

***2007 Groundwater Monitoring Report  
Katmai National Park and Preserve  
Headquarters  
King Salmon, Alaska  
ADEC Facility ID No. 2013  
Reckey No. 99250001301***

***Prepared for  
National Park Service***

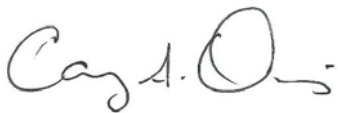
***July 2007  
7401-26***

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**July 2007  
7401-26**

**Prepared by  
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**2007 GROUNDWATER MONITORING REPORT  
KATMAI NATIONAL PARK AND PRESERVE HEADQUARTERS  
KING SALMON, ALASKA  
ADEC Facility ID No. 2013  
Reckey No. 99250001301**

## **1.0 INTRODUCTION**

The National Park Service (NPS) contracted Hart Crowser to perform groundwater monitoring at the Katmai National Park and Preserve (KATM) Headquarters in King Salmon, Alaska (Figure 1). The work was performed under U.S. General Services Administration (GSA) Contract No. GS-10F-0308K, Delivery Order No. 15.

This report presents the project objectives, a summary of findings, work performed, site data evaluation, conclusions, and recommendations. Background information and a summary of previous investigative activities for the site are included in Appendix A. Field methods used to accomplish the scope of work are presented in Appendix B and copies of the laboratory report and the data quality review are provided in Appendix C.

### **1.1 Site Description**

KATM occupies approximately 4 million acres on the west side of Cook Inlet, approximately 275 miles southwest of Anchorage, Alaska. The park headquarters is located in King Salmon, Alaska, on the north bank of the Naknek River, immediately adjacent to the King Salmon Airport (Figure 1). The facility consists of a visitor center situated adjacent to the Peninsula Airways office, with a maintenance facility and employee housing located to the southeast, on the south side of the King Salmon–Naknek Road (Figure 2).

Results of previous site investigation work at this site are provided in Appendix A.

### **1.2 Project Objectives**

The primary objectives of this work were to:

- Perform groundwater monitoring at selected onsite monitoring wells (MW-1R, MW-5, and MW-8) in order to update contaminant concentrations at the site;
- Measure the wells prior to spring runoff to evaluate whether free-phase hydrocarbons are still present at the site, particularly in MW-8; and

- Update the groundwater flow direction and gradient.

### **1.3 Summary of Findings**

The following summarizes the findings from this phase of work.

- The groundwater elevations measured at the site during May 2007 were approximately 2 to 3 feet lower than groundwater elevations measured in previous monitoring events;
- The inferred groundwater flow direction was to the southwest at an average gradient of 0.009;
- There were no ADEC groundwater cleanup level exceedences for benzene, toluene, ethylbenzene, and total xylenes (BTEX), gasoline-range organics (GRO), or diesel-range organics (DRO) in the site monitoring wells sampled in May 2007; and
- Free-phase hydrocarbons were not observed in any of the site monitoring wells during the May 2007 monitoring event.

## **2.0 WORK PERFORMED**

This section provides a summary of the work performed at the site for this project. Groundwater sampling and all fieldwork for this phase of the project occurred on May 9, 2007. All work was performed by a qualified person, as defined by 18 AAC 75. Our field methods are provided in Appendix B.

### **2.1 Monitoring Well Measurements**

Groundwater levels at monitoring wells MW-1, MW-1R, MW-3, MW-5, MW-7, and MW-8 were measured on May 9, 2007. In addition, all monitoring wells were checked for the presence of free-phase petroleum hydrocarbons. We were unable to locate MW-6 at the time of sampling. The groundwater level was not measured in MW-9 due to an impenetrable ice plug at approximately 1.5 feet below the top of the casing. The measured depths to groundwater and the relative groundwater elevations are presented in Table 1. The monitoring well locations and inferred groundwater flow direction are shown on Figure 2.

## **2.2 Groundwater Monitoring**

Monitoring wells MW-1R, MW-5, and MW-8 were purged and sampled on May 9, 2007. The wells were sampled after depth-to-groundwater measurements had been completed.

The wells were purged using a peristaltic pump and dedicated Teflon™ tubing connected to a flow-through cell to measure groundwater parameters. All wells were purged until temperature, pH, and conductivity readings stabilized, and upon stabilization, these parameter readings along with DO and ORP were recorded.

After recording the groundwater quality parameters, the flow-through cell was disconnected and the groundwater samples were collected. The samples were submitted to Test America, Inc. (TA), in Anchorage, Alaska, for the following analyses:

- BTEX – U.S. Environmental Protection Agency (EPA) Method 8021B;
- GRO – ADEC Method AK 101; and
- DRO – ADEC Method AK 102.

## **3.0 SITE DATA EVALUATION**

### **3.1 Free-Phase Hydrocarbon Observations**

No free-phase hydrocarbons were observed in any of the monitoring wells.

### **3.2 Hydrogeologic and Groundwater Flow Observations**

Relative groundwater elevations were calculated using the May 2007 groundwater-level measurements. Groundwater elevations for May 9, 2007, are presented in Table 1. The groundwater elevations are on average 2 to 3 feet lower than those observed during previous monitoring events. This decrease in groundwater elevation is likely due to seasonal fluctuations in the groundwater levels. The localized groundwater flow direction is inferred to be to the southwest, toward the Naknek River with an average gradient of 0.009 (Figure 2). This flow direction is consistent with groundwater flow directions measured previously at this site.

### **3.3 *Petroleum Hydrocarbon Analytical Results***

Table 2 presents a summary of petroleum hydrocarbon analytical results for groundwater samples collected in May 2007. The laboratory report and data quality review are included in Appendix C.

BTEX compounds were not detected above their respective laboratory method detection limits in any of the monitoring wells sampled in May 2007. GRO was detected in monitoring well MW-1R and its duplicate sample. Both of these detected concentrations were below the ADEC groundwater cleanup level of 1.3 milligrams per liter (mg/L). DRO was detected in both the parent and duplicate sample from MW-1R at concentrations slightly below the ADEC groundwater cleanup level of 1.5 mg/L.

### **3.4 *Comparative 2007 and Historical Hydrocarbon Analytical Results***

Table 3 presents the 2007 data and historical groundwater analytical results. Historical data prior to May 2004 showed a decreasing trend of GRO and DRO concentrations in MW-1R. The fall 2005 monitoring event revealed a significant increase in DRO and GRO in MW-1R and a significant increase in DRO in MW-5. In August 2006 and in May 2007, GRO and DRO concentrations were below ADEC cleanup levels in all sampled monitoring wells.

BTEX concentrations are below laboratory method reporting limits and have remained below the ADEC groundwater cleanup levels since 2001.

The GRO concentration in MW-1R in May 2007 (0.0611 mg/L) was lower than GRO concentrations measured during previous monitoring efforts. The DRO concentration in MW-1R measured in May 2007 (1.34 mg/L) was comparable to the concentration measured in August 2006. GRO and DRO concentrations in all other monitoring wells were similar to concentrations measured in previous monitoring events, with the exception of the November 2005 event, in which DRO concentrations in MW-5 were above ADEC groundwater cleanup level.

## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

Free-phase hydrocarbons were not measured in any of the site monitoring wells sampled in May 2007. MW-8 had a measurable amount of free-phase hydrocarbons in August 2006.

Measured groundwater elevations showed a groundwater flow direction to the southwest in May 2007. This is consistent with previous interpretations of



groundwater flow with the exception of the November 2005 event. The groundwater elevations measured at MW-1 and MW-1R in May 2007 do not fit with the inferred flow direction. These wells are located in the source area where contaminated soil was excavated in 1998 (Appendix A). The excavation area was lined prior to backfill and this lining is most likely allowing groundwater to pool in the vicinity of MW-1 and MW-1R, thus creating higher groundwater elevations.

BTEX concentrations at MW-1R remain below ADEC groundwater cleanup levels. MW-1R showed a decrease in GRO concentration and a slight increase in DRO concentration in May 2007. Concentrations for these analytes were below the ADEC groundwater cleanup levels. This slight increase in the DRO concentration in MW-1R is possibly due to a combination of sampling, laboratory, or seasonal groundwater fluctuations. All BTEX, GRO, and DRO concentrations in the other sampled monitoring wells (MW-5 and MW-8) were below laboratory method detection limits.

