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ADEC File No.

## INITIAL VAPOR INTRUSION EVALUATION REPORT

**CHEVRON-BRANDED SERVICE STATION 9-6489  
1304 AIRPORT HEIGHTS DRIVE  
ANCHORAGE, ALASKA  
FILE ID: 2100.26.066**

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CONSERVATION**

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**CONESTOGA-ROVERS  
& ASSOCIATES**

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BTEX	Benzene, toluene, ethyl-benzene, and xylene
Chevron	Chevron Environmental Management Company
COC	Chemicals of Concern
CRA	Conestoga-Rovers & Associates
CSM	Conceptual Site Model
fbg	Feet below grade
ft	Feet
GRO	Gasoline range organics
LNAPL	Light Non-Aqueous Phase Liquid
mg/l	Milligrams per liter
mg/kg	Milligrams per kilogram
P.E.	Project Engineer
UST	Underground storage tank
yd <sup>3</sup>	Cubic yards



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& ASSOCIATES**

## **1.0 INTRODUCTION**

Conestoga-Rovers & Associates (CRA) is submitting this *Initial Vapor Intrusion Evaluation Report* to the Alaska Department of Environmental Conservation (ADEC) on behalf of Chevron Environmental Management Company (Chevron) for Chevron-branded Service Station 9-6489 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 an active Chevron-branded service station, located at 1304 Airport Heights Drive on the southwest corner of Airport Heights Drive and Debarr Road in Anchorage, Alaska (Figure 1). The property legal description is SAXTON BLOCK 1 LOT 14A, and is located at approximately 61.209511 north and 149.823313 west. The surrounding area consists of both residential and commercial development. An undeveloped, forested area occupies the northeast corner of the intersection. Site facilities include five underground storage tanks (USTs), dispenser islands, associated piping and a station building (Figure 2). The station is built slab on grade. The ground surface is concrete below the station, under the canopies, and around the UST fill ports. The remaining ground surface is covered with asphalt. Site photographs are presented as Appendix A. Petroleum hydrocarbon concentrations were discovered during facility upgrades and tank removal in 1998. The site environmental history is included as Appendix B.

### **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. Site subsurface sediments



primarily consist of sandy gravel and gravelly sand to the total explored depth. Silty sand to sandy silt lenses were encountered at various depths throughout the site.

### **2.3 HYDROGEOLOGY**

The site is located in south central Alaska, between the northern Knik Arm and the southern Turnagain Arm of the Cook Inlet. Cook Inlet is located approximately one and a half miles downgradient from the site. Anchorage's average annual precipitation is 15.9 inches per year, and September is typically the wettest month. Historical static groundwater depths have ranged between 24.94 to 28.84 feet below grade (fbg) according to groundwater data from 1999 to present. Historically groundwater flows to the northwest. The August 2009 groundwater elevation 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 preliminary Conceptual Site Model (CSM) was submitted to the ADEC on October 5, 2007. Incidental soil ingestion, 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 not released onsite. Potential human receptors include residents, commercial or industrial workers, construction workers, and site visitors or trespassers.

## **3.0 SITE CONDITIONS**

Petroleum hydrocarbon concentrations were discovered during facility upgrades and tank removal in 1998. The site environmental history is included as Appendix B.

### **3.1. SOIL QUALITY**

Petroleum hydrocarbons have been detected above ADEC Method II Cleanup Levels (*Title 18 Alaska Administrative Code (AAC) 75.341*) in soil samples collected from monitoring wells MW-4, MW-5, and MW-7. The maximum gasoline range organics (GRO) concentration detected was 91.7 milligrams per kilogram (mg/kg) (MW-5 at 28 fbg) and benzene was detected at a maximum concentration of 2.19 mg/kg (MW-4 at 27 fbg). No petroleum hydrocarbons were detected above cleanup levels in soil samples collected from monitoring wells MW-6 and MW-8 through MW-11.



### **3.2 GROUNDWATER QUALITY**

During the August 2009 sampling event, no GRO or benzene, toluene, ethyl-benzene, and xylene (BTEX) was detected above laboratory detection limits in groundwater samples collected from monitoring wells MW-10 and MW-11. The maximum GRO concentration was 11 milligrams per liter (mg/l) (MW-7). Benzene exceeded the ADEC Table C Groundwater Cleanup Level (*Title 18 AAC 75.345*) in groundwater samples collected from monitoring wells MW-4, MW-5, MW-6, and MW-7. The maximum benzene concentration was 0.35 mg/l (MW-7). A summary of historical groundwater analytical results is presented in Table 1.

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

GRO and benzene are the primary chemicals of concern (COCs) at the site. Petroleum hydrocarbons in soil have been detected above cleanup levels near the former USTs. Petroleum hydrocarbon concentrations in groundwater have been defined downgradient by groundwater monitoring wells MW-10 and MW-11, and crossgradient by groundwater monitoring wells MW-8 and MW-9.

