

October 23, 1996

Mr. Barney Chan Alameda County Health Care Services Agency Department of Environmental Health 1131 Harbor Bay Parkway Alameda, CA 94502

Subject:

Groundwater Monitoring at Former Seabreeze Yacht Center, Inc. Site

280 6th Avenue, Oakland

Dear Mr. Chan:

Enclosed please find the results of the second quarterly monitoring of five wells at the former Seabreeze Yacht Center.

Also, for your information, removal of the concrete containment structure will commence next week. If you like, I can join you for a site inspection.

If you have any questions, please contact me at 272-1467.

Sincerely,

Diane Heinze, P.E.

Associate Environmental Scientist

enclosure

cc: Sum Arigala, RWQCB 2101 Webster Street, Suite 500, Oakland, CA 94612

cc: w/out enclosure:

Neil Werner Mark O'Brien Michele Heffes

C:\wp51\Seabreeze\cover.let

18 October 1996 S9171-C1

Ms. Diane Heinze Port of Oakland Environmental Department 530 Water Street Oakland, California 94607

Subject: Quarterly Groundwater Monitoring Report, September 1996, Former Seabreeze Yacht

Center, Inc. Site, 280 6th Avenue, Oakland, California

Dear Ms. Heinze:

This report documents the groundwater sampling activities performed on 12 and 16 September 1996 at the former Seabreeze Yacht Center, Inc. Site (Site), located in Oakland (Figure 1). The groundwater monitoring was conducted in accordance with the 7 June 1996 Port of Oakland (Port) letter to the Alameda County Health Care Services Agency, Department of Environmental Health (County). The groundwater monitoring network includes monitoring wells PW-2, MW-SB2, MW-SB3, MW-SB4, and MW-SB5 (Figure 2).

FIELD ACTIVITIES, SEPTEMBER 1996

On 12 September 1996, the presence of free product was checked and water levels were measured in the monitoring network wells using a dual-interface probe. Water levels were measured and recorded to the nearest one-hundredth of a foot. The dual-interface probe was decontaminated after each use by washing in a trisodium phosphate (TSP) solution and rinsing with deionized water. A slight sheen was identified in monitoring well MW-SB3; all other wells did not have any observable sheen or free product. An odor was identified in monitoring wells MW-SB2, MW-SB4, and MW-SB5.

On 12 September, each monitoring well, except PW-2, was purged of approximately three to five well volumes using a double diaphragm pump with new, disposable PVC tubing after water level measurements. Twelve gallons of well water (approximately 1.7 well volumes) were removed from monitoring well PW-2 since the well pumped dry during purging of the second well volume. Electrical conductivity, pH, and temperature of the purge water were monitored during purging. The monitoring wells did not recover to 80 percent of original water levels on 12 September, since the recharge rate in all of the wells was too slow. Therefore, groundwater sampling occurred on 16 September 1996; at that time the groundwater levels had recovered to at least 80 percent of the original water levels for MW-SB4 and MW-SB5. The groundwater levels in monitoring wells PW-2, MW-SB2, and MW-SB3 recovered to 62, 53, and 78 percent, respectively, prior to sample collection.



Ms. Diane Heinze 18 October 1996 Page 2

Sample bottles were labeled and stored in a cooler containing blue ice. The groundwater samples were submitted under chain-of-custody protocol to Pace Analytical of Petaluma for analysis on the day of sampling. The groundwater samples were analyzed for total lead, total copper, and total extractable hydrocarbons (TEH) as diesel, motor oil, and Bunker C. The groundwater sample from MW-SB2 was also analyzed for mercury, arsenic, cadmium, chromium, iron, nickel, silver, and zinc. The samples collected for metals analyses were placed in unpreserved plastic containers; the samples were filtered at the laboratory prior to analysis. Prior to the TEH analysis, the samples were subjected to a silica gel cleanup (EPA Method 3630). The groundwater sampling forms, which document sampling activities, are included in Attachment A and the chain-of-custody form is included in Attachment B.

One drum containing purge and decontamination water was generated from the September 1996 sampling activities. The drum was labeled and stored on-site for subsequent disposal.

ANALYTICAL RESULTS

The metals and TEH analytical results are summarized in Table 1 and the laboratory reports are presented in Attachment B. Lead and copper were not identified in any of the monitoring wells above the laboratory reporting limits. Iron (0.13 mg/L) was identified in the sample from monitoring well MW-SB2. The samples from monitoring wells MW-SB2A (duplicate sample from MW-SB2) and MW-SB5 contained diesel at 0.17 mg/L and 0.14 mg/L, respectively. Motor oil was identified in sample MW-SB3 at 0.28 mg/L.

GROUNDWATER FLOW DIRECTION

Recently collected and historic groundwater elevation data are summarized in Table 2. The groundwater elevation data were used to calculate groundwater flow direction and gradient magnitude using the three point method for the September 1996 monitoring event. The groundwater flow direction was calculated as southeast at S46E, with a gradient magnitude of 0.01.

The next quarterly monitoring event will be conducted in December 1996. Should you have any questions, or need further information, please contact us at your convenience.

Sincerely

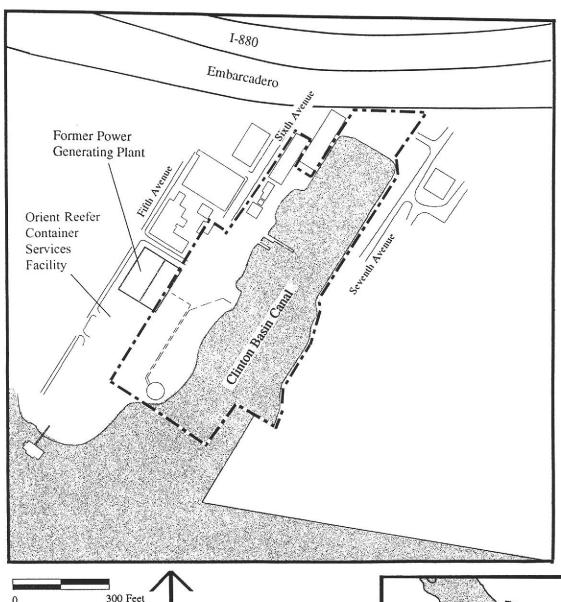
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Principal

Reg. Geologist No. 4009

Rhodora Del Rosario Civil Engineer

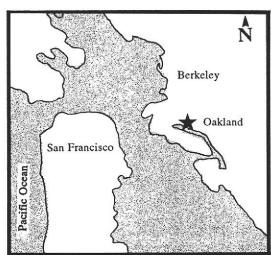
S9171-C1.996-10/10/96





Legend

Seabreeze Yacht Center



Seabreeze Yacht Center Oakland, California

BASELINE

MONITORING WELL LOCATIONS AND SEPTEMBER 1996 GROUNDWATER CONTOURS

Figure 2

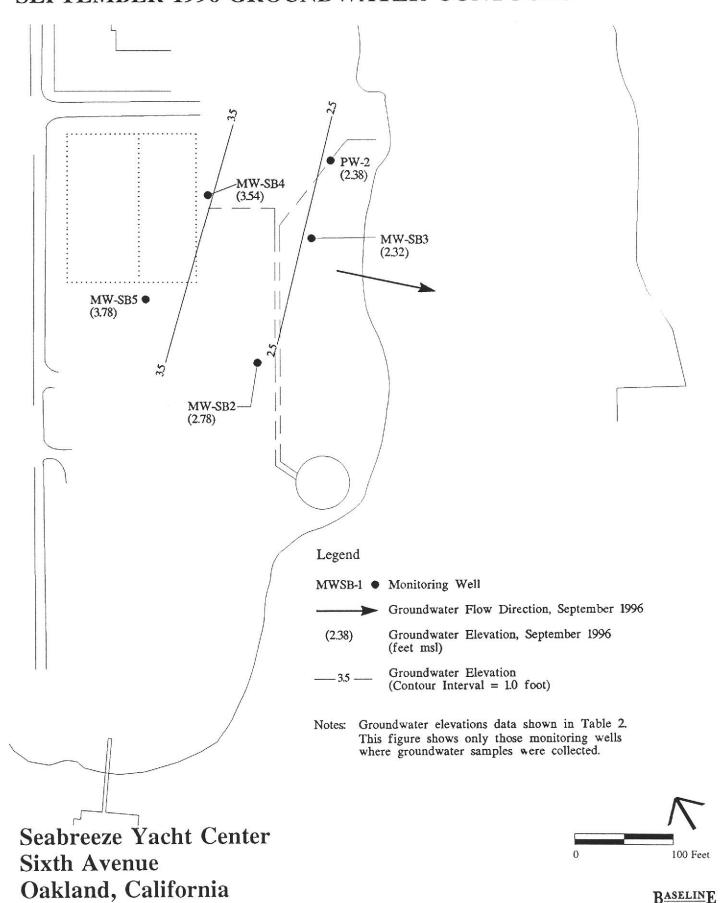


TABLE 1 ANALYTICAL RESULTS Seabreeze Yacht Center, Oakland, California (mg/L)