Free-phase hydrocarbons were not detected in MW-8 in May 2007. At this time, we do not recommend installing additional monitoring wells downgradient of MW-8.

We recommend sampling the groundwater in MW-1R, MW-5, and MW-8 for BTEX, GRO, and DRO in the summer of 2008 to ensure that contaminant concentrations in these wells remain below applicable ADEC groundwater cleanup levels. Groundwater levels should be measured in all site monitoring wells (MW-1R, MW-3, MW-5, MW-7, MW-8, and MW-9) in the summer of 2008. If no cleanup level exceedences are observed in the groundwater in 2008, Hart Crowser recommends that the NPS seek conditional site closure from ADEC.

## 5.0 INFORMATION LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work to be completed. It is intended for the exclusive use of the NPS for specific application to the project site. This report is not meant to represent a legal opinion, and no other warranty, express or implied, is made.

## 6.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC) 2003. *18 AAC 78 Underground Storage Tanks*, as amended through January 30.

ADEC 2006. *18 AAC 75 Oil and Other Hazardous Substances Pollution Control*, as amended through December 30, 2006.

Jacobs Engineering Group, Inc. 2005. *Draft 2004 Characterization and Remediation of Petroleum-Contaminated Soil at the former Petroleum, Oil, and Lubricants Pipeline and Morale, Welfare, and Recreation Marina, King Salmon Air Station, King Salmon, Alaska*, July.

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**Table 1 - Groundwater Elevations and Water Quality Parameters - May 9, 2007  
KATM Field Headquarters, King Salmon, Alaska**

<b>Well Number</b>	<b>Depth to water in feet *</b>	<b>MP Elevation in feet<sup>1</sup></b>	<b>Product Thickness in feet</b>	<b>Groundwater Elevation in feet<sup>1</sup></b>
MW-1R	10.09	98.05	0.00	87.96
MW-1	12.79	97.59	0.00	84.80
MW-3	14.89	99.83	0.00	84.94
MW-5	15.30	99.13	0.00	83.83
MW-6	NM	95.20	NM	NM
MW-7	13.53	96.88	0.00	83.35
MW-8	6.41	87.35	0.00	80.94
MW-9	NM	96.77	NM	NM

Notes:

\* = below MP.

<sup>1</sup> = Surveyed to an arbitrary benchmark set to 100.00 feet.

°C = degrees Celsius.

mg/L = milligrams per liter.

MP = Measuring point.

mS/cm = MilliSiemens per centimeter.

mV = Millivolts.

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**Table 2 - 2007 Groundwater Analytical Results  
KATM Field Headquarters, King Salmon, Alaska**

Well Number	EPA Method 8021B				Alaska Method AK 101	Alaska Method AK 102
	Benzene in mg/L	Toluene in mg/L	Ethylbenzene in mg/L	Total Xylenes in mg/L	GRO in mg/L	DRO in mg/L
MW-1R	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.0611	1.34
Duplicate (MW-1R)	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.0850	1.32
MW-5	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.427 U
MW-8	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.407 U
Trip Blank	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	NA
<b><i>ADEC Groundwater Cleanup Level</i></b>	<b><i>0.005</i></b>	<b><i>1.0</i></b>	<b><i>0.7</i></b>	<b><i>10</i></b>	<b><i>1.3</i></b>	<b><i>1.5</i></b>

Notes:

Cleanup levels per Title 18 of the Alaska Administrative Code, Chapter 75, Section 345, Table C.

ADEC = Alaska Department of Environmental Conservation.

DRO = Diesel-range organics.

EPA = Environmental Protection Agency.

GRO = Gasoline-range organics.

J = Estimated Value.

mg/L = milligrams per liter.

NA = Not applicable.

U = Not detected at concentration shown.

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**Table 3 - Historic Groundwater Analytical Results**  
**KATM Field Headquarters, King Salmon, Alaska**

Well	Sampled	EPA Method 8021B				Alaska Method AK 101	Alaska Method AK 102
		Benzene in mg/L	Toluene in mg/L	Ethylbenzene in mg/L	Total Xylenes in mg/L	GRO in mg/L	DRO in mg/L
MW-1	8/16/1999	0.0030	0.0980	0.1400	0.6000	2.7	11.0
	7/5/2000	<b>0.0065</b>	0.0630	0.1620	0.4289	3.0	8.2
	10/26/2000	0.0050	0.0511	0.1940	0.3911	3.3	229
	1/18/2001	0.0031	0.0412	0.1470	0.2550	2.1	10.2
MW-1R	7/3/2001	<b>0.0064</b> J	0.0061 J	0.0299 J	0.1222 J	3.9 J	6.3 J
	9/24/2001	<b>0.0246</b>	0.0029	0.0124	0.0442	1.6	4.7
	12/27/2001	0.0038	0.0032	0.0114	0.0437	1.3	4.8
	4/2/2002	0.0038	0.0020 U	0.0095	0.0439	1.6	5.6
	10/8/2002	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	2.40
	5/21/2003	0.0014	0.0024	0.0021	0.004 U	0.57	1.90
	9/17/2003	0.0005 U	0.0020 U	0.0020 U	0.0051	0.12	1.74
	5/18/2004	0.00218	0.0005 U	0.00056	0.00302	0.168	1.40
	11/1/2005	0.0005 U	0.014	0.126	0.184	2.74	45.3
	8/10/2006	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.112	1.20
	5/9/2007	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.061 J	1.34
	MW-5	8/14/1999	0.0010 U	0.0010 U	0.0010 U	0.001 U	0.10 U
7/4/2000		0.0005 U	0.0020 U	0.0020 U	0.002 U	0.09 U	0.29 U
10/26/2000		0.0005 U	0.0020 U	0.0020 U	0.002 U	0.09 U	NA
1/18/2001		0.0005 U	0.0020 U	0.0020 U	0.002 U	0.09 U	0.37
7/3/2001		0.0050 U	0.0020 U	0.0020 U	0.002 U	0.09 U	0.56 U
9/24/01		0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.56 U
12/27/01		0.0005 U	0.0020 U	0.0020 U	0.002 U	0.09 U	0.58 U
4/2/2002		0.0005 U	0.002 U	0.002 U	0.004 U	0.09 U	0.58 U
10/8/2002		0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.495 U
5/21/2003		0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.333 U
9/17/2003		0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.353 U
5/18/2004		0.0005 U	0.0005 U	0.0005 U	0.001 U	0.05 U	0.417 U
10/31/2005		0.0005 U	0.0005 U	0.0005 U	0.001 U	0.08 U	10.50
8/10/2006		0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.420 U
5/9/2007		0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.427 U
MW-7	8/15/1999	0.0010 U	0.001 U	0.001 U	0.001 U	0.10 U	0.25 U
	7/4/2000	0.0005 U	0.002 U	0.002 U	0.002 U	0.09 U	0.37
	10/26/2000	<b>0.0102</b>	0.0066	0.0096	0.0329	0.18 U	0.47
	1/18/2001	0.0006	0.002 U	0.002 U	0.002 U	0.09 U	0.43
	7/3/2001	0.0050 U	0.002 U	0.002 U	0.002 U	0.09 U	0.57 U
	9/24/2001	0.0008	0.002 U	0.002 U	0.004 U	0.09 U	0.58 U
	12/27/2001	0.0005	0.002 U	0.002 U	0.002 U	0.09 U	0.53 U
	4/2/2002	0.0005 U	0.002 U	0.002 U	0.004 U	0.09 U	0.54 U
	10/8/2002	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.532 U
	5/21/2003	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.369
	9/17/2003	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.616
	5/18/2004	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.05 U	0.424 U
	10/31/2005	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.08 U	0.417 U
	8/10/2006	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.400 U
MW-8	5/9/2007	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.407 U
MW-9	7/3/2001	0.0012	0.0020 U	0.0032	0.0028	0.19	0.77
	9/24/2001	0.0005 U	0.002 U	0.002 U	0.004 U	0.09 U	0.56 U
	12/27/2001	0.0005 U	0.002 U	0.002 U	0.002 U	0.09 U	0.60
	4/2/2002	0.0005 U	0.002 U	0.002 U	0.002 U	0.09 U	0.81 U
	10/8/2002	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.556 U
	5/21/2003	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.313 U
	9/17/2003	0.0005 U	0.0020 U	0.0020 U	0.004 U	0.09 U	0.316 U
	10/31/2005	0.0005 U	0.0005 U	0.0005 U	0.001 U	0.08 U	0.400 U
	8/10/2006	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.435 U
<b>ADEC Groundwater Cleanup Level</b>		<b>0.005</b>	<b>1.0</b>	<b>0.7</b>	<b>10</b>	<b>1.3</b>	<b>1.5</b>