## **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

Vapor intrusion may be a risk based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). Volatile chemical concentrations in groundwater exceed the ADEC Groundwater Target Levels in close proximity to the station building. Soil gas samples have not been collected at the site but are required based on volatile chemical concentrations in groundwater.

#### 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). Volatile chemical concentrations in groundwater samples collected from MW-4, MW-6 and MW-7 exceed the Groundwater Target Levels. CRA recommends soil gas sampling near the station building foundation in 2010 based on current soil and groundwater data. A soil gas sampling workplan will be submitted for ADEC approval by June 30, 2010.





**CONESTOGA-ROVERS  
& ASSOCIATES**

## **6.0    REFERENCES**

SECOR International Incorporated, *Site Assessment*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, September 1999.

SECOR International Incorporated, *Site Assessment*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, April 2001.

SECOR International Incorporated, *Sensitive Receptor Survey*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, November 2001.

SECOR International Incorporated, *Well Installation Report*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, July 2003.

Cambria Environmental Technology, Inc., *Subsurface Investigation Report*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, February 2007.

Conestoga-Rovers & Associates, Inc., *Preliminary Conceptual Site Model*, Chevron Service Station No. 9-6489, 1304 Airport Heights Dr., Anchorage, Alaska, October 2007.

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, 2009.

FIGURES

FIGURE 1: VICINITY MAP

FIGURE 2: GROUNDWATER ELEVATION CONTOUR MAP

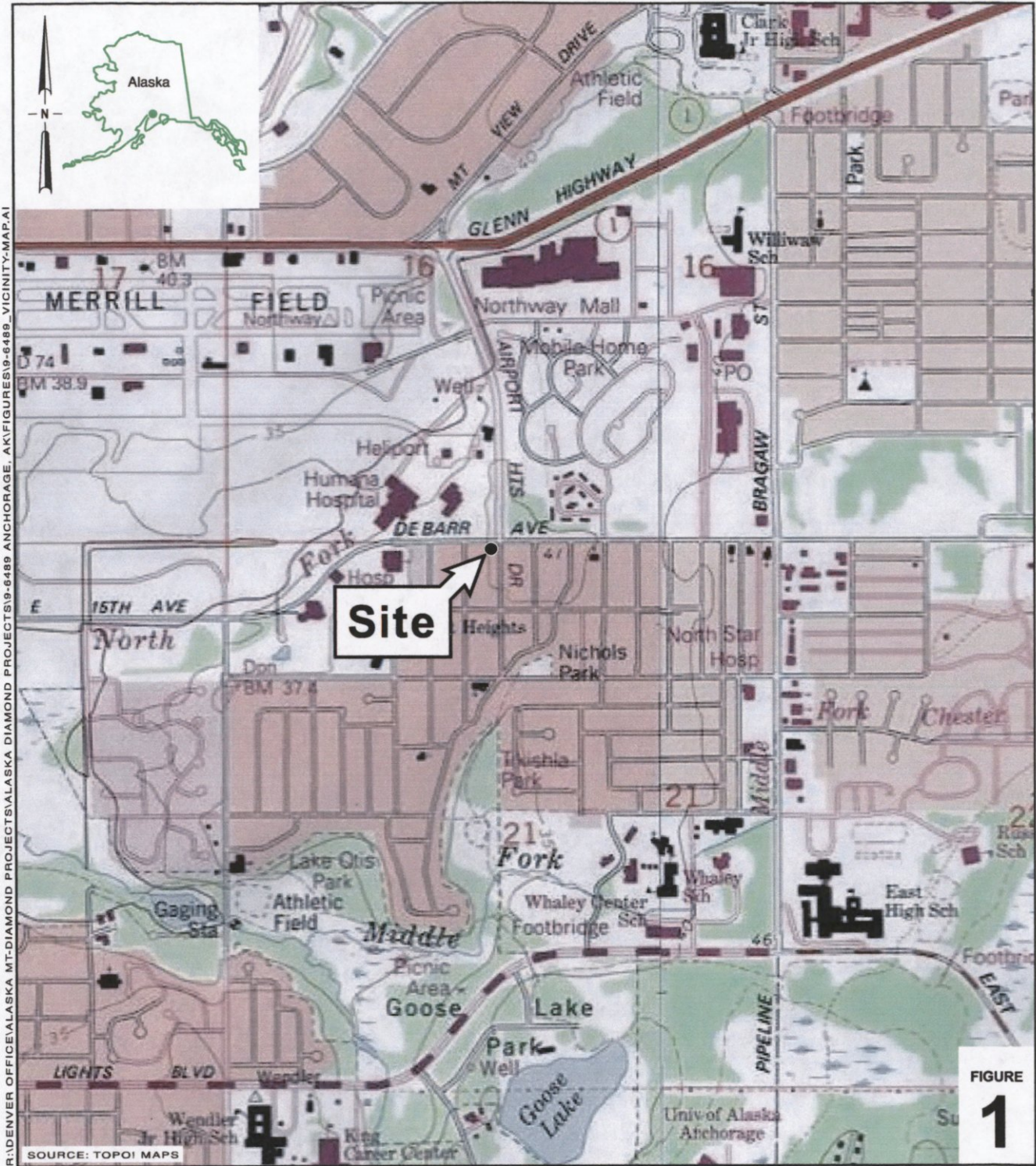
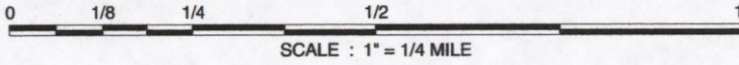


