



2100.26.117

ADEC File No.

# INITIAL VAPOR INTRUSION EVALUATION REPORT

**FORMER UNOCAL SERVICE STATION 4652  
CHEVRON SITE 30-6448  
1441 C STREET  
ANCHORAGE, ALASKA  
FILE ID: 2100.26.117**

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CONSERVATION

Prepared For:

**Mr. Robert Weimer**

**Alaska Department of Environmental Conservation**

Nicole Taylor  
Staff Geologist

Brian Duggan, P.E.  
Project Engineer

**FEBRUARY 26, 2010  
REF. NO. 621049 (7)**

**Prepared by:  
Conestoga-Rovers  
& Associates**

2420 West 26th Ave, Suite 450-D  
Denver, CO 80211

Office: 720-975-9120  
Fax: 720-975-9150



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& ASSOCIATES**

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BTEX	Benzene, toluene, ethylbenzene, and xylenes
Chevron	Chevron Environmental Management Company
COC	Chemicals of Concern
CRA	Conestoga-Rovers & Associates
CSM	Conceptual Site Model
DRO	Diesel range organics
fbg	Feet below grade
ft	Feet
GRO	Gasoline range organics
LNAPL	Light non-aqueous phase liquids
mg/l	Milligrams per liter
mg/kg	Milligrams per kilogram
P.E.	Professional Engineer
SVE	Soil Vapor Extraction
TPH	Total Petroleum Hydrocarbons
UST	Underground storage tank
yd <sup>3</sup>	Cubic Yards



## **1.0 INTRODUCTION**

Conestoga-Rovers & Associates (CRA) is submitting this *Vapor Intrusion Evaluation Report* to the Alaska Department of Environmental Conservation (ADEC) on behalf of Chevron Environmental Management Company (Chevron) for Chevron Site 30-6448 in Anchorage, Alaska. CRA evaluated site conditions to determine if additional vapor intrusion pathway investigation was required based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). The site background, site conditions, vapor intrusion pathway evaluation, conclusions and recommendations, and references are presented below.

## **2.0 SITE DESCRIPTION AND BACKGROUND**

### **2.1 SITE DESCRIPTION**

The site is a former Unocal service station located at 1441 C Street on the northeast corner of West 15<sup>th</sup> Avenue and C Street in Anchorage, Alaska (Figure 1). The property legal description is THIRD ADDITION BLK 31D LT 7A. The site latitude and longitude is approximately 61.208085 north and 149.887301 west. Former Unocal facilities consisted of three underground storage tanks (USTs), dispenser islands, and associated piping. The site was demolished in 1987 and is currently a fenced, vacant lot. The site environmental history is included as Appendix A.

### **2.2 REGIONAL AND SITE GEOLOGY**

Anchorage area bedrock consists of Mesozoic metamorphic and igneous rocks overlain by densely consolidated sediments of the Kenai Group. A series of marine transgressive sequences combined with fluvial sediments, deposited in a lacustrine environment and created by ice fronts surrounding the Anchorage area, are overlain by the most recent glacial sediments. Holocene glacial till deposits from the Matanuska-Susitna Valley underlay the upper portions of the subsurface. Lowland glacial sediments have been reported to reach thicknesses of up to 1,500 feet (ft). The Anchorage area is a glacial lowland defined by the Chugach Mountains to the southeast. The Chugach Mountains are approximately six miles east of the site. Site subsurface sediments primarily consist of sand with gravel to approximately 5 feet below grade (fbg), sandy to clayey silts to approximately 12 fbg, and silty clay from the Bootlegger Cove Formation to the total explored depth of 15 fbg.



### **2.3 HYDROGEOLOGY**

The site is located in south central Alaska between the northern Knik Arm and the southern Turnagain Arm of Cook Inlet. Cook Inlet is located approximately three miles downgradient from the site. Chester Creek is located approximately 1,200 ft downgradient from the site. The average annual precipitation rate in Anchorage is estimated at 15.9 inches per year, September is typically the wettest month. Historical static groundwater depths have ranged between 3.33 (MW-7) to 14.11 fbg (MW-16) according to groundwater data from 1986 to present. Historically groundwater flows to the southeast. The August 2009 groundwater elevation contour map is presented as Figure 2. A summary of historical groundwater analytical results is presented in Table 1.

### **2.4 CONCEPTUAL SITE MODEL SUMMARY**

A site-specific Conceptual Site Model (CSM) was submitted to the ADEC on December 10, 2007. Incidental soil ingestion, ingestion of groundwater, inhalation of outdoor air, and inhalation of indoor air were determined to be complete pathways. Dermal absorption is not a complete pathway because none of the skin permeating constituents listed on the scoping form were released onsite. Potential human receptors include commercial or industrial workers, construction workers, and site visitors or trespassers.

## **3.0 SITE CONDITIONS**

Petroleum hydrocarbons are presumed to have originated from leaks in the USTs, dispensers, and product piping. A leak occurred in one UST on July 25, 1986 due to a defective in-line leak detector. On the east boundary of the property a six inch jet fuel pipeline reported leaks in 1989 and 1990. There have been no recorded spills at the site. The site environmental history is included as Appendix A.

### **3.1 SOIL QUALITY**

During the 2008 subsurface investigation, petroleum hydrocarbons were detected above ADEC Method II Cleanup Levels (*Title 18 Alaska Administrative Code (AAC) 75.341*) in eight of the ten borings drilled onsite. Diesel range organics (DRO) was detected at a maximum concentration of 580 milligrams per kilogram (mg/kg) in sample SS-4-3. Sample SS-7-9 contained the maximum concentration of gasoline range organics (GRO)



at 480 mg/kg. Benzene was detected at a maximum concentration of 3.2 mg/kg in sample SS-8-12.

### **3.2 GROUNDWATER QUALITY**

No DRO, GRO, or benzene, toluene, ethylbenzene and xylene (BTEX) was detected above ADEC Table C Groundwater Cleanup Levels (*Title 18 AAC 75.345*) in samples MW-22 and MW-23, during the most recent groundwater sampling event in August 2009. Sample MW-20 contained the maximum concentration of DRO (2.6 milligrams per liter (mg/l)) and GRO (18 mg/l). The maximum benzene concentration was 0.22 mg/l in sample MW-11A. A summary of historical groundwater analytical results is presented in Table 1.

### **3.3 EXTENT OF PETROLEUM HYDROCARBONS**

DRO, GRO, and benzene are the primary chemicals of concern (COCs) at the site. Results from the 2008 investigation indicate petroleum hydrocarbons remain in soil on the southern, eastern and western portions of the site. Soil and groundwater results from offsite monitoring wells MW-21, MW-22, and MW-23 indicate that petroleum hydrocarbons are not migrating offsite. The groundwater plume has been delineated and appears to have stabilized.



#### 4.0 VAPOR INTRUSION PATHWAY EVALUATION

##### 4.1 INDOOR AIR INHALATION PATHWAY

The ADEC defines vapor intrusion as the migration of volatile chemicals from a subsurface vapor source into overlying buildings (ADEC, 2009). Inhalation of indoor air is a complete pathway based on the presence of volatile compounds in soil and groundwater; and occupied buildings are present within 100 ft of the soil or groundwater plumes.

##### 4.2 VAPOR INTRUSION EVALUATION CRITERIA

The ADEC requires additional vapor intrusion pathway investigation when one or more of the following conditions exist:

- Light non-aqueous phase liquid (LNAPL) is present in close proximity to structures (30 ft from a petroleum source, and 100 ft from a non-petroleum source);
- Volatile chemical concentrations in groundwater exceed the ADEC Groundwater Target Levels (ADEC, 2009, Appendix G) in close proximity to structures, and static groundwater depth is less than 20 fbg;
- Volatile chemical concentrations in soil gas exceed the ADEC Shallow and Deep Soil Gas Target Levels (ADEC, 2009, Appendix E & F).

##### 4.3 SITE VAPOR INTRUSION RISK

No vapor intrusion risk was identified based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). LNAPL has not been observed in site wells. Volatile chemical concentrations in groundwater samples exceed the ADEC Groundwater Target Levels in three onsite monitoring wells. Occupied structures are greater than 30 ft from the petroleum hydrocarbon plume.





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## 5.0 CONCLUSIONS AND RECOMMENDATIONS

CRA evaluated site conditions to determine if additional vapor intrusion pathway investigation was warranted based on the ADEC Draft Vapor Intrusion Guidance for Contaminated Sites (ADEC, 2009). DRO, GRO and benzene have been identified in soil and groundwater above cleanup levels. The vapor intrusion pathway is complete but does not warrant additional investigation based on the plume's distance to offsite commercial or residential buildings. CRA recommends no additional vapor intrusion pathway investigation based on available site data. The CSM and vapor intrusion evaluation will be revised as needed when new site data is acquired.



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& ASSOCIATES**

## 6.0 REFERENCES

Rittenhouse-Zeman and Associates, *Subsurface Product Loss Evaluation*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, September 1986.

Rittenhouse-Zeman and Associates, *Contamination Assessment Report*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, December 1988.

Rittenhouse-Zeman and Associates, *Supplemental Contamination Assessment*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, April 1989.

ICF Technology and Clement Associates, *Risk Assessment and Derivation of Target Cleanup Levels*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, May 1990.

GeoEngineers, *Site Hydrogeological Characterization*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, July 1996.

Shannon and Wilson, Incorporated, *Phase II Environmental Assessment*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, March 1998.

GeoEngineers, *Report of Remedial Activities*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, September 2003.

OilRisk Consultants, *Monitoring Well Installation Report*, Unocal Service Station No. 4652, 1441 C Street, Anchorage, Alaska, March 2005.

United States Environmental Protection Agency, *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, November 29, 2009.

