Annual Event/Fourth Quarter 2005
Groundwater Monitoring Event
Site #01-600
Seattle, Washington

December 20, 2005

Prepared for

Time Oil Co.
2737 West Commodore Way
Seattle, Washington

LANDAU ASSOCIATES
130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1-1
2.0	SITE BACKGROUND	2-1
3.0	GROUNDWATER MONITORING	3-1
	3.1 GROUNDWATER ELEVATIONS	3-1
	3.2 GROUNDWATER SAMPLING METHODOLOGY	3-1
	3.3 PRELIMINARY GROUNDWATER SCREENING LEVELS	3-2
4.0	GROUNDWATER ANALYTICAL RESULTS	4-1
	4.1 2737 WEST COMMODORE WAY (MAIN PROPERTY)	4-1
	4.2 2750 WEST COMMODORE WAY (ADJACENT TO SHIP CANAL)	4-2
	4.3 PRODUCT SAMPLING	4-3
5.0	SUMMARY AND CONCLUSIONS	5-1
6.0	USE OF THIS REPORT	6-1
7.0	REFERENCES	7-1

LIST OF FIGURES

Figure	Title
1	Vicinity Map
2	Site Plan and Monitoring Well Locations
3	Groundwater Elevation Contours – October 2005
4	Groundwater Analytical Results – October 2005
5	Gasoline-Range Petroleum Hydrocarbons in Groundwater – October 2005
6	Dissolved-Phase Benzene in Groundwater – October 2005
7	Diesel-Range Petroleum Hydrocarbons in Groundwater – October 2005
8	Dissolved-Phase PCP in Groundwater – October 2005

LIST OF TABLES

Table	Title
1	Groundwater Elevations
2	Groundwater Analytical Data
3	Cumulative Groundwater Analytical Results
4	Product Analytical Data

LIST OF APPENDICES

Appendix	Title
A	Laboratory Analytical Report

1.0 INTRODUCTION

This report presents the results of the annual groundwater monitoring event conducted in fourth quarter 2005 (October 2005) by Landau Associates on behalf of Time Oil Co. (Time Oil) at the Time Oil Seattle Terminal, Site No. 01-600 (the site). The site is located at 2737 and 2750 West Commodore Way in Seattle, Washington (Figure 1). The two properties are adjacent to each other but on opposite sides of Commodore Way and, for the purposes of this report, will be discussed concurrently. These activities are being conducted by Time Oil as part of an independent cleanup action in progress under a Voluntary Cleanup Program agreement with the Washington State Department of Ecology (Ecology).

2.0 SITE BACKGROUND

The site is an inactive tank farm facility that was used to store gasoline, diesel, and various other liquid fuels and fuel additives. The site is surrounded by commercial and industrial properties to the east, south, and west and by the Lake Washington Ship Canal to the north. A site map showing the site topography, structures, and the locations of the groundwater monitoring wells is provided on Figure 2.

Time Oil has conducted investigations at the site since 1991, including underground storage tank (UST) removal, site assessments, monitoring well installation, and petroleum-impacted soil removal. Passive skimmer pumps were installed at five monitoring well locations beginning in 2001 and a dual-phase extraction (DPE) system was pilot-tested and permitted in 2003-04. Also, product vacuum extractions have been conducted on a periodic basis and monthly extractions are planned for the remainder of 2005. Additional future planned activities in 2005 include tank farm demolition, additional UST removal, and pipeline removal below the pier. Quarterly groundwater monitoring is expected to continue through at least 2008.

3.0 GROUNDWATER MONITORING

Quarterly groundwater monitoring activities began at the site in July 2001. Tetra Tech EC, Inc. conducted the groundwater monitoring activities through the first quarter of 2005. Landau Associates began groundwater monitoring and skimmer pump operation and maintenance during the second quarter of 2005. Landau Associates collected groundwater elevation data from 35 onsite monitoring wells, groundwater samples from 33 onsite monitoring wells (Figures 3, 4, 5, 6, 7, and 8), and product samples from 6 monitoring wells. Nineteen of these wells are sampled on an annual basis; the remainder of the wells are sampled on a quarterly basis. The results of the fourth quarter 2005 event are provided in the following sections.

3.1 GROUNDWATER ELEVATIONS

Groundwater elevation data and product thickness measurements, where observed, were collected on October 24, 2005; these data are shown in Table 1. The depth to water and/or product at each location ranged from 2.46 to 23.54 ft below the top of casing. The groundwater elevation data indicate an approximate groundwater flow direction to the north toward the Ship Canal, as shown on Figure 3. Product was observed in 9 of the 35 monitoring wells (01MW-05, 01MW-10, 01MW-16, 01MW-22 through 01MW-25, 01MW-28, and 01MW-29) at thicknesses ranging from 0.25 ft (01MW-22) to 3.07 ft (01MW-05). Product thickness and the specific gravity of the product (0.8, based on an average estimate of the specific gravity of gasoline and oils) were taken into account in the calculation of the groundwater elevations, as shown in Table 1.

3.2 GROUNDWATER SAMPLING METHODOLOGY

Groundwater samples were collected on October 24 through 26 from 33 onsite groundwater monitoring wells (Figure 3, Table 2). Prior to sampling, the depth to water in each well was measured using a decontaminated electronic oil/water interface probe. New polyethylene tubing was installed in wells (where no tubing was present from previous sampling events) and the wells were purged using a peristaltic pump and low-flow groundwater sampling techniques until the water quality parameters [turbidity, pH, temperature, conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO)] were stable (concurrent readings within 10 percent). The groundwater samples were then collected and replicate water quality parameters were measured during sample collection to verify groundwater stability. Groundwater samples were collected directly into sample containers provided by North Creek Analytical Laboratories, Inc. (NCA), stored in a sample cooler on ice, and submitted with chain-of-custody documentation to NCA.

Groundwater samples collected from wells that contained measurable product were collected by inserting ⅝-inch back-pressured polyethylene tubing into the well and through the product layer. Smaller diameter tubing (⅜-inch) was back-pressured and inserted into the ⅝-inch tubing to minimize introduction of product into the groundwater sample. Groundwater was collected using a peristaltic pump, as described above.

3.3 PRELIMINARY GROUNDWATER SCREENING LEVELS

To provide some context for evaluation of the analytical results from the quarterly monitoring event, the data were compared to available published regulatory values for preliminary screening purposes. The preliminary screening levels for detected analytes are referenced in Table 2.

Previous quarterly groundwater monitoring reports prepared by Tetra Tech (2005) used the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SQuiRT) values. These values were taken from the National Ambient Water Quality Criteria for protection of aquatic organisms. The portion of the Lake Washington Ship Canal (Ship Canal) that is adjacent to the site has been designated as "Lake Class" in Chapter 173-201A-130 (58) of the Washington Administrative Code defining Water Quality Standards for Surface Waters of the State of Washington. The "Lake Class" designation specifically defines the current or potential future use for the Ship Canal as drinking water; fish/shellfish migration, rearing, spawning, or harvesting; wildlife habitat; recreation; and commerce and navigation.

Therefore, the appropriate preliminary screening levels for this site for assessment of groundwater concentrations that are protective of surface water in the Ship Canal are the Ecology Model Toxics Control Act (MTCA) Method B Fresh Surface Water criteria for the protection of groundwater as fresh surface water (Ecology 2001). For each analyte, the most conservative appropriate Method B value was used as the screening level. Typically, these values are analogous to the National Ambient Water Quality Criteria for protection of human health (water ingestion and fish consumption). Where no MTCA Method B values were available (e.g., diesel-range, gasoline-range, and lube oil-range petroleum hydrocarbons), MTCA Method A criteria for the protection of groundwater as drinking water were used.

4.0 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using U.S. Environmental Protection Agency (EPA) Method 8021, and gasoline-range total petroleum hydrocarbons (TPH) using Ecology Method NWTPH-Gx. Selected samples were also analyzed for diesel-range TPH using Ecology Method NWTPH-Dx and pentachlorophenol (PCP) using EPA Method 8270-SIM. In addition to the 33 groundwater samples, two field duplicate samples, 01MW-59 and 02MW-25, were collected from 01MW-09 and 02MW-05, respectively. Both duplicate samples were analyzed for BTEX and gasoline-range TPH, for quality assurance/quality control purposes. Sample 01MW-59 was also analyzed for diesel-range TPH. The laboratory analytical data report and data validation memorandum are provided in Appendix A. The analytical results from the groundwater monitoring event completed on October 24 through 26, 2005 are included in Table 2. A comparison of the analytical results for each analyte throughout 2005 is summarized in Table 3. The laboratory analytical results for samples of product collected from six wells (01MW-16, 01MW-22, 01MW-23, 01MW-25, 01MW-28, and 01MW-29) are provided in Table 4. The analytical results for all analytes at each monitoring well are shown on Figure 4. Concentration contours for the gasoline-range petroleum hydrocarbon concentrations in groundwater for the October 2005 event are shown on Figure 5; the benzene concentrations are contoured on Figure 6, the diesel-range petroleum hydrocarbon concentrations are contoured on Figure 7, and the PCP concentrations are contoured on Figure 8. For Figures 5, 6, and 7, the minimum contour represents the preliminary groundwater screening level. A summary of the analytical results is provided below by property.

4.1 2737 WEST COMMODORE WAY (MAIN PROPERTY)

- Diesel-range petroleum hydrocarbons were detected in the groundwater samples from wells 01MW-02, 01MW-03, 01MW-09, 01MW-18, 01MW-19, and 01MW-21 at concentrations ranging from 0.256 to 1.44 milligrams per liter (mg/L); concentrations at four of the six samples contained concentrations greater than the MTCA Method A preliminary screening level of 0.5 mg/L.