FIGURE 1

R:\DENVER OFFICE\ALASKA MT-DIAMOND PROJECTS\ALASKA DIAMOND PROJECTS\9-6489 ANCHORAGE\_AK\FIGURES\9-6489\_VICINITY-MAP.A1

SOURCE: TOPOI MAPS



**Chevron Service Station 9-6489**  
 1304 Airport Heights Drive  
 Anchorage, Alaska



**CONESTOGA-ROVERS  
 & ASSOCIATES**

**Vicinity Map**

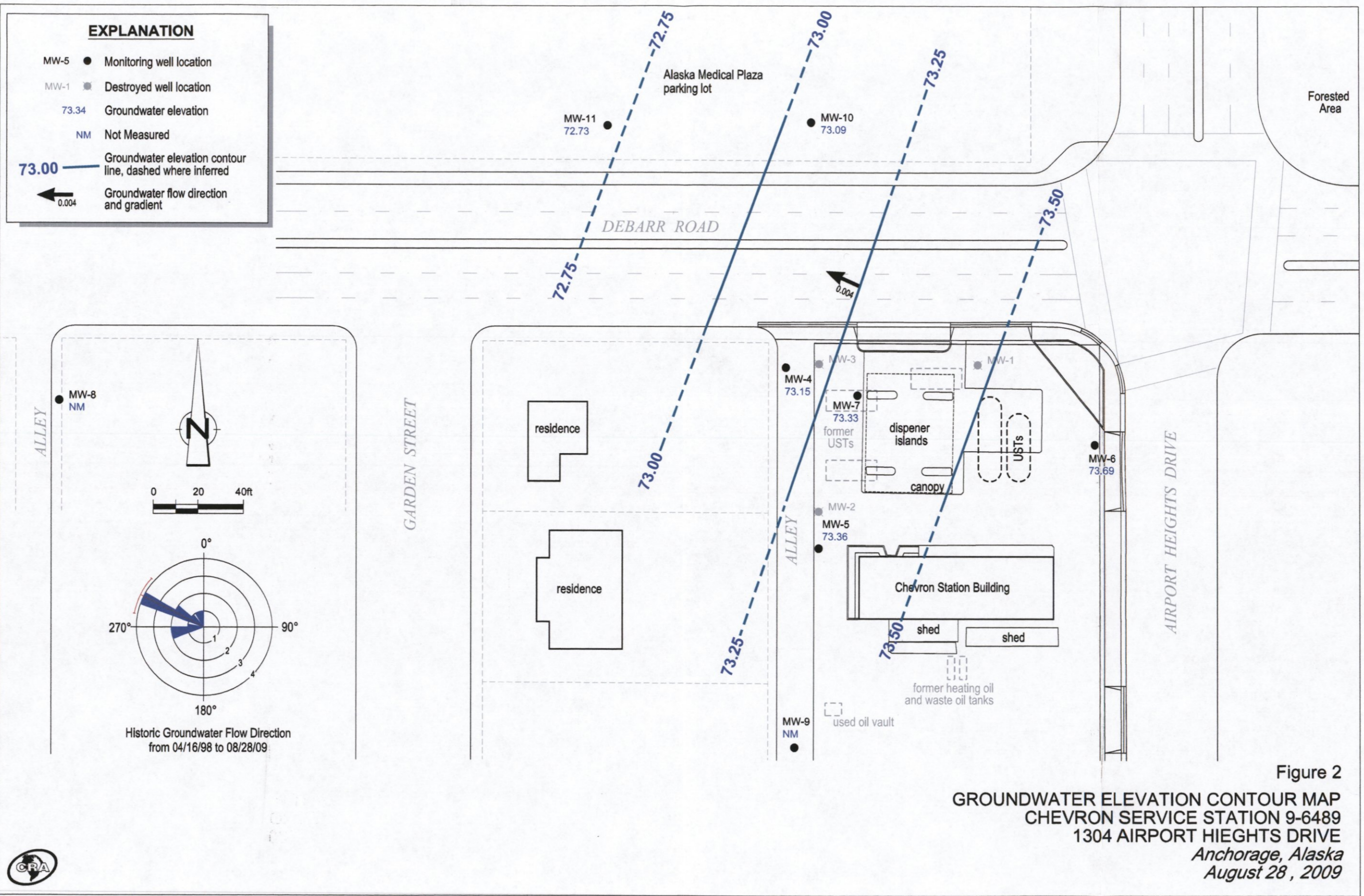


Figure 2  
**GROUNDWATER ELEVATION CONTOUR MAP**  
**CHEVRON SERVICE STATION 9-6489**  
**1304 AIRPORT HIEGHTS DRIVE**  
*Anchorage, Alaska*  
*August 28 , 2009*