Alaska Department of Environmental Conservation Division of Spill Prevention and Response, *Draft Vapor Intrusion Guidance for Contaminated Sites*, July, 2004

FIGURES

FIGURE 1: VICINITY MAP

FIGURE 2: GROUNDWATER ELEVATION CONTOUR MAP

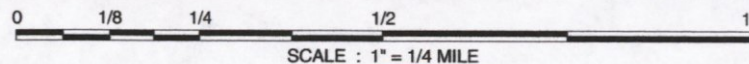


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SOURCE: TOPOI MAPS

FIGURE  
**1**



SCALE : 1" = 1/4 MILE

**Former Unocal Station 4652**  
1441 C Street  
Anchorage, Alaska



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**Vicinity Map**

EXPLANATION	
MW-5 ●	Monitoring well location
B-9 ■	Destroyed well location
64.43	Groundwater elevation
63.00 ———	Groundwater elevation contour line (dashed where inferred)
	Groundwater flow direction and gradient

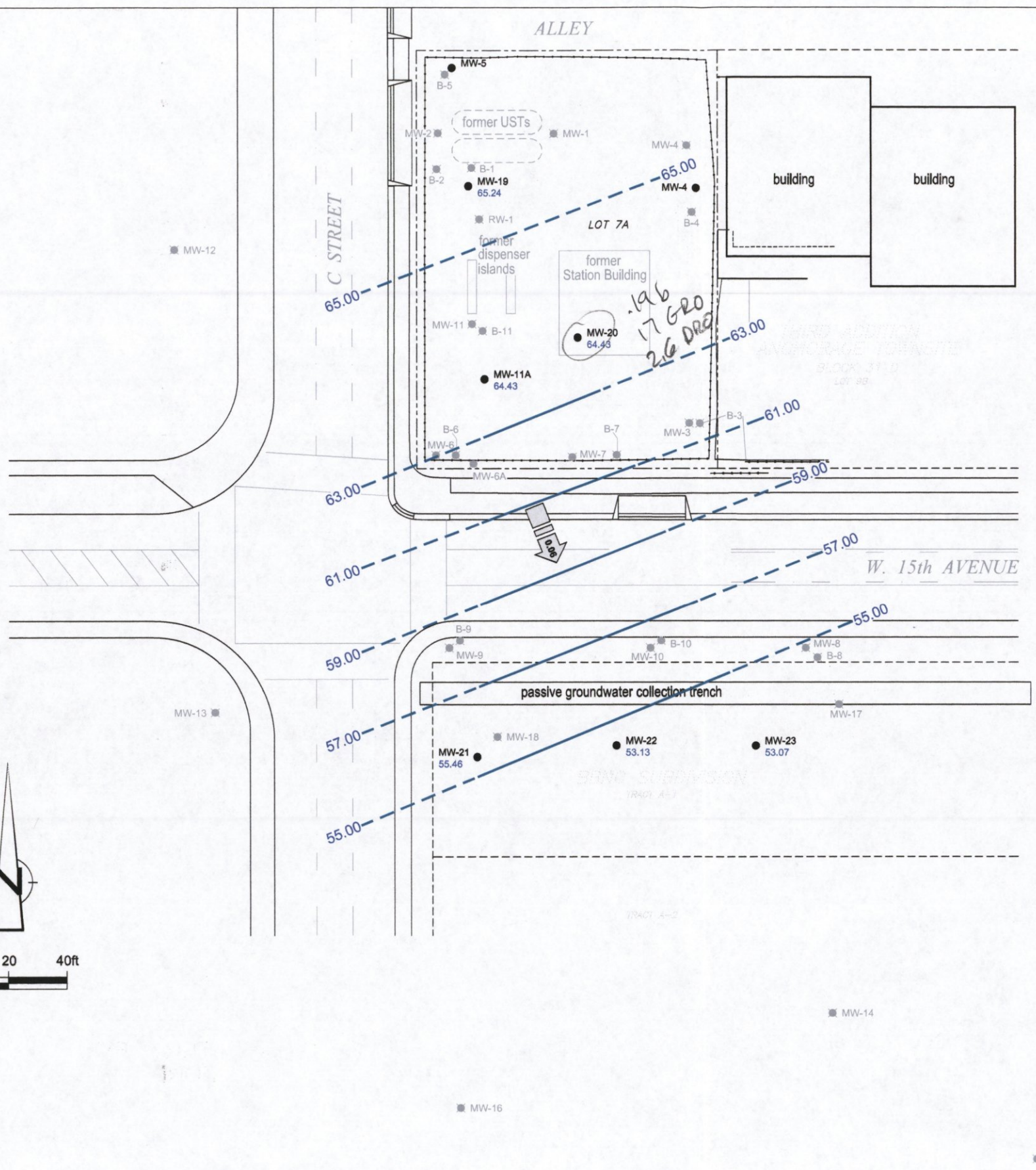
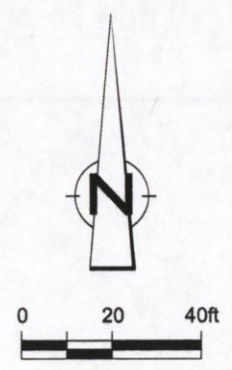
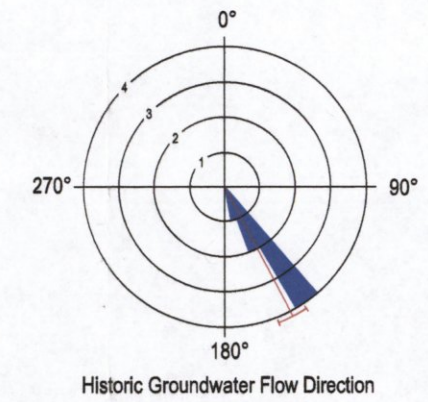


Figure 2  
 GROUNDWATER ELEVATION CONTOUR MAP  
 FORMER UNOCAL STATION 4652  
 1441 "C" STREET  
 Anchorage, Alaska  
 August 27, 2009



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TABLES

TABLE 1: GROUNDWATER ANALYTICAL RESULTS

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date Units	TOC ft nsl	DTW ftbg	GWE ft nsl	DRO mg/L	HYDROCARBONS			Benzene mg/L	PRIMARY VOCs			HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L	Oil and Grease mg/L		Toluene mg/L	Ethylbenzene mg/L	Total Xylenes mg/L		EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>						2.2	1.0		0.005	1.0	0.7	10.0	0.00005	0.0005	
MW-1	09/06/1986	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-1	03/19/1987	-	-	-	-	-	0.3	0.84	7.39	3.19	0.054	1.136	-	-	-
MW-1	10/09/1987	-	-	-	-	-	3.52	-	22.6	1.1	0.046	0.402	-	-	-
MW-1	01/16/1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-2	03/19/1987	-	-	-	-	-	6.8	13	8.28	21.1	4.26	13.48	-	-	-
MW-2	10/09/1987	-	-	-	-	-	7.69	-	18.1	29.9	3.28	12.87	-	-	-
MW-2	01/16/1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-3	08/02/1986	100.07	5.19	94.88	-	-	-	-	-	-	-	-	-	-	-
MW-3	09/06/1986	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-3	09/22/1986	100.07	5.29	94.78	-	-	-	-	-	-	-	-	-	-	-
MW-3	03/19/1987	100.07	6.79	93.28	-	-	0.7	1.7	0.694	0.012	0.069	0.275	-	-	-
MW-3	10/09/1987	100.07	5.33	94.74	-	-	0.26	-	0.23	0.028	0.0175	0.275	-	-	-
MW-3	01/16/1988	100.07	6.45	93.62	-	-	0.012	0.31	0.653	0.007	0.06	0.215	-	-	-
MW-3	05/03/1988	100.07	3.89	96.18	-	-	2.4	7.7	0.002	<0.0002	<0.0002	0.0019	-	-	-
MW-3	07/26/1988	100.07	5.21	94.86	-	-	1.1	-	0.56	<0.001	0.0098	<0.001	-	-	-
MW-3	11/17/1988	100.07	5.45	94.62	-	-	1.3	-	1.1	0.0075	0.4	2.4	-	-	-
MW-3	03/13/1989	100.07	6.89	93.18	-	-	1.5	-	0.87	0.0068	0.034	0.29	ND	-	-
MW-3	07/26/1989	100.07	4.85	95.22	-	-	0.8	-	0.16	0.023	0.0079	0.066	-	-	-
MW-3	10/09/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS		Oil and Grease	Benzene	PRIMARY VOCs			HVOCS	ADDITIONAL VOCs	
						GRO	TPH			Toluene	Ethylbenzene	Total Xylenes		EDB	1,2-DCA
	Units	ft msl	ftg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels*						1.5	2.2	1.0	0.005	1.0	0.7	10.0	0.0005	0.005	
MW-4	08/02/1986	102.17	5.16	97.01	-	-	-	-	-	-	-	-	-	-	-
MW-4	09/22/1986	102.17	4.77	97.40	-	-	-	-	-	-	-	-	-	-	-
MW-4	10/08/1987	102.17	5.34	96.83	-	-	-	0.15	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-4	01/15/1988	102.17	5.96	96.21	-	-	-	0.15	<0.001	0.0033	<0.001	<0.001	-	-	-
MW-4	05/03/1988	102.17	4.29	97.88	-	-	-	0.8	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-
MW-4	07/26/1988	102.17	5.10	97.07	-	-	-	<0.5	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-
MW-4	11/17/1988	102.17	5.38	96.79	-	-	-	<0.4	0.0002	0.0005	0.0003	0.0014	-	-	-
MW-4	03/13/1989	102.17	6.30	95.87	-	-	-	0.45	<0.0002	0.0003	<0.0002	0.0009	0.0045	-	-
MW-4	07/26/1989	102.17	4.10	98.07	-	-	-	<0.4	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-
MW-4	09/27/1990	102.17	5.35	96.82	-	-	-	<0.4	0.013	<0.0002	<0.0002	<0.0002	-	-	-
MW-4	10/09/1990	102.17	5.10	97.07	-	-	-	2	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-4	03/28/1991	102.17	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-4	04/19/1991	102.17	5.67	96.50	-	-	-	-	-	-	-	-	-	-	-
MW-4	05/15/1991	102.17	6.04	96.13	-	-	-	-	-	-	-	-	-	-	-
MW-4	07/12/1991	102.17	6.56	95.61	-	-	-	-	-	-	-	-	-	-	-
MW-4	09/26/1991	105.29	9.01	96.28	<0.10	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-4	10/11/1991	105.29	9.32	95.97	-	-	-	-	-	-	-	-	-	-	-
MW-4	01/10/1992	105.29	9.10	96.19	-	-	-	-	-	-	-	-	-	-	-
MW-4	02/17/1992	105.29	10.06	95.23	<0.10	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-4	03/31/1992	105.29	8.91	96.38	-	-	-	-	-	-	-	-	-	-	-
MW-4	05/19/1992	105.29	8.94	96.35	14 / 16	<0.1 / <0.1	<1 / <1	-	<0.001 / <0.001	<0.001 / <0.001	<0.001 / <0.001	<0.001 / <0.001	-	-	-
MW-4	06/30/1992	105.29	8.90	96.39	-	-	-	-	-	-	-	-	-	-	-
MW-4	07/15/1992	105.29	9.15	96.14	-	-	-	-	-	-	-	-	-	-	-
MW-4	08/28/1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-4	10/04/2007	72.25	7.79	64.46	-	-	-	-	-	-	-	-	-	-	-
MW-4	06/19/2008	72.25	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-4	08/28/2008	73.14	-	-	-	-	-	-	-	-	-	-	-	-	-