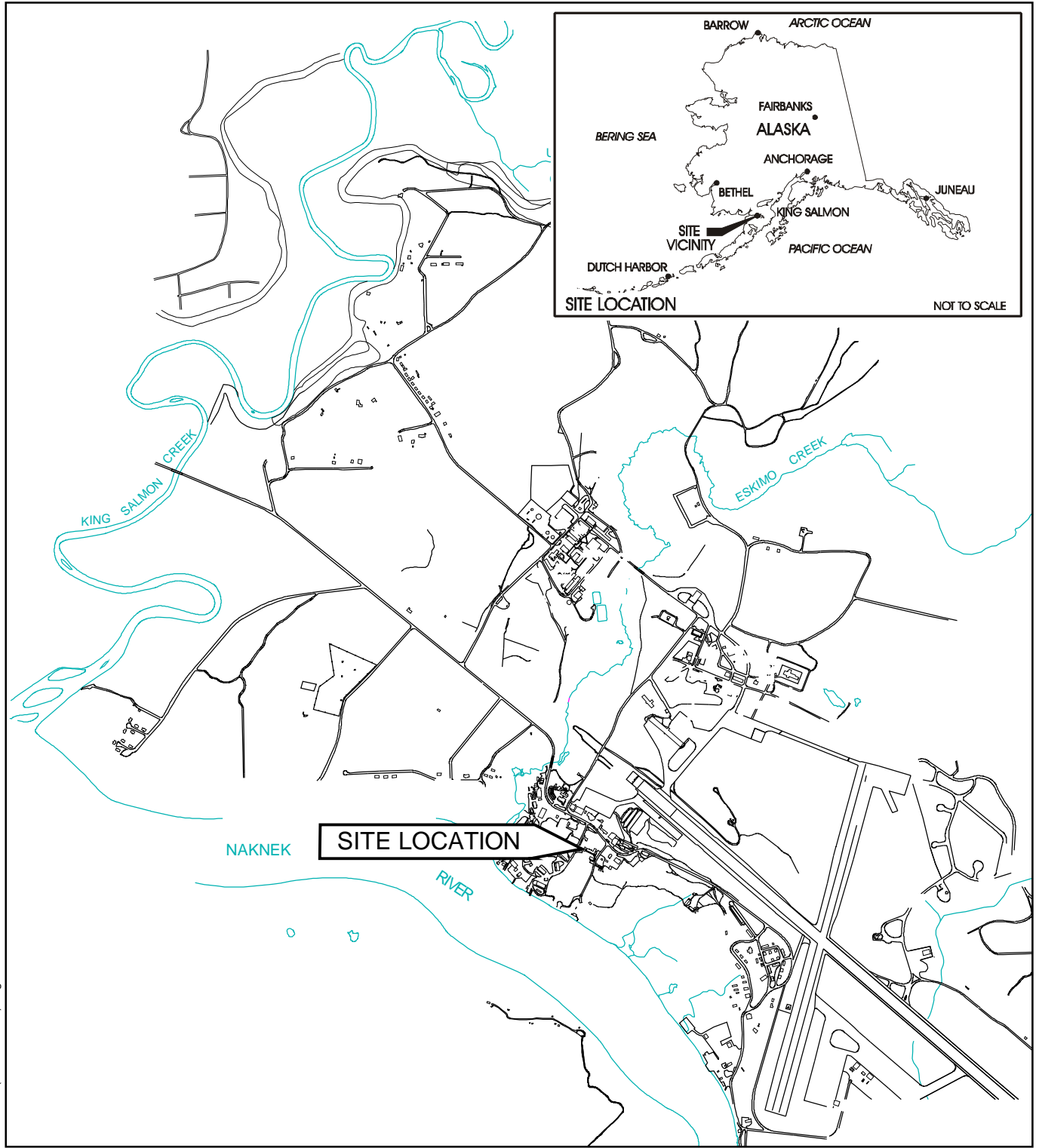
Notes:  
 Bold concentrations and reporting limits in excess of cleanup level.  
 Cleanup level per 18 AAC 75.345, Table C.  
 Reported concentrations have been rounded.  
 ADEC = Alaska Department of Environmental Conservation.  
 DRO = Diesel-range organics.  
 EPA = Environmental Protection Agency.  
 GRO = Gasoline-range Organics.  
 J = Estimated concentration.  
 mg/L = milligrams per liter.  
 NA = Not analyzed.  
 U = Not detected at concentration shown.

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**Site Location Map**  
**King Salmon Field Headquarters**  
**Katmai National Park and Preserve, Alaska**

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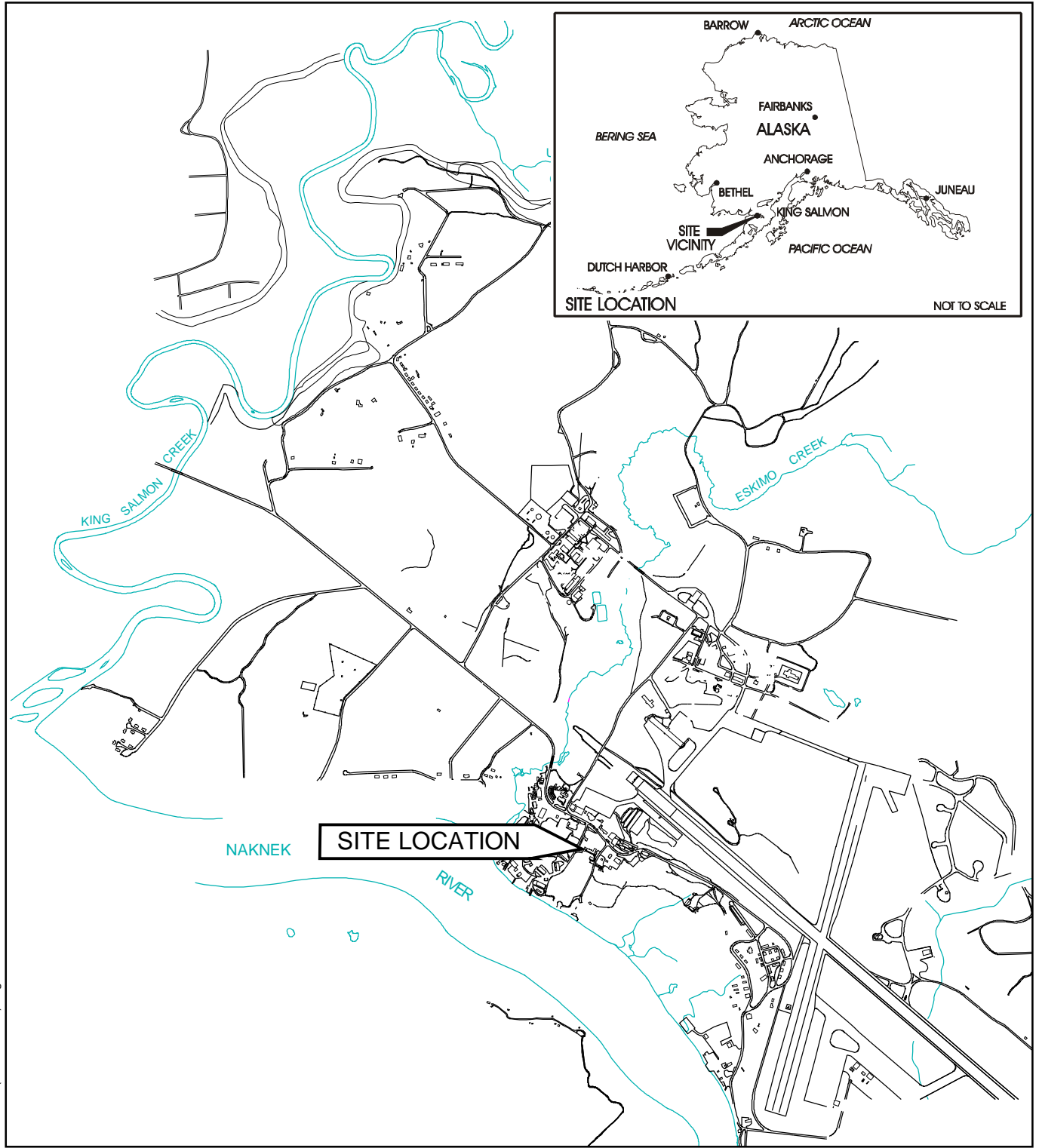
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**Site Location Map**  
**King Salmon Field Headquarters**  
**Katmai National Park and Preserve, Alaska**