TABLES

TABLE 1: GROUNDWATER ANALYTICAL RESULTS

**Table 1**  
 Groundwater Analytical Results  
 Chevron-branded Service Station 9-6489  
 1304 Airport Heights Dr  
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-4	07/03/1999	131.97	27.74	104.23	9.33	0.625	0.54	0.041	0.292	<0.04
MW-4	10/12/1999	131.97	26.44	105.53	17.9	1.48	4.35	0.296	1.67	<0.125
MW-4	05/22/2000	131.97	26.21	105.76	19.2 / 9.57	1.63 / 0.809	4.02 / 1.83	0.403 / 0.0246	1.89 / 0.82	<0.1 / <0.04
MW-4	09/20/2000	131.97	26.25	105.72	47.7	3.4	13.6	<0.25	6.86	<0.5
MW-4	05/04/2001	131.97	26.90	105.07	9.32	0.63	2.28	0.202	0.904	<0.5
MW-4	09/26/2001	131.97	26.90	105.07	9.16	0.539	2.39	0.181	0.684	<0.5
MW-4	05/08/2002	131.98	-	-	-	-	-	-	-	-
MW-4	10/02/2002	131.98	26.24	105.74	-	-	-	-	-	-
MW-4	12/12/2002	131.98	25.68	106.30	5.2	0.25	1.8	0.29	0.89	0.002
MW-4	06/05/2003	131.98	26.31	105.67	4.1	0.1	1.1	0.054	0.32	<0.002
MW-4	10/02/2003	131.98	26.72	105.26	8.0	0.085	1.6	0.21	0.9	<0.002
MW-4	06/08/2004	131.98	25.97	106.01	38.0 / 25.0	0.4 / 0.24	9.4 / 5.4	0.75 / 0.44	3.6 / 2.1	-
MW-4	09/27/2004	131.98	26.55	105.43	4.6 / 13.0	0.079 / 0.12	1.8 / 2.6	0.26 / 0.38	0.91 / 1.3	-
MW-4	05/10/2005	131.98	25.97	106.01	34.0	0.19	6.5	0.76	3.8	-
MW-4	05/16/2005	131.98	26.38	105.60	17.0	0.072	2.9	0.48	2.4	-
MW-4	09/22/2006	131.98	25.84	106.14	5.7	0.078	1.1	0.19	0.85	-
MW-4	05/23/2007	131.98	26.11	105.87	3.8	0.03	0.7	0.1	0.7	-
MW-4	09/21/2007	131.98	26.14	105.84	3.1	0.03	0.6	0.1	0.5	-
MW-4	05/02/2008	131.98	26.18	105.80	0.914 / 0.878	0.0122 / 0.0115	0.152 / 0.147	0.0433 / 0.0411	0.197 / 0.184	-
MW-4	07/14/2008	98.67	25.12	73.55	16.0 / 14.0	0.1 / 0.03	1.3 / 1.0	0.7 / 0.5	3.0 / 2.6	-
MW-4	05/05/2009	98.67	25.51	73.16	8.0 / 5.9	0.092 / 0.070	0.84 / 0.64	0.40 / 0.30	1.9 / 1.4	-
MW-4	08/28/2009	98.67	25.52	73.15	9.4 / 7.8	0.14 / 0.11	1.0 / 0.86	0.49 / 0.42	2.3 / 1.9	-

