



December 12, 1996

Project No. 95-113.03

Mr. Jeff Rubin  
Port of Oakland  
530 Water Street  
Oakland, California 94604

**Groundwater Monitoring and Sampling Report**  
**Tanks MF25 and MF26, United Airlines Hangar-Economy Parking Lot Site**  
**Metropolitan Oakland International Airport (MOIA)**  
**1100 Airport Drive**  
**Oakland, California**  
**(Work Order No. 028691)**

Dear Mr. Rubin:

This Groundwater Monitoring and Sampling Report (Report) has been prepared by Innovative Technical Solutions, Inc. (ITSI) on behalf of the Port of Oakland for groundwater monitoring and sampling performed on October 24, 1996 at the United Airlines Hangar-Economy Parking Lot Site, located at 1100 Airport Drive at the Metropolitan Oakland International Airport (MOIA) in Oakland, California. A site location map is shown on Figure 1.

The scope of work included monitoring and sampling of three groundwater monitoring wells, MW-1, MW-2, and MW-3. The monitoring wells are located in the vicinity of two former underground storage tanks: a 500-gallon oil/solvent tank (MF-25) and a 3,000-gallon oil/solvent tank (MF-26), removed in March 1992.

**SAMPLING OF MONITORING WELLS**

Groundwater monitoring and sampling was performed on October 24, 1996. The monitoring wells were initially gauged for depth to water and checked for the presence of separate phase hydrocarbons. Separate phase hydrocarbons were observed in two monitoring wells, MW-2 and MW-3. Depth to water and product thickness measurements were recorded on Monitoring Well

Purge and Sample Forms. Copies of the Monitoring Well Purge and Sample Forms are provided in Attachment A.

After depth to water measurements were recorded, monitoring well MW-1 with no separate phase hydrocarbons was purged using a clean disposable bailer. Approximately three casing volumes of water were removed, or until pH, conductivity, and temperature readings stabilized indicating formation water had entered the monitoring well. Field parameters were recorded on a Monitoring Well Purge and Sample Form.

A groundwater sample from monitoring well MW-1 was collected using the disposable bailer and placed into laboratory provided containers. The sample containers were properly labeled with the sample number, date and time of collection, and samplers initials, and were placed on ice in an insulated cooler. Purge water was stored in properly labeled drums onsite.

### GROUNDWATER LEVELS IN MONITORING WELLS

Depth to water results are summarized in Table 1. Groundwater elevations were calculated using the measured depth to water and survey elevations of top of casing, and are provided in Table 1. This survey used the Port of Oakland datum, which is 3.2 feet below mean sea level. Figure 2 shows the elevation contours and groundwater flow direction for the site. The groundwater flow direction is to the west, with a gradient of approximately 0.003 ft/ft.

### LABORATORY ANALYSIS OF GROUNDWATER SAMPLES

The sample was sent under chain-of-custody procedures to Pace Analytical in Petaluma, California, the current Port of Oakland contract laboratory. The sample was analyzed according to the following schedule:

Monitoring Well ID	Analyses						
	TPHg <sup>(1)</sup>	BTEX <sup>(2)</sup>	TPHj <sup>(3)</sup>	TPHd <sup>(4)</sup>	TPHmo <sup>(5)</sup>	VOCs <sup>(6)</sup>	TDS <sup>(7)</sup>
MW-1	x	x	x	x	x	x	x
MW-2	x	x	x	x	x	x	x
MW-3	x	x	x	x	x	x	x

<sup>(1)</sup>TPH as gasoline by California LUFT Method

<sup>(2)</sup>Benzene, toluene, ethylbenzene, and xylenes by California LUFT Method

<sup>(3)</sup>TPH as jet fuel by Modified EPA Method 8015

<sup>(4)</sup>TPH as diesel by Modified EPA Method 8015

<sup>(5)</sup>TPH as motor oil by Modified EPA Method 8015

<sup>(6)</sup>VOCs by EPA Method 8010

<sup>(7)</sup>Total dissolved solids by EPA Method 160.1

Laboratory results for the groundwater sample are summarized in Table 2, and shown in Figure 3. Copies of the laboratory results and chain-of-custody are provided in Attachment B.

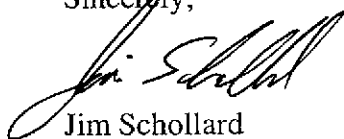
## FINDINGS

Results of the October 24, 1996 groundwater monitoring and sampling are summarized below:

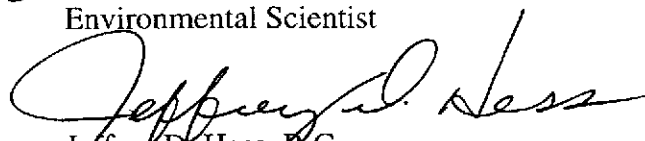
- Separate phase hydrocarbons were observed in two monitoring wells, MW-2 and MW-3, at a thickness of 0.16 and 0.02 feet, respectively.
- TPHg was reported at a concentration of 57 µg/l in MW-1.
- Benzene and xylenes were reported at concentrations of 1.9 µg/l and 1.3 µg/l in MW-1.
- Toluene and ethylbenzene were reportedly not detected in monitoring well MW-1.
- TPHd was reported at a concentration of 250 µg/l in MW-1.
- TPHj and TPHmo were reportedly not detected in monitoring well MW-1.
- 1,1-Dichloroethane and trichloroethene were reported in monitoring well MW-1 at concentrations of 12 µg/l and 1.4 µg/l, respectively.

Please give us a call if you have any questions or comments.

Sincerely,



Jim Schollard  
Environmental Scientist



Jeffrey D. Hess, R.G.  
Project Director

Attachments

TABLE 1

**GROUNDWATER ELEVATIONS  
TANKS MF25 AND MF26 (UNITED AIRLINES HANGAR-ECONOMY PARKING LOT SITE)  
METROPOLITAN OAKLAND INTERNATIONAL AIRPORT (MOIA)  
1100 AIRPORT DRIVE  
OAKLAND, CALIFORNIA**

Monitoring Well ID	Elevation of Top of Casing (feet)	Date of Monitoring	Measured Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (feet)	Note
MW-1	6.91	5/15/92	3.10	-	3.81	1
		8/7/92	3.20	-	3.71	1
		11/24/92	4.04	-	2.87	1
		2/12/93	-	-	-	1
		3/11/93	2.09	-	4.82	1
		5/17/93	3.14	-	3.77	1
		8/3/93	3.15	-	3.76	1
		11/25/93	3.59	-	3.32	1
		3/24/94	3.21	-	3.70	1
		5/9/94	2.99	-	3.92	1
		8/29/94	3.34	-	3.57	1
		9/27/94	3.51	-	3.40	1
		4/25/95	2.38	-	4.53	1
		8/11/95	3.08	-	3.83	1
		11/3/95	3.52	-	3.39	1
MW-2	6.63	4/25/95	2.20	-	4.43	1
		8/11/95	3.11	-	3.84	1
		11/3/95	3.28	-	3.35	1
		6/19/96	2.53	0.05	4.14	2
		10/24/96	3.44	0.16	3.31	2
MW-3	7.36	4/25/95	2.78	-	4.58	1
		8/11/95	3.62	-	4.02	1
		11/3/95	4.05	-	3.63	1
		6/19/96	3.17	0.01	4.20	2
		10/24/96	4.02	0.02	3.36	2

- 1 Data from Table 1, Results of Groundwater Sampling Analysis for Petroleum Hydrocarbons, BTEX, and TDS, Port of Oakland, Oakland International Airport, United Airlines Hangar Area-Economy Parking Lot Site, dated February 21, 1996, by Alisto Engineering Group.  
2 Groundwater elevation calculated assuming a specific gravity of 0.75 for product.

TABLE 2

SUMMARY OF LABORATORY RESULTS  
TANKS MF25 AND MF26 (UNITED AIRLINES HANGAR AREA-ECONOMY PARKING LOT SITE)  
METROPOLITAN OAKLAND INTERNATIONAL AIRPORT (MOIA)  
1100 AIRPORT DRIVE  
OAKLAND, CALIFORNIA

Monitoring Well ID	Date of Sampling	TPHg (µg/l)	B (µg/l)	T (µg/l)	E (µg/l)	X (µg/l)	TPHj (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	TOG (µg/l)	TDS (mg/l)	Note
MW-1	5/15/92	<50	<0.4	<0.3	<0.3	<0.4	-	-	-	<5,000	5,900	1
	8/7/92	<50	<0.4	<0.3	<0.3	<0.4	800	-	-	<5,000	-	1
	11/24/92	<50	<0.4	<0.3	<0.3	<0.4	<50	-	-	<5,000	-	1
	2/12/93	<50	<0.4	<0.3	<0.3	<0.4	-	-	-	<5,000	-	1
	5/17/93	<50	<0.4	<0.3	<0.3	<0.4	-	-	-	<5,000	4,100	1
	8/3/93	<50	<0.5	<0.5	<0.5	<0.5	-	5,200	-	<5,000	7,700	1
	11/25/93	70	<0.5	<0.5	<0.5	0.6	-	-	-	<5,000	3,790	1
	5/9/94	<50	<0.5	<0.5	<0.5	<0.5	-	-	-	<930	9,600	1
	8/29/94	<50	<0.5	<0.5	2.7	<0.5	-	-	-	<1,000	3,900	1
	4/25/95	<50	<5	<5	<5	<5	<50	1,400	610	-	4,000	1
	8/11/95	<50	<0.4	<0.3	<0.3	<0.4	<50	1,900	1,200	-	8,500	1
	11/3/95	<50	0.4	0.4	<0.3	<0.4	<50	4,200	1,800	-	6,600	1
6/19/96	<50	0.99	<0.5	1.1	<1.0	<500	11,000	820	-	3,040		
10/24/96	57	1.9	<0.5	<0.5	1.3	<500	250	<250	-	3090		
MW-2	4/25/95	5,200	340	570	110	580	13,000	<10,000	19,000	-	1,700	1
	8/11/95	5,500	320	680	110	510	7,900	<8,000	20,000	-	2,500	1
	11/3/95	3,800	200	400	27	360	11,000	<11,000	4,200	-	2,000	1
	6/19/96	2	2	2	2	2	2	2	2	-	2	
	10/24/96	2	2	2	2	2	2	2	2	-	2	
MW-3	4/25/95	7,200	150	600	100	580	38,000	<40,000	31,000	-	5,600	1
	8/11/95	2	2	2	2	2	2	2	2	-	2	1
	11/3/95	2	2	2	2	2	2	2	2	-	2	1
	6/19/96	2	2	2	2	2	2	2	2	-	2	
	10/24/96	2	2	2	2	2	2	2	2	-	2	

1 Data from Table 1, Results of Groundwater Sampling Analysis for Petroleum Hydrocarbons, BTEX, and TDS, Port of Oakland, Oakland International Airport, United Airlines Hangar Area-Economy Parking Lot Site, dated February 21, 1996, by Alisto Engineering Group.

2 Not sampled due to presence of free product in monitoring well.

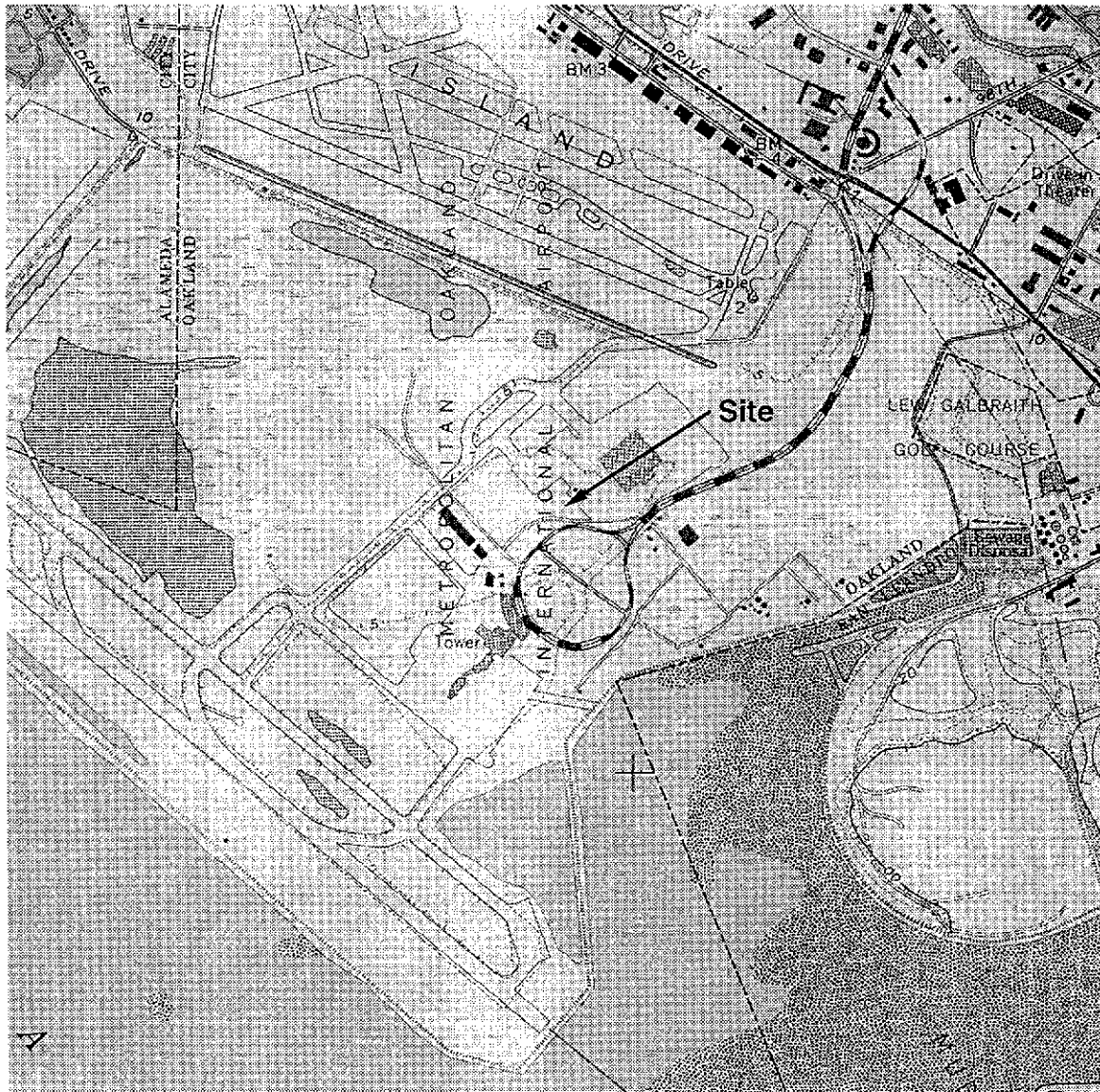
TABLE 3

SUMMARY OF LABORATORY RESULTS FOR VOLATILE ORGANIC COMPOUNDS  
TANKS MF25 AND MF26 (UNITED AIRLINES HANGAR AREA-ECONOMY PARKING LOT SITE)  
METROPOLITAN OAKLAND INTERNATIONAL AIRPORT (MOIA)  
1100 AIRPORT DRIVE  
OAKLAND, CALIFORNIA

Monitoring Well ID	Date of Sampling	Acetone (µg/l)	2-Butanone (µg/l)	Chloroform (µg/l)	1,1-DCA (µg/l)	1,2-DCE (µg/l)	4-Methyl-2-pentanone (µg/l)	1,1,1-TCA (µg/l)	TCE (µg/l)	PCE (µg/l)	Note
MW-1	11/24/92	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
	2/12/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
	5/17/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
	8/3/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
	11/25/93	ND	ND	ND	ND	6	ND	ND	ND	ND	1
	5/9/94	ND	ND	ND	ND	ND	ND	ND	ND	5.5	1
	9/27/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
	4/25/95	<20	<20	<5	<5	<5	<20	-	-	<5	1
	8/11/95	-	-	<0.5	4.3	13	-	2	1.8	0.6	1
	11/3/95	-	-	<0.5	1.3	3.7	-	0.6	0.5	<0.5	1
	6/19/96	-	-	<0.5	5.4	<0.5	-	<0.5	1.2	<0.5	
10/24/96	-	-	<0.5	12	<1.0	-	<0.5	1.4	<0.5		
MW-2	4/25/95	<200	200	<50	50	<50	<200	-	-	<50	1
	8/11/95	-	-	5	79	26	-	20	4	9	1
	11/3/95	-	-	<0.5	73	24	-	4.8	6.7	6.8	1
	6/19/96	2	2	2	2	2	2	2	2	2	
	10/24/96	2	2	2	2	2	2	2	2	2	
MW-3	4/25/95	300	300	-	30	<30	200	-	-	<30	1
	8/11/95	2	2	2	2	2	2	2	2	2	1
	11/3/95	2	2	2	2	2	2	2	2	2	1
	6/19/96	2	2	2	2	2	2	2	2	2	
	10/24/96	2	2	2	2	2	2	2	2	2	

1 Data from Table 1, Results of Groundwater Sampling Analysis for Petroleum Hydrocarbons, BTEX, and TDS, Port of Oakland, Oakland International Airport, United Airlines Hangar Area-Economy Parking Lot Site, dated February 21, 1996, by Alisto Engineering Group.

2 Not sampled due to presence of free product in monitoring well.



Approximate Scale

**FIGURE 1**

**SITE LOCATION**

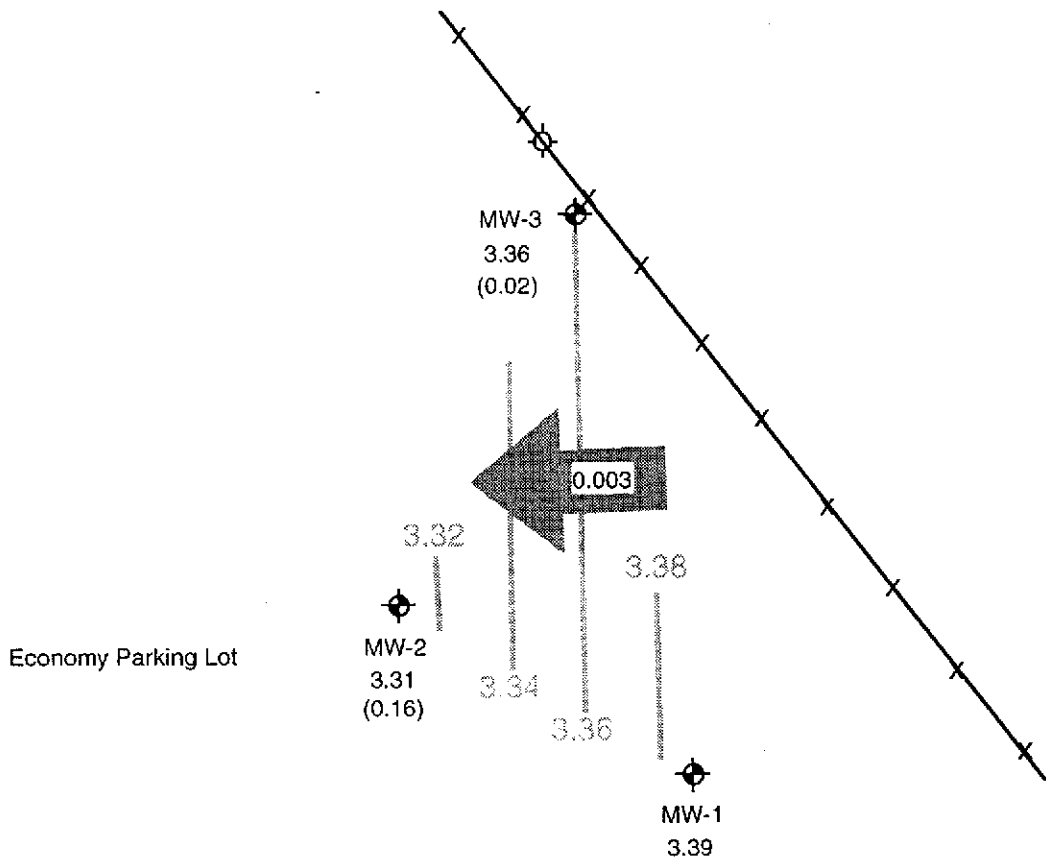
United Airlines Hangar-Economy Parking Lot Site  
Oakland International Airport  
1100 Airport Drive



**PORT OF OAKLAND**

**INNOVATIVE TECHNICAL SOLUTIONS, INC.**

Source: San Leandro, California 7.5-minute U.S.G.S. Quadrangle, dated 1959, and photorevised 1980.



Economy Parking Lot

MW-2  
3.31  
(0.16)

MW-3  
3.36  
(0.02)

MW-1  
3.39




3.32

3.34

3.36

3.38

0.003

- Legend**
-  Monitoring Well
  - 3.36 Groundwater Elevation on 10/24/96
  - (0.16) Product Thickness on 10/24/96
  -  Groundwater Elevation Contour Lines
  -  Groundwater Flow Direction and Gradient

0      20 Feet      40 Feet

Approximate Scale

**FIGURE 2**

**GROUNDWATER ELEVATIONS AND FLOW DIRECTION FOR OCTOBER 24, 1996**

United Airlines Hangar-Economy Parking Lot Site  
Oakland International Airport  
1100 Airport Drive

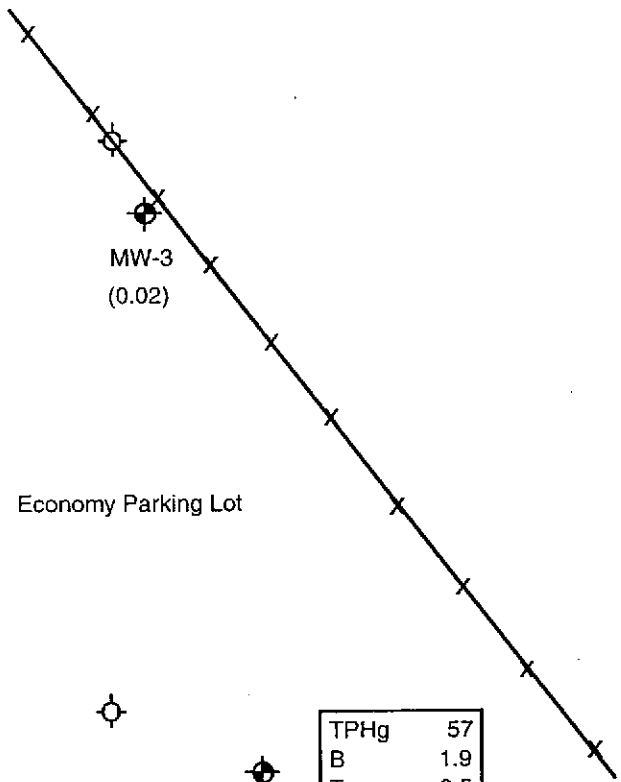
**ITSI**

**PORT OF OAKLAND**


**INNOVATIVE TECHNICAL SOLUTIONS, INC.**

Source: Adapted from Figure 2, Potentiometric Groundwater Elevation Contour Map, November 3, 1995, Aisto Engineering Group.



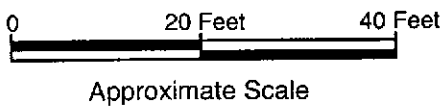



TPHg	57
B	1.9
T	<0.5
E	<0.5
X	1.3
TPHj	<500
TPHd	250
TPHmo	<250
1,1-DCA	12
TCE	1.4

 **Legend**  
Monitoring Well  
0.16 Product Thickness on 10/24/96

TPHg	57
B	1.9
T	<0.5
E	<0.5
X	1.3
TPHj	<500
TPHd	250
TPHmo	<250
1,1-DCA	12
TCE	1.4

Groundwater Concentrations in  $\mu\text{g/l}$  on 10/24/96  
 TPHg - TPH as gasoline  
 B - Benzene  
 T - Toluene  
 E - Ethylbenzene  
 X - Total xylenes  
 TPHj - TPH as jet fuel  
 TPHd - TPH as diesel  
 TPHmo - TPH as motor oil  
 1,1-DCA - 1,1-Dichloroethane  
 TCE - Trichloroethene



**FIGURE 3**  
**CONCENTRATIONS OF PETROLEUM HYDROCARBONS AND VOCs IN GROUNDWATER ON OCTOBER 24, 1996**  
 United Airlines Hangar-Economy Parking Lot Site  
 Oakland International Airport  
 1100 Airport Drive  
**PORT OF OAKLAND**  
  
**INNOVATIVE TECHNICAL SOLUTIONS, INC.**

Source: Adapted from Figure 2, Potentiometric Groundwater Elevation Contour Map, November 3, 1995, Alisto Engineering Group.

ATTACHMENT A  
COPIES OF MONITORING WELL PURGE AND SAMPLE FORMS

# MONITORING WELL PURGE AND SAMPLE FORM

PROJECT NAME: Port of Oakland - Economy Parking PROJECT NO.: 95-113.03  
 WELL NO.: MW-1 TESTED BY: S. Schollard DATE: 10/24/96

Measuring Point Description: notch @ T.O.C. Static Water Level (ft.): 3.52'  
 Total Well Depth (ft.): 11.56 Sample Method: disposable teflon bailer  
 Water Level Measurement Method: Solinist interface probe Time Sampled: ~~10.5~~ 16.35  
 Purge Method: disposable teflon bailer Sample Depth (ft.): ~10.5'  
 Time Start Purge: 1615 Field Filtering: NA  
 Time End Purge: 1626 Field Preservation: Blue ice  
 Comments: well dewatered; collected QC-1 duplicate sample @ 1645

Well Volume Calculation (fill in before purging)	Total Depth (ft)	Depth to Water (ft)	Water Column (ft)	Multiplier for Casing Diameter (in)			Casing Volume (gal)
				2	4	6	
	11.56	3.52	= 8.04	x 0.16	0.64	1.44	= 1.29
							(3 vols = 3.86)
Time	1617	1620	1626				
Volume Purged (gals)	1.3	1.3	1.3				
Cumulative Volume Purged (gals)	1.3	2.6	3.90				
Cumulative Number of Casing Volumes	1.01	2.02	3.03				
Purge Rate (gpm)	0.65	0.43	0.21				
Temperature (F°) or (C°)	32.1	27.3	26.1				
pH	6.75	6.56	6.58				
Specific Conductivity (umhos/cm) <small>ms/cm</small>	7.49	10.3	10.3				
Dissolved Oxygen (mg/L)	NA	NA	NA				
Turbidity/Color (NTU)	clear	→	cloudy/lt. grey				
Odor	None	None	None				
Dewatered?	No	No	Yes				

CHECKED BY: *S. Schollard* DATE: \_\_\_\_\_

# MONITORING WELL PURGE AND SAMPLE FORM

PROJECT NAME: Port of Oakland - Economy Parking PROJECT NO.: 95-113.03

WELL NO.: MW-2 TESTED BY: J. Schollard DATE: 12/24/96

Measuring Point Description: low pt. of cut on casing Static Water Level (ft.): OPL = 3.28'  
DTW = 3.44'

Total Well Depth (ft.): NM Sample Method: Not Sampled

Water Level Measurement Method: Solinst interface probe Time Sampled: "

Purge Method: NA Sample Depth (ft.): "

Time Start Purge: " Field Filtering: NA

Time End Purge: " Field Preservation: "

Comments: existing well cap broken; replaced well cap. Moderate petroleum odor upon opening well cap. Brown oily residue found on probe. \*Well not purged or sampled due to presence of free product

Well Volume Calculation (fill in before purging)	Total Depth (ft)	Depth to Water (ft)	=	Water Column (ft)	x	Multiplier for Casing Diameter (in)			=	Casing Volume (gal)
						2	4	6		
						0.16	0.64	1.44		

Time										
Volume Purged (gals)										
Cumulative Volume Purged (gals)										
Cumulative Number of Casing Volumes										
Purge Rate (gpm)										
Temperature (F°) or (C°)										
pH										
Specific Conductivity (µmhos/cm)										
Dissolved Oxygen (mg/L)										
Turbidity/Color (NTU)										
Odor										
Dewatered?										

CHECKED BY: J. Schollard ITSI

DATE: \_\_\_\_\_

# MONITORING WELL PURGE AND SAMPLE FORM

PROJECT NAME: Port of Oakland - Economy Parking PROJECT NO.: 95-113.03  
 WELL NO.: MW-3 TESTED BY: J. Schollard DATE: 10/24/96

Measuring Point Description: Notch on T.O.C Static Water Level (ft.): DTP = 4.00'  
DTW = 4.02'  
 Total Well Depth (ft.): N.M Sample Method: Not Sampled \*  
 Water Level Measurement Method: Solinst interface probe Time Sampled: "  
 Purge Method: N.A. Sample Depth (ft.): "  
 Time Start Purge: " Field Filtering: NA  
 Time End Purge: " Field Preservation: "

Comments: Existing locking well cap broken; replaced. Moderate petroleum odor upon removing well cap; brown oily residue on probe. Well not purged or sampled due to presence of free product.

Well Volume Calculation (fill in before purging)	Total Depth (ft)	Depth to Water (ft)	Water Column (ft)	Multiplier for Casing Diameter (in)			Casing Volume (gal)	
				2	4	6		
			=	x	0.16	0.64	1.44	=
Time								
Volume Purged (gals)								
Cumulative Volume Purged (gals)								
Cumulative Number of Casing Volumes								
Purge Rate (gpm)								
Temperature (F°) or (C°)								
pH								
Specific Conductivity (µmhos/cm)								
Dissolved Oxygen (mg/L)								
Turbidity/Color (NTU)								
Odor								
Dewatered?								

J. Schollard / ITSI  
 CHECKED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

**ATTACHMENT B**  
**COPIES OF LABORATORY REPORTS AND CHAIN-OF-CUSTODY FORM**  
**FOR GROUNDWATER SAMPLES**

# Pace Analytical

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

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

November 08, 1996

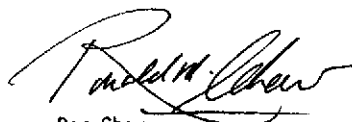
Mr. Jim Schollard  
Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

RE: PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Dear Mr. Schollard:

Enclosed are the results of analyses for sample(s) received on October 24, 1996. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Ron Chew  
Project Manager

Enclosures

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

# Pace Analytical

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

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

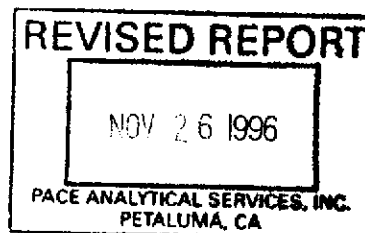
DATE: 11/08/96  
PAGE: 1

Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Attn: Mr. Jim Schollard  
Phone: (510)256-8898

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Wet Chemistry								
Total Dissolved Solids								
Total Dissolved Solids	3090	mg/L	5	11/02/96	EPA 160.1	AMD		
GC -- Volatiles								
GAS/BTEX by CA LUFT, Water								
Gasoline	57	ug/L	50	11/01/96	CA LUFT	AMH		
Benzene	1.9	ug/L	0.5	11/01/96	CA LUFT	AMH	71-43-2	
Toluene	ND	ug/L	0.5	11/01/96	CA LUFT	AMH	108-88-3	
Ethylbenzene	ND	ug/L	0.5	11/01/96	CA LUFT	AMH	100-41-4	
Xylene (Total)	1.3	ug/L	1	11/01/96	CA LUFT	AMH	1330-20-7	
a,a,a-Trifluorotoluene (S)	95	%		11/01/96	CA LUFT	AMH	2164-17-2	
4-Bromofluorobenzene (S)	93	%		11/01/96	CA LUFT	AMH	460-00-4	
Volatile Halogenated Organics								
Chloromethane	ND	ug/L	0.8	11/04/96	EPA 8010	ads	74-87-3	
Bromomethane	ND	ug/L	3	11/04/96	EPA 8010	ads	74-83-9	
Vinyl Chloride	ND	ug/L	1.8	11/04/96	EPA 8010	ads	75-01-4	
Chloroethane	ND	ug/L	5.2	11/04/96	EPA 8010	ads	75-00-3	
Methylene Chloride	ND	ug/L	2.5	11/04/96	EPA 8010	ads	75-09-2	
Trichlorofluoromethane	ND	ug/L	5	11/04/96	EPA 8010	ads	75-69-4	
1,1-Dichloroethene	ND	ug/L	1.3	11/04/96	EPA 8010	ads	75-35-4	
1,1-Dichloroethane	12	ug/L	0.7	11/04/96	EPA 8010	ads	75-34-3	
trans-1,2-Dichloroethene	ND	ug/L	1	11/04/96	EPA 8010	ads	156-60-5	
Chloroform	ND	ug/L	0.5	11/04/96	EPA 8010	ads	67-66-3	
1,2-Dichloroethane	ND	ug/L	0.5	11/04/96	EPA 8010	ads	107-06-2	
1,1,1-Trichloroethane	ND	ug/L	0.5	11/04/96	EPA 8010	ads	71-55-6	
Carbon Tetrachloride	ND	ug/L	1.2	11/04/96	EPA 8010	ads	56-23-5	
Bromodichloromethane	ND	ug/L	1	11/04/96	EPA 8010	ads	75-27-4	
1,2-Dichloropropane	ND	ug/L	0.5	11/04/96	EPA 8010	ads	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	3.4	11/04/96	EPA 8010	ads	10061-01-5	
Trichloroethene	1.4	ug/L	1.2	11/04/96	EPA 8010	ads	79-01-6	



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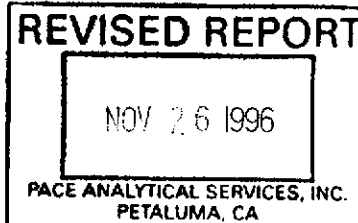
DATE: 11/08/96  
PAGE: 2

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

PACE Sample No: 70773437  
Client Sample ID: MW-1

Date Collected: 10/24/96  
Date Received: 10/24/96

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Dibromochloromethane	ND	ug/L	0.9	11/04/96	EPA 8010	ads	124-48-1	
1,1,2-Trichloroethane	ND	ug/L	0.5	11/04/96	EPA 8010	ads	79-00-5	
trans-1,3-Dichloropropene	ND	ug/L	3.4	11/04/96	EPA 8010	ads	10061-02-6	
Bromoform	ND	ug/L	2	11/04/96	EPA 8010	ads	75-25-2	
Tetrachloroethene	ND	ug/L	0.5	11/04/96	EPA 8010	ads	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.5	11/04/96	EPA 8010	ads	79-34-5	
Chlorobenzene	ND	ug/L	0.7	11/04/96	EPA 8010	ads	108-90-7	
2-Chloroethyl Vinyl Ether	ND	ug/L	5	11/04/96	EPA 8010	ads	110-75-8	
1,2-Dichlorobenzene	ND	ug/L	1	11/04/96	EPA 8010	ads	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1	11/04/96	EPA 8010	ads	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1	11/04/96	EPA 8010	ads	106-46-7	
Bromochloromethane (S)	114	%		11/04/96	EPA 8010	ads	74-97-5	
1,4-Dichlorobutane (S)	110	%		11/04/96	EPA 8010	ads	110-56-5	
GC								
TPH in Water by 8015 Modified								
Diesel Fuel	0.25	mg/L	0.05	11/06/96	TPH by EPA 8015M	WSN	11-84-7...	1
Motor Oil	ND	mg/L	0.25	11/06/96	TPH by EPA 8015M	WSN		
JP-4	ND	mg/L	0.5	11/06/96	TPH by EPA 8015M	WSN		
n-Pentacosane (S)	89	%		11/06/96	TPH by EPA 8015M	WSN	629-99-2	
Date Extracted				10/31/96				



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DATE: 11/08/96  
PAGE: 3

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

PACE Sample No: 70773445  
Client Sample ID: QC-1

Date Collected: 10/24/96  
Date Received: 10/24/96

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
<b>Wet Chemistry</b>								
Total Dissolved Solids								
Total Dissolved Solids	3620	mg/L	5	11/02/96	EPA 160.1	LMD		
<b>GC -- Volatiles</b>								
<b>GAS/BTEX by CA LUFT, Water</b>								
Gasoline	64	ug/L	50	11/01/96	CA LUFT	AMH		
Benzene	1.9	ug/L	0.5	11/01/96	CA LUFT	AMH	71-43-2	
Toluene	ND	ug/L	0.5	11/01/96	CA LUFT	AMH	108-88-3	
Ethylbenzene	ND	ug/L	0.5	11/01/96	CA LUFT	AMH	100-41-4	
Xylene (Total)	1.2	ug/L	1	11/01/96	CA LUFT	AMH	1330-20-7	
a,a,a-Trifluorotoluene (S)	97	%		11/01/96	CA LUFT	AMH	2164-17-2	
4-Bromofluorobenzene (S)	95	%		11/01/96	CA LUFT	AMH	460-00-4	
<b>Volatile Halogenated Organics</b>								
Chloromethane	ND	ug/L	0.8	11/05/96	EPA 8010	ads	74-87-3	
Bromomethane	ND	ug/L	3	11/05/96	EPA 8010	ads	74-83-9	
Vinyl Chloride	ND	ug/L	1.8	11/05/96	EPA 8010	ads	75-01-4	
Chloroethane	ND	ug/L	5.2	11/05/96	EPA 8010	ads	75-00-3	
Methylene Chloride	ND	ug/L	2.5	11/05/96	EPA 8010	ads	75-09-2	
Trichlorofluoromethane	ND	ug/L	5	11/05/96	EPA 8010	ads	75-69-4	
1,1-Dichloroethene	ND	ug/L	1.3	11/05/96	EPA 8010	ads	75-35-4	
1,1-Dichloroethane	12	ug/L	0.7	11/05/96	EPA 8010	ads	75-34-3	
trans-1,2-Dichloroethene	ND	ug/L	1	11/05/96	EPA 8010	ads	156-60-5	
Chloroform	ND	ug/L	0.5	11/05/96	EPA 8010	ads	67-66-3	
1,2-Dichloroethane	ND	ug/L	0.5	11/05/96	EPA 8010	ads	107-06-2	
1,1,1-Trichloroethane	ND	ug/L	0.5	11/05/96	EPA 8010	ads	71-55-6	
Carbon Tetrachloride	ND	ug/L	1.2	11/05/96	EPA 8010	ads	56-23-5	
Bromodichloromethane	ND	ug/L	1	11/05/96	EPA 8010	ads	75-27-4	
1,2-Dichloropropane	ND	ug/L	0.5	11/05/96	EPA 8010	ads	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	3.4	11/05/96	EPA 8010	ads	10061-01-5	
Trichloroethene	1.2	ug/L	1.2	11/05/96	EPA 8010	ads	79-01-6	
Dibromochloromethane	ND	ug/L	0.9	11/05/96	EPA 8010	ads	124-48-1	
1,1,2-Trichloroethane	ND	ug/L	0.5	11/05/96	EPA 8010	ads	79-00-5	
trans-1,3-Dichloropropene	ND	ug/L	3.4	11/05/96	EPA 8010	ads	10061-02-6	
Bromoform	ND	ug/L	2	11/05/96	EPA 8010	ads	75-25-2	
Tetrachloroethene	ND	ug/L	0.5	11/05/96	EPA 8010	ads	127-18-4	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.5	11/05/96	EPA 8010	ads	79-34-5	
Chlorobenzene	ND	ug/L	0.7	11/05/96	EPA 8010	ads	108-90-7	
2-Chloroethyl Vinyl Ether	ND	ug/L	5	11/05/96	EPA 8010	ads	110-75-8	
1,2-Dichlorobenzene	ND	ug/L	1	11/05/96	EPA 8010	ads	95-50-1	

REVISED REPORT

NOV 26 1996

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PETALUMA, CA

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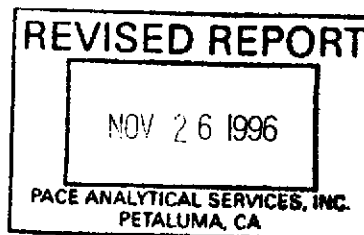
DATE: 11/08/96  
PAGE: 4

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

PACE Sample No: 70773445  
Client Sample ID: QC-1

Date Collected: 10/24/96  
Date Received: 10/24/96

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
1,3-Dichlorobenzene	ND	ug/L	1	11/05/96	EPA 8010	ads	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1	11/05/96	EPA 8010	ads	106-46-7	
Bromochloromethane (S)	105	%		11/05/96	EPA 8010	ads	74-97-5	
1,4-Dichlorobutane (S)	95	%		11/05/96	EPA 8010	ads	110-56-5	
GC								
TPH in Water by 8015 Modified								
Diesel Fuel	0.25	mg/L	0.05	11/06/96	TPH by EPA 8015M	WSN	11-84-7...	1
Motor Oil	ND	mg/L	0.25	11/06/96	TPH by EPA 8015M	WSN		
JP-4	ND	mg/L	0.5	11/06/96	TPH by EPA 8015M	WSN		
n-Pentacosane (S)	91	%		11/06/96	TPH by EPA 8015M	WSN	629-99-2	
Date Extracted				10/31/96				



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DATE: 11/08/96

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PACE Project Number: 706896

Client Project ID: Economy Parking/Port of Oakland

---

## PARAMETER FOOTNOTES

ND Not Detected  
NC Not Calculable  
PRL PACE Reporting Limit  
(S) Surrogate  
[1] Analyte is found in the associated blank as well as in the sample.

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## QUALITY CONTROL DATA

DATE: 11/08/96  
PAGE: 6

Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Attn: Mr. Jim Schollard  
Phone: (510)256-8898

QC Batch ID: 18650  
Analysis Method: TPH by EPA 8015M  
Associated PACE Samples: 70773437

QC Batch Method: EPA 3520  
Analysis Description: TPH in Water by 8015 Modified  
70773445

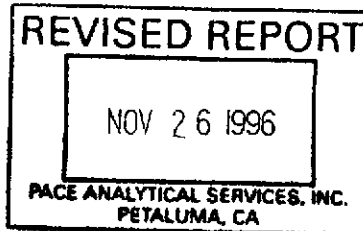
Date of Batch: 10/31/96

METHOD BLANK: 70775796  
Associated PACE Samples:

Parameter	Units	70773437	70773445	PRL	Footnotes
Diesel Fuel	mg/L		0.058	0.05	1
Motor Oil	mg/L		ND	0.25	
JP-4	mg/L		ND	0.5	
n-Pentacosane (S)	%		90		

LABORATORY CONTROL SAMPLE & LCSD: 70775804

Parameter	Units	70775812	LCS	Spike	LCSD	Spike	RPD	Footnotes
		Spike	Result	% Rec	Result	% Rec		
Diesel Fuel	mg/L	1.0	0.6075	60.8	0.6854	68.5	12	
n-Pentacosane (S)				99.3		98.3		



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## QUALITY CONTROL DATA

DATE: 11/08/96  
PAGE: 7

Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Attn: Mr. Jim Schollard  
Phone: (510)256-8898

QC Batch ID: 18659  
Analysis Method: EPA 160.1  
Associated PACE Samples:

QC Batch Method: EPA 160.1  
Analysis Description: Total Dissolved Solids  
70773437      70773445

Date of Batch: 10/31/96

METHOD BLANK: 70775937  
Associated PACE Samples:

Parameter	Units	70773437	70773445	PRL	Footnotes
			Method Blank Result		
Total Dissolved Solids	mg/L		ND	5	

SAMPLE DUPLICATE: 70775945

Parameter	Units	70773437	Dup.	RPD	Footnotes
			Result		
Total Dissolved Solids	mg/L	3090	3140	2	

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DATE: 11/08/96  
PAGE: 8

Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Attn: Mr. Jim Schollard  
Phone: (510)256-8898

QC Batch ID: 18720  
Analysis Method: CA LUFT  
Associated PACE Samples:

QC Batch Method: CA LUFT  
Analysis Description: GAS/BTEX by CA LUFT, Water  
70773437      70773445

Date of Batch: 11/01/96

METHOD BLANK: 70778402  
Associated PACE Samples:

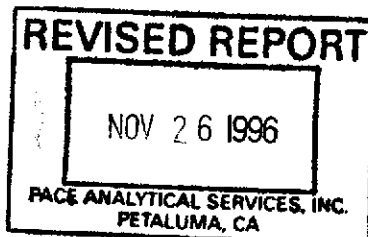
Parameter	Units	70773437	70773445	PRL	Footnotes
			Method Blank Result		
Gasoline	ug/L		ND	50	
Benzene	ug/L		ND	0.5	
Toluene	ug/L		ND	0.5	
Ethylbenzene	ug/L		ND	0.5	
Xylene (Total)	ug/L		ND	1	
a,a,a-Trifluorotoluene (S)	%		95		
4-Bromofluorobenzene (S)	%		85		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70778410 70778428

Parameter	Units	70773437	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes

LABORATORY CONTROL SAMPLE & LCSD: 70778436 70778444

Parameter	Units	70778436	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes



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DATE: 11/08/96  
PAGE: 9

Innovative Technical Solutions  
2855 Mitchell Drive, Suite 118  
Walnut Creek, CA 94598

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

Attn: Mr. Jim Schollard  
Phone: (510)256-8898

QC Batch ID: 18780  
Analysis Method: EPA 8010  
Associated PACE Samples:

QC Batch Method: EPA 8010  
Analysis Description: Volatile Halogenated Organics  
70773437 70773445

Date of Batch: 11/04/96

METHOD BLANK: 70780374  
Associated PACE Samples:

Parameter	Units	70773445		Footnotes
		Method Blank Result	PRL	
Chloromethane	ug/L	ND	0.8	
Bromomethane	ug/L	ND	3	
Vinyl Chloride	ug/L	ND	1.8	
Chloroethane	ug/L	ND	5.2	
Methylene Chloride	ug/L	ND	2.5	
Trichlorofluoromethane	ug/L	ND	5	
1,1-Dichloroethene	ug/L	ND	1.3	
1,1-Dichloroethane	ug/L	ND	0.7	
trans-1,2-Dichloroethene	ug/L	ND	1	
Chloroform	ug/L	ND	0.5	
1,2-Dichloroethane	ug/L	ND	0.5	
1,1,1-Trichloroethane	ug/L	ND	0.5	
Carbon Tetrachloride	ug/L	ND	1.2	
Bromodichloromethane	ug/L	ND	1	
1,2-Dichloropropane	ug/L	ND	0.5	
cis-1,3-Dichloropropene	ug/L	ND	3.4	
Trichloroethene	ug/L	ND	1.2	
Dibromochloromethane	ug/L	ND	0.9	
1,1,2-Trichloroethane	ug/L	ND	0.5	
trans-1,3-Dichloropropene	ug/L	ND	3.4	
Bromoform	ug/L	ND	2	
Tetrachloroethene	ug/L	ND	0.5	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.5	
Chlorobenzene	ug/L	ND	0.7	
2-Chloroethyl Vinyl Ether	ug/L	ND	5	

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## QUALITY CONTROL DATA

DATE: 11/08/96  
PAGE: 10

PACE Project Number: 706896  
Client Project ID: Economy Parking/Port of Oakland

METHOD BLANK: 70780374  
Associated PACE Samples:

Parameter	Units	70773437	70773445	PRL	Footnotes
			Method Blank Result		
1,2-Dichlorobenzene	ug/L		ND	1	
1,3-Dichlorobenzene	ug/L		ND	1	
1,4-Dichlorobenzene	ug/L		ND	1	
Bromochloromethane (S)	%		106		
1,4-Dichlorobutane (S)	%		107		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70780382 70780390		Spike		Matrix	Matrix	Spike	Footnotes	
Parameter	Units	70773437	Conc.	Spike Result	% Rec	Sp. Dup. Result	% Rec	RPD
Chloromethane	ug/L	0	20	23.68	118	22.26	111	6
Bromomethane	ug/L	0	20	23.03	115	21.85	109	5
Vinyl Chloride	ug/L	0.3479	20	19.45	95.5	18.27	89.6	6
Chloroethane	ug/L	0.3966	20	20.21	99.1	19.21	94.1	5
Methylene Chloride	ug/L	0	20	19.18	95.9	19.01	95.1	1
Trichlorofluoromethane	ug/L	0	20	20.12	101	19.01	95.1	6
1,1-Dichloroethene	ug/L	0.3172	20	20.96	103	20.01	98.5	5
1,1-Dichloroethane	ug/L	11.98	20	29.96	89.9	29.13	85.8	5
trans-1,2-Dichloroethene	ug/L	0	20	20.69	104	19.79	99.0	4
Chloroform	ug/L	0	20	20.56	103	20.42	102	1
1,2-Dichloroethane	ug/L	0.1878	20	19.65	97.3	18.84	93.3	4
1,1,1-Trichloroethane	ug/L	0	20	21.74	109	20.95	105	4
Carbon Tetrachloride	ug/L	0	20	20.34	102	19.62	98.1	4
Bromodichloromethane	ug/L	0	20	20.08	100	19.36	96.8	4
1,2-Dichloropropane	ug/L	0	20	19.30	96.5	19.44	97.2	1
cis-1,3-Dichloropropene	ug/L	0	20	19.26	96.3	18.89	94.5	2
Trichloroethene	ug/L	1.381	20	20.29	94.5	20.53	95.7	1
Dibromochloromethane	ug/L	0	20	19.08	95.4	19.05	95.3	0
1,1,2-Trichloroethane	ug/L	0	20	19.51	97.6	19.10	95.5	2
trans-1,3-Dichloropropene	ug/L	0	20	18.13	90.7	17.91	89.6	1
Bromoform	ug/L	0	20	17.93	89.7	18.32	91.6	2
Tetrachloroethene	ug/L	0.3790	20	20.24	99.3	19.64	96.3	3
1,1,2,2-Tetrachloroethane	ug/L	0	20	18.66	93.3	18.52	92.6	1
Chlorobenzene	ug/L	0	20	20.85	104	20.86	104	0
2-Chloroethyl Vinyl Ether	ug/L	0	20	15.54	77.7	16.46	82.3	6
1,2-Dichlorobenzene	ug/L	0	20	21.03	105	20.44	102	3
1,3-Dichlorobenzene	ug/L	0	20	20.31	102	20.82	104	2

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QUALITY CONTROL DATA

DATE: 11/08/96

PAGE: 11

PACE Project Number: 706896

Client Project ID: Economy Parking/Port of Oakland

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70780382 70780390		Matrix	Matrix	Spike	Matrix	Spike	Matrix	Spike	RPD	Footnotes
Parameter	Units	70773437	Spike Conc.	Spike Result	Spike % Rec	Sp. Dup. Result	Spike Dup % Rec			
1,4-Dichlorobenzene	ug/L	0	20	21.09	106	20.62	103	2		
Bromochloromethane (S)					103		100			
1,4-Dichlorobutane (S)					95.0		91.4			

LABORATORY CONTROL SAMPLE & LCSD: 70780408 70780416		Spike	LCS	Spike	LCSD	Spike	Matrix	Spike	RPD	Footnotes
Parameter	Units	Conc.	Result	% Rec	Result	% Rec		Dup		
Chloromethane	ug/L	20	23.82	119	23.27	116		3		
Bromomethane	ug/L	20	23.75	119	22.20	111		7		
Vinyl Chloride	ug/L	20	18.52	92.6	18.84	94.2		2		
Chloroethane	ug/L	20	19.48	97.4	19.05	95.3		2		
Methylene Chloride	ug/L	20	20.12	101	19.42	97.1		4		
Trichlorofluoromethane	ug/L	20	19.26	96.3	19.04	95.2		1		
1,1-Dichloroethene	ug/L	20	20.34	102	19.70	98.5		3		
1,1-Dichloroethane	ug/L	20	21.40	107	21.18	106		1		
trans-1,2-Dichloroethene	ug/L	20	22.02	110	20.36	102		8		
Chloroform	ug/L	20	20.86	104	20.17	101		3		
1,2-Dichloroethane	ug/L	20	19.86	99.3	19.94	99.7		0		
1,1,1-Trichloroethane	ug/L	20	20.98	105	19.71	98.6		6		
Carbon Tetrachloride	ug/L	20	20.58	103	19.85	99.3		4		
Bromodichloromethane	ug/L	20	20.68	103	20.16	101		2		
1,2-Dichloropropane	ug/L	20	20.25	101	19.78	98.9		2		
cis-1,3-Dichloropropene	ug/L	20	20.29	101	20.41	102		1		
Trichloroethene	ug/L	20	20.13	101	20.25	101		0		
Dibromochloromethane	ug/L	20	19.09	95.5	19.96	99.8		4		
1,1,2-Trichloroethane	ug/L	20	20.08	100	20.15	101		1		
trans-1,3-Dichloropropene	ug/L	20	19.49	97.5	18.95	94.8		3		
Bromoform	ug/L	20	19.69	98.5	19.71	98.6		0		
Tetrachloroethene	ug/L	20	20.59	103	20.42	102		1		
1,1,2,2-Tetrachloroethane	ug/L	20	20.04	100	19.85	99.3		1		
Chlorobenzene	ug/L	20	21.35	107	21.10	106		1		
2-Chloroethyl Vinyl Ether	ug/L	20	16.23	81.2	15.95	79.8		2		
1,2-Dichlorobenzene	ug/L	20	20.92	105	19.88	99.4		5		
1,3-Dichlorobenzene	ug/L	20	20.79	104	19.76	98.8		5		
1,4-Dichlorobenzene	ug/L	20	20.76	104	20.19	101		3		
Bromochloromethane (S)				105		103				
1,4-Dichlorobutane (S)				96.9		101				

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PACE Project Number: 706896

Client Project ID: Economy Parking/Port of Oakland

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## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

ND Not Detected  
NC Not Calculable  
PRL PACE Reporting Limit  
RPD Relative Percent Difference  
(S) Surrogate  
[1] Hydrocarbons present do not match profile of laboratory standard.

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