



May 12, 1998

Project No. 95-113.28

Mr. Dale Klettke
Associate Environmental Scientist
Port of Oakland
530 Water Street
Oakland, California 94607

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. Klettke:

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 December 23, 1997 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 three groundwater monitoring wells, MW-1, MW-2, and MW-3, and sampling MW-1 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). The USTs were removed in March 1992.

SAMPLING OF MONITORING WELL(S)

Groundwater monitoring and sampling was performed on December 23, 1997. 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 monitoring well MW-2 and a hydrocarbon sheen was noted in MW-1 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 wells MW-1 and MW-3, with no measurable separate phase hydrocarbons, were purged using a peristaltic pump. Approximately three casing volumes of water were removed from MW-1. Less than three casing volumes of water were purged from MW-3 because of dewatering and slow recharge. Physical parameters, including pH, conductivity, temperature and dissolved oxygen were measured following each purge cycle (approximately one casing volume). Field parameters were recorded on Monitoring Well Purge and Sample Forms. Purge water was stored in a properly labeled drum onsite.

Groundwater samples were collected from monitoring wells MW-1 and MW-3 using the peristaltic pump and placed into laboratory provided containers. The sample containers were properly labeled with the sample number, date and time of collection, and sampler's initials, and were placed on ice in an insulated cooler.

The above field activities were performed in accordance with the site-specific Health and Safety Plan for groundwater monitoring and sampling activities at the site.

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 east-southeast, with a gradient of approximately 0.0063 ft/ft.

LABORATORY ANALYSIS OF GROUNDWATER SAMPLES

The samples were sent under chain-of-custody procedures to Curtis and Thompkins, Ltd. in Berkeley, California, the Port of Oakland contract laboratory, and analyzed according to the following schedule:

Monitoring Well ID	Analyses										
	TPHg (1)	BTEX (2)	TPHj (3)	TPHd (4)	TPHmo (5)	VOCs (6)	Fe ²⁺ (7)	Fe ³⁺ (8)	NO ₃ (9)	SO ₄ (10)	TDS (11)
MW-1	x	x	x	x	x	x	x	x	x	x	x
MW-2	x	x	x	x	x	x	x	x	x	x	x
MW-3	x	x	x	x	x	x	x	x	x	x	x

- ⁽¹⁾ TPH as gasoline by Modified EPA Method 8015.
- ⁽²⁾ Benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020A.
- ⁽³⁾ TPH as JP-5 by Modified EPA Method 8015 with silica gel cleanup procedure.
- ⁽⁴⁾ TPH as diesel by Modified EPA Method 8015 with silica gel cleanup procedure.
- ⁽⁵⁾ TPH as motor oil by Modified EPA Method 8015 with silica gel cleanup procedure.
- ⁽⁶⁾ VOCs by EPA Method 8010.
- ⁽⁷⁾ Ferrous iron (Fe^{2+}) by SMWW Method 18:3500 Fe-D.
- ⁽⁸⁾ Ferric iron (Fe^{3+}) by EPA Method 6010A.
- ⁽⁹⁾ Nitrogen, nitrate (NO_3) by EPA Method 353.2.
- ⁽¹⁰⁾ Sulfate (SO_4) by EPA Method 300.0.
- ⁽¹¹⁾ Total dissolved solids (TDS) by EPA Method 160.1.

Laboratory results for the groundwater samples are summarized in Tables 2, 3 and 4, and are shown in Figure 3. Copies of the laboratory results, chromatograms and chain-of-custody are provided in Attachment B.

FINDINGS

Results of the December 23, 1997 groundwater monitoring and sampling are summarized below¹:

- Separate phase hydrocarbons were observed in monitoring well MW-2, at a thickness of 0.25 feet. A hydrocarbon sheen was observed in monitoring wells MW-1 and MW-3.
- TPHg was reportedly detected in MW-3 at a concentration of 2,200 $\mu\text{g/l}$ and was reportedly not detected in MW-1.
- Benzene was reportedly detected in MW-1 and MW-3 at concentrations of 0.7 $\mu\text{g/l}$ and 13 $\mu\text{g/l}$, respectively.
- Toluene, ethylbenzene and xylenes were reportedly detected in MW-3 at concentrations of 16 $\mu\text{g/l}$, 8.7 $\mu\text{g/l}$, and 116 $\mu\text{g/l}$, respectively. These analytes were reportedly not detected in MW-1.
- TPHj as JP-5, TPHd and TPHmo were reportedly detected in MW-3 at concentrations of 110,000 $\mu\text{g/l}$, 79,000 $\mu\text{g/l}$ and 8,200 $\mu\text{g/l}$, respectively. These analytes were reportedly not detected in MW-1.
- 1,1-Dichloroethane (1,1-DCA) was reportedly detected in MW-1 and MW-3 at concentrations of 6.6 $\mu\text{g/l}$ and 4.2 $\mu\text{g/l}$, respectively. Cis-1,2-dichloroethene (Cis-1,2-DCE) was reportedly detected in MW-1 at a concentration of 9.3 $\mu\text{g/l}$ and was reportedly not detected in MW-3.
- Ferrous iron (Fe^{2+}) was reportedly detected in MW-3 at a concentration of 0.5 mg/l and was reportedly not detected in MW-1. Ferric iron (Fe^{3+}) was reportedly detected in MW-1 and MW-3 at concentrations of 3.9 mg/l and 1.5 mg/l, respectively.

¹ Laboratory results represent the highest concentrations reported for either the sample or the field duplicate sample.

- Nitrogen/nitrate was reportedly not detected in MW-1 and MW-3.
- Sulfate was reportedly detected in MW-1 and MW-3 at concentrations of 120 mg/l and 690 mg/l, respectively.
- TDS was reported in MW-1 and MW-3 at concentrations of 3,570 mg/l and 13,900 mg/l, respectively.

Please call us if you have any questions or comments.

need some interpretation of results!

Sincerely,

Jim Schollard
Jim Schollard
Environmental Scientist

Jeffrey D. Hess
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
		6/19/96	2.93	-	3.98	
		10/24/96	3.52	-	3.39	
		1/22/97	2.61	-	4.30	
		4/25/97	2.77	-	4.14	
		8/6/97	3.27	-	3.64	
12/23/97	3.14	-	3.77			
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
		1/22/97	2.45	0.02	4.20	2
		4/25/97	2.60	0.03	4.05	2
		7/30/97	NM	0.14	NM	3
		8/6/97	2.96	-	3.67	
		12/23/97	2.85	0.25	3.97	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
		1/22/97	2.86	0.005	4.50	2
		4/25/97	3.13	0.01	4.24	2
		7/30/97	NM	0.03	NM	3
		8/6/97	3.76	-	3.60	
		12/23/97	3.48	-	3.88	

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.

3 Free product removed from well during redevelopment (July 30, 1997).

95-113.28/T.1-GWElev(12/97)

TABLE 2

SUMMARY OF LABORATORY RESULTS FOR PETROLEUM HYDROCARBONS
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)	Note
MW-1	5/15/92	<50	<0.4	<0.3	<0.3	<0.4	-	-	-	<5,000	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	1
	8/3/93	<50	<0.5	<0.5	<0.5	<0.5	-	5,200	-	<5,000	1
	11/25/93	70	<0.5	<0.5	<0.5	0.6	-	-	-	<5,000	1
	5/9/94	<50	<0.5	<0.5	<0.5	<0.5	-	-	-	<930	1
	8/29/94	<50	<0.5	<0.5	2.7	<0.5	-	-	-	<1,000	1
	4/25/95	<50	<5	<5	<5	<5	<50	1,400	610	-	1
	8/11/95	<50	<0.4	<0.3	<0.3	<0.4	<50	1,900	1,200	-	1
	11/3/95	<50	0.4	0.4	<0.3	<0.4	<50	4,200	1,800	-	1
	6/19/96	<50	0.99	<0.5	1.1	<1.0	<500	11,000	820	-	
	10/24/96	57	1.9	<0.5	<0.5	1.3	<500	<250	<250	-	
	1/22/97	<50	<0.5	<0.5	<0.5	<1.0	<500	220 ¹	<250	-	
	4/25/97*	110	1.2	<0.5	1.0	1.2	<500	<50 ²	<250	-	
	8/6/97	100	2.1	<0.5	<0.5	<1.0	<500	340 ³	<250	-	
12/23/97	<50	0.7	<0.5	<0.5	<1.0	<50	<50	<300	-		
MW-2	4/25/95	5,200	340	570	110	580	13,000	<10,000	19,000	-	1
	8/11/95	5,500	320	680	110	510	7,900	<8,000	20,000	-	1
	11/3/95	3,800	200	400	27	360	11,000	<11,000	4,200	-	1
	6/19/96	3	3	3	3	3	3	3	3	-	
	10/24/96	3	3	3	3	3	3	3	3	-	
	1/22/97	3	3	3	3	3	3	3	3	-	
	4/25/97	3	3	3	3	3	3	3	3	-	
	8/6/97	9,900	170	270	92	410	<1,000	12,000	2,300 ⁶	-	
12/23/97	3	3	3	3	3	3	3	3	-		

TABLE 2 (continued)

SUMMARY OF LABORATORY RESULTS FOR PETROLEUM HYDROCARBONS
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)	Note
MW-3	4/25/95	7,200	150	600	100	580	38,000	<40,000	31,000	-	1
	8/11/95	2	2	2	2	2	2	2	2	-	1
	11/3/95	2	2	2	2	2	2	2	2	-	1
	6/19/96	2	2	2	2	2	2	2	2	-	
	10/24/96	2	2	2	2	2	2	2	2	-	
	1/22/97	2	2	2	2	2	2	2	2	-	
	4/25/97	2	2	2	2	2	2	2	2	-	
	8/6/97	4,200	3.6	16	14	90	<500	1,400	<250	-	
	12/23/97	2,200 ⁸	13	16	8.7	116	110,000	79,000 ^{5,7}	8,200 ^{1,7}	-	

* Laboratory results represent the highest concentrations reported for either the sample or field duplicate sample (QC-1).

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.

3 Hydrocarbons present do not match profile of laboratory standard.

4 Single analyte peak(s) are present in fuel range. Fuel hydrocarbon pattern is not present.

5 Hydrocarbons are elevated due to the presence of single analyte peak(s) in fuel quantitation range.

6 Hydrocarbons are present in the requested fuel quantitation range but do not resemble pattern of any available fuel standard. Carbon range is C23 - C36.

7 Hydrocarbons are lighter than indicated standard.

8 Hydrocarbons are heavier than indicated standard.

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)	(cis/trans) 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/<0.4	-	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	
	1/22/97	-	-	<0.5	3.9	8.4/<1.0	-	<0.5	1.7	<0.5	
	4/25/97*	-	-	<0.5	6.2	10/<1.0	-	<0.5	<1.2	0.62	
8/6/97*	-	-	<0.5	14	19/<1.0	-	<0.5	2.5	0.54		
12/23/97*	-	-	<1.0	6.6	9.3/<1.0	-	<1.0	<1.0	<1.0		
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/<0.4	-	4.8	6.7	6.8	1
	6/19/96	∅	∅	∅	∅	∅	∅	∅	∅	∅	
	10/24/96	∅	∅	∅	∅	∅	∅	∅	∅	∅	
	1/22/97	∅	∅	∅	∅	∅	∅	∅	∅	∅	
	4/25/97	∅	∅	∅	∅	∅	∅	∅	∅	∅	
	8/6/97	-	-	<5	69	160/<10	-	<5	<12	<5	
	12/23/97	∅	∅	∅	∅	∅	∅	∅	∅	∅	

TABLE 3 (continued)

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)	(cis/trans) 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-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	
	1/22/97	2	2	2	2	2	2	2	2	2	
	4/25/97	2	2	2	2	2	2	2	2	2	
	8/6/97	-	-	2.1	3.8	<0.5/<1	-	<0.5	<1.2	0.62	
	12/23/97	-	-	<1.0	4.2	<1.0/<1.0	-	<1.0	<1.0	<1.0	

* Laboratory results represent the highest concentrations reported for either the sample or field duplicate sample (QC-1).

- 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.

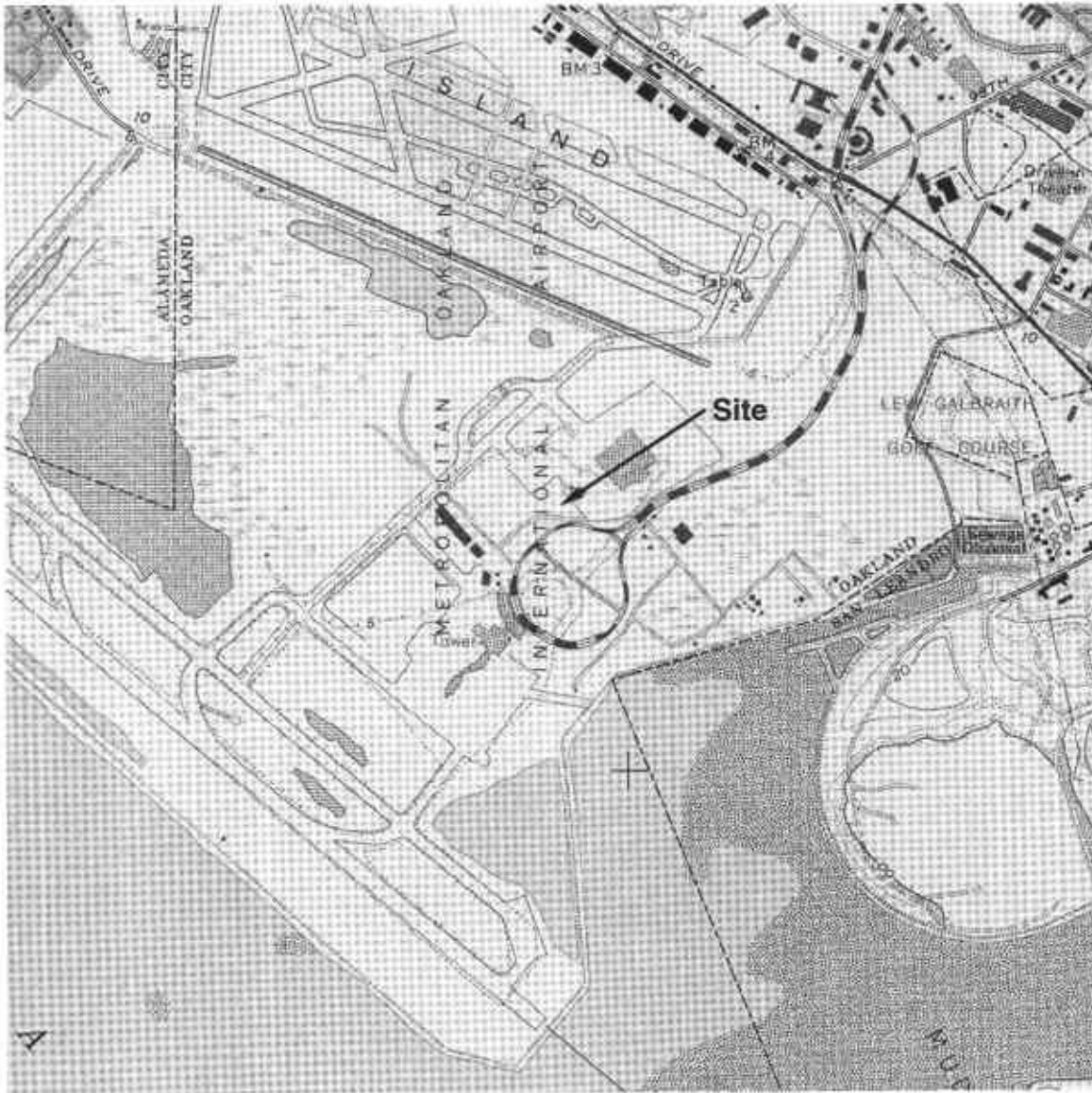
TABLE 4

SUMMARY OF LABORATORY RESULTS FOR INORGANIC ANALYTES
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	Ferrous Iron (Fe ²⁺) (mg/l)	Ferric Iron (Fe ³⁺) (mg/l)	Nitrogen, Nitrate (mg/l)	Sulfate (mg/l)	TDS (mg/l)	Note
MW-1	5/15/92	-	-	-	-	5,900	1
	8/7/92	-	-	-	-	-	1
	11/24/92	-	-	-	-	-	1
	2/12/93	-	-	-	-	-	1
	5/17/93	-	-	-	-	4,100	1
	8/3/93	-	-	-	-	7,700	1
	11/25/93	-	-	-	-	3,790	1
	5/9/94	-	-	-	-	9,600	1
	8/29/94	-	-	-	-	3,900	1
	4/25/95	-	-	-	-	4,000	1
	8/11/95	-	-	-	-	8,500	1
	11/3/95	-	-	-	-	6,600	1
	6/19/96	-	-	-	-	3,040	
	10/24/96	-	-	-	-	3,090	
	1/22/97	-	-	-	-	4,240	
	4/25/97*	-	-	-	-	2,770	
	8/6/97	-	-	-	-	2,430	
12/23/97*	-	<0.2	3.9	<0.2	120	3,570	
MW-2	4/25/95	-	-	-	-	1,700	1
	8/11/95	-	-	-	-	2,500	1
	11/3/95	-	-	-	-	2,000	1
	6/19/96	-	-	-	-	-	
	10/24/96	-	-	-	-	-	
	1/22/97	-	-	-	-	-	
	4/25/97	-	-	-	-	-	
	8/6/97	-	-	-	-	-	
	4/25/97	-	-	-	-	-	
	12/23/97	-	-	-	-	-	
MW-3	4/25/95	-	-	-	-	5,600	1
	8/11/95	-	-	-	-	-	1
	11/3/95	-	-	-	-	-	1
	6/19/96	-	-	-	-	-	
	10/24/96	-	-	-	-	-	
	1/22/97	-	-	-	-	-	
	4/25/97	-	-	-	-	-	
	8/6/97	-	-	-	-	15,100	
	12/23/97	0.5	1.5	<0.2	690	13,900	

* Laboratory results represent the highest concentrations reported for either the sample or field duplicate sample (QC-1).

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.



Approximate Scale

FIGURE 1

SITE LOCATION

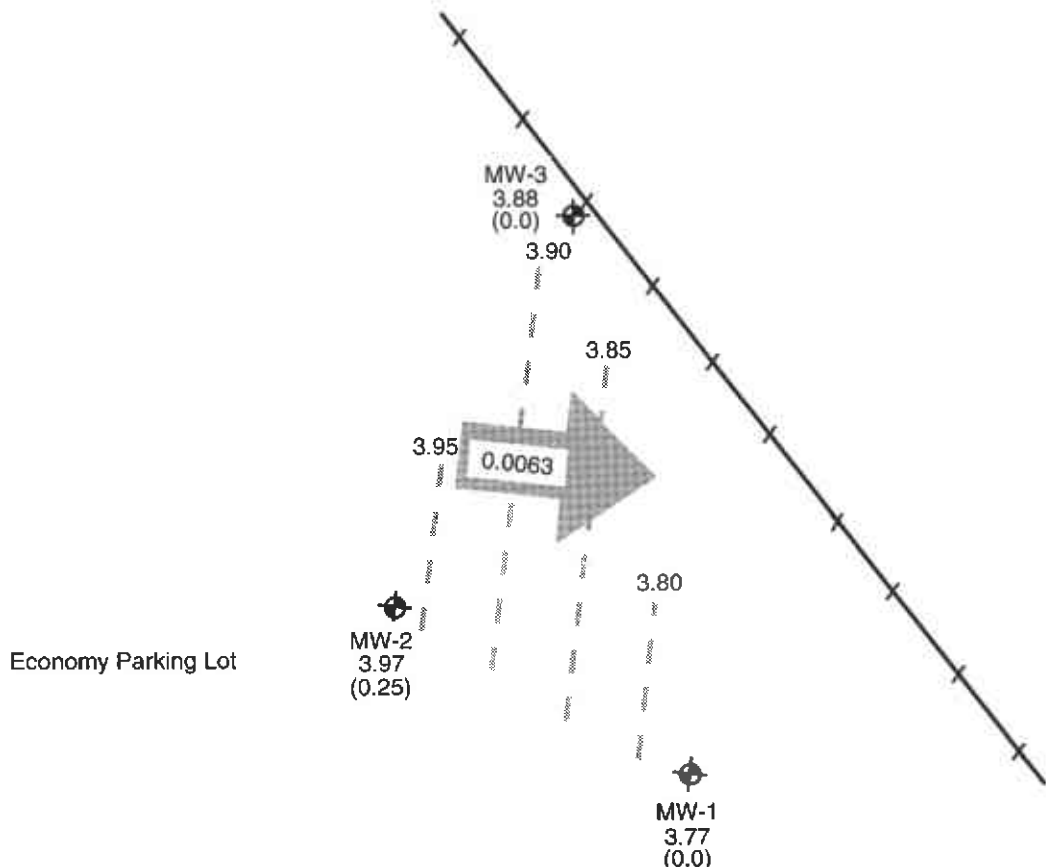
United Airlines Hangar-Economy Parking Lot Site
Oakland International Airport
1100 Airport Drive






PORT OF OAKLAND

INNOVATIVE TECHNICAL SOLUTIONS, INC.

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



- Legend**
-  Monitoring Well
 - 3.97 Groundwater Elevation on 12/23/97
 - (0.25) Product Thickness on 12/23/97
 -  Groundwater Elevation Contour Lines
 -  Groundwater Flow Direction and Gradient

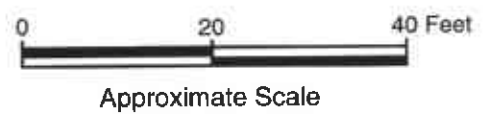


FIGURE 2
GROUNDWATER ELEVATIONS AND FLOW DIRECTION FOR DECEMBER 23, 1997

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

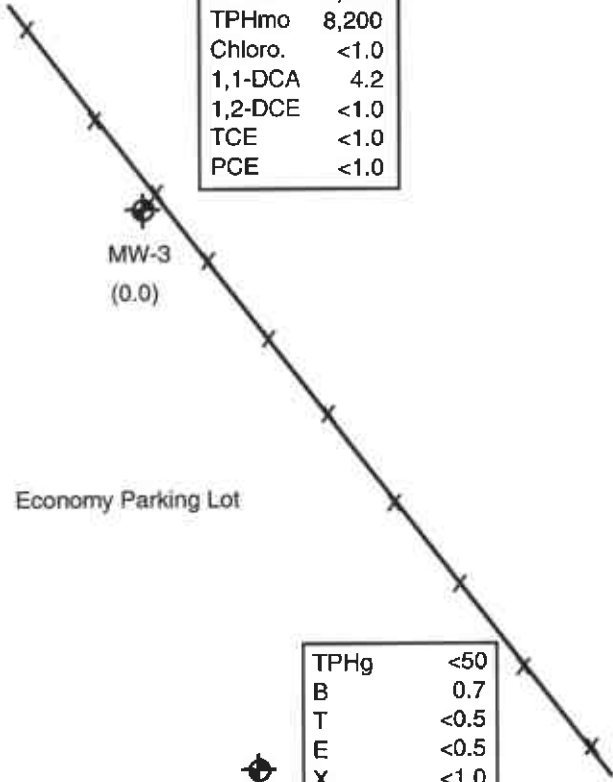


PORT OF OAKLAND
INNOVATIVE TECHNICAL SOLUTIONS, INC.

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



TPHg	2,200
B	13
T	16
E	8.7
X	116
TPHj	110,000
TPHd	79,000
TPHmo	8,200
Chloro.	<1.0
1,1-DCA	4.2
1,2-DCE	<1.0
TCE	<1.0
PCE	<1.0



TPHg	<50
B	0.7
T	<0.5
E	<0.5
X	<1.0
TPHj	<50
TPHd	<50
TPHmo	<300
Chloro.	<1.0
1,1-DCA	6.6
1,2-DCE	9.3
TCE	<1.0
PCE	<1.0

Legend
 Monitoring Well
 (0.25) Product Thickness on 12/23/97

Groundwater Concentrations in µg/l on 12/23/97

TPHg	2,200
B	13
T	16
E	8.7
X	116
TPHj	110,000
TPHd	79,000
TPHmo	8,200
Chloro.	<1.0
1,1-DCA	4.2
1,2-DCE	<1.0
TCE	<1.0
PCE	<1.0

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
 Chloro. - Chloroform
 1,1-DCA - 1,1-Dichloroethane
 1,2-DCE - cis-1,2-Dichloroethene
 TCE - Trichloroethene
 PCE - Perchloroethene

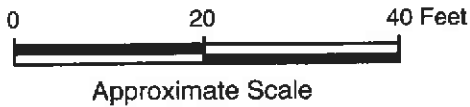


FIGURE 3
CONCENTRATIONS OF PETROLEUM HYDROCARBONS AND VOCs IN GROUNDWATER ON DECEMBER 23, 1997

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: P10 Economy Parking

PROJECT NO.: 95-113.28

WELL NO.: MW-1

TESTED BY: B. Scott

DATE: 12-23-97

Measuring Point Description: Mark/Notch T.O.C. Product level: Thick Sheen
 Static Water Level (ft.): 3.14

Total Well Depth (ft.): 13.21 Sample Method: Peristaltic Pump

Water Level Measurement Method: Solinst Interface Probe Time Sampled: 8:50/QC-1 @ 8:55

Purge Method: Peristaltic Pump Sample Depth (ft.): > 3.5'

Time Start Purge: 7:58 Field Filtering: NONE

Time End Purge: 8:40 Field Preservation: H₂O Ice

Comments: Removed Lid to Christy box, Standing water above well cap, removed water prior to uncapping well; collected duplicate (QC-1) sample

CHECKED BY: J. Scholard 1/15/98

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		
	13.21		3.14		10.07		0.16	0.64	1.44		1.61 (3 Vol = 4.8)
Time	8:10		8:19		8:32		8:40				
Volume Purged (gal)	1.0		1.25		1.50		1.25				
Cumulative Volume Purged (gal)	1.0		2.25		3.75		5.0				
Cumulative Number of Casing Volumes	0.62		1.40		2.3		3.1				
Purge Rate (gpm)	0.08		0.14		0.12		0.16				
Temperature (F°) or (C°)	18.3		18.7		19.0		19.0				
pH	6.91		6.98		7.12		7.13				
Specific Conductivity (µmhos/cm) x100	60		60		60		60				
Dissolved Oxygen (mg/L)	0.75		0.50		0.30		0.30				
Turbidity/Color (NTU)	CLEAR		CLEAR		CLEAR		CLEAR				
Odor	NONE		—————→		—————→		—————→				
Dewatered?	No		—————→		—————→		—————→				

MONITORING WELL PURGE AND SAMPLE FORM

PROJECT NAME: P/O Economy Parking

PROJECT NO.: 95-113.28

WELL NO.: MW-2

TESTED BY: B. SCOTT

DATE: 12-23-97

Measuring Point Description: Mark/Notch on T.O.C. Product Level: 2.60
 Static Water Level (ft.): 2.85

Total Well Depth (ft.): 10.5 Sample Method: —

Water Level Measurement Method: DUAL INTERFACE Time Sampled: —

Purge Method: — Sample Depth (ft.): —

Time Start Purge: — Field Filtering: —

Time End Purge: — Field Preservation: —

Comments: NOT SAMPLED DUE TO PRESENCE OF PRODUCT (0.25")

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	
				0.16	0.64	1.44	
Time							
Volume Purged (gals)							
Cumulative Volume Purged (gals)			<u>NOT SAMPLED</u>				
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

DATE: 1/15/98

MONITORING WELL PURGE AND SAMPLE FORM

PROJECT NAME: P/O - Economy Parking

PROJECT NO.: 95-113.28

WELL NO.: MW-3

TESTED BY: B. Scott

DATE: 12-23-97

Measuring Point Description: Mark on T.O.C

Product Level: None (Thick Sheen)
Static Water Level (ft.): 3.48

Total Well Depth (ft.): 11.20

Sample Method: Peristaltic Pump

Water Level Measurement Method: Solinist Interface Probe

Time Sampled: 10:30

Purge Method: Peristaltic Pump

Sample Depth (ft.): 11.00

Time Start Purge: 9:40

Field Filtering: NONE

Time End Purge: 9:54 (Well Pumped Dry)

Field Preservation: H₂O Ice

Comments: Removed Lid, bentonite around well cap, Standing Water inside Christy box, Removed prior to uncapping well. Thick sheen present, slow

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) 1.23 (3 Well Vol = 3.7)
				2	4	6	
	11.20	3.48	= 7.72	0.16	0.64	1.44	
Time	9:48	9:54					
Volume Purged (gals)	1.25	1.25					
Cumulative Volume Purged (gals)	1.25	2.50					
Cumulative Number of Casing Volumes	0.61	2.0					
Purge Rate (gpm)	0.16	0.16					
Temperature (F°) or (C°)	18.7	18.4					
pH	8.63	7.64					
Specific Conductivity (µmhos/cm) x 100	210	90					
Dissolved Oxygen (mg/L)	1.0	0.30					
Turbidity/Color (NTU)	*	*					
Odor	slight Petroleum	→					
Dewatered?	no	Yes					

CHECKED BY: J. Schollard

DATE: 1/15/98

* Clear w/ Black Particulate mater, some drop-lets of product.

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



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Innovative Technical Solutions, Inc.
1330 Broadway Ste. 1625
Oakland, CA 94612

Date: 08-JAN-98
Lab Job Number: 131806
Project ID: 95-113.28
Location: P/O Economy Parking

Reviewed by: Damara Moore

Reviewed by: [Signature]

This package may be reproduced only in its entirety.

Laboratory Number: **131806**
Client: **Innovative Technical Solutions, Inc.**
Project#: **95-113.28**
Location: **P/O Economy Parking**

Receipt Date: **12/23/97**

Case Narrative

This hardcopy data package contains sample results and batch QC for three water samples and one trip blank which were received from the above referenced project on December 23rd, 1997. All samples were received cold and intact. On December 23rd, 1997, it was decided that sample "TRIP BLANK" (131806-001) would be analyzed for the 8010/8020 analytes by EPA 8260, as there was only one voa provided. Therefore, there is no TVH-Gasoline result for this sample.

Purgeable Halocarbons by EPA 8260: Methylene chloride was detected in sample TRIP BLANK (131806-001). Although this analyte was not detected at significant levels in the method blank, the presence of this analyte appears to be due to laboratory contamination during the preparation process of preparing the trip blank in the laboratory.

TEH/JP5, Diesel and Motor Oil by EPA 8015 modified: All samples analyzed for total extractable hydrocarbons were treated with silica gel prior to analysis.

TPH/Gasoline+BTXE: Trifluorotoluene was observed to be co-eluting with the matrix in sample MW-3 (131806-002) for BTXE analysis. The sample chromatogram is included in this report. This surrogate was within limits in all QC samples. Bromobenzene was observed to be above QC limits in the laboratory control sample of batch 38366, however this surrogate was within limits for all samples in this data set.

No other analytical problems were encountered.



TEH-Tot Ext Hydrocarbons

Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8015M
Project#: 95-113.28	Prep Method: EPA 3520
Location: P/O Economy Parking	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131806-002	MW-1	38301	12/23/97	12/29/97	01/03/98	
131806-003	MW-3	38301	12/23/97	12/29/97	01/03/98	
131806-004	QC-1	38301	12/23/97	12/29/97	01/01/98	

Matrix: Water

Analyte	Units	131806-002	131806-003	131806-004
Diln Fac:		1	25	1
JP-5, C10-C16	ug/L	<50	110000	<50
Diesel C12-C22	ug/L	<50	79000 YL	<50
Motor Oil C22-C50	ug/L	<300	8200 YL	<300
Surrogate				
Hexacosane	%REC	94	DO	72

DO: Surrogate diluted out

Y: Sample exhibits fuel pattern which does not resemble standard

L: Lighter hydrocarbons than indicated standard

Chromatogram

Sample Name : 131806-003, 38301

FileName : G:\GC11\CHA\002A033.RAW

Method : ATEH363.MTH

Start Time : 0.00 min

Scale Factor: 0.0

End Time : 31.90 min

Plot Offset: -22 mV

Sample #: 38301

Date : 1/5/98 11:51 AM

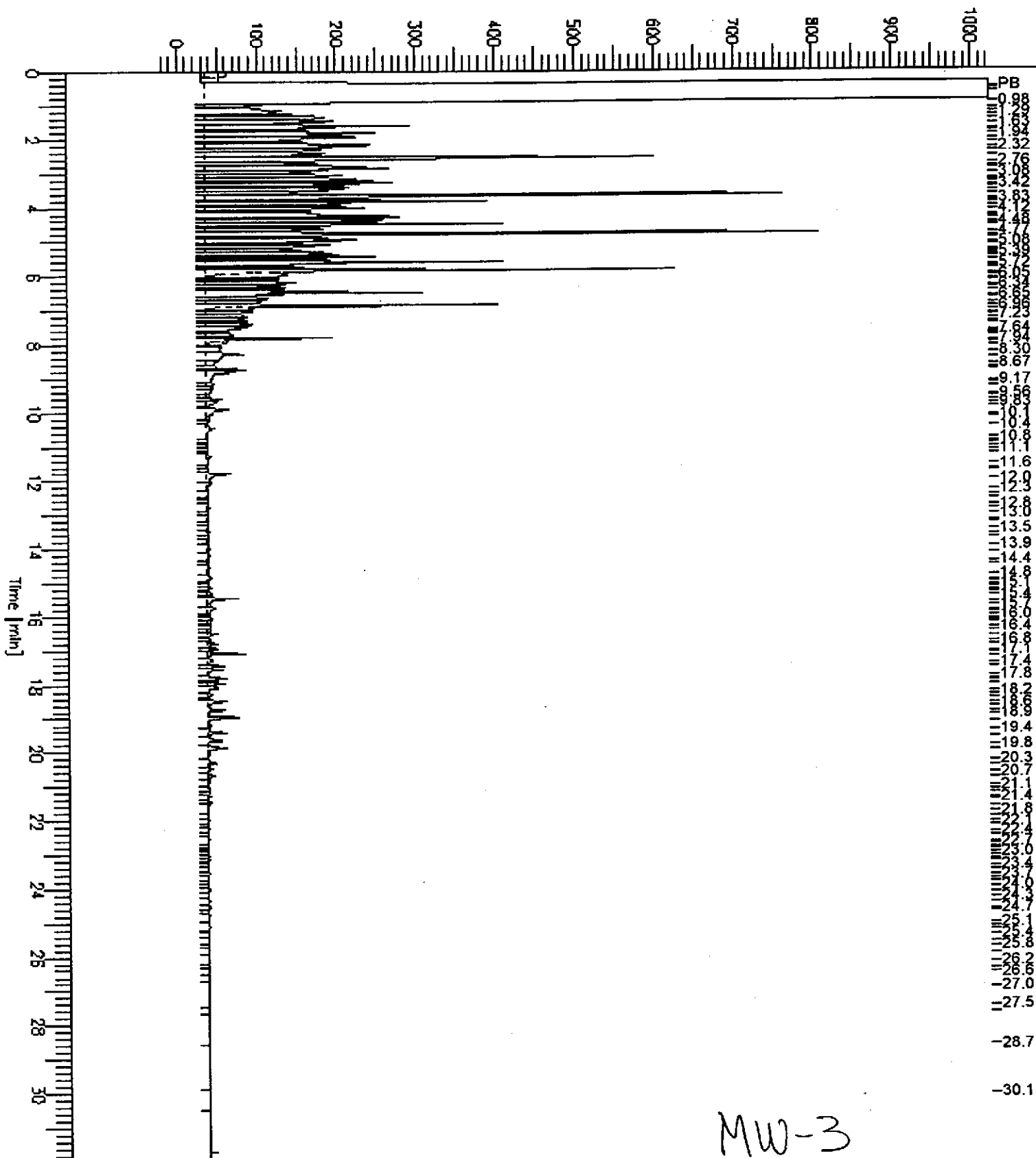
Time of Injection: 1/3/98 12:11 PM

Low Point : -21.68 mV

Plot Scale: 1045.7 mV

Page 1 of 1

Response [mV]



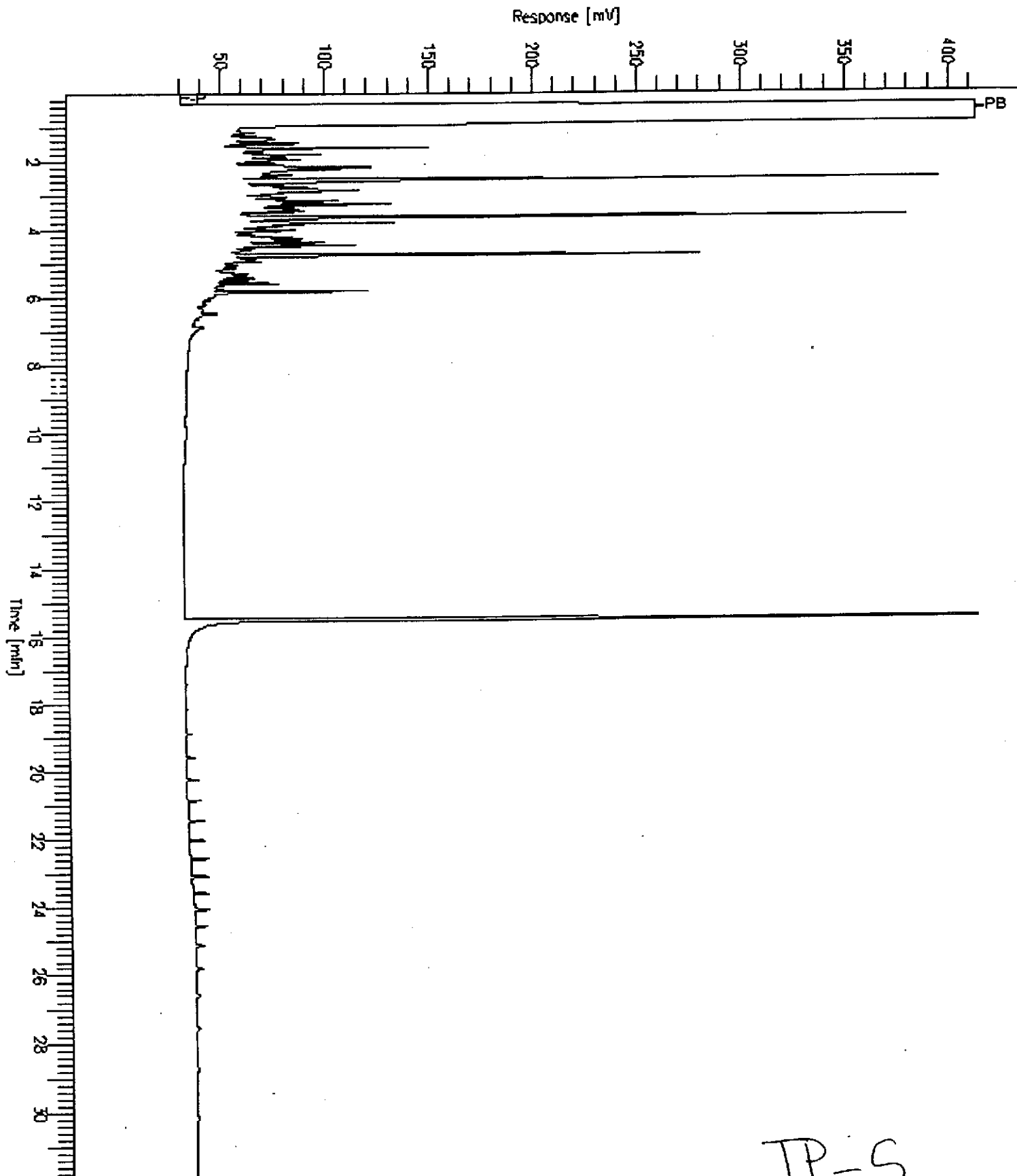
MW-3

Chromatogram

Sample Name : CCV,97WS4799,JP5
FileName : G:\GC11\CHA\002A032.RAW
Method : ATEH363.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 20 mV

Sample #: 250MG/L
Date : 1/5/98 11:12 AM
Time of Injection: 1/3/98 11:27 AM
Low Point : 20.23 mV
High Point : 413.38 mV
Plot Scale: 393.1 mV



JP-5

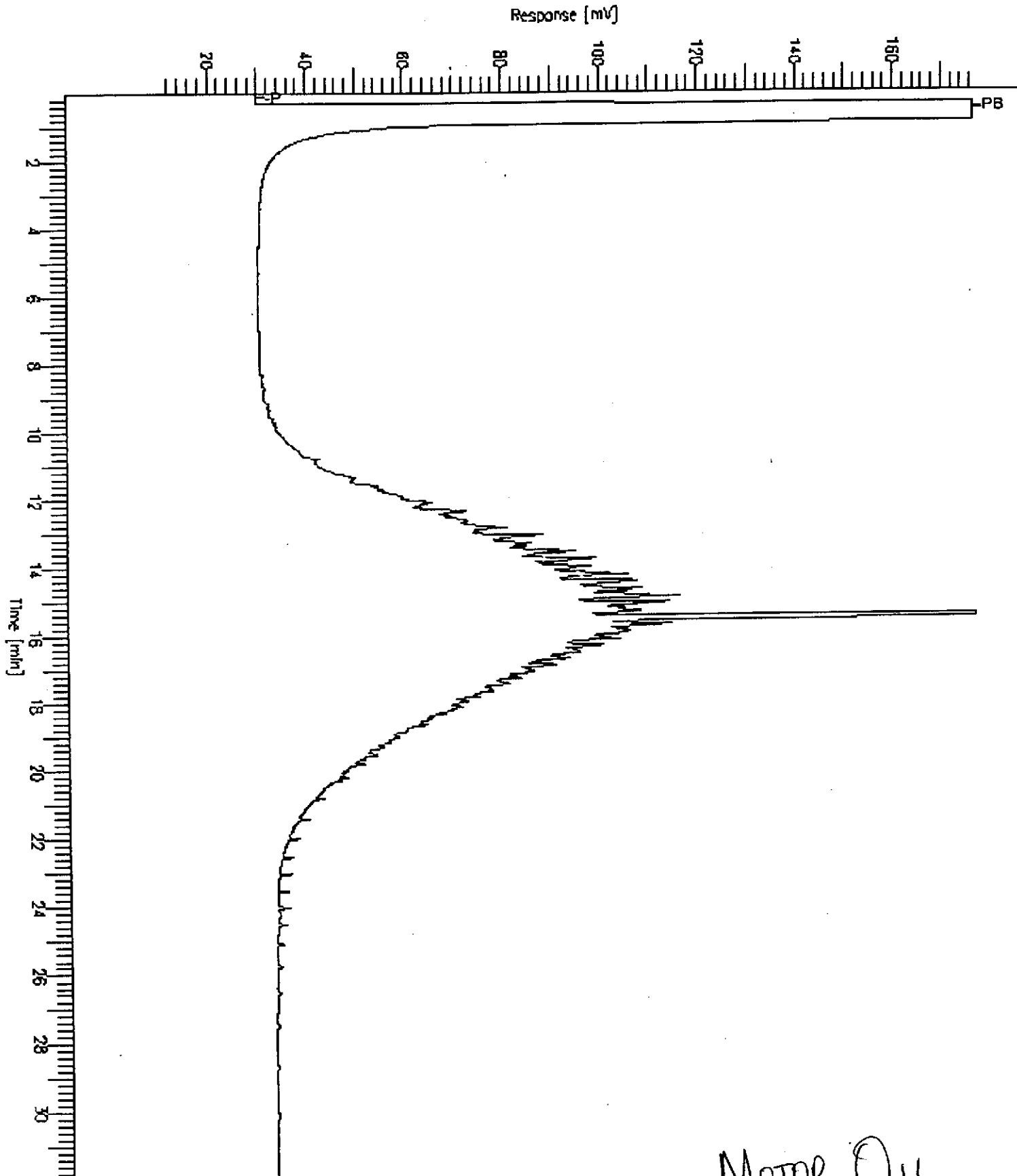
Chromatogram

Sample Name : CCV, 97WS5160.MO
FileName : G:\GC11\CHA\002A065.RAW
Method : ATEH363.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 10 mV

Sample #: 500MG/L
Date : 1/5/98 11:10 AM
Time of Injection: 1/4/98 11:26 AM
Low Point : 10.03 mV
High Point : 176.71 mV
Plot Scale: 166.7 mV

Page 1 of 1



MOTOR OIL

Chromatogram

Sample Name : CCV,97WS5204,DS

FileName : G:\GC11\CHA\002A063.RAW

Method : ATEH363.MTH

Start Time : 0.01 min

Scale Factor: 0.0

End Time : 31.91 min

Plot Offset: 19 mV

Sample #: 500MG/L

Date : 1/5/98 11:11 AM

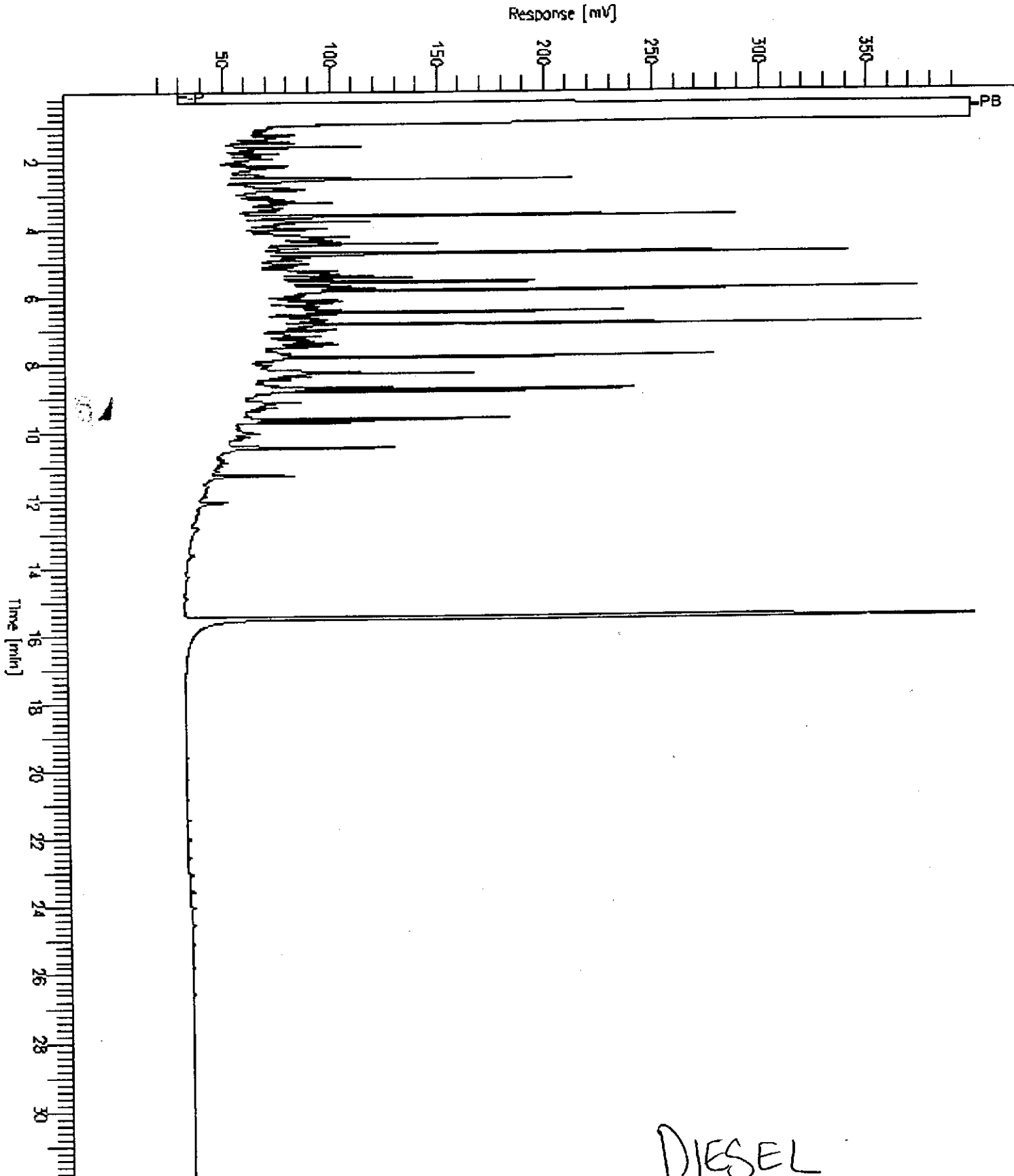
Time of Injection: 1/4/98 09:59 AM

Low Point : 19.30 mV

Plot Scale: 379.7 mV

Page 1 of 1

High Point : 399.04 mV



Lab #: 131806

BATCH QC REPORT



Curtis & Tompkins Ltd.

TEH-Tot Ext Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8015M
Project#: 95-113.28 Prep Method: EPA 3520
Location: P/O Economy Parking

METHOD BLANK

Matrix: Water Prep Date: 12/29/97
Batch#: 38301 Analysis Date: 12/31/97
Units: ug/L
Diln Fac: 1

MB Lab ID: QC61374

Analyte	Result
JP-5, C10-C16	<50
Diesel C12-C22	<50
Motor Oil C22-C50	<300

Surrogate	%Rec	Recovery Limits
Hexacosane	77	60-140



TEH-Tot Ext Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8015M
 Project#: 95-113.28 Prep Method: EPA 3520
 Location: P/O Economy Parking

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water Prep Date: 12/29/97
 Batch#: 38301 Analysis Date: 01/05/98
 Units: ug/L
 Diln Fac: 1

BS Lab ID: QC61375

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C12-C22	2475	2396	97	60-140
Surrogate	%Rec	Limits		
Hexacosane	116	60-140		

BSD Lab ID: QC61376

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	2234	90	60-140	7	35
Surrogate	%Rec	Limits				
Hexacosane	112	60-140				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits



TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: TVH
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131806-002	MW-1	38366	12/23/97	01/05/98	01/05/98	
131806-003	MW-3	38395	12/23/97	01/06/98	01/06/98	
131806-004	QC-1	38366	12/23/97	01/05/98	01/05/98	

Matrix: Water

Analyte	Units	131806-002	131806-003	131806-004
Diln Fac:		1	1	1
Gasoline C7-C12	ug/L	<50	2200 H	<50
Surrogate				
Bromofluorobenzene	%REC	92	97	96

H: Heavier hydrocarbons than indicated standard



BTXE

Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8020A
Project#: 95-113.28	Prep Method: EPA 5030
Location: P/O Economy Parking	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
131806-002	MW-1	38366	12/23/97	01/05/98	01/05/98	
131806-003	MW-3	38395	12/23/97	01/06/98	01/06/98	
131806-004	QC-1	38366	12/23/97	01/05/98	01/05/98	

Matrix: Water

Analyte	Units	131806-002	131806-003	131806-004
Diln Fac:		1	1	1
Benzene	ug/L	0.7	13	0.68
Toluene	ug/L	<0.5	16	<0.5
Ethylbenzene	ug/L	<0.5	8.7	<0.5
m,p-Xylenes	ug/L	<0.5	70	<0.5
o-Xylene	ug/L	<0.5	46	<0.5
Surrogate				
Trifluorotoluene	%REC	78	177 *	79
Bromofluorobenzene	%REC	70	76	69

* Values outside of QC limits

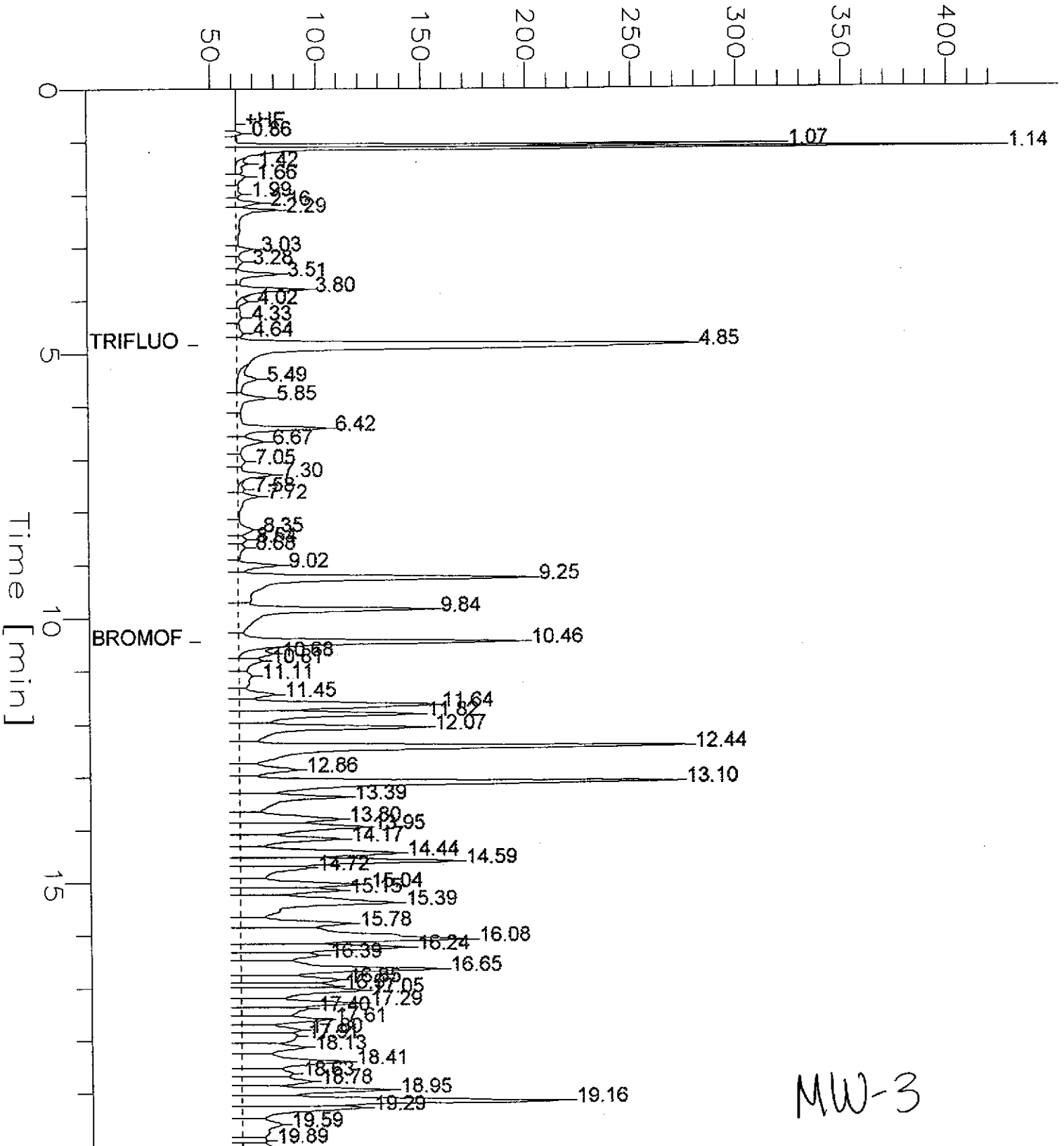
GC04 TVH 'J' Data File Rtx1FID

Sample Name : RR,131806-003,38395,
FileName : G:\GC04\DATA\006J026.RAW
Method :
Start Time : 0.00 min
Scale Factor : 1.0

End Time : 20.00 min
Plot Offset : 44 mV

Sample # :
Date : 1/7/98 12:47 PM
Time of Injection: 1/6/98 11:23 PM
Low Point : 43.87 mV
Plot Scale : 381.0 mV
Page 1 of 1
High Point : 424.88 mV

Response [mV]



GC04 TVH 'J' Data File Rtx1FID

Sample Name : CCV/LCS, QC61698, 97WS5166, 38395

Sample #: GAS

Page 1 of 1

FileName : G:\GC04\DATA\006J010.raw

Date : 1/6/98 05:02 PM

Method : TVHBTXE

Time of Injection: 1/6/98 03:48 PM

Start Time : 0.00 min

End Time : 20.00 min

Low Point : 10.17 mV

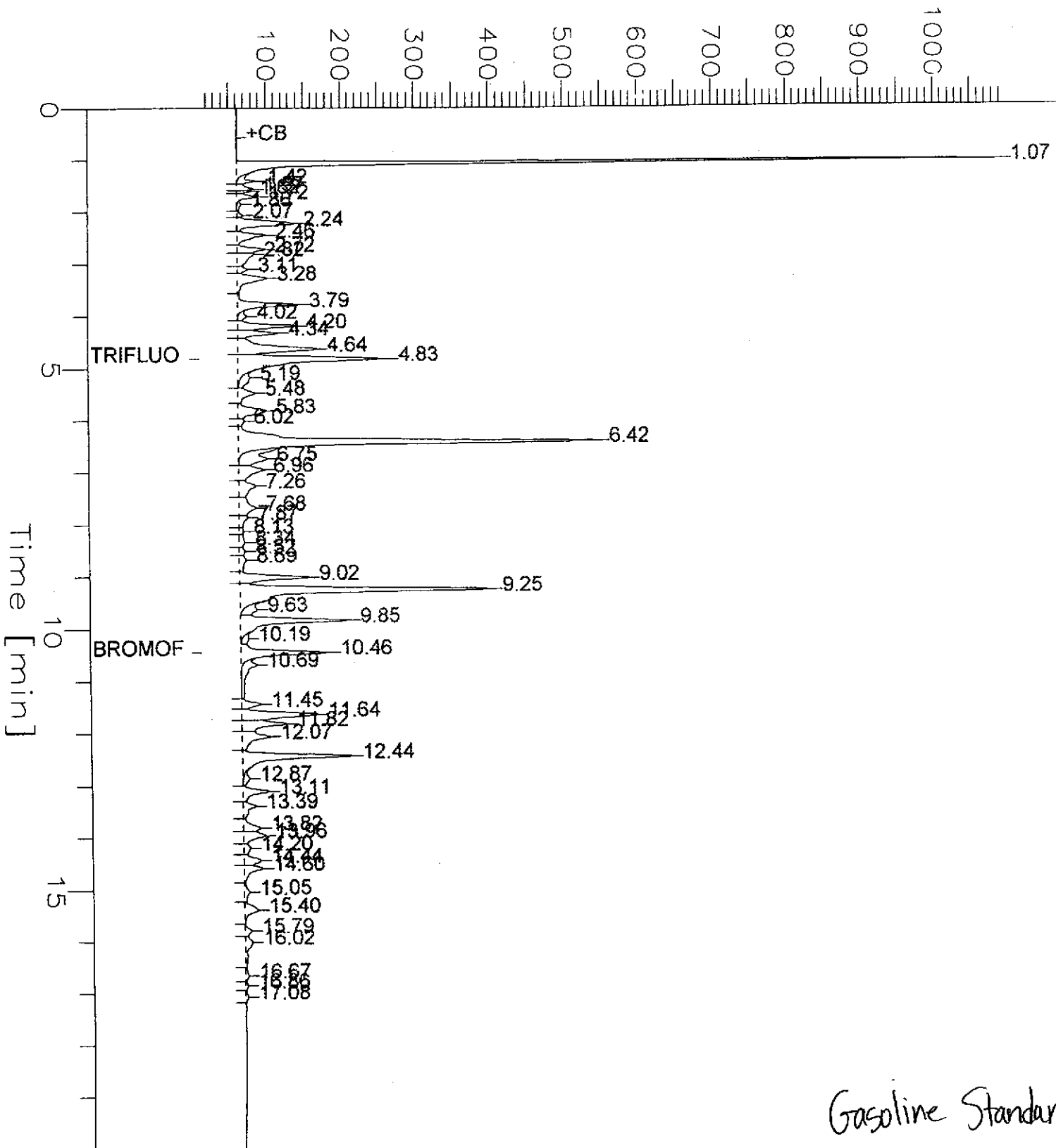
High Point : 1092.88 mV

Scale Factor: 1.0

Plot Offset: 10 mV

Plot Scale: 1082.7 mV

Response [mV]



Gasoline Standard

Lab #: 131806

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: TVH
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

METHOD BLANK

Matrix: Water Prep Date: 01/04/98
Batch#: 38366 Analysis Date: 01/04/98
Units: ug/L
Diln Fac: 1

MB Lab ID: QC61600

Analyte	Result	
Gasoline C7-C12	<50	
Surrogate	%Rec	Recovery Limits
Bromofluorobenzene	76	70-122

Lab #: 131806

BATCH QC REPORT

BTXE

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8020A
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

METHOD BLANK

Matrix: Water Prep Date: 01/04/98
Batch#: 38366 Analysis Date: 01/04/98
Units: ug/L
Diln Fac: 1

MB Lab ID: QC61600

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	80	58-130
Bromofluorobenzene	69	62-131

Lab #: 131806

BATCH QC REPORT



Curtis & Tompkins Ltd
Page 1 of 1

TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc.
Project#: 95-113.28
Location: P/O Economy Parking

Analysis Method: TVH
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 38395
Units: ug/L
Diln Fac: 1

Prep Date: 01/06/98
Analysis Date: 01/06/98

MB Lab ID: QC61700

Analyte	Result	
Gasoline C7-C12	<50	
Surrogate	%Rec	Recovery Limits
Bromofluorobenzene	73	70-122

Lab #: 131806

BATCH QC REPORT



Page 1 of 1

BTXE

Client: Innovative Technical Solutions, Inc.
Project#: 95-113.28
Location: P/O Economy Parking

Analysis Method: EPA 8020A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 38395
Units: ug/L
Diln Fac: 1

Prep Date: 01/06/98
Analysis Date: 01/06/98

MB Lab ID: QC61700

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	84	58-130
Bromofluorobenzene	64	62-131

Lab #: 131806

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: TVH
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

LABORATORY CONTROL SAMPLE

Matrix: Water Prep Date: 01/04/98
Batch#: 38366 Analysis Date: 01/04/98
Units: ug/L
Diln Fac: 1

LCS Lab ID: QC61598

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1960	2000	98	80-120
Surrogate	%Rec	Limits		
Bromofluorobenzene	133*	70-122		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

Lab #: 131806

BATCH QC REPORT



Page 1 of 1

BTXE

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8020A
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

LABORATORY CONTROL SAMPLE

Matrix: Water Prep Date: 01/04/98
Batch#: 38366 Analysis Date: 01/04/98
Units: ug/L
Diln Fac: 1

LCS Lab ID: QC61599

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	18.32	20	92	80-120
Toluene	19.89	20	99	80-120
Ethylbenzene	20.38	20	102	80-120
m,p-Xylenes	41.23	40	103	80-120
o-Xylene	22.61	20	113	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	83	58-130		
Bromofluorobenzene	76	62-131		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits

Lab #: 131806

BATCH QC REPORT



TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: TVH
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

LABORATORY CONTROL SAMPLE

Matrix: Water Prep Date: 01/06/98
Batch#: 38395 Analysis Date: 01/06/98
Units: ug/L
Diln Fac: 1

LCS Lab ID: QC61698

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1976	2000	99	80-120
Surrogate	%Rec	Limits		
Bromofluorobenzene	101	70-122		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

BTXE

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8020A
 Project#: 95-113.28 Prep Method: EPA 5030
 Location: P/O Economy Parking

LABORATORY CONTROL SAMPLE

Matrix: Water Prep Date: 01/06/98
 Batch#: 38395 Analysis Date: 01/06/98
 Units: ug/L
 Diln Fac: 1

LCS Lab ID: QC61699

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	17.24	20	86	80-120
Toluene	19.32	20	97	80-120
Ethylbenzene	19.27	20	96	80-120
m,p-Xylenes	40.92	40	102	80-120
o-Xylene	20.42	20	102	80-120
Surrogate	%Rec	Limits		
Trifluorotoluene	87	58-130		
Bromofluorobenzene	67	62-131		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits

TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc. Analysis Method: TVH
 Project#: 95-113.28 Prep Method: EPA 5030
 Location: P/O Economy Parking

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ Sample Date: 12/22/97
 Lab ID: 131788-015 Received Date: 12/22/97
 Matrix: Water Prep Date: 01/04/98
 Batch#: 38366 Analysis Date: 01/04/98
 Units: ug/L
 Diln Fac: 1

MS Lab ID: QC61601

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	1699	85	75-125
Surrogate	%Rec	Limits			
Bromofluorobenzene	109	70-122			

MSD Lab ID: QC61602

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2069	103	75-125	20	35
Surrogate	%Rec	Limits				
Bromofluorobenzene	112	70-122				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 1 outside limits
 Spike Recovery: 0 out of 2 outside limits

Lab #: 131806

BATCH QC REPORT



TVH-Total Volatile Hydrocarbons

Client: Innovative Technical Solutions, Inc.	Analysis Method: TVH
Project#: 95-113.28	Prep Method: EPA 5030
Location: P/O Economy Parking	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ	Sample Date: 12/23/97
Lab ID: 131823-001	Received Date: 12/24/97
Matrix: Water	Prep Date: 01/06/98
Batch#: 38395	Analysis Date: 01/06/98
Units: ug/L	
Diln Fac: 1	

MS Lab ID: QC61701

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	1889	94	75-125
Surrogate	%Rec	Limits			
Bromofluorobenzene	106	70-122			

MSD Lab ID: QC61702

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	1828	91	75-125	3	35
Surrogate	%Rec	Limits				
Bromofluorobenzene	105	70-122				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 1 outside limits
 Spike Recovery: 0 out of 2 outside limits

Halogenated Volatile Organics
EPA 8010 Analyte List

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8260
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

Field ID: TRIP BLANK Sampled: 12/23/97
Lab ID: 131806-001 Received: 12/23/97
Matrix: Water Extracted: 12/29/97
Batch#: 38275 Analyzed: 12/29/97
Units: ug/L
Diln Fac: 1

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	25	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

Surrogate	%Recovery	Recovery Limits
Toluene-d8	96	92-107
Bromofluorobenzene	105	80-121
1,2-Dichloroethane-d4	100	87-121

Aromatic Volatile Organics
EPA 8020 Analyte List

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8260
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

Field ID: TRIP BLANK Sampled: 12/23/97
Lab ID: 131806-001 Received: 12/23/97
Matrix: Water Extracted: 12/29/97
Batch#: 38275 Analyzed: 12/29/97
Units: ug/L
Diln Fac: 1

Analyte	Result	Reporting Limit
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

Surrogate	%Recovery	Recovery Limits
Toluene-d8	96	92-107
Bromofluorobenzene	105	80-121
1,2-Dichloroethane-d4	100	87-121



Halogenated Volatile Organics
EPA 8010 Analyte List

Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8260
Project#: 95-113.28	Prep Method: EPA 5030
Location: P/O Economy Parking	

Field ID: MW-1	Sampled: 12/23/97
Lab ID: 131806-002	Received: 12/23/97
Matrix: Water	Extracted: 12/30/97
Batch#: 38275	Analyzed: 12/30/97
Units: ug/L	
Diln Fac: 1	

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	6.3	1.0
cis-1,2-Dichloroethene	8.7	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
Surrogate	%Recovery	Recovery Limits
Toluene-d8	99	92-107
Bromofluorobenzene	101	80-121
1,2-Dichloroethane-d4	110	87-121



Halogenated Volatile Organics
EPA 8010 Analyte List

Client: Innovative Technical Solutions, Inc.
Project#: 95-113.28
Location: P/O Economy Parking

Analysis Method: EPA 8260
Prep Method: EPA 5030

Field ID: MW-3
Lab ID: 131806-003
Matrix: Water
Batch#: 38275
Units: ug/L
Diln Fac: 1

Sampled: 12/23/97
Received: 12/23/97
Extracted: 12/30/97
Analyzed: 12/30/97

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	4.2	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
Surrogate	%Recovery	Recovery Limits
Toluene-d8	101	92-107
Bromofluorobenzene	99	80-121
1,2-Dichloroethane-d4	112	87-121

Halogenated Volatile Organics
EPA 8010 Analyte List

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8260
Project#: 95-113.28 Prep Method: EPA 5030
Location: P/O Economy Parking

Field ID: QC-1 Sampled: 12/23/97
Lab ID: 131806-004 Received: 12/23/97
Matrix: Water Extracted: 12/30/97
Batch#: 38275 Analyzed: 12/30/97
Units: ug/L
Diln Fac: 1

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	6.6	1.0
cis-1,2-Dichloroethene	9.3	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

Surrogate	%Recovery	Recovery Limits
Toluene-d8	99	92-107
Bromofluorobenzene	105	80-121
1,2-Dichloroethane-d4	108	87-121

Lab #: 131806

BATCH QC REPORT

Halogenated Volatile Organics EPA 8010 Analyte List		
Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8260	
Project#: 95-113.28	Prep Method: EPA 5030	
Location: P/O Economy Parking		
METHOD BLANK		
Matrix: Water	Prep Date: 12/29/97	
Batch#: 38275	Analysis Date: 12/29/97	
Units: ug/L		
Diln Fac: 1		

MB Lab ID: QC61286

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
Surrogate	%Rec	Recovery Limits
Toluene-d8	97	92-107
Bromofluorobenzene	104	80-121
1,2-Dichloroethane-d4	102	87-121

Lab #: 131806

BATCH QC REPORT

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8260
Project#: 95-113.28	Prep Method: EPA 5030
Location: P/O Economy Parking	

METHOD BLANK

Matrix: Water	Prep Date: 12/29/97
Batch#: 38275	Analysis Date: 12/29/97
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC61286

Analyte	Result	Reporting Limit
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
Surrogate	%Rec	Recovery Limits
Toluene-d8	97	92-107
Bromofluorobenzene	104	80-121
1,2-Dichloroethane-d4	102	87-121

Lab #: 131806

BATCH QC REPORT

 Halogenated Volatile Organics
 EPA 8010 Analyte List

Client: Innovative Technical Solutions, Inc.	Analysis Method: EPA 8260
Project#: 95-113.28	Prep Method: EPA 5030
Location: P/O Economy Parking	

METHOD BLANK

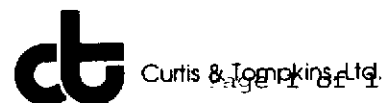
Matrix: Water	Prep Date: 12/29/97
Batch#: 38275	Analysis Date: 12/29/97
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC61288

Analyte	Result	Reporting Limit
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
Surrogate	%Rec	Recovery Limits
Toluene-d8	98	92-107
Bromofluorobenzene	103	80-121
1,2-Dichloroethane-d4	103	87-121

Lab #: 131806

BATCH QC REPORT



Halogenated Volatile Organics

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8260
 Project#: 95-113.28 Prep Method: EPA 5030
 Location: P/O Economy Parking

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water Prep Date: 12/29/97
 Batch#: 38275 Analysis Date: 12/29/97
 Units: ug/L
 Diln Fac: 1

BS Lab ID: QC61284

Analyte	Spike Added	BS	%Rec #	Limits
1,1-Dichloroethene	50	54.59	109	73-141
Trichloroethene	50	53.8	108	84-113
Chlorobenzene	50	51.8	104	87-117
Surrogate	%Rec	Limits		
Toluene-d8	97	92-107		
Bromofluorobenzene	103	80-121		
1,2-Dichloroethane-d4	99	87-121		

BSD Lab ID: QC61285

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
1,1-Dichloroethene	50	54.98	110	73-141	1	14
Trichloroethene	50	53.16	106	84-113	1	14
Chlorobenzene	50	51.28	103	87-117	1	13
Surrogate	%Rec	Limits				
Toluene-d8	98	92-107				
Bromofluorobenzene	103	80-121				
1,2-Dichloroethane-d4	100	87-121				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 3 outside limits
 Spike Recovery: 0 out of 6 outside limits

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 8260
 Project#: 95-113.28 Prep Method: EPA 5030
 Location: P/O Economy Parking

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water Prep Date: 12/29/97
 Batch#: 38275 Analysis Date: 12/29/97
 Units: ug/L
 Diln Fac: 1

BS Lab ID: QC61284

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	50	51.79	104	86-116
Toluene	50	49.74	99	83-118
Chlorobenzene	50	51.8	104	87-117
Surrogate	%Rec	Limits		
Toluene-d8	97	92-107		
Bromofluorobenzene	103	80-121		
1,2-Dichloroethane-d4	99	87-121		

BSD Lab ID: QC61285

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	50	50.84	102	86-116	2	11
Toluene	50	48.91	98	83-118	2	13
Chlorobenzene	50	51.28	103	87-117	1	13
Surrogate	%Rec	Limits				
Toluene-d8	98	92-107				
Bromofluorobenzene	103	80-121				
1,2-Dichloroethane-d4	100	87-121				

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits
 RPD: 0 out of 3 outside limits
 Spike Recovery: 0 out of 6 outside limits



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 131806
CLIENT: INNOVATIVE TECHNICAL SOLUTIONS
PROJECT#: 95-113.28
LOCATION: P/O ECONOMY PARKING

DATE SAMPLED: 12/23/97
DATE RECEIVED: 12/23/97
DATE ANALYZED: 12/31/97
QC BATCH#: 38332

=====

ANALYSIS: FERROUS IRON
METHOD REFERENCE: SMWW 18:3500 Fe-D

=====

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
131806-002	MW-1	ND	mg/L	0.2
131806-003	MW-3	0.5	mg/L	0.2
131806-004	QC-1	ND	mg/L	0.2
131806-METHOD BLANK		ND	mg/L	0.2

ND = Not detected at or above the reporting limit.

QA/QC SUMMARY: MS/MSD of 131806-004

=====

MS/MSD RPD, %	2
MS/MSD RECOVERY, %	104
LCS RECOVERY, %	95

=====



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 131806
CLIENT: INNOVATIVE TECHNICAL SOLUTIONS
PROJECT#: 95-113.28
LOCATION: P/O ECONOMY PARKING

DATE SAMPLED: 12/23/97
DATE RECEIVED: 12/23/97
DATE ANALYZED: 12/31/97
QC BATCH#: 38271

=====

ANALYSIS: FERRIC IRON
METHOD REFERENCE: EPA 6010A

=====

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
131806-002	MW-1	2.0	mg/L	0.1
131806-003	MW-3	1.5	mg/L	0.1
131806-004	QC-1	3.9	mg/L	0.1
131806-METHOD BLANK		ND	mg/L	0.1

ND = Not detected at or above the reporting limit.

QA/QC SUMMARY: BS/BSD

=====

RPD, % 5
RECOVERY, % 103

=====

Total Dissolved Solids (TDS)

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 160.1
Project #: 95-113.28 Prep Method: EPA 160.1
Location : P/O Economy Parking

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
131806-002	MW-1	38283	23-DEC-97	29-DEC-97	-
131806-003	MW-3	38283	23-DEC-97	29-DEC-97	-
131806-004	QC-1	38283	23-DEC-97	29-DEC-97	-
QC61307	Method Blank	38283	-	29-DEC-97	-

Analyte: Total Dissolved Solids Matrix: Water Units: mg/L

Sample #	Client ID	Result	Reporting Limit	Dilution Factor
131806-002	MW-1	3570	13	1.25
131806-003	MW-3	13900	13	1.25
131806-004	QC-1	3520	13	1.25
QC61307	Method Blank	ND	10	1

ND = None Detected at or above Reporting Limit

Total Dissolved Solids (TDS)

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 160.1
Project #: 95-113.28 Prep Method: EPA 160.1
Location : P/O Economy Parking

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC61308	SDUP of 131783-001	38283	22-DEC-97	29-DEC-97	-

Analyte: Total Dissolved Solids Matrix: Water Units: mg/L

Sample #	Sample Type	Result	%RPD	Limit
QC61308	SDUP of 131783-001	17760	4	25
131783-001	ZZZZZZZZ	17800		

Nitrogen, Nitrate

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 353.2
Project #: 95-113.28 Prep Method: EPA 353.2
Location : P/O Economy Parking

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
131806-002	MW-1	38267	23-DEC-97	24-DEC-97	-
131806-003	MW-3	38267	23-DEC-97	24-DEC-97	-
131806-004	QC-1	38267	23-DEC-97	24-DEC-97	-
QC61247	Method Blank	38267	-	24-DEC-97	-

Analyte: Nitrogen, Nitrate Matrix: Water Units: mg/L

Sample #	Client ID	Result	Reporting Limit	Dilution Factor
131806-002	MW-1	ND	0.2	1
131806-003	MW-3	ND	0.2	1
131806-004	QC-1	ND	0.2	1
QC61247	Method Blank	ND	0.2	1

ND = None Detected at or above Reporting Limit

Nitrogen, Nitrate

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 353.2
Project #: 95-113.28 Prep Method: EPA 353.2
Location : P/O Economy Parking

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC61248	Lab Control Sample	38267	-	24-DEC-97	-

Analyte: Nitrogen, Nitrate Matrix: Water Units: mg/L

Sample #	Sample Type	Spike Amt.	Result	%Recovery	Limits
QC61248	Lab Control Sample	16	16.05	100	80-120

Nitrogen, Nitrate

Client: Innovative Technical Solutions, Inc. Analysis Method: EPA 353.2
 Project #: 95-113.28 Prep Method: EPA 353.2
 Location : P/O Economy Parking

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC61249	MS of 131806-002	38267	23-DEC-97	24-DEC-97	-
QC61250	MSD of QC61249	38267	30-JUL-96	24-DEC-97	-

Analyte: Nitrogen, Nitrate Matrix: Water Units: mg/L

Sample #	Client ID	Spikeamt	Result	%Rec	Limits	%RPD	Limit
QC61249	MS of 131806-002	2	2.140	107	75-125		
QC61250	MSD of QC61249	2	2.100	105	75-125	2	35
131806-002	MW-1		<0.2				

San Francisco Regional Office

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

January 5, 1998

Ms. Damara Moore
CURTIS & TOMPKINS, LTD.
2323 Fifth Street
Berkeley, CA 94710

Client Ref.: 131806
Clayton Project No.: 97123.15

Dear Ms. Moore:

Attached is our analytical laboratory report for the samples received on December 24, 1997. Also enclosed is a copy of the Chain-of-Custody record acknowledging receipt of these samples.

Please note that any unused portion of the samples will be discarded after February 4, 1998, unless you have requested otherwise.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact Client Services at (510) 426-2657.

Sincerely,



Andrew C. Bradeen
Director, Laboratory Services
San Francisco Regional Office

ACB/caa

Attachments

QUALITY CONTROL NARRATIVE
for
Curtis & Tompkins, LTD.
Client Reference: 131806
Clayton Project No. 97123.15

Sample Information/Problems:

There were no problems encountered with sample receipt.

Analytical Information/Problems:

There were no problems encountered with the sample analyses.

Quality Control:

The quality control data is summarized in the Quality Assurance Data Package, which follows the analytical report.

- LCS/LCSD: A laboratory control sample and duplicate were analyzed where applicable, and all results were acceptable.
- CCV: Response for all analytes met Clayton acceptance criteria.
- Surrogate Recoveries: Not applicable.

Analytical Results
 for
 Curtis & Tompkins, Ltd.
 Client Reference: 131806
 Clayton Project No. 97123.15

Sample Identification: See Below
 Lab Number: 9712315
 Sample Matrix/Media: WATER
 Method Reference: EPA 300.0

Date Received: 12/24/97
 Date Analyzed: 12/31/97

Lab Number	Sample Identification	Date Sampled	Sulfate (mg/L)	Method Detection Limit (mg/L)
-01	MW-1	12/23/97	120	2
-02	MW-3	12/23/97	690	2
-03	QC-1	12/23/97	120	2
-04	METHOD BLANK	--	<2	2

ND: Not detected at or above limit of detection
 --: Information not available or not applicable

Quality Assurance Results Summary
Matrix Spike/Matrix Spike Duplicate Results
for
Clayton Project No. 97123.15

Quality Assurance Results Summary - Matrix Spike/Matrix Spike Duplicate
for
Clayton Project No. 97123.15

Clayton Lab Number: LCS
Ext./Prep. Method: --
Date: 12/31/97
Analyst: --
Std. Source: IC971120A
Sample Matrix/Media: WATER

Analytical Method: EPA 300.0
Instrument ID: 02739
Date: 12/31/97
Time: 20:00
Analyst: KR
Units: mg/L
QC Batch No: 9712319K

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
CHLORIDE	ND	15.0	14.5	96	14.4	96	96	79	108	0.4	20
FLUORIDE	ND	5.00	5.07	101	5.05	101	101	86	106	0.4	20
NITRITE	ND	5.00	5.08	102	5.06	101	101	81	109	0.4	20
SULFATE	ND	20.0	19.3	97	19.3	96	97	74	109	0.2	20

ND = Not detected at or above limit of detection
SOR = Spike out of range due to high sample concentration.

LCL = Lower Control Limit

UCL = Upper Control Limit

Quality Assurance Results Summary - Matrix Spike/Matrix Spike Duplicate
for
Clayton Project No. 97123.15

Clayton Lab Number: LCS
Ext./Prep. Method: --
Date: 01/02/98
Analyst: --
Std. Source: IC971120A
Sample Matrix/Media: WATER

Analytical Method: EPA 300.0
Instrument ID: 02739
Date: 01/02/98
Time: 15:00
Analyst: KR
Units: mg/L
QC Batch No: 9801029K

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
FLUORIDE	ND	5.00	4.84	97	4.84	97	97	86	106	0.0	20
SULFATE	ND	20.0	18.8	94	18.8	94	94	74	109	0.3	20

ND = Not detected at or above limit of detection
SOR = Spike out of range due to high sample concentration.

LCL = Lower Control Limit

UCL = Upper Control Limit

Curtis & Tompkins, Ltd.
 Analytical Laboratories, Since 1878
 2323 Fifth Street
 Berkeley, CA 94710
 (510)486-0900 ph
 (510)486-0532 fx

9712315

Project Number: 131806

Subcontract Lab:

Clayton Group Services
 1252 Quarry Lane
 Pleasanton, CA 94566
 (510) 426-2600

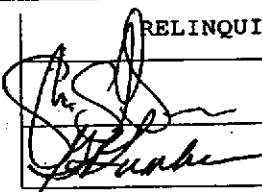
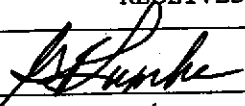

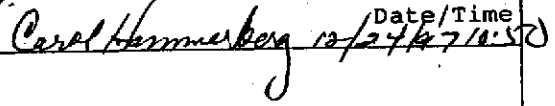
Please send report to: Damara Moore

Turnaround Time: _____

Sample ID	Date Sampled	Matrix	Analysis	C&T Lab #
MW-1	23-DEC-97	Water	SULFATE	01 131806-002
MW-3	23-DEC-97	Water	SULFATE	02 131806-003
QC-1	23-DEC-97	Water	SULFATE	03 131806-004

NP
↓

***Please report using Sample ID instead of C&T Lab #.

Notes:	RELINQUISHED BY:	RECEIVED BY:
	 12-24-97 7:50 pm Date/Time	 12/24/97 1:50 Date/Time
	 Date/Time 10:50	 Carol Hemmerberg 12/24/97 10:50 Date/Time

Signature on this form constitutes a firm Purchase Order for the services requested above.