JAB 7-3-07

740126 01 (Site Location).dwg

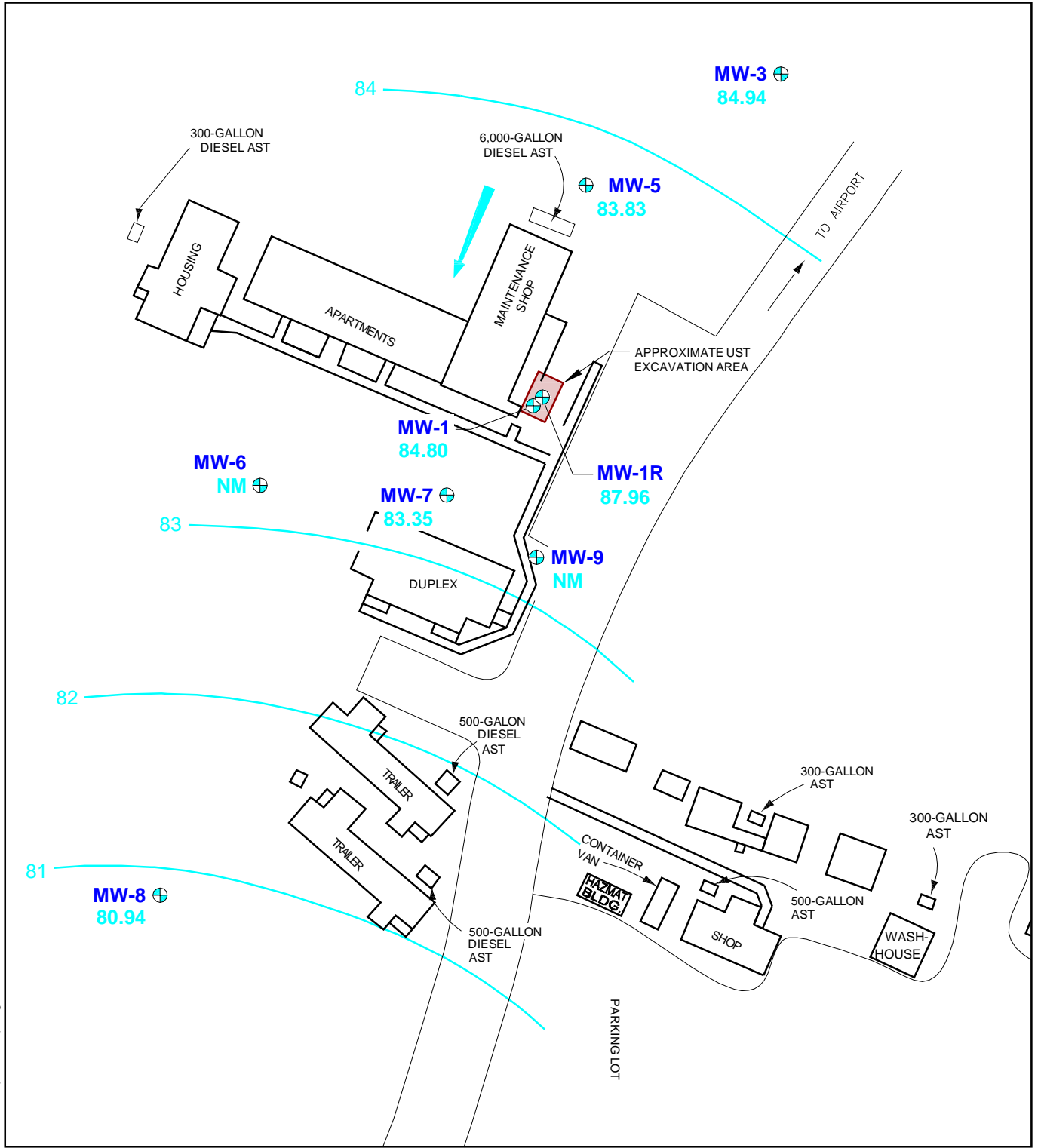


0 2000 4000  
Scale in Feet

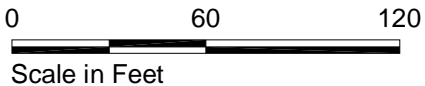
**Site Plan with Groundwater Elevations, Measured May 9, 2007**  
**King Salmon Field Headquarters**  
**Katmai National Park and Preserve, Alaska**

JAB 7-03-07

870201 02 (GW 7-06).dwg



Source: Base map provided by the National Park Service.



- MW-3** ⊕ Monitoring Well Location and Number
- 84.94** Groundwater Elevation in Feet (May 9, 2007)
- NM** Not Measured
- 83** - - - - - Groundwater Elevation Contour in Feet
- Average Groundwater Flow Direction



**HARTCROWSER**  
 7401-26 7/07  
 Figure 2



**APPENDIX A**  
**BACKGROUND AND PREVIOUS INVESTIGATION INFORMATION**

## CONTENTS

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<b><i>A1.0 Previous Investigations</i></b>	<b><i>A-1</i></b>
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## APPENDIX A BACKGROUND AND PREVIOUS INVESTIGATION INFORMATION

### *A1.0 Previous Investigations*

In 1998, Environmental Systems, Inc. (ESI), observed the removal of two diesel underground storage tanks (USTs) from the east side of the maintenance building at the Katmai National Park and Preserve headquarters building in King Salmon, Alaska. Approximately 40 cubic yards of petroleum-contaminated soil associated with a 1,000-gallon UST was removed. Additional petroleum contamination was also observed beneath a 6,000-gallon UST, but did not appear to be directly associated with this feature. ESI concluded that the contamination appeared to be associated with an unknown upgradient source.

In August 1999, eight monitoring wells (MW) were installed at the site (Shannon & Wilson [S&W] 2000a). MW-1, located within the footprint of the former UST excavation, exhibited the highest concentrations of contaminants in the soil, with several analytes, including gasoline-range organics (GRO) and diesel-range organics (DRO), detected above Alaska Department of Environmental Conservation (ADEC) Method Two Soil Cleanup Levels (Title 18 of the Alaska Administrative Code, Chapter 75.341 [18 AAC 75.341], Tables B1 and B2). Soil from MW-7 also contained a DRO concentration in excess of the ADEC Method Two Soil Cleanup Level. The GRO and DRO contaminants detected in groundwater were above ADEC Groundwater Cleanup Levels in MW-1 (18 AAC 75.345, Table C).

Monitoring wells were sampled in October 2000 and again in January 2001 (S&W 2000b and 2001). The groundwater flow direction in October was inferred to be to the south-southwest, toward the Naknek River. In June 2000, GRO and DRO contamination above ADEC Groundwater Cleanup Levels was again detected in MW-1, but not elsewhere. In October 2000, ADEC Groundwater Cleanup Levels for DRO and GRO were exceeded in MW-1 and benzene was detected above the ADEC Groundwater Cleanup Level of 0.005 milligram per liter (mg/L) in MW-7. At that time the presence of free-phase hydrocarbons was noted in MW-1 during purging. On inspection, the casing of MW-1 was also found to be damaged. January 2001 groundwater contours and laboratory analytical results were similar to those observed in October 2000. Free-phase petroleum hydrocarbons were again observed in the purge water of MW-1, but the thickness of the free-phase petroleum was not measured.

