PORT OF OAKLAND

July 13, 2000

#1222

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: **June 2000 Second Quarterly Groundwater Monitoring Report, Crowley Yard II, 321 Embarcadero, Oakland**

Dear Mr. Chan:

Please find enclosed the second quarterly groundwater monitoring report for Crowley Yard II, Oakland. The quarterly monitoring was based on a work plan included in Baseline's *Soil and Groundwater Investigation/Human and Ecological Risk Evaluation Report dated April 21, 2000.*

At the conclusion of the quarterly sampling events in January 2001, the data will be compared to the ecological screening/action levels to confirm that no ecological impacts from residual groundwater contamination are expected at the site.

If you have any questions concerning the report, please contact me at 510-627-1184.

Sincerely,

Douglas P. Herman
Associate Port Environmental Scientist

Cc w/encl.: Michele Heffes

Cc w/o encl.: Yane Nordhav, Baseline
Leroy Griffin, OES

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone (510) 272-1100 ■ Fax (510) 272-1172 ■ TDD (510) 763-5703 ■ Cable address, PORTOFOAK, Oakland

BASELINE

ENVIRONMENTAL CONSULTING

5 July 2000
98379-24

Mr. Douglas Herman
Port of Oakland
EH and SC Department
530 Water Street, 2nd Floor
Oakland, CA 94607

Subject: June 2000 Second Quarterly Groundwater Monitoring Report, Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California

Dear Mr. Herman:

The purpose of this report is to document the second quarterly groundwater monitoring at Pacific Dry Dock Yard II, 321 Embarcadero, Oakland, California (Figures 1 and 2). The work was based on a workplan included in BASELINE's *Soil and Groundwater Quality Investigation/Human Health and Ecological Risk Evaluation,* dated April 2000. This monitoring report describes groundwater sampling procedures and presents the analytical results of groundwater samples collected from the site on 8 June 2000. The details of the monitoring well installations were included in the April 2000 BASELINE report.

Field Activities

On 8 June 2000, groundwater samples were collected from the three on-site monitoring wells (MW-1, MW-2, and MW-3). The depth to groundwater and the presence of free product were checked in each well prior to well purging. Groundwater was slowly purged from each well using a peristaltic pump and clean disposable tubing until the temperature, conductivity, and pH of the purged water had stabilized, or a minimum of three well casing volumes had been removed. Purged water was temporarily stored on-site in 55-gallon drums awaiting off-site disposal by a Port contractor. Water levels were measured again prior to sampling to ensure that levels had recovered sufficiently to allow sample collection.

Groundwater samples were collected using a peristaltic pump and clean disposable tubing. Once filled, sample containers were sealed, labeled, stored in a plastic cooler containing blue ice, and transported under chain-of-custody procedures to Sequoia Analytical in Walnut Creek, California, a California-certified analytical laboratory. Each sample was

analyzed for total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo), benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), and cadmium, total chromium, lead, nickel, and zinc. The groundwater sampling activities were recorded on the Groundwater Sampling forms included in Attachment A.

Groundwater Levels and Flow Direction

Groundwater levels measured in the on-site wells are summarized in Table 1. Free product was not identified in any of the three wells monitored. The calculated groundwater flow direction, based on measurements collected from the three wells on 8 of June 2000, was N15W (Figure 2) with a gradient magnitude of 0.0145.

Analytical Results

The analytical results for the groundwater samples are summarized in Table 2. TPHd was detected in groundwater samples MW-1 and MW-2 at concentrations of 390 and 450 µg/L, respectively, and TPHmo was detected in MW-2 only, at 260 µg/L. The laboratory indicated that it was unidentified hydrocarbons, ranging between C9 and C24, that were detected in these samples. The MW-3 sample did not contain TPHd or TPHmo above the laboratory reporting limits.

Benzene was detected at 1.4 µg/L, ethylbenzene at 0.8 µg/L, and xylenes at 0.84 µg/L in MW-1. The MW-2 sample was reported to contain 1.6 µg/L of ethylbenzene. No BTEX were reported in MW-3. Naphthalene was detected at 15 and 7.5 µg/L in MW-1 and MW-2, respectively. MW-3 did not contain PAHs above the laboratory reporting limit of 5.0 µg/L. Metals were not detected at concentrations exceeding the laboratory reporting limits in any of the samples except for lead in MW-3 (28 µg/L). A copy of the laboratory report is included in Attachment B.

Conclusions

The results of the second quarterly groundwater monitoring event indicate that groundwater flows to the north-northwest. Therefore, MW-1 is located upgradient from the former tank locations, while MW-2 and MW-3 are located downgradient of the former tanks GF-11 and GF-12, respectively. Well MW-1 (upgradient) contained TPHd, above the laboratory reporting limits. Well MW-2 (downgradient of former Tank GF-11) contained TPHd, TPHmo, ethylbenzene, and naphthalene above the laboratory reporting limits. Well MW-3 (downgradient of former Tank GF-12) contained lead, but did not contain any organic compounds above laboratory reporting limits.

Groundwater monitoring should occur in September 2000; that groundwater event would constitute the third of four groundwater monitoring events. After the fourth groundwater

monitoring event, the data should be evaluated to determine whether the site could be submitted for consideration by the County for closure. If the Port were to submit the site for closure consideration, the Port would need to respond to the five comments made by the County in their 3 May 2000 letter, specifically concerning:

1. Future sampling along fuel pipelines located under the current residual foundations, when the foundations are removed.

2. Evaluation of clean-up levels for PAHs and TPHmo.

3. Evaluation of the potential impacts to ecological receptors from residual soil contaminants.

4. Preparation of a soil and groundwater management plan, including provisions for future maintenance worker health and safety, assuming that the site would become a park.

5. Provision for a deed restriction (limiting future land use of the site and prohibiting the use of groundwater underlying the site) and either the installation of a cap or the covering of the site with clean soil in areas of known contamination.

If you have any questions, or need any clarification, please call us at your convenience.

Sincerely,

Yane Nordhav
Principal
Reg. Geologist No. 4009

Jeffrey Kane
Environmental Engineer

YN:JK:km
Attachments

TABLE 1

GROUNDWATER ELEVATIONS AND GRADIENT DETERMINATION

Pacific Dry Dock, Yard II

321 Embarcadero, Oakland, California

Date	MW-1[1]		MW-2[2]		MW-3[3]		Groundwater[5] Flow Direction	Gradient[5] Magnitude
	Depth to Groundwater (ft)	Groundwater Elevations[4] (ft)	Depth to Groundwater (ft)	Groundwater Elevations[4] (ft)	Depth to Groundwater (ft)	Groundwater Elevations[4] (ft)		
3/6/00	2.15	4.28	3.63	4.10	3.85	2.64	N76W	0.0099
6/8/00	2.06	4.37	3.96	3.77	5.11	1.38	N15W	0.0145

[1] Top of well casing elevation = 6.43.
[2] Top of well casing elevation = 7.73.
[3] Top of well casing elevation = 6.49.
[4] Elevations are in feet above mean sea level.
[5] Flow direction and gradient magnitude determined by three-point method.

