

# GROUNDWATER MONITORING REPORT JULY 1995

Lots 1 and 5 (Northwest Area) Marina Village Alameda, California

PROSECTIONAL 95 JAN -3 AMID: 35

Prepared for

Alameda Marina Village Associates 1150 Marina Village Parkway Alameda, California

December 1995 Project No. 1736.14

**Geomatrix Consultants** 



22 December 1995 Project 1736.14

Ms. Juliet Shin Alameda County Health Care Services Agency Division of Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, California 94502-6577

Subject:

Groundwater Monitoring Report

July 1995

Lots 1 and 5 (Northwest Area) Marina Village Development

Alameda, California

Dear Ms. Shin:

On behalf of Alameda Marina Village Associates (AMVA), Geomatrix Consultants, Inc. (Geomatrix), is submitting the subject report. Based on the data presented in this report, we are recommending an additional sampling round in the spring of 1996 to confirm the results of this monitoring event. If you have any questions regarding this report, please call either of the undersigned.

Sincerely,

GEOMATRIX CONSULTANTS, INC.

Yvonne G. Pierce, R.G.

Project Geologist

YGP/EAN/mdg

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**Enclosure** 

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Elizabeth A. Nixon, P.E. Senior Engineer

Efaleo Thora

Geomatrix Consultants, Inc.



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## **Geomatrix Consultants**



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#### GROUNDWATER MONITORING REPORT Lots 1 and 5 (Northwest Area)

Marina Village Alameda, California

#### 1.0 INTRODUCTION AND OBJECTIVES

This report presents a summary of groundwater monitoring activities conducted by Geomatrix Consultants, Inc. (Geomatrix) on behalf of the Alameda Marina Village Associates (AMVA) at Lots 1 and 5 in Marina Village, also known as the northwest area, in Alameda, California (Figure 1). The work was performed in response to the 6 April 1995 letter from the Alameda County Health Care Services Agency (ACHCSA) to the AMVA requesting additional soil and groundwater investigations at the site. Work was conducted in accordance with the 13 June 1995 work plan prepared by Geomatrix, which was approved by ACHCSA in a 22 June 1995 letter to AMVA.

The objective of this sampling event was to provide current data on: (1) the possible presence of separate-phase hydrocarbons in wells at the site; (2) the distribution of possible dissolved petroleum hydrocarbons in groundwater at the site; and (3) the magnitude and direction of the hydraulic gradient at the site. This data was subsequently used as a basis for recommendations regarding future monitoring and management of the site.

#### 2.0 BACKGROUND

The site currently consists of undeveloped areas and paved parking lots. The site is bounded to the east by Oakland Inner Harbor and boat docks, to the west by Marina Village Parkway, to the south by four former shipways that currently are developed as office space, and to the north by an adjacent property owned by Barnhill Construction Company (Figure 2). A sheet pile wall extends from the shipways westward and northward along the boat docks as shown on Figure 2. The historical direction of the hydraulic gradient at the site generally has been toward Oakland Inner Harbor, and may be influenced by the presence of the sheet pile wall.

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The extent of petroleum hydrocarbons in soil at the site and surrounding areas was characterized during previous investigations performed by Levine•Fricke (1988, 1989, 1990) and Geomatrix (1992). Based on the results of these investigations, medium- and high-boiling petroleum hydrocarbons (crude oil, waste oil, diesel oil and fuel) were detected in shallow soil at concentrations greater than 500 parts per million (ppm) beneath approximately 2.5 acres of the site. Separate-phase high-boiling petroleum hydrocarbons, characterized as degraded crude oil, were observed in the soil beneath an area of approximately 1.3 acres adjacent to the northwest property boundary. The vertical extent of petroleum hydrocarbons in soil has been limited by the occurrence of estuarine clay sediments, locally referred to as San Francisco Bay Mud. The Bay Mud occurs at shallow depths (ranging from approximately 4 to 15 feet) below the ground surface at the site. The source of petroleum hydrocarbons in soil at the site likely was a combination of shipbuilding activities at and in the vicinity of the site that date back to the first half of this century, and historical off-site sources to the northwest of Marina Village. Priority polluta \* metals have been detected only at relatively low concentrations (i.e., within expected naturally occurring concentrations). Polychlorinated biphenyls (PCBs) and priority pollutant volatile organic compounds (VOCs) have not been detected in the soil at the site, with the exception of relatively low concentrations of toluene (up to 0.7 ppm).

Since 1987, ten shallow groundwater monitoring wells have been installed at and adjacent to Lots 1 and 5 (Figure 2). Well construction details for these wells are summarized in Table 1. Concentrations of medium and high boiling petroleum hydrocarbons historically have been either in the range of several milligrams per liter (mg/l) or have not been detected in groundwater samples from wells located at the site perimeter (wells WC-3, LF-6, LF-7, LF-11, LF-12, LF-13 and GMW-2). Separate-phase product or petroleum sheen have been observed in two of the wells, LF-8 and LF-9, located near the northwest property boundary. A sheen has also been observed in groundwater from well LF-10, which is located approximately upgradient from Lot 5. Very low concentrations of dissolved petroleum hydrocarbon constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in ground-



water samples from wells LF-7, LF-9, and LF-13 during one sampling round in 1990. BTEX have not been detected during other sampling rounds.

Subsequent placement of a 10,000 cubic yard soil stockpile in 1993 in the vicinity of monitoring well LF-9 renders this well inaccessible for sampling. As discussed with ACHCSA, the need to include this well in future sampling events was evaluated as part of this report.

#### 3.0 SEPARATE-PHASE PRODUCT AND WATER-LEVEL MEASUREMENTS

On 10 July 1995, the top-of-casing elevations of monitoring wells LF-6, LF-7, LF-8, LF-10, LF-11, LF-12, LF-13, WC-3, and GMW-2 were surveyed by Luk, Milani & Associates of Walnut Creek, California to an established City of Alameda datum. Well construction details are presented in Table 1. LF-9 was not surveyed because it was inaccessible. The presence of separate-phase petroleum hydrocarbons was measured to the nearest 0.01 foot on 11 July 1995 using a Flexidip oil-water interface probe. Water levels were measured on 17 July 1995 using a steel tape and an electric well sounder. Measurement equipment was washed with a detergent-water solution and rinsed with deionized water before each measurement was taken. Separate-phase product and water-level measurements are summarized in Table 2; field records for these measurements are included in Appendix A.

Approximately 0.55 feet of separate-phase product previously characterized as degraded crude oil was measured on top of the water column in well LF-8. Separate-phase product was not measured nor sheen observed in the other wells tested. Water-level elevations across the site ranged from -1.58 feet at well LF-10 to -3.67 feet at well LF-7. The horizontal hydraulic gradient at the site appears to be to the east toward Oakland and Inner Harbor at a magnitude ranging from approximately 0.021 to 0.0036 foot/foot.



#### 4.0 WELL REDEVELOPMENT

The monitoring wells were redeveloped using a diaphragm pump prior to sampling, except for LF-8, which was not redeveloped due to the presence of separate-phase crude oil. Water was purged from each well until the water quality parameters of temperature, pH, and specific conductance stabilized and the water produced from each well was sufficiently clear. The redeveloped wells were retested for the presence of separate-phase petroleum product a minimum of 24 hours after redevelopment. Separate-phase product was not measured in any of the redeveloped wells.

#### 5.0 GROUNDWATER SAMPLING

Before sample collection, the wells were purged with a diaphragm pump until a minimum of four casing volumes were removed and water quality parameters stabilized. The purge water was collected in 55-gallon drums and stored temporarily on site pending analysis. Groundwater samples were collected using disposable polyethylene bailers from monitoring wells LF-6, LF-7, LF-10, LF-11, LF-12, LF-13, WC-3, and GMW-2 on 12, 13, and 14 July 1995. No sample was collected from well LF-8 due to the presence of separate-phase product in the well. Field records for sampling are included in Appendix A.

Samples to be analyzed for extractable petroleum hydrocarbons were transferred to 1-liter amber bottles, and samples to be analyzed for BTEX were transferred to 40-milliliter volatile organic analysis vials. Additionally, a set of samples was filtered in the field using a 0.45-micron filter to remove suspended particles. This set of samples was retained for potential analysis for extractable petroleum hydrocarbons pending analytical results of the unfiltered samples. Immediately after collection, samples were placed in an ice-chilled cooler and transported under Geomatrix chain-of-custody procedures to American Environmental Network (AEN), of Pleasant Hill, California, a California-certified laboratory.



#### 6.0 LABORATORY ANALYTICAL PROGRAM AND RESULTS

The analytical program consisted of analyzing samples from eight wells by modified EPA Method 8015 for total extractable petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo). Of the eight wells, two wells (LF-7 and LF-13) additionally were analyzed according to EPA Method 8020 for BTEX. One equipment blank (identified as sample LF-21) and one blind field duplicate from well LF-10 (identified as sample LF-18) were collected and analyzed for TPHd and TPHmo for quality control purposes.

Analytical results of groundwater samples for dissolved extractable TPH may include interference from nondissolved petroleum hydrocarbons and/or soluble biogenic materials. The source of nondissolved petroleum hydrocarbons in water samples can be small amounts of petroleum-affected silt or clay-sized sediment (turbidity) that are collected along with the groundwater and then extracted during analysis. Soluble biogenic materials occur naturally in plants and animals; the levels present in groundwater from these natural sources can often be significant and give false positive results in a modified EPA Method 8015 analysis. Intrinsic bioremedial activity within the area of petroleum-affected soil or groundwater also can provide a source of soluble biogenic material. To remove polar biogenic mass from a sample, a silica gel cleanup procedure can be used in the preparation of the sample extract (this is a standard part of EPA Method 418.1 analysis). Isolation and removal of these two sources of interferences provides a more accurate assessment of the dissolved petroleum constituents in groundwater. To identify and remove potential sources of interferences from the groundwater samples, silica gel cleanup was performed by the laboratory on all samples collected, and selected filtered samples were analyzed to assess possible interference from nondissolved petroleum hydrocarbons associated with particulates in the sample media.

Groundwater analytical results for samples collected to date from the monitoring wells are summarized in Table 3. Analytical results from this latest sampling event are presented on Figure 4. Analytical laboratory reports and chain-of-custody documentation for the samples collected during this sampling event are presented in Appendix B. A comparison of results

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from filtered and unfiltered samples was completed on well LF-10. Analytical results for filtered and unfiltered samples were similar, which indicates that suspended material present in the well column does not appear to be influencing the results for dissolved petroleum hydrocarbons. Results for either filtered or unfiltered results for the samples are reported in Table 3. The data are considered representative of dissolved petroleum constituents in groundwater.

No BTEX or TPHmo were detected in the groundwater samples. TPHd was not detected in samples from any of the wells except LF-10. TPHd was detected in the unfiltered sample, unfiltered duplicate sample, and filtered sample from well LF-10 at concentrations of 0.06, 0.06 and 0.07 milligrams per liter (mg/l) respectively. Based on a review of the chromatograms for samples from this well, the TPHd reported in the sample may not be dissolved. Although a sheen was not observed in groundwater from this well prior to sampling, a sheen historically has been observed in samples from this well, and it is likely that diesel is present in soil in contact with groundwater in the well bore. Therefore, the reported diesel concentration may not be indicative of dissolved-phase diesel constituents in groundwater.

#### 7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on data obtained during this groundwater monitoring event, we conclude the following:

- The hydraulic gradient at the site appears to be to the east towards the Oakland Inner Harbor.
- The monitoring well network along the shoreline is sufficient for monitoring the potential for petroleum hydrocarbons to migrate toward Oakland Inner Harbor.
- Separate-phase crude oil was measured in well LF-8 along the northern property boundary; however, TPHd and TPHmo were not detected in samples collected from downgradient wells LF-13, LF-7, and LF-12.



- TPHd was detected at a concentration of 0.07 mg/l in well LF-10 located upgradient of Lots 1 and 5. This concentration may to be due to the presence of nondissolved diesel in the sample. However, TPHd and TPHmo were not detected in samples collected from well WC-3, which is located downgradient of well LF-10.
- Of the two wells analyzed for BTEX, LF-7 and LF-13, no BTEX was detected.
- Data that would be obtained from well LF-9 would not provide additional information regarding site characterization or the potential for migration of petroleum hydrocarbons toward the Oakland Inner Harbor that is not already available.
- Based on the data, groundwater at the perimeter of the areas containing petroleum-affected soil beneath Lots 1 and 5 does not contain dissolved petroleum hydrocarbons or BTEX. The data indicate that the petroleum-affected soil, the separate-phase crude oil measured in well LF-8, and the nondissolved diesel detected in LF-10 are not significant sources of dissolved petroleum hydrocarbons to groundwater. Therefore, the potential for migration of petroleum hydrocarbons toward the Oakland Inner Harbor is very low.

Based on these conclusions, we recommend one additional sampling event to confirm the absence of dissolved TPH and BTEX at the perimeter of the petroleum-affected area. We do not recommend that LF-9 be made accessible for this additional monitoring event. If these results are confirmed, we recommend that a reduced monitoring frequency be considered by the ACHCSA and that a plan be developed to address the future in-place management of petroleum-affected soil at the site.



#### 8.0 REFERENCES

- Geomatrix Consultants, Inc., 1992, Soil and Groundwater Quality Investigation, Shipways Project, Marina Village Development, Alameda, California, prepared for Alameda Real Estate Investments, July.
- Levine•Fricke, 1988, Investigations of Northwest Area Marina Village, Alameda, California, 6 October.
- Levine•Fricke, 1989, Continued Soil and Groundwater Investigation of Parcel 5, Implementation of a Groundwater Monitoring Program and Proposed Remedial Measures in the Northwest Study Area, Marina Village, Alameda, California, 26 June.
- Levine•Fricke, 1990, Results of Third Round of Groundwater Sampling, Northwest Area, Marina Village, Alameda, California, 13 April.



TABLE 1

#### WELL CONSTRUCTION DETAILS

Northwest Area Marina Village Alameda, California

Well Number	Date Constructed	Well Depth (feet below grade)	Screened Interval (feet below grade)	Measuring Point Elevation <sup>1</sup> (feet)
LF-6	3/88	15	5-15	3.30
LF-7	3/88	15	5-15	4.56
LF-8	3/88	15	5-15	4.84
LF-9	3/88	15	5-15	NA <sup>2</sup>
LF-10	3/88	15	5-15	3.95
LF-11	3/89	15	5-15	5.09
LF-12	3/89	15	5-15	7.19
LF-13	3/89	13	3-13	2.95
WC-3	1987	14	7-14	3.84
GMW-2	3/16/92	13.5	3-13	3.5

#### Note:

Top of well casings were surveyed on 10 July 1995 by Luk, Milani & Associates of Walnut Creek, California, relative to an established City of Alameda datum.

Well LF-9 not accessible for surveying.



#### **WATER-LEVEL MEASUREMENTS**

Northwest Area Marina Village Alameda, California

Well Number	Date Water Level Measured	Measuring Point (MP) Elevation <sup>1</sup>	Depth to Water Below MP <sup>2</sup> (feet)	Water-Level Elevation <sup>1</sup>	Separate Phase Product Thickness <sup>3</sup> (feet)
LF-6	7/17/95	3.3	5.66	-2.36	0
LF-7	7/17/95	4.56	8.23	-3.67	0
LF-8	7/11/95	4.84	7.95	NA <sup>4</sup>	0.55
LF-10	7/17/95	3.95	5.53	-1.58	0
LF-11	7/17/95	5.09	7.58	-2.49	0
LF-12	7/17/95	7.19	9.12	-1.93	0
LF-13	7/17/95	2.95	4.78	-1.83	0
WC-3	7/17/95	3.84	6.72	-2.88	0
GMW-2	7/17/95	3.5	6.37	-2.87	0

#### Notes:

Top of well casings were surveyed on 10 July 1995 by Luk, Milani & Associates of Walnut Creek, California, relative to an established City of Alameda datum.

Water levels were measured with a steel tape.

Thickness of separate-phase product measured with a Flexidip oil-water interface probe.

Water-level elevation not calculated due to the presence of separate-phase product.



#### HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

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Northwest Area Marina Village Alameda, California

Concentrations in milligrams per liter (mg/l)

Well Number	Date Sampled	TPHd²	TPHmo³	Benzene	Toluene	Ethylbenzene	Xylenes	Petroleum Product Thickness (inches)	Characteri- zation
LF-6	3/29/88 3/28/89 8/3/89 1/1/90 7/12/95	<0.05 <0.3 <0.3 NA <0.05	<0.05 <0.5 <0.5 NA <0.2	<0.004 <0.0005 NA NA NA	<0.006 <0.0005 NA NA NA	<0.007 <0.0005 NA NA NA	NA <0.002 NA NA NA		
LF-7	3/29/88 3/28/89 8/3/89 1/31/90 7/13/95	<0.05 <0.3 <0.3 <0.3 <0.05	<0.05 1.8 <0.5 3.3 <0.2	<0.004 <0.0005 NA <0.0005 <0.0005	<0.006 <0.0005 NA 0.003 <0.0005	<0.007 <0.0005 NA 0.001 <0.0005	NA <0.002 NA 0.007 <0.002		
LF-8	3/29/88 3/28/89 8/3/89 1/31/90 7/11/95	62.0 NA NA NA NA	NQ NA NA NA NA	<0.004 <0.003 NA NA NA	<0.006 <0.003 NA NA NA	<0.007 <0.003 NA NA NA	NA <0.010 NA NA NA	<0.1 Approx. 2 Approx. 5 Approx. 7 Approx. 6	Crude oil
LF-9	3/29/88 3/28/89 8/3/89 1/31/90	54.0 12.0 79.0 15.0/12.0	NQ 6.0 67.0 17.0/15.0	<0.004 <0.0005 NA 0.003/0.003	<0.006 <0.0005 NA <0.0005/<0.0005	0.007 <0.0005 NA 0.007/0.006	NA <0.002 NA 0.014/0.012		



#### HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

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Concentrations in milligrams per liter (mg/l)

Well Number	Date Sampled	TPHd²	TPHmo³	Benzene	Toluene	Ethylbenzene	Xylenes	Petroleum Product Thickness (inches)	Characteri- zation
LF-10	3/29/88 3/28/89 8/3/89 1/31/90 7/14/95 7/14/95 (filtered)	43.0 <0.2 <0.3/<0.3 <0.3 0.06/0.06 0.07	NQ 7.8 8.3/7.6 17.0 <0.2/<0.2 <0.2	<0.004 <0.0005 NA/NA <0.0005 NA/NA NA	<0.006 <0.0005 NA/NA <0.0005 NA/NA NA	<0.007 <0.0005 NA/NA <0.0005 NA/NA NA	NA <0.002 NA/NA <0.002 NA/NA NA		
LF-11	3/28/89 8/3/89 1/31/90 7/12/95	<0.3 <0.3 <0.3 <0.05	1.0 0.9 1.2 <0.2	<0.0005 NA <0.0005 NA	<0.0005 NA <0.0005 NA	<0.0005 NA <0.0005 NA	<0.002 NA <0.002 NA		
LF-12	3/28/89 8/3/89 1/31/90 7/13/95	<0.3 <0.3 <0.3 <0.05	1.1 2.0 1.4 <0.2	<0.0005 NA <0.0005 NA	<0.0005 NA <0.0005 NA	<0.0005 NA <0.0005 NA	<0.002 NA <0.002 NA		
LF-13	3/28/89 8/3/89 1/31/90 7/14/95 7/14/95 (filtered)	<0.3 <0.3 <0.3 NR <0.05	4.4 3.0 6.1 NR <0.2	<0.0005 NA 0.004 <0.0005 NA	<0.0005 NA 0.001 <0.0005 NA	<0.0005 NA <0.0005 <0.0005 NA	<0.002 NA <0.002 <0.002 NA		



#### HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

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Concentrations in milligrams per liter (mg/l)

Well Number	Date Sampled	TPHd²	TPHmo <sup>3</sup>	Benzene	Toluene	Ethylbenzene	Xylenes	Petroleum Product Thickness (inches)	Characteri- zation
WC-3	3/31/88 3/28/89 8/3/89 1/31/90 7/14/95 (filtered)	<0.05 <0.3 <0.3 <0.3 <0.05	<0.05 3.2 1.0 5.7 <0.2	<0.004 <0.0005 NA <0.0005 NA	<0.006 <0.0005 NA <0.0005 NA	<0.007 <0.0005 NA <0.0005 NA	NA <0.002 NA <0.002 NA		
GMW-2	4/29/92 7/12/95	0.2 <0.05	0.4 <0.2	NA NA	NA NA	NA NA	NA NA		

#### Notes:

NR Not reported due to insufficient silica gel cleanup on the sample.

<sup>/</sup> Indicates duplicate sample.

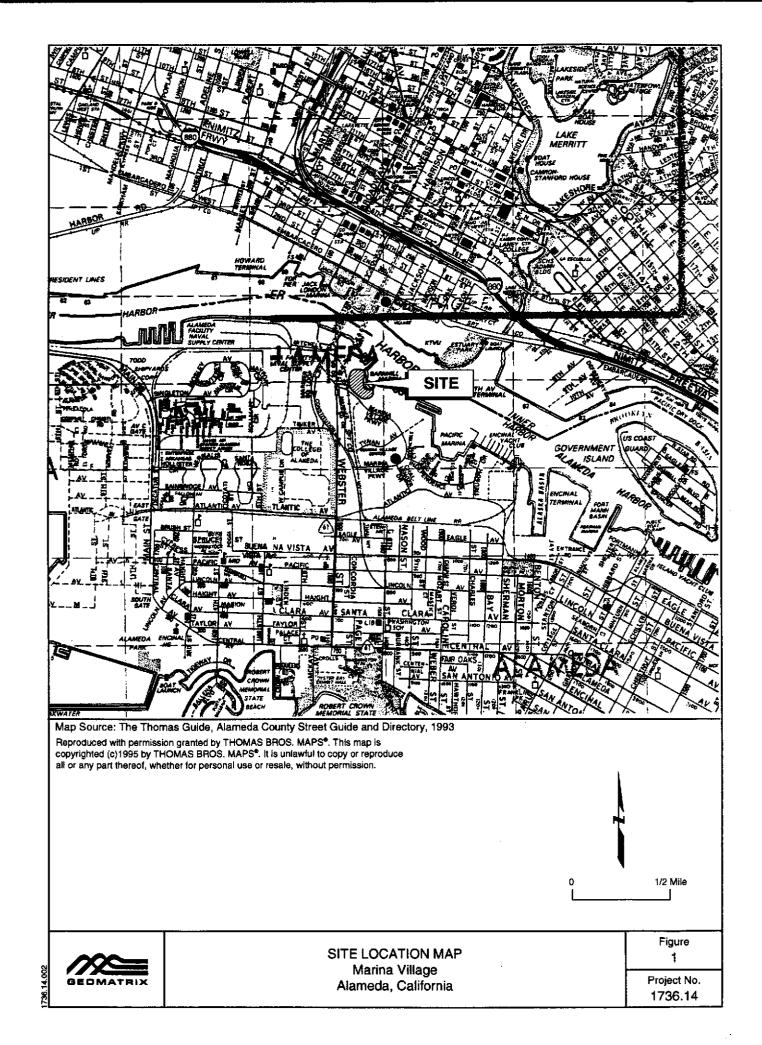
Samples analyzed for total petroleum hydrocarbons as diesel and motor oil by EPA Method 8015, and for benzene, toluene, ethylbenzene, and xylenes by EPA Method 602. In 1995, silica gel cleanup was performed prior to 8015 analysis.

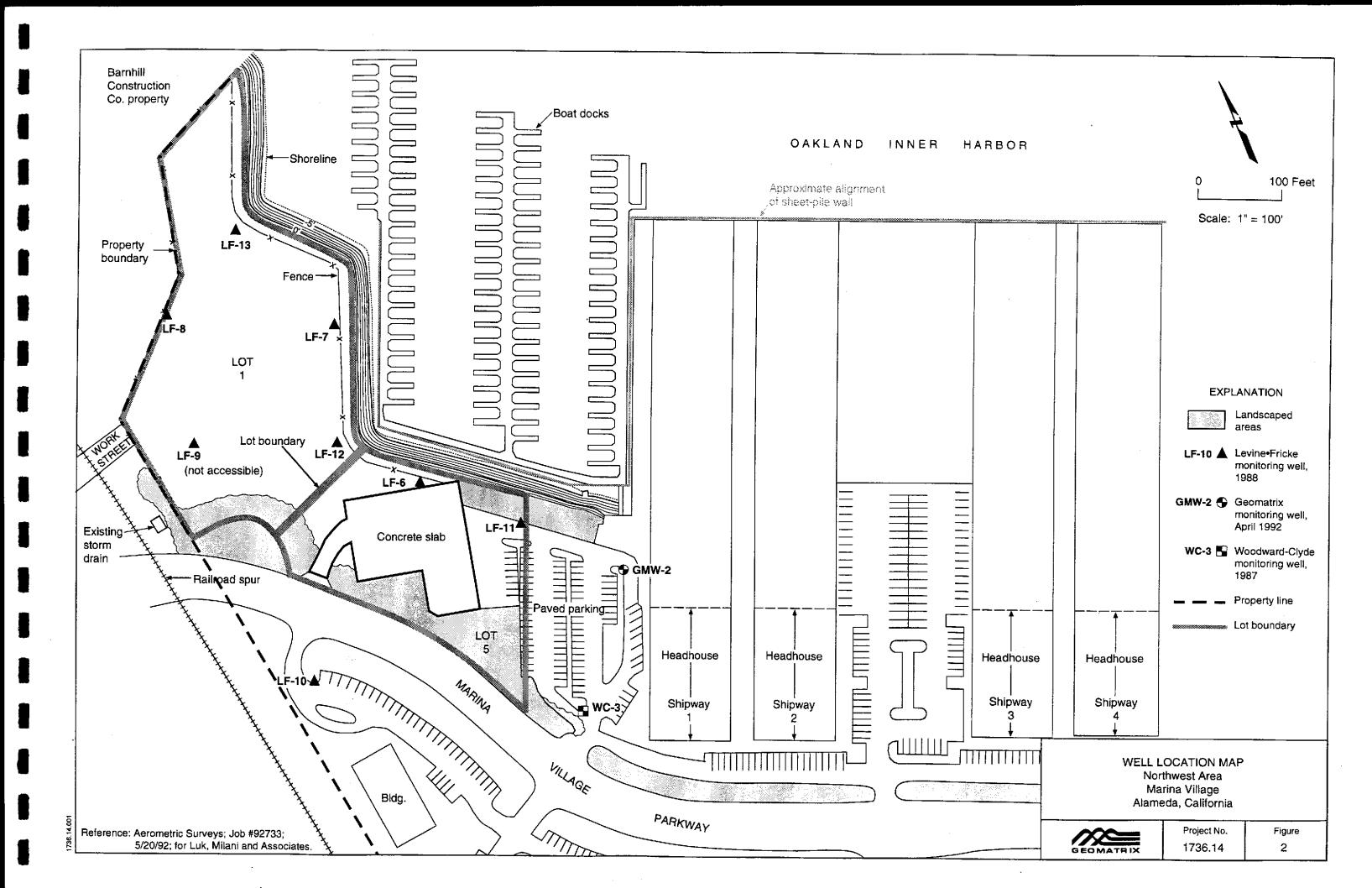
TPHd = total petroleum hydrocarbons as diesel.

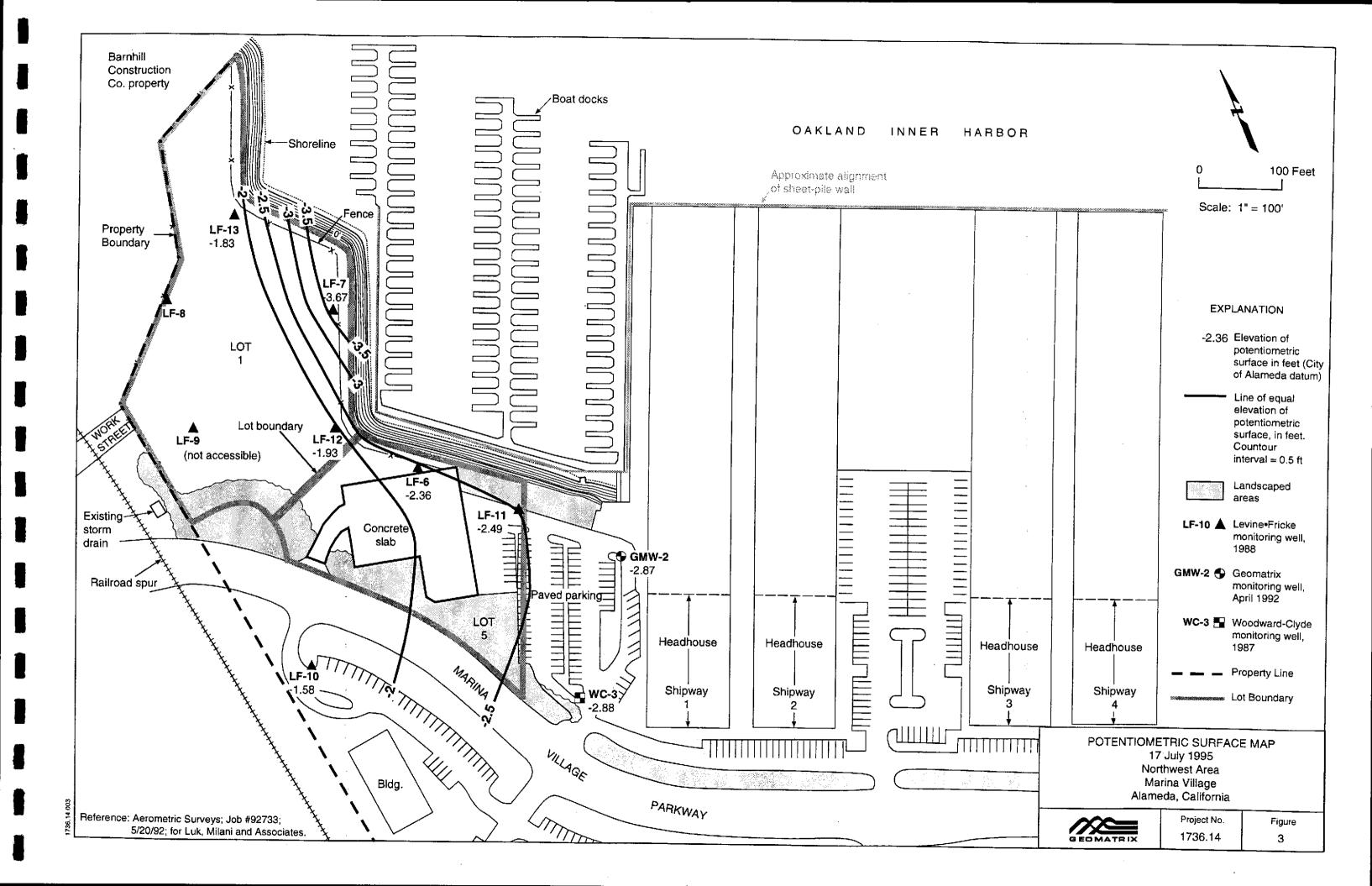
TPHmo = total petroleum hydrocarbons as motor oil.

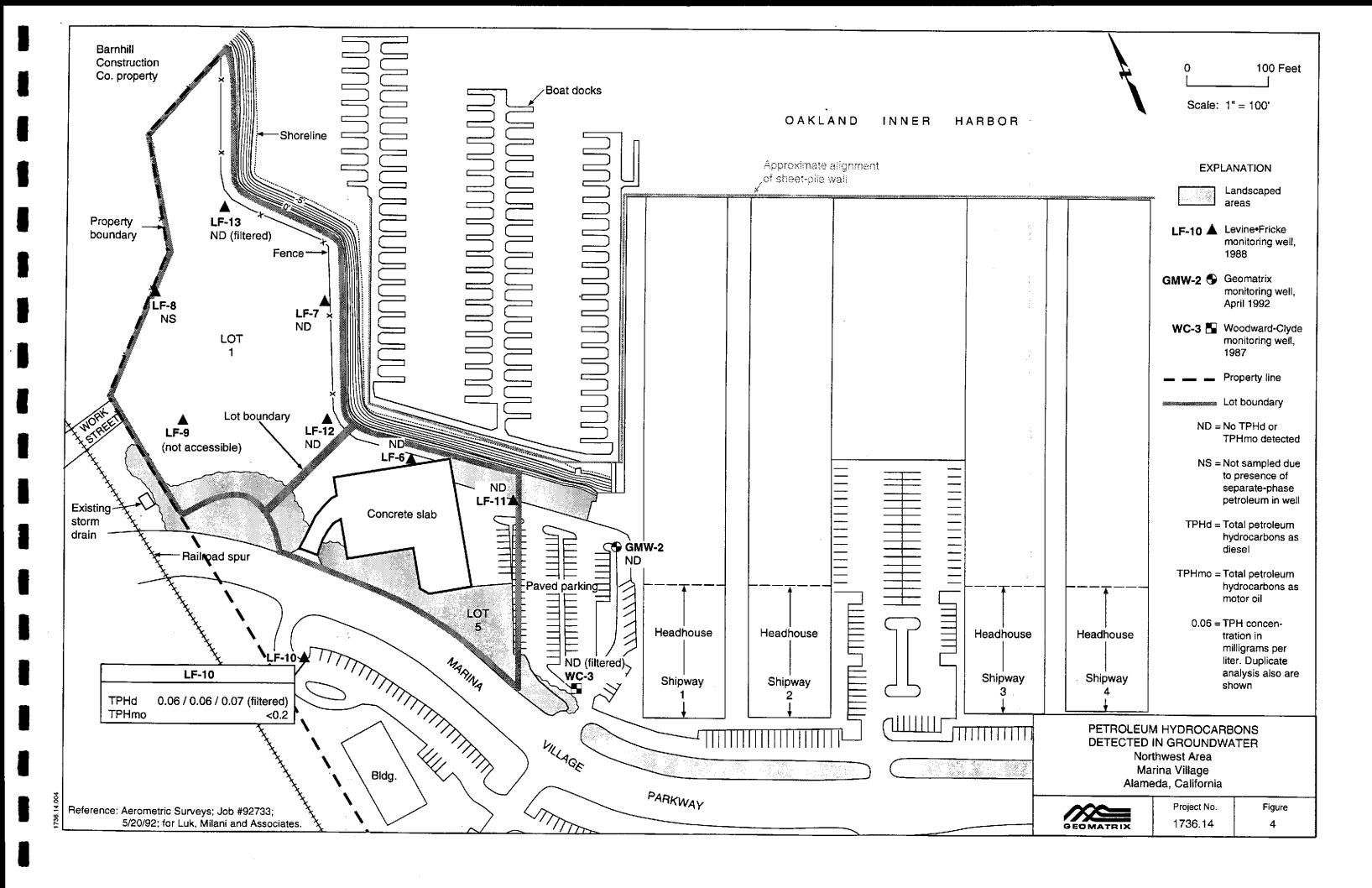
NQ Indicates extractable TPH detected in samples was not quantified against motor oil standard.

NA Indicates not analyzed.











## APPENDIX A

WATER LEVEL AND MONITORING WELL SAMPLING RECORD FIELD SHEETS

## WATER LEVEL MONITORING RECORD

# Before Redevelopment



Project MAIZ	EWA VILLAGE		Project No <u>i 7 36</u>	, IŲ
Date 7 11	G S Recorded By	NTITEW	Instrument Used _	FLXI DIF
Note: For your conve	enience, the following abbrevi	ations may be used.		,
P = pumping	i = inaccessible	D = dedicated pump		

ST = steel to		ES = elect	tric sounder PRODUCT		point WL :	water level
Well Ho.	Time	MF/ Elegation	Water Level Below MP (feet)	Water Level Elevation (feet)	Previous Water Level Below MP	Remerks
LF-6	1036		5.69			PID - ND
Gmw-2	1040		7.16			PID-ND
LF-11	1045		7.82			PID-ND
	1047		9.24	-		PID-ND
LF-7	1052		7.22			QN-019
LF-13	1059		4.72			PID -NO
LF-lo	1109		5.48			PID-ND.
LF-8	1117	7.40	7.95			PID-16.4 ppm.
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						BOTTOM OF WELL
						BHOW H-O.
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100 Pine Street, 10th Floor San Francisco, California 94111 (415) 434-9400

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	-							4 Casing Volumes = 6.4							<del>_</del>	
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	Ph C	ALIBRA	LION	(CHOOS	E TWO	)			Model	or Unit	No.:	#4		************		
Buffer So	olution	pH 4	.0	pH 7.0	pH 1	0.0			_							
Temp. °0	<u> </u>	30		30.5	<u> </u>											
Instrume	nt Reading			7.0	<u>l</u>						<del>- 1</del>					
-	•	SPECIFI	C CO	T			BRAT	FION	:	1		Model o	r Unit	No.: ⋣	8	j
KCL Sol	ution (µmh	os/cm at	20°C	1409	128 29											! 
Temp. °(				<u> </u>												
Instrume	nt Reading	3		<u> </u>	(24	) b					8					
Notes —	Notes SUGGESTED THAT WELL CASING HAS															
·	CRACKED BECAUSE OF FILTER PACK SAND															
	FOUND IN SAMPLES + LOCATION OF WELL															
· · · · · · · · · · · · · · · · · · ·	NEX				RETE			<u> 4B</u>	<u> </u>	1cu	Н-	15			—-	
<u>.</u>	SHIFT	<u> </u>	11	11	<u>e</u>	7.45										



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										(			
Well ID:	LF	-6	=1/1	<del>mzen</del>			. 1			o Water: 5.83 (0950)			
Sample	1D.:_4E-	61	<del>Duplie</del>	ate ID.: _	LF-	6F	.	Depth	to Wate	er after Purging:			
Sample	Depth:							Total	Depth o	r:			
Project	No:	736.14			<del></del>			Well [	)iamete	r:			
Project	Name:	WYSIND	<u>, U</u>	UL AGE	Ę	····	•	1 Casing Volume = VI.7 GALLOUS.					
Date: _	7/13	195						4 Casing Volumes = 6.5 GALLONS.					
Sample	d By:_ <i>A</i> /-	H IF	ن				.	Method of Purging: DIAPHAGM PUMP-					
								Method of Sampling: DEPOSIBLE DAILER.					
TIME	INTAKE DEPTH	RATE (gpm)	CUN VOI (gal	''	EMP. (°C)		H its)	CONDUCTIVITY (µmhos/cm)		(color, turbidity & sediment)			
0950	15' 2 11/1911 7.				7	7	710	CLOUDY AND TURBID, FINE					
0955	151		4	1	18.8		4	719	906	CLOUDY TURBIDANS = DTW			
0000	15'		6	19	.3	1.5	<u> </u>	719-	100	SIGHTLY CLOUDY, NO SED.			
1003	15		7	19.	(	7,4	5	7199	100	HIGHTZY CLOUDY, SED. = DTW			
,00.													
1025	5 SAMPLE			2	20.5		7.4		906	CLEAR, NO SEDIMENT.			
			-				-						
	,			_				1					
					-								
<u> </u>								1					
	Dh (	CALIBRA	TION I	CHOOS	F TWO	) )		<u> </u>	Mode	or Unit No.: 比客			
Buffer S		pH 4		pH 7.0	DH 1					3.5			
Temp. °		72.		ZZ.I	1								
<del></del>	ent Readin			7.6	1								
		SPECIFI	C CO		NCE -	CALI	BRA	TION:		Model or Unit No.: # €			
KCL So	lution (µmh	nos/cm at	20°C	1409	128	356							
Temp. °		ı			21.7								
Instrum	ent Readin	9			123	300							
Notes _									<u> </u>				
<u> </u>	ક	015 -		H-die H- Mo		<u> ا</u>				Silien Gel Chaurp.			
<b>_</b>			<u> 1</u>	- 1410	760 (	<u></u>				VIII VIII CAMPINE			
			A	mhr	Lite		أدما	14101		allfrid			
		1		Amhu	bile	v	wl	HCL	, F	iltud.			



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<u> </u>								- 1						
Well ID	: GMW	- 2					Initial Depth to	o Water: 7.16						
Sample	ID.:		Duplicat	ie ID.:			Depth to Wate	er after Purging:						
Sample	Depth:	<u> </u>				·	Total Depth o	of Well: 15'						
Project	No:	1736 14	<u> </u>				Well Diamete	r:						
Project	Name:	WIA 131	11/4 1	VILLA	6-1-		1 Casing Volume = 1.33							
Date: _		7/11/99	5			•	4 Casing Volumes = <u>5.33</u>							
Sample	ed By:	NATI	TFW				Method of Purging: DIAPEAGM,							
							Method of Sampling:							
TIME	INTAKE DEPTH	RATE (gpm)	CUM. VOL. (gal)	161	MP. C)	pH (units)	CONDUCTIVITY (µmhos/cm)	REMARKS (color, turbidity & sediment)						
1455	14		2	2(,	6	7.7.	16600	GEAR NO SPAMENT						
1505	(4'		5	22.1		કત	16600	CLEAR, NO SEDIMENT						
1510	14'		7	21,9		7.9	16800	CLEAR NO SEDIMENT						
	<u> </u>		<u> </u>				<u> </u>							
			<u> </u>											
						l								
						1								
	<del>  -  </del>			+										
<u> </u>	+		<del>                                     </del>	+										
	<del> </del>		<u> </u>	+	<del></del>		-							
		_	<u> </u>			<del></del>	<del> </del>							
							<u> </u>							
	Ţ		İ				<u></u>							
	+ -			1										
	Ph (	CALIBRA	TION (C	HOOSE	TWO)		Mode	el or Unit No.: # &						
Buffer S	olution	рН 4	,0 p	OH 7.0	pH 10	).0								
Temp. °	Ċ	30		50.5				300						
Instrum	ent Readin			7.0										
		SPECIFI	C CON		1		TION:	Model or Unit No.:						
KCL So	lution (µm)	nos/cm at	20°C	1409	1285									
Temp. °	<u>'C</u>	·			29,5									
Instrum	ent Readin	g			128	<u></u>								
Notes _	<del> </del>	<del></del>		/*: ··· 4		2.124.0	: ==0							
			VERY	CIEA	14 1	ensive	WATER							
<del></del>														
4														



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L							1								
Well ID:		Gmw-	2				-	Initial Depth to Water: 7.16 1100 7/						112	
Sample	ID .: Gm	W-Z	Duplic:	ate ID.: _			_ i	Depti	to Wat	er after Pi	urging:				
Sample	Depth:							Total	Depth o	of Well:		<u>11. Z</u> 4	5		
Project	No:	1736.	14				- 1			r:					
	Name:						<b>-</b>	1 Casing Volume =							
Date: _		7/12	145					4 Casing Volumes = Z. & GAL.							
Sample	d By:	N	+7				. !	Meth	od of Pu	rging: 🔟	) A PHO	Hem	PV	MP	
							1	Meth	od of Sa	mpling: _	DIC PAS	AALC	<u>. 154</u>	145	2
TIME	INTAKE DEPTH	RATE (gpm)	CUM VOL (gai	'}	EMP. (°C)		H its)	1	DUCTIVITY hos/cm)		Ri plor, turt	EMARK pidity &		ent)	
1110	11.25		1	2	5.2	7.	3	710	1900	CLEAR	NE	SEL	). D	iw a	TP.
1210			3.4	70.5 7.2				>19	100	CLEAR	No	SED	<u> 1CT.</u>	<u>ω &gt; -</u>	<u>01</u>
1230			5	70.		7,	3_	>14	1906	CLEXE	ه س	SEI	<u>, v</u>	1W=	Œ
									<u>.</u>						
1235	10'	SAME	仨	21.0		7	٠3	>19900		CLEAR	. <i>N</i>	6 SE	<b>=0</b> .		
										,					
								-				<u> </u>	-		
									<del></del>						<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>
			<u> </u>										·· ·	•	
	Ph C	ALIBRA	TION (	CHOOS	E TWO				Model	or Unit N	o.:	#8	3		
Buffer Sc	olution	pH 4	.0	pH 7.0	pH 10	0.0									
Temp. °0	>	28.	9	30.6											
Instrume	nt Reading	11,0		7.0											
		SPECIFIC	CCON	IDUCTA	NCE - C	ALIE	3RA1	FION:			Mod	del or l	Init No	).: <i>-#</i>	<u> </u>
KCL Sol	ution (µmh	os/cm at	20°C	1409	128	56				<u> </u>					
Temp. °C					3 2	.1					_				
instrume	nt Reading	3	1		1281	0									
Notes											A .	<u> </u>			
<b></b>	<u> </u>	TPH-				13 Y 13 Y		1015 1015		Sili	c4 6	nel C	<u> </u>	, <u>U</u> 9	<u>'-</u>
		11-41 -	,	, <u>, , , , , , , , , , , , , , , , , , </u>		/		ш. Э.							
		7ب ح	Εũ	الغرين	LTEO	εĎ	7		LITER	PAFI	الماجلات	FD.			
1															



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Well ID:	U=-1	)					Initial Depth t	o Water: 7 .8Z						
Sample	ID.:		Duplica	te ID.:				er after Purging:						
	Depth:					<u> </u>	Total Depth o	of Well:						
Project	No: <u>173</u>	36. iY					Well Diamete	or:						
Project	Name: –∆	MRINA				<del></del>	1 Casing Volu	ume = 1,14						
Date: _	7/11	195			<del></del>		4 Casing Volumes = 4.54							
Sample	d By:	NA:	T					rging: DIAPHRAGUA DUMD						
						<u> </u>	Method of Sa	mpling:						
TIME	TIME DEPTH (COM) VO		CUM VOL. (gal)	15	MP. °C)	pH (units)	CONDUCTIVITY (juminos/cm)	REMARKS (color, turbidity & sediment)						
1520	14'	**	Z	2	1.9	7.6	13 100	BLACK SEDIMENT, SULFUZ SMELL						
1525	14:		3	14	1.8	7.5	17900	RLACK SEDIMENT, "						
<i>15</i> 3 c	141	8	10	ا, د	7.6	13106	CLEAR, NO SEDIMENT							
1533	14)		10	14.	6	7.4	13506	CLEAR, NO SEPIMENT						
1537 14' 1				19	.1	7.6	13706	CLEAR, NO SEDIMENT						
			-											
	<u> </u>			_		••••								
<del></del>		·												
		;												
	Ph C	CALIBRA	TION (C	CHOOSE	TWO)		Mode	l or Unit No.: #6						
Buffer S	olution	pH 4	.0 p	H 7.0	pH 10.	0		100						
Temp. °0	0	30.4	5 3	30.0				100 mg						
Instrume	nt Reading			7.6										
		SPECIFI	C CON				FION:	Model or Unit No.: # ♀						
KCL Sol	ution (µmh	os/cm at	20°C	1409	1285									
Temp. °		· ·			24.5									
Instrume	nt Reading	g			1250	0 ]								
Notes				······································			<u></u>							
		IVELL	DEL	د انهاع	リビルブ									
			-			-								
<u></u>					<u></u>		··· <del>1</del> ············							



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Well ID:	ن	F-11						_	Initia	Depth t	o Water:	7.	53 (1)	305	
Sample	ID.: LF	-11	Duplic	ate l	D.: _				Dept	h to Wat	er after f	<sup>2</sup> urain	a:		_
Sample	Depth:								Total	Depth o	of Well:	12	.25 (STI	eel Tap	<u>=)</u>
Project	Depth: No:	1736.	14					_ '	Well	Diamete	r:	2,		<del></del> -	
Project I	Name: 🚅	MARIN	4 1	rich	445	5		_	1 Casing Volume = 8						
Date: _	7	12/95							4 Casing Volumes ≠ 3.4						_
Sample	d By:	NAT /	TFW					_ (	Method of Purging: DIAPHRAGM  Method of Sampling: DIS PUSABLIC BAILE					_	
								ł	Meth	od of Sa	mpling:	<u>טני</u>	PUSABL	C BAIL	£γ
TIME	INTAKE DEPTH	RATE (gpm)	- I Will I		TEMP.			pH (units)		DUCTIVITY nhos/cm)			REMARKS urbidity & se		
1315			Z		23	/	7	ري	150 OD		CLEA	R, A	Va Sepi	MEN),	
1317			3		21	٠6	7	. 6	1,	706	11 ,	"	; PLEGE	D ORY	<b>.</b>
1320			4		70	,9	7	.3	15	900	CL€Q	R, 10-	SED1.	MPNT.	
								<u>, ,</u>							
1332		Sampl	<u>e</u>	19.6			7.	<u> </u>	161	600	CLEA	R, 1	n sec	MENT	
				<u> </u>											
					_										_
										i					
1325					BA	CEIS	Is	105	€C	)	FIELD	PLA	NK UL	LECTED	
					W	SIPE	Au	UB	0U	۲.	PRIOR	TO	WELL	SAMPLE	<u>e.</u>
			: 								USES	O'	SH WA	<u>tes.[[</u>	(بد
													LF-		
	Ph C	ALIBRAT	TION (	CHC	OSE	TWO)			-	Model	or Unit		A &		
Buffer Sc	lution	pH 4	.0	pH 7	7.0	pH 10	0.0								
Temp. °C	;	28.4		30.	.6										
Instrume	nt Reading	9 4.6		<i>۱۰۵</i>											
		SPECIFIC	CON	NDU	CTAN	ICE - C	ALI	BRAT	ION			М	odel or Un	it No.: 🤲	٧
KCL Soil	ition (µmh	14	109	128											
Temp. °C	<del>;</del>			32.	.1										
Instrume	Instrument Reading 2504														
Notes		~~!!·	ط ء د	. T	la.	82-47	15				Fil	<u> 7</u>	Dlanh.	4F-21	
	,	TPH-			by oil		15				<u></u>		<u> </u>		
					,,,,,,,						Stru	ı G	ell Clea		
٧	FI to		ters					<del></del>				ou	Ay Sa	w/hc	
2	NNA	1 touch	أحاسا	hvs											لــــــ



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Well (D:	LF	-12					Initial Depth to Water: 9.24						
Sample	{D.:		Duplic	ate ID.:			Depth to Wat	er after Purging:					
Sample	Depth:	<del></del>	r			<del></del> +	Total Depth of Well: 75' Well Diameter: 2"						
Project	No:	1736.11	<u> </u>				Well Diameter:						
Project	Name:	MARIN	4 ()	LLAG	<u>e                                     </u>		1 Casing Volume =						
	7/1						4 Casing Volumes = 3.9						
Sample	d By:	NAT					Method of Purging: DIAPHRASM PWMP.						
Ĺ							Method of Sampling:						
TIME	INTAKE DEPTH	RATE (gpm)	CUN VOL (gal		TEMP. (°C) (		CONDUCTIVITY (jumhos/cm)	REMARKS (color, turbidity & sediment)					
1450			г	2	3.6	71	16800	BLACK, SUMPHIVELL SME					
1455			4	2	1.7	10	15700	CLEAR, NO SEDMENT.					
1500			7.	2	2,3	7.1	16400	ciete, in server					
1505							16200	ir tr					
1564		1	12	18	<u>r.1</u>	1	1100	ic tr					
1512			15	- 16	۰٥	7.1	16400	ig le					
			_					DEVELOPMENT UMPLITE					
							1						
						<u> </u>							
			:										
								·					
	Ph C	ALIBRA	TION (	CHOO	SE TWO	)	Mode	l or Unit No.: 峰分					
Buffer Sc	olution	pH 4	.0	pH 7.0	pH 1	0.0							
Temp. °C	>	28.4		30.6				20 Sept.					
Instrume	nt Readino			7.0				22200000					
						CALIBRA	TION:	Model or Unit No.: 보오					
	ution (µmh	os/cm at	20°C	1409	<del></del>								
Temp. °C					32.								
Instrume	nt Reading	3	l		1280	00							
Notes	· · · · · · · · · · · · · · · · · · ·	DEUELL	PME	٠ آنك		·							
	•												
						<del></del>							
<u> </u>													



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Well ID:	LF	-12				_	Initial Depth to Water: 9.02 (1330)							
Sample	ID .: LE-	-12	Duplic	ate ID.:.			_	Depth to Water after Purging:						
Sample	Depth:	10'						Total	Depth o	of Well: 16.5				
Project	No:	736.14	<del>,</del> ,	<del></del>			_	Well	Diamete	r:				
Project	Name:	MARI	NA	VILLA	IVE.		_	1 Casing Volume = 1,3						
Date: _	7/1	3 95		·			_	4 Casing Volumes = 5.2 (-Alluns.						
	d By:						_	Method of Purging: DIAPHRAGEN PURP						
]	-							Metho	od of Sa	mpling: DISPOSABLE BAILER.				
TIME	INTAKE DEPTH	RATE (gpm)	ÇUN VOI (gai	P. (°C)			pH (units)		OUCTIVITY thos/cm)	REMARKS (color, turbidity & sediment)				
1350	350 2 26.3					1.7	<u>، ح</u>	14	7€ (*	CLEAR, SOME DOTTOM SEC				
1355			3	2	22	7	2	13-	101	CLEAR				
1398			4	2	3.9	7.	2	14	201	CLEAR				
1400			5	21		7	3	146	:00	ELEAR				
1405		6	2	ાન	7.6	1	140	v	SEMI-CLEAR					
1415		SAM P	LE	2	5. h	1.	2	13	900	CLEAR				
									4					
		· · · · · · · · · · · · · · · · · · ·								·				
		<u> </u>						1						
								1						
						1		<del> </del>						
-		•				<del>                                     </del>		1						
						<del> </del>		+-						
				<u>l.</u>		<u> </u>			<u></u>	<u> </u>				
		CALIBRAT	<del></del>		$\overline{}$	<del></del>			Model	or Unit No.: 8				
Buffer So	-	pH 4		pH 7.0	pH 1	0.0		-						
Temp. °C	•	25.5		25.7										
Instrume	nt Readin	SPECIFIC		1.6	NCE -	CALI	RPA	TION	************	Model or Unit No.:				
KCI Son	ution (µmh			1409	128		- I	1014.	<del></del>	WOOD OF CHAINS.				
Temp. °C		- Coroni at 1		. , , , ,	71128	-				St. Carlo				
	nt Readin	g												
Notes					<u> </u>									
<u> </u>		TPH- O			801					2 Filtered Sample (LETZ Z Until trud Samples UF-12F				
		TPH-	<u> </u>	0.1	<u></u>	<u> </u>	015		•	Z Until trul Samphs UF-12F				
									SLICA	FEL CLEANUP.				
	Bett	M 50	MD	46	<u>~ 16.5</u>									



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<del> </del>															
Well ID:		LF - 1					Initial Depth to	o Water:							
Sample	ID.:		Duplicat	e ID.:	<del></del>	<del></del>	Depth to Wate	er after Purging:							
Sample	Depth:					·	Total Depth of Well: 151								
Project N	No:	MARIL	A V	ILLAG	-15 5		Well Diameter:								
Project I	Name:	173	614				Total Depth of Well:								
Date:	<u> </u>	12/95					4 Casing Volumes = 5.3								
Sampled	d By:	NAT				Method of Purging:									
•	•					Method of Sampling:									
TIME	TIME   INTAKE   HATE   V		CUM. VOL. (gal)	DL. IEMP.		pH (units)	CONDUCTIVITY (µmhos/cm)	REMARKS (color, turbidity & sediment)							
1530.			2			711	> 19900	CLEAR, MADY BLACK							
540			45			7.4	16800	11, NO SEDIMENT							
(543			8			7.3	16500	11, SUME SED.							
545			10			7.2	17100	11, NO SEDIMENT.							
						<u>.</u>									
-:-		-													
					-										
							<u>-</u>								
		-		<del></del>		<u> </u>									
							<u> </u>								
	Ph C	ALIBRAT	TION (C	HOOSE	TWO)		Mode	lor Unit No.: 性を							
Buffer Sc	olution	pH 4	.0 p	H 7.0	pH 10	.0		THE STATE							
Temp. °C		28.4		30.6				100							
instrume	nt Reading	J 11.6		7 . 0				B. B. G. H. L. L.							
		SPECIFIC	CON	DUCTAI	NCE - C	ALIBRA	TION:	Model or Unit No.: #-<							
KCL Sol	ution (µmh	os/cm at	20°C	1409	1285	6									
Temp. °C		,			32.	)		Contract Con							
Instrume	nt Reading	3			1280	7									
Notes															
							ا القارية من من فرم الارام	7							
_				W.	<u> </u>	ワトリ	ec ermen	1,							



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										_								
	LF					<del></del>					Depth t							_
Sample	ID .: LF	<del>-7</del>	Duplic	cate	ID.: _			_	Dept	lh	to Wat	er after	Pur	ging:_				
Sample	Depth:								Tota		Depth o	f Well:		15.7				
	No:								Well	D	iamete	r:	Z	•				_
Project	Name:	MARI	٧ <b>٨</b> ,	VIL	<u> </u>	<u>.∈</u>		_	1 Casing Volume = 1.7									
	7)							_	4 Casing Volumes = 6,8									
Sample	d By:	NA							Meth	100	d of Pu	rging:	<u>Dia</u>	<u>PH 2.4</u>	Gun	puni	<i>&gt;</i>	
									Meth	100	d of Sa	mpling	<u> 24</u>	POSA	BLC	134	IVE(	<u>=</u>
TIME	INTAKE DEPTH	RATE (gpm)	CU VO (ga	L.		MP. °C)		pH nits)	CONDUCTIVITY (jumhos/cm)				(coio	REI r, turbi	MARK dity & :		ent)	
1525	DOTTOM		2		2	2 .0	7.	G	(8500		00	CLEAR, MANY SOCIOS.						
1530	5 9.5 17		7	<u>ار</u>	9	900	Cre	4R	1 206	SC	CLD	5.~S	EC					
1535	<del></del>		િક	١٢	49	910	CH	54 <u>e</u>	بد ,	0 50	CLD	<u>s-s</u>	<u> </u>					
1540	540 u		7	-	<b>M</b> .1		7	.6	7 190		000	CLE	12	No	5€	DILL	SVT	
1550	50 SAMPLE			21.8		7.8		719000		CLEAR NO SEDIMENT								
									_						···-			
						<u>.                                      </u>			<u> </u>		<u>.</u>	·				<u> </u>		
				_							<del>-</del>			•				
				$\dashv$	·-·													
!																		
										-								
	Ph C	ALIBRAT	ION	(CHC	OOSE	TWO	,				Model	or Unit	No.	8	1			
Buffer Sc	olution	pH 4.	0	pH:	7.0	pH 10	0.0											
Temp. °C		25.1		25.	<b>7</b> .													
Instrume	nt Reading	1 41.0		7.0	)													
		SPECIFIC	COI	NDU	CTAN	NCE - C	ALI	BRA	TION	<b>:</b>				Mode	l or U	nit No	.: g	
KCL Solu	ution (µmh	os/cm at	20°C	14	409	128	56											
Temp. °C	<b>.</b>					128	00											
Instrume	nt Reading	1				26.7												
Notes							CON	υνι		17	y 15			00 C	-			
		<u> 1911 - Griz</u>		B		8015			Z			EIZEI.		130 TI				
		M - 149				BY	801	<u> </u>	2			FILTE						_
		STEX	13.\				<del></del>				3,	Ver	45		FILI	1=120	<u>. U .,</u>	
<i>D</i> -	<u> </u>				<u></u>	. 117		- سي	) L-		f (2) 2 ·		\					
IIIW S	5.37	. 156	(IEW)	<u> </u>	<u> </u>	126	=	7	1 3		L17.6	Tag	<u>r).</u>			_		



100 Pine Street, 10th Floor San Francisco, California 94111 (415) 434-9400

Well ID:		F-13				Initial Depth to Water: 4.72.							
	ID.:		Dunlicat	e iD :			Denti	to Wate	er after Purgir	na:			
-	Depth:						Total	Depth o	f Well:	13.5			
Project !	No:	1736.1	4				Well	Diamete	r:z"_				
Project i	Name:	HARINA	4 v	ILLAG	E.		1 Casing Volume = 45 . 98						
Date:	7	113/15	,				4 Casing Volumes = 2.31						
Sampler	d By:	ΛΛΑΤ					Method of Purging: <u>DIAPHRAGIM DVMP</u>						
Campic	<i></i>			<u>"</u>			Method of Sampling:						
TIME	INTAKE DEPTH	1 1 V(A 1			TEMP.			ouctivity hos/cm)	REMARKS (color, turbidity & sediment)				
1000			2	23	.2.	6.8	U	000	BLACK,	HANY FIN	ES.		
1040			4	22.	6	7.1	44	<u>ao</u>	CLEAR -	SUME SEDIM	eut.		
1050	7.								CLEAR!	ALC SEDIM	Gal. EUT		
1100			Ç	ZI	8	7.1	5	200	CLEAR, A	10 SDIMEW	r		
						-					,		
							_	· -	 	4 1			
				•				,					
										<b>pu</b>			
										•			
	Ph (	CALIBRA	TION (C	HOOSE	TWO	)		Mode	or Unit No.:	#S			
Buffer Se		pH 4	<del></del>	H 7.0	pH 10								
Temp. °		25		25.5	•		· · ·		The second				
<del></del>	ent Readin	1		70			·						
		SPECIFI		DUCTAN	ICE - C	CALIB	RATION	:		Model or Unit N	0.: #8		
KCL Sol	ution (µmh	nos/cm at	20°C	1409	128	56							
Temp. °					26.	7							
	ent Readin	g			128	øc							
Notes	DE TI DIATION												
-	1200	BM .	Caul	DING		10	.5	PRE	-DEV				
	13.07			·/.\\		_	.5-			12' on tope	<u>}-                                    </u>		
_	INIT!	16	EPTH	/ ~	10	-5-7							



revised DV9 t

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<del></del>								<u> </u>		<del></del>			-1 /			
Weil ID:	LE	-13		<del>-</del>				_	Initial Depth to Water: 4,53 7 HMS							
Sample	ID.: 6F1	13	Juplic Juplic	210	Ď.: _	6F-1	3F	_	Depth to Water after Purging:  Total Depth of Well:							
Sample	Depth:								Tota	Depth o	of Well:	13.5				
Project	No:17:	36-1-		<del></del>				_	Well Diameter:							
Project	Name:	MAPINA	VIL	LAG	TE.		<del></del>	_	1 Casing Volume =123							
Date: _	7 1	4/95						_	4 Casing Volumes = 4.92							
Sample	d By:	NA	<u> </u>			<u>,</u>		_	Method of Purging: DVAPRAGM PUVNITY							
									Method of Sampling: DUNCHBLE BALLEIZ.							
TIME	INTAKE DEPTH	RATE (gpm)	(ga	L.		MP. C)		oH nits)	1	DUCTIVITY nhos/cm)		REMARKS lor, turbidity & s				
1010	Bithem.		Z		2(	٠ 6	6:	7	7	300	CLET	R. WELL	DRY			
1025	13'		3		Z	07	6	. 4	6	500	CUE AR					
1030	13'		4	,	19	. 9	6	,8	6	900	CLEA	2				
1035	131	ĺ	5 20.6 7.0				10	7	3 <i>0</i> 0	CUEL	R (SEMI)					
-																
1040	54	NPLE			20	.લ	6.	9	75	500	CLEAR	(SEMI)				
													<u>-</u>			
			<del></del>						<del> </del>							
									ļ							
									<u> </u>			<del>.</del>				
								•								
												<del></del>				
													<del>''</del> ''			
									•							
<u>_</u>	Ph C	ALIBRAT	ION	(CHC	OSE	TWO)			<u> </u>	Model	or Unit No	).: #8				
Buffer So	lution	pH 4.	0	pH 7	².0	pH 10	0.0									
Temp. °C	;	25	. 1	26:	9						1					
instrume	nt Reading	<i>1</i> 4.0		7.	U											
		SPECIFIC	COI			ICE - C	ALI	BRA	TION	:		Model or Ur	nit No.:#8			
KCL Sofu	ition (µmh	os/cm at 2	20°C	14	109	1285	56									
Temp. ℃ 26.2																
Instrument Reading PLSCO																
Notes			. 1	,		و بسع				7	مساحد د دست	202 /	1.050			
		<u>TPH-017</u> DH - W	<u>50.</u> 1/taz	<u>- 143</u> O	7,	SU1	801	<del>~</del>		$\frac{\imath}{2}$	FILTE	1513 1 TISKISI).	LUEIS			
		<u> </u>	14 141/			<del>''' </del>		<u>-</u>			<u> </u>	- 1 - 1 - 1 - 1 - 1 - 1				
Silica	41	Chance		<i>15</i> T	ピメ	- 3		V	<u>) /\ (</u>	<i>,</i>						



100 Pine Street, 10th Floor San Francisco, California 94111 (415) 434-9400

Well ID	wc^	3					Initial Depth	to Water: 7.42					
Sample	ID.:		Duplic	ate ID.: _				ater after Purging:					
Sample	Depth:						Total Depth	of Well: 13.5					
Project	No:	736.14					Well Diamet	er:					
Project	Name:	WARIN	<u> </u>	<u> </u>	<u>e</u>		1 Casing Volume = 1.2						
Date: _	7	13/95					4 Casing Volumes = U.8						
Sample	d By:	NAT					Method of P	urging: DIAPHRAGM DUMP.					
							Method of S	ampling:					
TIME	INTAKE DEPTH	RATE (gpm)	(gai	L.   ''	EMP. (°C)	pH (units)	CONDUCTIVIT	REMARKS (color, turbidity & sediment)					
1140			Z	20	1.3	7.7	16500	BLACK COLOR, BLACK SEIN					
1147					7.5	16600	GEAR NO SEDIMENT						
1155			7.4	1600	CLEAR NO SEDIMENT								
1200	1200				۱9	1.3	15800	CLEAR, NO SEDIMENT					
1205	265			21	.6	7.3	1500	CLEAR, NO SEDIMENT					
					****								
					-								
								·					
	Ph C	ALIBRAT	TION (	CHOOS	E TWO	)	Mod	el or Unit No.: 止ぐ					
Buffer S	olution	pH 4	.0	pH 7.0	pH 1	0.0		52.0					
Temp. °	<u> </u>	25.5	-	25.5				1000000 1000000					
Instrume	nt Reading			7.0									
		SPECIFIC					TION:	Model or Unit No.: פען					
	ution (µmh	os/cm at	20°C	1409	128								
Temp. °					76.								
	ent Reading	9			1280	0							
Notes _	DTU	J= 7.	42	11140	1 -	· · · · · · · · · · · · · · · · · · ·							
			Botto			11/4 :	14.5	PREDEV.					
<b></b>		4:	£ 2.	20.0	w=2								
	VE(	Y FA	77	4 (50/2	WER.	<del> </del>	<u> </u>						

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### MONITORING WELL SAMPLING RECORD AND WELL DEVELOPMENT DATA

	1-16-	7			tr	nitial Depth	to Water:6_90
Well ID	- <u>hlc-</u>	3 r	PLIES	D.: _wc-	35 0	epth to W	ater after Purging:
	e Depth:						-4 Mall: 14,5
	Mar	1736	<u>,14</u>		v	Vell Diame	eter:
Davisor	Nome: M	ARINA	VILL	ALE.	1	Casing V	olume =
Date:		7/14/	45			LCasing V	olumes =
Sample	ed By://	AT				viethod of	Puraina:
<b></b>	-y					Method of	Sampling:
TIME	INTAKE DEPTH	RATE (gpm)	CUM. VOL. (gal)	TEMP.	pH (units)	CONDUCTIV (µmhos/cm	
1155	14'		1.5	27.3	7.4	13600	CLFAR
i200	14'		2.5	238	7.5	11.201	O CLEAR
			4.0	23.3	1.3	1570	O LLEAR
1265			50	23.9	1.1	15300	CLEAR
1207					<u> </u>		
1215	14'	SMPL		25.0	1.2	11000	CLEAR.
1213	1 1 1 1 1 1 1	72.1					
	51	MPUS		749	6.7	15 300	- CLEAR
1230		m ruz		64.3			
		<u> </u>	<del> </del>		<b>-</b>	<del>                                     </del>	
		<u> </u>	<del>-</del>	<del> </del>	<del> </del>		
			<u> </u>	<del> </del>	<del> </del>	+	
		<u> </u>		<u> </u>	<del> </del>	<del>                                     </del>	
			<u> </u>				HC.
	Ph	CALIBRA	ATION (C	HOOSE TW	O)	N	lodel or Unit No.: # &
Buffer	Solution	pН	4.0 p	H 7.0 PH	10.0		20 P. S. S. S. S. S. S. S. S. S. S. S. S. S.
Temp		25		6.9			2.50
Instru	ment Readi	ng ul.	0 17	.0	041155	ATION	Model or Unit No.:48
				DUCTANCE		A HUN:	
KCL !	Solution (μπ	nhos/cm a	t 20°C		2856		Section 1
Temp					6.2 2500		4576
Instru	ment Read	ing					
Note	S						2 FURRED I LITE
			TPII-			2012	3 1/45/19 11/11
\$			TPH -1	Moter o	<u>1 ' h</u>	y 80	()
8	luca F	11 01	ianun				



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### MONITORING WELL SAMPLING RECORD AND WELL DEVELOPMENT DATA

<u></u>	(4.5)	707-3700		,					
Well ID:	LF.	-10						o Water: <u>5.4.8</u>	
Sample ID.: Duplicate ID.:							Depth to Water after Purging:		
Project No: 1736 14						· · · · · · · · · · · · · · · · · · ·	Total Depth o	f Well: 4.5	
Project	No:	1736.14				<del></del>	Well Diameter:		
Project	Name:	MARINA	1 (	1166	<u>-e.</u>		1 Casing Volu	ıme =	
Date:	No: Name: 7/[	3/95					4 Casing Volu	imes =	
Sample	d By:	NAT					Method of Pu	rging: DIAPHRAGM DWMP.	
						<u></u>	Method of Sa	mpling:	
TIME	INTAKE DEPTH	RATE (gpm)	CUN VOI (gai	'	EMP. (℃)	pH (units)	CONDUCTIVITY (µmhos/cm)	REMARKS (color, turbidity & sediment)	
1230			2	7	3.5	6.8	16600	CLEAR, SUME CLACK SED	
1235			5	2	27	6.9.	17300	CLEAR, NO SEDIMENT	
1240			૪	7	7.9	6.9	13500	CLEAR, NO SEDIMENT	
1245			12	27	z.3	6.9.	17800	CLEAR, NO SEDIMENT	
1250			16	2	1.8	6.0	17400	CLEAR, NO SEDIMENT	
				-					
						<del> </del>			
					<del></del>	<del>                                     </del>			
				<del></del>		<del>                                     </del>			
	Ph C	CALIBRAT	ION (	CHOOS	E TWO	)	Model	or Unit No.: 봐당	
Buffer Sc		pH 4.		pH 7.0	pH 1			*********	
Temp. °(	<b>,</b>	25.5	7 7	25.7				and the second second	
Instrume	nt Reading	9 4.0		7,0	Ī			1.000	
		SPECIFIC	CON	NDUCTA	INCE -	CALIBRA	TION:	Model or Unit No.:난중	
KCL Solution (µmhos/cm at 20°C 1409 12856									
Temp. °C 26.7				26:	7				
Instrume	nt Reading	9			1760	00			
Notes							Bottom	SOUNDING - PRE DEU	
		WELL	DE	WE WA	M EN	7	: SORMA:	245 (1225 Tap)	

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## MONITORING WELL SAMPLING RECORD AND WELL DEVELOPMENT DATA

. . . . . . . .

Well ID:		LF -10	2 (6	\ .			- TEOPMENT DATA
Sample	ID.:	E-10	Duplica	2		Initial Dep	oth to Water: 5.39.  Water after Purging:
Sample	Depth:_		- publica	ite ID.:/_[	21 (	Depth to V	Water after Purpiper
						Total Dept	th of Well:
Project N	lame:	MAPIL	A VII	LAGE		Well Diam	th of Well: 2 "
Date:	<u>-</u> -		71.	4/45		1 Casing v	/olume = 1, 5
Sampled	By:	NA	<del>(- `.</del>	4132			olumes = 6.0
-			·	<del></del>		Method of I	Purging: Dis TXAGUE
	NTAKE	247	CUM.	<del></del>		Method of S	Sampling: DIAPRAGM DIM
	DEPTH	RATE (gpm)	VOL.	TEMP.	рH	CONDUCTIVIT	
			(gai)	(°C)	(units)	(muhos/on)	I MEMADES
1315	T		2	100	<del></del>		(color, turbidity & sediment)
1217				25.9	6.9	12800	Coses
			3	23.4	68	14900	CLEAR
320	<del></del>		4	22,4	6.8		CLEAR.
1323			57	22.1		15300	CLEAR
1325		T	6	22.9	6.9	12500	CLEAR
	7		<del></del>	06.9	6.8	15500	CLEAR
							CEVAILE
7.4							
30	San pur	Ē		24.9	1.7		
			$_{-}$		***	15300	CLE472.
·					<del></del> -		
: 							
			<del></del>				
	<del></del>						
			_				
<u> </u>	h CALIE	RATION	(CHOOS	E TWO		<del></del>	
SI SOMMON	P	H 4.0	pH 7.0	pH 10.0	<del></del>	Model or	Unit No.: #8
p. °C		5.1	26.9	P/ 10.0			
umentRead		4.0	7.0	<del> </del>			A Section 1
	_SPEC	IFIC CO	NDUCTA	NCE - CALIE	20.47:-		
Solutian (யா	nhos/cm	at 20°C	1409	12856	NOITAN		Model or Unit No.:
. °C				26.2			48
ment <del>Teadir</del>	ng			1200			
				· vau			
<del></del>		717-1					
		57 /	\$1	by 8	015		
		<u> </u>	Meter	0.1		8015 2	FILTERED I LITED
Ge C	Lang					<u></u>	UNFILTERED ILITE

### WATER LEVEL MONITORING RECORD



Project	ARINA LILLAGE		Project No1736.14
Date _ 7/17/ 45	Recorded By	NAT	Instrument Used <u>STEEL TA</u> SE
Note: For your conver	nience, the following abbreviation	ons may be used.	
P = pumping ST = steel tape	i = inaccessible ES = electric eounder	D = dedicated pump MP = measuring point	WL = water level
	99.7		

Well No.	Time	MP Elevation (feet)	Water Level Below MP (feet)	Water Level Elevation (feet)	Previous Water Level Below MP	Remerke
					7/11/95	SOUNDER / ST
LF-6	0935		5.63 5.66		5.69	
Gmw-Z			6.33 6.37		7.16	
	1025		7.61 1.58		7.82	
	1040		9.13 9.12		9.24	
LF-7	1845		£ 25   £ 23		1.22	
LF-13	1055		4.7/4.78		4.72	
wc-3	1105		6.67/6.72		7.42	7/12
LF-10	115		5.5/5.53		5,48	
LE-8				•	7.95	
	1					
	-					
	,					
		· · · · · · · · · · · · · · · · · · ·				
		*				
	-					



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### APPENDIX B

ANALYTICAL LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

## American Environmental Network

### Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

GEOMATRIX CONSULTANTS 100 PINE ST., SUITE 1000 SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 5489

REPORT DATE: 09/14/95

DATE(S) SAMPLED: 07/12/95

DATE RECEIVED: 07/12/95

AEN WORK ORDER: 9507121

#### PROJECT SUMMARY:

On July 12, 1995, this laboratory received 7 water sample(s).

Client requested 4 sample(s) be analyzed for organic parameters; three samples were placed on hold. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein

Laboratory Director

Revision of report dated 08/04/95

#### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-6 AEN LAB NO: 9507121-01 AEN WORK ORDER: 9507121 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/12/95 DATE RECEIVED: 07/12/95

**REPORT DATE:** 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/20/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	07/21/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	07/22/95
TPH as Oil	GC-FID	ND	0.2	mg/L	07/22/95

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

### GEOMATRIX CONSULTANTS

SAMPLE ID: GMW-2 AEN LAB NO: 9507121-03 AEN WORK ORDER: 9507121 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/12/95 DATE RECEIVED: 07/12/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	<del>-</del>		Extrn Date	07/20/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	07/21/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/29/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/29/95

ND = Not detected at or above the reporting limit  $\star$  = Value at or above reporting limit

#### **GEOMATRIX CONSULTANTS**

SAMPLE ID: LF-11 AEN LAB NO: 9507121-05 AEN WORK ORDER: 9507121 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/12/95 DATE RECEIVED: 07/12/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
	s.				
#Extraction for TPH	EPA 3510	-		Extrn Date	07/20/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	07/21/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/25/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/25/95

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

#### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-21 AEN LAB NO: 9507121-07 AEN WORK ORDER: 9507121 CLIENT PROJ. ID: 1736.14

Equipment Blank

DATE SAMPLED: 07/12/95 DATE RECEIVED: 07/12/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/20/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	07/21/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	07/22/95
TPH as Oil	GC-FID	ND	0.2	mg/L	07/22/95

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

## AEN (CALIFORNIA) QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507121

CLIENT PROJECT ID: 1736.14

### Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

#### <u>Definitions</u>

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

- D: Surrogates diluted out.
- #: Indicates result outside of established laboratory QC limits.

### QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507121 AEN LAB NO: 0720-BLANK DATE EXTRACTED: 07/20/95
DATE ANALYZED: 07/22/95
INSTRUMENT: C

MATRIX: WATER

### Method Blank

	Result (mg/L)	Reporting Limit (mg/L)
Diesel	ND	0.05
Oil	ND	0.2

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507121

INSTRUMENT: C MATRIX: WATER

### Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
07/22/95 07/25/95 07/25/95 07/22/95	LF-6 GMW-2 LF-11 LF-21	01 03 05 07	94 101 101 106
QC Limits:			59-118

DATE EXTRACTED: 07/17/95 DATE ANALYZED: 07/17/95 SAMPLE SPIKED: DI WATER INSTRUMENT: C

### Method Spike Recovery Summary

	Spike	Sample	LCS	LCSD	Average		QC Li	mits
Analyte	Conc. (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Percent Recovery	RPD	Percent Recovery	RPD
Diesel	1.82	ND	1.62	1.60	89	1	65-103	12

9507121 Chain-of-Custody Record § 10 5489 7/12/95 Date: Page Project No.: ANALYSES REMARKS Samplers (Signatures): Vallance / A Taylu ó Additional comments Number of containers EPA Method 8020 EPA Method 6240 EPA Method 8270 TPH as gasoline - Moto TPH as dieser TPH as BTEX Silica Gel Cleanup ŏ Soil (S) K on All Analyses. Time Sample Number 7/12/9 1095 LF-6 1010B All Fillevel Samples 1035 X X 1045 1.F-6 F- UIA À on Hold. Please X X GMU1-2-10MB Provide Rosulls X 1235 G-MW-7\_ X γ 1235 GMU -2 F CHING Verbally within 1 X 1235 Cambo 25 X Ϋ́ 1345 LF-11 SOSAB X Weele. 1345 LF-11 LF-GF ) HOLD GMW-ZF & FILTIERED LF-HF ) SAMPLES. 1340 LF - 11 F SOLAR X Х 1340 LF -11F1 Y ¥ LF-21 0713 Turnaround time Results to: Total No. of containers: TWO WEEKS. YVUNNE AFRCE Relinquished by: A/AT Date: Relinquished by Relinguished by: Method of shipment: Date Pick-Up -1/10/41 Signature: Signature: Laboratory comments and Log No. Printed name: Printed name: NATIANIEL TAYLOR Company: Company: Company: GEUND IVIX. Received by: Time: Received by: Received by Time: Time: Signature: Signature Medical le Midden Printed name Printed name / Welly / -Printed name Printed name NEIV Geometrix Consultants 100 Pine St. 10th Floor Company: Company: San Francisco, CA 94111 (415) 434-9400

## American Environmental Network

### Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

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GEOMATRIX CONSULTANTS 100 PINE ST., SUITE 1000 SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 6333

REPORT DATE: 09/14/95

DATE(S) SAMPLED: 07/13/95

DATE RECEIVED: 07/14/95

AEN WORK ORDER: 9507160

#### PROJECT SUMMARY:

On July 14, 1995, this laboratory received 4 water sample(s).

Client requested 2 sample(s) be analyzed for organic parameters; two samples were placed on hold. On July 25, 1995, client requested one sample be taken off hold to be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein

Laboratory Director

Revision of report dated 08/10/95

#### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-7

AEN LAB NO: 9507160-01 AEN WORK ORDER: 9507160 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/13/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX Benzene Toluene Ethylbenzene Xylenes, Total	EPA 8020 71-43-2 108-88-3 100-41-4 1330-20-7	ND ND ND ND	0.5 0.5	ug/L ug/L ug/L ug/L	07/17/95 07/17/95 07/17/95 07/17/95
#Extraction for TPH	EPA 3510	-		Extrn Date	07/24/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	e 07/24/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/25/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/25/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

### GEOMATRIX CONSULTANTS

**SAMPLE ID:** LF-12 **AEN LAB NO:** 9507160-03 AEN WORK ORDER: 9507160 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/13/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/24/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	07/24/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/29/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/29/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

#### GEOMATRIX CONSULTANTS

**SAMPLE ID:** LF-12F **AEN LAB NO:** 9507160-04 AEN WORK ORDER: 9507160 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/13/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/27/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/02/95
TPH as Diesel	GC-FID	0.09 *	0.05	mg/L	08/03/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/03/95

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

#### AEN (CALIFORNIA) QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507160

CLIENT PROJECT ID: 1736.14

### Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

#### <u>Definitions</u>

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

- D: Surrogates diluted out.
- #: Indicates result outside of established laboratory QC limits.

#### QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507160 AEN LAB NO: 0724-BLANK DATE EXTRACTED: 07/24/95
DATE ANALYZED: 07/26/95
INSTRUMENT: C

MATRIX: WATER

### Method Blank

	Result (mg/L)	Reporting Limit (mg/L)
Diesel	ND	0.05
Oil	ND	0.2

AEN LAB NO: 0727-BLANK DATE EXTRACTED: 07/27/95 DATE ANALYZED: 08/03/95

INSTRUMENT: C

#### Method Blank

	Result (mg/L)	Reporting Limit (mg/L)		
Diesel	ND	0.05		
Oil	ND	0.2		

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507160 INSTRUMENT: C

MATRIX: WATER

### Surrogate Standard Recovery Summary

Data			Percent Recovery
Date Analyzed	Client Id.	Lab Id.	n-Pentacosane
07/26/95 07/26/95 08/03/95	LF-7 LF-12 LF-12F	01 03 04	97 95 108
QC Limits:			59-118

DATE EXTRACTED: 07/21/95 07/21/95 DI WATER DATE ANALYZED: SAMPLE SPIKED:

INSTRUMENT: C

### Method Spike Recovery Summary

	Spike	Sample	LCS	LCSD	Average		QC Li	mits
Analyte	Conc. (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Percent Recovery	RPD	Percent Recovery	RPD
Diesel	1.82	ND	1.55	1.53	85	1	65-103	12

DATE EXTRACTED: 07/27/95 DATE ANALYZED: 07/27/95 SAMPLE SPIKED: INSTRUMENT: C DI WATER

### Method Spike Recovery Summary

	Spike	Sample	LCS	LCSD	Average		QC Li	mits
Analyte	Conc. (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Average Percent Recovery	RPD	Percent Recovery	RPD
Diesel	1.82	ND	1.66	1.75	94	5	65-103	12

METHOD: EPA 8020

AEN JOB NO: 9507160 AEN LAB NO: 0717-BLANK DATE ANALYZED: 07/17/95 INSTRUMENT: H MATRIX: WATER

### Method Blank

	CAS #	Result (ug/L)	Reporting Limit (ug/L)
Benzene Toluene Ethylbenzene Xylenes. Total	71-43-2 108-88-3 100-41-4 1330-20-7	ND ND ND ND	0.5 0.5 0.5

METHOD: EPA 8020

AEN JOB NO: 9507160

INSTRUMENT: H MATRIX: WATER

### Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
07/17/95	LF-7	01	98
QC Limits:	•		92-109

DATE ANALYZED: 07/17/95 SAMPLE SPIKED: LCS INSTRUMENT: H

### Laboratory Control Sample Recovery

					QC Limits
Analyte	Spike Added (ug/L)	LCS Result (ug/L)	LCSD Result (ug/L)	Average Percent Recovery	Percent Recovery
Benzene Toluene	36.1 99.3	36.1 109.0	38.6 114.0	104 112	60-120 60-120

7507160 7507159 DS4 7/14/95

Chain-of-Custody Record	6333	Date:	7/14/95	Page of
Project No.:	ANALYSES			REMARKS
1736 IV	9		water (W)	Additional comments
Marina Sample Number  Date Time Sample Number	TPH as diesel TPH as BTEX  [72/-1/7]		Soil (S) or water (W)  Acidified  Number of containers	LICA GEL EAN UP HON YOU'S
Date Time Sample Number Lin Lin Lin Lin Lin Lin Lin Lin Lin Lin	<del>                                     </del>	<del></del>	OB & Z CU	EAN UP TON !!
7/13 1555 65-7			XWX3	A LAN Marine
7/13 1605 CF -7-	XX		XWX3 XWXZ16	L AMAEISTS.
7/13 1620 LF-7 F=	X X X	12/26	XWXZ PL	EASE HULD
7/13 1430 LF-12 1/13 1420 LF-12F	X X Y) Y' W	- 10 - 17 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	1 1 1 1 1 1 1 1 1 1	-7F
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Turnaround time:	Results to:	Total No.	of containers:	
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Signature () Signature:	(RPM 10 700) 8	ignature:		
	N. 8	rinted name	// <u>//</u>	Geometrix Consultants 100 Pine St. 10th Floor
Company: Company:		ompany:		San Francisco, CA 94111 (415) 434-9400

NONCONFORMANCE REPORT
Please record today's DATE: 7/15/95
Circle your DEPT: CS EX GC IN MS QA SC Other
Please provide ALL the following information:  AEN Proj. # 9507/60 Company Geometric  Sample ID see below Project (1736.14  Analysis see below Contact Gunne Pierce
Indicate the REASON for this Nonconformance Report  Documents incomplete Missing sample Sample mislabeled  Improper preservation Sample warm Wrong container  Sample damaged Leaking sample Headspace in VOA  Insufficient sample QC recovery out Positive blank  Holding time expired XOther (explain):
Describe the SITUATION leading to this Nonconformance
(1) Verify silice all cleanup on lettractables only (2) Please document original CoC
Is it necessary to inform the Client? (Y/N) If so, in the space below write the full name of person contacted:    Uverne Piece   was notified (verbally by fax) on pare/time   7/15/95   by   USH   from AEN.    Describe the CORRECTIVE ACTIONS taken and when.
Sample on HOLD: Processed AS IS: Sample RERUN: RESAMPLED:
DATE: 1 /1995 Yvonne Picre Called 805 7-17-95  Uso - siliaa gel Crang on Extractable
only-diginal COC documented. Polyan
Continued on Corrective Action Form.
Continued on Corrective Action Form.  Please DATE: 7/15/95 and SIGN here: Newsl Harrington
Continued on Corrective Action Form.

SCREONM. V3

Effective: April 17, 1995

## American Environmental Network

### Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

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GEOMATRIX CONSULTANTS 100 PINE ST., SUITE 1000 SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 6335

REPORT DATE: 09/15/95

DATE(S) SAMPLED: 07/14/95

DATE RECEIVED: 07/14/95

AEN WORK ORDER: 9507159

#### PROJECT SUMMARY:

On July 14, 1995, this laboratory received 8 water sample(s).

Client requested 3 sample(s) be analyzed for organic parameters; five samples were placed on hold. On July 25, 1995, client requested four samples be taken off hold to be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein

Laboratory Director

### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-13

#Silica gel Cleanup

TPH as Diesel

TPH as 0il

AEN LAB NO: 9507159-01 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/14/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

Cleanup Date 08/04/95

08/05/95

08/05/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX Benzene Toluene Ethylbenzene Xylenes. Total	EPA 8020 71-43-2 108-88-3 100-41-4 1330-20-7	ND ND ND ND	0.5 0.5 0.5 2	ug/L	07/17/95 07/17/95 07/17/95 07/17/95
#Extraction for TPH	EPA 3510	-		Extrn Date	07/21/95

0.05 \*

ND

0.05 mg/L

0.2 mg/L

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

EPA 3630

GC-FID

GC-FID

### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-13F AEN LAB NO: 9507159-02 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14

**DATE SAMPLED:** 07/14/95 DATE RECEIVED: 07/14/95

**REPORT DATE:** 09/15/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
	·				· <del></del>
#Extraction for TPH	EPA 3510	-		Extrn Date	07/27/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/03/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	09/02/95
TPH as Oil	GC-FID	ND	0.2	mg/L	09/02/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

### **GEOMATRIX CONSULTANTS**

SAMPLE ID: WC-3 AEN LAB NO: 9507159-03 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14 **DATE SAMPLED:** 07/14/95

DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

ANALYTE	METHOD/ CAS#	RESULT RE	PORTING LIMIT	i UNITS	DATE ANALYZED
•	:		•		
#Extraction for TPH	EPA 3510	-		Extrn Date	07/21/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/04/95
TPH as Diesel	GC-FID	0.1 *	0.05	mg/L	08/05/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/05/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

### GEOMATRIX CONSULTANTS

SAMPLE ID: WC-3F

AEN LAB NO: 9507159-04 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Èxtrn Date	07/27/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/03/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	09/02/95
TPH as Oil	GC-FID	ND	0.2	mg/L	09/02/95

ND = Not detected at or above the reporting limit  $\star$  = Value at or above reporting limit

#### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-10 AEN LAB NO: 9507159-05 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/14/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

	METHOD/		G	DATE	
ANALYTE	CAS#	RESULT	LIMIT	UNITS	ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/21/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/04/95
TPH as Diesel	GC-FID	0.06 *	0.05	mg/L	08/29/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/29/95

ND = Not detected at or above the reporting limit
 \* = Value at or above reporting limit

### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-10F

AEN LAB NO: 9507159-06 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14 DATE SAMPLED: 07/14/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	G UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	07/21/95
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	08/04/95
TPH as Diesel	GC-FID	0.07 *	0.05	mg/L	08/04/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/04/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

### GEOMATRIX CONSULTANTS

SAMPLE ID: LF-18

AEN LAB NO: 9507159-07 AEN WORK ORDER: 9507159 CLIENT PROJ. ID: 1736.14

Digitate of LF-10

DATE SAMPLED: 07/14/95 DATE RECEIVED: 07/14/95 REPORT DATE: 09/15/95

	METHOD/	R	DATE		
ANALYTE	CAS#	RESULT	RESULT LIMIT		ANALYZED
#Extraction for TPH	EPA 3510			Extrn Date	07/21/95
		-			
#Silica gel Cleanup	EPA 3630	-		Cleanup Date	
TPH as Diesel	GC-FID	0.06 *	0.05	mg/L	08/05/95
TPH as Oil	GC-FID	ND	0.2	mg/L	08/05/95

ND = Not detected at or above the reporting limit
\* = Value at or above reporting limit

#### AEN (CALIFORNIA) QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507159

CLIENT PROJECT ID: 1736.14

### Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

#### <u>Definitions</u>

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

- D: Surrogates diluted out.
- #: Indicates result outside of established laboratory QC limits.

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507159 AEN LAB NO: 0721-BLANK DATE EXTRACTED: 07/21/95 DATE ANALYZED: 07/22/95

INSTRUMENT: C MATRIX: WATER

#### Method Blank

	Result (mg/L)	Reporting Limit (mg/L)
Diesel	ND	0.05
Oil	ND	0.2

AEN LAB NO: 0727-BLANK DATE EXTRACTED: 07/27/95 DATE ANALYZED: 08/03/95

INSTRUMENT: C

### Method Blank

Niesel	Result (mg/L)	Reporting Limit (mg/L)
Diesel	ND	0.05
Oil	ND	0.2

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507159

INSTRUMENT: MATRIX: WATER

### Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
08/05/95 09/02/95 08/05/95 09/02/95 08/29/95 08/29/95 08/04/95 08/05/95	LF-13 LF-13F WC-3 WC-3F LF-10 LF-10F LF-18	01 02 03 04 05 06 07	61 66 103 118 81 95 96
QC Limits:			59-118

DATE EXTRACTED: 07/21/95 DATE ANALYZED: 07/21/95 SAMPLE SPIKED: DI WATER

INSTRUMENT: C

### Method Spike Recovery Summary

			· ·			QC Lin	its
Analyte	Spike Conc. (mg/L)	LCS Result (mg/L)	LCSD Result (mg/L)	Average Percent Recovery	RPD	Percent Recovery	RPD
Diesel	1.82	1.55	1.53	85	1	65-103	12

DATE EXTRACTED: 07/27/95 DATE ANALYZED: 07/27/95 SAMPLE SPIKED: INSTRUMENT: C DI WATER

### Method Spike Recovery Summary

				_		QC Lim	iits
Analyte	Spike Conc. (mg/L)	LCS Result (mg/L)	LCSD Result (mg/L)	Average Percent Recovery	RPD	Percent Recovery	RPD
Diesel	1.82	1.66	1.75	94	5	65-103	12

METHOD: EPA 8020

AEN JOB NO: 9507159 AEN LAB NO: 0717-BLANK DATE ANALYZED: 07/17/95

INSTRUMENT: H MATRIX: WATER

### Method Blank

	CAS #	Result (ug/L)	Reporting Limit (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2

METHOD: EPA 8020

AEN JOB NO: 9507159 INSTRUMENT: H

MATRIX: WATER

### Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
07/17/95	LF-13	01	99
QC Limits:			92-109

DATE ANALYZED: 07/17/95

SAMPLE SPIKED: INSTRUMENT: H LÇŞ

### Laboratory Control Sample Recovery

· · · · · · · · · · · · · · · · · · ·					QC Limits
Analyte	Spike Added (ug/L)	LCS Result (ug/L)	LCSD Result (ug/L)	Average Percent Recovery	Percent Recovery
Benzene Toluene	36.1 99.3	36.1 109.0	38.6 114.0	104 112	60-120 60-120

645C

9507159

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		Chai	n-of-Custod	y F	?ec	or	d				Νõ		63	35	)					$\perp$	Date	<b>)</b> :	7/1	4/	45	Page / of /
	Project No											ANA	LYSE	S				_			1				<del></del>	REMARKS
	Samplers	173 (Signature L'Alln	6 w/ 195): Ind A. Taylo	Zet o	EPA Method 8020	Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	TPI-Wets Cal					270,						1	(S) or water (W)	Acidified	Number of containers	Additional comments  SILICA GEL
	Date	Time	Sample Number	EPA	EPA	EPA	EPA	ξ	TPH	Ŧ	H			l		$\mathcal{I}$				ا ر		18	Soil (S)	Acid	Ę	
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	Company				ľ	vanje	any.									iripa	···y .									San Francisco, CA. 94111 (415) 434-9400

### NONCONFORMANCE REPORT

COEN

Please record today's DATE: 7/15/95	<u>-</u>	12/2
		:her
Please provide ALL the following info AEN Proj. # 9507159 Sample ID <u>All below</u> Analysis <u>See below</u>	ermation: Company Ge Project	omatrix
Insufficient sampleQC r	sing sample	Sample mislabeled Wrong container
Holding time expired XOther  Describe the SITUATION lea	<del>-</del>	formance correct
(1) Verify Samples on hold - 7 (2) Verify silica get Cleanup of not BIEX (3) Please note verifications	w extractables	(WC-3Freed) Only- true
<u> </u>		
Is it necessary to inform the Client?( the full name of person contacted:  Union Purce was  Date/time 7/15/95  Describe the CORRECTIVE	notified (verbally)	y fax) on from AEN.
Describe the CORRECTIVE  Sample on HOLD: Processed AS IS:	by Notified (verbally) by Notified (verbally) by ACTIONS taken and w	from AEN. then. RESAMPLED:
Describe the CORRECTIVE  Sample on HOLD: Processed AS IS:	notified (verbally) by North ACTIONS taken and was sample RERUN:	ry fax) on from AEN.  then.  RESAMPLED:  05 7-1)-95
Date/time Pierce was  Date/time 7/15/95  Describe the CORRECTIVE  Sample on HOLD: Processed AS IS:  DATE: / /1995 Yuan & Pi  all Samples  End an an hold.	notified (verbally) by North ACTIONS taken and was sample RERUN:  ACT Called 8  with an "F"	ry fax) on from AEN.  then.  RESAMPLED:  OS 7-1)-95  M UNL  Clanyp on
the full name of person contacted:    Ustante Pierce   was	notified (verbally)  by North  ACTIONS taken and w  Sample RERUN:  Called 8  With an "F"  Cilica Gil C  Continued on Correct  ad SIGN here: Num  Manager Polini  mager Allen  Continued on Correct  Manager Polini  Manager Allen  Mana	resampled:  OF 7-1)-95  Millianyp on  tive Action Form.

Effective: April 17, 1995

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