- Lube oil-range petroleum hydrocarbons were not detected in any of the groundwater samples collected during fourth quarter 2005.

- Gasoline-range petroleum hydrocarbons were detected in the groundwater samples from wells 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, 01MW-13, 01MW-18, 01MW-19, 01MW-20, 01MW-21, 01MW-26, and 01MW-27 at concentrations ranging from 363 to 25,700 micrograms per liter (µg/L); concentrations at 10 of the 12 locations contained concentrations greater than the MTCA Method A preliminary screening level of 800 µg/L (when benzene is present).

- Benzene was detected in groundwater samples from wells 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, 01MW-13, 01MW-18, 01MW-19, 01MW-20, 01MW-21, 01MW-26, and 01MW-27 at concentrations ranging from 1.38 to 9,840 µg/L, with the maximum concentration observed at well 01MW-03. All of the detected benzene concentrations are greater than the MTCA Method B preliminary screening level of 1.2 µg/L.

- Toluene was detected in groundwater samples from wells 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, 01MW-18, 01MW-19, 01MW-20, 01MW-26, and 01MW-27 at concentrations ranging from 2.88 to 986 µg/L, which are all less than the MTCA Method B preliminary screening level of 1,000 µg/L.

- Ethylbenzene was detected in groundwater samples from wells 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, 01MW-18, 01MW-19, 01MW-20, 01MW-26, and 01MW-27 at concentrations ranging from 14.3 to 894 µg/L. Only one sample (01MW-19 with a concentration of 894 µg/L) was above the MTCA Method B preliminary screening level of 700 µg/L.

- Total xylenes were detected in groundwater samples from wells 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, 01MW-13, 01MW-18, 01MW-19, 01MW-20, 01MW-21, 01MW-26, and 01MW-27 at concentrations ranging from 2.26 to 4,610 µg/L, which are all less than the MTCA Method B preliminary screening level of 10,000 µg/L.

- PCP was detected in the groundwater samples from 01MW-01, 01MW-22, 01MW-23, and 01MW-26 at concentrations of 6.79, 273, 19.8, and 9 µg/L, respectively. All detected concentrations are greater than the MTCA Method B preliminary screening level of 0.01 µg/L.

4.2 2750 WEST COMMODORE WAY (ADJACENT TO SHIP CANAL)

- Concentrations of all analyzed constituents (gasoline-range hydrocarbons and BTEX) were below laboratory reporting limits at the two wells closest to the Ship Canal, 02MW-02 and 02MW-07, and in well 02MW-06. Except as listed below, concentrations of analyzed constituents were also below laboratory reporting limits.

- Gasoline-range petroleum hydrocarbons were detected at a concentration greater than the MTCA Method A preliminary screening level of 800 µg/L (when benzene is present) in the groundwater sample from well 02MW-04, at an estimated concentration of 3,990 µg/L. Gasoline-range petroleum hydrocarbons were also detected at wells 02MW-01 and 02MW-05 at concentrations of 379 and 335 µg/L, respectively.

- Benzene was detected at concentrations greater than the MTCA Method B preliminary screening level of 1.2 µg/L in groundwater samples from wells 02MW-01 and 02MW-04 at concentrations of 52.2 and 29.2 µg/L, respectively. In addition, benzene was detected at well 02MW-03 at a concentration of 0.894 µg/L.

- Toluene was detected in the groundwater sample from well 02MW-04 at a concentration of 262 µg/L, which is less than the MTCA Method B preliminary screening level of 1,000 µg/L.

- Ethylbenzene was detected in groundwater samples from wells 02MW-01 and 02MW-04 at concentrations of 1.38 µg/L and 24.9 µg/L, respectively, which are less than the MTCA Method B preliminary screening level of 700 µg/L.

- Total xylenes were detected in groundwater samples from wells 02MW-01 and 02MW-04 at concentrations of 3.84 and 263 µg/L, respectively, which are less than the MTCA Method B preliminary cleanup level of 10,000 µg/L.

4.3 PRODUCT SAMPLING

Passive skimmer pumps are currently installed in monitoring wells 01MW-05, 01MW-09, 01MW-23, 01MW-25, and 01MW-29. Product (if present) was not removed from the passive skimmers during fourth quarter 2005. In an effort to determine whether the product on site contains PCP, product samples from wells 01MW-16, 01MW-22, 01MW-23, 01MW-25, 01MW-28, and 01MW-29 were collected and analyzed for PCP. The product results are provided in Table 4. The results indicate that the product in all the wells sampled consists predominantly of diesel- and lube oil-range petroleum constituents and does not contain PCP. This information will be used to identify appropriate disposal options for product removed from the passive skimmers and during planned monthly batch vacuum extractions of product from site wells.

5.0 SUMMARY AND CONCLUSIONS

Gasoline-range petroleum hydrocarbons and benzene were detected at concentrations exceeding MTCA screening levels in wells on both properties in areas including the northern portion of the tank farm and the office building toward Commodore Way and in isolated areas to the north of Commodore Way, as shown on Figures 3, 5, and 6. On the south side of Commodore Way, diesel-range petroleum hydrocarbons also exceeded MTCA screening levels, as shown on Figure 7, but in a less widespread area of the tank farm. PCP exceeded the MTCA screening level where analyzed, but only in the former PCP mixing area (Figure 8). The maximum concentrations of gasoline-range petroleum hydrocarbons and benzene constituents occur in areas north and east of the office building on the 2737 Commodore Way property. Overall, concentrations of the petroleum constituents exceeding the MTCA preliminary screening levels are greater on the 2737 Commodore Way property than on the 2750 Commodore Way property (adjacent to the Ship Canal) and appear to decrease between the two areas. However, this decrease could reflect the distribution of monitoring well locations between the two areas.

In general, detected analytes were found to have decreased from levels observed in the third quarter of 2005 (July) on both the 2737 and 2750 Commodore Way properties (Table 3), with the exception of monitoring wells 01MW-03, 01MW-12, and 02MW-01. During fourth quarter 2005, there were no detections of target analytes in wells 02MW-02 or 02MW-07, which are located adjacent to the Ship Canal and downgradient from the site (Figure 4).

Due to only a 1-liter capacity and quarterly maintenance, the passive skimmer pumps are not able to remove a quantity of product that will have a measurable impact on the groundwater quality. Monthly batch vacuum extractions of product from site wells should be more effective in removing the product. Due to potential concentrations of PCP in the product, the vacuum extractions are scheduled to begin following the determination of a proper disposal method and facility. Based on the lack of PCP in the product, it is anticipated that vacuum extractions will be conducted in the near future to remove the product in areas where there is not a potential for the extractions to influence the PCP distribution in groundwater.

6.0 USE OF THIS REPORT

This quarterly groundwater report has been prepared by Landau Associates for the exclusive use of Time Oil for specific application to the Seattle Terminal No. 01-600 site. Services for this project were conducted in accordance with the Environmental Services Contract between Time Oil Co. and Landau Associates, Inc. Landau Associates has performed our services in accordance with generally accepted engineering and consulting standards for environmental work in effect at the time and locality services were performed. The reuse of information, conclusions, and recommendations provided herein by Time Oil or others in connection with any site other than the Seattle Terminal without Landau Associates' written permission shall be at the sole risk of Time Oil and without liability to Landau Associates.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.

Evalyn I. Albright
Senior Staff Environmental Scientist

Rebekah Brooks, L.G.
Associate Hydrogeologist

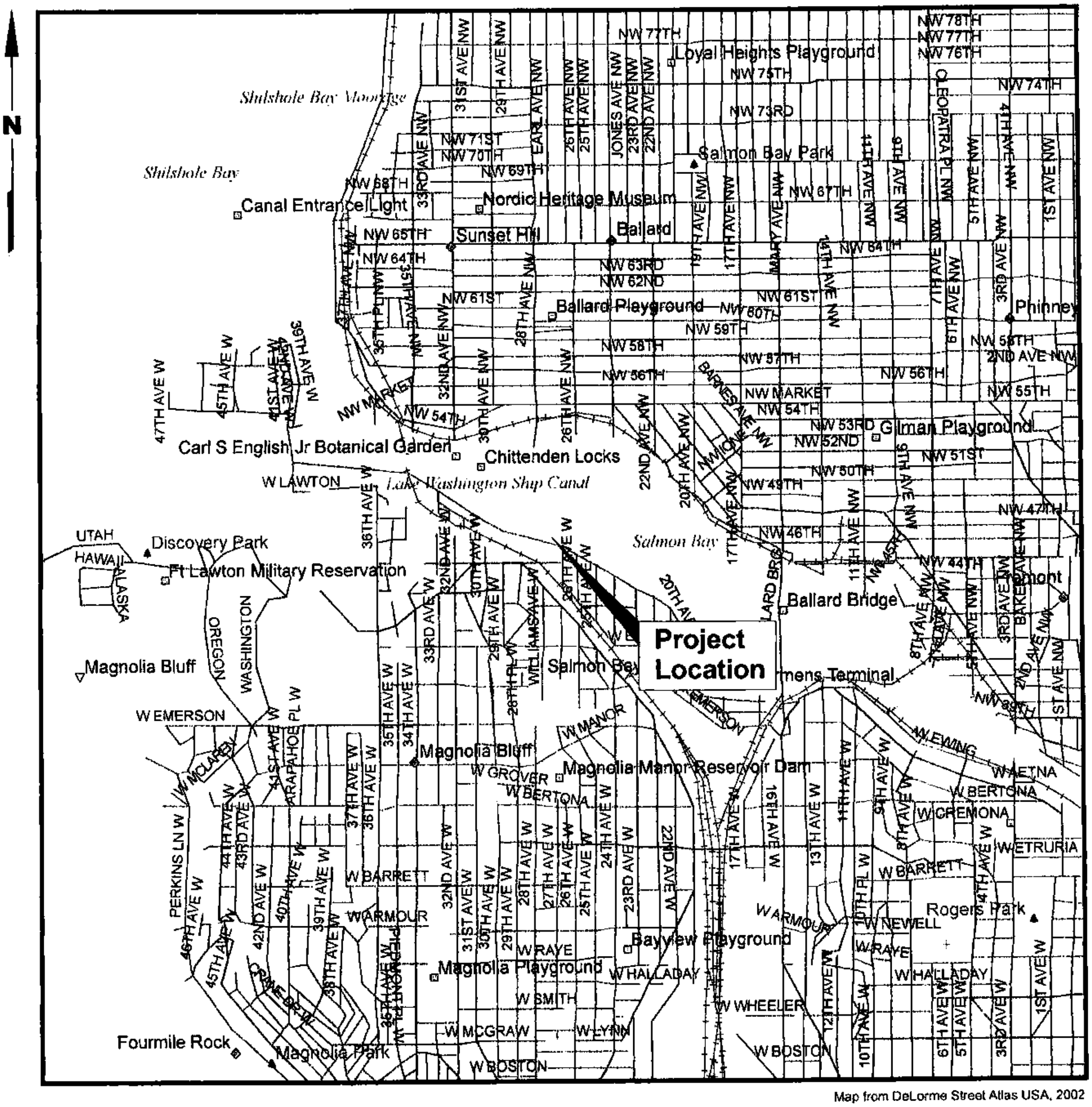
EIA/RB/ccy
No. 231028.010.011

7.0 REFERENCES

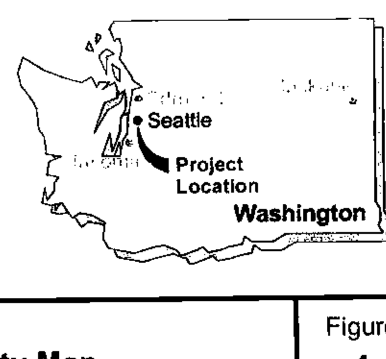
Ecology. 2001. *Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC.* Publication No. 94-06. Washington State Department of Ecology, Toxics Cleanup Program. Amended February 12.

Lenhard, R.J. and J.C. Parker. 1990. "Estimation of Free Hydrocarbon Volume from Fluid Levels in Monitoring Wells." *Groundwater.* Vol. 28, No. 1, pp. 57-67.

Tetra Tech. 2005. Draft: *Quarterly Groundwater Sampling Report for January 2005, 2737 West Commodore Way and 2750 West Commodore Way, Seattle, Washington.* March.



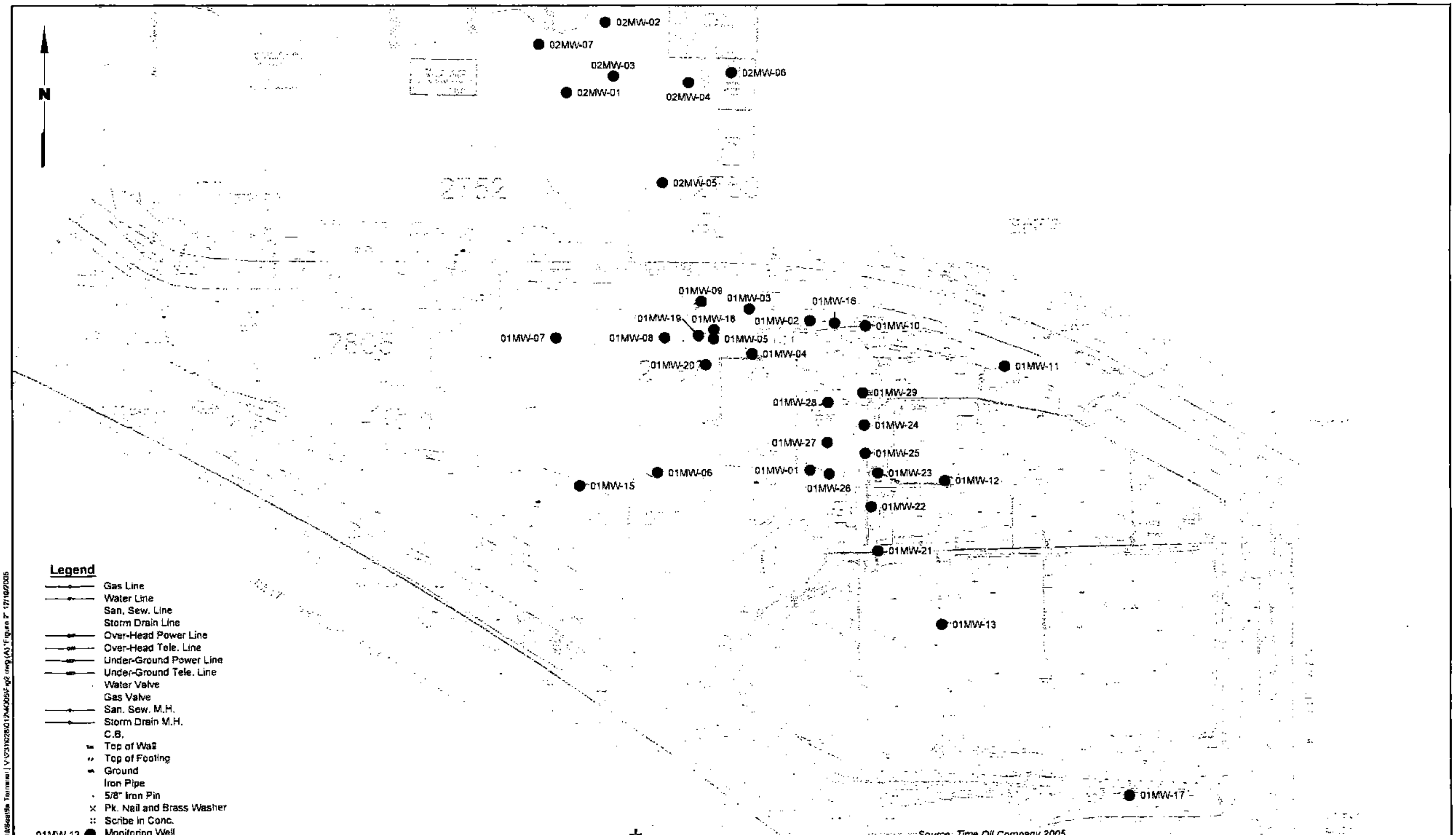
0 ½ 1
Scale in Miles



Time Oil/Seattle Terminal | V:\231\028\012\4Q05\Fig1.cdr 12/19/2005

LANDAU ASSOCIATES

Time Oil Seattle Terminal Seattle, Washington	**Vicinity Map**	Figure 1

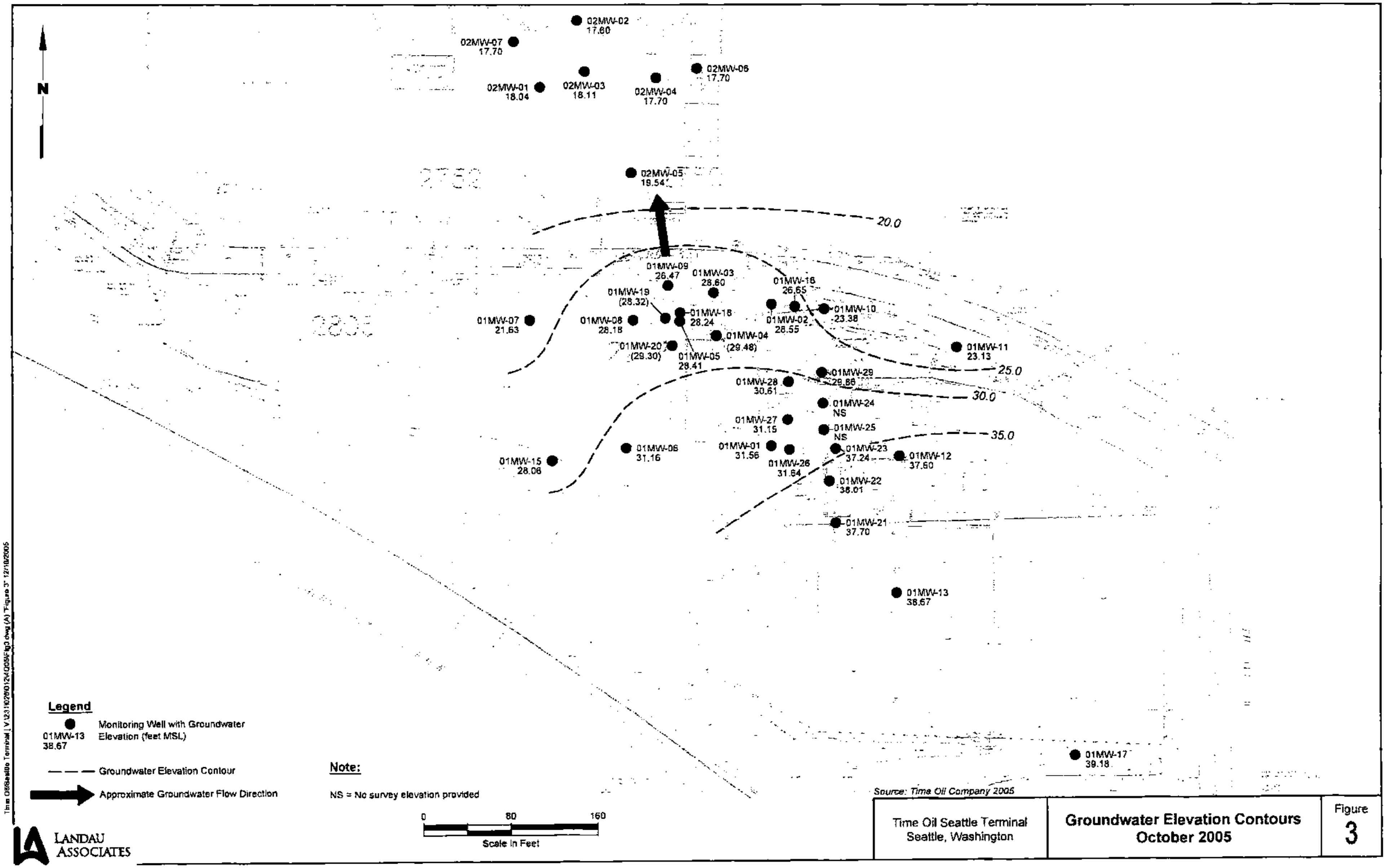


Time Oil Seattle Terminal
Seattle, Washington

Site Plan and Monitoring Well Locations

Figure 2

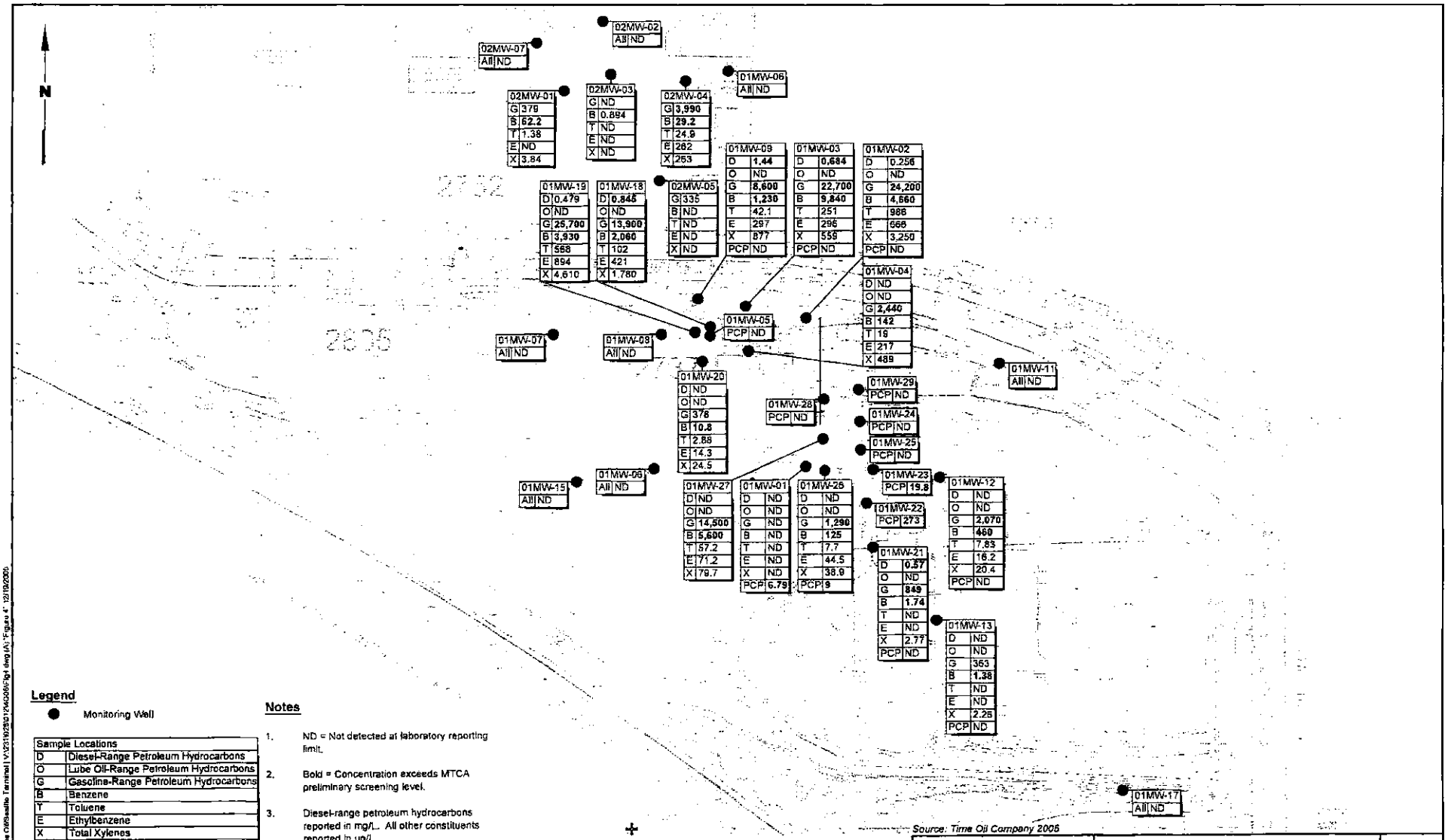
LANDAU ASSOCIATES



Time Oil Seattle Terminal
Seattle, Washington

Groundwater Elevation Contours
October 2005

Figure 3



Legend

- Monitoring Well

Sample Locations	
D	Diesel-Range Petroleum Hydrocarbons
O	Lube Oil-Range Petroleum Hydrocarbons
G	Gasoline-Range Petroleum Hydrocarbons
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total Xylenes
PCP	Pentachlorophenol

Notes

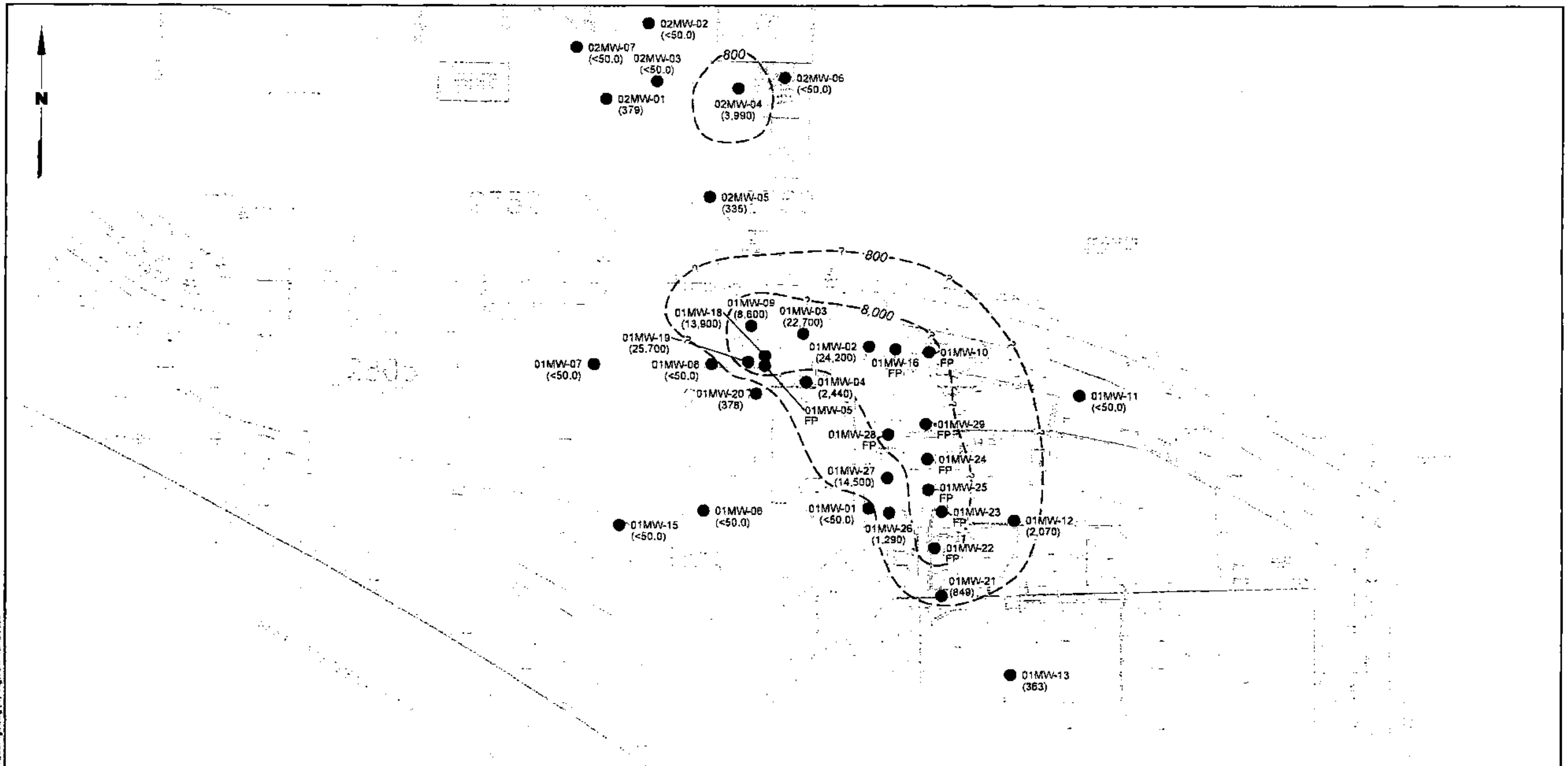
1. ND = Not detected at laboratory reporting limit.
2. Bold = Concentration exceeds MTCA preliminary screening level.
3. Diesel-range petroleum hydrocarbons reported in mg/L. All other constituents reported in µg/L.

LANDAU ASSOCIATES

Time Oil Seattle Terminal
Seattle, Washington

Groundwater Analytical Results
October 2005

Figure
4



Legend

●	Monitoring Well
01MW-13 (363)	Concentration of TPH-G in μg/L
μg/L	Micrograms per Liter
FP	Free Product Observed
— — —	TPH-G Concentration Contour

Notes:

1. < indicates constituent not detected at concentration shown.
2. The 800 μg/L contour is the preliminary screening level based on the MTCA Method A criteria for the protection of groundwater as drinking water.

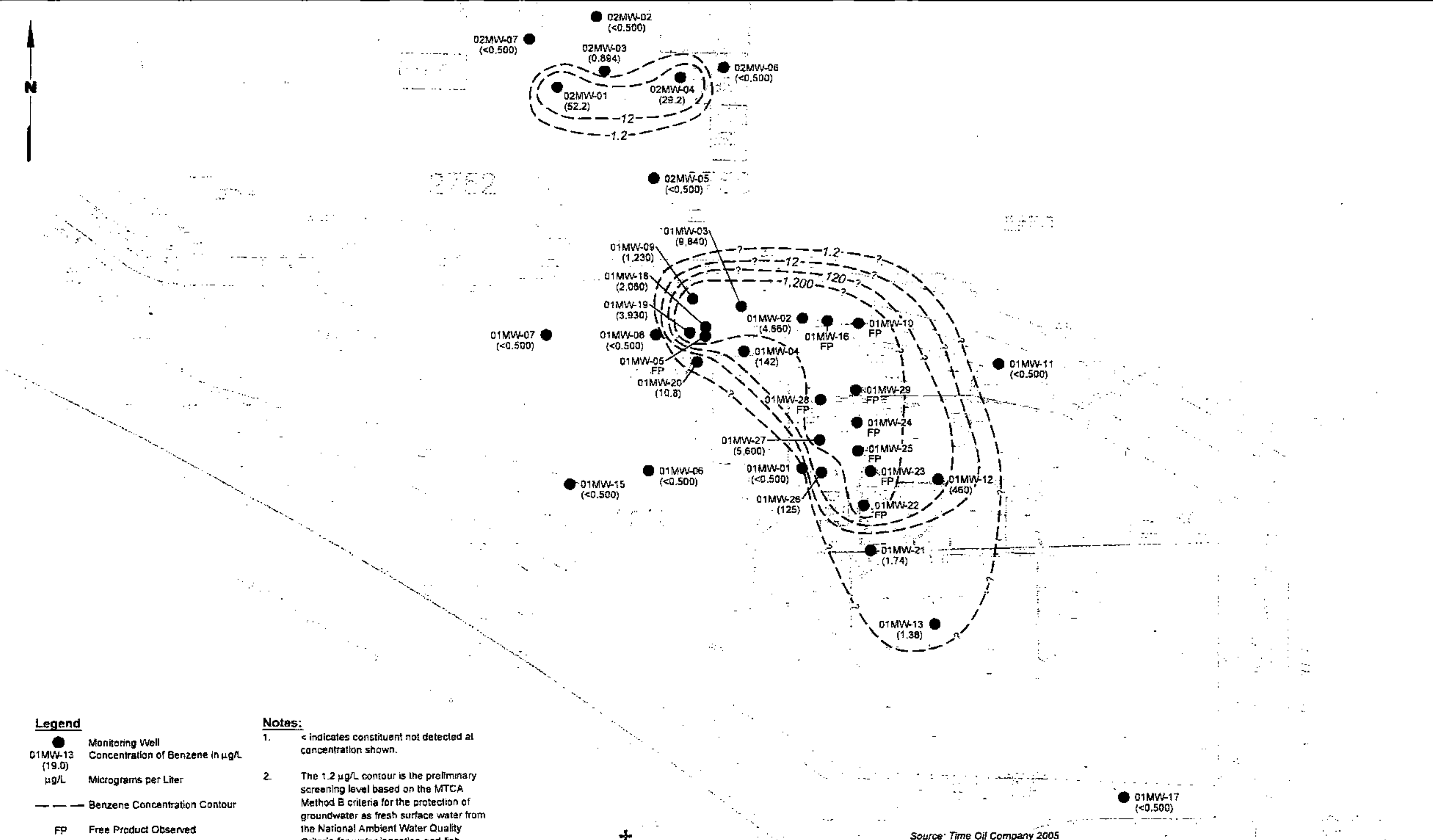
0 80 160
Scale in Feet

Source: Time Oil Company 2005

LANDAU ASSOCIATES

Time Oil Seattle Terminal Seattle, Washington	**Gasoline-Range Petroleum Hydrocarbons in Groundwater October 2005**	Figure **5**

Time Oil/Seattle Terminal | V:\231\028\012\4\D08\Fig5.dwg (A) "Figure 5" 12/19/2005



Legend

● 01MW-13 (19.0)	Monitoring Well; Concentration of Benzene in µg/L
µg/L	Micrograms per Liter
— — —	Benzene Concentration Contour
FP	Free Product Observed

Notes:

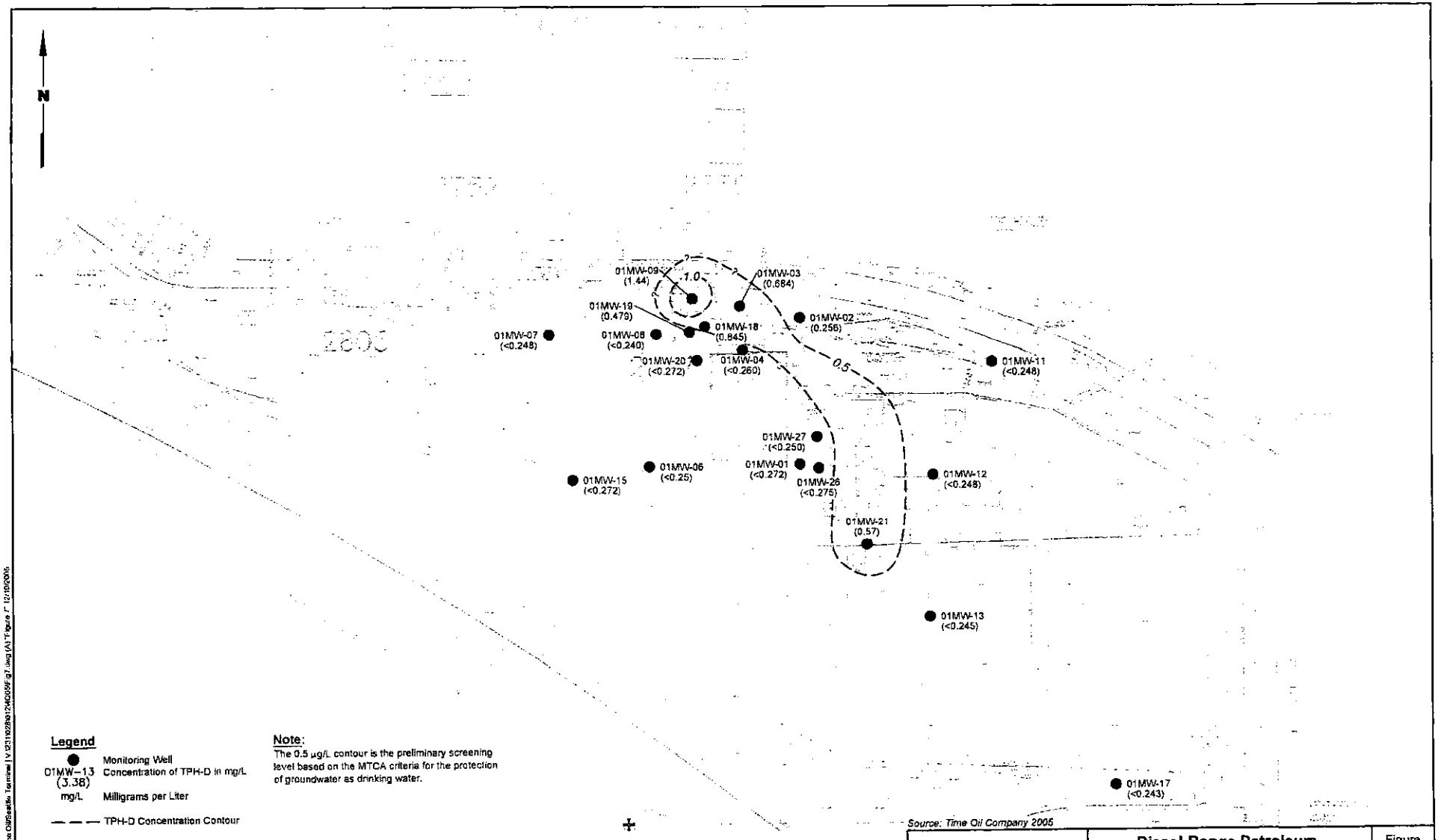
1. < indicates constituent not detected at concentration shown.
2. The 1.2 µg/L contour is the preliminary screening level based on the MTCA Method B criteria for the protection of groundwater as fresh surface water from the National Ambient Water Quality Criteria for water ingestion and fish consumption.

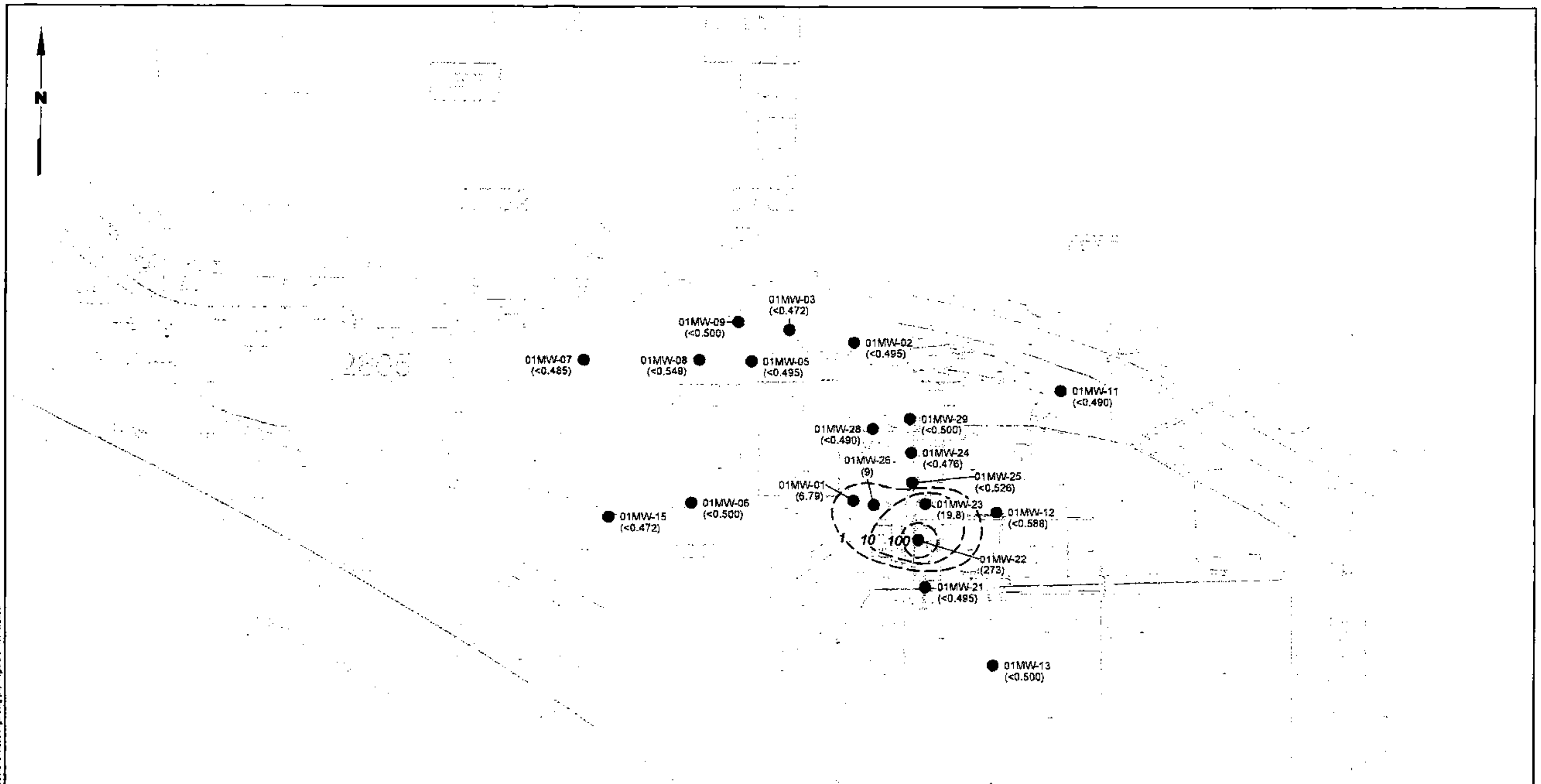
LANDAU ASSOCIATES

Time Oil Seattle Terminal
Seattle, Washington

Benzene in Groundwater
October 2005

Figure 6


N
01MW-09 (1.44)
1.0
01MW-03 (0.684)
01MW-19 (0.479)
01MW-18 (0.845)
01MW-02 (0.256)
01MW-07 (<0.248)
01MW-08 (<0.240)
01MW-20 (<0.272)
01MW-04 (<0.260)
0.5
01MW-11 (<0.248)
01MW-27 (<0.250)
01MW-15 (<0.272)
01MW-06 (<0.25)
01MW-01 (<0.272)
01MW-26 (<0.275)
01MW-12 (<0.248)
01MW-21 (0.57)
01MW-13 (<0.245)
01MW-17 (<0.243)
Legend
Monitoring Well
01MW-13 (3.38) Concentration of TPH-D in mg/L
mg/L Milligrams per Liter
TPH-D Concentration Contour
Note:
The 0.5 µg/L contour is the preliminary screening level based on the MTCA criteria for the protection of groundwater as drinking water.
0 80 160
Scale in Feet
Source: Time Oil Company 2005
LANDAU ASSOCIATES
Time Oil Seattle Terminal
Seattle, Washington
Diesel-Range Petroleum Hydrocarbons in Groundwater October 2005
Figure 7



Legend

● Monitoring Well

01MW-22 (273) Concentration of PCP in mg/L

mg/L Milligrams per Liter

— — — PCP Concentration Contour

Note:
The 0.5 µg/L contour is the preliminary screening level based on the MTCA criteria for the protection of groundwater as drinking water.

0 80 160
Scale in Feet

Source: Time Oil Company 2005

LANDAU ASSOCIATES

Time Oil Seattle Terminal Seattle, Washington	**PCP in Groundwater October 2005**	Figure 8

Time Oil/Seattle Terminal | V:\031\026\012\4\O05\Fig8.dwg (A) "Figure 8" 12/19/2006

TABLE 1
GROUNDWATER ELEVATIONS
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

Location	Well Casing Elevation	Time	Depth to Water	Depth to Product	Product Thickness	Groundwater Elevation	Comments
01MW-01	46.48	11:40	14.92			31.56	Product odor
01MW-02	44.78	12:20	16.23			28.55	Product odor
01MW-03	44.35	12:25	15.75			28.60	
01MW-04*	45.08	16:32	15.60			29.48	
01MW-05	45.40	12:45	19.45	16.38	3.07	28.41	Sheen, strong odor
01MW-06	47.74	9:39	16.58			31.16	Petroluem odor
01MW-07	45.17	9:52	23.54			21.63	
01MW-08	45.21	9:59	17.03			28.18	
01MW-09	43.91	10:05	17.44			26.47	Sheen, strong odor
01MW-10	45.02	11:55	23.47	21.18	2.29	23.38	Light colored product
01MW-11	46.10	10:10	22.97			23.13	Slight product odor
01MW-12	45.84	10:57	8.24			37.60	Strong product odor
01MW-13	46.36	9:32	7.69			38.67	
01MW-15	50.89	9:42	22.83			28.06	
01MW-16	44.95	12:10	19.40	18.03	1.37	26.65	Light colored product
01MW-17	59.42	9:27	20.24			39.18	
01MW-18	45.18	12:40	16.94			28.24	Strong product odor
01MW-19	45.35	12:30	17.03			28.32	Strong product odor
01MW-20	46.27	12:35	16.97			29.30	Strong product odor
01MW-21	46.21	10:20	8.51			37.70	Well under pressure; strong product odor
01MW-22	46.11	10:24	8.30	8.05	0.25	38.01	Dark black product
01MW-23	45.81	10:36	9.04	8.45	0.59	37.24	Dark black product
01MW-24	NS	11:05	9.37	9.10	0.27	---	Light colored product
01MW-25	NS	11:26	10.21	8.54	1.67	---	Dark black product
01MW-26	46.24	11:31	14.60			31.64	Product odor
01MW-27	46.33	11:43	15.18			31.15	Sheen on probe
01MW-28	45.54	11:48	16.50	14.54	1.96	30.61	Dark black product and light colored product
01MW-29	45.57	11:21	16.72	15.46	1.26	29.86	Light colored product
02MW-01	24.19	8:48	6.15			18.04	
02MW-02	20.06	8:28	2.46			17.60	
02MW-03	27.86	9:05	9.75			18.11	
02MW-04	27.17	9:01	9.47			17.70	
02MW-05	36.59	8:55	17.05			19.54	
02MW-06	26.54	8:58	8.84			17.70	
02MW-07	20.85	8:45	3.15			17.70	

All units in feet, mean sea level.

Where light nonaqueous phase liquid (LNAPL) thickness was measured, groundwater elevation was adjusted to account for the presence of LNAPL in the well using the method described in Lenhard and Parker (1990).

Water levels collected on 10/24/2005.

* Water level collected on 10/25/05.

NS - No survey elevation provided.

TABLE 2
GROUNDWATER ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	01MW-01 B5J0554-12 10/25/2005	01MW-02 B5J0554-08 10/25/2005	01MW-03 B5J0554-15 10/25/2005	01MW-04 B5J0554-16 10/25/2005	01MW-05 B5J0581-13 10/26/2005	01MW-06 B5J0554-09 10/25/2005	01MW-07 B5J0545-09 10/24/2005	01MW-08 B5J0554-01 10/25/2005
DIESEL-RANGE HYDROCARBONS									
NWTPH-Dx (mg/L)									
Diesel Range Hydrocarbons	0.5 (a)	0.272 U	**0.256**	**0.684**	0.260 U	NA	0.25 U	0.248 U	0.240 U
Lube Oil Range Hydrocarbons	0.5 (a)	0.543 U	0.476 U	0.532 U	0.521 U	NA	0.500 U	0.495 U	0.481 U
GASOLINE AND BTEX									
NWTPH-Gx AND EPA METHOD 8021B (µg/L)									
Gasoline Range Hydrocarbons	800 (a)	50.0 U	**24,200**	**22,700**	**2,440**	NA	50.0 U	50.0 U	50.0 U
Benzene	1.2 (b)	0.500 U	**4,660**	**9,840**	**142**	NA	0.500 U	0.500 U	0.500 U
Toluene	1000 (b)	0.500 U	**986**	**251**	**19**	NA	0.500 U	0.500 U	0.500 U
Ethylbenzene	700 (b)	0.500 U	**666**	**296**	**217**	NA	0.500 U	0.500 U	0.500 U
Xylenes (total)	10,000 (b)	1.00 U	**3,250**	**559**	**489**	NA	1.00 U	1.00 U	1.00 U
PENTACHLOROPHENOL (PCP)									
EPA Method 8270-SIM (µg/L)									
Pentachlorophenol	0.01 (b)	**6.79**	0.495 U	0.472 U	NA	0.495 U	0.500 U	0.485 U	0.549 U

TABLE 2
GROUNDWATER ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	01MW-09 B5J0554-05 10/25/2005	Dup of 01 MW - 09 01MW-59 B5J0554-06 10/25/2005	01MW-11 B5J0545-13 10/24/2005	01MW-12 B5J0554-11 10/25/2005	01MW-13 B5J0545-12 10/24/2005	01MW-15 B5J0554-02 10/25/2005	01MW-17 B5J0545-11 10/24/2005	01MW-18 B5J0554-07 10/25/2005
DIESEL-RANGE HYDROCARBONS									
NWTPH-Dx (mg/L)									
Diesel Range Hydrocarbons	0.5 (a)	**1.44** J	**0.619** J	0.248 U	0.248 U	0.245 U	0.272 U	0.243 U	**0.845**
Lube Oil Range Hydrocarbons	0.5 (a)	0.495 U	0.532 U	0.495 U	0.495 U	0.490 U	0.543 U	0.485 U	0.495 U
GASOLINE AND BTEX									
NWTPH-Gx AND EPA METHOD 8021B (µg/L)									
Gasoline Range Hydrocarbons	800 (a)	**8,600**	**9,480**	50.0 U	**2,070**	**363**	50.0 U	50.0 U	**13,900**
Benzene	1.2 (b)	**1,230**	**1,440**	0.500 U	**460**	**1.38**	0.500 U	0.500 U	**2,060**
Toluene	1000 (b)	**42.1**	**36.9**	0.500 U	**7.83**	0.500 U	0.500 U	0.500 U	**102**
Ethylbenzene	700 (b)	**297**	**285**	0.500 U	**16.2**	0.500 U	0.500 U	0.500 U	**421**
Xylenes (total)	10,000 (b)	**877**	**725**	1.00 U	**20.4**	**2.26**	1.00 U	1.00 U	**1,780**
PENTACHLOROPHENOL (PCP)									
EPA Method 8270-SIM (µg/L)									
Pentachlorophenol	0.01 (b)	0.500 U	0.485 U	0.490 U	0.588 U	0.500 U	0.472 U	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	01MW-19 B5J0554-14 10/25/2005	01MW-20 B5J0554-13 10/25/2005	01MW-21 B5J0554-10 10/25/2005	01MW-22 B5J0545-11 10/26/2005	01MW-23 B5J0581-03 10/26/2005	01MW-24 B5J0581-07 10/26/2005	01MW-25 B5J0581-05 10/26/2005
DIESEL-RANGE HYDROCARBONS								
NWTPH-Dx (mg/L)								
Diesel Range Hydrocarbons	0.5 (a)	**0.479**	0.272 U	**0.57**	NA	NA	NA	NA
Lube Oil Range Hydrocarbons	0.5 (a)	0.500 U	0.543 U	0.481 U	NA	NA	NA	NA
GASOLINE AND BTEX								
NWTPH-Gx AND EPA METHOD 8021B (µg/L)								
Gasoline Range Hydrocarbons	800 (a)	**25,700**	**378**	**849**	NA	NA	NA	NA
Benzene	1.2 (b)	**3,930**	**10.8**	**1.74**	NA	NA	NA	NA
Toluene	1000 (b)	**568**	**2.88**	0.500 U	NA	NA	NA	NA
Ethylbenzene	700 (b)	**894**	**14.3**	0.500 U	NA	NA	NA	NA
Xylenes (total)	10,000 (b)	**4,610**	**24.5**	**2.77**	NA	NA	NA	NA
PENTACHLOROPHENOL (PCP)								
EPA Method 8270-SIM (µg/L)								
Pentachlorophenol	0.01 (b)	NA	NA	0.495 U	**273**	**19.8**	0.476 U	0.526 U

TABLE 2
GROUNDWATER ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	01MW-26 B5J0554-03 10/25/2005	01MW-27 B5J0554-04 10/25/2005	01MW-28 B5J0581-10 10/26/2005	01MW-29 B5J0581-08 10/26/2005	02MW-01 B5J0545-03 10/24/2005	02MW-02 B5J0545-01 10/24/2005	02MW-03 B5J0545-06 10/24/2005
DIESEL-RANGE HYDROCARBONS								
NWTPH-Dx (mg/L)								
Diesel Range Hydrocarbons	0.5 (a)	0.275 U	0.250 U	NA	NA	NA	NA	NA
Lube Oil Range Hydrocarbons	0.5 (a)	0.549 U	0.500 U	NA	NA	NA	NA	NA
GASOLINE AND BTEX								
NWTPH-Gx AND EPA METHOD 8021B (µg/L)								
Gasoline Range Hydrocarbons	800 (a)	**1,290**	**14,500**	NA	NA	**379**	50.0 U	50.0 U
Benzene	1.2 (b)	**125**	**5,600**	NA	NA	**52.2**	0.500 U	**0.894**
Toluene	1000 (b)	**7.7**	**57.2**	NA	NA	**1.38**	0.500 U	0.500 U
Ethylbenzene	700 (b)	**44.5**	**71.2**	NA	NA	0.500 U	0.500 U	0.500 U
Xylenes (total)	10,000 (b)	**38.9**	**79.7**	NA	NA	**3.84**	1.00 U	1.00 U
PENTACHLOROPHENOL (PCP)								
EPA Method 8270-SIM (µg/L)								
Pentachlorophenol	0.01 (b)	**9**	NA	0.490 U	0.500 U	NA	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	02MW-04 B5J0545-08 10/24/2005	02MW-05 B5J0545-05 10/24/2005	Dup of 02MW-05 02MW-25 B5J0545-04 10/24/2005	02MW-06 B5J0545-07 10/24/2005	02MW-07 B5J0545-02 10/24/2005
DIESEL-RANGE HYDROCARBONS						
NWTPH-Dx (mg/L)						
Diesel Range Hydrocarbons	0.5 (a)	NA	NA	NA	NA	NA
Lube Oil Range Hydrocarbons	0.5 (a)	NA	NA	NA	NA	NA
GASOLINE AND BTEX						
NWTPH-Gx AND EPA METHOD 8021B (µg/L)						
Gasoline Range Hydrocarbons	800 (a)	**3,990** J	**335**	**316**	50.0 U	50.0 U
Benzene	1.2 (b)	**29.2**	0.500 U	0.500 U	0.500 U	0.500 U
Toluene	1000 (b)	**24.9**	0.500 U	0.500 U	0.500 U	0.500 U
Ethylbenzene	700 (b)	**262**	0.500 U	0.500 U	0.500 U	0.500 U
Xylenes (total)	10,000 (b)	**263**	1.00 U	1.00 U	1.00 U	1.00 U
PENTACHLOROPHENOL (PCP)						
EPA Method 8270-SIM (µg/L)						
Pentachlorophenol	0.01 (b)	NA	NA	NA	NA	NA

Notes:
(a) Model Toxics Control Act (MTCA) Method A criteria for the protection of groundwater as drinking water
(b) Model Toxics Control Act (MTCA) Method B criteria for the protection of groundwater as fresh surface water. Values based on ambient water quality criteria for the protection of human health
NA = Indicates the compound was not analyzed for this sample
Bold indicates the compound was detected above the laboratory reporting limit
Box indicates exceedance of screening criteria
U = Indicates the compound was undetected at the reported concentration
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 3
CUMULATIVE GROUNDWATER ANALYTICAL RESULTS
JANUARY 2005 TO PRESENT TIME OIL #01-600 SEATTLE TERMINAL

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)
MTCA Screening Level		*0.01 (b)*	*0.5 (a)*	*0.5 (a)*	*800 (a)*	*1.2 (b)*	*1000 (b)*	*700 (b)*	*10,000 (a)*
01MW-02	01/05/2005	NA	**0.433**	< 0.500	**31,300**	**12,600**	**218**	**290**	**1,000**
01MW-02	04/25/2005	NA	**2.06**	< 0.500	**33,400**	**16,100**	**355**	**457**	**1,340**
01MW-02	07/26/2005	NA	**2.21**	< 0.500	**27,600**	**10,400**	**735**	**664**	**2,570**
01MW-02	10/25/2005	< 0.495	**0.256**	< 0.476	**24,200**	**4,660**	**986**	**666**	**3,250**
01MW-03	01/05/2005	NA	**0.762**	< 0.500	**2,720**	**729**	**17.1**	**32.6**	**24.7**
01MW-03	04/25/2005	NA	**1.12**	< 0.500	**5,690**	**2,550**	**13.4**	**23.5**	**27.1**
01MW-03	07/26/2005	NA	**0.998**	< 0.500	**4,200**	**957**	**13.4**	**10.5**	**35.3**
01MW-03	10/25/2005	< 0.472	**0.684**	< 0.532	**22,700**	**9,840**	**251**	**296**	**559**
01MW-08	01/05/2005	NA	< 0.250	< 0.500	< 50.0	**0.582**	< 0.500	< 0.500	< 1.00
01MW-08	04/25/2005	NA	**0.833**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-08	07/26/2005	NA	**0.422**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-08	10/25/2005	< 0.549	< 0.240	< 0.481	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-09	01/05/2005	NA	**0.646**	< 0.500	**6,300**	**1,130**	**45.7**	**231**	**872**
01MW-09	04/25/2005	NA	**1.78**	< 0.500	**7,620**	**1,200**	**63.4**	**281**	**972**
01MW-09	07/26/2005	NA	**20.9**	< 0.500	**9,450**	**900**	**41.9**	**261**	**964**
01MW-09 DUP	07/26/2005	NA	**5.1**	< 1.00	**9,840**	**1,160**	**47.1**	**304**	**1,110**
01MW-09	10/25/2005	< 0.500	**1.44**	< 0.495	**8,600**	**1,230**	**42.1**	**297**	**877**
01MW-09 DUP	10/25/2005	< 0.485	**0.619**	< 0.532	**9,480**	**1,440**	**36.9**	**285**	**725**
01MW-11	01/05/2005	NA	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-11	04/25/2005	NA	**1.23**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-11	07/26/2005	NA	**1.19**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-11	10/24/2005	< 0.490	< 0.248	< 0.495	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-12	01/05/2005	NA	**0.294**	< 0.500	**1,090**	**195**	**5.48**	**14.8**	**13**
01MW-12	04/25/2005	NA	**5.76**	< 2.50	**1,650**	**372**	**4.36**	**15.4**	**13.5**
01MW-12	07/26/2005	NA	**7.14**	**1.25**	**1,800**	**419**	**6.87**	**16.3**	**21.2**
01MW-12	10/25/2005	< 0.588	< 0.248	< 0.495	**2,070**	**460**	**7.83**	**16.2**	**20.4**

TABLE 3
CUMULATIVE GROUNDWATER ANALYTICAL RESULTS
JANUARY 2005 TO PRESENT TIME OIL #01-600 SEATTLE TERMINAL

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)
MTCA Screening Level		*0.01 (b)*	*0.5 (a)*	*0.5 (a)*	*800 (a)*	*1.2 (b)*	*1000 (b)*	*700 (b)*	*10,000 (a)*
01MW-13	01/05/2005	NA	< 0.250	< 0.500	**376**	**1.99**	< 0.500	**1.03**	**1.24**
01MW-13	04/25/2005	NA	**3.38**	< 0.500	**374**	**2.28**	< 0.500	**1.49**	**2.51**
01MW-13	07/26/2005	NA	**4.7**	**1.23**	**522**	**2.08**	< 0.500	**0.864**	**3.69**
01MW-13	10/24/2005	< 0.500	< 0.245	< 0.490	**363**	**1.38**	< 0.500	< 0.500	**2.26**
01MW-17	01/05/2005	NA	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-17	04/25/2005	NA	**0.472**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-17	07/26/2005	NA	**0.49**	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-17	10/24/2005	NA	< 0.243	< 0.485	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
01MW-26	01/05/2005	**21.3**	0.296	< 0.500	**1,050**	**98.6**	**6.16**	**40.1**	**45.4**
01MW-26	01/05/2005	**15.7**	< 0.250	< 0.500	**976**	**96.7**	**6.14**	**39.5**	**29.9**
01MW-26	04/25/2005	**16.9**	**1.88**	< 0.500	**827**	**74.5**	**5.51**	**23.8**	**33.0**
01MW-26	07/26/2005	**22.1**	**1.96**	**0.561**	**1,280**	**92.6**	**10.5**	**43.4**	**88.6**
01MW-26	10/25/2005	**9**	< 0.275	< 0.549	**1,290**	**125**	**7.7**	**44.5**	**38.9**
02MW-01	01/05/2005	NA	< 0.250	< 0.500	**172**	**51.5**	**1.01**	< 0.500	**2.53**
02MW-01	04/25/2005	NA	NA	NA	**188**	**36.2**	**0.863**	< 0.500	**1.86**
02MW-01	07/26/2005	NA	NA	NA	**205**	**48.9**	**1.04**	< 0.500	**2.3**
02MW-01	10/24/2005	NA	NA	NA	**379**	**52.2**	**1.38**	< 0.500	**3.84**
02MW-02	01/05/2005	NA	< 0.250	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
02MW-02	04/25/2005	NA	NA	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
02MW-02	07/26/2005	NA	NA	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
02MW-02	10/24/2005	NA	NA	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
02MW-04	01/05/2005	NA	< 0.250	< 0.500	**2,610**	**20.5**	**18.2**	**190**	**139**
02MW-04 DUP	01/05/2005	NA	< 0.250	< 0.500	**2,760**	**20.1**	**15.8**	**179**	**124**
02MW-04	04/25/2005	NA	NA	NA	**3,830**	**19.0**	**45.1**	**292**	**488**
02MW-04 DUP	04/25/2005	NA	NA	NA	**4,330**	**20.2**	**49.1**	**337**	**465**
02MW-04	07/26/2005	NA	NA	NA	**6,580**	**25.5**	**51**	**411**	**801**
02MW-04	10/24/2005	NA	NA	NA	**3,990**	**29.2**	**24.9**	**262**	**263**

TABLE 3
CUMULATIVE GROUNDWATER ANALYTICAL RESULTS
JANUARY 2005 TO PRESENT TIME OIL #01-600 SEATTLE TERMINAL

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)
MTCA Screening Level		*0.01 (b)*	*0.5 (a)*	*0.5 (a)*	*800 (a)*	*1.2 (b)*	*1000 (b)*	*700 (b)*	*10,000 (a)*
02MW-05	01/05/2005	NA	< 0.250	< 0.500	**310**	< 0.500	< 0.500	< 0.500	< 1.00
02MW-05	04/25/2005	NA	NA	NA	**575**	**0.922**	< 0.500	< 0.500	< 1.00
02MW-05	07/26/2005	NA	NA	NA	**503**	**0.781**	< 0.500	**0.54**	**1.08**
02MW-05 DUP	07/26/2005	NA	NA	NA	**505**	**0.727**	< 0.500	< 0.500	< 1.00
02MW-05	10/24/2005	NA	NA	NA	**335**	< 0.500	< 0.500	< 0.500	< 1.00
02MW-05 DUP	10/24/2005	NA	NA	NA	**316**	< 0.500	< 0.500	< 0.500	< 1.00
02MW-07	01/05/2005	NA	< 0.250	NA	**236**	< 0.500	< 0.500	< 0.500	**2.1**
02MW-07	04/25/2005	NA	NA	NA	**319**	< 0.500	< 0.500	**0.662**	**3.42**
02MW-07	07/26/2005	NA	NA	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00
02MW-07	10/24/2005	NA	NA	NA	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00

Notes:

NA = Indicates the compound was not analyzed for this sample.

< symbol indicates result is less than reporting limit.

(a) Model Toxics Control Act (MTCA) Method A criteria for the protection of groundwater as drinking water.

(b) Model Toxics Control Act (MTCA) Method B criteria for the protection of groundwater as fresh surface water. Values based on ambient water quality criteria for the protection of human health.

Bold indicates the compound was detected above the laboratory reporting limit.

Box indicates exceedance of screening criteria.

TABLE 4
PRODUCT ANALYTICAL DATA
TIME OIL SITE #01-600 - SEATTLE TERMINAL
SEATTLE, WASHINGTON

	Screening Criteria	01MW-16	01MW-22 B5J0545-11 10/26/2005	01MW-23 B5J0581-03 10/26/2005	01MW-25 B5J0581-05 10/26/2005	01MW-28 B5J0581-10 10/26/2005	01MW-29 B5J0581-08 10/26/2005
GROUNDWATER:							
PENTACHLOROPHENOL (PCP) **EPA Method 8270-SIM (µg/L)**							
Pentachlorophenol	0.01 (b)	NS	**273**	**19.8**	0.526 U	0.490 U	0.500 U
		01MW-16 PRODUCT B5J0581-12 10/26/2005	01MW-22 PRODUCT B5J0581-02 10/26/2005	01MW-23 PRODUCT B5J0581-04 10/26/2005	01MW-25 PRODUCT B5J0581-06 10/26/2005	01MW-28 PRODUCT B5J0581-11 10/26/2005	01MW-29 PRODUCT B5J0581-09 10/26/2005
PRODUCT:							
PENTACHLOROPHENOL (mg/kg) **EPA 8270 Mod**							
PCP		375 U	375 U	375 U	375 U	375 U	375 U
PETROLEUM HYDROCARBONS (mg/kg) **NWTPH-HCID**							
Diesel Range Hydrocarbons		**DET**	**DET** J	**DET**	**DET**	**DET**	**DET**
Gx Range Hydrocarbons		2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
Heavy Fuel Oil Range Hydrocarbons		10000 U	10000 U	10000 U	10000 U	10000 U	10000 U
Insulating Oil Range Hydrocarbons		10000 U	10000 U	10000 U	10000 U	10000 U	10000 U
Kerosene Range Hydrocarbons		5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Lube Oil Range Hydrocarbons		10000 U	**DET**	**DET**	**DET**	10000 U	10000 U

Notes:
(a) Model Toxics Control Act (MTCA) Method A criteria for the protection of groundwater as drinking water
(b) Model Toxics Control Act (MTCA) Method B criteria for the protection of groundwater as fresh surface water. Values based on ambient water quality criteria for the protection of human health
NA = Indicates the compound was not analyzed for this sample
NS = Not sampled.
Bold indicates the compound was detected above the laboratory reporting limit
Box indicates exceedance of screening criteria.
U = Indicates the compound was undetected at the reported concentration
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
DET indicates the compound was detected.