**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS			Benzene	PRIMARY VOCs		Total Xylenes	HVOCs	ADDITIONAL VOCs	
						GRO	TPH	Oil and Grease		Toluene	Ethylbenzene			EDB	1,2-DCA
		ft msl	ftg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels*					1.5	2.2	1.0	0.005	1.0	0.7	10.0			0.0005	0.0005
MW-5	08/02/1986	105.38	7.14	98.24	-	-	-	-	-	-	-	-	-	-	-
MW-5	09/22/1986	105.38	7.98	97.40	-	-	-	-	-	-	-	-	-	-	-
MW-5	03/19/1987	105.38	8.04	97.34	-	-	0.06	0.19	0.0033	0.0074	0.0047	<0.0154	-	-	-
MW-5	10/09/1987	105.38	7.21	98.17	-	-	0.16	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	01/16/1988	105.38	7.78	97.60	-	-	0.6	2.7	<0.001	13	0.025	0.054	-	-	-
MW-5	05/03/1988	105.38	6.03	99.35	-	-	1.3	5.8	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-
MW-5	07/26/1988	105.38	6.99	98.39	-	-	<0.5	-	<0.0002	0.0004	<0.0002	<0.0002	-	-	-
MW-5	11/17/1988	105.38	7.13	98.25	-	-	<0.4	-	<0.0002	0.0008	0.0003	0.0015	-	-	-
MW-5	03/13/1989	105.38	8.25	97.13	-	-	<0.6	-	<0.0002	0.0003	<0.0002	0.0006	-	-	-
MW-5	07/26/1989	105.38	6.24	99.14	-	-	<0.4	-	<0.0002	<0.002	<0.0002	<0.0006	-	-	-
MW-5	05/19/1990	-	-	-	-	-	0.8	-	<0.0002	<0.002	<0.0002	<0.0006	-	-	-
MW-5	10/02/1990	105.38	6.52	98.86	-	-	2.4	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	03/28/1991	105.38	8.12	97.26	-	-	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	04/19/1991	105.38	6.72	98.66	-	-	-	-	-	-	-	-	-	-	-
MW-5	05/15/1991	105.38	6.81	98.57	-	-	-	-	-	-	-	-	-	-	-
MW-5	07/12/1991	105.38	8.12	97.26	-	-	-	-	-	-	-	-	-	-	-
MW-5	09/26/1991	105.38	10.47	94.91	<0.10	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	10/11/1991	105.38	10.71	94.67	-	-	-	-	-	-	-	-	-	-	-
MW-5	01/10/1992	108.59	11.38	97.21	-	-	-	-	-	-	-	-	-	-	-
MW-5	02/17/1992	108.59	11.66	96.93	<0.10	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	03/31/1992	108.59	11.11	97.48	-	-	-	-	-	-	-	-	-	-	-
MW-5	05/19/1992	108.59	9.84	98.75	1.2	<0.1	1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-5	06/30/1992	108.59	10.22	98.37	-	-	-	-	-	-	-	-	-	-	-
MW-5	07/15/1992	108.59	10.45	98.14	-	-	-	-	-	-	-	-	-	-	-
MW-5	08/28/1992	108.59	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-5	10/04/2007	74.94	9.40	65.54	-	-	-	-	-	-	-	-	-	-	-
MW-5	06/19/2008	74.94	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-5	08/28/2008	76.35	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-6	08/02/1986	101.56	5.54	96.02	-	-	-	-	-	-	-	-	-	-	-
MW-6	09/06/1986	101.56	-	-	-	-	-	-	14	17	2.1	14	-	-	-
MW-6	09/22/1986	101.56	5.68	95.88	-	-	-	-	-	-	-	-	-	-	-
MW-6	03/19/1987	101.56	7.27	94.29	-	-	12	24	14.3	19	2.39	14.5	-	-	-
MW-6	10/09/1987	101.56	6.01	95.55	-	-	11.3	-	18.7	31.2	2.77	18.74	-	-	-
MW-6	01/16/1988	101.56	6.75	94.81	-	-	6.6	9.4	23.9	28.4	1.85	17.9	-	-	-
MW-6	05/03/1988	101.56	4.46	97.10	-	-	6.8	7.6	1.4	3.6	0.59	5.8	-	-	-
MW-6	07/26/1988	101.56	5.60	95.96	-	-	10.1	-	15	27	1.4	13	-	-	-
MW-6	11/17/1988	101.56	5.99	95.57	-	-	6.9	-	16	24	2.8	16	ND	-	-
MW-6	03/13/1989	101.56	6.46	95.10	-	-	12.8	-	8.5 / 10	7.3 / 8.7	0.56 / 0.76	5.9 / 4.4	-	-	-
MW-6	07/26/1989	101.56	4.98	96.58	-	-	10.7	-	17	23	10	14	-	-	-
MW-6	10/09/1989	101.56	4.78	96.78	-	-	-	-	-	-	-	-	-	-	-
MW-6	09/27/1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC ft msl	DTW ft bfg	GWE ft msl	DRO mg/L	HYDROCARBONS		Oil and Grease mg/L	Benzene mg/L	PRIMARY VOCs		Total Xylenes mg/L	HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L			Toluene mg/L	Ethylbenzene mg/L			EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>						2.2	1.0		0.005	1.0	0.7	10.0		0.00005	0.0005
MW-6A	10/09/1989	101.20	-	-	-	-	-	-	-	-	-	-	0.246	-	-
MW-6A	09/27/1990	101.20	9.74	91.46	-	-	-	-	-	-	-	-	-	-	-
MW-6A	10/02/1990	101.20	9.84	91.36	-	-	14.8	-	0.706	1.13	0.11	0.975	-	-	-
MW-6A	03/28/1991	101.20	9.89	91.31	-	-	-	-	-	-	-	-	-	-	-
MW-6A	05/15/1991	101.20	9.74	91.46	-	-	-	-	-	-	-	-	-	-	-
MW-6A	07/12/1991	101.20	10.38	90.82	-	-	-	-	-	-	-	-	-	-	-
MW-6A	09/26/1991	101.20	9.76	91.44	2.7	30	2.5	-	8.7	8.4	0.9	0.975	-	-	-
MW-6A	10/11/1991	101.20	9.75	91.45	-	-	-	-	-	-	-	-	-	-	-
MW-6A	01/10/1992	101.20	10.08	91.12	-	-	-	-	-	-	-	-	-	-	-
MW-6A	02/17/1992	101.20	11.14	90.06	0.36	16	1.4	-	1.9	0.24	<0.001	<0.001	-	-	-
MW-6A	03/31/1992	101.20	9.44	91.76	-	-	-	-	-	-	-	-	-	-	-
MW-6A	05/19/1992	101.20	7.82	93.38	78	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-6A	06/30/1992	101.20	9.58	91.62	-	-	-	-	-	-	-	-	-	-	-
MW-6A	07/15/1992	101.20	9.60	91.60	-	-	-	-	-	-	-	-	-	-	-
MW-6A	08/28/1992	101.20	9.64	91.56	-	-	-	-	2.7	1.3	0.71	2.62	-	-	-
MW-6A	10/13/1992	101.20	5.63	95.57	-	-	-	-	-	-	-	-	-	-	-
MW-6A	11/21/1992	101.20	9.23	91.97	-	-	-	-	1.3 / 1.7	0.30 / 0.31	0.23 / 0.22	0.67 / 0.68	-	-	-
MW-6A	12/17/1992	101.20	9.50	91.70	-	-	-	-	1.6	0.39	0.58	2.1	-	-	-
MW-6A	01/25/1993	101.20	9.85	91.35	-	-	-	-	-	-	-	-	-	-	-
MW-6A	02/10/1993	101.20	9.91	91.29	-	-	-	-	1.1	0.003	0.35	0.55	-	-	-
MW-6A	03/08/1993	101.20	9.91	91.29	-	-	-	-	-	-	-	-	-	-	-
MW-6A	03/16/1993	101.20	9.83	91.37	-	-	-	-	-	-	-	-	-	-	-
MW-6A	04/14/1993	101.20	9.37	91.83	-	-	-	-	-	-	-	-	-	-	-
MW-6A	05/05/1993	101.20	9.16	92.04	-	-	-	-	1.3	0.29	0.39	0.99	-	-	-
MW-6A	06/15/1993	101.20	8.09	93.11	-	-	-	-	-	-	-	-	-	-	-
MW-6A	07/19/1993	101.20	8.58	92.62	-	-	-	-	-	-	-	-	-	-	-
MW-6A	08/20/1993	101.20	11.28	89.92	-	-	-	-	1.8	<0.05	0.40	0.70	-	-	-
MW-6A	03/20/1996	-	-	-	-	5.100	-	-	1.100	0.011	0.091	0.350	-	-	-
MW-6A	03/19/1997	-	-	-	-	0.960	-	-	0.356	<0.00250	<0.00250	<0.00500	-	-	-
MW-6A	12/10/1997	-	-	-	-	0.0988	-	-	0.0450	<0.000500	<0.000500	<0.00100	-	-	-
MW-6A	11/20/1998	-	-	-	-	0.115	-	-	0.0397	<0.000500	0.00338	0.0053	-	-	-
MW-6A	01/19/2000	68.76	7.49	61.27	-	3.150	-	-	0.605	0.00464	0.104	0.400	-	-	-
MW-7	08/02/1986	100.40	4.72	95.68	-	-	-	-	-	-	-	-	-	-	-
MW-7	09/06/1986	100.40	-	-	-	-	-	-	2.4	4.9	0.39	5.6	-	-	-
MW-7	09/22/1986	100.40	4.79	95.61	-	-	-	-	-	-	-	-	-	-	-
MW-7	03/19/1987	100.40	4.59	95.81	-	-	18	27	6.03	12.3	2.66	13.9	-	-	-
MW-7	10/09/1987	100.40	5.00	95.40	-	-	9.28	-	8.4	19.8	2.07	18	-	-	-
MW-7	01/16/1988	100.40	5.72	94.68	-	-	3.2	7.1	8.2	3.9	2.4	17.5	-	-	-
MW-7	05/03/1988	100.40	3.33	97.07	-	-	7.3	7.5	6.3	17	1.1	9.9	-	-	-
MW-7	07/26/1988	100.40	4.68	95.72	-	-	10.6	-	6.4	15	1.5	11	-	-	-
MW-7	11/17/1988	100.40	5.02	95.38	-	-	8	-	7.8	12	2.7	14	-	-	-
MW-7	03/13/1989	100.40	6.35	94.05	-	-	8.9	-	8.1	8.5	0.63	4.2	ND	-	-
MW-7	07/26/1989	100.40	3.38	97.02	-	-	10.8	-	5	17	1.1	16	0.123	-	-
MW-7	10/09/1989	100.40	3.76	96.64	-	-	-	-	-	-	-	-	-	-	-
MW-7	05/19/1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS			Benzene	PRIMARY VOCs			Total Xylenes	HVOCs	ADDITIONAL VOCs	
						GRO	TPH	Oil and Grease		Toluene	Ethylbenzene	EDB			1,2-DCA	
	Units	ft msl	ftg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels*						1.5	2.2	1.0	0.005	1.0	0.7	10.0		0.00005	0.0005	
MW-8	09/06/1986	96.80	-	-	-	-	-	-	0.2	0.031	<0.001	0.79	-	-	-	-
MW-8	09/22/1986	96.80	6.31	90.49	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	03/19/1987	96.80	7.84	88.96	-	-	3.4	6.6	1.34	0.875	1.04	4.64	-	-	-	-
MW-8	10/09/1987	96.80	6.50	90.30	-	-	0.26	-	0.116	0.608	0.0177	55.7	-	-	-	-
MW-8	01/16/1988	96.80	7.28	89.52	-	-	0.57	4.5	0.278	0.394	0.046	0.304	-	-	-	-
MW-8	05/03/1988	96.80	5.40	91.40	-	-	1.5	6.8	<0.0002	<0.0002	<0.0002	0.0006	-	-	-	-
MW-8	07/26/1988	96.80	6.17	90.63	-	-	0.8	-	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-
MW-8	11/17/1988	96.80	6.57	90.23	-	-	0.6	-	0.097	0.0047	0.065	0.27	-	-	-	-
MW-8	03/13/1989	96.80	8.43	88.37	-	-	3.8	-	1.4	0.061	0.97	4.9	ND	-	-	-
MW-8	07/26/1989	96.80	5.86	90.94	-	-	1.6	-	0.91	0.0022	0.28	1.5	-	-	-	-
MW-8	10/09/1989	96.80	5.58	91.22	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	05/19/1990	96.80	-	-	-	-	2.1	-	<0.0002	<0.0002	<0.0002	<0.0002	0.024	-	-	-
MW-8	10/02/1990	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	03/28/1991	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	05/15/1991	96.80	10.45	86.35	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	07/12/1991	96.80	10.20	86.60	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	09/26/1991	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	02/17/1992	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	05/18/1992	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	06/30/1992	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	08/28/1992	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	10/13/1992	96.80	8.20	88.60	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	11/21/1992	96.80	8.74	88.06	-	-	-	-	2.0	0.01	0.18	0.82	-	-	-	-