		Met	alsi	Total Ext	tractable Hydro	ocarbons²
Sample ID	Sample Date	Lead	Copper	Diesel	Bunker C	Motor Oil
PW-2	2/2/95 3/6/95 7/1/96 9/16/96	0.0043 <0.003 <0.003 ¹⁰	 <0.01 <0.005 ¹¹	 1.7³ <0.049⁴ <0.05⁴	4.4 ³ <0.3 ⁴ <0.5 ⁴	 1.1 ³ <0.25 ⁴
MW-SB2	4/9/91 4/19/91 1/10/94 12/26/94 3/6/95 7/1/96 9/16/96 ⁹	<0.06 ⁷ <0.07 <0.10 ⁷ <0.0048 ⁸ <0.003 <0.003 ¹⁰	<0.02 ⁸ 0.0481 <0.02 ⁸ 0.014 ⁸ 0.055 <0.005 ¹¹	 16.0 ³ / 18.0 ^{3,5} <0.05 ⁴ <0.05 ⁴	28.0 ³ / 33.0 ^{3,5} <0.3 ⁴ <0.5 ⁴	 4.9 ³ / <25.0 ^{3,5} <0.25 ⁴
MW-SB2A	7/1/96 9/16/96	<0.003 <0.003 ¹⁰	0.065 < 0.005 ¹¹	0.17 ^{4,6} 0.17 ⁴	<0.3 ⁴ <0.5 ⁴	 <0.25 ⁴
MW-SB3	3/6/95 7/1/96 9/16/96	 0.0036 <0.003 ¹⁰	 <0.01 <0.005 ¹¹	4.5³ <0.049⁴ <0.05³,⁴	5.8 ³ <0.3 ⁴ <0.5 ⁴	1.5 ³ 0.28 ^{3,4}
MW-SB4	3/3/95 7/1/96 9/16/96	 0.014 <0.003 ¹⁰	 0.013 <0.005 ¹¹	4.5 ³ <0.049 ⁴ <0.05	3.0 ³ <0.3 ⁴ <0.5	0.66 ³ <0.25 ⁴
MW-SB5	3/6/95 7/1/96 9/16/96	 0.0031 <0.003 ¹⁰	 0.012 <0.005 ¹¹	15.0 ³ / 15.0 ^{3,5} <0.049 ⁴ 0.14 ^{3,4,12}	34.0 ³ / 31.0 ^{3.5} <0.3 ⁴ <0.5 ⁴	8.1 ³ / 6.9 ^{3.5} <0.25 ⁴

Notes: <x.x

= analyte not identified above laboratory reporting limit of x.x.

X.X

= concentrations reported at or above laboratory reporting limit.

x.x/x.x

= duplicate sample.

= no analysis performed.

MW-SB2A = duplicate sample of MW-SB2.

Refer to Figure 2 for well locations.

Laboratory reports for the September 1996 sampling event are included in Attachment B.

Analytical Method EPA 6010A, unless otherwise noted.

Analytical Method California DOHS, LUFT Manual (EPA 8015M).

Sample chromatogram does not resemble hydrocarbon standard.

Samples were subjected to silica gel cleanup (EPA 3630) prior to analysis.

Table 1, continued

- 5 Duplicate sample centrifuged prior to TEH analyses.
- Sample exhibited fuel pattern which did not resemble standard.
- Analyzed using EPA Method 7420.
- 8 Analyzed using EPA Method 7210.
- Sample also analyzed for mercury, arsenic, cadmium, chromium, iron, nickel, silver, and zinc. All metals were reported below the corresponding laboratory reporting limits except for iron, which was identified at 0.13 mg/L.
- Analyzed using EPA method 7421. Sample filtered by the laboratory prior to analysis.
- Analyzed using EPA Method 7211. Sample filtered by the laboratory prior to analysis.
- Laboratory indicated that miscellaneous peaks were present in the diesel range.

TABLE 2

GROUNDWATER ELEVATION DATA Seabreeze Yacht Center, Oakland, California

Well	Date	Time	Surface Elevation (msl)	TOC Elevation (msl)	Depth to Groundwater (feet)	Groundwater Elevation (msl)
PW-2 ¹	2/15/95 ² 3/3/95 6/28/96 9/16/96	9:10 7:37 8:54	5.56	6.57	4.60 3.90 3.83 4.19	1.97 2.67 2.74 2.38
MW-SB2 ³	4/19/91 7/9/91 1/10/94 1/26/94 11/14/94 11/28/94 3/3/95 6/28/96 9/16/96	11:09 11:04 12:31 13:40 7:30 11:05 14:14 9:00 8:50 7:40 9:01	6.2	7.18	5.38 3.7 3.08 1.63 4.8 4.76 4.73 2.85 2.84 3.76 4.30	1.8 3.48 4.1 5.5 2.38 2.42 2.45 4.33 4.34 3.42 2.88
MW-SB3 ³	11/14/94 11/28/94 12/06/94 3/3/95 6/28/96 9/16/96	7:25 11:00 14:12 8:53 8:37 8:40 7:35 8:55	6.0	8.10	8.23 8.14 8.07 6.32 6.15 6.78 5.46 5.78	-0.13 -0.04 0.03 1.78 1.95 1.32 2.64 2.32
MW-SB4 ⁴	11/28/94 3/3/95 6/28/96 9/16/96	9:02 8:35 8:28 8:52	6.6	6.39	1.05 0.90 3.16 2.85	5.34 5.49 3.23 3.54
MW-SB5 ⁴	11/28/94 3/3/95 6/28/96 9/16/96	8:40 9:00 8:45 10:15	6.9	6.30	6.32 2.54 2.43 2.52	-0.02 3.76 3.87 3.78

Notes: 11/14/94: High tide 9:21; Low tide 15:50.

11/28/94: High tide 7:46.

2/15/95: High tide 5:14 and 18:03; Low tide 23:34.

3/3/95: High tide 13:14; Low tide 7:03. 6/28/96: High tide 11:41; Low tide 4:35.

9/16/96: High tide 2:57 and 14:57; Low tide 8:23 and 21:07.

- = Unknown.

msl = Feet above mean sea level

TOC = Top of casing

Refer to Figure 2 for well locations.

Table 2, continued

- Well survey conducted by Bates & Bailey 2/8/95.
- ² Groundwater elevation measured by SOMA; all other elevations measured by BASELINE.
- Well survey conducted by Bates & Bailey 11/18/94.
- ⁴ Well survey conducted by Bates & Bailey 11/28/94.

ATTACHMENT A GROUNDWATER SAMPLING FORMS

Project no.:	S	S9171-C1	Well no.:	PW-2		Date: <u>9/12/96</u>	
Project name:	5	Seabreeze Yacht Center	Depth of well	from TOC (feet):	15		
Location:	2	260 6th Avenue	Well diamete	r (inch):	4		
	(Dakland, CA	Screened inte	rval from TOC (feet):	6.5-15.0		
Recorded by:	,	WKS	TOC elevatio	n (feet):	6.57		
Weather:		Sunny	Water level fi	rom TOC (feet):	4.19	Time: 8:54	
Precip in past				from TOC (feet):	None	Time: 8:54	
5 days (inch):	1	None	Water level n		Dual interface		
5 days (men)		10110					
[(D BE REMOVED BEFOR) - (4.19 ft)] × (0.166 Water level Well radiu	ft)2 × 3.14 ×	7.48 = 7.0	gallons in one gallons in 5 w total gallons r	vell volumes	
CALIBRATIO	N•						
		Time	Temp	<u>pH</u> 7.00	EC (<u>umho/cm)</u> 10,000		
Calibration Before	re Purging:	9:10	20.5	7.00	9,000		
	er Purging:	12:19	23.8	6.91	9,000		
FIELD MEAS	UREMENT	s.					
I ILLD MLAO	OI (EIVIEIVI)	5.		Cumulative			
	Temp		EC	Gallons			
<u>Time</u>	(°C)	<u>pH</u>	(umho/cm)	Removed		<u>Appearance</u>	
9:15	20.5	6.74	11,000	2.5	Clear with bla	ack particulate matter	
9:23	21.0	6.74	9,000	6		ack particulate matter	
9:28	21.3	6.70	9,000	7.5		ack particulate matter	
9:34	20.9	6.70	9,000	10		ack particulate matter	
9:41 WEI	20.0 LL PUMPED	6.81 DRY	9,000	12	Clear with bla	ack particulate matter	
		slow to allow 80% recharg	ge before samp	ling on 9/12/96. Sam	ple collected or	ı 9/16/96.	
Wate	er level durir	ng sample collection recove	red to 62% of	original water level.			
		rior to sampling (feet):		6.78		Time: 9/16/96 7:23	
Appearance of	-	Clear				Time: 9/16/96 7:30 Time:	
Duplicate/blanl		None					
Purge method:	-	Double diaphragm pump		VOC anadament	None		
Sampling equip	_	Disposable PVC bailer	1:4	_VOC attachment:	None		
Sample contain	-	Two 1-liter amber glass, 1-	liter plastic	Laboratory	Pace Analytic	cal	
Sample analyse	es:	TEPH, copper, lead		Laboratory:	MW-SB2 to		

Project no.:	S91	71-C1	Well no.:	MW-S	B2	Date: 9/12/96
Project name:	Sea	breeze Yacht Center	Depth of well f	rom TOC (feet):	11.0	
Location:	260	6th Avenue	Well diameter (inch):	2	
~ ·	Oak	land, CA	Screened interv	al from TOC (feet)	: 3-11	
Recorded by:	WK	S	TOC elevation	(feet):	7.18	
Weather:		ny	Water level fro	m TOC (feet):	4.30	Time: 9:01
Precip in past			Product level fr	om TOC (feet):	None	Time: 9:01
5 days (inch):	Nor	ne	Water level me	asurement:	Dual interface	e probe
		E REMOVED BEFO				
-		4.30 ft)] × (0.083			1 gallons in one 5 gallons in 5 w	
	well depth v	Vater level Well rac	lius	the state of the s	5 total gallons i	
CALIBRATIO	N.			-	_	
CALIDRATIO	14.		Temp		EC	
500 00	7 <u>2</u> 0 82 8	<u>Time</u>	(° C)	<u>pH</u>	(umho/cm)	
	n Standard:	0.10	20.5	7.00	10,000 9,000	
	re Purging: er Purging:	9:10 12:19	20.5 23.8	7.00 6.91	9,000	
All	or i arguig.	12.17	23.0	V	-,,,,,,	
FIELD MEASI	UREMENTS:					
				Cumulative		
	Temp		EC	Gallons		A
<u>Time</u>	(° C)	<u>рН</u>	(umho/cm)	Removed		<u>Appearance</u>
10:20	21.7	6.73	12,000	0.25	Clear	
10:30	21.6	6.65	10,000	2	Clear	
10:40	21.2	6.66	9,000	4	Clear	
10:45	19.7	6.83	10,000	4.75	Clear	
WEL	LL PUMPED D	RY				
Note: Rech	orna rota too al-	ow to allow 80% rech	arge hefore sampli	o on 9/12/96 Sam	nnle collected or	1 9/16/96.
Wate	er level during s	ample collection reco	vered to 53% of or	ginal water level.		WORKS TOTAL F. T.T.
		to sampling (feet):	8.14			Time: 9/16/96 7:50
Appearance of		ar, sulfur odor				Time: 9/16/96 7:50
Duplicate/blank	Commercial	V-SB2A				Time: 9/16/96 8:00
Purge method:	description of the last of the	ıble diaphragm pump				
Sampling equip	Quality Contraction Contractio	posable PVC bailer		VOC attachment:	None	
Sample contain	-	o 1-liter amber glass,		. 1		1
Sample analyse		PH, copper, lead		Laboratory:	Pace Analytic	
Decontamination	on method: TS	P and water, DI water	rinse	Rinsate disposal:	MW-SB2 to	3 & PW-2

Project no.:	S917	'1-C1	Well no.:	MW-SB3		Date: 9/12/96
Project name:	Seab	reeze Yacht Center	Depth of well	from TOC (feet):	11.06	
Location:	280	6th Street	Well diamete	r (inch):	2	
-	Oakl	and, CA	Screened inte	rval from TOC (fee	t): 4.86-11.06	
Recorded by:	WKS	S	TOC elevatio	n (feet):	8.10	
Weather:		y	Water level fi	om TOC (feet):	5.78	Time: 8:55
Precip in past			Product level	from TOC (feet):	None	Time: 8:55
days (inch):	None		Water level n	neasurement:	Dual interfac	e probe
			ORE SAMPLING			
	**	10.00	083 ft) ² × 3.14 ×	Committee	85 gallons in on 4.3 gallons in 5 v	
	well depth w	ater level Well r	adius		4.0 total gallons	
				•	,	
CALIBRATIO	ON:		Temp		EC	
		<u>Time</u>	(° C)	<u>pH</u>	(umho/cm)	
	on Standard:			7.00	10,000	
	ore Purging:	9:10	20.5 23.8	7.00 6.91	9,000 9,000	
AI	fter Purging:	12:19	23.8	0.91	9,000	
FIELD MEAS	SUREMENTS:					
			F.C	Cumulative		
<u>Time</u>	Temp (° C)	<u>pH</u>	EC (<u>umho/cm)</u>	Gallons <u>Removed</u>		Appearance
<u>1 mme</u>	1_0	<u>pr1</u>	(primo/em)	Kellioved		<u> 11ppemmee</u>
9:55	23.0	6.72	12,000	1.0		ack particulates
10:03	23.5	6.65	12,500	2.0		ack particulates
10:06	23.1	6.69	13,000	2.5		ack particulates
10:09	22.6	6.83	13,500	4.0	Clear with bi	ack particulates
N		to allow 800/ mas	haraa hafara samn	ling on 0/12/06 So	mple collected o	n 9/16/96
				ling on 9/12/96. Sa original water level.		
Water level of	fter nurging prior	to sampling (feet):	7.41			Time: 9/16/96 7:35
Appearance of				en and petroleum o	dor	Time: 9/16/96 7:45
Ouplicate/blar						Time:
Purge method		ble diaphragm pum	ıp			
Sampling equ		osable PVC bailer		VOC attachment:	None	
Sample contai	•	1-liter amber glass	s, 1-liter plastic			
Sample analys		H, copper, lead		Laboratory:	Pace Analyti	
Decontaminat	ion method: TSP	and water, DI water	er rinse	Rinsate disposal:	MW-SB2 to	5 & PW-2

Project no.:		S9171-C1	Well no.:	MW-SB4	Date: 9/12/96
Project name:		Seabreeze Yacht Center	Depth of well	from TOC (feet):	14.75
Location:		260 6th Avenue	Well diamete	r (inch):	2
		Oakland, CA	Screened inte	rval from TOC (feet)): 2.55-14.75
Recorded by:		WKS	TOC elevatio	n (feet):	6.39
Weather:		Sunny	Water level fi	rom TOC (feet):	2.85 Time: 8:52
Precip in past			Product level	from TOC (feet):	Slight sheen Time: 8:52
5 days (inch):		None	. Water level n	neasurement:	Dual interface probe
VOLUME OF	WATER T	O BE REMOVED BEFOR	RE SAMPLING	3:	
	[(14.75 f	$(t) - (2.85 \text{ ft})] \times (0.083)$	$ft)^2 \times 3.14 \times$.9 gallons in one well volume
	Well depth	Water level Well radio	18		.5 gallons in 5 well volumes
				10	.5 total gallons removed
CALIBRATIO	ON:				
			Temp		EC
	N/6 8 59X	<u>Time</u>	(° C)	<u>pH</u>	(<u>umho/cm</u>)
	on Standard:	0.40	00.5	7.00	10,000
	ore Purging:	9:10 12:19	20.5 23.8	7.00 6.91	9,000 9,000
Ai	fter Purging:	12,19	23.0	0.71	2,000
FIELD MEAS	SUREMENT	S:			
				Cumulative	
	Temp		EC	Gallons	
<u>Time</u>	(° C)	<u>H</u> q	(umho/cm)	Removed	<u>Appearance</u>
11:00	20.2	6.76	7,500	1	Clear to very slightly turbid
11:04	22.0	6.72	2,300	2.5	Clear
11:09	22.3	6.66	2,000	4.5	Clear
11:15	21.8	6.66	3,900	7	Slightly turbid to clear
11:19	21.2	6.66	5,000	9	Slightly turbid to clear
DE	CREASED F	LOW RATE			
11:30	20.5	6.64	9,000	9.75	Slightly turbid to clear
11:36	20.7	6.67	9,000	10.5	Slightly turbid to clear
Notes: Rec	charge rate to	oo slow to allow 80% rechar	ge before samp	ling on 9/12/96. San	nple collected on 9/16/96.
Wa	ter level duri	ng sample collection recove	ered to 99% of	original water level.	
		prior to sampling (feet):		2.81	Time: 9/16/96 8:10
Appearance o	f sample:	Clear to very slightly turbic	d, petroleum od	or	Time: 9/16/96 8:15
Duplicate/blas	nk number:	None			Time:
Purge method	l :	Double diaphragm pump			
Sampling equ	ipment:	Disposable PVC bailer	***************************************	VOC attachment:	None
Sample contain	-	Two 1-liter amber glass, 1-			
Sample analys		TEPH, copper, lead		Laboratory:	Pace Analytical
Decontaminat	tion method:	TSP and water, DI water ri	nse	Rinsate disposal:	MW-SB2 to 5 & PW-2

Project no.:		S9171-C1	Well no.:	MW-SB5		Date: <u>9/12/96</u>
Project name:		Seabreeze Yacht Center	Depth of well t	from TOC (feet):	14.75	
Location:	9	260 6th Avenue	Well diameter	(inch):	2	
··		Oakland, CA	Screened inter	al from TOC (feet)	2.55-14.75	
Recorded by:		WKS	TOC elevation	(feet):	6.30	
Weather:		Sunny	Water level fro	m TOC (feet):	2.52	Time: 10:15
Precip in past			Product level f	rom TOC (feet):	None	Time: 10:15
5 days (inch):		None	Water level me	easurement:	Dual interfac	e probe
		D BE REMOVED BEF			200 1982P 187	
	731) - (2.52 ft)] × (0.0		-	ogallons in one	
	Well depth	Water level Well ra	dius		ogallons in 5 v total gallons i	
CALIBRATIO	ON:			-		
CALIBRATIC	OIT.		Temp		EC	
<u>p</u> 2023 xxx	7 <u>120</u> 27 820	<u>Time</u>	(° C)	<u>pH</u>	(umho/cm)	
	on Standard:	9:10	20.5	7.00 7.00	10,000 9,000	
	fore Purging:	12:19	23.8	6.91	9,000	
	5 5					
FIELD MEAS	SUREMENT	S:				
			EC	Cumulative Gallons		Tr.
Time	Temp (° C)	<u>pH</u>	(umho/cm)	Removed		Appearance
Inne	<u>(</u>	<u> 1</u>	(parinto) Giriy	20010100		
11:54	20.8	6.81	12,500	1		ht amber color
11:58	21.9	6.68	13,000	2		ht amber color
12:01	22.1	6.67	13,000	3	_	ht amber color
12:05	21.3	6.74 6.75	13,000	4	-	ht amber color ht amber color
12:09	20.6	6.75	13,000	6	rig	nt amour color
Notes: Rec	charge rate to	o slow to allow 80% recl	narge before sampli	ng on 9/12/96. Sam	ple collected or	n 9/16/96.
		ng sample collection reco				
337-4111	G	rior to compline (feet):		2.55		Time: 9/16/96 8:20
Appearance o		rior to sampling (feet): Light amber color, petro	leum odor	2.33		Time: 9/16/96 8:30
Duplicate/blan		None	iodiii odoi			Time:
Purge method		Double diaphragm pump)			
Sampling equ		Disposable PVC bailer		VOC attachment:	None	
Sampling equi		Two 1-liter amber glass.				
Sample analys		TEPH, copper, lead		Laboratory:	Pace Analyti	cal
		TSP and water, DI water	The second secon	Rinsate disposal:	MW-SB2 to	5 & PW-2

ATTACHMENT B LABORATORY REPORTS

Tel: 707-792-1865 Fax: 707-792-0342

October 7, 1996

Ms. Rhodora DelRosario Baseline 5900 Hollis Street, Suite D Emeryville, CA 94608

RE: PACE Project Number: 706592

Client Project ID: Fort of Oakland-Biosite

Panela a. Schemmer

Dear Ms. DelRosario:

Enclosed are the revised QC report for Diesel, and a copy of our Quality Assurance Manual. I apologize for any inconvenience this may have caused you. If you have any further concerns, please feel free to contact me or Ron Chew at the laboratory.

Sincerely,

Pamela A. Schemmer

Quality Assurance Officer

enclosures

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96

PAGE: 1

Baseline
00 Hollis Street, Suite D
peryville, CA 94608

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

tn: Ms. Rhodora DelRosario

one: (510)420-8686

CE Sample No:	70732003			Date Collec	ted: 09	7/16/96			
ient Sample ID:	PW-2			Date Recei		/16/96			
Parameters		Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
tals									
Copper by Furnace,	Method 7211			-	00 (05 (0)	FDA 7044	20.5	7440-50-8	
Copper Date Digested		ND	ug/L	5	09/25/96 09/19/96	EPA /211	BBF	7440-30-6	
Lead, AAS Furnace					09/ 19/ 90				
Lead		ND	ug/L	3	09/24/96	EPA 7421	BBF	7439-92-1	
Date Digested					09/19/96				
GC									
TPH in Water by 80	15 Modified	ND	()	0.05	00/3//06	TOU by EDA SOISM	wsn	11-84-7	
Diesel Fuel Motor Oil		ND ND	mg/L mg/L	0.05 0.25	09/24/96 09/24/96	TPH by EPA 8015M TPH by EPA 8015M	WSII	11-04-7	
Bunker C		ND	mg/L	0.5	09/24/96	TPH by EPA 8015M	wsn		
n-Pentacosane (S)	112	%	0.5	09/24/96	TPH by EPA 8015M	wsn	629-99-2	
Date Extracted	•		74		09/18/96	, σσ.σ	and the		

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 2

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

PACE Sample No:	70732011	to work on the sall some lands to		Date Collec		7/16/96			
lient Sample ID:	MW-SB2			Date Recei	vea: us	7/16/96			
arameters		Results	Units	PRL	Analyzed	Method	Analys	st CAS#	Footnotes
Metals									
Copper by Furnace,	Method 7211					Commence			
Copper		ND	ug/L	5		EPA 7211	BBF	7440-50-8	
Date Digested					09/19/96				
Lead, AAS Furnace				_				7/70 00 4	
Lead		ND	ug/L	3		EPA 7421	BBF	7439-92-1	
Date Digested					09/19/96				
TPH in Water by 80	115 Modified								
Diesel Fuel		ND	mg/L	0.05	09/24/96	TPH by EPA 8015M	wsn	11-84-7	
Motor Oil		ND	mg/L	0.25	09/24/96	TPH by EPA 8015M	wsn		
Bunker C		ND	mg/L	0.5	09/24/96	TPH by EPA 8015M	wsn		
n-Pentacosane (S	5)	64	%		09/24/96	TPH by EPA 8015M	wsn	629-99-2	
Date Extracted					09/18/96				
The superior and the superior of the superior									

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96

PAGE: 3

PACE Project Number: 706592 Client Project ID: Port of Oakland-Biosite

	ACE Sample No: 70732029			Date Collec		7/16/96			
	ient Sample ID: MW-SB3			Date Recei	ved: 09	7/16/96			
	rameters	Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
-					Anatyzea				
Me	etals								
	Copper by Furnace, Method 7211								
	Copper	ND	ug/L	5	09/25/96	EPA 7211	BBF	7440-50-8	
	Date Digested				09/19/96				
	Lead, AAS Furnace								
	Lead	ND	ug/L	3		EPA 7421	BBF	7439-92-1	
	Date Digested				09/19/96				
-									
	TPH in Water by 8015 Modified	***	20000				A Land Address of the Control	44 0/ 7	
	Diesel Fuel	ND	mg/L	0.05	09/26/96		wsn	11-84-7	
	Motor Oil	0.28	mg/L	0.25	09/26/96	TPH by EPA 8015M	wsn		1
	Bunker C	ND	mg/L	0.5	09/26/96	[14일: 14] [14] [14] [14] [14] [14] [14] [14]	wsn	(20, 00, 2	
	n-Pentacosane (S)	76	%		09/26/96	TPH by EPA 8015M	wsn	629-99-2	
	Date Extracted				09/18/96				

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 4

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

PACE Sample No:	70732037			Date Collec		/16/96			
Lient Sample ID:	MW-SB4			Date Recei	ved: 09	7/16/96			
Parameters		Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
Metals									
Copper by Furnace,	Method 7211								
Copper		ND	ug/L	5	09/25/96	EPA 7211	BBF	7440-50-8	
Date Digested					09/19/96				
Lead, AAS Furnace				122				7/70 00 4	
Lead		ND	ug/L	3	09/24/96	EPA 7421	BBF	7439-92-1	
Date Digested					09/19/96				
TPH in Water by 80	15 Modified								
Diesel Fuel		ND	mg/L	0.05	09/26/96	TPH by EPA 8015M	wsn	11-84-7	
Motor Oil		ND	mg/L	0.25	09/26/96	TPH by EPA 8015M	wsn		
Bunker C		ND	mg/L	0.5	09/26/96	TPH by EPA 8015M	wsn		
n-Pentacosane (S)	72	%		09/26/96	TPH by EPA 8015M	wsn	629-99-2	
Date Extracted					09/18/96				

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 5

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

PACE Sample No:	70732045 MW-SB5	Wild by William		Date Collec Date Recei		/16/96 /16/96			
rameters		Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
Metals Copper by Furnace,	Method 7211								
Copper Date Digested Lead, AAS Furnace	Hethod 7211	ND	ug/L	5	09/25/96 09/19/96	EPA 7211	BBF	7440-50-8	
Lead Date Digested		ND	ug/L	3	09/24/96 09/19/96	EPA 7421	BBF	7439-92-1	
TPH in Water by 80	15 Modified								
Diesel Fuel Motor Oil Bunker C		0.14 ND ND	mg/L mg/L mg/L	0.05 0.25 0.5	09/26/96 09/26/96 09/26/96	TPH by EPA 8015M TPH by EPA 8015M TPH by EPA 8015M	wsn wsn wsn	11-84-7	1,2
n-Pentacosane (S Date Extracted)	76	%		09/26/96 09/18/96	TPH by EPA 8015M	wsn	629-99-2	

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 6

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

PACE Sample No: 70732052			Date Collec		7/16/96			
Tient Sample ID: MW-SB2A			Date Recei	ved: 09	7/16/96			
arameters	Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
Metals								
Copper by Furnace, Method 7211								
Copper	ND	ug/L	5		EPA 7211	BBF	7440-50-8	
Date Digested				09/19/96				
Lead, AAS Furnace								
Lead	ND	ug/L	3	09/24/96	EPA 7421	BBF	7439-92-1	
Date Digested				09/19/96	82			
TPH in Water by 8015 Modified					***			
Diesel Fuel	0.17	mg/L	0.05	09/26/96	TPH by EPA 8015M	wsn	11-84-7	
Motor Oil	ND	mg/L	0.25	09/26/96	TPH by EPA 8015M	wsn		
Bunker C	ND	mg/L	0.5	09/26/96	TPH by EPA 8015M	wsn		
n-Pentacosane (S)	88	%		09/26/96		wsn	629-99-2	
Date Extracted	000000000	9009		09/18/96	Account of the second of the s			

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96

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PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

E Sample No:	70739206		***************************************	Date Collec	ted: 09	/16/96			
ent Sample ID:	MW-SB2			Date Recei	ved: 09	/16/96			
ameters		Results	Units	PRL	Analyzed	Method	Analys	t CAS#	Footnotes
ale									
		ND	ug/L	0.2	09/30/96	EPA 7470	BBF	7439-97-6	
Arsenic		ND	ug/L	5	09/27/96	EPA 7060	BBF	7440-38-2	
Date Digested					09/19/96				
etals, ICP									
Cadmium		ND	ug/L	5	09/26/96				
Chromium		ND	ug/L	7	09/26/96	EPA 6010	BBF	7440-47-3	
Iron		130	ug/L	40	09/26/96	EPA 6010	BBF	7439-89-6	
Nickel		ND	ug/L	30	09/26/96	EPA 6010	BBF	7440-02-0	
Silver		ND	ug/L	7	09/26/96	EPA 6010	BBF	7440-22-4	
Zinc		ND	ug/L	100	09/26/96	EPA 6010	BBF	7440-66-6	
Date Digested			nese s a ssues		09/26/96				
	ent Sample ID: ameters als ercury, CVAAS Mercury rsenic, AAS Furnace Arsenic Date Digested etals, ICP Cadmium Chromium Iron Nickel Silver Zinc	ent Sample ID: MW-SB2 ameters als ercury, CVAAS Mercury rsenic, AAS Furnace Arsenic Date Digested etals, ICP Cadmium Chromium Iron Nickel Silver Zinc	aneters Results als ercury, CVAAS Mercury ND rsenic, AAS Furnace Arsenic ND Date Digested etals, ICP Cadmium ND Chromium ND Iron 130 Nickel ND Silver ND	ent Sample ID: MW-SB2 ameters Results Units als ercury, CVAAS Mercury ND ug/L rsenic, AAS Furnace Arsenic ND ug/L Date Digested etals, ICP Cadmium ND ug/L Chromium ND ug/L Iron 130 ug/L Nickel ND ug/L Silver ND ug/L	### Results Units PRL ### Alsercury, CVAAS ### Mercury ND ug/L 0.2 ### results Units PRL ### Alsercury, CVAAS ### Mercury ND ug/L 0.2 ### results Units PRL ### Alsercury ND ug/L 0.2 ### results Units PRL ### Alsercury ND ug/L 0.2 ### results Units PRL ### Units PRL	### Results Units PRL Analyzed ### Analyzed	Date Received: 09/16/96	Date Received: 09/16/96 Date Received: 0	Date Received: 09/16/96 Sample ID: MW-SB2 Date Received: 09/16/96 Date Received: 09/16/9

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 8

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

PARAMETER FOOTNOTES

Not Detected Not Calculable

RL PACE Reporting Limit

S) Surrogate

Hydrocarbons present do not match profile of laboratory standard.

Miscellaneous peaks present in diesel range.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

Tel: 707-792-1865

Fax: 707-792-0342

DATE: 10/07/96

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QUALITY CONTROL DATA

eline D Hollis Street, Suite D PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

REVISED

Attn: Ms. Rhodora DelRosario

ne: (510)420-8686

Emeryville, CA 94608

QC Batch ID: 17552 Ambeiated PACE Samples:

70732003 70732052 QC Batch Method: EPA 3520

70732011

70732029

70732037

70732045

Date of Batch: 09/18/96

HOD BLANK: 70733266

issociated PACE Samples:

1	70732003	70732011 Method Blank	70732029	70732037	70732045	70732052
'arameter	Units	Result	PRL	Footnotes		
sel Fuel	mg/L	ND	0.05			
lotor Oil	mg/L	ND	0.25			
Bunker C	mg/L	ND	0.5			
entacosane (S)	X	57				

PORATORY CONTROL SAMPLE & LCS	D: 70733274	7073328	2	Spike				
		Spike	LCS	Spike	LCSD	Dup		
'arameter	Units	Conc.	Result	∦ Rec	Result	∦ Rec	RPD	Footnotes
		• • • • • • •	• • • • • • • • • • • • • • • • • • • •	• • • • •		• • • • •		• • • • • • • • • • • • • • • • • • • •
sel Fuel	mg/L	1	0.625	63	0.68	68	8	
-Pentacosane (S)				81		110		

REPORT OF LABORATORY ANALYSIS

Tel: 707-792-1865 Fax: 707-792-0342

QUALITY CONTROL DATA

DATE: 10/01/96

PAGE: 10

Baseline 5900 Hollis Street, Suite D meryville, CA 94608

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

Attn: Ms. Rhodora DelRosario

hone: (510)420-8686

QC Batch ID: 17570

Associated PACE Samples:

70732003 70732052 QC Batch Method: EPA 3020 70732029

70732011 70739206

70732037

70732045

Date of Batch: 09/19/96

METHOD BLANK: 70733886 Associated PACE Samples:								
	70732003	70732011 Method Blank	70732029	70732037	70732045	70732052	70739206	
Parameter	Units	Result	PRL	Footnotes				
			•••••					
opper cead	ug/L	ND	5					
tead	ug/L	ND	3					
Arsenic	ug/L	ND	5	2				

ATRIX SPIKE & MATRIX SPIKE DUP	LICATE: 707339	707339	28 Spike	Matrix Spike	Spike	Matrix Sp. Dup.	Spike Dup		
Parameter	Units	70725148	Conc.	Result	% Rec	Result	% Rec	RPD	Footnotes
opper	ug/L	12.8	20	28.51	78	28.35	77	1	
opper Cead Arsenic	ug/L ug/L	ND ND	40 40	35.5 42.3	80 98	36.4 41.4	83 96	2	

ABORATORY CONTROL SAMPLE	& LCSD: 70733894	70733902					Spike		
Danamatan	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Dup % Rec	RPD	Footnotes	
Parameter	Units	conc.	result	76 KEC	resutt	76 KEC			
opper	ug/L	20	21.1	106	21.05	105	1		
opper Lead	ug/L	40	38.7	97	38.1	95	2		
Arsenic	ug/L	40	42.5	106	42	105	1		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

QUALITY CONTROL DATA

DATE: 10/01/96

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Baseline 5900 Hollis Street, Suite D meryville, CA 94608 PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

Attn: Ms. Rhodora DelRosario

hone: (510)420-8686

QC Batch ID: 17707

QC Batch Method: EPA 3010

Date of Batch: 09/25/96

Associated PACE Samples:

nples: 70739206

ETHOD BLANK: 70738695 Associated PACE Samples:

	70739206			
Parameter	Units	Method Blank Result	PRL	Footnotes
	• • • • • • • • • • • • • • • • • • • •			
madmi um	ug/L	ND	5	
hromium	ug/L	ND	7	
ron	ug/L	ND	40	
Nickel	ug/L	ND	30	
_Silver	ug/L	ND	7	
inc	ug/L	ND	100	

MATRIX SPIKE & MATRIX SPIKE	E DUPLICATE: 70740 Units	70737135	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Cadmium	ug/L	ND	200	208	104	208	104	0	
hromium	ug/L	ND	2000	1880	94	1920	96	2	
ron	ug/L	ND	20000	19100	95	19500	97	2	
ickel	ug/L	ND	2000	1890	94	1930	97	3	
Silver	ug/L	ND	200	182	91	186	93	2	
Zinc	ug/L	ND	2000	1920	96	1960	98	2	
	51								

CABORATORY CONTROL SAMPLE & LCS	D: 70740410	70740428 Spike	B LCS	Spike	LCSD	Spike Dup	(
Parameter	Units	Conc.	Result	% Rec	Result	% Rec	RPD	Footnotes
admī um	ug/L	200	205	103	208	104	1	
Chromium	ug/L	2000	1900	95	1910	95	0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

QUALITY CONTROL DATA

DATE: 10/01/96

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PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

LABORATORY CONTROL SAMPLE	& LCSD: 70740410	7074042	28			Spike			
		Spike	LCS	Spike	LCSD	Dup			
arameter	Units	Conc.	Result	% Rec	Result	% Rec	RPD	Footnotes	
									
Iron	ug/L	20000	19300	97	19300	97	0		
Nickel	ug/L	2000	1940	97	1910	96	1		
lver	ug/L	200	185	92	184	92	0		
inc	ug/L	2000	1950	98	1950	98	0		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

QUALITY CONTROL DATA

DATE: 10/01/96

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Baseline 5900 Hollis Street, Suite D neryville, CA 94608

PACE Project Number: 706592

Matrix Spike Sp. Dup.

2.22

......

% Rec Result

107

Client Project ID: Port of Oakland-Biosite

Spike

110 3

% Rec RPD Footnotes

......

Dup

Attn: Ms. Rhodora DelRosario

none: (510)420-8686

QC Batch ID: 17816 Associated PACE Samples:

70739206

QC Batch Method: EPA 7470

Date of Batch: 09/30/96

ETHOD BLANK: 70742051 Associated PACE Samples:

70739206

Method

Blank

Result PRL

70739206 Conc.

ND 2

Footnotes

Matrix

Spike

Result

2.16

Units -----

Units

......

ug/L

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70742069 70742077

.....

Parameter

Mercury

ug/L 0.2

,	-3, -	5570			1550703				
ABORATORY CONTROL SAMPLE & L	CSD: 70742085	7074209	3			Spike			
		Spike	LCS	Spike	LCSD	Dup			
Parameter	Units	Conc.	Result	% Rec	Result	% Rec	RPD	Footnotes	
ercury	ug/L	2	2.19	110	2.19	110	0		

Spike

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc. 1455 McDowell Blvd. North, Suite D Petaluma, CA 94954

> Tel: 707-792-1865 Fax: 707-792-0342

DATE: 10/01/96 PAGE: 14

PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

QUALITY CONTROL DATA PARAMETER FOOTNOTES

ne Quality Control Sample Final Results listed above have been rounded to reflect an appropriate number of significant figures.

ND Not Detected

Not Calculable

RL PACE Reporting Limit

Relative Percent Difference

S) Surrogate

REPORT OF LABORATORY ANALYSIS

Data File: /chem/70gce04.1/092696.b/id9f0003.d

Date : 26-SEP-1996 14:01

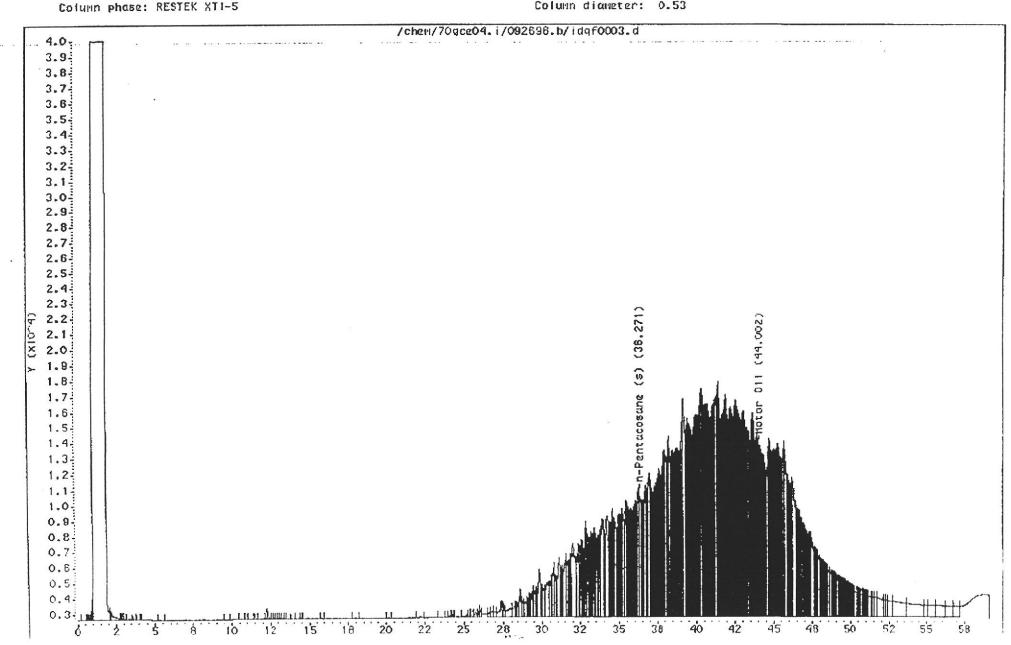
Client ID:

Sample Info: CCAL Motor oil Aandard

Instrument: 70gce04.i

Page 2

Operator: usn



Date: 26-SEP-96 22:38

Client ID:

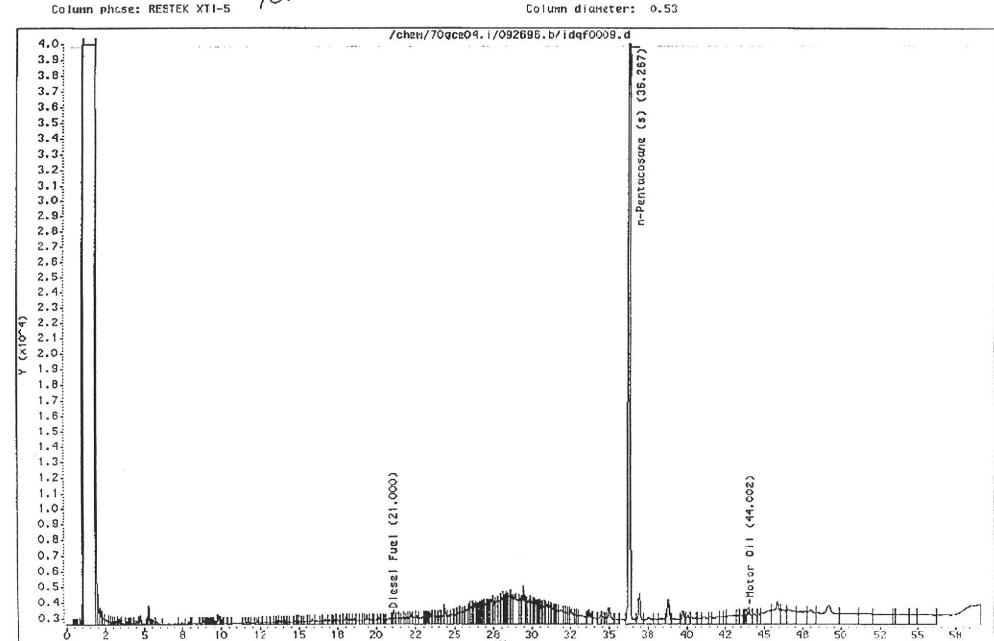
Sample Info: SAMFLE-water Volume injected (uL): 1.0

70732052

Instrument: 70gce04.i

Page 3

Operator: usn



MW-SB3

Data File: /chen/70gce04.i/092696.b/ldqf0008.d

Date: 26-SEP-1996 19:19

Client ID:

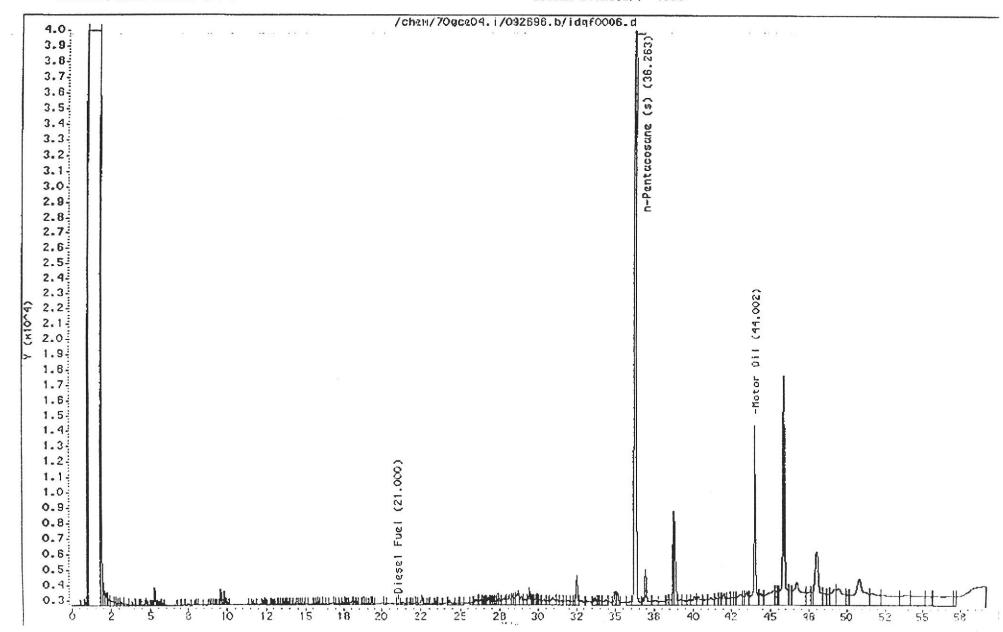
Sample Info: SAMPLE-water Volume Injected (uL): 1.0 Column phase: RESTEK XT1-5

70733029

Instrument: 70gce04.i

Page 3

Operator: usn



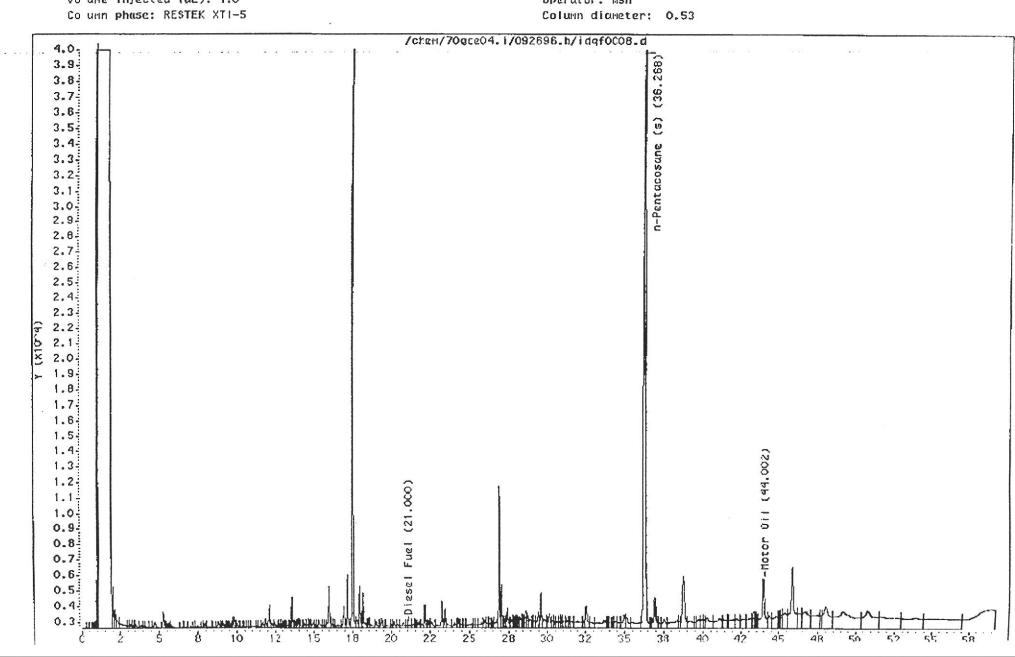
70732 045

Client ID:

Sample Info: SAMPLE-mater Volume Injected (uL): 1.0 Instrument: 70gce04.i

Operator: usn

Page 3



Tel: 707-792-1865 Fax: 707-792-0342

RECEIVED

October 01, 1996

OCT / 1996

BASELINE

Ms. Rhodora DelRosario Baseline 5900 Hollis Street, Suite D Emeryville, CA 94608

RE: PACE Project Number: 706592

Client Project ID: Port of Oakland-Biosite

Dear Ms. DelRosario:

Enclosed are the results of analyses for sample(s) received on September 16, 1996. Please note samples analyzed for TPH by EPA 8015 Modified were extracted with a silica gel cleanup procedure. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Stephanii Mato

Stephanie Matzo Project Manager

Enclosures

Page 2

Data File: /chem/70gce04.i/092696.b/idaf0002.d

Date: 26-SEP-1996 12:58

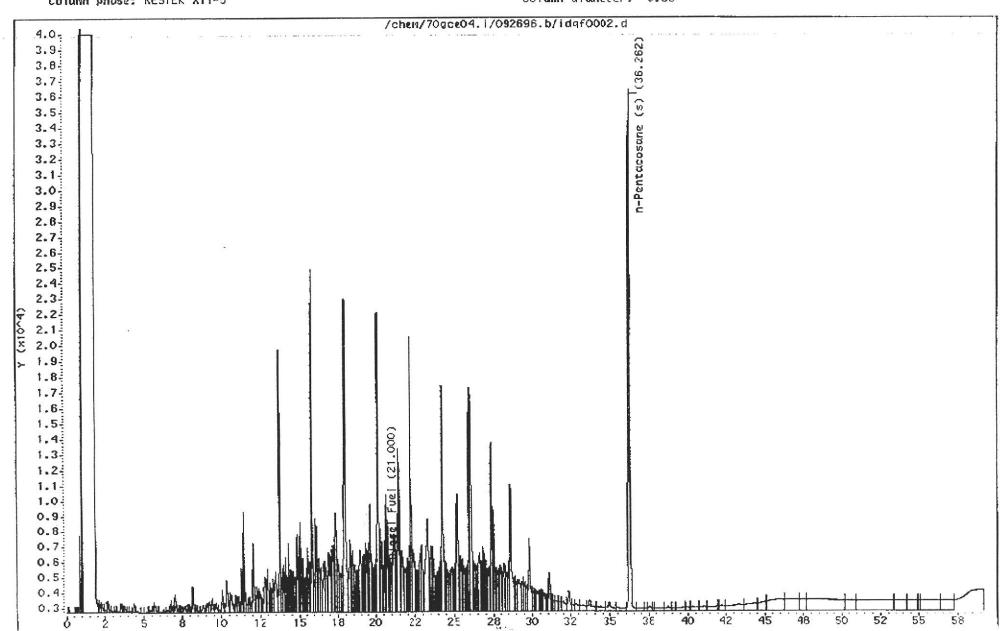
Client ID:

Sample Info: CCAL diesel standard

Column phose: RESTEK XT1-5

Instrument: 70gce04.i

Operator: Han



Page 2

Data File: /chem/70gce04.i/092696.b/idqf0003.d

Date : 28-SEP-1996 14:01

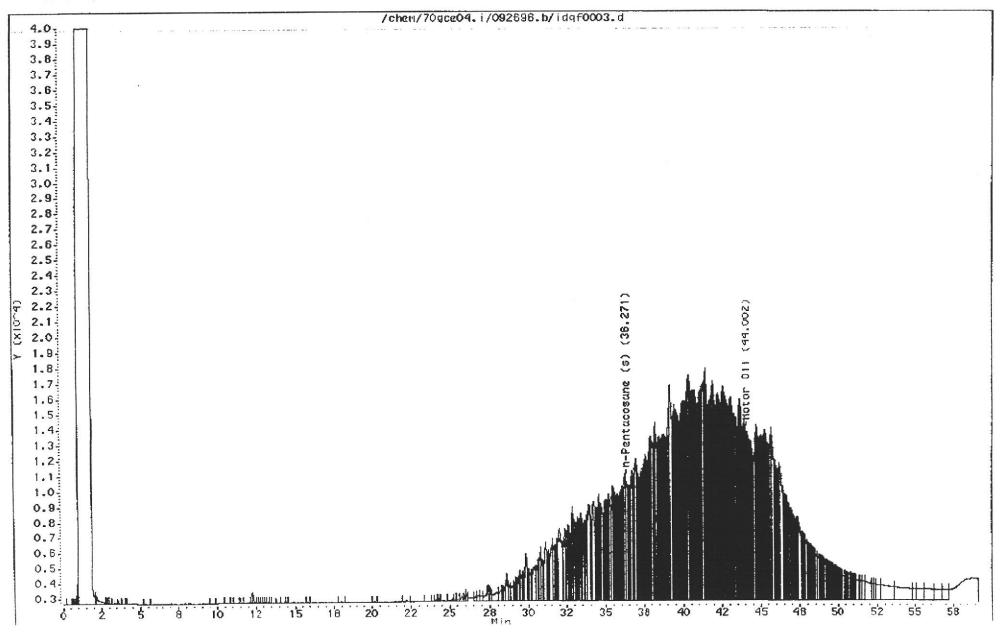
Client ID:

Sumple Info: CCAL Motor oil Amdard

Column phase: RESTEK XTI-5

Instrument: 70gce04.i

Operator: wsn



Data File: /chem/70gce04.i/092696.b/ldqf0009.d

Date : 26-SEP-96 22:38

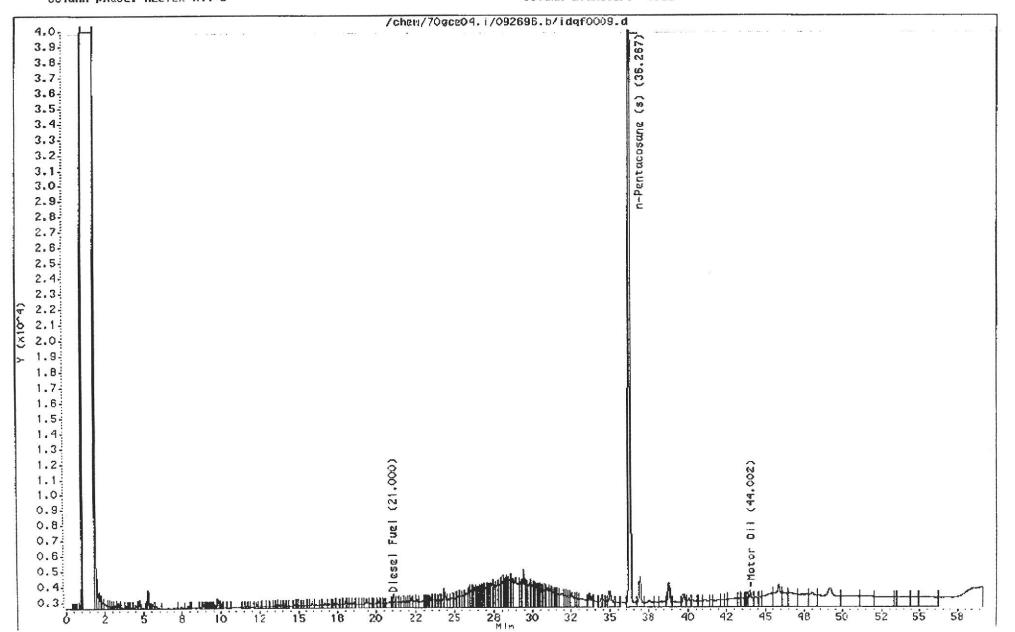
Client ID:

Sample Info: SAMFLE-water

Volume injected (uL): 1.0 Column phase: RESTEK XTI-5 70732052

Instrument: 70gce04.i

Operator: wsn



Data File: /chen/70gce04.i/092696.b/ldqf0006.d

Date: 26-SEP-1996 19:19

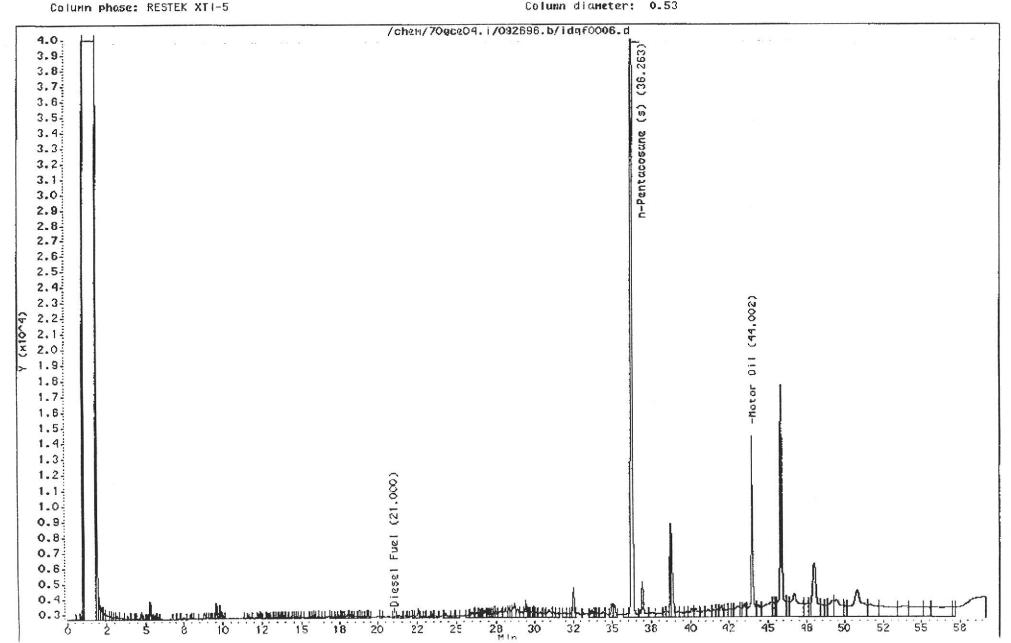
Client ID:

Sample Info: SAMPLE-mater Volume Injected (uL): 1.0

70733029

Instrument: 70gce04.i

Operator: usn



Data File: /chen/70gce04.i/092896.b/id9f0008.d

Date : 26-SEP-96 21:32

Client 10:

Sample Info: SAMPLE-mater Vo ume Injected (uL): 1.0

Co umn phase: RESTEK XT1-5

70732045

Instrument: 70gce04.i

Operator: Hish

