bentonite chips. No water
25							
30							
35							
40							

W. A. CRAIG, INC.



DRILLING LOG

PAGE OF

BORING NO. GP9

PROJECT NAME:	**PEM**	**PROJECT NO.**	**3471**
ADDRESS:	**1009 66TH AVE. OAKLAND**	**BORING DIAMETER:**	**1.25"**
FIELD GEOLOGIST:	**GEORGE PAVLOV RUSSEL GENTRY**	**REG. GEOLOGIST:**	**FRANK GOLDMAN**
DRILLING COMPANY:	**GEOCORE**	**DATE:**	**APRIL 25, 1995**
DRILLING METHOD:	**GEOPROBE**		

DEPTH	SAMPLE RECOVERY	WATER SAMPLE RECOVERY	HNu/PID [ppm]	WELL/BORING CONSTR.	LITHOLOGIC LOG	USCS SYMBOLS	LITHOLOGIC DESCRIPTION Description, Grain Size, Sorting, Color, Moisture, Mechanical Properties
5						SC	***Sandy clay,*** *with silt, greenish grey, firm, moist, some gravel, no odor*
10						ML	***Clayey silt,*** *yellow brown, soft to slightly firm, moist, some fine grain sand grain sand, moderately strong odor*
15						CL/ ML	***Silty clay,*** *greenish brown, firm, slightly moist, some fine grain sand, slight odor*
20						SC	***Sand clay,*** *greenish brown, firm, moist, some gravel, no odor*
25							End of boring at 20'. Boring backfilled with bentonite chips. No water
30							
35							
40							

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

3471

05/05/95

Dear Bill:

Enclosed are:

1). the results of **35** samples from your **PEM** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton

3471

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
51957	GP1-4.5'-5'	S	130,b,d	0.33	3.1	2.2	13	97
51958	GP1-9.5'-10'	S	1100,b,d	13	72	28	150	101
51959	GP1-16.5'-17'	S	ND	ND	ND	ND	ND	105
51960	GP2-7.5'-8'	S	1900,b,d	ND< 0.2	6.0	40	220	103
51961	GP2-12.5'-13'	S	530,b,d	ND< 0.04	12	1.4	53	100
51962	GP2-17.5'-18'	S	ND	ND	0.005	ND	0.012	104
51963	GP2-22.5'-23'	S	5.2,b,d	0.010	0.083	0.034	0.14	100
51964	GP3-4'-4.5'	S	ND	ND	ND	ND	ND	109
51965	GP3-10.5'-11'	S	ND	ND	ND	ND	ND	104
51966	GP3-15'-15.5'	S	ND	ND	ND	ND	ND	108
51967	GP3-19.5'-20'	S	ND	ND	ND	ND	ND	107
51968	GP4-4.5'-5'	S	1.3,b,d	0.024	0.007	0.006	0.18	104
51969	GP4-10'-10.5'	S	970,b,d	11	47	23	130	106
51970	GP4-15'-15.5'	S	ND	ND	0.006	ND	0.013	104
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
51971	GP4-19.5'-20'	S	ND	ND	ND	0.007	0.008	107
51972	GP5-4.5'-5'	S	ND,b,d	ND	0.006	0.006	0.049	106
51973	GP5-12'-12 1/4'	S	230,b,d	0.97	10	4.9	27	96
51974	GP5-19.5'-20'	S	ND	ND	ND	ND	ND	111
51975	GP6-4.5'-5'	S	ND	ND	ND	ND	ND	112
51976	GP6-10'-10.5'	S	ND	ND	ND	ND	ND	109
51977	GP6-15'-15.5'	S	ND	ND	ND	ND	ND	110
51978	GP6-19.5'-20'	S	ND	ND	ND	ND	ND	101
51979	GP6-24.5'-25'	S	ND	ND	ND	ND	ND	102
51980	GP7-7.5'-8'	S	1300,b,d	16	99	31	170	103
51981	GP7-13.5'-14'	S	260,b,d	1.5	8.9	5.1	27	102
51982	GP7-18.5'-19'	S	ND	ND	ND	ND	ND	101
51983	GP7-23.5'-24'	S	6.5,b,d	0.030	0.18	0.086	0.44	108
51984	GP7-28.5'-29'	S	ND,b	ND	0.017	ND	0.012	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
51985	GP8-4.5'-5'	S	ND	ND	0.012	ND	0.023	103
51986	GP8-11.5'-12'	S	ND	ND	ND	ND	ND	93
51987	GP8-18.5'-19'	S	ND	ND	ND	ND	ND	98
51988	GP9-4.5'-5'	S	1.2,b,d	0.016	ND	0.10	0.17	105
51989	GP9-14.5'-15'	S	32,a	1.5	2.2	0.85	4.4	105
51990	GP9-19'-19.5'	S	1.3,a	0.011	0.020	0.027	0.13	101
51991	GP9-9.5'-10'	S	1300,b,d	14	75	28	160	101
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