One new well (MW-9) and one replacement well (MW-1R) were installed by Hart Crowser in July 2001. These wells were developed and sampled in

conjunction with the sampling of MW-5 and MW-7. Groundwater analytical results for MW-9 indicated detectable levels of benzene, ethylbenzene, total xylenes, GRO, and DRO, but at concentrations below the respective ADEC Groundwater Cleanup Levels. Benzene, GRO, and DRO concentrations in the groundwater sample from replacement well MW-1R exceeded the ADEC Groundwater Cleanup Levels (Hart Crowser 2001).

During the August 1999 release investigation and all subsequent groundwater sampling events, water samples were collected from the headquarter's water supply well. No concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), GRO, or DRO have been detected in the water supply well.

National Park Service (NPS) personnel reported that the passive pump in MW-1 was checked in February 2003. Free-phase petroleum hydrocarbons were not observed at that time. An attempt was made during the September 17, 2003, monitoring event to check the pump for recovery of free-phase hydrocarbons. However, the pump was stuck and neither the Hart Crowser field representative nor NPS personnel could remove it from the well for inspection.

Hart Crowser monitored the site wells on a semiannual basis from August 2001 until 2004 when monitoring was decreased to once per year (Hart Crowser 2001a, 2001b, 2002a, 2002b, 2003a, 2003b, 2003c, 2004, and 2006a). With the exception of the October 31, 2005 monitoring event the overall, historical data indicated a decrease in GRO and DRO concentrations for MW-1R. DRO and GRO concentrations have been below ADEC groundwater cleanup levels in all site wells with the exception of MW-1, MW-1R, and MW-5 (in October 2005). BTEX concentrations in all site wells have stayed below the ADEC groundwater cleanup levels since 2001. Free-phase hydrocarbons were detected in MW-8 in 2006 (Hart Crowser 2006b).

## **A2.0 References**

Hart Crowser, 2001a. *Additional Soil and Groundwater Assessment, Katmai National Park and Preserve Field Headquarters, King Salmon, Alaska.* August.

Hart Crowser, 2001b. *Quarterly Groundwater Monitoring, September 2001, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* November.

Hart Crowser, 2002a. *Quarterly Groundwater Monitoring, December 2001, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* March.

Hart Crowser 2002b. *Quarterly Groundwater Monitoring, April 2002, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* May.

- Hart Crowser, 2003a. *Quarterly Groundwater Monitoring, October 2002, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* February.
- Hart Crowser, 2003b. *Semi-Annual Groundwater Monitoring, May 2003, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* October.
- Hart Crowser, 2003c. *Semiannual Groundwater Monitoring, September 2003, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* November.
- Hart Crowser, 2004. *May 2004 Semiannual Groundwater Monitoring, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* July.
- Hart Crowser, 2006a. *Fall 2005 Semiannual Groundwater Monitoring Report, Katmai National Park and Preserve Headquarters, King Salmon, Alaska,* April.
- Hart Crowser 2006b. *Fall 2006 Groundwater Monitoring Report, Katmai National Park and Preserve Headquarters, King Salmon, Alaska.* November.
- Shannon & Wilson (S&W), 2000a. *Final Release Investigation, Katmai National Park and Preserve, King Salmon, Alaska.* February.
- S&W, 2000b. *October 2000 Groundwater Sampling, Katmai National Park and Preserve, King Salmon, Alaska.* December 6.
- S&W, 2001. *January 2001 Groundwater Sampling, Katmai National Park and Preserve, King Salmon, Alaska.* January.

**APPENDIX B  
FIELD METHODS**

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## **APPENDIX B FIELD METHODS**

All fieldwork was conducted, and all field and laboratory quality assurance for this project were performed in accordance with sample collection procedures in Title 18 of the Alaska Administrative Code, Chapter 75 (18 AAC 75), *Oil and Other Hazardous Substances Pollution Control, as amended December 30, 2006*, and 18 AAC 78, *Underground Storage Tanks, dated January 30, 2003*.

### **B1.0 Monitoring Well Free-Phase Hydrocarbon/Water-Level Measurements**

Prior to groundwater sampling, monitoring wells were opened and the free-phase petroleum hydrocarbon and/or water levels were measured with an oil/water interface probe. All measurements were made to the nearest 0.01-foot.

### **B2.0 Monitoring Well Sampling**

After free-phase petroleum hydrocarbon/water level measurements were recorded, the wells were then purged. Dedicated Teflon™ tubing was placed into each well and water was removed with a peristaltic pump into a flow-through cell, and then discharged into a purge water container. Temperature, pH, and conductivity levels were monitored during the purging process and purging continued until these parameters stabilized.

After parameter stabilization occurred, the parameter readings were recorded along with the dissolved oxygen (DO) concentration and oxidation-reduction potential (ORP). The flow-through cell was then disconnected and samples for laboratory analyses were collected using the pump. Very low flow rates were used so that laminar flow into sample containers was achieved, thus minimizing sample aeration.

Immediately after collection, the samples were labeled and placed in a cooler with gel ice for delivery to the laboratory under standard chain-of-custody procedures. Samples were shipped to Test America, Inc. (TA) in Anchorage, Alaska for analyses of benzene, toluene, ethylbenzene, xylenes (BTEX), gasoline-range organics (GRO), and diesel-range organics (DRO). A trip blank accompanied the cooler containing samples for BTEX and GRO analyses.

One duplicate sample was collected and submitted blind to the laboratory for analyses of BTEX, GRO, and DRO.



### **B3.0 Field Documentation Procedures**

The Hart Crowser field representative maintained a record of field activities in a logbook and on standard field report forms (well sampling and chain-of-custody forms). All field logbook entries were dated and signed. Activities and observations noted in the logbook included weather, water quality measurements, and site conditions.

### **B4.0 Decontamination Procedures**

All sampling equipment including the oil/water interface probe, and the well sounder were cleaned prior to and between sampling/measurement attempts using an anionic detergent wash (Alconox) followed by two potable water rinses.

### **B5.0 Investigation-Derived Wastes (IDW)**

IDW are wastes generated during field investigations. The IDW from the well installations and development consisted of the following waste streams:

- Water from purging; and
- Personal protective equipment (PPE) and general debris.

#### **B5.1 Decontamination/Development/Purge Water**

Water generated from decontamination and during well purging was drummed, labeled with the project number, the date, the well number, the designation "decontamination/development/purge water," a contact name, and a telephone number. Water below ADEC Groundwater Cleanup Levels (18 AAC 75.345, Table C) was disposed of at an upgradient portion of the site. Purge water from MW-1R and MW-8 were containerized as described above and shipped to Anchorage for storage pending the receipt of analytical results. After results showed that all contaminant levels for this purge water were below ADEC groundwater cleanup levels, the water was disposed of by pouring it on a paved surface and allowing it to evaporate.

#### **B5.2 PPE and Debris**

PPE and debris were placed in plastic bags and taped shut for disposal at an onsite dumpster.

**APPENDIX C  
DATA QUALITY REVIEW AND  
LABORATORY REPORTS**

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<b><i>C1.0 Data Quality Review</i></b>	<b><i>C-1</i></b>
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## APPENDIX C DATA QUALITY REVIEW AND LABORATORY REPORT

### ***C1.0 Data Quality Review***

All data quality assurance/quality control data provided by Test America, Inc. (TA) for the groundwater samples collected at the KATM Headquarters Site in King Salmon, Alaska, meet the data quality objectives set forth in Title 18 of the Alaska Administrative Code (AAC) Chapter 75 (18 AAC 75) and 18 AAC 78. All data are accepted for the purposes of this report.