MW-8	12/17/1992	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	01/25/1993	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	02/10/1993	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	03/08/1993	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	03/16/1993	96.80	10.18	86.62	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	04/14/1993	96.80	8.45	88.35	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	05/05/1993	96.80	8.45	88.35	-	-	-	-	0.47	<0.005	0.016	0.02	-	-	-	-
MW-8	06/15/1993	96.80	8.98	87.82	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	07/19/1993	96.80	9.36	87.44	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	08/20/1993	96.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-8	03/20/1996	-	-	-	-	6.500	-	-	1.200	0.013	0.036	1.400	-	-	-	-
MW-8	03/19/1997	-	-	-	-	2.820	-	-	0.618	0.00545	0.0276	0.547	-	-	-	-
MW-8	12/10/1997	-	-	-	-	<0.0500	-	-	0.00506	<0.000500	0.000568	0.00405	-	-	-	-
MW-8	11/20/1998	-	-	-	-	<0.0500	-	-	0.0123	<0.000500	0.00156	0.00397	-	-	-	-
MW-8	01/19/2000	64.35	8.57	55.78	-	10.100	-	-	0.535	0.197	0.748	4.090	-	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS			Benzene	PRIMARY VOCs			HVOCS	ADDITIONAL VOCs	
						GRO	TPH	Oil and Grease		Toluene	Ethylbenzene	Total Xylenes		EDB	1,2-DCA
		Units	ft msl	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels*					1.5	2.2	1.0	0.005	1.0	0.7	10.0		0.0005	0.0005	
MW-9	09/06/1986	100.00	-	-	-	-	-	-	3.3	0.034	0.15	0.56	-	-	-
MW-9	09/22/1986	100.00	9.05	90.95	-	-	-	-	-	-	-	-	-	-	-
MW-9	03/19/1987	100.00	10.03	89.97	-	-	-	3.1	4.71	0.071	0.073	2.896	-	-	-
MW-9	10/09/1987	100.00	9.54	90.46	-	-	-	2.24	5.43	0.607	0.0985	3.189	-	-	-
MW-9	01/16/1988	100.00	9.60	90.40	-	-	-	0.44	4.8	0.583	0.492	1.894	-	-	-
MW-9	05/03/1988	100.00	8.02	91.98	-	-	-	4.9	5.3	0.062	<0.04	0.96	-	-	-
MW-9	07/26/1988	100.00	6.30	93.70	-	-	-	2.7	6.7	0.85	0.22	2.6	-	-	-
MW-9	11/17/1988	100.00	9.20	90.80	-	-	-	1.7	6.2 / 4.4	0.2 / 0.042	0.63 / 0.52	1.8 / 1.3	-	-	-
MW-9	03/13/1989	100.00	10.86	89.14	-	-	-	3.1	8.4	0.06	0.52	2	ND	-	-
MW-9	07/26/1989	100.00	8.77	91.23	-	-	-	3.7	8.2	0.21	<0.1	0.96	-	-	-
MW-9	10/09/1989	100.00	7.96	92.04	-	-	-	-	-	-	-	-	0.079	-	-
MW-9	05/19/1990	100.00	-	-	-	-	-	1.7	4.09	0.019	0.16	0.822	-	-	-
MW-9	08/30/1990	100.00	-	-	-	-	-	-	2	0.059	<0.04	0.4	-	-	-
MW-9	10/02/1990	100.00	9.70	90.30	-	-	-	3.8	2.8	0.02	0.224	1.3	-	-	-
MW-9	03/28/1991	100.00	11.64	88.36	-	-	-	13	1.93	0.008	0.077	0.353	-	-	-
MW-9	05/15/1991	100.00	9.65	90.35	-	-	-	-	-	-	-	-	-	-	-
MW-9	07/12/1991	100.00	9.89	90.11	-	-	-	-	-	-	-	-	-	-	-
MW-9	09/26/1991	100.00	10.06	89.94	<0.1	0.7	<1	-	1.8	0.006	0.1	0.1	-	-	-
MW-9	10/11/1991	100.00	10.19	89.81	-	-	-	-	-	-	-	-	-	-	-
MW-9	01/10/1992	100.00	10.78	89.22	-	-	-	-	-	-	-	-	-	-	-
MW-9	02/17/1992	100.00	11.16	88.84	<0.1	0.5	<1	-	0.13	<0.001	<0.001	0.013	-	-	-
MW-9	03/31/1992	100.00	10.97	89.03	-	-	-	-	-	-	-	-	-	-	-
MW-9	05/19/1992	100.00	9.36	90.64	3.6	<1	<1	-	0.24	<0.05	<0.05	<0.05	-	-	-
MW-9	06/30/1992	100.00	9.67	90.33	-	-	-	-	-	-	-	-	-	-	-
MW-9	07/15/1992	100.00	9.90	90.10	-	-	-	-	-	-	-	-	-	-	-
MW-9	08/28/1992	100.00	10.49	89.51	-	-	-	-	0.91	0.004	0.014	0.015	-	-	-
MW-9	10/13/1992	100.00	9.90	90.10	-	-	-	-	-	-	-	-	-	-	-
MW-9	11/21/1992	100.00	9.98	90.02	-	-	-	-	1.1	<0.001	0.023	0.022	-	-	-
MW-9	12/17/1992	100.00	10.08	89.92	-	-	-	-	0.35	<0.001	0.02	0.68	-	-	-
MW-9	01/25/1993	100.00	10.88	89.12	-	-	-	-	-	-	-	-	-	-	-
MW-9	02/10/1993	100.00	11.14	88.86	-	-	-	-	0.59	<0.001	0.013	0.012	-	-	-
MW-9	03/08/1993	100.00	11.53	88.47	-	-	-	-	-	-	-	-	-	-	-
MW-9	03/16/1993	100.00	11.52	88.48	-	-	-	-	-	-	-	-	-	-	-
MW-9	04/14/1993	100.00	10.57	89.43	-	-	-	-	-	-	-	-	-	-	-
MW-9	05/05/1993	100.00	9.80	90.20	-	-	-	-	0.41	<0.005	<0.005	<0.01	-	-	-
MW-9	06/15/1993	100.00	9.69	90.31	-	-	-	-	-	-	-	-	-	-	-
MW-9	07/19/1993	100.00	10.38	89.62	-	-	-	-	-	-	-	-	-	-	-
MW-9	08/20/1993	100.00	10.74	89.26	-	-	-	-	0.78	0.02	<0.01	0.03	-	-	-
MW-9	03/20/1996	-	-	-	-	0.900	-	-	0.290	<0.00050	0.0089	0.010	-	-	-
MW-9	03/19/1997	-	-	-	-	0.460	-	-	0.165	<0.00250	0.00332	<0.00500	-	-	-
MW-9	12/10/1997	-	-	-	-	<0.0500	-	-	0.0176	<0.000500	<0.000500	<0.00100	-	-	-
MW-9	11/20/1998	-	-	-	-	0.121	-	-	0.0640	<0.000500	0.00139	0.00207	-	-	-
MW-9	01/19/2000	67.52	10.44	57.08	-	<0.0500	-	-	0.0154	<0.000500	<0.000500	<0.00100	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date Units	TOC ft msl	DTW ftg	GWE ft msl	DRO mg/L	HYDROCARBONS			Benzene mg/L	PRIMARY VOCs			HVOCS mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L	Oil and Grease mg/L		Toluene mg/L	Ethylbenzene mg/L	Total Xylenes mg/L		EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels*						1.5	2.2	1.0	0.005	1.0	0.7	10.0	0.0005	0.0005	
MW-10	09/06/1986	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	09/22/1986	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	01/16/1987	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	03/19/1987	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	10/09/1987	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	05/03/1988	96.81	4.72	92.09	-	-	-	<0.0004	<0.0004	<0.0004	<0.0012	-	-	-	
MW-10	07/26/1988	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	11/17/1988	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	03/13/1989	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	07/26/1989	96.81	-	-	-	-	-	-	-	-	-	-	-	-	
MW-10	10/09/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	
MW-11	09/06/1986	103.04	-	-	-	-	-	33	25	3.9	20	-	-	-	
MW-11	09/22/1986	103.04	6.04	97.00	-	-	-	-	-	-	-	-	-	-	
MW-11	03/19/1987	103.04	6.01	97.03	-	-	-	-	-	-	-	-	-	-	
MW-11	10/09/1987	103.04	-	-	-	-	-	-	-	-	-	-	-	-	
MW-11	01/16/1988	103.04	-	-	-	-	-	-	-	-	-	-	-	-	
MW-11	05/03/1988	103.04	6.23	96.81	-	-	-	-	-	-	-	-	-	-	
MW-11	07/26/1988	103.04	5.96	97.08	-	-	-	-	-	-	-	-	-	-	
MW-11	11/17/1988	103.04	5.93	97.11	-	-	-	-	-	-	-	-	-	-	
MW-11	03/13/1989	103.04	5.79	97.25	-	-	97	92	83	4.5	36	-	-	-	
MW-11	07/26/1989	103.04	5.93	97.11	-	-	-	-	-	-	-	-	-	-	
MW-11	10/09/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC ft msl	DTW ftg	GWE ft msl	DRO mg/L	HYDROCARBONS			Benzene mg/L	PRIMARY VOCs		Total Xylenes mg/L	HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L	Oil and Grease mg/L		Toluene mg/L	Ethylbenzene mg/L			EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels*					1.5	2.2	1.0		0.005	1.0	0.7	10.0		0.00005	0.0005
MW-11A	09/27/1990	105.46	11.76	93.70	-	-	-	-	-	-	-	-	-	-	-
MW-11A	10/01/1990	105.46	12.42	93.04	-	-	-	-	-	-	-	-	-	-	-
MW-11A	10/09/1990	105.46	-	-	-	-	3.8	-	2.08	0.188	<0.001	0.09	-	-	-
MW-11A	03/28/1991	105.46	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-11A	04/19/1991	105.46	11.10	94.36	-	-	-	-	-	-	-	-	-	-	-
MW-11A	05/15/1991	105.46	11.54	93.92	-	-	-	-	-	-	-	-	-	-	-
MW-11A	07/12/1991	105.46	11.28	94.18	-	-	-	-	-	-	-	-	-	-	-
MW-11A	09/26/1991	105.46	11.45	94.01	0.17	10	1.5	-	6.4	0.91	<0.001	0.9	-	-	-
MW-11A	10/11/1991	105.46	11.69	93.77	-	-	-	-	-	-	-	-	-	-	-
MW-11A	01/10/1992	104.90	12.04	92.86	-	-	-	-	-	-	-	-	-	-	-
MW-11A	02/17/1992	104.90	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-11A	03/31/1992	104.90	11.75	93.15	-	-	-	-	-	-	-	-	-	-	-
MW-11A	05/19/1992	104.90	10.64	94.26	11	7.4	2.5	-	2	<0.05	0.09	0.84	-	-	-
MW-11A	06/30/1992	104.90	11.41	93.49	-	-	-	-	-	-	-	-	-	-	-
MW-11A	07/15/1992	104.90	11.53	93.37	-	-	-	-	-	-	-	-	-	-	-
MW-11A	08/28/1992	104.90	11.49	93.41	-	-	-	-	3.5	0.099	0.5	1.84	-	-	-
MW-11A	10/13/1992	104.90	9.29	95.61	-	-	-	-	-	-	-	-	-	-	-
MW-11A	11/21/1992	104.90	11.42	93.48	-	-	-	-	2.5	0.0036	0.19	0.59	-	-	-
MW-11A	12/17/1992	104.90	11.52	93.38	-	-	-	-	4.1	<0.05	0.33	3	-	-	-
MW-11A	01/25/1993	104.90	11.89	93.01	-	-	-	-	-	-	-	-	-	-	-
MW-11A	02/10/1993	104.90	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-11A	03/08/1993	104.90	11.95	92.95	-	-	-	-	-	-	-	-	-	-	-
MW-11A	03/16/1993	104.90	11.90	93.00	-	-	-	-	-	-	-	-	-	-	-
MW-11A	04/14/1993	104.90	11.60	93.30	-	-	-	-	-	-	-	-	-	-	-
MW-11A	05/05/1993	104.90	11.59	93.31	-	-	-	-	-	-	-	-	-	-	-
MW-11A	06/15/1993	104.90	11.04	93.86	-	-	-	-	-	-	-	-	-	-	-
MW-11A	07/19/1993	104.90	11.20	93.70	-	-	-	-	-	-	-	-	-	-	-
MW-11A	08/20/1993	104.90	9.41	95.49	-	-	-	-	4.7	<0.10	1.1	3.9	-	-	-
MW-11A	03/29/2005	71.09	-	-	<0.42	3.21	-	-	0.254	0.00201	0.0131	0.834	-	-	-
MW-11A	12/31/2005	71.09	-	-	0.567	4.47	-	-	0.236	<0.005	0.00985	0.981	-	-	-
MW-11A	06/30/2006	71.09	-	-	<0.39	3.71	-	-	0.194	<0.005	0.015	0.906	-	-	-
MW-11A	09/18/2006	71.09	-	-	0.79	4.90	-	-	0.240	0.0013	0.014	1.1	-	-	-
MW-11A	06/29/2007	71.09	-	-	2.20	3.10	-	-	0.200	0.0010	0.010	0.60	-	-	-
MW-11A	10/04/2007	71.09	8.54	62.55	0.28	-	-	-	0.22	0.002	0.020	1.1	-	<0.0000095	0.006
MW-11A	06/19/2008	71.09	9.63	61.46	0.28	4.9	-	-	0.20	0.002	0.03	0.7	-	-	-
MW-11A	08/28/2008	73.45	10.72	62.73	0.37	4.2	-	-	0.20	0.001	0.01	0.7	-	-	-
MW-11A	05/14/2009	73.45	9.24	64.21	0.44	3.5	-	-	0.18	0.0012	0.018	0.68	-	-	-
MW-11A	08/27/2009	73.45	9.02	64.43	0.45	5.2	-	-	0.22	0.0019	0.021	1.2	-	-	-