APPENDIX B

TABLES OF LABORATORY RESULTS

QA/QC DOCUMENTS

AND

CHAIN-OF-CUSTODY DOCUMENTS

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/24-04/25/95 Matrix: Soil

Analyte	Concentration (mg/kg)			Amount Spiked	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
TPH (gas)	0.000	1.730	1.795	2.03	85	88	3.7
Benzene	0.000	0.166	0.164	0.2	83	82	1.2
Toluene	0.000	0.168	0.164	0.2	84	82	2.4
Ethylbenzene	0.000	0.168	0.164	0.2	84	82	2.4
Xylenes	0.000	0.516	0.518	0.6	86	86	0.4
TPH (diesel)	0	294	290	300	98	97	1.4
TRPH (oil & grease)	0.0	20.2	19.6	20.8	97	94	3.0

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

W. A. CRAIG, INC.

CHAIN-OF-CUSTODY RECORD

1 of 2

4018 AWACX 355

PROJECT NO. | PROJECT NAME: PEM

PURCHASE ORDER NO. | SIGNATURE OF SAMPLER: Franklin J Feldman

DATE	TIME	W. A. CRAIG, INC.'S SAMPLE IDENTIFICATION	MATRIX: Soil, Water, Air, Sludge, Other	ANALYSIS: TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	TPHg & BTEX					Preserved? ICE	REMARKS	LABORATORY I. D. NUMBER
4/24/95	8:25 AM	GP1-3½-5	Soil				X					X		51957
4/24/95	8:37 AM	GP1-9½-10					X					X		51958
4/24/95	9:02 AM	GP1-16½-17					X					X		51959
4/24/95	9:22 AM	GP2-7½-8					X					X		51960
4/24/95	9:36	GP2-12½-13					X					X		51961
4/24/95	9:50	GP2-17½-18					X					X		51962
4/24/95	10:17	GP2-22½-23					X					X		51963
4/24/95	11:10	GP3-4-4½					X					X		51964
4/24/95	11:20	GP3-10½-11					X					X		51965
4/24/95	11:30	GP3-15-15½					X					X		51966
4/24/95	11:48	GP3-19½-20					X					X		51967
4/24/95	14:02	GP4-4½-5					X					X		51968
4/24/95	14:12	GP4-10-10½					X					X		51969
4/24/95	14:23	GP4-15-15½					X					X		51970
4/24/95	14:39	GP4-19½-20					X					X		51971
4/24/95	15:10	GP5-4½-5					X					X		51972

RELINQUISHED BY (Signature): Franklin J Feldman | DATE/TIME: 4/25/95 3:00 | RECEIVED BY (Signature): Ronald Gentry

RELINQUISHED BY (Signature): Ronald Gentry | DATE/TIME: 4/25/95 4:25 | RECEIVED BY (Signature): Heidi Ricca

RELINQUISHED BY (Signature): | DATE/TIME: | RECEIVED BY (Signature):

LABORATORY: McCampbell Analytical

TURNAROUND TIME: 48 hr

VOAS | O&G | METALS | OTHER

PLEASE SEND RESULTS TO:
W. A. CRAIG,
P.O. BOX 448
NAPA, CA 94559-0448
(707) 252-3353

ATTN:

ICE/T° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓

PRESERVATIVE APPROPRIATE ✓
CONTAINERS ✓

W. A. CRAIG, INC.

CHAIN-OF-CUSTODY RECORD

AWACX355 4018 2 of 2

PROJECT NO.