The data review procedures, calculations, and qualifications used for this project are based on the Alaska Department of Environmental Conservation (ADEC) guidance document *Technical Memorandum – 06-002 Environmental Laboratory Data and Quality Assurance Requirements* (dated October 9, 2006). Based on the data assessment results the analytical results are flagged with data qualifiers to indicate potential problems with the qualified results.

Analytical results summarizing the analysis of groundwater samples collected from the KATM Headquarters Site were submitted in TA work order AQE0032. Samples consisting of groundwater were collected and analyzed in accordance with EPA methods found in SW846 (Revision 5, dated January 1998).

### ***C2.0 Laboratory Data Review Checklist***

#### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

Yes                       No                      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

Yes                       No                      Comments: N/A

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

Yes                       No                      Comments:

b. Correct analyses requested?

Yes                       No                      Comments:

3. Laboratory Sample receipt documentation

a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?

Yes                       No                      Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

Yes                       No                      Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes                       No                      Comments:

d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside of acceptance range, insufficient or missing samples, etc.?

Yes                       No                      Comments: N/A

e. Data quality or usability affected? Explain. N/A

4. Case Narrative

a. Present and understandable?

Yes                       No                      Comments:

b. Discrepancies, errors or QC failures identified by the lab?

Yes                       No                      Comments:

c. Were all corrective actions documented?

Yes       No      Comments: N/A

d. What is the effect on data quality/usability according to the case narrative? N/A

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes       No      Comments:

b. All applicable holding times met?

Yes       No      Comments:

c. All soils reported on a dry weight basis?

Yes       No      Comments: N/A

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

Yes       No      Comments:

e. Data quality or usability affected? Explain. N/A

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes       No      Comments:

ii. All method blank results less than PQL?

Yes       No      Comments:

iii. If above PQL, what samples are affected? N/A

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes       No      Comments: N/A

v. Data quality or usability affected? Explain. N/A

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis and 20 samples?

Yes       No      Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes       No      Comments: N/A

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? Or project specified DQOs? (AK Petroleum methods 75-125 %R; all other analyses see the laboratory QC pages)

Yes       No      Comments:

iv. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? Or project specified DQOs? (AK Petroleum methods 20 %; all other analyses see the laboratory QC pages)

Yes       No      Comments:

v. If %R or RPD outside of acceptable limits, what samples are affected? None.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes       No      Comments: N/A

vii. Data quality or usability affected? Explain. N/A

c. Surrogates – Organics only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes                       No                      Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? Or project specified DQOs? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes                       No                      Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes                       No                      Comments: N/A

iv. Data quality or usability affected? Explain. N/A

d. Trip Blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): water and soil

i. One trip blank reported per matrix, analysis and cooler?

Yes                       No                      Comments:

ii. All results less than PQL?

Yes                       No                      Comments:

iii. If above PQL, what samples are affected? N/A

iv. Data quality or usability affected? Explain. N/A

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes                       No                      Comments:

ii. Submitted blind to lab?



Yes                       No                      Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

Yes                       No                      Comments: The RPD between the parent and duplicate sample for GRO was slightly higher than 30%.

iv. Data quality or usability affected? Explain. All positive detections for GRO in project samples were flagged "J" to indicate that the values are estimated.

f. Decontamination or Equipment Blank (if applicable)

Yes                       No                       Not Applicable

i. All results less than PQL?

Yes                       No                      Comments:

ii. If above PQL, what samples are affected? N/A

iii. Data quality or usability affected? Explain. N/A

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab specific, etc.)

a. Defined and appropriate

Yes                       No                      Comments: N/A

Project Manager:  Date: 7/3/07

Supervisor:  Date: 7/3/07

May 17, 2007

Caryn Orvis  
Hart Crowser, Inc.  
2600 Cordova, Suite 210  
Anchorage, AK/USA 99503

RE: King Salmon

Enclosed are the results of analyses for samples received by the laboratory on 05/10/07 16:09.  
The following list is a summary of the Work Orders contained in this report, generated on 05/17/07  
16:04.

If you have any questions concerning this report, please feel free to contact me.

---

<u>Work Order</u>	<u>Project</u>	<u>ProjectNumber</u>
AQE0032	King Salmon	7401-26

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TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



<b>Hart Crowser, Inc.</b> 2600 Cordova, Suite 210 Anchorage, AK/USA 99503	Project Name:	<b>King Salmon</b>	Report Created:
	Project Number:	7401-26	05/17/07 16:04
	Project Manager:	Caryn Orvis	

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW- 5	AQE0032-01	Water	05/09/07 11:30	05/10/07 16:09
MW- 8	AQE0032-02	Water	05/09/07 13:15	05/10/07 16:09
MW- 11	AQE0032-03	Water	05/09/07 12:45	05/10/07 16:09
MW- 1R	AQE0032-04	Water	05/09/07 14:15	05/10/07 16:09
Trip Blank	AQE0032-05	Water	05/09/07 00:00	05/10/07 16:09

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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<b>Hart Crowser, Inc.</b>	Project Name: <b>King Salmon</b>	
2600 Cordova, Suite 210	Project Number: 7401-26	Report Created:
Anchorage, AK/USA 99503	Project Manager: Caryn Orvis	05/17/07 16:04

**Gasoline Range Organics (C6-C10) and BTEX per AK101**  
 TestAmerica - Anchorage, AK

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>AQE0032-01 (MW- 5)</b>		<b>Water</b>			<b>Sampled: 05/09/07 11:30</b>					
Gasoline Range Organics	AK101 GRO/BTEX	ND	----	50.0	ug/l	1x	7050038	05/11/07 14:54	05/11/07 23:32	
Benzene	"	ND	----	0.500	"	"	"	"	"	"
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.50	"	"	"	"	"	"

Surrogate(s): a,a,a-TFT (FID)  
 a,a,a-TFT (PID)

103%  
 84.1%

50 - 150 %  
 50 - 150 %

<b>AQE0032-02 (MW- 8)</b>		<b>Water</b>			<b>Sampled: 05/09/07 13:15</b>					
Gasoline Range Organics	AK101 GRO/BTEX	ND	----	50.0	ug/l	1x	7050038	05/11/07 14:54	05/12/07 00:39	
Benzene	"	ND	----	0.500	"	"	"	"	"	"
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.50	"	"	"	"	"	"

Surrogate(s): a,a,a-TFT (FID)  
 a,a,a-TFT (PID)

102%  
 83.3%

50 - 150 %  
 50 - 150 %

<b>AQE0032-03 (MW- 11)</b>		<b>Water</b>			<b>Sampled: 05/09/07 12:45</b>					
<b>Gasoline Range Organics</b>	AK101 GRO/BTEX	<b>85.0</b>	----	50.0	ug/l	1x	7050038	05/11/07 14:54	05/12/07 02:19	
Benzene	"	ND	----	0.500	"	"	"	"	"	"
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.50	"	"	"	"	"	"

Surrogate(s): a,a,a-TFT (FID)  
 a,a,a-TFT (PID)

97.6%  
 79.5%

50 - 150 %  
 50 - 150 %

<b>AQE0032-04 (MW- 1R)</b>		<b>Water</b>			<b>Sampled: 05/09/07 14:15</b>					
<b>Gasoline Range Organics</b>	AK101 GRO/BTEX	<b>61.1</b>	----	50.0	ug/l	1x	7050038	05/11/07 14:54	05/12/07 02:53	
Benzene	"	ND	----	0.500	"	"	"	"	"	"
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.50	"	"	"	"	"	"

Surrogate(s): a,a,a-TFT (FID)  
 a,a,a-TFT (PID)

97.2%  
 79.3%

50 - 150 %  
 50 - 150 %

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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<b>Hart Crowser, Inc.</b>	Project Name: <b>King Salmon</b>	
2600 Cordova, Suite 210	Project Number: 7401-26	Report Created:
Anchorage, AK/USA 99503	Project Manager: Caryn Orvis	05/17/07 16:04

**Gasoline Range Organics (C6-C10) and BTEX per AK101**  
TestAmerica - Anchorage, AK

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>AQE0032-05 (Trip Blank)</b>		<b>Water</b>			<b>Sampled: 05/09/07 00:00</b>					
Gasoline Range Organics	AK101 GRO/BTEX	ND	----	50.0	ug/l	1x	7050038	05/11/07 14:54	05/11/07 22:59	
Benzene	"	ND	----	0.500	"	"	"	"	"	"
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.50	"	"	"	"	"	"
<i>Surrogate(s):</i>	<i>a,a,a-TFT (FID)</i>			<i>101%</i>	<i>50 - 150 %</i>	<i>"</i>				<i>"</i>
	<i>a,a,a-TFT (PID)</i>			<i>83.0%</i>	<i>50 - 150 %</i>	<i>"</i>				<i>"</i>

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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<b>Hart Crowser, Inc.</b> 2600 Cordova, Suite 210 Anchorage, AK/USA 99503	Project Name: <b>King Salmon</b> Project Number: 7401-26 Project Manager: Caryn Orvis	Report Created: 05/17/07 16:04
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**Diesel Range Organics (C10-C25) per AK102**  
TestAmerica - Anchorage, AK

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>AQE0032-01 (MW- 5)</b>		<b>Water</b>			<b>Sampled: 05/09/07 11:30</b>					
Diesel Range Organics	AK 102	ND	----	0.427	mg/l	1x	7050046	05/15/07 12:58	05/16/07 13:56	
<i>Surrogate(s): 1-Chlorooctadecane</i>			96.7%		50 - 150 %	"				"
<b>AQE0032-02 (MW- 8)</b>		<b>Water</b>			<b>Sampled: 05/09/07 13:15</b>					
Diesel Range Organics	AK 102	ND	----	0.407	mg/l	1x	7050046	05/15/07 12:58	05/16/07 14:30	
<i>Surrogate(s): 1-Chlorooctadecane</i>			87.4%		50 - 150 %	"				"
<b>AQE0032-03 (MW- 11)</b>		<b>Water</b>			<b>Sampled: 05/09/07 12:45</b>					
Diesel Range Organics	AK 102	<b>1.32</b>	----	0.424	mg/l	1x	7050046	05/15/07 12:58	05/16/07 15:03	
<i>Surrogate(s): 1-Chlorooctadecane</i>			83.6%		50 - 150 %	"				"
<b>AQE0032-04 (MW- 1R)</b>		<b>Water</b>			<b>Sampled: 05/09/07 14:15</b>					
Diesel Range Organics	AK 102	<b>1.34</b>	----	0.431	mg/l	1x	7050046	05/15/07 12:58	05/16/07 15:03	
<i>Surrogate(s): 1-Chlorooctadecane</i>			84.3%		50 - 150 %	"				"

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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<b>Hart Crowser, Inc.</b>	Project Name: <b>King Salmon</b>	Report Created:
2600 Cordova, Suite 210	Project Number: 7401-26	05/17/07 16:04
Anchorage, AK/USA 99503	Project Manager: Caryn Orvis	

**Gasoline Range Organics (C6-C10) and BTEX per AK101 - Laboratory Quality Control Results**  
 TestAmerica - Anchorage, AK

**QC Batch: 7050038**      **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Blank (7050038-BLK1)</b>													<b>Extracted: 05/11/07 14:54</b>	
Gasoline Range Organics	AK101 GRO/BTEX	ND	---	50.0	ug/l	1x	--	--	--	--	--	--	05/12/07 05:39	
Benzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.50	"	"	--	--	--	--	--	--	"	
<i>Surrogate(s): a,a,a-TFT (FID)</i>		<i>Recovery: 106%</i>		<i>Limits: 50-150%</i>	"								05/12/07 05:39	
<i>a,a,a-TFT (PID)</i>		<i>83.8%</i>		<i>50-150%</i>	"								"	

<b>LCS (7050038-BS1)</b>													<b>Extracted: 05/11/07 14:54</b>	
Benzene	AK101 GRO/BTEX	18.6	---	0.500	ug/l	1x	--	20.6	90.3%	(80-120)	--	--	05/11/07 21:52	
Toluene	"	18.5	---	0.500	"	"	--	19.7	93.9%	"	--	--	"	
Ethylbenzene	"	17.7	---	0.500	"	"	--	19.8	89.4%	(80-126)	--	--	"	
Xylenes (total)	"	59.6	---	1.50	"	"	--	59.6	100%	(80-127)	--	--	"	
<i>Surrogate(s): a,a,a-TFT (PID)</i>		<i>Recovery: 89.9%</i>		<i>Limits: 60-120%</i>	"								05/11/07 21:52	

<b>LCS (7050038-BS2)</b>													<b>Extracted: 05/11/07 14:54</b>	
Gasoline Range Organics	AK101 GRO/BTEX	598	---	50.0	ug/l	1x	--	550	109%	(60-120)	--	--	05/11/07 22:25	
<i>Surrogate(s): a,a,a-TFT (FID)</i>		<i>Recovery: 101%</i>		<i>Limits: 60-120%</i>	"								05/11/07 22:25	

<b>LCS Dup (7050038-BSD1)</b>													<b>Extracted: 05/11/07 14:54</b>	
Benzene	AK101 GRO/BTEX	18.4	---	0.500	ug/l	1x	--	20.6	89.3%	(80-120)	1.08% (13.8)		05/12/07 04:32	
Toluene	"	18.0	---	0.500	"	"	--	19.7	91.4%	"	2.74% (10.4)		"	
Ethylbenzene	"	17.3	---	0.500	"	"	--	19.8	87.4%	(80-126)	2.29% (11.8)		"	
Xylenes (total)	"	57.9	---	1.50	"	"	--	59.6	97.1%	(80-127)	2.89% (11.2)		"	
<i>Surrogate(s): a,a,a-TFT (PID)</i>		<i>Recovery: 87.2%</i>		<i>Limits: 60-120%</i>	"								05/12/07 04:32	

<b>LCS Dup (7050038-BSD2)</b>													<b>Extracted: 05/11/07 14:54</b>	
Gasoline Range Organics	AK101 GRO/BTEX	582	---	50.0	ug/l	1x	--	550	106%	(60-120)	2.71% (20)		05/12/07 05:06	
<i>Surrogate(s): a,a,a-TFT (FID)</i>		<i>Recovery: 105%</i>		<i>Limits: 60-120%</i>	"								05/12/07 05:06	

<b>Duplicate (7050038-DUP1)</b>													<b>QC Source: AQE0032-01</b>		<b>Extracted: 05/11/07 14:54</b>	
Gasoline Range Organics	AK101 GRO/BTEX	ND	---	50.0	ug/l	1x	ND	--	--	--	6.28% (35)		05/12/07 00:06			
<i>Surrogate(s): a,a,a-TFT (PID)</i>		<i>Recovery: 99.8%</i>		<i>Limits: 50-150%</i>	"								05/12/07 00:06			

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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<b>Hart Crowser, Inc.</b> 2600 Cordova, Suite 210 Anchorage, AK/USA 99503	Project Name: <b>King Salmon</b> Project Number: 7401-26 Project Manager: Caryn Orvis	Report Created: 05/17/07 16:04
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**Gasoline Range Organics (C6-C10) and BTEX per AK101 - Laboratory Quality Control Results**  
 TestAmerica - Anchorage, AK

**QC Batch: 7050038      Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Matrix Spike (7050038-MS1)</b>			QC Source: AQE0032-02				Extracted: 05/11/07 14:54							
Benzene	AK101 GRO/BTEX	17.9	---	0.500	ug/l	1x	ND	20.6	86.9%	(69-124)	--	--	05/12/07 01:12	
Toluene	"	17.4	---	0.500	"	"	ND	19.7	88.3%	(80-126)	--	--	"	
Ethylbenzene	"	16.6	---	0.500	"	"	0.0400	19.8	83.6%	(77.3-143)	--	--	"	
Xylenes (total)	"	56.4	---	1.50	"	"	0.110	59.6	94.4%	(67.5-140)	--	--	"	
Surrogate(s): a,a,a-TFT (PID)		Recovery: 80.3%	Limits: 50-150%		"		05/12/07 01:12							
<b>Matrix Spike Dup (7050038-MSD1)</b>			QC Source: AQE0032-02				Extracted: 05/11/07 14:54							
Benzene	AK101 GRO/BTEX	17.8	---	0.500	ug/l	1x	ND	20.6	86.4%	(69-124)	0.560% (10)		05/12/07 01:46	
Toluene	"	17.4	---	0.500	"	"	ND	19.7	88.3%	(80-126)	0.00%	"	"	
Ethylbenzene	"	16.6	---	0.500	"	"	0.0400	19.8	83.6%	(77.3-143)	0.00%	"	"	
Xylenes (total)	"	56.1	---	1.50	"	"	0.110	59.6	93.9%	(67.5-140)	0.533%	"	"	
Surrogate(s): a,a,a-TFT (PID)		Recovery: 85.9%	Limits: 50-150%		"		05/12/07 01:46							

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<b>Hart Crowser, Inc.</b> 2600 Cordova, Suite 210 Anchorage, AK/USA 99503	Project Name: <b>King Salmon</b> Project Number: 7401-26 Project Manager: Caryn Orvis	Report Created: 05/17/07 16:04
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**Diesel Range Organics (C10-C25) per AK102 - Laboratory Quality Control Results**  
 TestAmerica - Anchorage, AK

**QC Batch: 7050046      Water Preparation Method: EPA 3510**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Blank (7050046-BLK1)</b>							Extracted: 05/15/07 12:58							
Diesel Range Organics	AK 102	ND	---	0.500	mg/l	1x	--	--	--	--	--	--	05/16/07 13:23	
<i>Surrogate(s): 1-Chlorooctadecane</i>		<i>Recovery: 93.5%</i>		<i>Limits: 50-150%</i>		<i>"</i>							<i>05/16/07 13:23</i>	
<b>LCS (7050046-BS1)</b>							Extracted: 05/15/07 12:58							
Diesel Range Organics	AK 102	10.3	---	0.500	mg/l	1x	--	10.3	100%	(75-125)	--	--	05/16/07 13:56	
<i>Surrogate(s): 1-Chlorooctadecane</i>		<i>Recovery: 100%</i>		<i>Limits: 60-120%</i>		<i>"</i>							<i>05/16/07 13:56</i>	
<b>LCS Dup (7050046-BSD1)</b>							Extracted: 05/15/07 12:58							
Diesel Range Organics	AK 102	9.89	---	0.500	mg/l	1x	--	10.3	96.0%	(75-125)	4.06% (20)		05/16/07 14:30	
<i>Surrogate(s): 1-Chlorooctadecane</i>		<i>Recovery: 94.4%</i>		<i>Limits: 60-120%</i>		<i>"</i>							<i>05/16/07 14:30</i>	
<b>Duplicate (7050046-DUP1)</b>				QC Source: AQE0032-01				Extracted: 05/15/07 12:58						
Diesel Range Organics	AK 102	ND	---	0.407	mg/l	1x	ND	--	--	--	13.2% (20)		05/16/07 13:23	
<i>Surrogate(s): 1-Chlorooctadecane</i>		<i>Recovery: 94.6%</i>		<i>Limits: 50-150%</i>		<i>"</i>							<i>05/16/07 13:23</i>	

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**Hart Crowser, Inc.**

2600 Cordova, Suite 210  
Anchorage, AK/USA 99503

Project Name: **King Salmon**

Project Number: 7401-26

Project Manager: Caryn Orvis

Report Created:

05/17/07 16:04

**Notes and Definitions**

Report Specific Notes:

None

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL\* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. \*MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
- Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Anchorage, AK



Troy J. Engstrom, Manager

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- 1910 Fairview Ave., E., Seattle WA 98102
- 2250 Denali St., #705, Anchorage, AK 99503
- Five Centepoinde Dr., Lake Oswego, OR 97035
- 301 E. Ocean Blvd., #1950, Long Beach CA 90802
- 120 3rd Ave S., #110, Edmonds, WA 98020
- 811 Church Hill Rd., #236, Cherry Hill, NJ 08002

# Sample Custody Record HART CROWSER

Samples Shipped To: Y.A.

JOB 7401-26 LAB NUMBER AQE0032  
 PROJECT NAME King Solomon GW SPI  
 HART CROWSER CONTACT Caryn Davis  
907 256 7475  
 SAMPLED BY: Russell Grandel

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	INC	INC	INC	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
01	MW-5		5/9/07	1130	water	X	X	X	5	
02	MW-8		1315	"		X	X	X	5	
03	MW-11		1245	"		X	X	X	5	
04	MW-1R		1415	"		X	X	X	5	
05	TRIP					X	X	X	3	TRIP BLANK

RECEIVED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<u>Russell Grandel</u>	5/10/07	1900	<u>Caryn Davis</u>	5/10/07	0830
<u>Russell Grandel</u>			<u>Rachel James</u>	5/10/07	0835
<u>Hart Crowser</u>			<u>T.A. Anchorage</u>		

RELINQUISHED BY: Russell Grandel DATE: 5/10/07 TIME: 1900

RECEIVED BY: Caryn Davis DATE: 5/10/07 TIME: 0830

RECEIVED BY: Rachel James DATE: 5/10/07 TIME: 0835

RECEIVED BY: T.A. Anchorage DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: \_\_\_\_\_

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

TURNAROUND TIME:  24 HOURS  1 WEEK  48 HOURS  STANDARD  72 HOURS  OTHER \_\_\_\_\_

TEMPERATURE: 11°C

SHIPMENT METHOD:  HAND  COURIER  OVERNIGHT

TOTAL NUMBER OF CONTAINERS: 23

SAMPLE RECEIPT INFORMATION:  YES  NO  N/A

GUSTODY SEALS:  YES  NO  N/A

GOOD CONDITION:  YES  NO

# Test America Cooler Receipt Form

(Army Corps. Compliant)

WORK ORDER # AQE0032 CLIENT: Hart Crouser PROJECT: King Salmon 6W

Date/Time Cooler Arrived 5 / 10 / 07 09 : 40 Cooler signed for by: Rachel James  
(Print name)

## Preliminary Examination Phase:

Date cooler opened:  same as date received or      /      /     

Cooler opened by (print) Johanna Dreher Rachel James (sign) RJ

1. Delivered by  ALASKA AIRLINES  Fed-Ex  UPS  NAC  LYNDEN  CLIENT  Other:     

Shipment Tracking # if applicable      (include copy of shipping papers in file)

2. Number of Custody Seals 0 Signed by      Date      /      /     

Were custody seals unbroken and intact on arrival?  Yes  No

3. Were custody papers sealed in a plastic bag?  Yes  No

4. Were custody papers filled out properly (ink, signed, etc.)?  Yes  No

5. Did you sign the custody papers in the appropriate place?  Yes  No

6. Was ice used?  Yes  No Type of ice:  blue ice  gel ice  real ice  dry ice Condition of Ice: Solid

Temperature by Digi-Thermo Probe 1.1 °C Thermometer # Rec #3

7. Packing in Cooler:  bubble wrap  styrofoam  cardboard  Other:     

8. Did samples arrive in plastic bags?  Yes  No

9. Did all bottles arrive unbroken, and with labels in good condition?  Yes  No

10. Are all bottle labels complete (ID, date, time, etc.)?  Yes  No

11. Do bottle labels and Chain of Custody agree?  Yes  No

12. Are the containers and preservatives correct for the tests indicated?  Yes  No

13. Is there adequate volume for the tests requested?  Yes  No

14. Were VOA vials free of bubbles?  N/A  Yes  No

If "NO" which containers contained "head space" or bubbles?     

AQE0032-04  
COC time 1415  
jur time 1345  
contact client  
COC is correct  
see phone log  
JD 05/11/07

## Log-in Phase:

Date of sample log-in 05 / 10 / 07

Samples logged in by (print) Johanna Dreher (sign) Johanna Dreher

1. Was project identifiable from custody papers?  Yes  No

2. Do Turn Around Times and Due Dates agree?  Yes  No

3. Was the Project Manager notified of status?  Yes  No

4. Was the Lab notified of status?  Yes  No

5. Was the COC scanned and copied?  Yes  No