**Table 1**  
 Groundwater Analytical Results  
 Chevron-branded Service Station 9-6489  
 1304 Airport Heights Dr  
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-5	07/03/1999	133.43	28.04	105.39	1.18	<b>0.0063</b>	0.0073	0.0122	0.0036	<0.002
MW-5	10/12/1999	133.43	27.75	105.68	0.098 / 0.103	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.005 / <0.005
MW-5	05/22/2000	133.43	27.50	105.93	<0.08	<0.0005	0.00175	<0.0005	<0.001	<0.002
MW-5	09/20/2000	133.43	27.57	105.86	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
MW-5	05/04/2001	133.43	28.24	105.19	<0.05	0.000639	<0.0005	<0.0005	<0.001	<0.001
MW-5	09/26/2001	133.43	-	-	-	-	-	-	-	-
MW-5	05/08/2002	133.54	28.60	104.94	<0.05 / <0.05	<0.0002 / 0.000405	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.001 / <0.0001	<0.001 / <0.001
MW-5	10/02/2002	133.43	27.56	105.98	-	-	-	-	-	-
MW-5	06/05/2003	133.44	27.68	105.76	0.012 / 0.012	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.002 / <0.002
MW-5	10/02/2003	133.44	28.04	105.40	0.026 / 0.037	0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.002 / <0.002
MW-5	06/08/2004	133.44	27.26	106.18	0.027	0.005	<0.0005	<0.0005	<0.0005	-
MW-5	09/27/2004	133.44	27.65	105.79	0.017	0.001	<0.0005	<0.0005	<0.0005	-
MW-5	05/10/2005	133.44	27.30	106.14	0.035	<b>0.0059</b>	0.0005	<0.0002	<0.0006	-
MW-5	09/27/2005	133.44	27.49	105.95	0.039	0.004	<0.0005	<0.0005	<0.0005	-
MW-5	05/16/2006	133.44	27.67	105.77	0.068 / 0.068	<b>0.013 / 0.015</b>	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0015 / <0.0015	-
MW-5	09/22/2006	133.44	27.13	106.31	0.027	<b>0.0094</b>	<0.0005	<0.0005	<0.0015	-
MW-5	05/23/2007	133.44	27.42	106.02	0.01	0.003	<0.001	<0.001	<0.002	-
MW-5	09/21/2007	133.44	27.48	105.96	0.02	<b>0.008</b>	<0.001	<0.001	<0.002	-
MW-5	05/02/2008	133.54	27.53	106.01	<0.05	<b>0.00677</b>	<0.0005	<0.0005	<0.0015	-
MW-5	07/14/2008	100.17	26.51	73.66	0.08	<b>0.03</b>	<0.001	<0.001	<0.002	-
MW-5	05/05/2009	100.17	26.83	73.34	0.039	<b>0.014</b>	<0.0005	<0.0005	<0.0015	-
MW-5	08/28/2009	100.17	26.81	73.36	0.063 J	<b>0.018</b>	<0.0005	<0.0005	<0.0015	-

**Table 1**  
**Groundwater Analytical Results**  
**Chevron-branded Service Station 9-6489**  
**1304 Airport Heights Dr**  
**Anchorage, Alaska**

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-6	07/03/1999	133.12	27.36	105.76	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-6	10/12/1999	133.12	27.04	106.08	0.266	<b>0.053</b>	<0.0005	<0.0005	<0.0005	<0.005
MW-6	05/22/2000	133.12	26.79	106.33	<0.08	<0.0005	<0.0005	<0.0005	0.00147	<0.002
MW-6	09/20/2000	133.12	26.86	106.26	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
MW-6	05/04/2001	133.12	27.54	105.58	<0.05	<b>0.0167</b>	<0.0005	<0.0005	<0.001	<0.001
MW-6	09/26/2001	133.12	27.51	105.61	0.211	<b>0.0694</b>	<0.0005	<0.0005	<0.001	0.00246
MW-6	05/08/2002	133.11	27.91	105.20	0.0961	<b>0.0367</b>	<0.0005	<0.0005	<0.001	<0.001
MW-6	10/02/2002	133.11	26.84	106.27	-	-	-	-	-	-
MW-6	12/12/2002	133.11	26.19	106.92	0.16	<b>0.068</b>	<0.0005	<0.0005	<0.0005	<0.0005
MW-6	06/05/2003	133.11	26.93	106.18	0.026	<b>0.008</b>	<0.0005	<0.0005	<0.0005	<0.002
MW-6	10/02/2003	133.11	27.33	105.78	0.095	<b>0.043</b>	<0.0005	<0.0005	<0.0005	<0.002
MW-6	06/08/2004	133.11	26.52	106.59	0.21	<b>0.14</b>	<0.0005	<0.0005	<0.0005	-
MW-6	09/27/2004	133.11	27.02	106.09	0.048	<b>0.018</b>	<0.0005	<0.0005	<0.0005	-
MW-6	05/10/2005	133.11	26.56	106.55	0.3	<b>0.086</b>	<0.0002	<0.0002	<0.0006	-
MW-6	09/27/2005	133.11	26.76	106.35	0.24	<b>0.14</b>	<0.0005	<0.0005	<0.0005	-
MW-6	05/16/2006	133.11	27.02	106.09	0.24	<b>0.079</b>	<0.0005	<0.0005	<0.0015	-
MW-6	09/22/2006	133.11	26.41	106.70	0.13	<b>0.044</b>	<0.0005	<0.0005	<0.0015	-
MW-6	05/23/2007	133.11	26.73	106.38	0.04	<b>0.02</b>	<0.001	<0.001	<0.002	-
MW-6	09/21/2007	133.11	26.81	106.30	0.07 / 0.07	<b>0.03 / 0.03</b>	<0.001 / <0.001	<0.001 / <0.001	<0.002 / <0.002	-
MW-6	05/02/2008	133.11	26.84	106.27	<0.05	<b>0.018</b>	<0.0005	<0.0005	<0.0015	-
MW-6	07/14/2008	99.81	25.80	74.01	0.2	<b>0.08</b>	<0.001	<0.001	<0.002	-
MW-6	05/05/2009	99.81	26.04	73.77	0.088	<b>0.036</b>	<0.0005	<0.0005	<0.0015	-
MW-6	08/28/2009	99.81	26.12	73.69	0.36	<b>0.11</b>	<0.0005	<0.0005	<0.0015	-



**Table 1**  
Groundwater Analytical Results  
Chevron-branded Service Station 9-6489  
1304 Airport Heights Dr  
Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCs			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-7	07/03/1999	132.95	27.42	105.53	20.1	0.627	2.82	0.507	2.42	<0.2
MW-7	10/12/1999	132.95	27.18	105.77	22.2	1.24	4.98	0.452	2.74	<0.25
MW-7	05/22/2000	132.95	26.94	106.01	29.1	1.25	5.71	0.504	3.06	<0.2
MW-7	09/20/2000	132.95	26.99	105.96	33.2 / 24.6	1.5 / 1.44	8.52 / 5.33	0.873 / <0.1	5.04 / 4.94	<0.1 / <0.2
MW-7	05/04/2001	132.95	27.65	105.30	6.04	0.222	0.841	0.122	0.488	<0.005
MW-7	09/26/2001	132.95	27.60	105.35	8.4	0.254	1.76	0.214	1.43	<0.01
MW-7	05/08/2002	132.85	27.98	104.87	28.1	0.48	5.24	0.573	4.31	<0.025
MW-7	10/02/2002	132.85	26.96	105.89	-	-	-	-	-	-
MW-7	12/12/2002	132.84	26.37	106.47	4.9 / 12.0	0.024 / 0.32	3.9 / 4.3	0.39 / 0.48	2.2 / 2.6	0.5 / <0.001
MW-7	06/05/2003	132.84	27.04	105.80	0.83	0.012	0.14	0.017	0.13	<0.002
MW-7	10/02/2003	132.84	27.45	105.39	14.0	0.086	1.5	0.28	1.6	<0.002
MW-7	06/08/2004	132.84	26.65	106.19	73.0	0.53	15.0	2.0	12.0	-
MW-7	09/27/2004	132.84	27.11	105.73	8.7	0.066	2.3	0.31	1.7	-
MW-7	05/10/2005	132.84	26.65	106.19	26.0	0.11	4.2	0.63	3.7	-
MW-7	09/27/2005	132.84	27.15	105.69	9.6	0.088	1.3	0.22	1.6	-
MW-7	05/16/2006	132.84	27.09	105.75	12.0	0.11	1.6	0.35	2.0	-
MW-7	09/22/2006	132.84	26.52	106.32	6.0 / 5.9	0.11 / 0.12	0.77 / 0.78	0.17 / 0.17	1.1 / 1.1	-
MW-7	05/23/2007	132.84	26.81	106.03	4.9 / 2.2	0.09 / 0.04	0.6 / 0.3	0.2 / 0.08	1.1 / 0.4	-
MW-7	09/21/2007	132.84	26.83	106.01	0.9	0.03	0.1	0.03	0.2	-
MW-7	05/02/2008	132.85	26.93	105.92	20.4	0.415	3.05	0.786	4.36	-
MW-7	07/14/2008	99.54	25.86	73.68	8.2	0.04	0.02	0.5	1.8	-
MW-7	05/05/2009	99.54	26.21	73.33	5.3	0.19	0.52	0.26	1.2	-
MW-7	08/28/2009	99.54	26.21	73.33	11	0.35	0.63	0.56	3.0	-

**Table 1**  
 Groundwater Analytical Results  
 Chevron-branded Service Station 9-6489  
 1304 Airport Heights Dr  
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-8	09/20/2000	-	25.46	-	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
MW-8	05/04/2001	-	-	-	-	-	-	-	-	-
MW-8	06/25/2001	-	-	-	<0.05	0.000224	<0.0005	<0.0005	<0.001	<0.001
MW-8	09/26/2001	-	26.00	-	<0.05 / <0.05	<0.0002 / <0.0002	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.001 / <0.001	<0.001 / <0.001
MW-8	05/08/2002	129.94	-	-	-	-	-	-	-	-
MW-8	10/02/2002	129.94	-	-	-	-	-	-	-	-
MW-8	12/12/2002	129.95	24.94	105.01	0.029	<0.0005	<0.0005	<0.0005	<0.0005	0.055
MW-8	06/05/2003	129.95	-	-	-	-	-	-	-	-
MW-8	10/02/2003	129.95	-	-	-	-	-	-	-	-
MW-8	06/08/2004	129.95	-	-	-	-	-	-	-	-
MW-8	09/27/2004	129.95	-	-	-	-	-	-	-	-
MW-8	05/10/2005	129.95	25.18	104.77	<0.01 / <0.01	<0.0002 / <0.0002	0.0003 / <0.0002	<0.0002 / <0.0002	<0.0006 / <0.0006	-
MW-8	09/27/2005	129.95	25.35	104.60	<0.01 / <0.01	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	-
MW-8	05/16/2006	129.95	-	-	-	-	-	-	-	-
MW-8	09/22/2006	129.95	24.99	104.96	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-8	05/23/2007	129.95	-	-	-	-	-	-	-	-
MW-8	09/21/2007	129.95	25.36	104.59	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-8	05/02/2008	129.94	-	-	-	-	-	-	-	-
MW-8	07/14/2008	97.04	-	-	-	-	-	-	-	-
MW-8	05/05/2009	97.04	-	-	-	-	-	-	-	-

**Table 1**  
 Groundwater Analytical Results  
 Chevron-branded Service Station 9-6489  
 1304 Airport Heights Dr  
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-9	12/12/2002	132.96	26.32	106.64	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-9	06/05/2003	132.96	-	-	-	-	-	-	-	-
MW-9	10/02/2003	132.96	-	-	-	-	-	-	-	-
MW-9	06/08/2004	132.96	26.71	106.25	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
MW-9	09/27/2004	132.96	-	-	-	-	-	-	-	-
MW-9	05/10/2005	132.96	-	-	-	-	-	-	-	-
MW-9	09/27/2005	132.96	-	-	-	-	-	-	-	-
MW-9	05/16/2006	132.96	-	-	-	-	-	-	-	-
MW-9	09/22/2006	132.96	-	-	-	-	-	-	-	-
MW-9	05/23/2007	132.96	26.86	106.10	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-9	09/21/2007	132.96	26.93	106.03	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-9	05/02/2008	132.96	27.00	105.96	<0.05	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-9	07/14/2008	99.67	26.00	73.67	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-9	05/14/2009	99.67	26.19	73.48	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-9	08/28/2009						Cannot Locate			
MW-10	10/02/2003	132.15	28.19	103.96	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-10	06/08/2004	132.15	28.45	103.70	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
MW-10	09/27/2004	132.15	26.91	105.24	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
MW-10	05/10/2005	132.15	28.57	103.58	<0.01	<0.0002	<0.0002	<0.0002	<0.0006	-
MW-10	09/27/2005	132.15	28.65	103.50	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
MW-10	05/16/2006	132.15	28.84	103.31	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-10	09/22/2006	132.15	28.33	103.82	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-10	05/23/2007	132.15	28.58	103.57	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-10	09/21/2007	132.15	28.60	103.55	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-10	05/02/2008	132.15	28.62	103.53	<0.05	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-10	07/14/2008	101.07	27.46	73.61	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-10	05/05/2009	101.07	27.97	73.10	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-10	08/28/2009	101.07	27.98	73.09	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-

**Table 1**  
Groundwater Analytical Results  
Chevron-branded Service Station 9-6489  
1304 Airport Heights Dr  
Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		PRIMARY VOCS			
					GRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels <sup>a</sup>					2.2	0.005	1	0.7	10	0.47
MW-11	09/22/2006	133.42	27.74	105.68	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-11	05/23/2007	133.42	27.98	105.44	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-11	09/21/2007	133.42	28.01	105.41	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-11	05/02/2008	133.42	28.02	105.40	<0.05	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-11	07/14/2008	100.14	26.87	73.27	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-11	05/05/2009	100.14	27.42	72.72	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-
MW-11	08/28/2009	100.14	27.41	72.73	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	10/12/1999	-	-	-	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Trip Blank	05/22/2000	-	-	-	<0.08	<0.0005	<0.0005	<0.0005	<0.001	<0.002
Trip Blank	09/20/2000	-	-	-	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
Trip Blank	05/04/2001	-	-	-	<0.05	-	-	-	-	<0.005
Trip Blank	06/25/2001	-	-	-	<0.05	<0.0002	<0.0005	<0.0005	1.19	<0.001
Trip Blank	09/26/2001	-	-	-	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
Trip Blank	05/08/2002	-	-	-	<0.05	<0.0002	<0.0005	<0.0005	<0.001	<0.001
Trip Blank	12/12/2002	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	06/05/2003	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
Trip Blank	10/02/2003	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
Trip Blank	06/08/2004	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
Trip Blank	09/27/2004	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
Trip Blank	05/10/2005	-	-	-	<0.01	<0.0005	<0.0002	<0.0002	<0.0006	-
Trip Blank	09/27/2005	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	-
Trip Blank	05/16/2006	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	09/24/2006	-	-	-	<0.01	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	05/23/2007	-	-	-	<0.01	<0.001	<0.001	<0.001	<0.002	-
Trip Blank	09/21/2007	-	-	-	<0.01	<0.001	<0.001	<0.001	<0.002	-
Trip Blank	05/02/2008	-	-	-	<0.05	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	07/14/2008	-	-	-	<0.01	<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  
Chevron-branded Service Station 9-6489  
1304 Airport Heights Dr  
Anchorage, Alaska

**Notes and Abbreviations**

VOCS = Volatile Organic Compounds

TOC = Top of Casing

DTW = Depth to Water

GWE = Groundwater Elevation

GRO = Gasoline Range Organics by Alaska Series Method AK101

Total Xylenes = Sum of m-, o-, and p-xylenes

MTBE = Methyl Tertiary-Butyl Ether

Benzene, Toluene, Ethylbenzene, and Total Xylenes by Environmental Protection Agency (EPA) Method 8021B, 8260B, or SW-846 8021B

ft msl = Feet Above Mean Sea Level

fbg = Feet Below Grade

mg/L = Milligrams per Liter

ADEC = Alaska Department of Environmental Conservation

<sup>a</sup> = Levels established in ADEC Table C Groundwater Cleanup Levels (18 AAC 75.345)

Groundwater data from 1999 through 2007 provided by Gettler-Ryan, Inc.

**BOLD** = Indicates concentration above the ADEC Table C Groundwater Cleanup Level

<x = Constituent not detected above x milligrams per liter

x / y = Sample Results / Blind Duplicate Results

- = Not Measured/Not Analyzed

APPENDIX A  
SITE PHOTOGRAPHS



1. Site layout looking NE



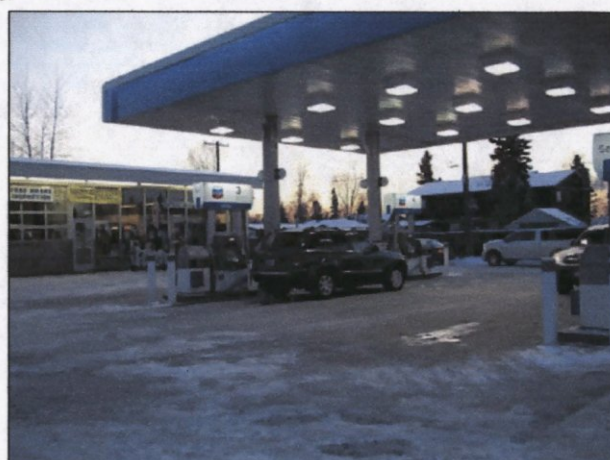
2. Site layout looking NW



3. Drum location (behind building)



4. Site layout looking SE



5. Site layout looking SW

Appendix A

PHOTOS

CHEVRON SERVICE STATION 9-6489

1304 AIRPORT HEIGHTS DRIVE

Anchorage, Alaska



APPENDIX B  
ENVIRONMENTAL HISTORY



## ENVIRONMENTAL HISTORY

**1997 Well Installation:** Three groundwater monitoring wells were installed onsite (MW-1, MW-2, and MW-3) in August 1997. The maximum benzene concentration was detected at 0.0909 mg/kg (MW-1).

**1998 Well Destruction, UST Removal and Excavation:** Groundwater monitoring wells MW-1, MW-2, and MW-3 were destroyed prior to upgrade activities due to their proximity to the planned excavation. In September 1998, five USTs and associated product lines were replaced at the site and approximately 150 cubic yards (yd<sup>3</sup>) of soil was removed. The maximum detected concentration of GRO was 1,740 mg/kg. The only detected concentration of benzene was 0.294 mg/kg.

**1999 Site Assessment:** Four groundwater monitoring wells (MW-4 through MW-7) were installed in July 1999. Soil samples MW-4 at 27 fbg, MW-5 at 28 fbg, MW-6 at 15 fbg, and MW-7 at 27 fbg contained benzene concentrations above soil cleanup levels at 2.19 mg/kg, 0.32 mg/kg, 0.03 mg/kg, and 0.36 mg/kg, respectively.

**2000 Site Assessment:** One off-site, downgradient groundwater monitoring well (MW-8) was installed in August 2000 to further delineate the lateral extent of dissolved phase hydrocarbons beneath the site. No petroleum hydrocarbons were detected above cleanup levels in any analyzed soil sample.

**2001 Sensitive Receptor Survey:** During September and October SECOR conducted a Sensitive Receptor Survey at the request of the ADEC. The survey included a quarter mile radius United States Geological Survey (USGS) well database search and door-to-door well survey. One well was located in the ¼ mile radius USGS search. The subsequent door-to-door well survey was conducted in a ¼ mile radius from the site. Of the 48 questionnaires collected by SECOR, one indicated the presence of a 10-inch diameter metal on-site well. The owner of the well did not know the installation date or the original use of the well. Full details of the well survey are included in SECOR's November 29, 2001 *Sensitive Receptor Survey Report*.

**2002 Site Assessment:** In June 2002, one groundwater monitoring well (MW-9) was installed to further delineate the lateral extent of dissolved phase hydrocarbons beneath the site. No petroleum hydrocarbons were detected in any analyzed soil sample.

**2003 Site Assessment:** One off-site, downgradient groundwater monitoring well (MW-10) was installed in May 2003 to further delineate the lateral extent of dissolved phase

hydrocarbons beneath the site. No petroleum hydrocarbons were detected in any analyzed soil sample.

**2006 Site Assessment:** One groundwater monitoring well (MW-11) was installed west of MW-10 to assess groundwater quality northwest of the site. No petroleum hydrocarbon constituents were detected above laboratory detection limits.