TABLE 2

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER

Pacific Dry Dock, Yard II

321 Embarcadero, Oakland, California

(µg/L)

	MW-1		MW-2		MW-3	
Date	**3/6/00**	**6/8/00**	**3/6/00**	**6/8/00**	**3/6/00**	**6/8/00**
Petroleum Hydrocarbons (DHS LUFT Method)						
TPH as diesel	**120**[1,2]	**390**[3]	**240**[3]	**450**[3]	<50	<50
TPH as motor oil	**250**	<250	<250	**260**[3]	<250	<250
Volatile Organic Compounds (DHS LUFT Method)						
Benzene	**0.67**	**1.4**	<0.5	<0.50	<0.5	<0.50
Toluene	<0.5	<0.5	<0.5	<0.50	<0.5	<0.50
Ethylbenzene	**3.6**	**0.80**	**4.4**	**1.6**	<0.5	<0.50
Xylenes (total)	<0.5	**0.84**	<0.5	<0.50	<0.5	<0.50
Polycyclic Aromatic Hydrocarbons (Method 8270B)						
Naphthalene	<5.0	**15**	**39**	**7.5**	<5.0	<5.0
Acenaphthylene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acenaphthene	<5.0	<5.0	**15**	<5.0	<5.0	<5.0
Fluorene	<5.0	<5.0	**5.8**	<5.0	<5.0	<5.0
Phenanthrene	<5.0	<5.0	**6.5**	<5.0	<5.0	<5.0
Anthracene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Fluoranthene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Pyrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzo(a)anthracene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Table 2: **SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER-** ***continued***

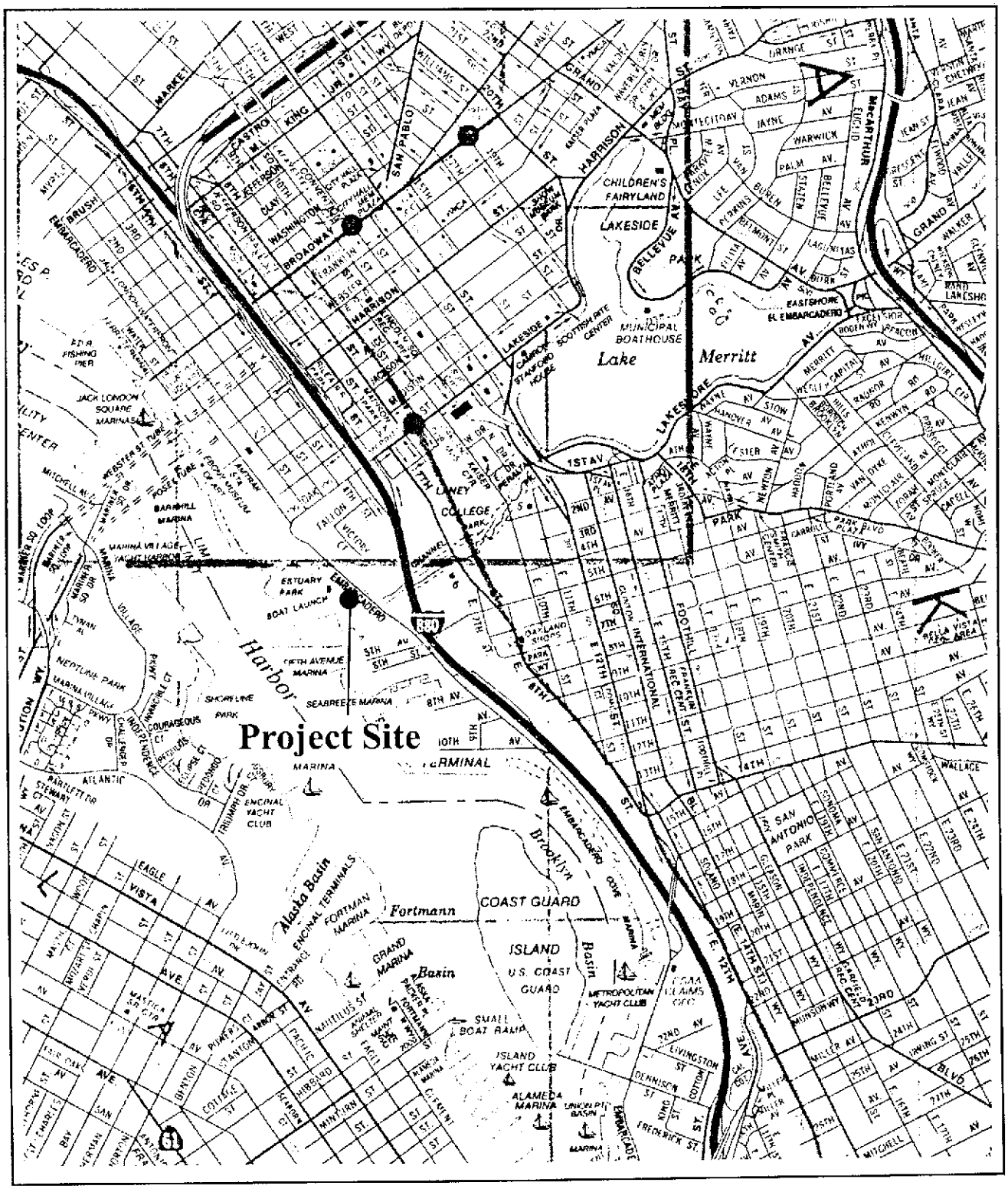
	MW-1		MW-2		MW-3	
Date	**3/6/00**	**6/8/00**	**3/6/00**	**6/8/00**	**3/6/00**	**6/8/00**
Chrysene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzo(b)fluoranthene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzo(k)fluoranthene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzo(a)pyrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibenzo(a,b)anthracene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzo(g,h,i)perylene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Indeno(1,2,3-cd)pyrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Metals (ICP Scan Method)						
Cadmium	<10	<10	<10	<10	<10	<10
Chromium	**23**	<10	**24**	<10	<10	<10
Lead	<20	<20	<20	<20	<20	**28**
Nickel	**16**	<10	**29**	<10	<10	<10
Zinc	<40	<20	<40	<20	<40	<20

Notes:
<xx = Compound not identified above reporting limit of xx.
-- = Not analyzed.
µg/L = micrograms per liter.
TPH = Total petroleum hydrocarbons.