PROJECT NAME: PEM

PURCHASE ORDER NO.

SIGNATURE OF SAMPLER:

DATE	TIME	W. A. CRAIG, INC.'S SAMPLE IDENTIFICATION	MATRIX: Soil, Water, Air, Sludge, Other	ANALYSIS: TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	TPHg & BTEX	Preserved? ICE	REMARKS	LABORATORY I. D. NUMBER
4/25/15	15:17	GP5-12-12½	Soil				X	X		51973
4/25/15	16:22	GP5-19½-20	Soil				X	X		51974
4/25/15	8:20	GP6-4½-5	Soil				X	X		51975
4/25/15	8:31	GP6-10-10½	Soil				X	X		51976
4/25/15	8:50	GP6-15-15½	Soil				X	X		51977
4/25/15	9:10	GP6-19½-20	Soil				X	X		51978
4/25/15	9:27	GP6-24½-25	Soil				X	X		51979
4/25/15	10:04	GP7-7½-8	Soil				X	X		51980
4/25/15	10:21	GP7-13½-14	Soil				X	X		51981
4/25/15	10:40	GP7-18½-19	Soil				X	X		51982
4/25/15	11:00	GP7-23½-24	Soil				X	X		51983
4/25/15	11:55	GP7-28½-29'	Soil				X	X		51984
4/25/15	12:10	GP8-4½-5'	Soil				X	X		51985
4/25/15	12:28	GP8-11½-12'	Soil				X	X		51986
4/25/15	13:05	GP8-18½-19'	Soil				X	X		51987
4/25/15	13:28	GP9-4½-5'	Soil				X	X		51988

RELINQUISHED BY (Signature): DATE/TIME 4/25/15 Time — RECEIVED BY (Signature):

RELINQUISHED BY (Signature): DATE/TIME 4/25/15 4:25 — RECEIVED BY (Signature):

RELINQUISHED BY (Signature): DATE/TIME — RECEIVED BY (Signature):

ICE/T° GOOD CONDITION HEAD SPACE ABSENT PRESERVATIVE APPROPRIATE CONTAINERS

LABORATORY: McCampbell Analytical

TURNAROUND TIME: 48hr. RUSH 24 hr. 72 hr. OTHER

PLEASE SEND RESULTS TO: W. A. CRAIG P.O. BOX 44 NAPA, CA (707) 252-33

ATTN:

3 of 3

W. A. CRAIG, INC.

CHAIN-OF-CUSTODY RECORD

AWACX355 4018

PROJECT NO.:

PROJECT NAME: P.E.M.

PURCHASE ORDER NO.:

SIGNATURE OF SAMPLER: [signature]

DATE 1995	TIME	W. A. CRAIG, INC.'S SAMPLE IDENTIFICATION	MATRIX: Soil, Water, Air, Sludge, Other	TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	TPHg & BTEX					Preserved? Ice	REMARKS	LABORATORY I. D. NUMBER
4/25	13:50	GP9-14½'-15'	Soil				X					X		51989
4/25	14:14	GP9-19'-19½'	Soil				X					X		51990
4/25	13:40	GP9-9½'-10'	Soil				X					X		51991

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)
[signature]	4/25/95 3:00	[signature]
[signature]	4/25/95 4:25	[signature]

LABORATORY: McCampbell Analytical

TURNAROUND TIME: ~~24hr.~~ 48hr

PLEASE SEND RESULTS TO:

W. A. CRAIG, INC.
P.O. BOX 448
NAPA, CA 94559-0448
(707) 252-3353

ATTN:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓
PRESERVATIVE
APPROPRIATE CONTAINERS ✓

VOAS | O&G | METALS | OTHER

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc.	Client Project ID: # 3471C; PEM	Date Sampled: 04/11/95
P.O. Box 448		Date Received: 04/11/95
Napa, CA 94559-0448	Client Contact: Bill Craig	Date Extracted: 04/11/95
	Client P.O:	Date Analyzed: 04/11/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
51603	1-SW-1-SW-9'	S	1100,a	16	94	25	140	97
51604	2-PB-1-W-10.5'	S	400,a	5.8	33	8.9	53	98
51605	3-SW-1-W-9'	S	3.6,b,d	0.024	0.12	0.054	0.36	100
51606	4-SW-1-SE-9'	S	980,a	15	82	21	120	98
51607	5-SW-1-E-9'	S	900,a	17	90	22	130	99
51608	6-PB-1-E-10.5'	S	310,a	4.2	3.0	8.2	16	99
51609	7-TB-0-E-10'	S	1200,a	14	84	26	150	99
51610	8-TB-0-S-10'	S	500,a	7.2	16	11	41	98
51611	9-TB-0-S-10'	S	1.0,a	0.018	0.035	0.024	0.10	102
51612	10-TB-0-W-13'	S	5700,a	62	420	130	770	99
51613	11-TB-0-W-6'	S	2800,b	18	150	72	420	101
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/11/95 Matrix: Soil

Analyte	Concentration (mg/kg)			Amount Spiked	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
TPH (gas)	0.000	1.985	2.010	2.03	98	99	1.3
Benzene	0.000	0.182	0.178	0.2	91	89	2.2
Toluene	0.000	0.192	0.184	0.2	96	92	4.3
Ethylbenzene	0.000	0.194	0.184	0.2	97	92	5.3
Xylenes	0.000	0.614	0.578	0.6	102	96	6.0
TPH (diesel)	0	310	313	300	103	104	1.0
TRPH (oil & grease)	0.0	18.4	19.7	20.8	88	95	6.8

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

W. A. CRAIG, INC.

CHAIN-OF-CUSTODY RECORD

3940 AWACX 342

PROJECT NO.	PROJECT NAME
3940C	P.E.M.
PURCHASE ORDER NO.	SIGNATURE OF SAMPLER
	Russell Beatty

DATE 1995	TIME	W. A. CRAIG, INC.'S SAMPLE IDENTIFICATION	MATRIX: Soil, Water, Air, Sludge, Other	TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	TPHg & BTEX					Preserved? ICE	REMARKS	LABORATORY I. D. NUMBER
4/1	12:35	1-SW-1-SW-9'	S				✓					✓		51603
"	13:01	2 PB 1-W 10½'	S				✓					✓		51604
"	13:03	3 SW 1 W 9'	S				✓					✓		51605
"	13:1?	4 SW 1 SE 9'	S				✓					✓		51606
"	13:15	5 SW 1 E 9'	S				✓					✓		51607
"	13:25	6 PB-1-E-10½'	S				✓					✓		51608
"	13:36	7 PB O E 10'	S				✓					✓		51609
"	13:40	8 PB O-S 10'	S				✓					✓		51610
"	13:46	9 PB O S 10'	S				✓					✓		51611
"	13:52	10 PB O W-13'	S				✓					✓		51612
"	13:59	11-PB O-W-6'	S				✓					✓		51613

ICE/T° ✓ GOOD CONDITION ✓ HEAD SPACE ABSENT ✓

PRESERVATIVE | VOAS | O&G | METALS | OTHER
APPROPRIATE CONTAINERS ✓

Paid $5?? #6185

RELINQUISHED BY (Signature):	DATE/TIME	RECEIVED BY (Signature):
Russell Beatty	4/1/95 14:35	[signature]
RELINQUISHED BY (Signature): [signature]	DATE/TIME 4/1 3:24	RECEIVED BY (Signature): Nicole Rieck?
RELINQUISHED BY (Signature):	DATE/TIME	RECEIVED BY (Signature):

LABORATORY: McCampbell Analytical

TURNAROUND TIME: 48hr

PLEASE SEND RESULTS TO:

W. A. CRAIG, INC.
P.O. BOX 448
NAPA, CA 94559-0448
(707) 252-3353

ATTN: