

QUARTERLY GROUNDWATER MONITORING REPORT - MARCH 30, 1994
PACIFIC DRY DOCK YARD I
OAKLAND, CALIFORNIA

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Versar Project No. 2722-017

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PROJECT SUMMARY

On March 30, 1994, Versar, Inc. (Versar) conducted the fourth round of groundwater monitoring and sampling at the Pacific Dry Dock Yard I located at 1441 Embarcadero in Oakland, California.


Quarterly groundwater monitoring is being conducted from the five monitoring wells as part of the site investigation activities. Each sampling event includes: 1) measurement of groundwater levels; 2) collection and analysis of groundwater samples for total petroleum hydrocarbons as gasoline, total petroleum hydrocarbons as diesel, benzene, toluene, ethylbenzene, xylenes, total dissolved solids, and salinity; 3) calculation of the hydraulic gradient; and 4) generation of a report summarizing the results of the sampling event. Mr. Philip Walsack, Geohydrologist prepared this report under the guidance of Mr. Lawrence Kleinecke, Senior Geohydrologist.


The following conclusions summarize the findings of Versar's investigation:

- On March 30, 1994, the calculated groundwater gradient was 0.030 feet/foot to the southeast. The data used to calculate this gradient were collected during low tide.
- Total petroleum hydrocarbons as diesel, benzene, toluene, ethylbenzene, and xylenes were detected in groundwater monitoring well MW1.
- Toluene concentrations were identified in all five groundwater monitoring wells.
- The analysis of filtered duplicate sample from monitoring well MW1 identified a decrease in contaminant concentrations from the unfiltered sample.

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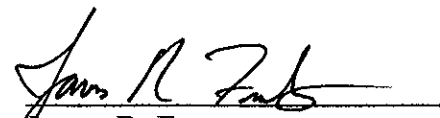

James R. Frantes
Vice President, Pacific Region

TABLE OF CONTENTS

	<u>Page</u>
PROJECT SUMMARY	i
1.0 INTRODUCTION	1
1.1 Site Geology and Geohydrology	1
1.2 Site History	2
1.3 Quarterly Monitoring Program	4
2.0 SAMPLING ACTIVITIES	5
2.1 Groundwater Monitoring and Sampling	5
3.0 LABORATORY ANALYTICAL RESULTS	7
4.0 FUTURE ACTIVITIES	8
5.0 REFERENCES	9

LIST OF FIGURES

Figure

- 1 Site Location
- 2 Site Layout
- 3 Calculated Groundwater Gradient, March 30, 1994
- 4 Laboratory Analytical Results for Groundwater Samples Collected on March 30, 1994

LIST OF TABLES

Table

- 1 Monitoring Well Groundwater Levels
- 2 Laboratory Analytical Results for Groundwater
- 3 Laboratory Analytical Results for TPH-D in Filtered Duplicate Samples from Monitoring Wells MW1 and MW3
- 4 Historical Trend of Chemical Data for Groundwater

LIST OF APPENDICES

Appendix

- A Groundwater Monitoring and Sampling Procedures
- B Monitoring Well Purge Table Sheets
- C Laboratory Analytical Reports and Chain-of-Custody Records for Groundwater Samples Collected March 30, 1994, Fourth Quarterly Groundwater Sampling

1.0 INTRODUCTION

Versar, Inc. (Versar) has been retained by Crowley Marine Services, Inc. (Crowley) to conduct environmental investigations, including a program of quarterly groundwater monitoring at Pacific Dry Dock Yard I (PDDI), located at 1441 Embarcadero in Oakland, California. This quarterly groundwater monitoring report describes the procedures and findings of the fourth round of quarterly monitoring and groundwater sampling conducted on March 30, 1994. This investigation is being conducted in accordance with the policies of the San Francisco Bay Regional Water Quality Control Board and the Alameda County Health Care Services Agency.

The site occupies approximately two acres and is bounded by the Embarcadero to the north, the Oakland Inner Harbor to the south, an undeveloped lot to the east, and a boat repair yard to the west.

Currently, a machine shop with covered storage occupies the south-central section, and a sheet metal bulkhead abuts the southern edge of the site. Four aboveground diesel storage tanks occupy the southwest corner of the site. Other structures, including an office building, a machine shed, an aboveground waste oil tank, assorted sheds, and storage buildings were demolished recently and removed. Figures 1 and 2 show the site location and site layout, respectively.

1.1 Site Geology and Geohydrology

The site is located in the Coast Ranges geomorphic province between the Hayward Fault (to the east) and the San Andreas Fault (to the west). The underlying bedrock consists of Mesozoic volcanic and metavolcanic rocks found throughout the Coast Ranges. Overlying the bedrock are Quaternary marine and non-marine alluvial sediments consisting of clays and silts.

The site is nearly level at an elevation ranging from five to ten feet above lower low tide datum (National Geodetic Vertical Datum of 1929). Versar's investigation has characterized the shallow soils beneath the site as sand, silt, and clay fill material extending from the surface to the bay muds. The fill material contains wood and brick fragments. The bay muds consist of silty clays, clays with shell fragments, and thin layers of sands or gravels. These layers are often saturated with groundwater.

During the March 30, 1994 sampling event, groundwater was measured during low tide and was measured between 4.51 and 9.81 feet below ground surface (bgs). Calculations indicate a groundwater gradient of 0.013 feet per foot (ft/ft) to the southeast. The impact of tidal fluctuations on gradient calculations has not been determined. Figure 3 shows the groundwater contours and flow direction calculated from the fourth quarterly sampling round.

1.2 Site History

Since 1935, PDDI has been used as a dry dock facility. In the past, during the repair and refurbishing of seagoing vessels, Crowley used products containing regulated materials and generated various regulated and non-regulated wastes. These products and waste materials include waste sand-blasting materials, oil-based paints, solvents, acids, caustics, waste oils, and motor fuels.

During December 1989 and January 1990, Versar conducted a site assessment of PDDI. The findings of the site assessment (Versar, 1990) included the identification of an underground storage tank (UST) reported to contain unleaded gasoline. The UST was reportedly out of service.

In September 1991, Versar supervised the removal of the UST (Versar, 1991). Soil and groundwater samples collected from the excavation following the removal were found to contain total petroleum hydrocarbons as gasoline (TPH-G); total petroleum hydrocarbons as diesel (TPH-D); total oil and grease (TOG); benzene, toluene, ethylbenzene, and xylenes (BTEX); and organic lead.

During October 1991 and January 1992, Versar collected a series of soil and groundwater samples from PDDI (Versar, May 1992). The results of this investigation identified four areas of soil containing identifiable concentrations of TPH-G, TPH-D, TOG, and/or BTEX.

On June 23 and 24, 1993, five 2-inch diameter groundwater monitoring wells were installed to a depth of 13 to 14 feet bgs at PDDI (Versar, November 7, 1993). During drilling activities, soil samples collected from boreholes MW1, MW2, and MW4 were submitted for laboratory analysis and identified concentrations of TPH-D, BTEX, and TOG. Analysis of soil samples collected from borehole MW3 identified concentrations of TPH-D and toluene. The sample collected from borehole MW5 contained only toluene.

Metals were detected in two soil samples (MW1-5.5 and MW3-5.5). Metals detected included arsenic, barium, beryllium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc. However, none of the metals detected exceeded their respective total threshold limit concentration (TTLC) as described in the California Code of Regulations, Title 22 nor did they exceed ten times the soluble threshold limit concentration (STLC).

On June 25, 1993, each monitoring well was developed by removing a minimum of five well volumes of groundwater, or until dry. On July 1, 1993, each of the wells were purged and sampled. This sampling event was the first quarter of a one year long quarterly monitoring and sampling program. The samples were analyzed for TPH-D, TPH-G, TOG, and BTEX. Additionally, the groundwater sample collected from MW3 was analyzed for semivolatile organic compounds and volatile organic compounds.

The second round of quarterly groundwater monitoring and sampling at PDDI was conducted on October 14, 1993. The samples were analyzed for TPH-D, TPH-G, BTEX, TDS, and salinity. On December 8, 1993, a peristaltic pump and groundwater sampling filter were used to collect duplicate samples from monitoring wells MW1 and MW3. The analytical results of filtered groundwater samples collected from monitoring wells MW1 and MW3 indicated up to a tenfold decrease in the concentration of TPH-D when compared to

unfiltered samples. These results indicate that some of the TPH-D contamination was likely due to the adsorption of TPH-D to soil particles. Additional sampling of groundwater was conducted to confirm the presence of TPH-D in monitoring wells MW1 and MW3.

The third round of quarterly monitoring and sampling at PDDI was performed on January 17 and 18, 1994. The groundwater samples were analyzed for TPH-D, TPH-G, BTEX, TDS, and salinity. Petroleum hydrocarbon constituents were detected in monitoring wells MW1 and MW3. The analytical results of filtered groundwater samples collected from monitoring wells MW1 and MW3 were comparable to the unfiltered groundwater samples.

1.3 Quarterly Monitoring Program

The primary purpose of this program is to maintain regularly scheduled groundwater monitoring at the PDDI site. The general objectives of this third quarterly sampling event were to:

- Measure groundwater levels in monitoring wells MW1, MW2, MW3, MW4, and MW5 and determine the local hydraulic gradient;
- Purge and collect groundwater samples from monitoring wells MW1, MW2, MW3, MW4, and MW5;
- Collect filtered duplicate groundwater samples from monitoring wells MW1 and MW3;
- Submit the groundwater samples to a certified laboratory for analysis for TPH-G, TPH-D, BTEX, and salinity; and
- Prepare this fourth quarterly groundwater monitoring report.

2.0 SAMPLING ACTIVITIES

The fourth round of quarterly groundwater monitoring and sampling at PDDI was conducted on March 30, 1994. The investigation included measurement of the groundwater levels in the five monitoring wells and collection of groundwater samples from the five monitoring wells.

2.1 Groundwater Monitoring and Sampling

On March 30, 1994, before any groundwater sampling was conducted, the depth to groundwater was measured in each monitoring well. Groundwater was present at depths of 4.87 feet bgs, 4.51 feet bgs, 9.81 feet bgs, 4.91 feet bgs, and 6.35 feet bgs in monitoring wells MW1, MW2, MW3, MW4, and MW5, respectively. These depths were converted to elevations using previous survey data and were used to calculate the hydraulic gradient. The gradient on March 30, 1994, was 0.030 ft/ft in a southeasterly direction, as shown on Figure 3. The groundwater level data for the previous sampling events are listed in Table 1.

After the measurement of groundwater levels, the monitoring wells were purged following Versar's standard procedures outlined in Appendix A using a peristaltic pump instead of a bailer. Data collected during purging included: 1) the initial depth to groundwater; 2) pH; 3) temperature; 4) conductivity; and 5) observations of sheen, odor, free product, and turbidity. Details of the purging were recorded and are included as Appendix B.

Groundwater samples were collected from each monitoring well using a peristaltic pump. The samples for TPH-G and BTEX were placed in precleaned, 40-milliliter glass vials preserved with hydrochloric acid. Groundwater samples to be analyzed for TPH-D were placed in precleaned, 1-liter glass amber containers; and samples analyzed for salinity were placed in 1-liter plastic containers. Sampling containers were labeled with the date collected and a unique sample identification and stored at approximately 4° C in an insulated cooler. All monitoring well groundwater samples were submitted for analysis to Trace Analysis Laboratory, Inc., a California state-certified laboratory (Certification No. 1199). The samples were prepared following Environmental Protection Agency (EPA) protocols and were

accompanied by Versar's chain-of-custody record. The results of the laboratory analysis are presented in Section 3.0, Laboratory Analytical Results.

In past sampling rounds, the analytical results appeared to be influenced by high turbidity. To test this phenomenon, filtered duplicate groundwater samples were collected from monitoring wells MW1 and MW3 during the past three rounds of sampling including this round of sampling. The duplicate filtered samples were collected using a peristaltic pump and a 0.45 micron acrylic co-polymer membrane filter. Groundwater samples collected using the filter had a lower turbidity than initial samples collected with a disposable bailer, although the difference was minor during this round of sampling.

Except for the use of the groundwater sampling filter, all monitoring wells were purged and sampled following Versar's standard procedures outlined in Appendix A.

3.0 LABORATORY ANALYTICAL RESULTS

During the March 30, 1994 sampling event, five groundwater samples were collected for laboratory analysis for TPH-G, TPH-D, BTEX, and salinity. TPH-G and TPH-D was analyzed following the California Department of Health Services Method. BTEX was analyzed following the modified EPA Method 8020, and salinity was analyzed following EPA Method 120.1. Groundwater samples analytical results are summarized in Figure 4. A copy of the laboratory analytical reports and chain-of-custody records from the sampling event are included as Appendix C.

Trace Analysis Laboratory reported that the groundwater samples collected on March 30, 1994, from monitoring wells MW1, MW2, MW3, MW4, and MW5 did not contain TPH-G at or above the method reporting limits. The groundwater sample collected from MW1 contained benzene, toluene, ethylbenzene, and xylene concentrations of 2.5 micrograms per liter ($\mu\text{g/L}$), 1.7 $\mu\text{g/L}$, 0.56 $\mu\text{g/L}$, and 1.9 $\mu\text{g/L}$, respectively. Groundwater samples from MW2, MW3, and MW5 contained toluene at 1.1 $\mu\text{g/L}$, 0.90 $\mu\text{g/L}$, and 0.87 $\mu\text{g/L}$, respectively. Concentrations of both toluene and xylenes were detected at 1.5 $\mu\text{g/L}$ in the groundwater sample from monitoring well MW4. The groundwater sample from MW1 contained 110 $\mu\text{g/L}$ of TPH-D. The four remaining groundwater samples did not contain TPH-D at or above method reporting limit. Groundwater samples collected from MW1 and MW3 contained TPH-D concentrations of 110 $\mu\text{g/L}$ and not detected, respectively. Groundwater samples collected from MW1 and MW3 as filtered duplicate samples contained no detected TPH-D concentrations in either sample. Analysis of groundwater samples collected from MW1 through MW5 reported concentrations of salinity ranging between 0.10 $\mu\text{g/L}$ and 21 $\mu\text{g/L}$.

Laboratory analytical results for groundwater samples from March 30, 1994, are summarized in Table 2. Laboratory analytical results for TPH-D in the filtered duplicate samples from MW1 and MW3 are summarized in Table 3. The historical trend of chemical data are summarized in Table 4.

4.0 FUTURE ACTIVITIES

This is the fourth sampling event of the quarterly sampling activities for the five monitoring wells MW1, MW2, MW3, MW4, and MW5 at the PDDI site. Because petroleum hydrocarbon contamination has been identified in groundwater samples collected during the first four quarters of sampling, additional quarterly groundwater monitoring will be conducted. Sample analysis will continue for TPH-D, TPH-G, and BTEX, however, filtered duplicate samples will no longer be collected. The next quarterly sampling event is scheduled for July 1994.

5.0 REFERENCES

Versar, Inc. Fair Oaks, California. 1990, Site Assessment Report for the Pacific Dry Dock and Repair Yards I and II, Oakland, California.

Versar, Inc. Fair Oaks, California. October 1991, Tank Removal, Pacific Dry Dock and Repair Yard I, Western Section, Oakland, California.

Versar, Inc. Fair Oaks, California. March 1992, Phase II Site Investigation Work Plan, Pacific Dry Dock and Repair Yard I, Western Section, Oakland, California.

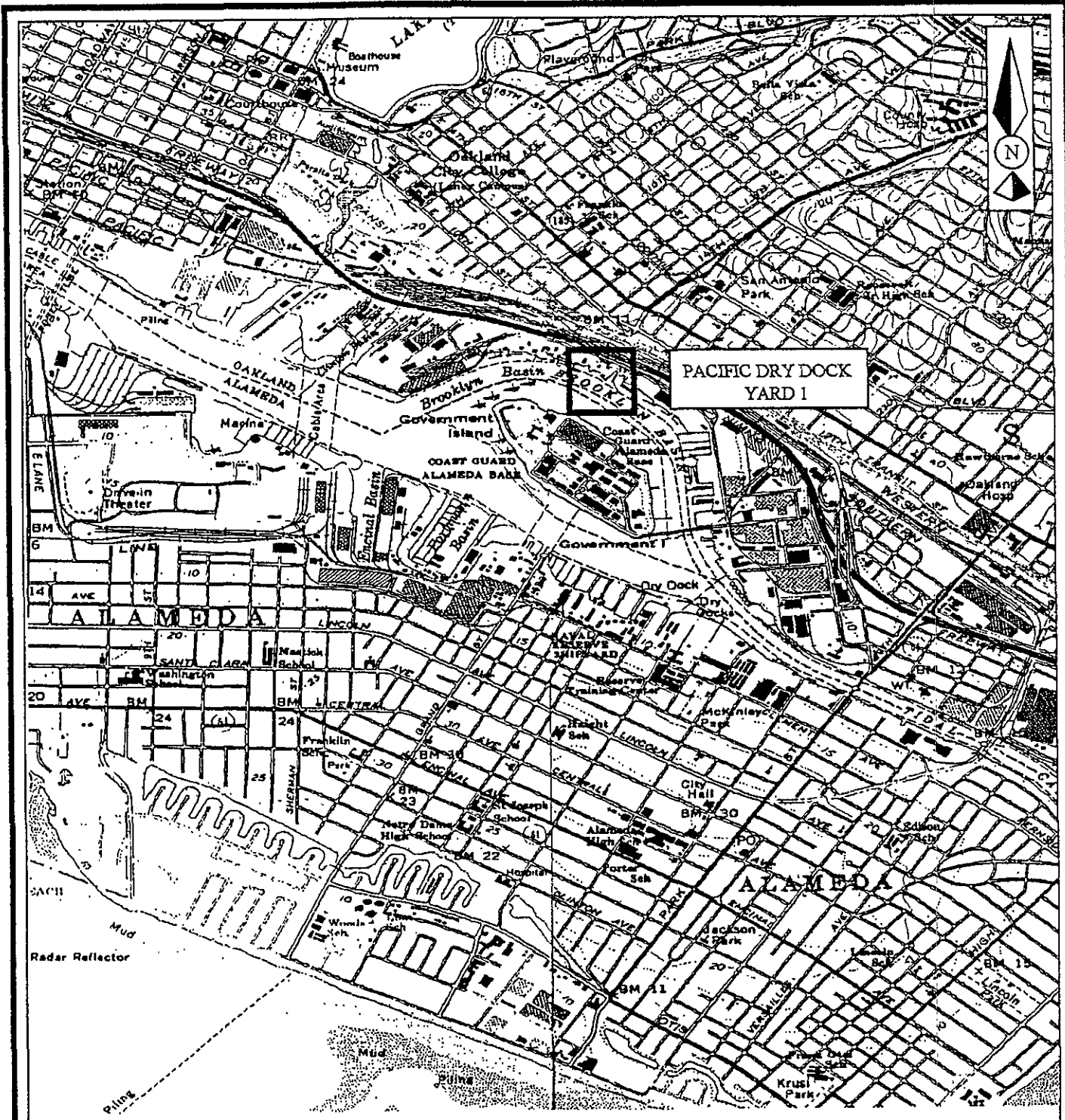
Versar, Inc. Fair Oaks, California. May 1992, Preliminary Investigation and Evaluation Report (PIER), Pacific Dry Dock and Repair Yard I, Western Section, Oakland, California.

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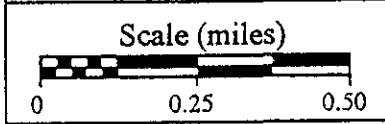
Versar, Inc. Fair Oaks, California. November 7, 1993, Well Installation, Pacific Dry Dock and Repair Yard I, Western Section, Oakland, California.

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Versar, Inc. Fair Oaks, California. Quarterly Groundwater Monitoring Report - June 10, 1994, Pacific Dry Dock Yard I, Oakland, California.



SOURCE: USGS TOPO 1959



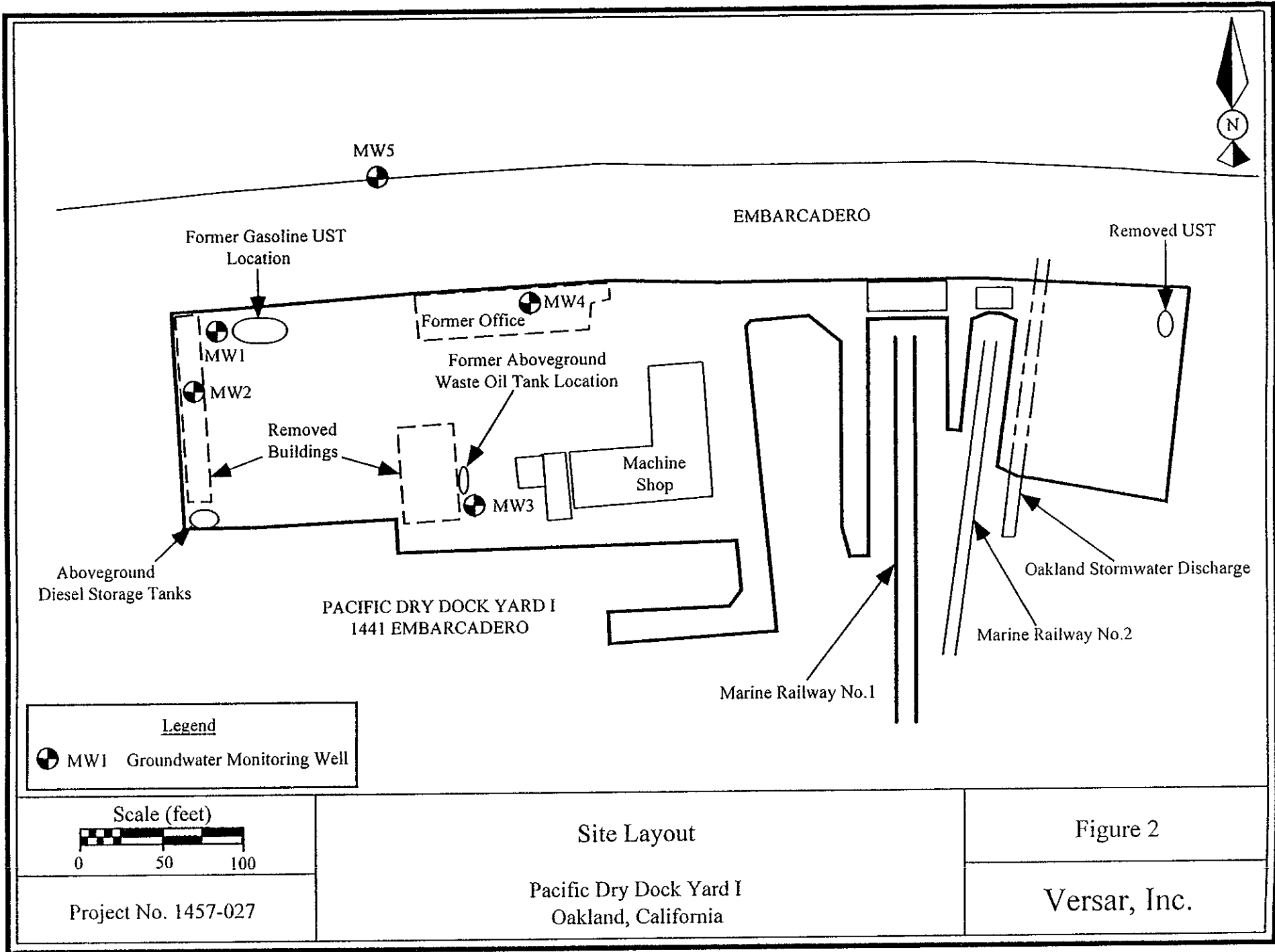
Site Location

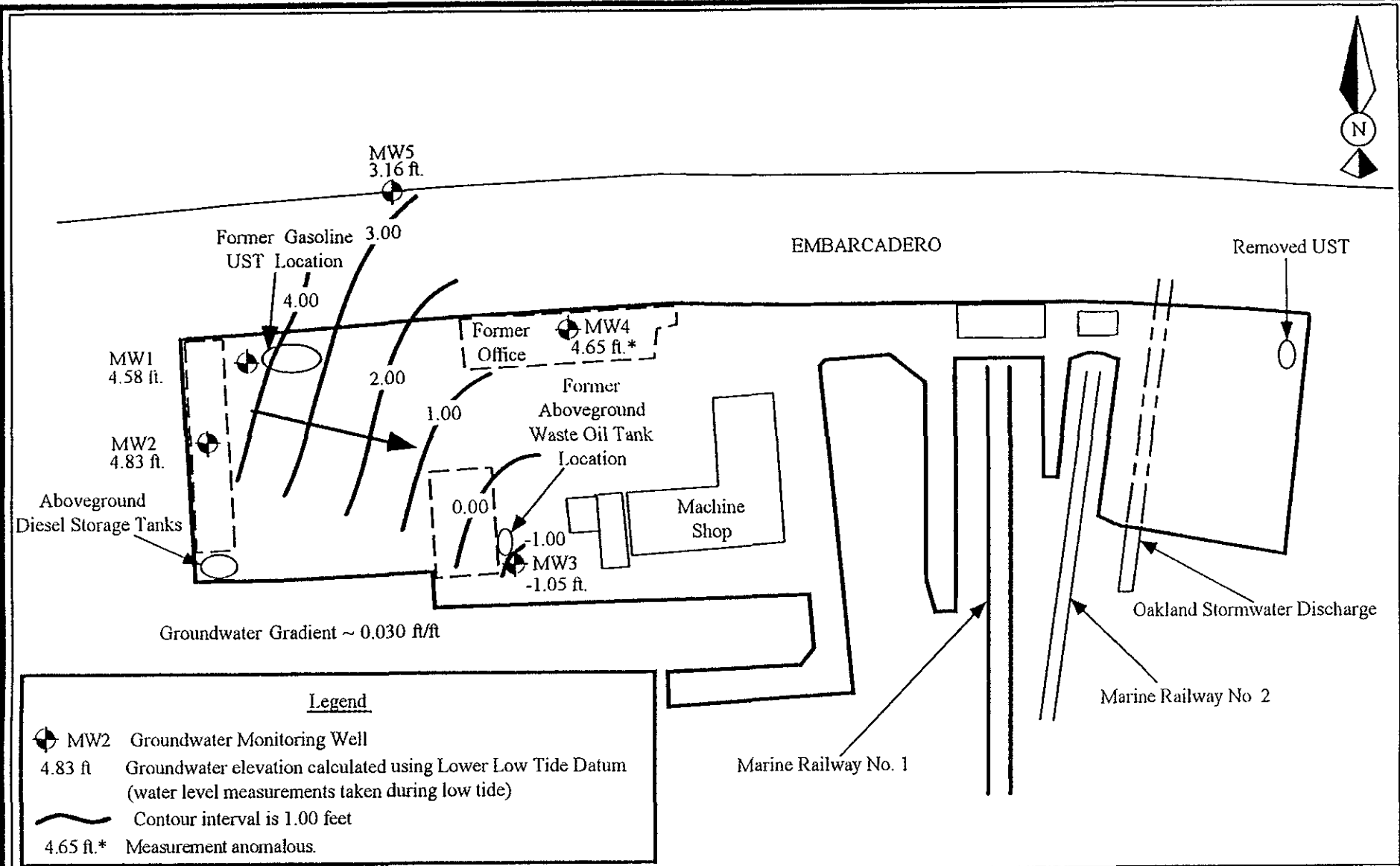
Figure 1

Project No. 1457-027



Pacific Dry Dock Yard I
Oakland, California

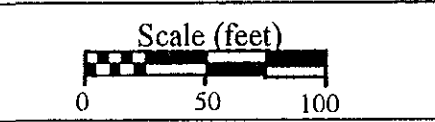
Versar, Inc.





Legend

 MW2 Groundwater Monitoring Well
 4.83 ft Groundwater elevation calculated using Lower Low Tide Datum (water level measurements taken during low tide)
 Contour interval is 1.00 feet
 4.65 ft.* Measurement anomalous.

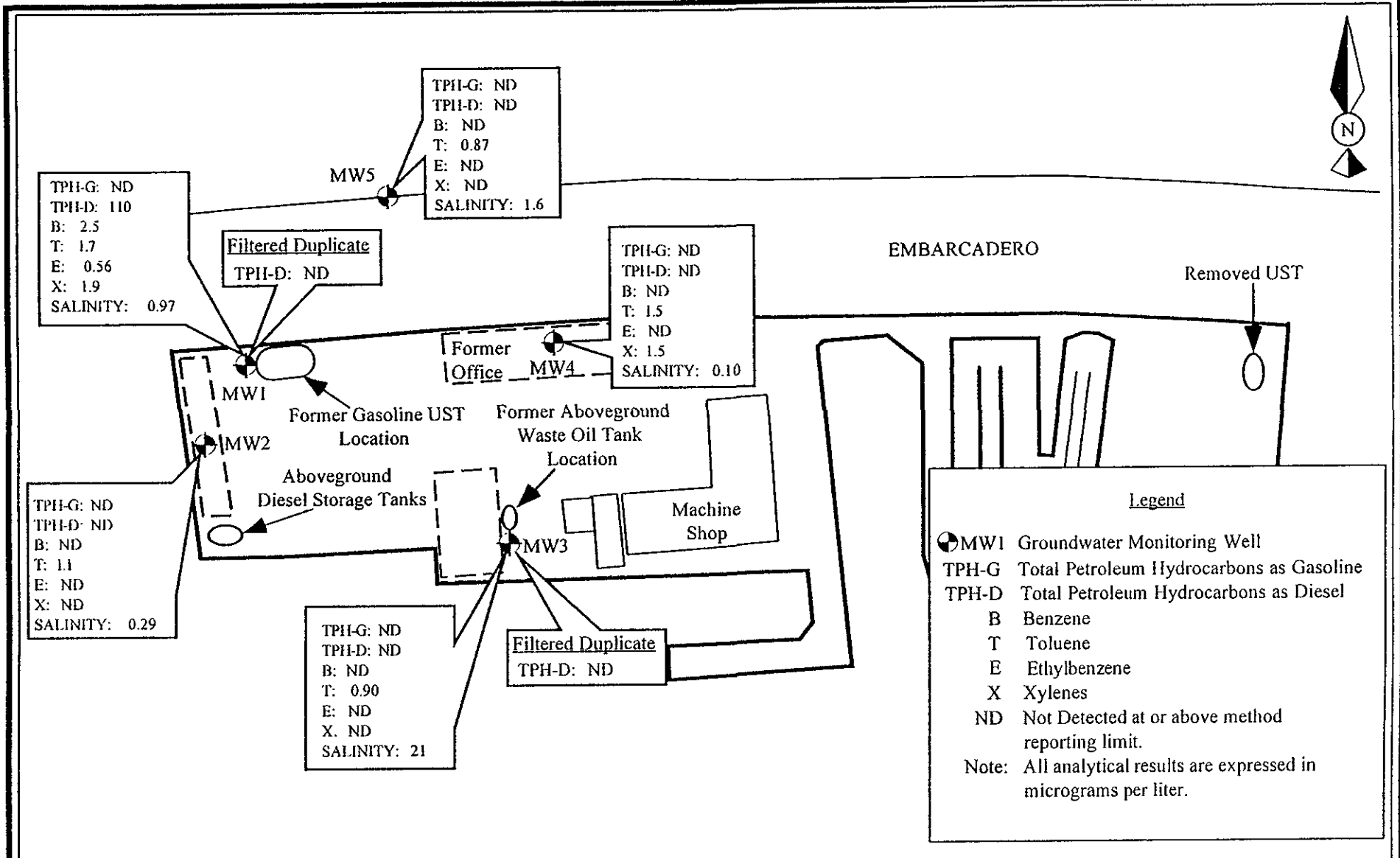


Project No. 1457-027

Calculated Groundwater Gradient
 March 30, 1994
 Pacific Dry Dock Yard I
 Oakland, California

Figure 3

Versar, Inc.



TPH-G: ND
 TPH-D: 110
 B: 2.5
 T: 1.7
 E: 0.56
 X: 1.9
 SALINITY: 0.97

Filtered Duplicate
 TPH-D: ND

MW5
 TPH-G: ND
 TPH-D: ND
 B: ND
 T: 0.87
 E: ND
 X: ND
 SALINITY: 1.6

TPH-G: ND
 TPH-D: ND
 B: ND
 T: 1.5
 E: ND
 X: 1.5
 SALINITY: 0.10

Former Office
 MW4

TPH-G: ND
 TPH-D: ND
 B: ND
 T: 1.1
 E: ND
 X: ND
 SALINITY: 0.29

MW1
 Former Gasoline UST Location

MW2
 Aboveground Diesel Storage Tanks

Former Aboveground Waste Oil Tank Location

Machine Shop

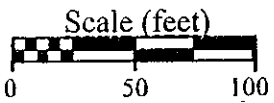
MW3

TPH-G: ND
 TPH-D: ND
 B: ND
 T: 0.90
 E: ND
 X: ND
 SALINITY: 21

Filtered Duplicate
 TPH-D: ND

EMBARCADERO

Removed UST



Laboratory Analytical Results for Groundwater Samples Collected on March 30, 1994
 Pacific Dry Dock Yard I
 Oakland, California

Figure 4

Versar, Inc.

Project No. 1457-027

TABLE 1
 QUARTERLY GROUNDWATER MONITORING REPORT
 MONITORING WELL GROUNDWATER LEVELS

March 30, 1994

Pacific Dry Dock Yard I
 Oakland, California

	MW1	MW2	MW3	MW4	MW5	Hydraulic Gradient (feet/foot)
Reference Casing Elevation (feet)	9.45	9.34	8.76	9.55	9.51	
<u>October 14, 1993</u>						
Depth to Groundwater (High Tide)	6.54	5.74	3.98	6.45	6.92	
Groundwater Elevation	2.91	3.60	4.78	3.10	2.59	0.013 ft/ft to the north
<u>December 8, 1993</u>						
Depth to Groundwater (Low Tide)	6.28	4.55	6.50	6.02	6.71	
Groundwater Elevation	3.17	4.79	2.26	3.53	2.80	0.016 ft/ft to the east
<u>January 17, 1994</u>						
Depth to Groundwater (High Tide)	4.93	4.90	6.60	6.05	6.60	
Groundwater Elevation	4.52	4.44	2.16	3.50	2.91	0.013 ft/ft to the southeast
<u>March 30, 1994</u>						
Depth to Groundwater (Low Tide)	4.87	4.51	9.81	4.91	6.35	
Groundwater Elevation	4.58	4.83	-1.05	4.65	3.16	0.030 ft/ft to the southeast

¹ Depth-to-groundwater measurements were taken during high tide and are expressed in feet below top of casing.

² Depth-to-groundwater measurements were taken during low tide and are expressed in feet below top of casing.

TABLE 2

QUARTERLY GROUNDWATER MONITORING REPORT
LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER

March 30, 1994

Pacific Dry Dock Yard I
Oakland, California

Groundwater Monitoring Well	Sample Date	TPH-G (µg/L)	TPH-D (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TDS (µg/L)	Salinity (µg/L)
MW1	10/14/93	ND ¹	63	ND	ND	ND	ND	8,800,000	8.7
	12/8/93	NA ²	57	NA	NA	NA	NA	NA	NA
	1/18/94	ND	60	1.0	1.4	ND	1.5	1,200,000	1.0
	3/30/94	ND	110	2.5	1.7	0.56	1.9	NA	0.97
MW2	10/14/93	ND	ND	ND	ND	ND	ND	12,000,000	11.0
	1/18/94	ND	ND	ND	ND	ND	ND	570,000	0.46
	3/30/94	ND	ND	ND	1.1	ND	ND	NA	0.29
MW3	10/14/93	ND	840	ND	ND	ND	ND	31,000,000	29.0
	12/8/93	NA	89	NA	NA	NA	NA	NA	NA
	1/18/94	ND	64	ND	ND	ND	ND	28,000,000	27
	3/30/94	ND	ND	ND	0.90	ND	ND	NA	21
MW4	10/14/93	ND	ND	ND	ND	ND	ND	3,600,000	43.4
	1/18/94	ND	ND	ND	ND	ND	ND	3,100,000	2.6
	3/30/94	ND	ND	ND	1.5	ND	1.5	NA	0.10
MW5	10/14/93	ND	ND	ND	ND	ND	ND	2,000,000	2.0
	1/18/94	ND	ND	ND	ND	ND	ND	2,200,000	2.1
	3/30/94	ND	ND	ND	0.87	ND	ND	NA	1.6

¹ ND = Not Detected at or above method reporting limits.

² NA = Not Analyzed

TABLE 3

QUARTERLY GROUNDWATER MONITORING REPORT
LABORATORY ANALYTICAL RESULTS FOR TPH-D IN FILTERED DUPLICATE SAMPLES
FROM MONITORING WELLS MW1 AND MW3

March 30, 1994

Pacific Dry Dock Yard I
Oakland, California

Groundwater Monitoring Well	Sample Date	Total Petroleum Hydrocarbons as Diesel ($\mu\text{g/L}$)
MW1	10/14/93	63
	1/18/94	60
	3/30/94	110
MW1 (Filtered Duplicate)	12/8/93	57
	1/18/94	150
	3/30/94	ND ¹
MW3	10/14/93	840
	1/18/94	64
	3/30/94	ND
MW3 (Filtered Duplicate)	12/8/93	89
	1/18/94	91
	3/30/94	ND

¹ND = Not Detected at or above method reporting limits.

TABLE 4

QUARTERLY GROUNDWATER SAMPLING AND ANALYSIS PROGRAM
 HISTORICAL TREND OF CHEMICAL DATA FOR GROUNDWATER

Pacific Dry Dock Yard I
 Oakland, California

Groundwater Monitoring Well	Sample Date	TPH-G (µg/L)	TPH-D (µg/L)	Total Oil and Grease (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TDS (µg/L)	Salinity (µg/L)
MW1	7/1/93	ND ¹	ND	ND	ND	ND	ND	ND	NA ²	NA
	10/14/93	ND	63	NA	ND	ND	ND	ND	8,800,000	8.7
	12/8/93	NA	57	NA	NA	NA	NA	NA	NA	NA
	1/18/94	ND	60	NA	NA	1.0	1.4	1.5	1,200,000	1.0
	3/30/94	ND	110	NA	2.5	1.7	0.56	1.9	NA	0.97
MW2	7/1/93	ND	ND	ND	ND	ND	ND	ND	NA	NA
	10/14/93	ND	ND	NA	ND	ND	ND	ND	12,000,000	11
	12/8/93	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1/18/94	ND	ND	NA	ND	ND	ND	ND	570,000	0.46
	3/30/94	ND	ND	ND	ND	2.2	ND	ND	NA	0.29
MW3	7/1/93	ND	ND	ND	ND	ND	ND	ND	NA	NA
	10/14/93	ND	840	NA	ND	ND	ND	ND	31,000,000	29
	12/8/93	NA	89	NA	NA	NA	NA	NA	NA	NA
	1/18/94	ND	64	NA	ND	ND	ND	ND	28,000,000	27
	3/30/94	ND	ND	NA	ND	0.90	ND	ND	NA	21
MW4	7/1/93	ND	ND	ND	ND	ND	ND	ND	NA	NA
	10/14/93	ND	ND	NA	ND	ND	ND	ND	3,600,000	3.4
	12/8/93	NA	89	NA	NA	NA	NA	NA	NA	NA
	1/18/94	ND	ND	NA	ND	ND	ND	ND	3,100,000	2.6
	3/30/94	ND	ND	NA	ND	1.5	ND	1.5	NA	0.1
MW5	7/1/93	ND	ND	ND	ND	ND	ND	ND	NA	NA
	10/14/93	ND	ND	NA	ND	ND	ND	ND	2,000,000	2.0
	12/8/93	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1/18/94	ND	ND	NA	ND	ND	ND	ND	2,200,000	2.1
	3/30/94	ND	ND	ND	ND	0.87	ND	ND	NA	1.6

¹ ND = Not Detected at or above method reporting limits.

² NA = Not Analyzed

APPENDIX A

Groundwater Monitoring and Sampling Procedures

1.0 SAMPLING AND DECONTAMINATION PROCEDURES

The decontamination procedures for non-dedicated field equipment and well development/purging equipment are given below. These procedures are followed during all field activities.

1. Non-dedicated well development, purging, and sampling equipment is carefully pre-cleaned prior to each use, as follows:
 - a. Carefully brush off any loose foreign debris with a soft bristle brush.
 - b. Rinse the equipment thoroughly in clean water.
 - c. Wash the equipment in a non-phosphate detergent bath.
 - d. Rinse thoroughly in clean water.
 - e. Rinse with pesticide-grade hexane (if deemed necessary).
 - f. Rinse thoroughly with deionized water.
 - g. Air dry in a dust-free environment.
 - h. *Store in sterile plastic bags or other suitable cover until use.*
2. Clean disposable gloves are worn by all field personnel when handling decontaminated equipment.

2.0 COLLECTION OF SAMPLES

2.1 Groundwater Sampling

Groundwater samples were collected for laboratory analysis using the procedures given below.

1. Open the well and measure the organic vapor concentration with a flame ionization detector (FID) or photoionization detector (PID).

2. Measure the water levels (if any) in the well using a decontaminated measuring device. All measurements must be made to the nearest 0.01 foot, and measured relative to the top of the casing. Record the depth of the water in the field notebook.
3. Inspect the disposal bailer to ensure that the bottom valve assembly is working correctly.
4. Begin purging the well by inserting a bailer into the PVC monitoring well casing and carefully lower it into the well. Take care to avoid agitating and aerating the fluid column in the well.
5. Slowly withdraw the bailer and transfer the water samples to a sampling containers.
6. Measure the temperature, pH, conductivity, and turbidity. Record these and all subsequent measurements in the field notebook.
7. Continue purging the well (a minimum of three well volumes) until the temperature, pH, conductivity, and turbidity have stabilized, or the well is dry.
8. When the water has recovered to 80 percent of the original level, carefully lower a new disposable bailer into the well and recover groundwater samples.
9. Fill the appropriate sample containers by releasing water from the bailer via the bottom emptying device with a minimum of agitation. The most volatile parameters are collected first, proceeding to the least volatile parameters.
10. Place the purge water in a DOT-approved 55-gallon drums.

3.0 ANALYSIS OF SAMPLES

Samples are submitted to a California state-certified laboratory for analysis.

4.0 SAMPLE HANDLING

4.1 Sample Containers, Preservation, and Holding Times

All samples are collected, placed in containers, preserved, and analyzed within the time constraints with applicable local, provincial, and federal procedures. All sample containers are precleaned in accordance with prescribed EPA methods. A non-adhesive tape is placed

around all sample container lids to prevent leaks and to prevent unauthorized tampering with individual samples following collection and prior to the time of analysis.

4.2 Sample Tracking and Management

All samples are tracked using a standard chain-of-custody form. The chain of custody record includes the following information:

1. Sample number
2. Signature of collector
3. Date and time of collection
4. Sample collection location
5. Sample type
6. Signature of persons involved in the chain-of-possession
7. Inclusive dates of possession
8. Analytical parameters
9. Pertinent field observations

The custody record is completed using waterproof ink. Corrections are made by drawing a line through, initialing the error, and then entering the correct information.

Custody of the samples begins at the time of sample collection and are maintained by the sampling team supervisor until samples are relinquished for shipment to the laboratory, or until samples are hand-delivered to the designated laboratory sample custodian. Partial sample sets being accumulated for hand-delivery to the laboratory are stored in coolers with chain-of-custody records affixed.

Each sample shipment is accompanied by a chain-of-custody record identifying its contents. The original record accompanies the shipment and the copy is retained by the sampling team leader. The original (the top copy) is enclosed in a plastic zip-lock bag and secured to the inside of the cooler lid with tape.

APPENDIX B

Monitoring Well Purge Table Sheets

MONITORING WELL PURGE TABLE

Project Number: 1457-027	Site Name: Pacific Dry Dock Yard I
Well Number: MW1	Date(s) Purged: 3/30/94
OVA - Ambient: 0 parts-per-million	Purge Method: Peristaltic pump
OVA - Vault: 0 parts-per-million	Purge Rate: 0.2 gallon/minutes
OVA - Casing: 22 parts-per-million	Date & Time Sampled: 3/30/94 - 1602
Water Level - Initial: 4.87 feet (0930)	Purged & Sampled By: P. Cox
Water Level - Final: 7.98 feet (1513)	Sampling Method: Peristaltic pump
Well Depth: 14.39 feet	Free Product: None
Well Diameter: 2 inch	Sheen: None
Well Casing Volume: 1.5 gallons	Odor: Moderate to mild petroleum odor

Time	Cumulative Purge Water Removed (gallons)	Temperature (Degrees Fahrenheit)	pH	Conductivity (µm/cm)	Turbidity
1121	0.0	69.3	7.13	>20,000	Low
1123	0.5	65.8	7.09	13,700	Low
1126	1.0	64.4	7.15	4,260	Low
1128	1.5	64.1	7.13	4,290	Low
1131	2.0	64.4	7.08	5,760	Low
1136	2.5	64.5	7.08	5,760	Low
1138	3.0	64.1	7.07	4,490	Moderate
1140	3.5	64.2	7.03	6,970	Moderate
1142	4.0	65.1	7.00	12,400	Moderate
1145	4.5	65.6	7.04	19,400	Moderate
1602	Sample	63.3	7.87	2,260	Low

Field Notes: Duplicate sample collected using groundwater sample filter. Initial water level measurements were taken during low tide.

MONITORING WELL PURGE TABLE

Project Number: 1457-027	Site Name: Pacific Dry Dock Yard I
Well Number: MW2	Date(s) Purged: 3/30/94
OVA - Ambient: 0 parts-per-million	Purge Method: Peristaltic pump
OVA - Vault: 0 parts-per-million	Purge Rate: 0.2 gallon/minute
OVA - Casing: 0 parts-per-million	Date & Time Sampled: 3/30/94 - 1625
Water Level - Initial: 4.51 feet (0940)	Purged & Sampled By: P. Cox
Water Level - Final: 5.80 feet (1515)	Sampling Method: Peristaltic pump
Well Depth: 14.20 feet	Free Product: None
Well Diameter: 2 inch	Sheen: None
Well Casing Volume: 1.5 gallons	Odor: Moderate to Low sulfur odor

Time	Cumulative Purge Water Removed (gallons)	Temperature (Degrees Fahrenheit)	pH	Conductivity (µm/cm)	Turbidity
1200	0.0	69.1	8.25	2,320	Low
1202	0.5	66.4	7.56	1,080	Low
1205	1.0	65.5	7.20	725	Low
1207	1.5	64.9	6.94	751	Low
1210	2.0	65.4	6.93	804	Low
1212	2.5	64.6	6.99	819	Low
1215	3.0	65.3	6.94	889	Low
1217	3.5	65.4	6.99	1,110	Low
1220	4.0	65.4	6.92	1,060	Low
1222	4.5	65.4	6.90	1,140	Low
1625	Sample	63.3	8.15	1,150	Low

Field Notes: Initial water level measurements were taken during low tide.

MONITORING WELL PURGE TABLE

Project Number: 1457-027	Site Name: Pacific Dry Dock Yard I
Well Number: MW3	Date(s) Purged: 3/30/94
OVA - Ambient: 0 parts-per-million	Purge Method: Peristaltic pump
OVA - Vault: 0 parts-per-million	Purge Rate: 0.2 gallon/minute
OVA - Casing: 0 parts-per-million	Date & Time Sampled: 3/30/94 - 1637
Water Level - Initial: 9.81 feet (0942)	Purged & Sampled By: P. Cox
Water Level - Final: 5.87 feet (1518)	Sampling Method: Peristaltic pump
Well Depth: 15.14	Free Product: None
Well Diameter: 2 inch	Sheen: None
Well Casing Volume: 0.8 gallon	Odor: None

Time	Cumulative Purge Water Removed (gallons)	Temperature (Degrees Fahrenheit)	pH	Conductivity (µm/cm)	Turbidity
1242	0.0	67.1	6.87	>20,000	Moderate
1244	0.5	65.4	6.94	>20,000	Low
1247	1.0	63.5	7.05	>20,000	Low
1249	1.5	62.8	6.99	>20,000	Low
1252	2.0	62.8	6.99	>20,000	Low
1254	2.5	62.4	6.99	>20,000	Low
1257	3.0	62.6	7.00	>20,000	Low
1637	Sample	60.7	7.71	>20,000	Low

Field Notes: Orange algae in pump water. Duplicate sample collected using groundwater sampling filter. Initial water level measurements were taken at low tide.

MONITORING WELL PURGE TABLE

Project Number: 1457-027			Site Name: Pacific Dry Dock Yard I		
Well Number: MW4			Date(s) Purged: 3/30/94		
OVA - Ambient: 0 parts-per-million			Purge Method: Peristaltic pump		
OVA - Vault: 0 parts-per-million			Purge Rate: 0.2 gallon/minute		
OVA - Casing: 0 parts-per-million			Date & Time Sampled: 3/30/94 - 1547		
Water Level - Initial: 4.91 feet (0938)			Purged & Sampled By: P. Cox		
Water Level - Final: 9.35 feet (1510)			Sampling Method: Peristaltic pump		
Well Depth: 13.25 feet			Free Product: None		
Well Diameter: 2 inch			Sheen: None		
Well Casing Volume: 1.3 gallons			Odor: None		
Time	Cumulative Purge Water Removed (gallons)	Temperature (Degrees Fahrenheit)	pH	Conductivity (µm/cm)	Turbidity
1043	0.0	65.4	7.27	2,500	Low
1045	0.5	64.7	7.15	2,410	Low
1047	1.0	63.9	7.03	2,290	Low
1050	1.5	63.6	7.00	2,340	Low
1052	2.0	63.8	7.07	2,340	Low
1054	2.5	63.4	7.10	2,350	Low
1057	3.0	63.3	7.11	2,400	Low
1059	3.5	63.3	7.11	2,440	Low
1102	4.0	63.4	7.11	2,510	Low
1545	Sample	65.5	7.67	2,570	Low
Field Notes: Initial water level measurements were taken during low tide.					

MONITORING WELL PURGE TABLE

Project Number: 1457-027	Site Name: Pacific Dry Dock Yard I
Well Number: MW5	Date(s) Purged: 3/30/94
OVA - Ambient: 0 parts-per-million	Purge Method: Peristaltic pump
OVA - Vault: 0 parts-per-million	Purge Rate: 0.2 gallon/minute
OVA - Casing: 0 parts-per-million	Date & Time Sampled: 3/30/94 - 1530
Water Level - Initial: 6.35 feet (0935)	Purged & Sampled By: P. Cox
Water Level - Final: 6.37 feet (1506)	Sampling Method: Peristaltic pump
Well Depth: 13.90 feet	Free Product: None
Well Diameter: 2 inch	Sheen: None
Well Casing Volume: 1.2 gallons	Odor: None

Time	Cumulative Purge Water Removed (gallons)	Temperature (Degrees Fahrenheit)	pH	Conductivity (µm/cm)	Turbidity
0954	0.0	66.8	6.95	5,100	Moderate
0927	0.3	65.5	6.88	3,900	Low-mod
0959	1.0	64.9	6.86	3,940	Low-mod
1000	1.5	64.2	6.82	3,960	Low
1008	2.0	63.2	6.81	3,940	Low
1011	2.5	63.8	6.73	3,970	Low
1013	3.0	64.1	6.73	4,020	Low
1015	3.5	69.1	6.75	4,020	Low
1018	4.0	64.0	6.75	4,040	Low
1530	Sample	66.8	7.65	4,440	Low

Field Notes: Initial water level measurements were taken during low tide.

APPENDIX C

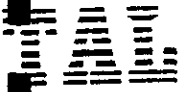
Laboratory Analytical Results and Chain-of-Custody Records for
Groundwater Samples Collected During March 30, 1994
Fourth Quarterly Groundwater Sampling

Trace Analysis Laboratory, Inc.

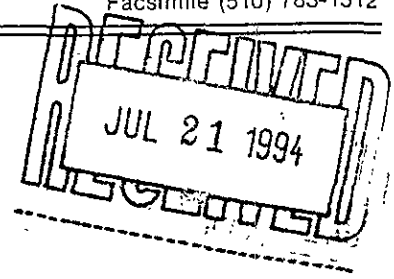
3423 Investment Boulevard, #8 • Hayward, California 94545

COPY

Telephone (510) 783-6960
Facsimile (510) 783-1512



July 14, 1994



Mr. Lawrence Kleinecke
Versar, Inc.
5330 Primrose Drive, Suite 228
Fair Oaks, California 95628

Dear Mr. Kleinecke:

Trace Analysis Laboratory received seven water samples on March 30, 1994 for your Project No. 1457-027, Crowley PDD1 (our custody log number 4254). Five of these samples were analyzed for benzene, toluene, ethylbenzene, and xylene, among other tests. All five of the samples had positive results. Three of the samples were positive for toluene only. One was positive for toluene and xylenes only.

We reviewed these results for errors, with special attention to whether the toluene could have been due to laboratory contamination. Our review indicates that the calibration, quality control samples, and calculations are in order. To evaluate whether the toluene could have been due to laboratory contamination, we reviewed our method blanks and samples from other clients that were analyzed in the same batch. I have attached chromatograms for MB1 (Method Blank 1), MB2, and LW (Lab Water) that immediately preceded the analysis of your samples. These blanks are all nondetectable for toluene. I also have attached a chromatogram for sample 4257, MW-4. This sample was analyzed immediately following samples for your project. Sample 4257, MW-4 is nondetectable for toluene. Based on this data, it does not appear likely that the toluene was introduced during the analysis. Sample 4257, MW-4 was stored in the same refrigerator as the samples from your project, so the sample storage does not seem like a source of the contamination.

If you should have any questions or require additional information, please call me.

Sincerely yours,

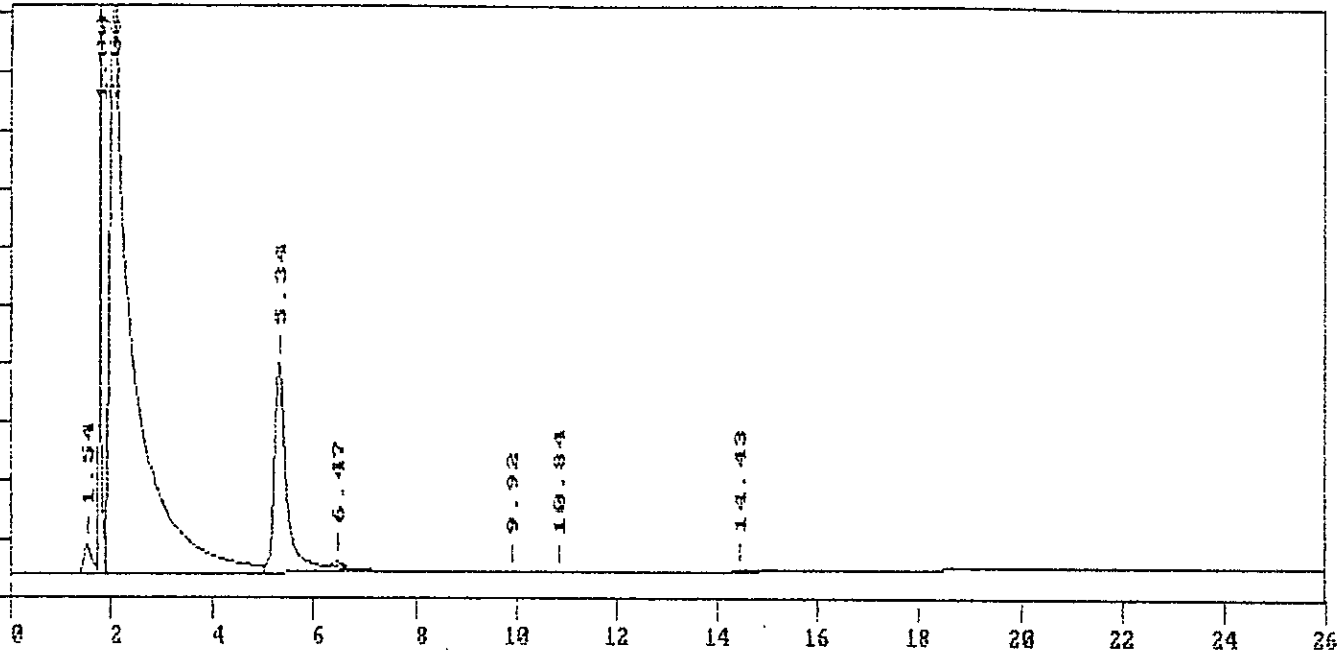
A handwritten signature in black ink, appearing to read 'Louis W. Dupuis'. The signature is written in a cursive, flowing style with a prominent 'L' and 'D'.

Louis W. Dupuis
Quality Assurance/Quality Control Manager

Enclosures

Sample Name=MPI H2O

0.0 to 26.0 min, Low Y=-10.0 High Y=100.0 mv Span=310.0



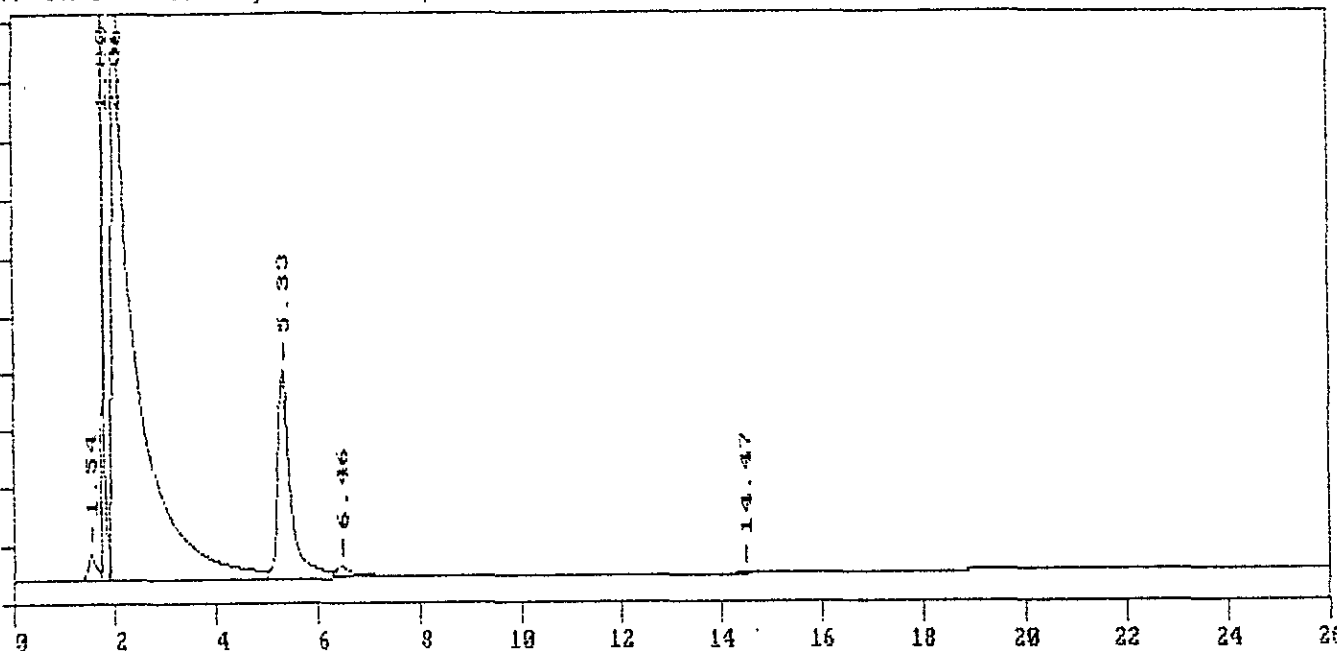
SAMPLE: 3760---PID MPI H2O
 INJ: 25 WEIGHT: 1 AS/PFB CONV: 1600
 ANALYSIS DATE: Apr 3, 1994 05:12:50
 DATA FILE: C:\DIRECT\DATA\10404-31.58R
 METHOD FILE: C:\DIRECT\DATA\NBTEX03.MET
 CALIBRATION: C:\DIRECT\DATA\NBTEX3.CAL
 Method Blank1: Manual Method Blank2: Manual

Time (min)	Peak Area	Area/Height (min)	Amount PPS	AVG. MB AMOUNT	Peak Name	AMOUNT LESS MB
1.514	143759	0.189	0.7891	0.0000		0.7891
1.804	379292	0.044	4.0364	0.0000		4.0364
2.067	9780772	0.515	47.1286	0.0000		47.1286
4.337	2062303	0.716	25.6550	0.0000	TRIFLOROTOLU	25.6550
5.465	50869	0.238	0.2451	0.0000		0.2451
9.919	10666	0.270	0.0780	0.0000	ETHYLBENZENE	0.0780
10.245	11471	0.243	(0.0604)	0.0000	M-XYLENE	0.0604
14.432	16139	0.541	0.0778	0.0000		0.0778

REL. YLINES= 5.036144E-02
 RECOVERY: 103.4476 %

Sample Name=MB2 H2O

0 to 26.0 min. Low Y=-10.0 High Y=300.0 mv Span=310.0



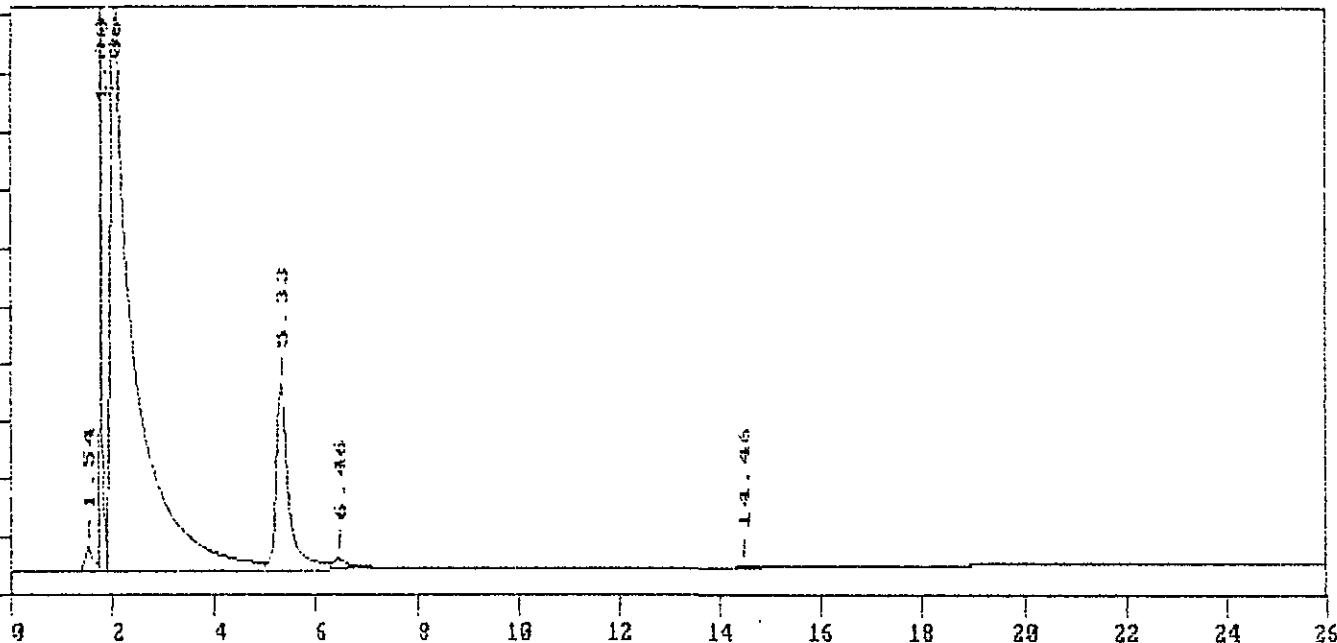
SAMPLE: 3750--PID MB2 H2O
 VOLUME INJ: 25 WEIGHT: 1 AS/PPB CONV: 1600
 ANALYSIS DATE: Apr 5, 1994 06:49:25
 RAW DATA FILE: C:\DIRECT\DATA\0404-31.59R
 METHOD FILE: C:\DIRECT\DATA\LABTEXM3.MET
 CALIBRATION: C:\DIRECT\DATA\LABTEX3.CAL
 Method Blank1: 0404-31.59R Method Blank2: Manual

Ret Time (min)	Peak Area	Area/Height (min)	Amount PPB	AVS, MB AMOUNT	Peak Name	AMOUNT LESS MB
1.041	154841	0.193	0.7461	0.0000		0.7461
1.800	382064	0.043	4.2502	0.0000		4.2502
2.059	9814784	0.527	47.2924	0.0000		47.2924
3.309	1222570	0.292	23.9175	0.0000	TRIFLUROTOLU	23.9175
4.461	232142	0.223	1.1186	0.0000		1.1186
4.465	12005	0.391	0.0578	0.0000		0.0578

TOTAL XYLENES= -3.018072E-01

SUBSTITUTE RECOVERY: 95.44139 %

NAME=LW
 Y to 25.0 min, Low Y=-10.0 High Y=300.0 mv Span=310.0



SAMPLE: 0760--PID LW
 HEIGHT: 1 AS/PPB CONV: 1600
 ANALYSIS DATE: Apr 5, 1994 07:26:01
 DATA FILE: C:\DIRECT\DATA\0404-31.60R
 METHOD FILE: C:\DIRECT\DATA\BTEXLWS.MET
 CALIBRATION: C:\DIRECT\DATA\BTEX3.CAL
 SPIKE: 0404-31.56R SPIKE DUPLICATE: 0404-31.57R
 BLANK1: 0404-31.59R METHOD BLANK2: 0404-31.59R

Ret. Time	Peak Area/Height	Amount	SPIKE	SPIKE	SPIKE DUP	SPIKE DUP	RPD	Mean	AVG.	MDL	MDL		
(min)		PPB	Conc.	Recovery	Conc.	Recovery		Recovery	BLANK (3XSD)	(NOISE/RF)			
1.50	0	0.000	BENZENE	0.00	22.75	0.0%	23.74	0.0%	0.0	0.0%	0.00	0.00	0.02
1.73	97922	0.294	TRIFLOROT	21.49	0.00	-0.0%	0.00	-0.0%	1200	10.7%	0.00	0.00	0.04
1.82	0	0.000	TOLUENE	0.00	24.27	0.0%	25.48	0.0%	0.0	0.0%	0.00	0.00	0.02
1.92	0	0.000	ETHYLBENZ	0.00	24.65	0.0%	25.98	0.0%	0.0	0.0%	0.04	0.17	0.02
2.50	0	0.000	P-XYLENE	0.00	24.80	0.0%	26.05	0.0%	0.0	0.0%	0.00	0.00	0.02
2.84	0	0.000	M-XYLENE	0.00	24.39	0.0%	25.76	0.0%	0.0	0.0%	0.03	0.13	0.02
3.48	0	0.000	O-XYLENE	0.00	25.06	0.0%	26.33	0.0%	0.0	0.0%	0.00	0.00	0.02

DUPLICATE RECOVERY: 86.64167 %

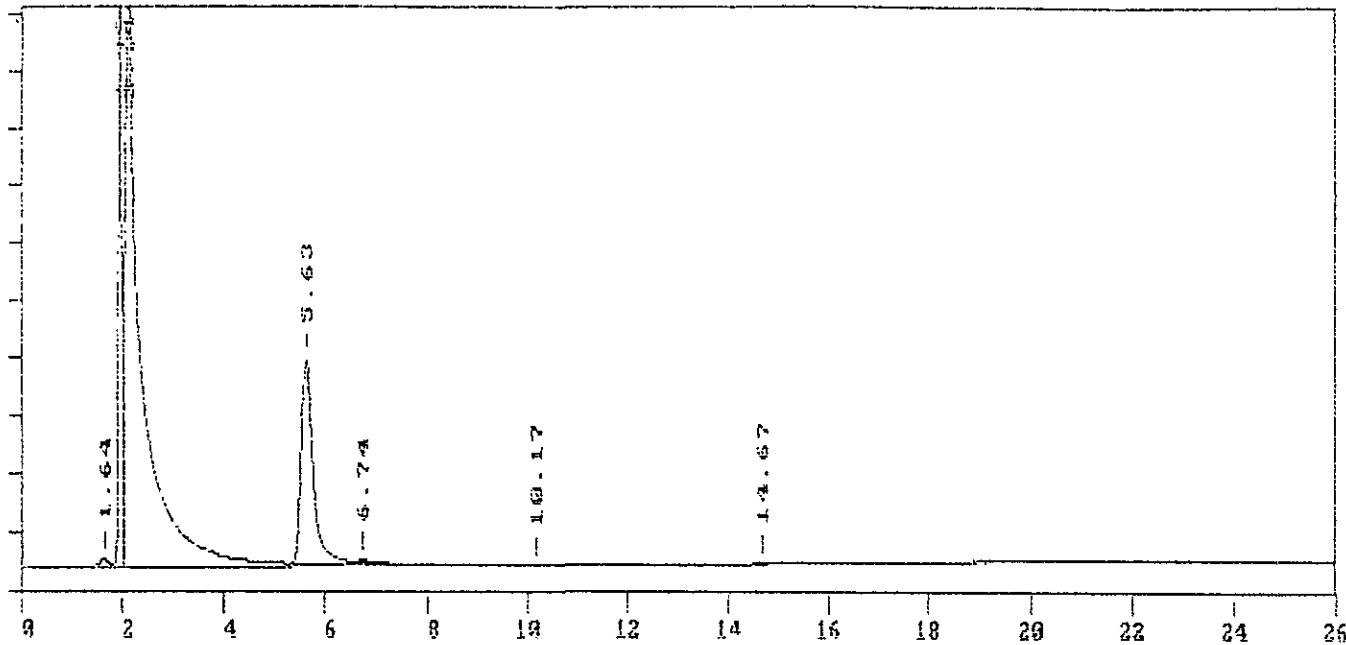
avg Toluene recovery: 104%

RPD: 4.9%

std MDLs

MB = ND

Temp=1254 MV
 25.0 min. Low Y=-10.0 High Y=200.0 mv Span=310.0



GC/MS FILE: 3760--P1D ~~4257mw4~~ 4257mw4
 TIME INT: 25 WEIGHT: 1 AS/PPB CONV: 1.600
 ANALYSIS DATE: Apr 5, 1994 11:04:06
 DATA FILE: C:\DIRECT\DATA\0404-31.55R
 METHOD FILE: C:\DIRECT\DATA\1\BTEXM3.MET
 CALIBRATION: C:\DIRECT\DATA\1\BTEX3.CAL
 Method Blank 1: 0404-31.55R Method Blank 2: 0404-31.55R

Ret Time (min)	Peak Area	Area/Height (m.u.)	Amount PPB	AMOUNT (PPB)	Peak Name	AMOUNT (LESS MB)
1.640	54938	0.347	0.5647	0.0000		0.5647
1.850	1473468	0.075	7.1965	0.0000		7.1965
2.133	2761840	0.790	37.5456	0.0000	B = ND	37.5456
3.731	1912453	0.501	24.1665	0.0000	TRIFLOROETHYLENE	24.1665
5.730	14540	0.174	0.0715	0.0000	T = ND	0.0715
10.140	16050	0.314	0.1218	0.0590	ETHYLBENZENE	0.0628 = ND
14.67	13534	0.334	0.0770	0.0000		0.0770

INTERNAL STANDARDS = -3.01807RE-02 = ND
 RECOVERY: 97.44485 %

STD MDL 70

Trace Analysis Laboratory, Inc.

3423 Investment Boulevard, #8 • Hayward, California 94545

Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

FILE

TOE
APR 14 1994
11 11 11 11 11 11

April 8, 1994

Mr. Lawrence Kleinecke
Versar, Inc.
5330 Primrose Drive, Suite 228
Fair Oaks, California 95628

Dear Mr. Kleinecke:

Trace Analysis Laboratory received seven water samples on March 31, 1994 for your Project No. 1457-027, Crowley PDD1 (our custody log number 4254).

These samples were analyzed for Total Petroleum Hydrocarbons as Diesel and Gasoline, Benzene, Toluene, Ethylbenzene, Xylenes, and Salinity. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours, _____

Scott T. Ferriman

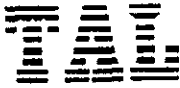
Scott T. Ferriman
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.

3423 Investment Boulevard, #8 • Hayward, California 94545

Telephone (510) 783-6960
Facsimile (510) 783-1512



LOG NUMBER: 4254
DATE SAMPLED: 03/30/94
DATE RECEIVED: 03/30/94
DATE EXTRACTED: 04/01/94
DATE ANALYZED: 04/06/94
DATE REPORTED: 04/08/94

CUSTOMER: Versar, Inc.
REQUESTER: Lawrence Kleinecke
PROJECT: No. 1457-027, Crowley PDD1

Sample Type: Water

Method and Constituent:	Units	MW-1		MW-1 Filter Duplicate		MW-2	
		Concentration	Reporting Limit	Concentration	Reporting Limit	Concentration	Reporting Limit
DHS Method: Total Petroleum Hydrocarbons as Diesel	ug/l	110	50	ND	50	ND	50

Method and Constituent:	Units	MW-3		MW-3 Filter Duplicate		MW-4	
		Concentration	Reporting Limit	Concentration	Reporting Limit	Concentration	Reporting Limit
DHS Method: Total Petroleum Hydrocarbons as Diesel	ug/l	ND	50	ND	50	ND	50

Method and Constituent:	Units	MW-5		Method Blank	
		Concentration	Reporting Limit	Concentration	Reporting Limit
DHS Method: Total Petroleum Hydrocarbons as Diesel	ug/l	ND	50	ND	50

QC Summary:

% Recovery: 103
% RPD: 12

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NUMBER: 4254
 DATE SAMPLED: 03/30/94
 DATE RECEIVED: 03/31/94
 DATE ANALYZED: 04/05/94
 DATE REPORTED: 04/08/94
 PAGE: Two

Sample Type: Water

Method and Constituent:	Units	MW-1		MW-2		MW-3	
		Concen- tration	Reporting Limit	Concen- tration	Reporting Limit	Concen- tration	Reporting Limit

DHS Method:

Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50	ND	50	ND	50
--	------	----	----	----	----	----	----

Modified EPA Method 8020 for:

Benzene	ug/l	2.5	0.50	ND	0.50	ND	0.50
Toluene	ug/l	1.7	0.50	1.1	0.50	0.90	0.50
Ethylbenzene	ug/l	0.56	0.50	ND	0.50	ND	0.50
Xylenes	ug/l	1.9	1.5	ND	1.5	ND	1.5

Method and
Constituent:

Units	MW-4		MW-5		Method Blank	
	Concen- tration	Reporting Limit	Concen- tration	Reporting Limit	Concen- tration	Reporting Limit

DHS Method:

Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50	ND	50	ND	50
--	------	----	----	----	----	----	----

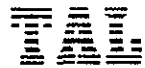
Modified EPA Method 8020 for:

Benzene	ug/l	ND	0.50	ND	0.50	ND	0.50
Toluene	ug/l	1.5	0.50	0.87	0.50	ND	0.50
Ethylbenzene	ug/l	ND	0.50	ND	0.50	ND	0.50
Xylenes	ug/l	1.5	1.5	ND	1.5	ND	1.5

QC Summary:

% Recovery: 104
 % RPD: 4.9

Concentrations reported as ND were not detected at or above the reporting limit.



LOG NUMBER: 4254
DATE SAMPLED: 03/30/94
DATE RECEIVED: 03/31/94
DATE ANALYZED: 03/31/94
DATE REPORTED: 04/08/94
PAGE: Three

Sample Type: Water

Method and
Constituent:

EPA Method 120.1
Salinity

MW-1		MW-2		MW-3	
Concen- tration	Reporting Limit	Concen- tration	Reporting Limit	Concen- tration	Reporting Limit
0.97	0.010	0.29	0.010	21	0.010

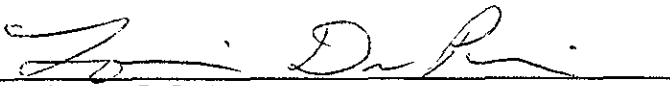
Method and
Constituent:

EPA Method 120.1
Salinity

MW-4		MW-5	
Concen- tration	Reporting Limit	Concen- tration	Reporting Limit
0.10	0.010	1.6	0.010

QC Summary:

% RPD: 1.1


Louis W. DuPuis
Quality Assurance/Quality Control Manager

PROJECT NO.		PROJECT NAME				PARAMETERS										INDUSTRIAL HYGIENE SAMPLE				
1457-027		Crowley				NO. OF CONTAINERS TPH-D TPH-G/IGTEX Salinity										Y				
																N				
SAMPLERS: (Signature)					(Printed)					REMARKS										
Philip M. Cox					Philip M. Cox															
FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION															
MW-1	3/30/94	1602		X	MW-1	4	X	X	X											
MW-1F		1602		X	↓	1	X													
MW-2		1625		X	MW2	4	X	X	X											
MW-3		1637		X	MW3	4	X	X	X											
MW-3F		1637		X	↓	1	X													
MW-4		1547		X	MW-4	4	X	X	X											
MW-5		1530		X	MW-5	4	X	X	X											

Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)	
Philip M. Cox		3/31/94 10:23									
(Printed)				(Printed)		(Printed)				(Printed)	
Philip M. Cox											
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks			
		3/31/94 10:23 AM		L. Jean Nordian							
(Printed)				(Printed)							