[1] Identified as discrete peaks in the laboratory report.
[2] Chromatogram pattern: Unidentified Hydrocarbons > C16.
[3] Chromatogram pattern: Unidentified Hydrocarbons > C9-C24.

REGIONAL LOCATION

Figure 1



Pacific Dry Dock Yard II
321 Embarcadero
Oakland, California

0 2000 Feet

BASELINE

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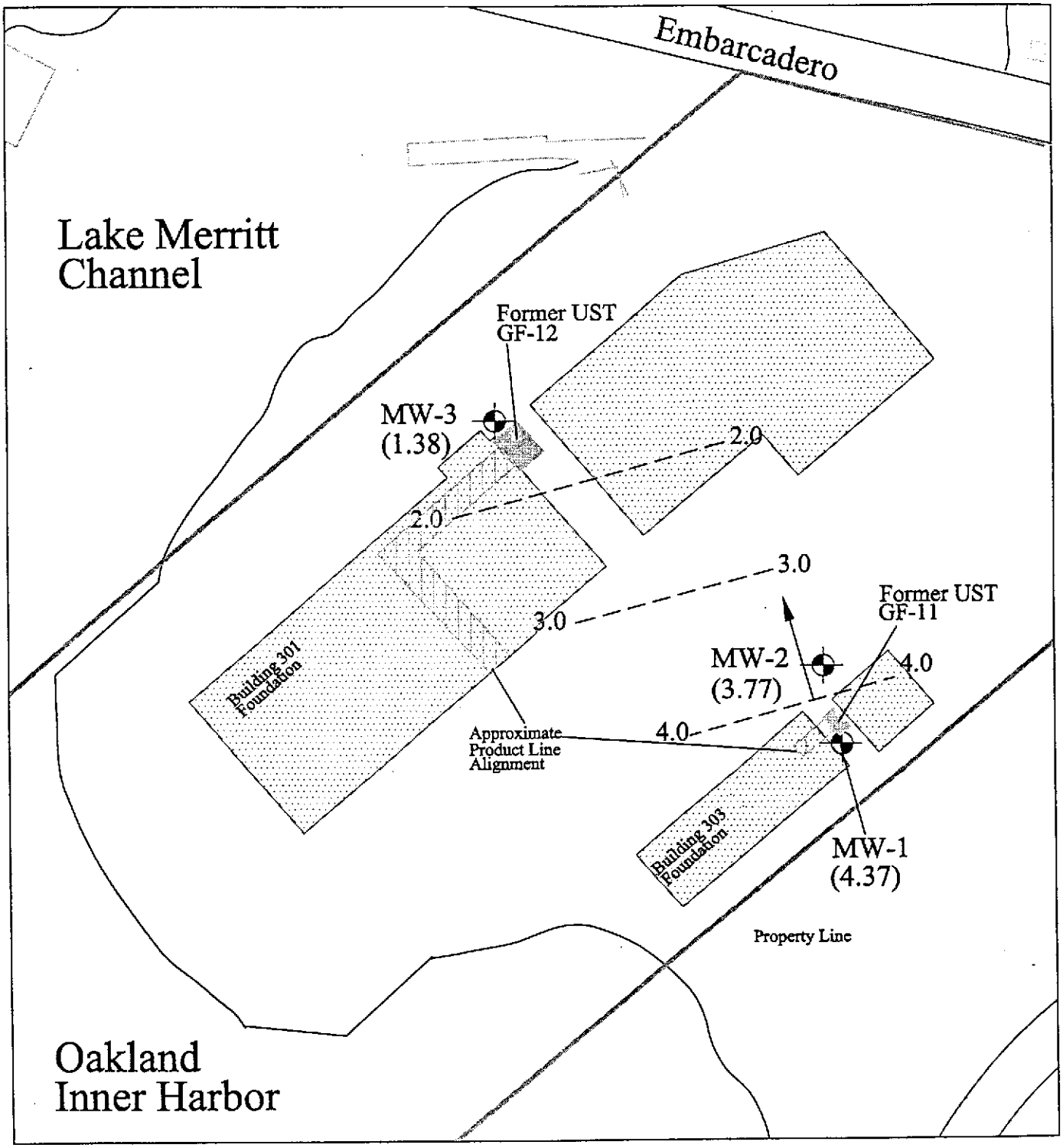
SITE PLAN AND GROUNDWATER CONTOURS
March 2000

Figure 2



Legend

Monitoring Well Location

Groundwater Flow Direction

3.0 – – – 3.0 Groundwater Elevation Contour

(4.37) Groundwater Elevation (feet msl)

Pacific Dry Dock Yard II
321 Embarcadero, Oakland

0 75 Feet

N

BASELINE

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ATTACHMENT A

GROUNDWATER SAMPLING FORMS

GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-1 Date: 06/08/2000
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	10.03
Location:	321 Embarcadero	Well diameter (inch):	2
	Oakland, CA	Screened interval from TOC (feet):	2-10
Recorded by:	WKS/AS	TOC elevation (feet):	6.43
Weather:	Cloudy	Water level from TOC (feet):	2.06 Time: 9:52
Precip in past		Product level from TOC (feet):	None Time: 9:52
5 days (inch):	≈0.25	Water level measurement:	Dual interface probe

VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

[(10.03 ft) - (2.06 ft)] × (0.083 ft)² × 3.14 × 7.48 =
Well depth Water level Well radius

1.29 gallons in one well volume
3.86 gallons in 3 well volumes
4.0 total gallons removed

CALIBRATION:

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:					
Before Purging:	9:40	16.4	7.00/10.01	1,000	0.0/5.0
After Purging:	11:30	19.4	6.88/9.94	1,061	0.0/5.01

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	NTU
11:11	18.9	7.30	24,550	1.0	Clear with black particles (algae)	1.11
11:15	19.5	7.19	24,660	2.0	Clear with black particles (algae)	0.39
11:17	19.7	7.23	24,670	2.5	Clear with black particles (algae)	0.14
11:20	19.7	7.22	24,670	3.0	Clear with black particles (algae)	0.10
11:25	19.5	7.27	24,540	4.0	Clear with black particles (algae)	0.01

D.O. reading prior to sampling:	0.40 mg/L	Time:	11:30
Appearance of sample:	Clear / 0.01 NTU	Time:	11:30
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump	VOC attachment:	NA
Sample containers:	2-liter amber glass, 3-4 ml VOAs, 1-liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, PAH, Cd, Cr, Pb, Ni, Zn	Laboratory:	Sequoia Analytical
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

BASELINE • 5900 Hollis Street, Suite D • Emeryville, CA 94608 • (510) 420-8686 • Fax (510) 420-1707

GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-2	Date:	06/08/2000
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	10.01		
Location:	321 Embarcadero	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	2-10		
Recorded by:	WKS/AS	TOC elevation (feet):	7.73		
Weather:	Cloudy	Water level from TOC (feet):	3.96	Time:	9:54
Precip in past		Product level from TOC (feet):	None	Time:	9:54
5 days (inch):	=0.25	Water level measurement:	Dual interface probe		

VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

[(10.01 ft) - (3.96 ft)] × (0.083 ft)² × 3.14 × 7.48 =

Well depth Water level Well radius

0.97 gallons in one well volume
2.93 gallons in 3 well volumes
3.0 total gallons removed

CALIBRATION:

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:					
Before Purging:	9:40	16.4	7.00/10.01	1,000	0.0/5.0
After Purging:	11:30	19.4	6.88/9.94	1,061	0.0/5.01

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	NTU
10:35	19.6	7.29	18,210	0.5	Clear	0.58
10:40	19.6	7.39	18,240	1.5	Clear	0.00
10:44	19.5	7.41	18,190	2.0	Clear	0.21
10:48	19.4	7.41	18,290	2.5	Clear	0.35
10:55	19.3	7.45	17,290	3.0	Clear	0.21

D.O. reading prior to sampling:	1.29 mg/L	Time:	10:55
Appearance of sample:	Clear / 0.21 NTU	Time:	10:55
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump	VOC attachment:	NA
Sample containers:	2-liter amber glass, 3-40 ml VOAs, 1-liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, PAH, Cd, Cr, Pb, Ni, Zn	Laboratory:	Sequoia Analytical
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

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GROUNDWATER SAMPLING

Project no.:	98379-24	Well no.:	MW-3 Date: 06/08/2000
Project name:	Pacific Dry Dock Yard II	Depth of well from TOC (feet):	11.05
Location:	321 Embarcadero	Well diameter (inch):	2
	Oakland, CA	Screened interval from TOC (feet):	4-11
Recorded by:	WKS/AS	TOC elevation (feet):	6.49
Weather:	Cloudy	Water level from TOC (feet):	5.11 Time: 9:35
Precip in past		Product level from TOC (feet):	None Time: 9:35
5 days (inch):	≈0.25	Water level measurement:	Dual interface probe

VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

[(11.05 ft) - (5.11 ft)] × (0.083 ft)² × 3.14 × 7.48 =
Well depth Water level Well radius

0.96 gallons in one well volume
2.88 gallons in 3 well volumes
3.0 total gallons removed

CALIBRATION:

	Time	Temp (° C)	pH	EC (µmho/cm)	NTU
Calibration Standard:					
Before Purging:	9:40	16.4	7.00/10.01	1,000	0.0/5.0
After Purging:	11:30	19.4	6.88/9.94	1,061	0.0/5.01

FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance	NTU
10:00	20.4	6.88	11,280	0.5	Clear	0.03
10:06	20.1	6.89	11,190	1.5	Clear	0.00
10:11	19.8	6.90	11,190	2.5	Clear	0.01
10:15	19.8	6.91	11,200	3.0	Clear	0.00

D.O. reading prior to sampling:	0.94 mg/L	Time:	10:20
Appearance of sample:	Clear / 0.00 NTU	Time:	10:20
Duplicate/blank number:	--	Time:	--
Purge method:	Peristaltic pump and disposable polyethylene tubing		
Sampling equipment:	Peristaltic pump	VOC attachment:	NA
Sample containers:	2-liter amber glass, 3-4 ml VOAs, 1-liter poly		
Sample analyses:	TPHd, TPHmo, BTEX, PAH, Cd, Cr, Pb, Ni, Zn	Laboratory:	Sequoia Analytical
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum on site

98379-24gw.600

ATTACHMENT B

LABORATORY REPORTS

Sequoia
Analytical

404 N. Wiget Lane
Walnut Creek, CA 94598
(925) 988-9600
FAX (925) 988-9673
www.sequoialabs.com

29 June, 2000

Bill Scott
Baseline
5900 Hollis St. Suite D
Emeryville, CA 94608

RE: No Project
Sequoia Report: W006196

Enclosed are the results of analyses for samples received by the laboratory on 08-Jun-00 15:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alan B. Kemp
Laboratory Director

CA ELAP Certificate #1271

Sequoia Analytical

404 N. Wiget Lane
Walnut Creek, CA 94598
(925) 988-9600
FAX (925) 988-9673
www.sequoialabs.com

Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	W006196-01	Water	08-Jun-00 11:30	08-Jun-00 15:00
MW-2	W006196-02	Water	08-Jun-00 10:55	08-Jun-00 15:00
MW-3	W006196-03	Water	08-Jun-00 10:20	08-Jun-00 15:00

Alan B. Kemp, Laboratory Director

Sequoia Analytical

404 N. Wiget Lane
Walnut Creek, CA 94598
(925) 988-9600
FAX (925) 988-9673
www.sequoialabs.com

Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Diesel Hydrocarbons (C9-C24) with Silica Gel Cleanup by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W006196-01) Water	**Sampled: 08-Jun-00 11:30**	**Received: 08-Jun-00 15:00**							
Diesel Range Hydrocarbons	**390**	50	ug/l	1	0F19001	19-Jun-00	22-Jun-00	DHS LUFT	D-14
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*79.0 %*	*50-150*		"	"	"	"	
MW-2 (W006196-02) Water	**Sampled: 08-Jun-00 10:55**	**Received: 08-Jun-00 15:00**							
Diesel Range Hydrocarbons	**450**	50	ug/l	1	0F19001	19-Jun-00	22-Jun-00	DHS LUFT	D-14
Motor Oil (C16-C36)	**260**	250	"	"	"	"	"	"	D-14
Surrogate: n-Pentacosane		*128 %*	*50-150*		"	"	"	"	
MW-3 (W006196-03) Water	**Sampled: 08-Jun-00 10:20**	**Received: 08-Jun-00 15:00**							
Diesel Range Hydrocarbons	ND	50	ug/l	1	0F19001	19-Jun-00	22-Jun-00	DHS LUFT	
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*107 %*	*50-150*		"	"	"	"	

Sequoia Analytical

404 N. Wiget Lane
Walnut Creek, CA 94598
(925) 988-9600
FAX (925) 988-9673
www.sequoialabs.com

Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

BTEX by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W006196-01) Water Sampled: 08-Jun-00 11:30 Received: 08-Jun-00 15:00									
Benzene	**1.4**	0.50	ug/l	1	0F21003	21-Jun-00	21-Jun-00	EPA 8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	**0.80**	0.50	"	"	"	"	"	"	
Xylenes (total)	**0.84**	0.50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*95.0 %*	*70-130*		"	"	"	"	
MW-2 (W006196-02) Water Sampled: 08-Jun-00 10:55 Received: 08-Jun-00 15:00									
Benzene	ND	0.50	ug/l	1	0F21003	21-Jun-00	21-Jun-00	EPA 8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	**1.6**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*94.0 %*	*70-130*		"	"	"	"	
MW-3 (W006196-03) Water Sampled: 08-Jun-00 10:20 Received: 08-Jun-00 15:00									
Benzene	ND	0.50	ug/l	1	0F21003	21-Jun-00	21-Jun-00	EPA 8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*98.3 %*	*70-130*		"	"	"	"	

Sequoia Analytical

404 N. Wiget Lane
Walnut Creek, CA 94598
(925) 988-9600
FAX (925) 988-9673
www.sequoialabs.com

Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Metals Scan by ICP

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W006196-01) Water Sampled: 08-Jun-00 11:30 Received: 08-Jun-00 15:00									
Cadmium	ND	0.010	mg/l	1	0F19009	19-Jun-00	23-Jun-00	ICP Scan	
Chromium	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.020	"	"	"	"	"	"	
Nickel	ND	0.010	"	"	"	"	"	"	
Zinc	ND	0.020	"	"	"	"	"	"	
MW-2 (W006196-02) Water Sampled: 08-Jun-00 10:55 Received: 08-Jun-00 15:00									
Cadmium	ND	0.010	mg/l	1	0F19009	19-Jun-00	23-Jun-00	ICP Scan	
Chromium	ND	0.010	"	"	"	"	"	"	
Lead	ND	0.020	"	"	"	"	"	"	
Nickel	ND	0.010	"	"	"	"	"	"	
Zinc	ND	0.020	"	"	"	"	"	"	
MW-3 (W006196-03) Water Sampled: 08-Jun-00 10:20 Received: 08-Jun-00 15:00									
Cadmium	ND	0.010	mg/l	1	0F19009	19-Jun-00	23-Jun-00	ICP Scan	
Chromium	ND	0.010	"	"	"	"	"	"	
Lead	**0.028**	0.020	"	"	"	"	"	"	
Nickel	ND	0.010	"	"	"	"	"	"	
Zinc	ND	0.020	"	"	"	"	"	"	

Sequoia Analytical

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Baseline 5900 Hollis St. Suite D Emeryville CA, 94608	Project: No Project Project Number: Pacific Dry Dock; Yard II; Embarcadero Project Manager: Bill Scott	**Reported:** 29-Jun-00 08:24

Semivolatile Organic Compounds by EPA Method 8270B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W006196-01) Water Sampled: 08-Jun-00 11:30 Received: 08-Jun-00 15:00									
Acenaphthene	ND	5.0	ug/l	1	0F13023	13-Jun-00	20-Jun-00	EPA 8270B	
Acenaphthylene	ND	5.0	"	"	"	"	"	"	
Anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	5.0	"	"	"	"	"	"	
Benzo[a]pyrene	ND	5.0	"	"	"	"	"	"	
Chrysene	ND	5.0	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	5.0	"	"	"	"	"	"	
Fluoranthene	ND	5.0	"	"	"	"	"	"	
Fluorene	ND	5.0	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.0	"	"	"	"	"	"	
2-Methylnaphthalene	ND	5.0	"	"	"	"	"	"	
Naphthalene	15	5.0	"	"	"	"	"	"	
Phenanthrene	ND	5.0	"	"	"	"	"	"	
Pyrene	ND	5.0	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*31.9 %*		*21-110*	"	"	"	"	
Surrogate: Phenol-d6		*23.9 %*		*10-110*	"	"	"	"	
Surrogate: Nitrobenzene-d5		*66.1 %*		*35-114*	"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*70.9 %*		*43-116*	"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*77.3 %*		*10-123*	"	"	"	"	
Surrogate: p-Terphenyl-d14		*65.2 %*		*33-141*	"	"	"	"	
MW-2 (W006196-02) Water Sampled: 08-Jun-00 10:55 Received: 08-Jun-00 15:00									
Acenaphthene	ND	5.0	ug/l	1	0F13023	13-Jun-00	20-Jun-00	EPA 8270B	
Acenaphthylene	ND	5.0	"	"	"	"	"	"	
Anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	5.0	"	"	"	"	"	"	
Benzo[a]pyrene	ND	5.0	"	"	"	"	"	"	
Chrysene	ND	5.0	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	5.0	"	"	"	"	"	"	
Fluoranthene	ND	5.0	"	"	"	"	"	"	
Fluorene	ND	5.0	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.0	"	"	"	"	"	"	

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Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Semivolatile Organic Compounds by EPA Method 8270B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-2 (W006196-02) Water Sampled: 08-Jun-00 10:55 Received: 08-Jun-00 15:00									
2-Methylnaphthalene	ND	5.0	ug/l	1	0F13023	13-Jun-00	20-Jun-00	EPA 8270B	
Naphthalene	**7.5**	5.0	"	"	"	"	"	"	
Phenanthrene	ND	5.0	"	"	"	"	"	"	
Pyrene	ND	5.0	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*30.9 %*	*21-110*		"	"	"	"	
Surrogate: Phenol-d6		*22.7 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*68.3 %*	*35-114*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*74.2 %*	*43-116*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*74.7 %*	*10-123*		"	"	"	"	
Surrogate: p-Terphenyl-d14		*64.7 %*	*33-141*		"	"	"	"	
MW-3 (W006196-03) Water Sampled: 08-Jun-00 10:20 Received: 08-Jun-00 15:00									
Acenaphthene	ND	5.0	ug/l	1	0F13023	13-Jun-00	20-Jun-00	EPA 8270B	
Acenaphthylene	ND	5.0	"	"	"	"	"	"	
Anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.0	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.0	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	5.0	"	"	"	"	"	"	
Benzo[a]pyrene	ND	5.0	"	"	"	"	"	"	
Chrysene	ND	5.0	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	5.0	"	"	"	"	"	"	
Fluoranthene	ND	5.0	"	"	"	"	"	"	
Fluorene	ND	5.0	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.0	"	"	"	"	"	"	
2-Methylnaphthalene	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
Phenanthrene	ND	5.0	"	"	"	"	"	"	
Pyrene	ND	5.0	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*31.6 %*	*21-110*		"	"	"	"	
Surrogate: Phenol-d6		*22.6 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*66.5 %*	*35-114*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*73.9 %*	*43-116*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*73.3 %*	*10-123*		"	"	"	"	
Surrogate: p-Terphenyl-d14		*71.5 %*	*33-141*		"	"	"	"	

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Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Diesel Hydrocarbons (C9-C24) with Silica Gel Cleanup by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0F19001 - EPA 3510B										
Blank (0F19001-BLK1)				Prepared: 19-Jun-00 Analyzed: 26-Jun-00						
Diesel Range Hydrocarbons	ND	50	ug/l							
Motor Oil (C16-C36)	ND	250	"							
Surrogate: n-Pentacosane	*16.7*		"	*33.3*		*50.2*	*50-150*			
LCS (0F19001-BS1)				Prepared: 19-Jun-00 Analyzed: 26-Jun-00						
Diesel Range Hydrocarbons	447	50	ug/l	500		89.4	35-125			
Surrogate: n-Pentacosane	*18.3*		"	*33.3*		*55.0*	*50-150*			

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Baseline 5900 Hollis St. Suite D Emeryville CA, 94608	Project: No Project Project Number: Pacific Dry Dock; Yard II; Embarcadero Project Manager: Bill Scott	**Reported:** 29-Jun-00 08:24

BTEX by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0F21003 - EPA 5030B [P/T]										
Blank (0F21003-BLK1)				Prepared & Analyzed: 21-Jun-00						
Benzene	ND	0.50	ug/l							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: a,a,a-Trifluorotoluene	*29.2*		"	*30.0*		*97.3*	*70-130*			
LCS (0F21003-BS1)				Prepared & Analyzed: 21-Jun-00						
Benzene	18.9	0.50	ug/l	20.0		94.5	70-130			
Toluene	19.3	0.50	"	20.0		96.5	70-130			
Ethylbenzene	20.1	0.50	"	20.0		101	70-130			
Xylenes (total)	57.9	0.50	"	60.0		96.5	70-130			
Surrogate: a,a,a-Trifluorotoluene	*29.3*		"	*30.0*		*97.7*	*70-130*			
Matrix Spike (0F21003-MS1)		**Source: W006196-03**		Prepared & Analyzed: 21-Jun-00						
Benzene	18.6	0.50	ug/l	20.0	ND	93.0	70-130			
Toluene	19.0	0.50	"	20.0	ND	95.0	70-130			
Ethylbenzene	19.1	0.50	"	20.0	ND	95.5	70-130			
Xylenes (total)	55.1	0.50	"	60.0	ND	91.8	70-130			
Surrogate: a,a,a-Trifluorotoluene	*27.5*		"	*30.0*		*91.7*	*70-130*			
Matrix Spike Dup (0F21003-MSD1)		**Source: W006196-03**		Prepared & Analyzed: 21-Jun-00						
Benzene	18.4	0.50	ug/l	20.0	ND	92.0	70-130	1.08	20	
Toluene	18.7	0.50	"	20.0	ND	93.5	70-130	1.59	20	
Ethylbenzene	18.9	0.50	"	20.0	ND	94.5	70-130	1.05	20	
Xylenes (total)	54.7	0.50	"	60.0	ND	91.2	70-130	0.729	20	
Surrogate: a,a,a-Trifluorotoluene	*26.7*		"	*30.0*		*89.0*	*70-130*			

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Baseline 5900 Hollis St. Suite D Emeryville CA, 94608	Project: No Project Project Number: Pacific Dry Dock; Yard II; Embarcadero Project Manager: Bill Scott	**Reported:** 29-Jun-00 08:24

Metals Scan by ICP - Quality Control
Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0F19009 - 200.7										
Blank (0F19009-BLK1)				Prepared: 19-Jun-00 Analyzed: 23-Jun-00						
Cadmium	ND	0.010	mg/l							
Chromium	ND	0.010	"							
Lead	ND	0.020	"							
Nickel	ND	0.010	"							
Zinc	ND	0.020	"							
LCS (0F19009-BS1)				Prepared: 19-Jun-00 Analyzed: 23-Jun-00						
Cadmium	1.10	0.010	mg/l	1.00		110	80-120			
Chromium	1.00	0.010	"	1.00		100	80-120			
Lead	1.00	0.020	"	1.00		100	80-120			
Nickel	1.00	0.010	"	1.00		100	80-120			
Zinc	1.10	0.020	"	1.00		110	80-120			
LCS Dup (0F19009-BSD1)				Prepared: 19-Jun-00 Analyzed: 23-Jun-00						
Cadmium	1.00	0.010	mg/l	1.00		100	80-120	9.52	20	
Chromium	0.990	0.010	"	1.00		99.0	80-120	1.01	20	
Lead	0.960	0.020	"	1.00		96.0	80-120	4.08	20	
Nickel	0.940	0.010	"	1.00		94.0	80-120	6.19	20	
Zinc	1.00	0.020	"	1.00		100	80-120	9.52	20	
Matrix Spike (0F19009-MS1)		**Source: W006173-01**		Prepared: 19-Jun-00 Analyzed: 23-Jun-00						
Cadmium	1.00	0.010	mg/l	1.00	ND	100	80-120			
Chromium	1.00	0.010	"	1.00	ND	100	80-120			
Lead	1.00	0.020	"	1.00	ND	100	80-120			
Nickel	1.00	0.010	"	1.00	ND	99.2	80-120			
Zinc	1.10	0.020	"	1.00	0.052	105	80-120			
Matrix Spike Dup (0F19009-MSD1)		**Source: W006173-01**		Prepared: 19-Jun-00 Analyzed: 23-Jun-00						
Cadmium	1.00	0.010	mg/l	1.00	ND	100	80-120	0	20	
Chromium	0.990	0.010	"	1.00	ND	99.0	80-120	1.01	20	
Lead	1.00	0.020	"	1.00	ND	100	80-120	0	20	
Nickel	0.990	0.010	"	1.00	ND	98.2	80-120	1.01	20	
Zinc	1.00	0.020	"	1.00	0.052	94.8	80-120	9.52	20	

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Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Semivolatile Organic Compounds by EPA Method 8270B - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0F13023 - EPA 3510B										
Blank (0F13023-BLK1)				Prepared: 13-Jun-00 Analyzed: 17-Jun-00						
Acenaphthene	ND	5.0	ug/l							
Acenaphthylene	ND	5.0	"							
Anthracene	ND	5.0	"							
Benzo (a) anthracene	ND	5.0	"							
Benzo (b) fluoranthene	ND	5.0	"							
Benzo (k) fluoranthene	ND	5.0	"							
Benzo (ghi) perylene	ND	5.0	"							
Benzo[a]pyrene	ND	5.0	"							
Chrysene	ND	5.0	"							
Dibenz (a,h) anthracene	ND	5.0	"							
Fluoranthene	ND	5.0	"							
Fluorene	ND	5.0	"							
Indeno (1,2,3-cd) pyrene	ND	5.0	"							
2-Methylnaphthalene	ND	5.0	"							
Naphthalene	ND	5.0	"							
Phenanthrene	ND	5.0	"							
Pyrene	ND	5.0	"							
Surrogate: 2-Fluorophenol	*61.3*		"	*150*		*40.9*	*21-110*			
Surrogate: Phenol-d6	*41.1*		"	*150*		*27.4*	*10-110*			
Surrogate: Nitrobenzene-d5	*78.4*		"	*100*		*78.4*	*35-114*			
Surrogate: 2-Fluorobiphenyl	*82.0*		"	*100*		*82.0*	*43-116*			
Surrogate: 2,4,6-Tribromophenol	*121*		"	*150*		*80.7*	*10-123*			
Surrogate: p-Terphenyl-d14	*74.5*		"	*100*		*74.5*	*33-141*			
LCS (0F13023-BS1)				Prepared: 13-Jun-00 Analyzed: 17-Jun-00						
Acenaphthene	72.6	5.0	ug/l	100		72.6	46-118			
Pyrene	63.3	5.0	"	100		63.3	26-127			
Surrogate: 2-Fluorophenol	*63.9*		"	*150*		*42.6*	*21-110*			
Surrogate: Phenol-d6	*41.5*		"	*150*		*27.7*	*10-110*			
Surrogate: Nitrobenzene-d5	*83.3*		"	*100*		*83.3*	*35-114*			
Surrogate: 2-Fluorobiphenyl	*79.3*		"	*100*		*79.3*	*43-116*			
Surrogate: 2,4,6-Tribromophenol	*125*		"	*150*		*83.3*	*10-123*			
Surrogate: p-Terphenyl-d14	*68.5*		"	*100*		*68.5*	*33-141*			

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Baseline	Project: No Project	
5900 Hollis St. Suite D	Project Number: Pacific Dry Dock; Yard II; Embarcadero	**Reported:**
Emeryville CA, 94608	Project Manager: Bill Scott	29-Jun-00 08:24

Semivolatile Organic Compounds by EPA Method 8270B - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0F13023 - EPA 3510B										
LCS Dup (0F13023-BSD1)				Prepared: 13-Jun-00 Analyzed: 17-Jun-00						
Acenaphthene	73.1	5.0	ug/l	100		73.1	46-118	0.686	30	
Pyrene	60.9	5.0	"	100		60.9	26-127	3.86	30	
Surrogate: 2-Fluorophenol	*69.4*		"	*150*		*46.3*	*21-110*			
Surrogate: Phenol-d6	*43.1*		"	*150*		*28.7*	*10-110*			
Surrogate: Nitrobenzene-d5	*82.4*		"	*100*		*82.4*	*35-114*			
Surrogate: 2-Fluorobiphenyl	*82.3*		"	*100*		*82.3*	*43-116*			
Surrogate: 2,4,6-Tribromophenol	*121*		"	*150*		*80.7*	*10-123*			
Surrogate: p-Terphenyl-d14	*65.5*		"	*100*		*65.5*	*33-141*			

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Baseline 5900 Hollis St. Suite D Emeryville CA, 94608	Project: No Project Project Number: Pacific Dry Dock; Yard II: Embarcadero Project Manager: Bill Scott	**Reported:** 29-Jun-00 08:24

Notes and Definitions

D-14	Chromatogram Pattern: Unidentified Hydrocarbons C9-C24
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

[redacted] U[redacted]96 [redacted] Turn-around Time [redacted] Normal

BASELINE
5900 Hollis Street, Suite D
Emeryville, CA 94608
Tel: (510) 420-8686 Fax: (510) 420-1707

CHAIN OF CUSTODY RECORD

Lab: Sequoia W.C.
BASELINE Contact Person: Bill Scott

Project No.	Project Name and Location: 321
98379-15	Pacific Dry Dock Yard II, Embarcadero, Oakland

Samplers: (Signature) William L Scott / Amor Sendra

Sample ID No. Station	Date:	Time:	Media	Containers No.	Type	Preservative: None	HCl	NO_3	SO_4	Other:	TPH as diesel + motor oil with silica gel clean up	PAHs	BTEX	cd, cr, pb, Ni, Zn						Remarks/ Composite
MW-1	6-8-00	11:30	water	3	40 ml VOAs		X						X							
		11:30		2	1-liter Amb.	X					X	X								
		11:30		1	1-liter poly			X						X						
MW-2		10:55		3	40 ml VOAs		X						X							
		10:55		2	1-liter Amb.	X					X	X								
		10:55		1	1-liter poly			X						X						
MW-3		10:20		3	40 ml VOAs		X						X							
		10:20		2	1-liter Amb.	X					X	X								
		10:20		1	1-liter poly			X						X						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Conditions of Samples Upon Arrival at Laboratory:
William L Scott	6-8-00 / 15:00			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Remarks:
Relinquished by: (Signature)	Date/Time	Received by: (Signature) WC	Date/Time 6/8/00 15:00	

D:\Graphic\Chain of Custody Record\Master.cdr 4/12/00

Quality Control Checklist
for Review of Laboratory Report

Job No.: 99379-24 Site: Pacific Dry Dock Yard II

Laboratory: Sequoia Analytical Laboratory Report No: WO0618c

Report Date: 26 June 2000 BASELINE Review By: Amos Sanders

	Yes	No	NA
GENERAL QUESTIONS (Describe "no" responses below in "comments" section. Contact the laboratory, as required, for further explanation or action on "no" responses; document discussion in comments section.)			
1a. Does the report include a case narrative? *(A case narrative MUST be prepared by the lab for all analytical work requested by BASELINE)*		X	
1b. Is the number of pages for the lab report as indicated on the case narrative/lab transmittal consistent with the number of pages that are included in report?	X		
1c. Does the case narrative indicate which samples were analyzed by a subcontractor and the subcontractor's name?			X
1d. Does the case narrative summarize subsequent requests not shown on the chain-of-custody (e.g., additional analyses requested, release of "hold" samples)?			X
1e. Does the case narrative explain why requested analyses could not be performed by laboratory (e.g., insufficient sample)?			X
1f. Does the case narrative explain all problems with the QA/QC data as identified in the checklist (as applicable) ?			X
2a. Is the laboratory report format consistent and legible throughout the report?	X		
2b. Are the sample and reported dates shown in the laboratory report correct?	X		
3a. Does the lab report include the original chain-of-custody form?	X		
3b. Were all samples appropriately analyzed as requested on the chain-of-custody form?	X		
4. Was the lab report signed and dated as being reviewed by the laboratory director, QA manager, or other appropriate personnel? (Some lab reports have signature spaces for each page). (This requirement also applies to any analyses subcontracted out by the laboratory)	X		
5a. Are preparation methods, cleanup methods (if applicable), and laboratory methods indicated for all analyses?		X	
5b. If additional analytes were requested as part of the reporting of the data for an analytical method, were these included in the lab report?			X
6. Are the units in the lab report provided for each analysis consistent throughout the report?	X		
7. Are the detection limits (DL) appropriate based on the intended use of the data? (e.g., DL below applicable MCLs for water quality issues?)	X		
8a. Are detection limits appropriate based on the analysis performed? (i.e., not elevated due to dilution effects)	X		
8b. If no, is an explanation provided by the laboratory?			X

	Yes	No	NA
9a. Were the samples analyzed within the appropriate holding time? (generally 2 weeks for volatiles, and up to 6 months for total metals)		X	
9b. If no, was it flagged in the report?		X	
10. If samples were composited prior to analysis, does the lab report indicate which samples were composited for each analysis?			X
11a. Do the chromatograms confirm quantitative laboratory results? (petroleum hydrocarbons)			X
11b. Is a standard chromatogram(s) included in the laboratory report?			X
11c. Do the chromatograms confirm laboratory notes, if present (e.g., sample exhibits lighter hydrocarbon than standard)			X
12. Are the results consistent with previous analytical results from the site? *(If no, contact the lab and request review/reanalysis of data, as appropriate)*	X		
13a. REVISED LAB REPORTS ONLY. Is the revised lab report or revised pages to a lab report signed and dated as being reviewed by the laboratory director, QA manager, or other appropriate personnel?			X
13b. REVISED LAB REPORTS ONLY. Does the case narrative indicate the date of revision and provide an explanation for the revision?			X
13c. REVISED LAB REPORTS ONLY. Does the revised lab report adequately address the problem(s) which triggered the need for a revision?			X
13d. REVISED LAB REPORTS ONLY. Are the data included in the revised report the same as data reported in the original report, except where the report was revised to correct incorrectly reported data?			X
Q.A/QC Questions Field/Laboratory Quality Control - Groundwater Analyses			
14. Are field blanks reported as "ND"? (groundwater samples) *A field blank is a sample of DI water which is prepared in the field using the same collection and handling procedures as the other samples collected, and used to demonstrate that the sampling procedure has not contaminated the sample.*			X
15. Are trip blanks reported as "ND"? (groundwater samples/volatile analyses) *A trip blank is a sample of contaminant-free matrix placed in an appropriate container by the lab and transported with the field samples collected. Provides information regarding positive interference introduced during sample transport, storage, preservation, and analysis. The sample is NOT opened in the field.*			X
16. Are duplicate sample results consistent with the original sample? (groundwater samples) *Field duplicates consist of two independent samples collected at the same sampling location during a single sampling event. Used to evaluate precision of the analytical data and sampling technique. (Differences between the duplicate and sample results may also be attributed to environmental variability).*			X

	Yes	No	NA
Batch Quality Control (Samples are batched together by matrix [soil, water] and analyses requested. A batch generally consists of 20 or fewer samples of the same matrix type, and is prepared using the same reagents, standards, procedures, and time frame as the samples. QC samples are run with each batch to assess performance of the entire measurement process.)			
17. Do the sample batch numbers and corresponding laboratory QA/QC batch numbers match?	X		
18a. Are method blanks (MB) for the analytical method(s) below the laboratory reporting limits? *Used to assess lab contamination and prevent false positive results. MBs should be "ND."*	X		
18b. If no, is an explanation provided in the case narrative to validate the data?			X
18c. Are analytes which may be considered laboratory contaminants reported below the laboratory reporting limit? *Common lab contaminants include acetone, methylene chloride, diethylhexyl phthalate, and di-n-octyl phthalate.*			X
18d. If no, was the laboratory contacted to determine whether reported analyte could be a potential laboratory contaminant and was an explanation included in the case narrative?			X
19. Are laboratory control samples (LCS) and LCS duplicate (LCSD) [a.k.a., Blank Spike (BS) and BS duplicates (BSD)] within laboratory reporting limits? Limits should be provided on the report. *LCS is a reagent blank spike with a representative selection of target analyte(s) and prepared in the same manner as the samples analyzed. The LCS should be spiked with the same analytes as the matrix spike (below). The LCS is free from interferences from the sample matrix and demonstrates the ability of the lab instruments to recover the target analytes. Accuracy (recovery information) is generally reported as % spike recovery; precision (reproducibility of results) between the LCS and LCSD is generally reported as the relative percent difference (RPD). LCS/LCSD can be run in addition to or in lieu of, matrix QC data.*	X		
20a. Are the Matrix QC data (i.e., MS/MSD) within laboratory limits? Limits should be provided on the lab report. *The lab selects a sample from the batch and analyzes a spike and a spike duplicate of that sample. Matrix QC data is used to obtain precision and accuracy information and is reported in the same manner as LCS/LCSD. If the MS/MSD fails, the results may still be considered valid if the MB and either the LCS/LCSD or BS/BSD is within the lab's limits (failure is probably due to matrix interference).*	X		
20b. If no, is the MB and either LCS/LCSD or BS/BSD within lab limits to validate the data?			X

	Yes	No	NA
Sample Quality Control			
21a. Are the surrogate spikes reported within the lab's acceptable recovery limits? *A surrogate is a non-target analyte, which is similar in chemical structure to the analyte(s) being analyzed for, and which is not commonly found in environmental samples. A known concentration of the surrogate is spike into the sample or QA "sample" prior to extraction or sample preparation. Results are usually reported as % recovery of the spike. Failure to meet lab's limits for primary and secondary surrogates results in rebatching and reanalysis of the sample; failure of only the primary or the secondary surrogate may be acceptable under certain circumstances. Failure generally is due to coelution with the sample matrix.*	X		
21b. If no, is an explanation given in the case narrative to validate the data?			X

Comments: