CROWLEY MARINE SERVICES, INC.

95 OCT 13 PM 2:36

ENVIRONMENTAL PROTECTION

October 10, 1995

Mr. Barney Chan
Alameda County Health Care Service Agency
Department of Environmental Health
1131 Harbor Bay Parkway, #260
Alameda, California 94502-6577

Reference: **Groundwater Monitoring Report for the former Pacific Dry Dock and Repair Company Yard II Facility, Oakland, California**

Dear Mr. Chan:

Enclosed for your review is the groundwater monitoring report for the above referenced property at 321 Embarcadero, in Oakland.

Please contact me at (206) 443-8042 with any questions or comments that you may have regarding this matter.

Sincerely,

Stephen Wilson
Manager, Environmental Compliance

Encl.

cc: PDDII Correspondence w/o encl.
PDDII Reports w/encl.
Dan Schoenholtz w/encl.
Beth Hamilton w/o encl.
Michael Holly

Post Office Box 2287, Seattle, Washington 98111-2287 - (206) 443-8100 - Telex 6838207 - Fax (206) 443-8072
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4300 B Street, Suite 507, Anchorage, Alaska 99503-5997 - (907) 563-1114 - Telex 6732564 - Fax (907) 762-3330
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Versar INC.

GROUNDWATER MONITORING REPORT - JUNE 21, 1995
PACIFIC DRY DOCK AND REPAIR COMPANY YARD II FACILITY
OAKLAND, CALIFORNIA

Prepared for:

CROWLEY MARINE SERVICES, INC.
2401 Fourth Avenue
P.O. Box 2287
Seattle, Washington 98111

Prepared by:

VERSAR, INC.
7844 Madison Avenue, Suite 167
Fair Oaks, California 95628

Versar Project No. 2463-103

October 2, 1995

PROJECT SUMMARY

On June 21, 1995, Versar, Inc. (Versar) conducted the second scheduled round of groundwater monitoring and sampling at the former Pacific Dry Dock and Repair Company Yard II facility located at 321 Embarcadero in Oakland, California.

Groundwater monitoring is being conducted as part of the site investigation activities. Each sampling event includes: (1) measurement of groundwater levels from all three monitoring wells; (2) collection and analysis of groundwater samples for total petroleum hydrocarbons as gasoline; total petroleum hydrocarbons as diesel; benzene, toluene, ethylbenzene, and xylenes; and halogenated volatile organic compounds from monitoring wells MW1, MW2 and MW3; (3) calculation of the hydraulic gradient; and (4) production of a report summarizing the results of the sampling event. Mr. Philip Hoffmeister, Geologist, prepared this report under the guidance of Mr. Michael Sellens, Registered Geologist, and Mr. Michael Holley, Professional Engineer.

The following conclusions summarize the investigation:

- On June 21, 1995, the calculated groundwater gradient was 0.022 foot/foot in a north-northwest direction. The data used to calculate this gradient were collected during an outgoing tide.

- Total petroleum hydrocarbons as diesel were detected in samples collected from groundwater monitoring wells MW1, MW2 and MW3.

- Total petroleum hydrocarbons as gasoline was detected in the sample collected from groundwater monitoring well MW2.

- Benzene, toluene, ethylbenzene, and xylenes were detected in a sample collected from groundwater monitoring well MW2. Ethylbenzene and xylenes were detected in a sample collected from groundwater monitoring well MW1.

- Chlorobenzene, 1,2-Dichloroethene, 1,3-Dichlorobenzene, and 1,4-Dichlorobenzene, were detected in a sample collected from groundwater monitoring well MW2.

- Chloroform marginally above the method reporting limit was detected in a sample collected from groundwater monitoring well MW1.

Prepared by:

Philip Hoffmeister
Geologist

Approved for Release:

P.P. Michael D. Holley, P.E.
Engineering Program Manager

Michael P. Sellens, R.G. 4714
Manager, Geoscience Department

REGISTERED GEOLOGIST
Michael P. Sellens
No. 4714
STATE OF CALIFORNIA

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1.0 INTRODUCTION

Crowley Marine Services, Inc. (Crowley) retained Versar, Inc. (Versar) to conduct an environmental investigation, including a program of groundwater monitoring, at the former Pacific Dry Dock and Repair Company Yard II Facility (the Site), located at 321 Embarcadero in Oakland, California (Figure 1). This report describes the procedures and findings of the second round of monitoring and groundwater sampling, which was conducted on June 21, 1995. 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 1.5 acres of shoreline property between the Embarcadero and Oakland Inner Harbor. The property is bounded by Oakland Inner Harbor on the south, the Lake Merritt Channel on the west, the Embarcadero on the north side, and industrial property on the east side (Figure 2).

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 similar to those found throughout the Coast Ranges. Overlying the bedrock are Quaternary marine and nonmarine alluvial sediments consisting of clays and silts.

The Site is nearly level at an elevation of between 10 and 15 feet above lower low water (National Geodetic Vertical Datum of 1929). Versar has characterized the shallow soils as sand, silt, and clay fill material extending from the surface to the bay muds. The depth of the bay muds is between 15 feet and 20 feet below ground surface (bgs). The bay muds consist of silty clays and clays with shell fragments, and thin water-saturated layers of sands or gravels.

1.3 Groundwater Monitoring Program

The primary purpose of this program is to maintain regularly scheduled groundwater monitoring at the Site. The general objectives of the second sampling event were to:

- measure groundwater levels in monitoring wells MW1, MW2, and MW3 and determine the local hydraulic gradient;
- purge and collect groundwater samples from monitoring wells MW1, MW2 and MW3;
- submit the groundwater samples to a certified laboratory for analysis for TPH-G, BTEX, TPH-D, and HVOCs; and
- prepare this groundwater monitoring report.

On June 21, 1995, Versar measured the depth to groundwater between 3.44 and 4.63 bgs. Calculations for the June 21 event indicate a groundwater gradient of 0.022 foot per foot (ft/ft) in a north northwest direction. The impact of tidal fluctuations on gradient calculations has not yet been determined. Figures 3 shows the groundwater gradient calculated from the June 21 data. Appendix A includes the historical groundwater gradient maps.

1.2 Site History

The first recorded owner of the Site property was James T. Stratton who secured a patent to the Tidelands of Brooklyn Basin in October, 1889. In May 1911, the City of Oakland voided Mr. Stratton's property rights, and assumed ownership of the property. Approximately one year later in June 1911, General Engineering and Dry Dock, Co. (GEDD) obtained a lease and sublet the Site to Hanlon Dry Dock and Shipbuilding Company (Hanlon). This lease continued until December 1939. In October 1942, following the termination of the lease agreement with GEDD, the United States of America assumed ownership of the property. In January 1948, the property was returned to the City of Oakland and the Port of Oakland was created.

Crowley has been at the Site since approximately 1948. In the past, while repairing and refurbishing seagoing vessels, Crowley used products containing regulated materials and generated various regulated and nonregulated wastes. These products and waste materials include sand-blasting materials, oil-based paints, solvents, acids, caustic agents, oils, and motor fuels.

A summary of all environmental activities conducted at the Site, has been presented in the correspondence from Keiley, Enea, Piunti & Hamilton, dated July 31, 1995, to the Alameda Health Care Agency.

2.0 SAMPLING ACTIVITIES

The second round of groundwater monitoring and sampling at the Site was conducted on June 21, 1995. The investigation included measurement of the groundwater levels and the collection of groundwater samples from the three monitoring wells.

On June 21, 1995, prior to conducting any groundwater sampling, the depth to groundwater was measured in each monitoring well. Groundwater was present at depths of 3.44 feet bgs (MW1), 4.44 feet bgs (MW2), and 4.63 feet bgs (MW3). These depths were converted to elevations using data from the survey and were used to calculate the hydraulic gradient. The gradient on June 21, 1995 was 0.022 ft/ft in a north-northwest direction, as shown in Figure 3. The groundwater level data for the second round are listed in Table 1. Historical groundwater level measurements are included as Figure 4.

After depth to groundwater in each monitoring well was measured, the monitoring well were purged following Versar's standard procedures, outlined in Appendix B. Data collected during purging included (1) the initial and final 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 C.

Groundwater samples were collected from each monitoring well using a dedicated bailer. The samples for HVOCs, 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 amber glass containers. Sampling containers were labeled with the date collected and a unique sample identification and stored at approximately 4^{0} C in an insulated cooler. All groundwater samples and a Versar chain of custody document were picked up by a representative from Trace on June 21, 1995. The samples were prepared following U.S. 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".

3.0 LABORATORY ANALYTICAL RESULTS

During the June 21, 1995 sampling event, three groundwater samples were collected and submitted for laboratory analysis for HVOCs, TPH-G, TPH-D, and BTEX. Analysis for HVOCs was performed following EPA Method 601. Analysis for TPH-G and TPH-D was performed following the California Department of Health Services method. Analysis for BTEX was performed following the modified EPA Method 8020. Analytical results of groundwater samples are summarized in Table 2 and shown in Figure 5. A copy of the laboratory analytical report and chain-of-custody record from the sampling event is included as Appendix D. The historical groundwater analytical results are summarized in Table 4.

Trace Analysis Laboratory reported that the groundwater samples collected on June 21, 1995, from monitoring wells MW1 and MW3 did not contain TPH-G at or above the method reporting limits. The groundwater sample from MW2 contained 2,300 micrograms per liter (µg/L) of TPH-G, 65 µg/L of benzene, 0.74 µg/L of toluene, 1.3 µg/L of ethylbenzene and 810 µg/L of total xylenes. Ethylbenzene and xylenes were detected in the groundwater sample collected from MW1 at concentrations of 1.0 µg/L and 5.3 µg/L, respectively. BTEX was not detected in the sample collected from monitoring well MW3. TPH-D was detected in the groundwater samples collected from MW1, MW2 and MW3 at concentrations of 160, 3,300, and 140 µg/L, respectively. Chlorobenzene was detected in the sample collected from MW2 at a concentration of 290 µg/L. A first time detection of 1,2-Dichloroethene, 1,3-Dichlorobenzene, and 1,4-Dichlorobenzene was reported in the groundwater sample collected from MW2 at concentrations of 1.6 µg/L, 11 µg/L, and 35 µg/L, respectively. Also, chloroform was detected in the groundwater sample collected from MW1 at a concentration of 0.73 µg/L for the first time. The groundwater sample collected from MW3 did not contain HVOC's at or above the method reporting limits.

4.0 FUTURE ACTIVITIES

Because hydrocarbon and halogenated volatile organic compounds have been identified in groundwater samples collected during the first and second sampling event, additional groundwater monitoring will be conducted. The next sampling event is scheduled for September 1995.

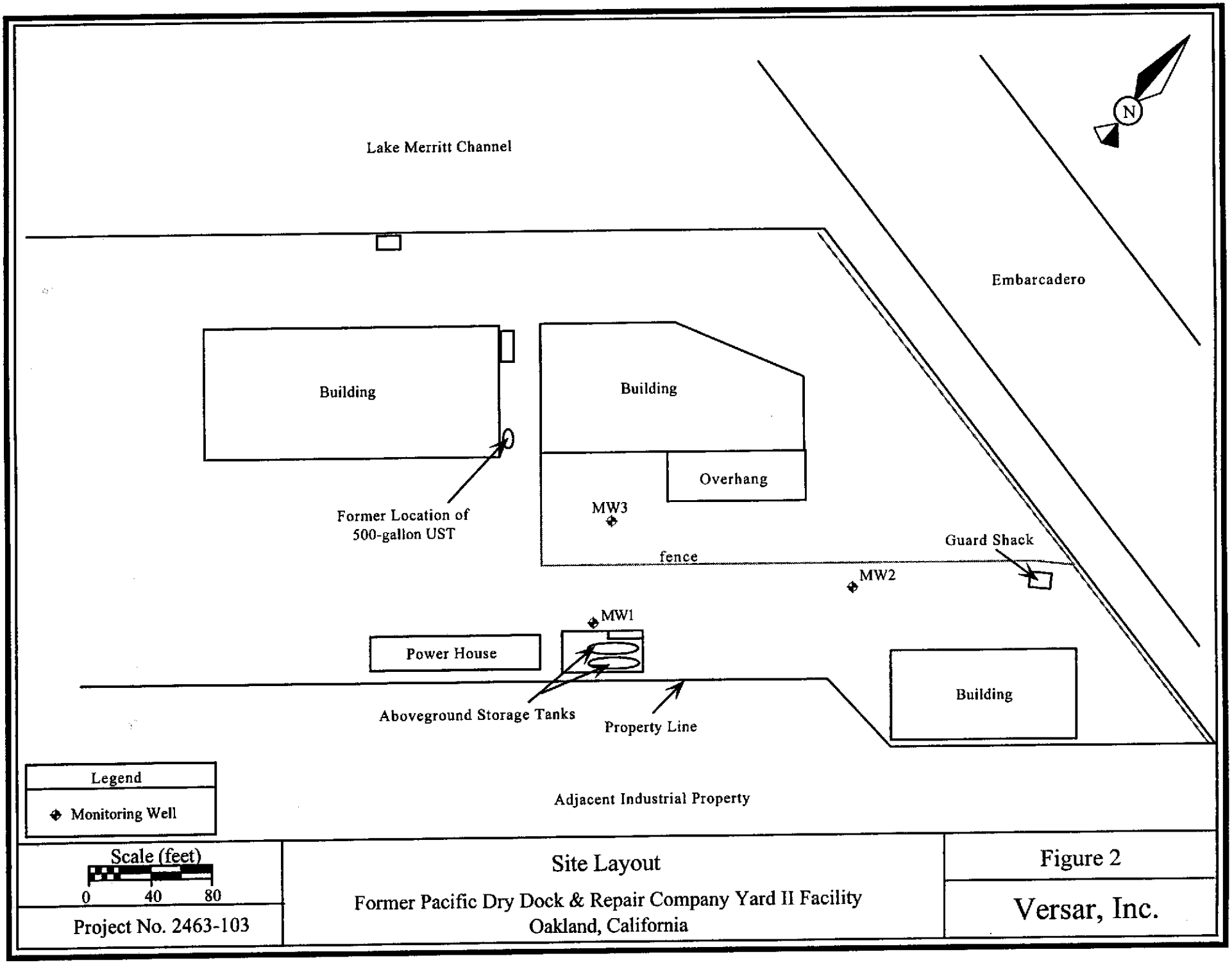
5.0 REFERENCES

Law Offices of Keiley, Enea, Piunti & Hamilton. Status of Subsurface Investigation at Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California, July 31, 1995.

Versar, Inc. Fair Oaks, California. May 10, 1995, Groundwater Monitoring Well Installation and Monitoring Report-March 13, 1995, Former Pacific Dry Dock and Repair Company Yard II Facility, Oakland, California.

SOURCE: USGS TOPO 1959

Scale (miles) 0 0.25 0.50	Site Location	Figure 1
Project No. 2463-103	Former Pacific Dry Dock & Repair Company Yard II Facility Oakland, California	Versar, Inc.



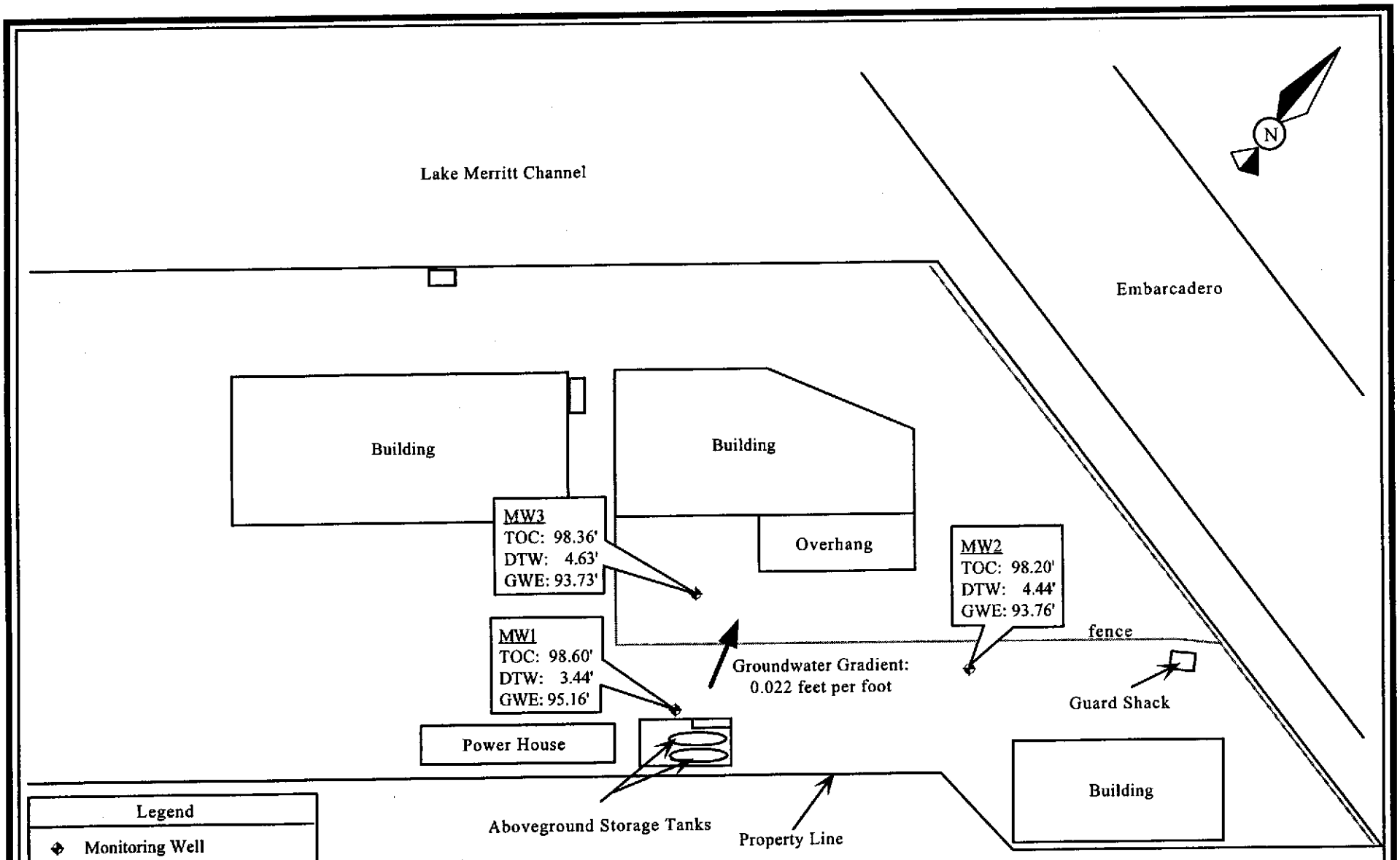
Project No. 2463-103

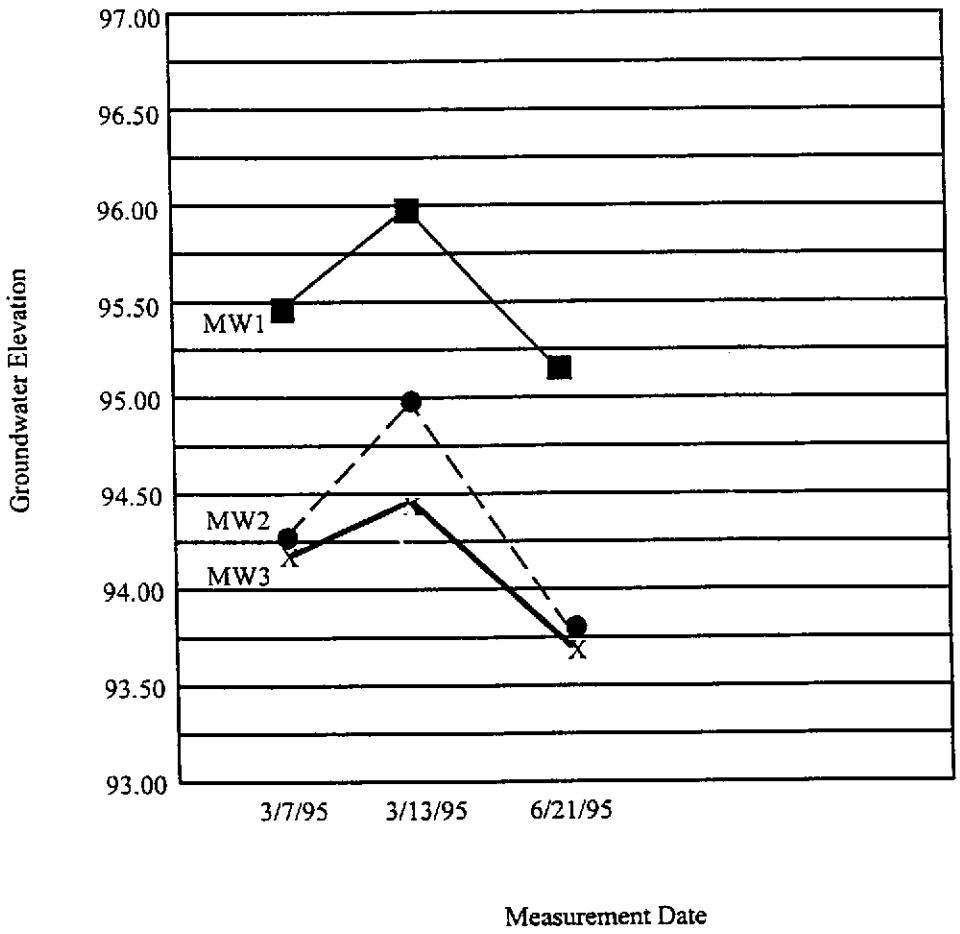
Site Layout

Former Pacific Dry Dock & Repair Company Yard II Facility
Oakland, California

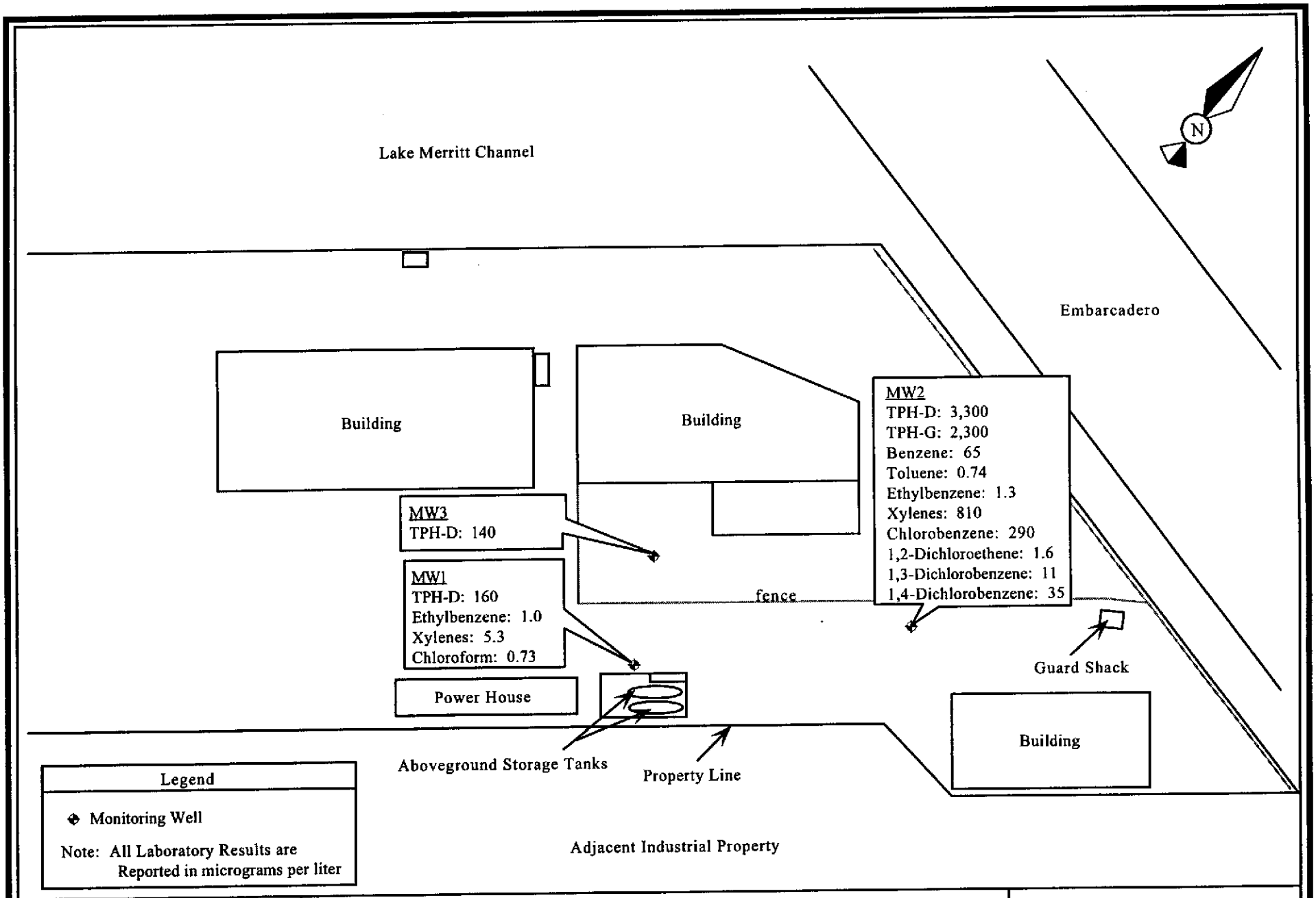
Figure 2

Versar, Inc.


Lake Merritt Channel
N
Embarcadero
Building
Building
Overhang
MW3
TOC: 98.36'
DTW: 4.63'
GWE: 93.73'
MW2
TOC: 98.20'
DTW: 4.44'
GWE: 93.76'
MW1
TOC: 98.60'
DTW: 3.44'
GWE: 95.16'
fence
Groundwater Gradient:
0.022 feet per foot
Guard Shack
Power House
Building
Aboveground Storage Tanks
Property Line
Adjacent Industrial Property
Legend
Monitoring Well
TOC Top of Casing elevation
DTW Depth to Groundwater in feet
GWE Groundwater Elevation
Note: Top of Casing and Groundwater Elevations are in feet, relative to a temporary benchmark elevation of 100.00 feet.
Scale (feet)
0 40 80
Project No. 2463-103
Calculated Groundwater Gradient, June 21, 1995
Former Pacific Dry Dock & Repair Company Yard II Facility
Oakland, California
Figure 3
Versar, Inc.



Vertical Scale (feet) 0 0.50 1.00	Groundwater Measurements March 7, 1995, through June 21, 1995	Figure 4
Project No. 2463-103	Former Pacific Dry Dock & Repair Company Yard II Facility Oakland, California	Versar, Inc.



Project No. 2463-103

Laboratory Analytical Results for Groundwater
Samples Collected on June 21, 1995
Former Pacific Dry Dock & Repair Company Yard II Facility
Oakland, California

Figure 5

Versar, Inc.

TABLE 1

GROUNDWATER MONITORING REPORT
MONITORING WELL GROUNDWATER LEVELS

June 21, 1995

Former Pacific Dry Dock and Repair Company Yard II Facility
Oakland, California

	MW1	MW2	MW3	Hydraulic Gradient (feet/foot)
Reference Casing Elevation (feet)	98.60	98.20	98.36	----
March 7, 1995				
Depth to Groundwater[1]	3.15	3.93	4.12	0.015 ft/ft
Groundwater Elevation[2]	95.45	94.27	94.24	to the northwest
March 13, 1995				
Depth to Groundwater[1]	2.62	3.23	3.96	0.019 ft/ft
Groundwater Elevation	95.98	94.97	94.40	to the northwest
June 21, 1995				
Depth to Groundwater[1]	3.44	4.44	4.63	0.022 ft/ft
Groundwater Elevation	95.16	93.76	93.73	to the north-northwest

[1] Depth-to-groundwater measurements are expressed in feet below top of casing.
[2] Groundwater elevations are in feet relative to a temporary benchmark elevation of 100.00 feet.

TABLE 2

GROUNDWATER MONITORING REPORT
LABORATORY ANALYTICAL RESULTS FOR TPH-D, TPH-G AND BTEX
IN GROUNDWATER SAMPLES

June 21, 1995

Former Pacific Dry Dock and Repair Company Yard II Facility
Oakland, California

Groundwater Monitoring Well	TPH-D (µg/L)[1]	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
MW1	160	ND	ND	ND	1.0	5.3
MW2	3,300	2,300	65	0.74	1.3	810
MW3	140	ND	ND	ND	ND	ND

[1] µg/L = micrograms per liter
[2] ND = Not Detected at or above method reporting limits.

TABLE 3

GROUNDWATER MONITORING REPORT
LABORATORY ANALYTICAL RESULTS FOR HVOC'S
ON GROUNDWATER SAMPLES

June 21, 1995

Former Pacific Dry Dock and Repair Company Yard II Facility
Oakland, California

Groundwater Monitoring Well	Chlorobenzene (µg/L)[1]	Chloroform (µg/L)	1,2-Dichloroethene (µg/L)	1,3-Dichlorobenzene (µg/L)	1,4-Dichlorobenzene (µg/L)
MW1	ND[2]	0.73	ND	ND	ND
MW2	290	ND	1.6	11	35
MW3	ND	ND	ND	ND	ND

[1] µg/L = micrograms per liter
[2] ND = Not Detected at or above method reporting limits.

TABLE 4

GROUNDWATER MONITORING REPORT
HISTORICAL GROUNDWATER ANAYLTICAL RESULTS

June 21, 1995

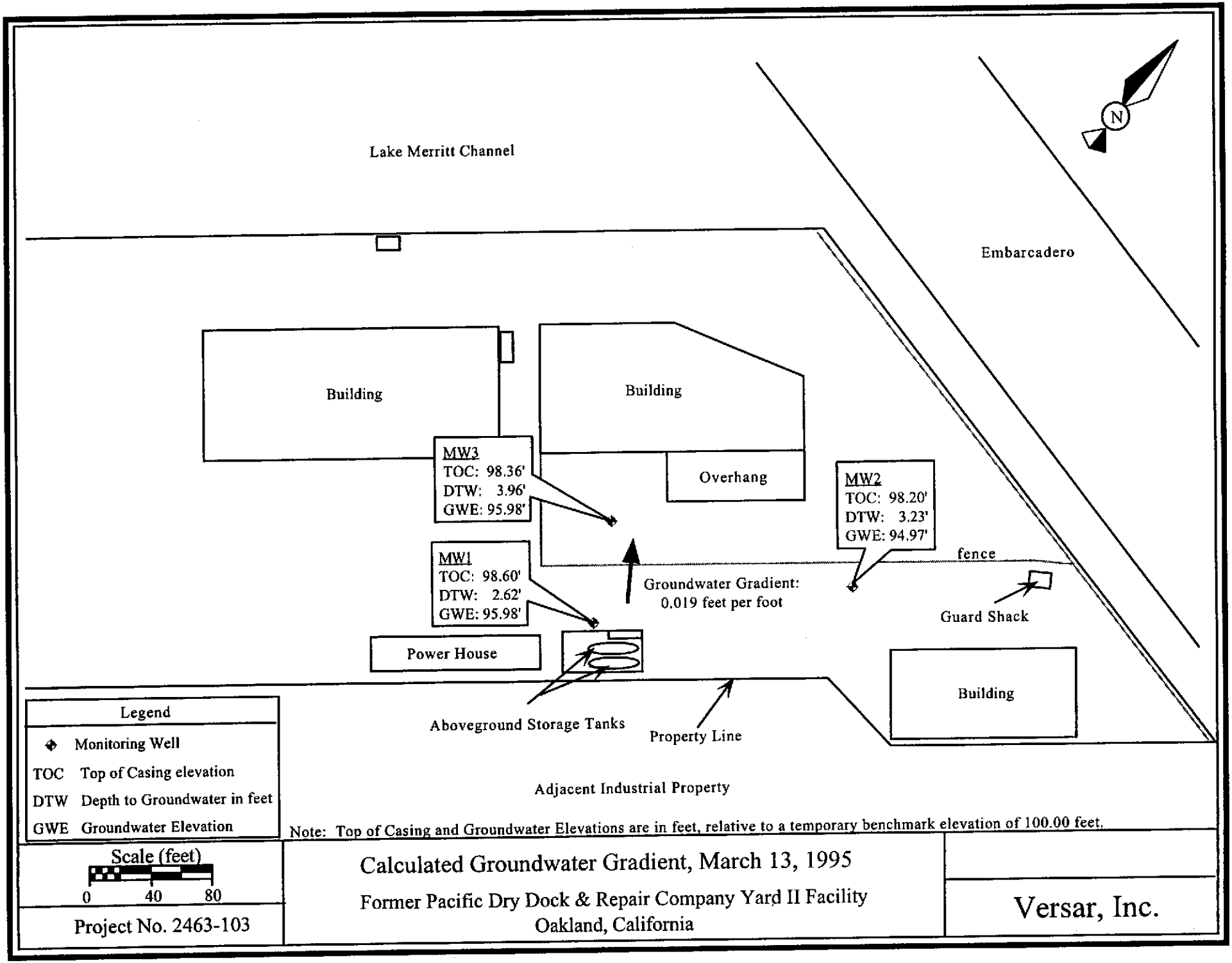
Former Pacific Dry Dock and Repair Company Yard II Facility
Oakland, California

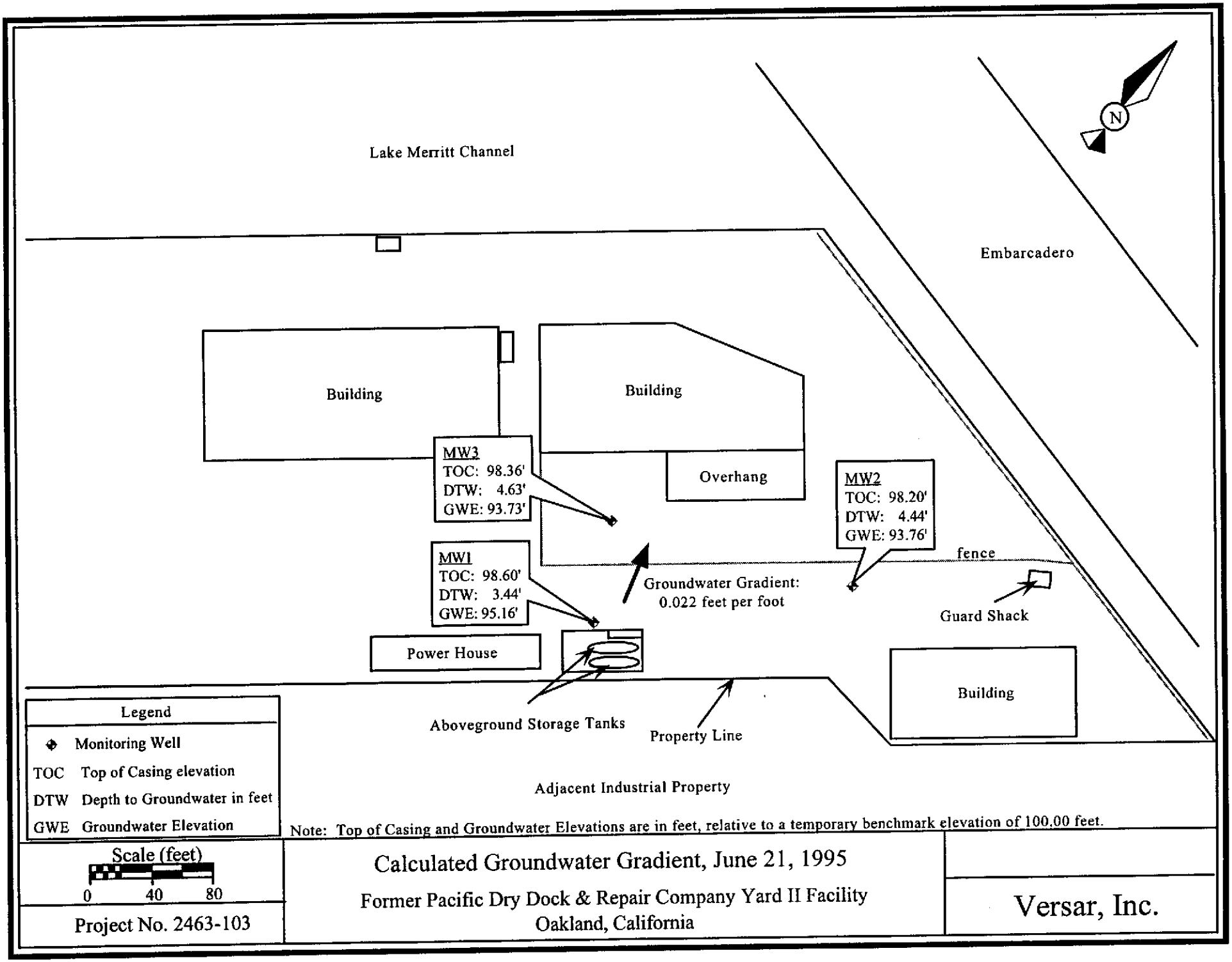
Groundwater Sample Location and Date	TPH-D (µg/L)[1]	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Chlorobenzene (µg/L)
MW1							
3/13/95	220	ND[2]	ND	ND	ND	ND	4.6
MW2							
3/13/95	2,500	1,600	77	ND	ND	850	790
MW3							
3/13/95	ND	ND	ND	ND	ND	ND	0.51

[1] µg/L = micrograms per liter
[2] ND = Not Detected at or above method reporting limits.

APPENDIX A

Groundwater Gradient Maps from
Previous Groundwater Monitoring Events


Lake Merritt Channel
N
Embarcadero
Building
Building
Overhang
MW3
TOC: 98.36'
DTW: 3.96'
GWE: 95.98'
MW2
TOC: 98.20'
DTW: 3.23'
GWE: 94.97'
fence
MW1
TOC: 98.60'
DTW: 2.62'
GWE: 95.98'
Groundwater Gradient:
0.019 feet per foot
Guard Shack
Power House
Building
Aboveground Storage Tanks
Property Line
Adjacent Industrial Property
Legend
Monitoring Well
TOC Top of Casing elevation
DTW Depth to Groundwater in feet
GWE Groundwater Elevation
Note: Top of Casing and Groundwater Elevations are in feet, relative to a temporary benchmark elevation of 100.00 feet.
Scale (feet)
0 40 80
Project No. 2463-103
Calculated Groundwater Gradient, March 13, 1995
Former Pacific Dry Dock & Repair Company Yard II Facility
Oakland, California
Versar, Inc.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Project No. 2463-103
Calculated Groundwater Gradient, June 21, 1995
Former Pacific Dry Dock & Repair Company Yard II Facility
Oakland, California
Versar, Inc.

APPENDIX B

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 dectector (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 C

Monitoring Well Purge Table Sheets

MONITORING WELL PURGE TABLE

Project Number: 2463-103	**Site Name:** Former Pacific Dry Dock and Repair Company Yard II Facility
Well Number: MW1	**Date(s) Purged:** 6/21/95
OVA - Ambient: 0.1 ppm	**Purge Method:** Dedicated bailer
OVA - Vault: 0.0 ppm	**Purge Rate:** 0.71 gallon/min
OVA - Casing: 0.9 ppm	**Date & Time Sampled:** 6/21/95 (1150)
Water Level - Initial: 3.44 feet	**Purged & Sampled By:** P. Hoffmeister
Water Level - Final: 3.51 feet	**Sampling Method:** Dedicated bailer
Well Depth: 14.76 feet	**Free Product:** None
Well Diameter: 4 inches	**Sheen:** None
Well Casing Volume: 7.2 gallons	**Odor:** None

Time	Purge Water Removed (gallons)	Temperature (degrees Fahrenheit)	pH	Electrical Conductivity (umhos/cm)	Turbidity
1105	0.5	72.2	6.23	328	Clear
1109	2.5	70.1	5.94	456	Clear
1114	5.0	68.5	5.70	551	Low
1120	7.5	68.1	5.73	533	Low
1124	10.0	68.2	5.74	542	Low
1128	12.5	67.5	5.76	526	Low
1131	15.0	67.5	5.77	585	Low
1134	17.5	67.9	5.82	555	Low
1137	20.0	68.1	5.88	587	Low
1139	22.5	68.0	5.87	593	Low
1140	25.0	68.1	582	597	Clear
1150	Sample	70.1	6.09	583	Clear

Field Notes:

MONITORING WELL PURGE TABLE

Project Number: 2463-103	**Site Name:** Former Pacific Dry Dock and Repair Company Yard II Facility
Well Number: MW2	**Date(s) Purged:** 6/21/95
OVA - Ambient: 0.1 ppm	**Purge Method:** Dedicated bailer
OVA - Vault: 0.1 ppm	**Purge Rate:** 0.65 gallon/min
OVA - Casing: 0.6 ppm	**Date & Time Sampled:** 6/21/95 (1257)
Water Level - Initial: 4.44 feet	**Purged & Sampled By:** P. Hoffmeister
Water Level - Final: 4.56 feet	**Sampling Method:** Dedicated bailer
Well Depth: 16.60 feet	**Free Product:** None
Well Diameter: 4 inches	**Sheen:** Yes
Well Casing Volume: 7.8 gallons	**Odor:** None

Time	Purge Water Removed (gallons)	Temperature (degrees Fahrenheit)	pH	Electrical Conductivity (umhos/cm)	Turbidity
1215	0.5	76.0	5.99	555	Clear
1218	2.5	70.5	5.77	569	Clear
1222	5.0	69.7	5.68	587	Low
1225	7.5	68.2	5.45	706	Low
1229	10.0	68.5	5.30	724	Low
1232	12.5	68.7	5.25	736	Low
1236	15.0	68.6	5.19	706	Low
1239	17.5	68.5	5.27	695	Low
1242	20.0	68.6	5.25	673	Low
1245	22.5	69.1	513	690	Low
1248	23.0	68.6	5.10	710	Low
1250	23.5	68.1	5.02	723	Low
1257	Sample	72.8	5.46	710	Low

Field Notes:

MONITORING WELL PURGE TABLE

Project Number: 2463-103	**Site Name:** Former Pacific Dry Dock and Repair Company Yard II Facility
Well Number: MW3	**Date(s) Purged:** 6/21/95
OVA - Ambient: 0.1 ppm	**Purge Method:** Dedicated bailer
OVA - Vault: 0.0 ppm	**Purge Rate:** 0.52 gallon/min
OVA - Casing: 0.0 ppm	**Date & Time Sampled:** 6/21/95 (1045)
Water Level - Initial: 4.63 feet	**Purged & Sampled By:** P. Hoffmeister
Water Level - Final: 4.80 feet	**Sampling Method:** Dedicated bailer
Well Depth: 14.35 feet	**Free Product:** None
Well Diameter: 4 inches	**Sheen:** None
Well Casing Volume: 6.2 gallons	**Odor:** None

Time	Purge Water Removed (gallons)	Temperature (degrees Fahrenheit)	pH	Electrical Conductivity (umhos/cm)	Turbidity
1005	0.5	73.4	4.09	1,710	Clear
1008	1.75	70.2	3.92	2,420	Ckear
1010	3.50	70.4	4.30	1,010	Clear
1013	5.25	69.3	4.29	2,510	Low
1015	7.0	69.4	4.67	1,730	Low
1018	8.75	68.8	4.80	1,170	Low
1020	10.50	69.1	4.79	1,180	Low
1023	12.25	68.6	4.55	1,830	Low
1025	14.0	68.7	3.65	2,020	Low
1028	15.75	69.1	4.84	1,130	Low
1030	17.50	68.9	4.77	1,610	Low
1033	18.0	68.8	4.79	1,340	Low
1035	18.5	68.9	4.69	1,150	Low
1046	Sample	69.1	4.96	1,190	Clear

Field Notes:

APPENDIX D

Laboratory Analytical Results and Chain-of-Custody Records for
Groundwater Samples Collected June 21, 1995,
Second Groundwater Sampling Event

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545

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

July 12, 1995

Mr. Philip L. Hoffmeister
Versar, Inc.
7844 Madison Avenue, Suite 167
Fair Oaks, California 95628

Dear Mr. Hoffmeister:

Trace Analysis Laboratory received three water samples on June 21, 1995 for your Project No. 2463-103, Crowley: Pacific Dry Dock 2 (our custody log number 5626).

These samples were analyzed for Total Petroleum Hydrocarbons as Diesel, Gasoline, Benzene, Toluene, Ethylbenzene, Xylenes, and by EPA 8010. 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
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE EXTRACTED: 06/23/95
DATE ANALYZED: 07/04/95
DATE REPORTED: 07/12/95

CUSTOMER: Versar, Inc.

REQUESTER: Philip L. Hoffmeister

PROJECT: No. 2463-103, Crowley: Pacific Dry Dock 2

Sample Type: Water

Method and Constituent:	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Diesel	ug/l	160	50	3,300	50	140	50

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

QC Summary:

% Recovery: 106
% RPD: 8.4

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

Trace Analysis Laboratory, Inc.

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE ANALYZED: 06/30/95
DATE REPORTED: 07/12/95
PAGE: Two

Sample Type: Water

Method and Constituent:	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50	2,300	310	ND	50
Modified EPA Method 8020 for:							
Benzene	ug/l	ND	0.50	65	0.50	ND	0.50
Toluene	ug/l	ND	0.50	0.74	0.50	ND	0.50
Ethylbenzene	ug/l	1.0	0.50	1.3	0.50	ND	0.50
Xylenes	ug/l	5.3	1.5	810	1.5	ND	1.5

Method and Constituent:	Units	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:			
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50
Modified EPA Method 8020 for:			
Benzene	ug/l	ND	0.50
Toluene	ug/l	ND	0.50
Ethylbenzene	ug/l	ND	0.50
Xylenes	ug/l	ND	1.5

QC Summary:

% Recovery: 89
% RPD: 1.1

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

TAL Trace Analysis Laboratory, Inc.

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE ANALYZED: 07/04/95
DATE REPORTED: 07/12/95
PAGE: Three

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
EPA Method 601:							
Benzyl Chloride	ug/l	ND	120	ND	120	ND	120
Bromobenzene	ug/l	ND	120	ND	120	ND	120
Bromodichloromethane	ug/l	ND	0.50	ND	0.50	ND	0.50
Bromoform	ug/l	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ug/l	ND	6.0	ND	6.0	ND	6.0
Carbon Tetrachloride	ug/l	ND	6.0	ND	6.0	ND	6.0
Chlorobenzene	ug/l	ND	0.50	290	0.50	ND	0.50
Chloroethane	ug/l	ND	6.0	ND	6.0	ND	6.0
2-Chloroethyl Vinyl Ether	ug/l	ND	6.0	ND	6.0	ND	6.0
Chloroform	ug/l	0.73	0.50	ND	0.50	ND	0.50
Chloromethane	ug/l	ND	6.0	ND	6.0	ND	6.0
Dibromochloromethane	ug/l	ND	0.50	ND	0.50	ND	0.50
Dibromomethane	ug/l	ND	120	ND	120	ND	120
1,2-Dichlorobenzene	ug/l	ND	6.0	ND	6.0	ND	6.0
1,3-Dichlorobenzene	ug/l	ND	6.0	11	6.0	ND	6.0
1,4-Dichlorobenzene	ug/l	ND	6.0	35	6.0	ND	6.0
Dichlorodifluoromethane	ug/l	ND	6.0	ND	6.0	ND	6.0
1,1-Dichloroethane	ug/l	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ug/l	ND	0.50	ND	0.50	ND	0.50
1,1-Dichloroethene	ug/l	ND	0.50	ND	0.50	ND	0.50

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

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE ANALYZED: 07/04/95
DATE REPORTED: 07/12/95
PAGE: Four

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
EPA Method 601 (Continued):							
cis and trans-1,2-Dichloroethene	ug/l	ND	0.50	1.6	0.50	ND	0.50
Dichloromethane	ug/l	ND	120	ND	120	ND	120
1,2-Dichloropropane	ug/l	ND	0.50	ND	0.50	ND	0.50
cis-1,3-Dichloropropene	ug/l	ND	0.50	ND	0.50	ND	0.50
trans-1,3-Dichloropropene	ug/l	ND	0.50	ND	0.50	ND	0.50
1,1,2,2-Tetrachloroethane	ug/l	ND	0.50	ND	0.50	ND	0.50
1,1,1,2-Tetrachloroethane	ug/l	ND	120	ND	120	ND	120
Tetrachloroethene	ug/l	ND	0.50	ND	0.50	ND	0.50
1,1,1-Trichloroethane	ug/l	ND	0.50	ND	0.50	ND	0.50
1,1,2-Trichloroethane	ug/l	ND	0.50	ND	0.50	ND	0.50
Trichloroethene	ug/l	ND	0.50	ND	0.50	ND	0.50
Trichlorofluoromethane	ug/l	ND	0.50	ND	0.50	ND	0.50
1,2,3-Trichloropropane	ug/l	ND	120	ND	120	ND	120
Vinyl Chloride	ug/l	ND	6.0	ND	6.0	ND	6.0

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

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE ANALYZED: 07/04/95
DATE REPORTED: 07/12/95
PAGE: Five

Sample Type: Water

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 601:			
Benzyl Chloride	ug/l	ND	120
Bromobenzene	ug/l	ND	120
Bromodichloromethane	ug/l	ND	0.50
Bromoform	ug/l	ND	0.50
Bromomethane	ug/l	ND	6.0
Carbon Tetrachloride	ug/l	ND	6.0
Chlorobenzene	ug/l	ND	0.50
Chloroethane	ug/l	ND	6.0
2-Chloroethyl Vinyl Ether	ug/l	ND	6.0
Chloroform	ug/l	ND	0.50
Chloromethane	ug/l	ND	6.0
Dibromochloromethane	ug/l	ND	0.50
Dibromomethane	ug/l	ND	120
1,2-Dichlorobenzene	ug/l	ND	6.0
1,3-Dichlorobenzene	ug/l	ND	6.0
1,4-Dichlorobenzene	ug/l	ND	6.0
Dichlorodifluoromethane	ug/l	ND	6.0
1,1-Dichloroethane	ug/l	ND	0.50
1,2-Dichloroethane	ug/l	ND	0.50
1,1-Dichloroethene	ug/l	ND	0.50

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

LOG NUMBER: 5626
DATE SAMPLED: 06/21/95
DATE RECEIVED: 06/21/95
DATE ANALYZED: 07/04/95
DATE REPORTED: 07/12/95
PAGE: Six

Sample Type: Water

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 601 (Continued):			
cis and trans-1,2-Dichloroethene	ug/l	ND	0.50
Dichloromethane	ug/l	ND	120
1,2-Dichloropropane	ug/l	ND	0.50
cis-1,3-Dichloropropene	ug/l	ND	0.50
trans-1,3-Dichloropropene	ug/l	ND	0.50
1,1,2,2-Tetrachloroethane	ug/l	ND	0.50
1,1,1,2-Tetrachloroethane	ug/l	ND	120
Tetrachloroethene	ug/l	ND	0.50
1,1,1-Trichloroethane	ug/l	ND	0.50
1,1,2-Trichloroethane	ug/l	ND	0.50
Trichloroethene	ug/l	ND	0.50
Trichlorofluoromethane	ug/l	ND	0.50
1,2,3-Trichloropropane	ug/l	ND	120
Vinyl Chloride	ug/l	ND	6.0

QC Summary:

% Recovery: 92
% RPD: 2.2

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

Louis W. DuPuis
Quality Assurance/Quality Control Manager

Versar

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
2463-103	CROWLEY : PACIFIC DRY DOCK YARD II

SAMPLERS: (Signature) Philip L. Hoffmeister

(Printed) PHILIP L. HOFFMEISTER

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH-D	TPH-G/BTEX	HVOCs 8010	REMARKS
MW1	6/21/95	11:50		X		5	X	X	X	WATER
MW2	"	12:57		X		5	X	X	X	"
MW3	"	10:45		X		5	X	X	X	"

PARAMETERS

INDUSTRIAL HYGIENE SAMPLE: Y / (N)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
(Printed)		(Printed)	(Printed)		(Printed)
Relinquished by: (Signature) Philip L. Hoffmeister	Date / Time 6/21/95 1:25 pm	Received for Laboratory by: (Signature) Scott T. Ferriman	Date / Time 6/21/95 1:25 pm	Remarks Reg TAT	
(Printed) PHILIP L. HOFFMEISTER		(Printed) Scott T. Ferriman			

Place on ice Green tray 5 Reg