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**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date Units	TOC ft msl	DTW ftg	GWE ft msl	DRO mg/L	HYDROCARBONS			Benzene mg/L	PRIMARY VOCs		Total Xylenes mg/L	HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L	Oil and Grease mg/L		Toluene mg/L	Ethylbenzene mg/L			EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels*						1.5	2.2	1.0	0.005	1.0	0.7	10.0		0.00005	0.0005
MW-12	11/17/1988	107.89	9.88	98.01	-	-	0.5	-	0.0019	0.0061	0.0023	0.012	-	-	-
MW-12	03/13/1989	107.89	10.53	97.36	-	-	0.6	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-12	07/26/1989	107.89	9.76	98.13	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-12	05/19/1990	107.89	-	-	-	-	0.5	-	0.0003	<0.0002	<0.0002	0.007	-	-	-
MW-12	10/02/1990	107.89	9.65	98.24	-	-	2.4	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-12	03/28/1991	107.89	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-12	05/15/1991	107.89	8.89	99.00	-	-	-	-	-	-	-	-	-	-	-
MW-12	07/12/1991	107.89	9.43	98.46	-	-	-	-	-	-	-	-	-	-	-
MW-12	09/26/1991	107.89	9.55	98.34	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-12	10/11/1991	107.89	10.36	97.53	-	-	-	-	-	-	-	-	-	-	-
MW-12	01/10/1992	107.89	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-12	02/17/1992	107.89	9.80	98.09	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-12	05/19/1992	107.89	9.00	98.89	5.5	<0.1	<1	-	0.002	<0.001	<0.001	<0.001	-	-	-
MW-12	06/30/1992	107.89	9.66	98.23	-	-	-	-	-	-	-	-	-	-	-
MW-12	07/15/1992	107.89	9.75	98.14	-	-	-	-	-	-	-	-	-	-	-
MW-12	08/28/1992	107.89	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-13	03/13/1988	101.86	10.33	91.53	-	-	1.1	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-13	07/26/1988	101.86	7.66	94.20	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-13	11/17/1988	101.86	8.68	93.18	-	-	<0.4	-	0.0003	0.0009	0.0013	0.0049	-	-	-
MW-13	05/19/1990	101.86	-	-	-	-	0.4	-	0.0009	<0.0002	<0.0002	0.007	-	-	-
MW-13	10/02/1990	101.86	7.66	94.20	-	-	2.6	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-13	01/10/1991	101.86	9.04	92.82	-	-	-	-	-	-	-	-	-	-	-
MW-13	03/29/1991	101.86	7.66	94.20	-	-	<1	-	0.001	<0.001	<0.001	<0.001	-	-	-
MW-13	05/15/1991	101.86	7.68	94.18	-	-	-	-	-	-	-	-	-	-	-
MW-13	07/12/1991	101.86	7.41	94.45	-	-	-	-	-	-	-	-	-	-	-
MW-13	09/26/1991	101.86	7.87	93.99	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-13	10/11/1991	101.86	8.17	93.69	-	-	-	-	-	-	-	-	-	-	-
MW-13	02/17/1992	101.86	9.30	92.56	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-13	03/31/1992	101.86	8.97	92.89	-	-	-	-	-	-	-	-	-	-	-
MW-13	05/19/1992	101.86	7.22	94.64	2.2	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-13	06/30/1992	101.86	7.81	94.05	-	-	-	-	-	-	-	-	-	-	-
MW-13	07/15/1992	101.86	7.95	93.91	-	-	-	-	-	-	-	-	-	-	-
MW-13	08/28/1992	101.86	-	-	-	-	-	-	-	-	-	-	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC Units	DTW ft msl	GWE ft msl	DRO ft msl	HYDROCARBONS		Oil and Grease mg/L	Benzene mg/L	PRIMARY VOCs			ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L			Toluene mg/L	Ethylbenzene mg/L	Total Xylenes mg/L	HVOCs mg/L	EDB mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>						1.5	2.2	1.0	0.005	1.0	0.7	10.0	0.00005	0.0005
MW-14	03/13/1988	88.32	7.78	80.54	-	-	0.77	-	<0.0002	<0.0002	<0.0002	<0.0006	ND	-
MW-14	07/26/1988	88.32	8.60	79.72	-	-	0.5	-	0.0003	<0.0002	<0.0002	<0.0006	-	-
MW-14	05/19/1990	88.32	-	-	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-
MW-14	10/02/1990	88.32	5.27	83.05	-	-	2.6	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-14	01/10/1991	88.32	7.47	80.85	-	-	-	-	-	-	-	-	-	-
MW-14	03/29/1991	88.32	8.24	80.08	-	-	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-14	05/15/1991	88.32	5.83	82.49	-	-	-	-	-	-	-	-	-	-
MW-14	07/12/1991	88.32	8.80	79.52	-	-	-	-	-	-	-	-	-	-
MW-14	09/26/1991	88.32	9.75	78.57	<0.1	<0.1	1.1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-14	10/11/1991	88.32	9.62	78.70	-	-	-	-	-	-	-	-	-	-
MW-14	02/17/1992	88.32	7.40	80.92	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-14	03/31/1992	88.32	6.94	81.38	-	-	-	-	-	-	-	-	-	-
MW-14	05/19/1992	88.32	6.20	82.12	4.8	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-14	06/30/1992	88.32	8.50	79.82	-	-	-	-	-	-	-	-	-	-
MW-14	07/15/1992	88.32	9.00	79.32	-	-	-	-	-	-	-	-	-	-
MW-14	08/28/1992	88.32	-	-	-	-	-	-	-	-	-	-	-	-
MW-14	12/10/1997	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-
MW-14	11/20/1998	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-
MW-14	01/19/2000	53.79	7.70	46.09	-	<0.0500 / <0.0500	-	-	<0.000500 / <0.000500	0.00230 / 0.00176	<0.000500 / <0.000500	<0.00100 / <0.00100	-	-
MW-15	03/13/1988	84.65	-	-	-	-	-	-	-	-	-	-	-	-
MW-15	07/26/1988	84.65	8.46	76.19	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-
MW-15	05/19/1990	84.65	-	-	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-
MW-15	10/02/1990	84.65	4.06	80.59	-	-	1.8	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-15	01/10/1991	84.65	7.77	76.88	-	-	-	-	-	-	-	-	-	-
MW-15	03/29/1991	84.65	7.80	76.85	-	-	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-15	05/15/1991	84.65	5.34	79.31	-	-	-	-	-	-	-	-	-	-
MW-15	07/12/1991	84.65	8.66	75.99	-	-	-	-	-	-	-	-	-	-
MW-15	09/26/1991	84.65	9.77	74.88	<0.1	<0.1	2	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-15	10/11/1991	84.65	10.64	74.01	-	-	-	-	-	-	-	-	-	-
MW-15	02/17/1992	84.65	7.46	77.19	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-15	03/31/1992	84.65	6.78	77.87	-	-	-	-	-	-	-	-	-	-
MW-15	05/19/1992	84.65	5.66	78.99	2	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-
MW-15	06/30/1992	84.65	7.97	76.68	-	-	-	-	-	-	-	-	-	-
MW-15	07/15/1992	84.65	8.50	76.15	-	-	-	-	-	-	-	-	-	-
MW-15	08/28/1992	84.65	-	-	-	-	-	-	-	-	-	-	-	-
MW-15	12/10/1997	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-
MW-15	11/20/1998	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-
MW-15	01/19/2000	50.78	7.18	43.60	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-



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**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS			Benzene	PRIMARY VOCs		Total Xylenes	HVOCs	ADDITIONAL VOCs	
						GRO	TPH	Oil and Grease		Toluene	Ethylbenzene			EDB	1,2-DCA
ADEC Groundwater Cleanup Levels*						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		ft msl	ftg	ft msl	mg/L	2.2	1.0	0.005	1.0	0.7	10.0		0.0005	0.0005	
MW-16	03/13/1988	90.13	13.88	76.25	-	-	0.8	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-16	07/26/1988	90.13	13.50	76.63	-	-	<0.4	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-16	05/19/1990	90.13	-	-	-	-	0.5	-	<0.0002	<0.0002	<0.0002	<0.0006	-	-	-
MW-16	10/02/1990	90.13	12.82	77.31	-	-	2.4	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-16	01/10/1991	90.13	13.89	76.24	-	-	-	-	-	-	-	-	-	-	-
MW-16	03/29/1991	90.13	13.55	76.58	-	-	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-16	05/15/1991	90.13	13.32	76.81	-	-	-	-	-	-	-	-	-	-	-
MW-16	07/12/1991	90.13	13.36	76.77	-	-	-	-	-	-	-	-	-	-	-
MW-16	09/26/1991	90.13	13.64	76.49	<0.1	<0.1	1.7	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-16	10/11/1991	90.13	13.66	76.47	-	-	-	-	-	-	-	-	-	-	-
MW-16	02/17/1992	90.13	13.85	76.28	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-16	03/31/1992	90.13	13.15	76.98	-	-	-	-	-	-	-	-	-	-	-
MW-16	05/19/1992	90.13	13.26	76.87	5.2	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-16	06/30/1992	90.13	13.45	76.68	-	-	-	-	-	-	-	-	-	-	-
MW-16	07/15/1992	90.13	13.60	76.53	-	-	-	-	-	-	-	-	-	-	-
MW-16	08/28/1992	90.13	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-16	12/10/1997	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-	-
MW-16	11/20/1998	-	-	-	-	<0.0500	-	-	<0.000500	<0.000500	<0.000500	<0.00100	-	-	-
MW-16	01/19/2000	55.07	14.11	40.96	-	<0.0500	-	-	<0.000500	0.000601	<0.000500	<0.00100	-	-	-
MW-17	09/27/1990	96.67	11.21	85.46	-	-	-	-	-	-	-	-	-	-	-
MW-17	10/02/1990	96.67	11.20	85.47	-	-	1.8	-	<0.001	<0.001	<0.001	<0.001	ND	-	-
MW-17	03/28/1991	96.67	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-17	05/15/1991	96.67	10.95	85.72	-	-	-	-	-	-	-	-	-	-	-
MW-17	07/12/1991	96.67	11.72	84.95	-	-	-	-	-	-	-	-	-	-	-
MW-17	09/26/1991	96.67	9.71	86.96	<0.1	0.4	2	-	0.15	<0.001	0.006	0.014	-	-	-
MW-17	10/11/1991	96.67	10.07	86.60	-	-	-	-	-	-	-	-	-	-	-
MW-17	01/10/1992	96.67	9.48	87.19	-	-	-	-	-	-	-	-	-	-	-
MW-17	02/17/1992	96.67	9.56	87.11	<0.1	<0.1	<1	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-17	03/31/1992	96.67	9.08	87.59	-	-	-	-	-	-	-	-	-	-	-
MW-17	05/19/1992	96.67	9.00	87.67	83	<0.1	<1	-	0.081	<0.001	<0.001	<0.001	-	-	-
MW-17	06/30/1992	96.67	11.78	84.89	-	-	-	-	-	-	-	-	-	-	-
MW-17	07/15/1992	96.67	12.15	84.52	-	-	-	-	-	-	-	-	-	-	-
MW-17	08/28/1992	96.67	12.10	84.57	-	-	-	-	0.066	0.003	<0.001	<0.001	-	-	-
MW-17	10/13/1992	96.67	9.59	87.08	-	-	-	-	-	-	-	-	-	-	-
MW-17	11/21/1992	96.67	8.74	87.93	-	-	-	-	0.027	<0.001	<0.001	<0.001	-	-	-
MW-17	12/17/1992	96.67	10.35	86.32	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-
MW-17	01/25/1993	96.67	11.99	84.68	-	-	-	-	-	-	-	-	-	-	-
MW-17	02/10/1993	96.67	9.95	86.72	-	-	-	-	0.048	<0.001	<0.001	<0.002	-	-	-
MW-17	03/08/1993	96.67	11.50	85.17	-	-	-	-	-	-	-	-	-	-	-
MW-17	03/16/1993	96.67	11.04	85.63	-	-	-	-	-	-	-	-	-	-	-
MW-17	04/14/1993	96.67	9.53	87.14	-	-	-	-	-	-	-	-	-	-	-
MW-17	05/05/1993	96.67	8.86	87.81	-	-	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-17	06/15/1993	96.67	9.81	86.86	-	-	-	-	-	-	-	-	-	-	-
MW-17	07/19/1993	96.67	10.30	86.37	-	-	-	-	-	-	-	-	-	-	-
MW-17	08/20/1993	96.67	12.28	84.39	-	-	-	-	-	-	-	-	-	-	-
MW-17	03/20/1996	-	-	-	-	0.440 / 0.460	-	-	0.110 / 0.110	<0.00050 / <0.00050	0.014 / 0.013	0.0035 / 0.0034	-	-	-
MW-17	03/19/1997	-	-	-	-	0.544 / 0.559	-	-	0.144 / 0.154	<0.00250 / <0.00250	0.0250 / 0.0258	<0.00500 / 0.0051	-	-	-
MW-17	12/10/1997	-	-	-	-	0.443	-	-	0.0992	0.000669	0.0203	0.00171	-	-	-
MW-17	11/20/1998	-	-	-	-	0.485	-	-	0.167	0.00114	0.0295	0.00065	-	-	-
MW-17	01/19/2000	61.99	9.56	52.43	-	0.393	-	-	0.132	0.00112	0.0102	0.00273	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	DRO	HYDROCARBONS		Oil and Grease	Benzene	PRIMARY VOCs			ADDITIONAL VOCs		
						GRO	TPH			Toluene	Ethylbenzene	Total Xylenes	HVOCs	EDB	1,2-DCA
	Units	ft msl	ftg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels*															
					1.5	2.2	1.0		0.005	1.0	0.7	10.0		0.0005	0.0005
MW-18	09/27/1990	97.12	8.79	88.33	-	-	-	-	-	-	-	-	-	-	-
MW-18	10/02/1990	97.12	8.78	88.34	-	-	3.8	-	3.21	0.004	0.003	0.005	-	-	-
MW-18	03/28/1991	97.12	10.22	86.90	-	-	-	-	-	-	-	-	-	-	-
MW-18	05/15/1991	97.12	7.77	89.35	-	-	-	-	-	-	-	-	-	-	-
MW-18	07/12/1991	97.12	9.41	87.71	-	-	-	-	-	-	-	-	-	-	-
MW-18	09/26/1991	97.12	9.83	87.29	<0.1	<0.1	1.7	-	0.16	<0.001	<0.001	0.0021	-	-	-
MW-18	10/11/1991	97.12	9.78	87.34	-	-	-	-	-	-	-	-	-	-	-
MW-18	01/10/1992	97.12	9.72	87.40	-	-	-	-	-	-	-	-	-	-	-
MW-18	02/17/1992	97.12	10.04	87.08	<0.1	107	<1	-	4.1	0.012	<0.001	<0.001	-	-	-
MW-18	03/31/1992	97.12	9.19	87.93	-	-	-	-	-	-	-	-	-	-	-
MW-18	05/19/1992	97.12	8.16	88.96	5.1	1.7	<1	-	0.83	<0.05	<0.05	<0.05	-	-	-
MW-18	06/30/1992	97.12	9.11	88.01	-	-	-	-	-	-	-	-	-	-	-
MW-18	07/15/1992	97.12	9.60	87.52	-	-	-	-	-	-	-	-	-	-	-
MW-18	08/28/1992	97.12	10.98	86.14	-	-	-	-	-	-	-	-	-	-	-
MW-18	10/13/1992	97.12	9.81	87.31	-	-	-	-	-	-	-	-	-	-	-
MW-18	11/21/1992	97.12	9.13	87.99	-	-	-	-	3.7	0.0038	0.0019	0.0016	-	-	-
MW-18	12/17/1992	97.12	8.70	88.42	-	-	-	-	3.2 / 2.7	<0.01 / 0.01	<0.01 / <0.01	<0.01 / <0.01	-	-	-
MW-18	01/25/1993	97.12	9.69	87.43	-	-	-	-	-	-	-	-	-	-	-
MW-18	02/10/1993	97.12	12.20	84.92	-	-	-	-	2.6	0.004	0.003	<0.002	-	-	-
MW-18	03/08/1993	97.12	10.36	86.76	-	-	-	-	-	-	-	-	-	-	-
MW-18	03/16/1993	97.12	10.38	86.74	-	-	-	-	-	-	-	-	-	-	-
MW-18	04/14/1993	97.12	7.45	89.67	-	-	-	-	-	-	-	-	-	-	-
MW-18	05/05/1993	97.12	7.69	89.43	-	-	-	-	1.6	<0.01	<0.01	<0.02	-	-	-
MW-18	06/15/1993	97.12	9.09	88.03	-	-	-	-	-	-	-	-	-	-	-
MW-18	07/19/1993	97.12	10.82	86.30	-	-	-	-	-	-	-	-	-	-	-
MW-18	08/20/1993	97.12	11.28	85.84	-	-	-	-	-	-	-	-	-	-	-
MW-18	03/19/1997	-	-	-	-	2.370	-	-	0.892	<0.00500	<0.00500	<0.0100	-	-	-
MW-18	12/10/1997	-	-	-	-	0.882 / 0.406	-	-	0.356 / 0.162	<0.000500 / <0.000500	<0.000500 / <0.000500	<0.00100 / <0.00100	-	-	-
MW-18	11/20/1998	-	-	-	-	0.601	-	-	1.950	<0.000500	<0.000500	<0.00100	-	-	-
MW-18	01/19/2000	62.51	9.38	53.13	-	2.330	-	-	1.350	<0.000500	<0.000500	<0.00100	-	-	-
MW-19	03/29/2005	73.64	-	-	<0.40	2.01	-	-	0.0143	0.0008	0.135	0.286	-	-	-
MW-19	12/31/2005	73.64	-	-	<0.39	<0.05	-	-	<0.005	<0.005	0.00059	<0.015	-	-	-
MW-19	06/30/2006	73.64	-	-	<0.40	0.266	-	-	0.00356	<0.005	0.031	0.0564	-	-	-
MW-19	09/18/2006	73.64	-	-	1.0	4.6	-	-	0.027	0.0009	0.27	0.80	-	-	-
MW-19	06/29/2007	73.64	-	-	0.35	0.20	-	-	0.002	<0.001	0.02	0.03	-	-	-
MW-19	10/04/2007	73.64	9.82	63.82	0.66 / 0.71	2.6 / 2.6	-	-	0.02 / 0.02	<0.001 / <0.001	0.2 / 0.2	0.5 / <0.5	-	-	-
MW-19	06/19/2008	73.64	10.58	63.06	0.60	3.3	-	-	<0.002	0.001	0.2	0.4	-	-	-
MW-19	08/28/2008	75.65	10.68	64.97	0.69	2.0	-	-	0.02	<0.001	0.1	0.3	-	-	-
MW-19	05/14/2009	75.65	10.54	65.11	0.51	1.5	-	-	0.020	<0.0005	0.11	0.25	-	-	-
MW-19	08/27/2009	75.65	10.41	65.24	0.56	2.2	-	-	0.024	0.0005 J	0.14	0.42	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC ft nsl	DTW ftg	GWE ft nsl	DRO mg/L	HYDROCARBONS		Oil and Grease mg/L	Benzene mg/L	PRIMARY VOCs		Total Xylenes mg/L	HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L			Toluene mg/L	Ethylbenzene mg/L			EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels*					1.5	2.2	1.0		0.005	1.0	0.7	10.0		0.00005	0.0005
MW-20	03/29/2005	71.21	-	-	8.90 / 8.63	46.2 / 45.9	-	-	0.657 / 0.665	3.67 / 3.72	1.78 / 1.77	11.4 / 11.5	-	-	-
MW-20	12/31/2005	71.21	-	-	10.1 / 11.0	60.1 / 58.6	-	-	0.844 / 0.821	5.73 / 5.88	1.78 / 1.81	12.6 / 12.9	-	-	-
MW-20	06/30/2006	71.21	-	-	10.9 / 10.7	57.9 / 58.5	-	-	0.800 / 0.788	6.08 / 6.04	2.09 / 2.08	14.1 / 14.1	-	-	-
MW-20	09/18/2006	71.21	-	-	5.6 / 5.3	23 / 23	-	-	0.35 / 0.35	0.73 / 0.75	0.94 / 0.92	6.0 / 5.9	-	-	-
MW-20	06/29/2007	71.21	-	-	8.0 / 7.5	41 / 43	-	-	0.50 / 0.50	3.5 / 3.7	1.4 / 1.4	9.7 / 9.4	-	-	-
MW-20	10/04/2007	71.21	8.94	62.27	5.30	29	-	-	0.3	1.2	1.2	7.0	-	-	-
MW-20	06/19/2008	71.21	9.88	61.33	4.6 / 4.3	21 / 19	-	-	0.3 / 0.2	0.6 / 0.5	0.7 / 0.7	3.9 / 4.2	-	-	-
MW-20	08/28/2008	-	-	-	4.2	24	-	-	0.3	1.0	0.9	5.3	-	-	-
MW-20	08/29/2008	73.73	9.98	63.75	4.5	26	-	-	0.3	1.1	0.9	4.7	-	-	-
MW-20	05/14/2009	73.73	9.59	64.14	5.4 J / 3.9 J	35 / 38	-	-	0.40 / 0.37	1.6 / 1.5	1.4 / 1.5	8.9 / 9.2	-	-	-
MW-20	08/27/2009	73.73	9.30	64.43	2.3 J / 2.6	17 / 18	-	-	0.19 / 0.19	0.48 / 0.47	0.79 / 0.83	5.3 / 5.6	-	-	-
MW-21	03/29/2005	62.30	-	-	<0.40	<0.8	-	-	0.00635	<0.005	<0.005	<0.001	-	-	-
MW-21	12/31/2005	62.30	-	-	<0.39	<0.05	-	-	0.00591	<0.005	<0.005	<0.0015	-	-	-
MW-21	06/30/2006	62.30	-	-	<0.40	<0.05	-	-	0.0155	<0.005	<0.005	<0.0015	-	-	-
MW-21	09/18/2006	62.30	-	-	<0.24	0.051	-	-	0.020	<0.005	<0.005	<0.0005	-	-	-
MW-21	06/29/2007	62.30	-	-	0.032	<0.01	-	-	0.002	<0.001	<0.001	<0.001	-	-	-
MW-21	10/04/2007	62.30	7.15	55.15	0.043	0.09	-	-	0.04	<0.001	<0.001	<0.002	-	-	-
MW-21	06/19/2008	62.30	7.21	55.09	0.031	0.05	-	-	0.02	<0.001	<0.001	<0.002	-	-	-
MW-21	08/28/2008	62.87	7.49	55.38	0.009	0.04	-	-	0.02	<0.001	<0.001	<0.002	-	-	-
MW-21	05/14/2009	62.87	7.24	55.63	<0.50	0.018	-	-	0.0077	<0.0005	<0.0005	<0.0015	-	-	-
MW-21	08/27/2009	62.87	7.41	55.46	<0.052	0.028 J	-	-	0.013	<0.0005	<0.0005	<0.0015	-	-	-
MW-22	03/29/2005	60.59	-	-	<0.40	<0.08	-	-	<0.0005	<0.0005	<0.0005	<0.001	-	-	-
MW-22	12/31/2005	60.59	-	-	<0.39	<0.05	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-22	06/30/2006	60.59	-	-	<0.41	<0.05	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-22	09/18/2006	60.59	-	-	<0.048	<0.01	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-22	06/29/2007	60.59	-	-	0.066	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-22	10/04/2007	60.59	6.21	54.38	0.046	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.000096	<0.0005
MW-22	06/19/2008	60.59	7.22	53.37	0.053	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-22	08/28/2008	60.88	7.73	53.15	0.092	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-22	05/14/2009	60.88	6.41	54.47	<0.50	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-22	08/27/2009	60.88	7.75	53.13	<0.051	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-

**Table 1**  
**Groundwater Analytical Results**  
**Former Unocal Station 30-6448**  
**1441 C Street**  
**Anchorage, Alaska**

Location	Date	TOC Units	DTW ft msl	GWE ft msl	DRO mg/L	HYDROCARBONS			Benzene mg/L	PRIMARY VOCs		Total Xylenes mg/L	HVOCs mg/L	ADDITIONAL VOCs	
						GRO mg/L	TPH mg/L	Oil and Grease mg/L		Toluene mg/L	Ethylbenzene mg/L			EDB mg/L	1,2-DCA mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>						1.5	2.2	1.0	0.005	1.0	0.7	10.0		0.00005	0.0005
MW-23	03/29/2005	59.51	-	-	<0.40	<0.08	-	-	<0.0005	<0.0005	<0.0005	<0.001	-	-	-
MW-23	12/31/2005	59.51	-	-	<0.39	<0.05	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-23	06/30/2006	59.51	-	-	<0.39	<0.05	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-23	09/18/2006	59.51	-	-	<0.24	<0.01	-	-	<0.0005	<0.0005	<0.0005	<0.001	-	-	-
MW-23	06/29/2007	59.51	-	-	0.061	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-23	10/04/2007	59.51	5.18	54.33	0.054	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-23	06/19/2008	59.51	6.50	53.01	0.059	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-23	08/28/2008	59.94	6.97	52.97	0.120	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
MW-23	05/14/2009	59.94	5.60	54.34	<0.50	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
MW-23	08/27/2009	59.94	6.87	53.07	0.051 J	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
Trip Blank	10/04/2007	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.002	-	<0.000096	<0.0005
Trip Blank	06/19/2008	-	-	-	-	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
Trip Blank	08/28/2008	-	-	-	-	<0.01	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
Trip Blank	02/16/2009	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.002	-	-	-
Trip Blank	04/29/2009	-	-	-	-	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-
Trip Blank	08/19/2009	-	-	-	-	<0.010	-	-	<0.0005	<0.0005	<0.0005	<0.0015	-	-	-

**Table 1**  
Groundwater Analytical Results  
Former Unocal Station 30-6448  
1441 C Street  
Anchorage, Alaska

**Notes and Abbreviations**

TOC = Top of Casing  
DTW = Depth to Water  
GWE = Groundwater Elevation  
TPH = Total Petroleum Hydrocarbons  
DRO = Diesel Range Organics by Alaska Series Method AK102  
GRO = Gasoline Range Organics by Alaska Series Method AK101  
Benzene, Toluene, Ethylbenzene, and Total Xylenes by Environmental Protection Agency (EPA) Method 8021B or 8260B  
Total Xylenes = Sum of m-, o-, and p-xylenes  
MTBE = Methyl Tertiary-Butyl Ether  
HVOC = Halogenated Volatile Organic Compounds by EPA Method 524.2  
ADEC = Alaska Department of Environmental Conservation  
\* = Levels established in ADEC Table C Groundwater Cleanup Levels (18 AAC 75.345)  
**BOLD** = Indicates concentration above the ADEC Table C Groundwater Cleanup Level  
NA = Not Applicable  
ft msl = Feet Above Mean Sea Level  
ftg = Feet Below Grade  
mg/L = Milligrams per Liter  
ND = Not detected above laboratory method detection limits  
- = Not Measured/Not Analyzed  
\* = Sample date defaulted to first date listed in historical data table  
-x = Constituent not detected above x milligrams per liter  
x / y = Sample Results / Blind Duplicate Results  
\*\* = Sample date accurate to month and year only  
<sup>1</sup> = Methylene Chloride  
Groundwater data from 1992 through 2007 provided by Gettler-Ryan, Inc.

APPENDIX A  
ENVIRONMENTAL HISTORY

## ENVIRONMENTAL HISTORY

**1986 Subsurface Investigation and Well Installation:** A subsurface petroleum loss of approximately 600 gallons of gasoline was detected. LNAPL was detected in a well adjacent to the USTs. Twelve soil borings were advanced and ten completed as monitoring wells B-3 through B-11 and RW-1. No petroleum hydrocarbons were detected in soil samples collected downgradient of the site. Recovery well RW-1 was installed south of the USTs in August to recover LNAPL and assess impact south of the site. Soil sample B-11-6 contained the maximum benzene concentration at 82.8 mg/kg.

**1987 Site Demolition, UST Removal and Excavation:** Three USTs were removed and the service station was demolished in October 1987. Excavation spoils were stockpiled onsite and in April 1988 were transported to a soil land farming area at Stephan's Tool Rental in Anchorage, Alaska. No soil sample data was available at the time of this report.

**1988 Soil Vapor Survey, Test Pits, and Well Installation:** Two soil borings were completed as monitoring wells B-12 and B-13. Petrex soil vapor samplers were installed on properties adjacent to the site. Test pits TP-1 through TP-5 were excavated to assess the vertical and horizontal extent of petroleum hydrocarbons in the subsurface. Total petroleum hydrocarbons (TPH) were detected at a maximum concentration of 5.17 mg/kg in sample TP-1. Sample TP-4 contained the maximum benzene concentration of 4.65 mg/kg. Soil gas data indicated the presence of volatiles in site soil.

**1989 Well Installation:** Three soil borings were advanced and completed as groundwater monitoring wells MW-14 through MW-16. No petroleum hydrocarbons were detected above soil cleanup levels in any collected sample.

**1989 Subsurface Investigation:** Six test pits TP-6 through TP-12 were excavated to assess the downgradient extent of petroleum hydrocarbons in soil. Approximately 300 cubic yards (yd<sup>3</sup>) of soil was excavated near the former used oil tank and septic system. The maximum BTEX concentration was 0.33 mg/kg in sample TP-6.

**1989 Groundwater Extraction System Installation:** A groundwater extraction and treatment system was installed and operated from December 1989 until March 1994. The system consisted of two collection galleries (one offsite and one onsite) designed to reduce downgradient groundwater migration. A total of 1,157,334 gallons of treated groundwater was discharged to the sanitary sewer during operations.

**1990 Soil Vapor Extraction System Installation:** A soil vapor extraction (SVE) system was installed and operated from January 1990 until October 1993.

**1990 Well Installation:** Four soil borings were advanced and completed as groundwater monitoring wells MW-6A, MW-11A, MW-17, and MW-18. TPH was detected at a maximum concentration of 1,983 mg/kg in sample MW-11A. Soil sample MW-18 contained the maximum benzene concentration of 0.39 mg/kg.

**1997 Phase II Environmental Site Assessment:** Test pits TP-A through TP-L were excavated south of the site to assess downgradient migration. Soil sample TP-A contained the maximum concentrations of GRO (6.89 mg/kg) and benzene (3.67 mg/kg).

**2003 Excavation and Well Decommissioning:** Monitoring wells MW-14 through MW-18 were decommissioned. Approximately 2,005 yd<sup>3</sup> of soil were excavated along the northern and western extent of the property south of the site.

**2004 Subsurface Investigation and Well Installation:** Three soil borings were advanced and completed as groundwater monitoring wells MW-21 through MW-23. No DRO or GRO were detected above soil cleanup levels in any collected sample. Benzene was detected at a maximum concentration of 0.0298 mg/kg in sample MW-21.

**2008 Subsurface Investigation:** Ten soil borings SS-1 through SS-10 were advanced to assess the residual horizontal and vertical extent of petroleum hydrocarbons in soil. DRO was detected at a maximum concentration of 580 mg/kg in sample SS-4-3. Sample SS-6-8 contained the maximum GRO concentration of 630 mg/kg. Benzene was detected at a maximum concentration of 3.2 mg/kg in sample SS-8-12.