

Table 14-3. Analytical Results for Sediment at South of Runway 18-36 Area

Location	Year	DRO (mg/kg)
NSWSD-2 Downgradient	2006	270 J
	2007	550 Y
	2008	390 YJ
	2009	15,000 YHJ
	2010	1,600 Y
	2011	500 Y
	2012	1,400 Y
	2013	580 DY
NSWSD-4 Downgradient	2014	9,900 DY
	2006	330
	2007	270 Y
	2008	160 YJ
	2009	120 YH
	2010	130 Y
	2011	110 Y
	2012	100 Y
NSWSD-5 Downgradient	2013	97 DY
	2014	420 DY
	2006	250
	2007	100 Y
	2008	36 J
	2009	280 YHJ
	2010	340 Y
	2011	110 Y
Endpoint Criteria	2012	430 Y
	2013	170 DY
	2014	8,600 DY
		90.6

Notes:

Bold indicates reported concentration is greater than endpoint criteria.

14.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 14-4. The 2014 data indicated that biodegradation of petroleum hydrocarbons is likely occurring by iron (II) reduction; sulfate reduction; and methanogenesis as shown by elevated ferrous iron concentrations, depleted sulfates, and elevated methane concentrations in comparison to background conditions. Water quality parameters presented in Table 14-1 collected during 2014 support evidence of continued natural attenuation as shown by the reducing environment (negative ORP) and depleted dissolved oxygen (0.0 mg/L) in the vicinity of the product recovery trench. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 14-4. 2014 Analytical and Field Measurement Data for NAPs for South of Runway 18-36 Area

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
02-231	MNA	172	0.33	1,100	325	65	0.3
02-232	MNA	181	1.1	140	70	50	1.2
AS-1	MNA	209	0.20 U	6,600	180	50	0.3

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

14.4 TREND EVALUATION

Statistical evaluations are only conducted on target analyte concentrations in groundwater for analytes that exceed endpoint criteria within that last three sampling events, in accordance with the CMP, Revision 6 (Navy 2014a). Because groundwater contaminant concentrations in all wells have been below endpoint criteria for at least the last three consecutive years, trend evaluations were not performed at this site in 2014.

14.5 CONCLUSIONS

This section presents the conclusions based on a review of LTM activities performed at the South of Runway 18-36 Area site in 2014. The conclusions are as follows:

- Groundwater Flow: Based on historic and 2014 field measurements, the interpreted groundwater flow direction has a radial pattern that is generally to the north toward Crossover Canal and West Canal, to the west toward South Sweeper Creek, and to the southwest at the south end of the site toward Sweeper Cove.
- MNA: The groundwater parameters obtained during 2014 provide evidence that natural attenuation of petroleum hydrocarbons continues to occur at the site.
- Free Product: Free product was observed in wells E-216 (0.31 feet) and RW-18/36-04 (0.03 feet). Groundwater sampling was not planned at these locations.
- Well 02-231: This surface water protection well is located within the contaminant plume. The DRO concentration was observed below the endpoint criteria in 2014 and has remained below the criteria for six consecutive sampling events. BTEX concentrations have remained below their respective endpoint criteria for ten sampling events. TAH and TAqH concentrations continue to exceed their respective endpoint criteria in 2014.

- Well 02-232: This surface water protection well is located downgradient of the contaminant plume and upgradient of sediment location NSWSD-05. BTEX, TAH, and TAqH concentrations have remained below their respective endpoint criteria for at least six sampling events.
- Well AS-1: This surface water protection well is located downgradient of the contaminant plume and upgradient of sediment location NSWSD-02. BTEX concentrations have remained below their respective endpoints for eight sampling events. For the 2014 samples, TAH and TAqH concentrations exceeded the ADEC water quality standards.
- Sediment Location NSWSD-2: The DRO concentration exceeded the endpoint criteria at 9,900 mg/kg. Oily sediments, sheen, and petroleum odor were observed when the sediment was disturbed during sampling. This sample location is immediately downgradient and adjacent to the product recovery trench.
- Sediment Location NSWSD-4: The DRO concentration exceeded the endpoint criteria at 97 mg/kg. Oily sediments, sheen, and petroleum odor were noted when the sediment was disturbed during sampling. DRO concentrations have decreased at this location in previous years but increased in 2014. This sample location is downstream of the product recovery trench by approximately 180 feet.
- Sediment Location NSWSD-5: DRO exceeded the endpoint criteria at 8,600 mg/kg. Oily sediments, sheen, and petroleum odor were observed when the sediment was disturbed during sampling. This sample location is downstream of the product recovery trench by approximately 300 feet.
- During a shoreline inspection of South Sweeper Creek at low tide downgradient from the site, black-stained sediment was observed at several sections of shoreline in the vicinity of sample locations NSWSD-2, NSWSD-4, and NSWSD-5, and at numerous small areas downgradient from the site.

14.6 RECOMMENDATIONS

DRO continues to exceed endpoint criteria in shoreline sediments, and TAH and TAqH continue to exceed endpoint criteria in surface water protection wells. However, DRO has remained below endpoint criteria in well 02-231 for the last six sampling events. Therefore, it is recommended that sampling for DRO be discontinued in this well.

It is recommended that sampling for BTEX be continued to support the TAH/TAqH calculations, but not for comparison with specific endpoint criteria.

Because of the continued exceedance of endpoint criteria for DRO in sediment, the continued exceedance of endpoint criteria for TAH and TAqH in surface water protection wells, and the observance of free product in other site wells, it is recommended that all other monitoring at the site be continued as prescribed.

Legend

- - - 25 Ground elevation contour (ft above MLLW)
- · - · - Estimated extent of endpoint criteria exceedance
- - - Main Road Pipeline
- - - Shoreline inspection performed
- - - - - Product recovery trench
- 02-231 Sample collected in 2014
- 2.20 Water Table Elevation (MLLW)
- 2014 Monitoring well
- Well not monitored in 2014
- ▲ 2014 Sediment sample location
- ← General Groundwater Flow Direction

Notes:

1. Concentrations in micrograms per liter (µg/L) for water and milligrams per kilograms (mg/kg) for sediment.
2. Only values in exceedance of endpoint criteria shown.

Endpoint Criteria	
<i>Groundwater</i>	
TAH	10 µg/L
TAqH	15 µg/L
<i>Sediment</i>	
DRO	90.6 mg/kg

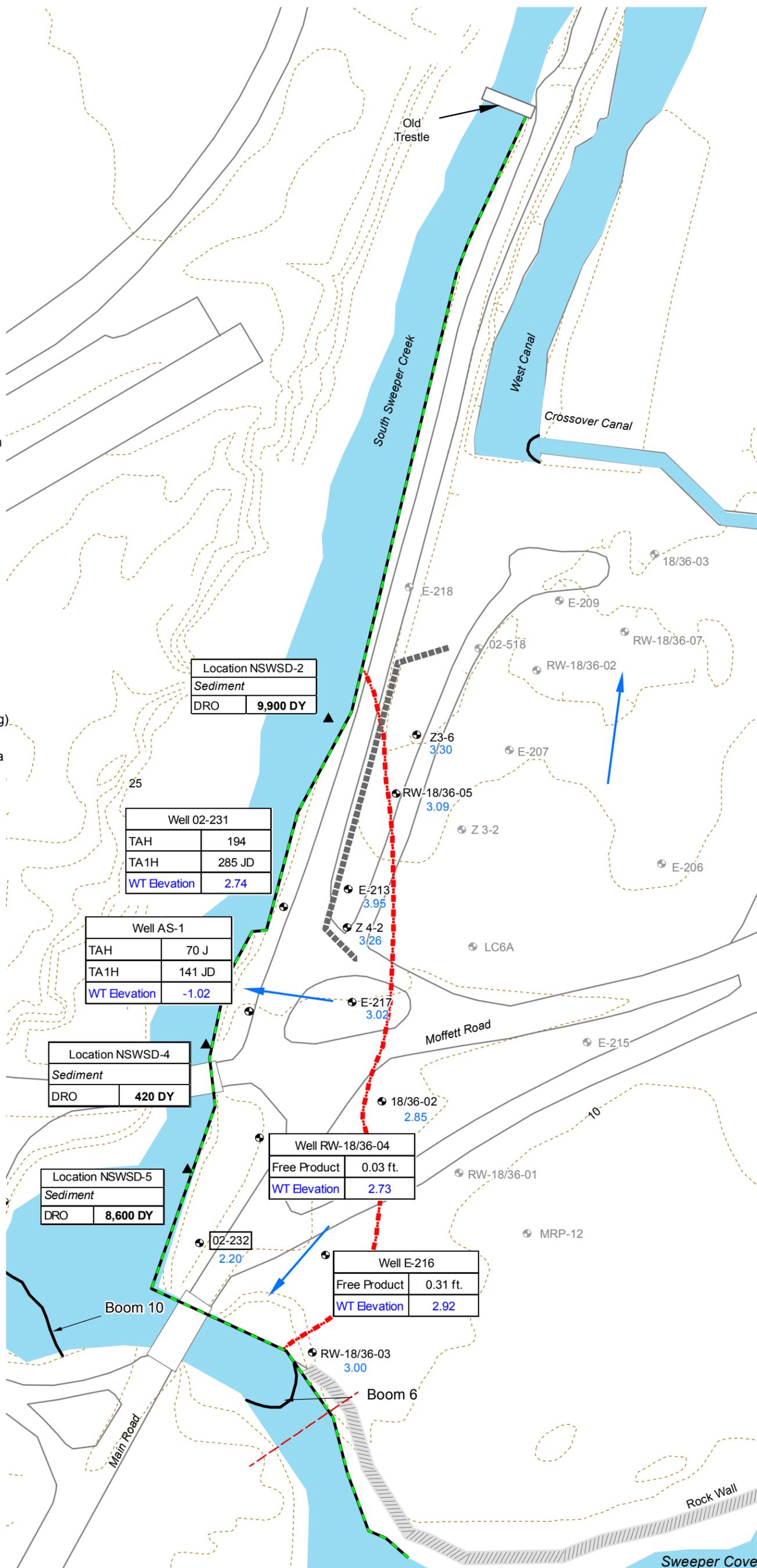


Figure 14-1
South of Runway 18-36 Area
Sample Locations

Task Order 05
Adak Island, AK
2014 Annual Groundwater and
Landfill Monitoring Report

15 SWMU 11, PALISADES LANDFILL

15.1 BACKGROUND

Palisades Landfill (SWMU 11) is located approximately 1 mile north of the main downtown area of Adak. It was used as a primary disposal area for all operations on Adak Island from the 1940s to approximately 1970. The landfill area, which is approximately 6 acres, covers portions of the coastal uplands immediately adjacent to Kuluk Bay and part of a steep ravine. The ravine is approximately 1,200 feet long, 5 to 300 feet wide, and 5 to 150 feet deep, with a small stream (Palisades Creek) running through it. The mouth of the ravine opens immediately to Kuluk Bay (Navy 2001a).

The landfill received wastes from the 1940s to 1970. Approximately 80,000 to 100,000 cubic yards of solid waste are located in the landfill. A wide variety of materials were reportedly disposed of at Palisades Landfill, including waste petroleum, oils, and lubricants; chlorinated and non-chlorinated solvents; paint waste; sanitary trash; scrap vehicles; lead and mercury batteries; construction waste; and mercury. The landfill was covered with local soils in the early 1970s after disposal practices were stopped. A portion of the disposed material within the ravine has no cover and is on a steep slope. The exposed waste in the ravine consists primarily of barrels, assorted metal debris, and building demolition waste. The landfill does not extend into Kuluk Bay. Groundwater occurs locally under the site and discharges into the marine environment at the downgradient boundary (Navy 2001a).

Surface soil, surface water, groundwater, and stream sediment samples were collected during 1992 and 1998 site investigations. VOCs, semivolatile organic compounds (SVOCs), PCBs, and inorganic analytes were detected in the sediment and surface water. Although no remedial investigation or risk assessment was performed at the time, the Federal Facilities Compliance Agreement parties concluded that performing an interim remedial action (IRA) was the best option for this site (Navy 2001a).

In the summer of 1996, Palisades Landfill was closed according to the 1995 interim action ROD as an IRA. Closure entailed installation of a landfill cover, ICs for access and land use, surface water controls, a vegetative cover, and LTM. The final OU A ROD (Navy, ADEC, and EPA 2000) determined that the selected interim actions met CERCLA requirements and no further remedial actions were required. Because of the presence of hazardous materials that do not allow for unrestricted use and unlimited access, Palisades Landfill will continue to be evaluated under the CERCLA 5-year review process. The first 5-year review was

completed in November 2001 (Navy 2001b). The second 5-year review was completed in December 2006 (Navy 2006d), and the third 5-year review was completed in December 2011 (Navy 2011b).

Engineering controls that are implemented at SWMU 11 include excavation and use restriction signs and a soil cover with drainage swales. The sinkhole noted in the 2009 IC Inspection Report (Navy 2010) was repaired in 2010, but was again observed during subsequent IC inspections in 2013 and 2014 (Navy 2013e and 2014b, respectively). Repairs are scheduled to be conducted in 2015.

15.2 SAMPLING HISTORY RELATED TO CLOSURE MONITORING

Sediment and surface water have been sampled at Palisades Landfill periodically since May 1996. As of 2014, 21 sampling events have occurred (see Table 2-2). In May 1996, prior to landfill closure, and in August and November 1996 following landfill closure, two surface water and sediment locations were sampled and analyzed for pesticides, PCBs, SVOCs, and total inorganics (metals). Surface water samples were also analyzed for dissolved inorganics (metals), BTEX, and turbidity. Sediment samples were also analyzed for total organic compounds. Sampling of sediment and surface water was performed at the same locations annually from 1997 through 2006 and again in 2008. Sediment sampling has been performed annually from 2007 through 2011, and was reduced to biennially and performed again in 2013 and 2014 for the 5-year review. The analytical results from the sampling conducted at Palisades Landfill from 1996 through 2014 are presented in Appendix C-2.

Target analytes were analyzed in sediment in 2014 as specified in the CMP, Revision 6 (Navy 2014a) and include the following:

- PCB Aroclors
- Antimony
- Arsenic
- Nickel

15.3 TARGET ANALYTE RESULTS

During the 2014 landfill monitoring event, sediment samples were collected at the Palisades Landfill, as specified in the CMP, Revision 6 (Navy 2014a). The sample locations are shown on Figure 15-1. Field forms and logbooks are provided in Appendix A while photographs of the site and sampling locations are presented in Appendix I. A summary of the analytical

results for the target analytes from the 2014 sampling event and the endpoint criteria are provided for sediment in Table 15-1. Analytical results for sediment were compared with the endpoint criteria listed in Table 3-3. Analytical results that exceeded the endpoint criteria are summarized in the text below and compiled in Appendix C-2.

Sediment samples were collected at three locations (101, 102, and 103) and analyzed for PCB Aroclors and select total metals (antimony, arsenic, and nickel). Sampling location 101 represents the most upgradient location along the Palisades Creek flow path northwest of the landfill before it enters the ponded area. Sampling location 102 is located where the surface water discharges at the base of the metal debris. Sampling location 103 is located at the mouth of Palisades Creek where it enters Kuluk Bay and represents a downgradient sampling point intended to evaluate the migration of contaminants beyond location 102. Sediment samples from locations 101 and 102 are considered freshwater sediment samples; and the sediment sample from location 103 is considered a marine sediment sample.

Visual inspections of the sediment sampling locations at Palisades Landfill were also completed during the LTM field event and field inspection forms are presented in Appendix A. No visual evidence of contamination was observed at any sampling locations. Visual inspections are discussed in more detail in Section 4.1.3. IC inspections were conducted during the 2014 monitoring event and are reported in the 2014 IC Site Inspection Report (Navy 2014b).

Table 15-1. Summary of Sediment Analytical Results at SWMU 11, Palisades Landfill, 2014 LTM

Target Analyte	Location 101 ¹	Location 102 ¹	Location 103 ²	Endpoint Criteria	
				Long et. al. 1995 ² Freshwater and Marine ²	Ecological RBSC ³
PCBs (Aroclors) (µg/kg)					
Aroclor 1016	5.0 U	5.3 U	4.3 U		
Aroclor 1221	9.9 U	11 U	5.8 U		
Aroclor 1232	5.0 U	5.3 U	4.3 U		
Aroclor 1242	5.0 U	5.3 U	4.3 U	Sum of Aroclors	
Aroclor 1248	5.0 U	5.3 U	4.3 U		
Aroclor 1254	5.0 U	370	4.3 U		
Aroclor 1260	4.0 J	130	4.3 U		
Sum of Above Detected Aroclors	4.0 J	500	0	22.7 ³	
Total Metals (mg/kg)					
Antimony	0.239 J	3.08 J	0.047 UJ		2
Arsenic	5.13	18.3	5.32	8.2	
Nickel	6.46	48.2	5.38	20.9	

Notes:

Bold indicates reported concentration is greater than endpoint criteria.

¹ Freshwater sediment sample

² Marine Sediment Sample (Long et al. 1995)

³ Final PSE-2 guidance document for Adak (Navy 1996)

15.3.1 Polychlorinated Biphenyls

Sediment sample location 102 had a detected concentration of Aroclor 1254 at 370 µg/kg and Aroclor 1260 at 130 µg/kg, exceeding the endpoint criteria sum of 22.7 µg/kg. Sediment sample 101 had an estimated detection of Aroclor 1260 at a concentration of 4.0 µg/kg, below the endpoint criteria sum of 22.7 µg/kg. No PCBs were detected in sediment sample 103. All other target analyte Aroclors at the Palisades Landfill were not detected in any sample.

15.3.2 Total Metals

Sediment sample 102 was the only sample for which concentrations of target metals were observed to be above endpoint criteria. For this sample, antimony was 3.08 mg/kg (slightly above the endpoint criteria of 2 mg/kg), arsenic was 16.0 mg/kg (above the endpoint criteria of 8.2 mg/kg), and nickel was 31.5 mg/kg (above the endpoint criteria of 20.9 mg/kg). No other samples had target metals exceeding endpoint criteria.

15.4 CONCLUSIONS

The analytical data were reviewed for the compounds included on the target analyte list that exceeded their endpoint criteria during the 2014 sampling event. The purpose of the analysis of the recent historical data is to determine whether overt trends exist in the concentration data for the Palisades Landfill.

15.4.1 Polychlorinated Biphenyls in Sediment

The summation of PCB concentrations has only been detected once above the revised endpoint criterion of 22.7 µg/kg during any sampling event at locations 101 and 103. In 2000, Aroclor 1260 was detected at location 103 at a concentration of 32 µg/kg.

The summation of PCB concentrations has exceeded the revised endpoint criteria of 22.7 µg/kg at location 102 ten times since 1996, most recently in 2014. Aroclor 1260 has been the most frequently detected Aroclor with highest concentrations observed in 2006 (300 µg/kg) and in 2010 (150 µg/kg). Additionally, in 2001, sample 102 was found to contain Aroclor 1254 at a concentration of 78.7 µg/kg. In 2014, Aroclors 1260 and 1254 were detected above endpoint criteria at 50 µg/kg and 64 µg/kg, respectively. The remaining five Aroclors have not been detected in any sample since monitoring began in 1996.

15.4.2 Total Metals in Sediment

Arsenic has been detected above the endpoint criteria in sediment samples at Palisades Landfill every year since sampling began in 1996, except for 2010. Concentrations of arsenic in samples collected from locations 101 and 103 have remained steady at low levels, while concentrations of arsenic in samples collected from location 102 have fluctuated with no clear trend. Arsenic concentrations from 2014 remained below endpoint criteria in samples 101 and 103 and continue to be highest in sediment sample 102 (at 16.0 mg/kg). The endpoint for arsenic in both freshwater and marine sediments is 8.2 mg/kg, which is based on the studies of Long et al. (1995).

Nickel has not been detected above endpoint criteria in any sample collected from location 101 since sampling began in 1996. However, since 1996 nickel has routinely been detected above the endpoint criteria to a maximum concentration of 125 mg/kg in the samples collected from location 102. In 2009, sample location 102 contained a nickel concentration of 27.5 mg/kg, which is above the endpoint criteria of 20.9 mg/kg; in 2010, the concentration was 19.8 mg/kg, which is slightly below the endpoint criteria of 20.9 mg/kg; in 2011, the concentration was above the endpoint criteria, at 31.5 mg/kg; and in 2013, the

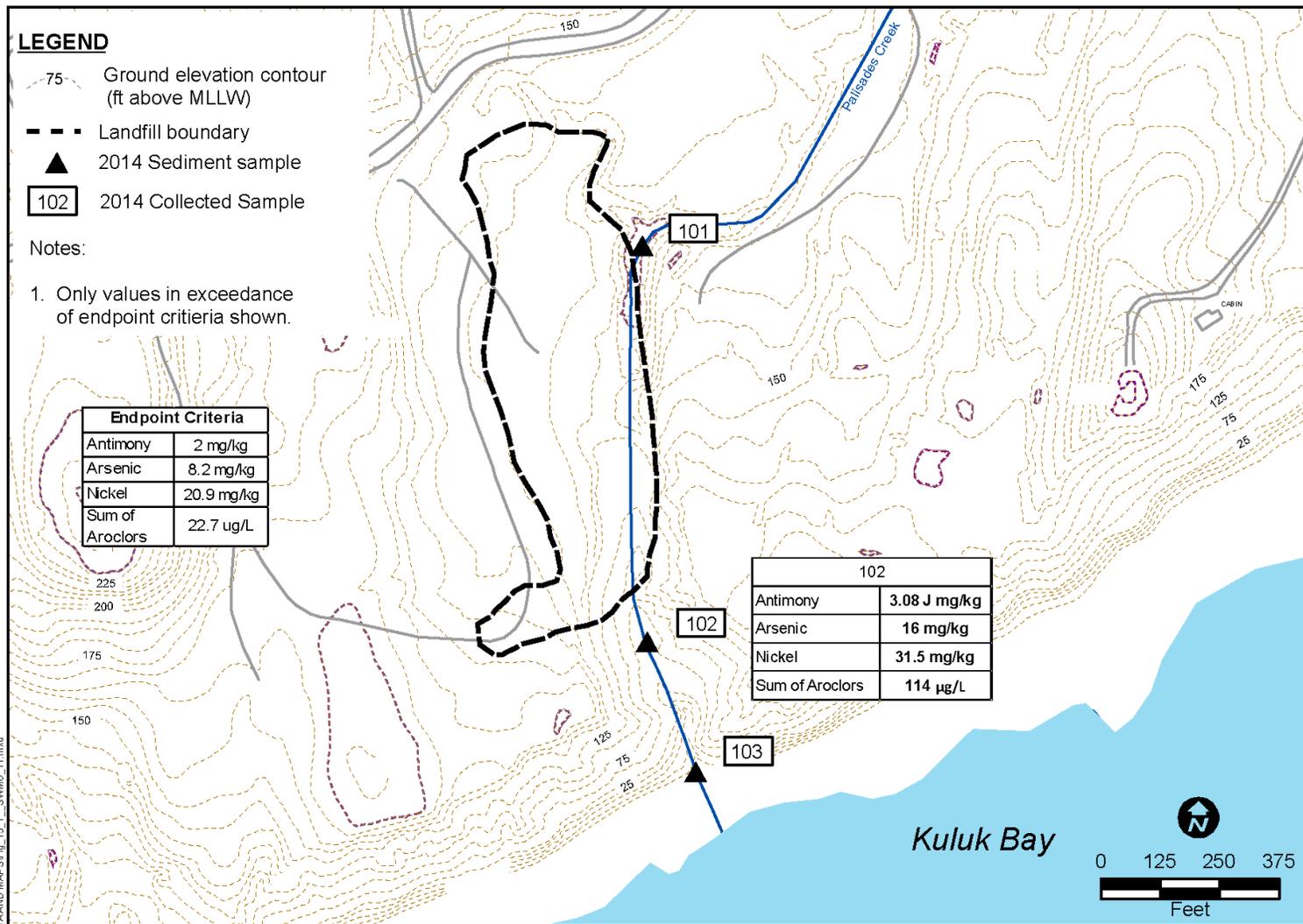
concentration was again above the endpoint criteria at 55.8 mg/kg. In 2014 the concentration was 31.5 mg/kg.

Since 1996 the concentration of nickel in samples collected from location 103 has fluctuated from non-detectable to four times detection limits. The endpoint for nickel in both freshwater and marine sediments is 20.9 mg/kg, which is based on the studies of Long et al. (1995). In 2014, the concentration was 5.38 mg/kg, which is below the endpoint criteria.

Antimony was not detected above the endpoint criteria of 2 mg/kg in any samples from 2001 through 2006. In 2007, sediment collected from location 102 was observed to contain antimony above endpoint criteria. In 2008, the antimony concentration was below endpoint criteria in all samples. Antimony has been observed to exceed the endpoint criteria at sample location 102 each year since 2009 and again in 2011, 2013, and 2014 at an estimated concentration of 3.08 mg/kg which is above the endpoint criteria of 2 mg/kg. The antimony concentrations at locations 101 and 103 remained below the endpoint criteria in 2014.

15.5 RECOMMENDATIONS

The summation of PCB Aroclor concentrations, antimony, arsenic, and nickel were detected in sediment above endpoint criteria in 2014 at sample location 102. Since the summation of PCB Aroclor concentrations, antimony, arsenic, and nickel are consistently above the endpoint criteria, it is recommended that sediment monitoring of these contaminants of concern be continued biennially at the three locations (Table 2-6).



15-7

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U.S. NAVY	SEALASKA	<p align="center">Figure 15-1 SWMU 11, Palisades Landfill Sample Locations</p>	<p align="center">Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report</p>
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16 SWMU 13 METALS LANDFILL

16.1 BACKGROUND

The Metals Landfill (SWMU 13) is located immediately southeast of the central community of Adak and is bounded by Monument Hill to the west and Kuluk Bay to the east. The total volume of landfill waste and soil in the Metals Landfill is approximately 400,000 cubic yards. The total site area is approximately 28 acres, while approximately 19 acres were formally used as a landfill (Navy 2001a).

The Metals Landfill began operations in the 1940s and received a variety of waste materials, including sanitary trash, construction waste, paints, chlorinated and non-chlorinated solvents, batteries, scrap vehicles, medical waste, and sewage sludge. In 1970, restrictions were placed on the types of materials that could be disposed of at the landfill. Beginning in 1988, when a sludge press was installed at the sewage treatment plant, dewatered sewage sludge was disposed of on the southern end of the eastern section of the landfill. The landfill stopped receiving wastes in 1989 (Navy 2001a).

A site inspection of Metals Landfill was conducted in 1989 by regulatory agencies. The investigation discovered four drums with liquid, one cracked vehicle battery, and one acetylene cylinder scattered in one small area of the landfill. As a result of the inspection, the regulatory agency determined that the battery area contains hazardous waste and, therefore, was deemed a hazardous waste pile under the Resource Conservation and Recovery Act (RCRA). This is the only area of the landfill to have a RCRA issue. The remaining landfill has been designated as a SWMU under RCRA. The presence of the batteries resulted in a Federal Facilities Compliance Agreement being signed and issued by the EPA in November 1990 (Navy 2001a).

In 1996, the discrete waste pile within the Metals Landfill was closed as a waste pile under the RCRA guidelines. Closure entailed verification of the collection and disposal of five batteries from the site at a permitted hazardous waste landfill and the completion of a survey plat that included a note restricting the disturbance of the hazardous waste disposal unit in accordance with regulations.

In the summer of 1996, the entire Metals Landfill was closed per the 1995 ROD as an IRA (Navy et al. 1995). Closure included evaluation and removal of shoreline debris, implementation of surface water erosion controls, construction of a landfill cap, placement of a vegetative cover, implementation of ICs for access and land use, and LTM. The final

OU A ROD (Navy, ADEC, and EPA 2000) determined that the selected interim actions met CERCLA requirements and no further remedial actions were required. Because of the presence of hazardous materials that do not allow for unrestricted use and unlimited access, Metals Landfill, together with Palisades Landfill, will continue to be evaluated under the CERCLA 5-year review process. The initial 5-year review report was completed in November 2001 (Navy 2001a) with subsequent reviews being completed in 2006 (Navy 2006d) and 2011 (Navy 2011b).

Engineering controls that were implemented at SWMU 13 include a landfill cap (vegetated soil cover), erosion controls, and signs. Repairs to the eroded shoreline, drainage swales, and vegetative cap are scheduled to be conducted in 2015 (Navy 2013e and 2014b).

16.2 SAMPLING HISTORY RELATED TO CLOSURE MONITORING

Groundwater has been sampled at the Metals Landfill periodically since July 1996. To date, 17 sampling events at the Metals Landfill have occurred from 1996 through 2014 (see Table 2-2). In July and November 1996, groundwater was sampled at eight monitoring wells for VOCs, SVOCs, PCBs/pesticides, and total and dissolved metals. Groundwater sampling was also performed annually (1997 through 2010) with reductions to the above-listed analyses. All eight wells were sampled during these events with the exception of wells 401 (MW13-1) and 404 (MW13-4) during the November 2000 event. The analytical results from the sampling conducted at Metals Landfill from 1996 through 2014 are presented in Appendix C-2.

Because bis(2-ethylhexyl)phthalate has not been detected above the endpoint criterion from 2000 to 2008, and none of the VOCs included on the target analyte list have been detected above the endpoint criteria from 1998 to 2008; SVOCs and VOCs were discontinued. Analysis of total and dissolved arsenic and barium were reduced to once every other (even) year in 2007. Monitoring occurred in 2008 and 2010 and was then reduced to every five years. Monitoring was conducted in 2014 to prepare for the 5-year review, with the next monitoring scheduled to occur in 2019.

16.3 TARGET ANALYTE RESULTS

During 2014, groundwater samples were collected at the Metals Landfill for analysis of total and dissolved barium, total and dissolved arsenic, and water quality parameters. Monitoring wells are positioned at locations that are hydraulically downgradient of the solid waste at the Metals Landfill (Figure 16-1). Field forms and logbooks are provided in Appendix A, and

photographs of the site and sampling locations are presented in Appendix I. Field sampling parameters collected during the field event are included in Appendix D-3.

Groundwater samples were collected from the following eight monitoring wells:

- MW13-1
- MW13-2
- MW13-3
- MW13-4
- MW13-5
- MW-603
- MW-604
- MW-605

Groundwater samples were analyzed for the following:

- Total and dissolved arsenic
- Total and dissolved barium
- Water quality parameters, including:
 - Total Kjeldahl nitrogen (TKN)
 - Ammonia
 - Alkalinity
 - Sulfate
 - Chemical oxygen demand
 - Total dissolved solids

Concentrations of target analytes found in groundwater samples are presented on Table 16-1. Concentrations of non-target analytes are presented in Appendix C-2.

Visual inspections of the groundwater monitoring wells and institutional controls at Metals Landfill were also completed during the monitoring event. No wells at the Metals Landfill were found to be in need of repairs during the 2014 monitoring event (Appendix E).

Methane was measured in the head space of each well using a lower explosive level meter. Meter readings were recorded in the logbooks (Appendix A). None of the well head spaces had measurable methane readings.

16.3.1 Metals

Total and dissolved arsenic and barium were not detected above the endpoint criteria of 10 µg/L and 2,000 µg/L, respectively, in any well. Total and dissolved arsenic concentrations ranged from 0.2 µg/L (estimated, MW-604) to 8.5 µg/L (MW13-2). Total and dissolved barium concentration ranged from 0.65 µg/L (MW-603) to 48.7 µg/L (MW-605).

16.3.2 Water Quality Parameters

Alkalinity was measured in groundwater samples ranging from 128 to 445 mg/L. Sulfate measurements ranged from estimated concentrations of 0.33 to 30 mg/L. Total dissolved solids ranged from estimated concentrations of 176 to 498 mg/L. Chemical oxygen demand measurements ranged from an estimated concentration of 3.4 to 25 mg/L. TKN measurements ranged from 0.48 to 2.4 mg/L. Ammonia measurements did not exceed the detection limit of 0.050 mg/L at wells MW-13-2, MW-13-4, MW-13-5, MW-603, and MW-604. The remaining three wells were observed to have ammonia concentrations ranging from an estimated concentration of 0.02 mg/L to 3.0 mg/L.

16.4 CONCLUSIONS

Dissolved and total arsenic and barium concentrations in groundwater have not been detected above endpoint criteria since sampling began in 1996. Sample results for arsenic and barium have remained stable with relatively no trend. Concentrations of all non-target analytes were observed to remain low and similar to historical data. This data supports the conclusion that landfill controls remain effective in preventing release of contaminants.

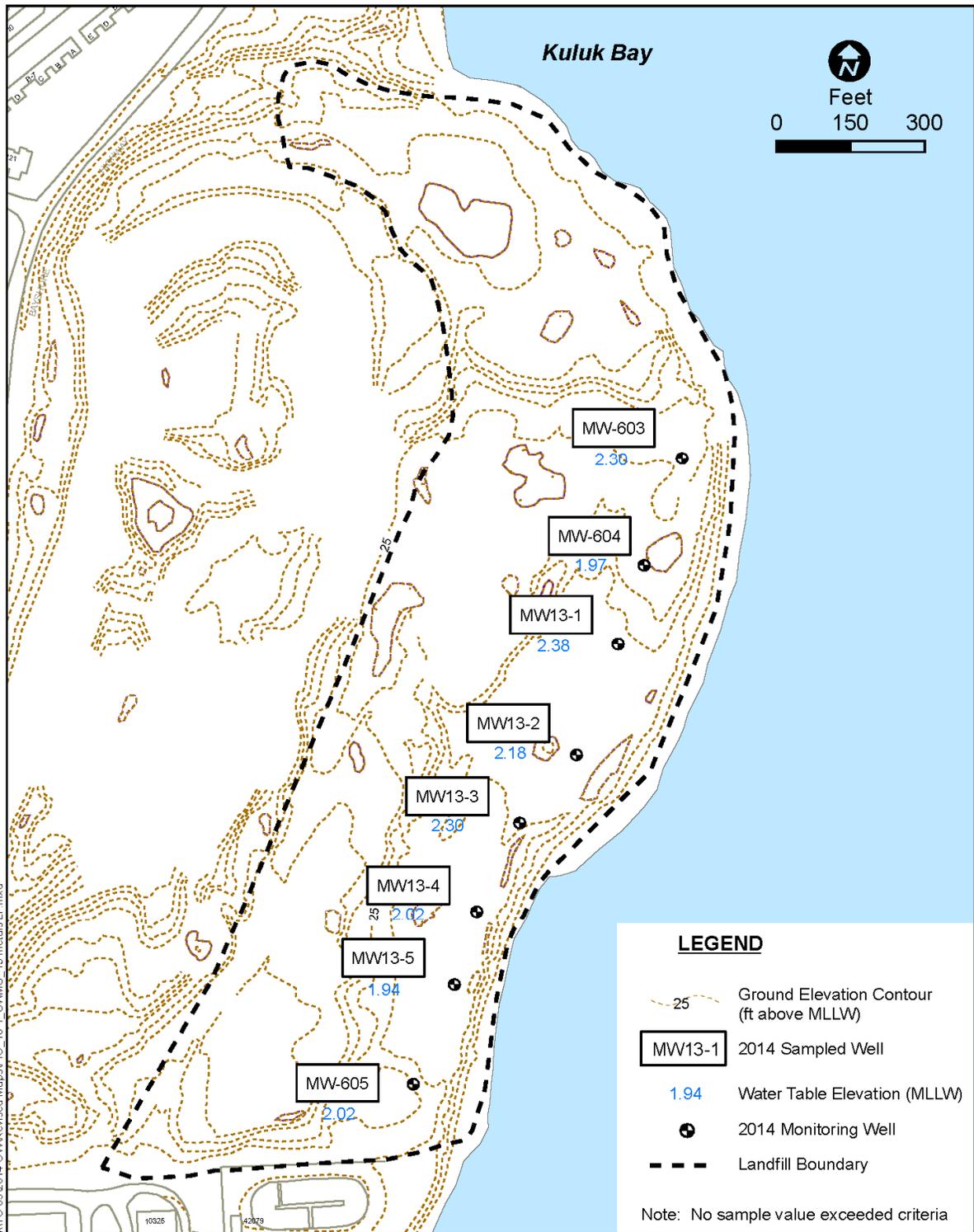
16.5 RECOMMENDATIONS

Due to continued observance of arsenic and barium concentrations below endpoint criteria, the Navy recommends that groundwater monitoring at this site be changed to a five-year interval (prior to the five-year review) for these contaminants. It is also recommended that sampling groundwater for water quality parameter be discontinued since this data is not used to evaluate the effectiveness of the remedy.

Table 16-1. Summary of Groundwater Analytical Results at SWMU 13, Metals Landfill, 2014 LTM

Target Analyte	Well Location	Endpoint Criterion							
	MW13-1	MW13-2	MW13-3	MW13-4	MW13-5	MW-603	MW-604	MW-605	Alaska Cleanup Level 18 AAC 75.345
Total Metals (µg/L)									
Arsenic	3.9	8.5	1.5	0.5 J	0.6	0.5	0.2 J	4.5	10
Barium	9.14	9.49	6.78	1.57	2.71	0.65	0.93	48.6	2,000
Dissolved Metals (µg/L)									
Arsenic	3.8	6.8	1.1	0.5 J	0.7	0.5	0.2 J	4.2	10
Barium	8.98	0.66	2.64	1.54	2.41	0.65	0.90	48.7	2,000
Water Quality Parameters (mg/L)									
Alkalinity	376	157	128	258	298	219	156	445	None
Sulfate	0.33	7.4	6.3	15	22	30	10	9.8	None
TDS	416 J	221	176 J	347 J	345 J	485 J	261 J	498 J	None
COD	25	5.0 U	7.9	3.4 J	3.4 J	6.4	3.9 J	13	None
TKN	2.4	0.73	0.90	0.49	0.48	0.60	0.50	2.4	None
Ammonia	1.7	0.13 U	0.02 J	0.05 U	0.05 U	0.05 U	0.05 U	3.0	None

16-5



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U.S. NAVY SEALASKA		<p align="center">Figure 16-1 SWMU 13, Metals Landfill Sample Locations</p>	<p align="center">Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report</p>
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17 SWMU 14, OLD PESTICIDE STORAGE AND DISPOSAL AREA

This section presents the results of groundwater monitoring performed at SWMU 14, Old Pesticide Storage and Disposal Area site during 2014. The combination of MNA and compliance monitoring is the selected remedy for this site (Navy, ADEC, and EPA 2000). To comply with requirements specified for this remedy, the Navy conducts periodic groundwater sampling and water level/product thickness monitoring at the site. Groundwater samples are collected to evaluate groundwater quality relative to endpoint criteria and to verify that natural attenuation is occurring.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

17.1 FIELD MEASUREMENTS

Depth-to-water and product thickness measurements were collected at four monitoring wells on August 26, 2014. Table 17-1 provides the measured depths-to-water and the calculated groundwater elevations. Figure 17-1 shows the location of the wells, the site topography and features, and the interpreted groundwater flow direction. The historic water level data indicate that the direction of groundwater flow beneath the site is to the south-southeast, toward Sweeper Cove. Groundwater elevations collected in 2014 were compared with historical data and is consistent with this interpretation. Free product was not observed in any well.

Groundwater sampling was performed on September 1, 2014 at well MW-14-5. Field measurements were recorded in the field forms and logbooks during monitoring well sampling activities (Appendix A). Table 17-1 lists the final field measurements recorded at the monitoring well prior to sample collection. A review of the field measurement data reported for well MW-14-5 indicates that groundwater parameters stabilized prior to sample collection.

Table 17-1. 2014 Field Measurements for SWMU 14, Old Pesticide Storage and Disposal Area

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to-Water (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
MW-14-5	21.94	15.91	6.03	0	6.15	0.530	2	0.00	8.34	0.00	-7
MW-15-424	21.94	18.20	3.74	0	NP	NP	NP	NP	NP	NP	NP
MW-15-3	18.9	13.58	5.32	0	NP	NP	NP	NP	NP	NP	NP

Notes:

NP – not planned to be measured

The reported casing elevation is the surveyed elevation residing in the NIRIS database.

The last groundwater parameter measurement prior to sample collection is reported.

17.2 TARGET ANALYTE RESULTS

For the 2014 LTM event, the groundwater sample collected from well MW-14-5 was analyzed for DRO, GRO, total lead, and dissolved lead. Table 17-2 presents the analytical results from 2003 through 2014. Figure 17-1 shows the location of the well and the analytical results that are in exceedance of endpoint criteria. The historical analytical results obtained for this site are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

DRO and GRO were detected above their endpoint criteria (1,500 µg/L and 2,200 µg/L, respectively) in well MW-14-5 at concentrations of 2,800 µg/L and 5,400 µg/L, respectively. Additionally, total and dissolved lead were detected above endpoint criteria (15 µg/L) in this well at 17.4 µg/L and 17.1 µg/L, respectively.

Table 17-2. Analytical Results for Petroleum-Related Chemicals and Metals for SWMU 14, Old Pesticide Storage and Disposal Area

Well Location	Year	DRO (µg/L)	GRO (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)
MW-14-5 Plume Source Area	2003	3,800	13,000	83.6	84.6
	2004	1,720	16,100 J	21.5	25.3
	2005	2,770	12,600 J	22.3	20.8
	2006	2,100	9,900	14.7	15.0
	2007	4,100 Z	14,000 DY	41.5 J	36.8 J
	2008	2,500 Z	11,000 DY	24.3	23.8
	2009	3,200 Y	15,000 DY	16.7	17.5
	2010	1,900 Z	9,000 DY	14.4	13.8
	2011	5,100 L	11,000 DY	NP	NP
	2012	3,100 LJ	7,000 Y	17.2	17.0
	2013	2,900 Y	4,700 Y	28.5	27.9
2014	2,800 L	5,400 YJ	17.4	17.1	
Endpoint Criteria		1,500	2,200	15	15

Notes:

NP – not planned

Bold indicates reported concentration is greater than the endpoint criteria.

17.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 17-3. The 2014 data showed only weak evidence that petroleum biodegradation may be occurring at the site, possibly by aerobic digestion and iron (II) reduction as shown by slightly elevated ferrous iron concentrations and depleted dissolved oxygen levels. Water quality parameters collected

during the 2014 LTM event, which are presented in Table 17-1, suggest that natural attenuation may be occurring as shown by the reducing environment (negative ORP) and depleted dissolved oxygen (0.0 mg/L) within the petroleum plume well at the site. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 17-3. 2014 Analytical and Field Measurement Data for NAPs for SWMU 14, Old Pesticide Storage and Disposal Area

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
MW-14-5	MNA	57	8.1	1.3 U	30	6	0.60

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

17.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation was conducted only for analytes that exceeded the endpoint criteria within the last two sampling events and had a minimum of four data points. The results of the Mann-Kendall trend evaluations are presented in Table 17-4. Worksheets and graphs are provided in Appendix H.

The following are the results of the statistical evaluation:

- Well MW-14-5:
 - The DRO, total lead, and dissolved lead concentrations exhibit no trend at either the 80 or 95 percent confidence intervals, with coefficients of variation indicating concentrations are stable.
 - The GRO concentration exhibits a decreasing trend at the 80 and 95 percent confidence intervals. The Sen's evaluation indicates a statistically significant decreasing trend with a median slope of -729.

17.5 CONCLUSIONS

This section presents conclusions based on a review of the groundwater monitoring conducted in 2014 at the SWMU 14, Old Pesticide Storage and Disposal Area site. The conclusions are as follows:

- Groundwater Flow: The groundwater flow direction is interpreted to be toward Sweeper Cove to the south-southeast.
- MNA: Groundwater parameters in 2014 show weak evidence that petroleum biodegradation is occurring at the site, possibly by aerobic digestion and iron (II) reduction.
- Free Product: Free product was not observed in the site wells in 2014.
- Well MW-14-5: This well is located within the petroleum contaminant plume. DRO, GRO, total lead, and dissolved lead were all detected above their endpoint criteria. The DRO, total lead, and dissolved lead concentrations are exhibiting no trend at the 80 and 95 percent confidence levels and their concentrations appear stable. GRO exhibits statistically significant decreasing trends.

17.6 RECOMMENDATIONS

DRO, GRO, total lead, and dissolved lead continue to exceed endpoint criteria at MW-14-5, and exhibit variable (stable and statistically significant decreasing) trends in concentrations. Therefore, it is recommended that monitoring for these parameters be continued as prescribed.

Table 17-4. Concentration Trend Evaluation for SWMU 14, Old Pesticide Storage and Disposal Area

Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		Median Slope	Statistically Significant Trend	2-Tailed Test at 80% C.I.	
										Lower Limit	Upper Limit		
MW-14-5	DRO	Yes	2,900 Y	1,500	10	3	No Trend	No Trend	Stable	NC	NC	NC	NC
	GRO	Yes	5,400 YJ	2,200	10	-24	Decreasing	Decreasing	NA	-729	Yes	-933	-500
	Total Lead	Yes	28.5	15	10	-1	No Trend	No Trend	Stable	NC	NC	NC	NC
	Dissolved Lead	Yes	27.9	15	10	-9	No Trend	No Trend	Stable	NC	NC	NC	NC

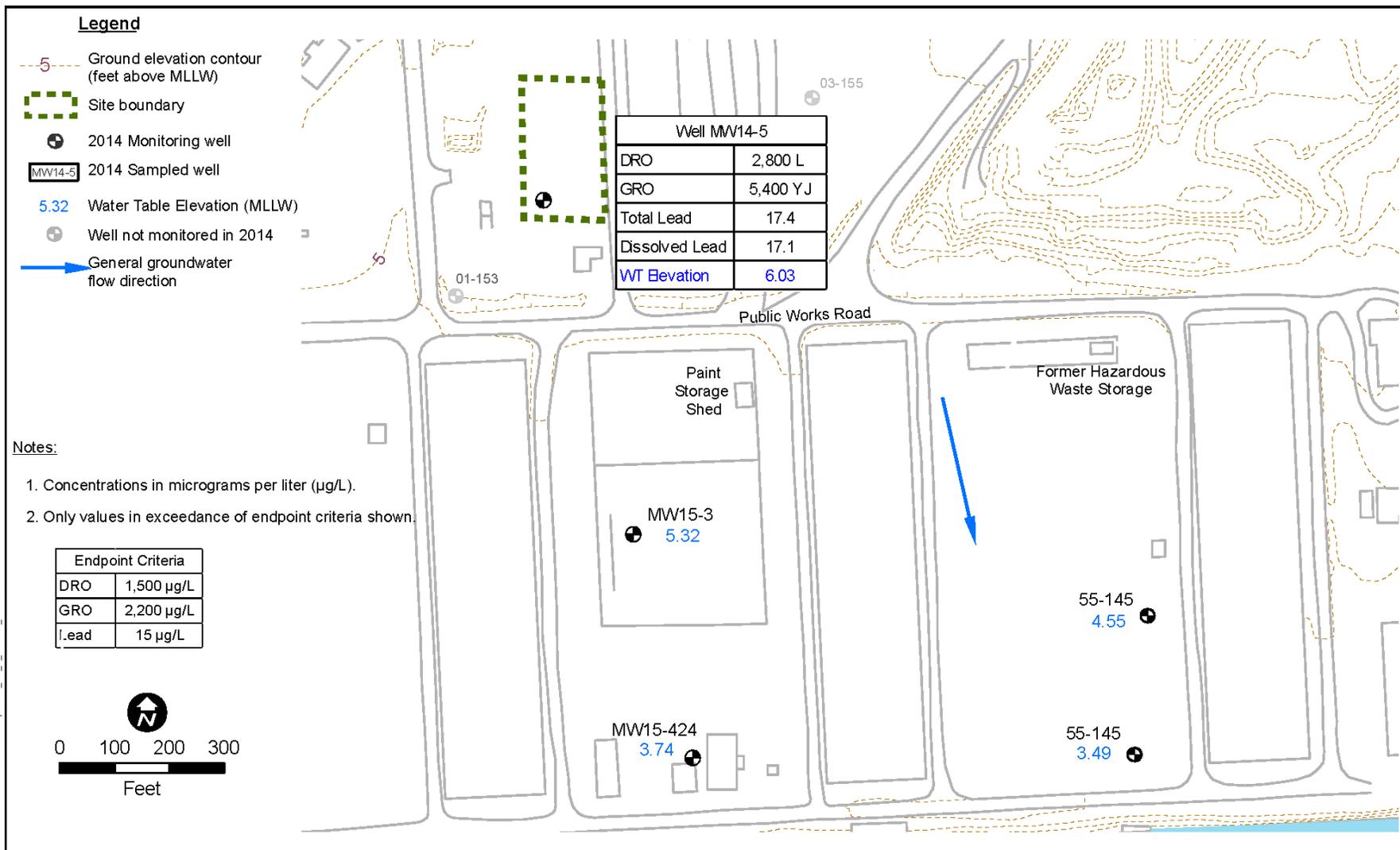
Notes:

¹ Endpoint criteria are established from ADEC cleanup levels for groundwater used as a drinking water source.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.

17-7



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U.S. NAVY SEALASKA	Figure 17-1 SWMU 14, Old Pesticide Storage and Disposal Area Sample Locations	Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report
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18 SWMU 17, POWER PLANT NO. 3 AREA

This section presents the results of groundwater monitoring performed at the SWMU 17, Power Plant No. 3 Area site during 2014. The remedy specified for this site in the OU A ROD is free product recovery for petroleum and compliance monitoring for non-petroleum chemicals (Navy, ADEC, and EPA 2000). MNA has been selected as the post-free product recovery remedy for this site. The program is implemented in part with the CMP, Revision 6 (Navy 2014a). The site has met endpoint criteria for free product recovery and petroleum monitoring. Monitoring under the program in 2014 includes CERCLA compliance monitoring of groundwater for comparison to endpoint criteria for the remaining CERCLA contaminants of concern.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

18.1 FIELD MEASUREMENTS

Depth-to-water and product thickness measurements were collected at one monitoring well on August 27, 2014. Table 18-1 provides the measured depth-to-water and the calculated groundwater elevation. No free product was observed in this well.

Figure 18-1 shows the location of the well, the site topography and features, and the interpreted groundwater flow direction. Historic groundwater elevation data indicate that the direction of groundwater flow beneath the site conforms to the topographic slopes to the east-northeast, east, and southeast toward Yakutat Creek.

Field measurements were recorded in the field forms and logbooks during monitoring well sampling activities (Appendix A). Table 18-1 lists the final field measurements recorded at the monitoring well prior to sample collection. A review of the sampling data indicates that groundwater parameters stabilized to within specified criteria for the well prior to sample collection.

Table 18-1. 2014 Field Measurements for SWMU 17, Power Plant No. 3 Area

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to-Water (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
05-735	19.00	15.82	3.18	0	6.19	0.461	0	0.00	8.71	0.00	-70

Notes:
 The reported casing elevation is the surveyed elevation residing in the NIRIS database.
 The last groundwater parameter measurement prior to sample collection is reported.

18.2 TARGET ANALYTE RESULTS

The groundwater sample from monitoring well 05-735 was analyzed for select chlorinated VOCs including vinyl chloride and cis-1,2-dichloroethene (cis-1,2-DCE). Table 18-2 presents the analytical results. Figure 18-1 shows the location of the well and the analytical results that are in exceedance of endpoint criteria. Historical analytical results obtained for this site are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

Daughter products vinyl chloride and cis-1,2-DCE were detected at concentrations above their endpoint criteria (2 µg/L and 70 µg/L, respectively) in well 05-735 (3.3 µg/L and 190 µg/L, respectively).

Table 18-2. Analytical Results for Volatile Organic Compounds for SWMU 17, Power Plant No. 3 Area

Well Location	Year	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)
05-735 Plume Source Area	2001	189	4.18
	2002	420	5.6 J
	2003	730	7.0
	2004	483 J	6.7 J
	2005	542 J	7.2 J
	2006	420	7.4
	2007	570 D	3.4 D
	2008	340 JD	6.1
	2009	340 D	5.4
	2010	400 D	4.3
	2011	280 DJ	2.8
	2012	240 D	2.7
	2013	180 D	3.2
	2014	190 D	3.3
Endpoint Criteria		70	2

Note:

Bold indicates reported concentration is greater than the endpoint criteria.

18.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 18-3. The accumulated data indicated that natural attenuation by dechlorination is occurring as evidenced by the decreasing concentrations of PCE, TCE, and daughter products as well as the observed reducing environment. Water quality parameters collected during 2014 (presented in Table 18-1) and continued decreasing concentrations of chlorinated VOCs in groundwater

provide evidence of continued natural attenuation and dechlorination as shown by the reducing environment (negative ORP) and depleted dissolved oxygen (0.50 mg/L). A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 18-3. 2014 Analytical and Field Measurement Data for NAPs for SWMU 17, Power Plant No. 3 Area

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
05-735	MNA	90	13	310	20	18	0.50

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

18.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation was conducted only for analytes that exceeded the endpoint criteria within the last two sampling events and had a minimum of four data points. Results of the Mann-Kendall and Sen's trend evaluations are summarized in Table 18-4. Worksheets and graphs are provided in Appendix H.

The following are the results of the statistical evaluation:

- Well 05-735: Cis-1,2-DCE exhibits a decreasing trend at the 80 and 95 percent confidence intervals, with a statistically significant Sen's evaluation of a decreasing trend with a median slope of -29.3. Vinyl chloride exhibits a decreasing trend at the 80 and 95 percent confidence intervals, with a statistically significant Sen's evaluation of a decreasing trend with a median slope of -0.29.

18.5 CONCLUSIONS

This section presents the conclusions based on a review of groundwater monitoring conducted at the SWMU 17, Power Plant No. 3 Area site in 2014. The conclusions are as follows:

- Groundwater Flow: Based on historic field measurements and site topography, the interpreted groundwater flow direction is to the northeast, east, southeast, and south, and it generally follows surface topography.

- MNA: The groundwater parameters obtained during 2014 provide evidence that natural attenuation by dechlorination is occurring as evidenced by the decreasing concentrations of PCE daughter products. The groundwater parameters support evidence of continued natural attenuation as shown by the generally reducing environment (negative ORP) and depleted dissolved oxygen (0.0 mg/L).
- Free Product: No free product was observed at this site in 2014.
- Well 05-735: Vinyl chloride and cis-1,2-DCE were detected in groundwater collected at concentrations above endpoint criteria. Vinyl chloride and cis-1,2-DCE both exhibit strong, statistically significant decreasing trends.

18.6 RECOMMENDATIONS

Vinyl chloride and cis-1,2-DCE remain above endpoint criteria in compliance well 05-735, but are exhibiting statistically significant decreasing concentrations. Therefore, it is recommended that monitoring for these compounds continue as prescribed.

Table 18-4. Concentration Trend Evaluation for SWMU 17, Power Plant No. 3 Area

Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		Median Slope	Statistically Significant Trend	2-Tailed Test at 80% C.I.	
												Lower Limit	Upper Limit
05-735	cis-1,2-DCE	Yes	190 D	70	10	-34	Decreasing	Decreasing	NA	-29.3	Yes	-39	-19
	Vinyl Chloride	Yes	3.3	2	10	-27	Decreasing	Decreasing	NA	-0.29	Yes	-0.43	-0.13

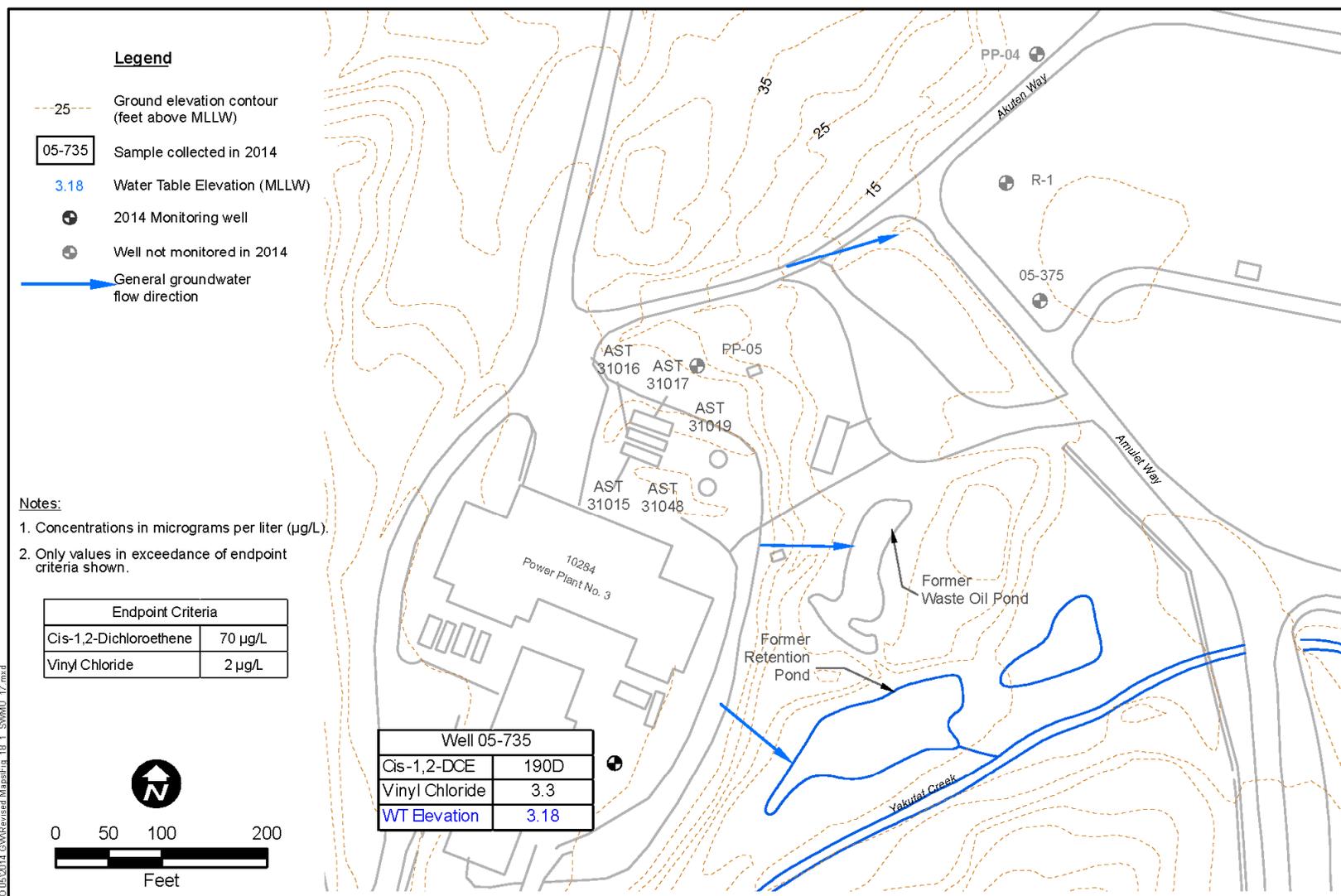
Notes:

¹ Endpoint criteria are established from ADEC cleanup levels for groundwater used as a drinking water source.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.

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U.S. NAVY SEALASKA

Figure 18-1
SWMU 17, Power Plant No. 3 Area
Sample Locations

Task Order 05
 Adak Island, AK
 2014 Annual Groundwater and
 Landfill Monitoring Report

19 SWMUs 18/19, WHITE ALICE LANDFILL

19.1 BACKGROUND

The White Alice Landfill (SWMUs 18/19) is located in the vicinity of an abandoned quarry west of the downtown area (Figure 19-1), and it comprises the former South Sector Drum Disposal Area and the Quarry Metal Disposal Area. The South Sector Drum Disposal Area was located at the base of the abandoned quarry. Approximately twenty 55-gallon drums were disposed of on low-lying tundra. The drums were heavily rusted and were most likely deposited during the 1940s. There is no information on the contents of the drums, or any other history available. The Quarry Metal Disposal Area was a small scrap metal disposal area located in the abandoned quarry. Scrap metal, including material from demolition of Quonset huts, had been placed on the floor of the quarry. The disposal area was active from 1980 to 1985. No information was available on the history of any contaminant releases at the site (Navy 2001a).

Once combined to form the White Alice Landfill, the areas received construction waste into the 1990s. In 1997, the landfill was closed according to the State of Alaska's solid waste regulations (18 AAC 60). Closure entailed placement of a landfill cover, grading and contouring, surface water/erosion controls, access restrictions in the form of a sign and a gate, and a vegetative cover according to Alaska solid waste landfill closure requirements (18 AAC 60).

19.2 SAMPLING HISTORY RELATED TO CLOSURE MONITORING

Groundwater and surface water have been sampled at the White Alice Landfill periodically since March 1996. To date, 16 sampling events have occurred from 1996 through 2014 (see Appendix C-2). Sampling at the White Alice Landfill has consisted of four quarterly rounds (1996), eight annual rounds (1997 through 2004), and subsequent biennial rounds of sampling at two monitoring wells and three surface water seeps (2006, 2008, and 2010). Following 2010, sampling has been reduced to once every 5 years, but was conducted in 2014 to support the 5-year review, with the next sampling event scheduled for 2019. The analytical results from the sampling conducted from 1996 through 2014 are presented in Appendix C-2. The locations where samples were collected are shown on Figure 19-1.

Per the CMP, Revision 6 (Navy 2014a), target analytes include the following:

- Arsenic

- Barium
- Nickel
- Chromium

In addition, the 2014 monitoring for both groundwater and surface water included analysis for non-target analytes, including priority pollutant dissolved and total metals and water quality parameters.

19.3 DISCUSSION OF RESULTS

During 2014, surface water and groundwater samples were collected as specified in the CMP, Revision 6 (Navy 2014a). The locations where samples were collected are shown on Figure 19-1. Field forms and logbooks are provided in Appendix A, and site photographs are presented in Appendix I. Field sampling parameters collected during the monitoring event are included in Appendix D-3. A summary of the analytical results from the 2014 sampling event and the endpoint criteria are provided for surface water and groundwater in Tables 19-1 and 19-2, respectively. The current and historical results for all analytes, including non-target analytes, are provided in Appendix C-2.

Visual inspections of the groundwater monitoring wells at the White Alice Landfill were also completed during the groundwater sampling event. Well inspection forms are provided in Appendix A.

Inspections relative to ICs were conducted during the 2014 monitoring event and are reported in the 2014 IC Site Inspection Report (Navy 2014b). Recommendations for repairs were made in the 2014 IC Inspection Report, which include repairing eroded areas and perimeter fencing. Repairs are scheduled to occur in 2015.

19.3.1 Surface Water

Surface water samples were collected from three locations (WASW01, WASW02, and WASW03) and analyzed for the following:

- Total Metals
- Dissolved Metals
- Water Quality Parameters, including:
 - Sulfate
 - TKN

- Ammonia
- Alkalinity
- Chemical oxygen demand
- Total dissolved solids

WASW01 is located in an unnamed stream to the west and downgradient from the White Alice Landfill. WASW02 is located in a shallow surface flow originating along the west and northwest flank of the landfill. WASW03 is located in the pond across the road from the southeast entrance of the landfill. The sample locations are shown in Figure 19-1.

A summary of the analytical results from 2014 and the endpoint criteria are provided for surface water in Table 19-1.

19.3.1.1 Metals

No total or dissolved metals included in the target analyte list for the White Alice Landfill were detected in surface water above the endpoint criteria.

19.3.1.2 Water Quality Parameters

Total alkalinity was measured in surface water samples at concentrations ranging from 4.5 to 49 mg/L. Sulfate was measured at estimated concentrations ranging from 2.2 to 7.6 mg/L. Total dissolved solids were measured at concentrations ranging from 21.0 to 120 mg/L. Chemical oxygen demand was detected at concentrations ranging from 5.0 to 9.4 mg/L. TKN was detected at concentrations ranging from 0.42 to 0.59 mg/L. Ammonia was not detected in any of the surface water samples.

19.3.2 Groundwater

Groundwater samples were collected from two monitoring wells (21-3 and 21-4) and were analyzed for the following:

- Total Metals
- Dissolved Metals
- Water Quality Parameters, including:
 - Sulfate
 - TKN
 - Ammonia
 - Alkalinity

- Chemical oxygen demand
- Total dissolved solids

Monitoring well 21-3 is located downgradient of the landfill, and well 21-4 is located upgradient of the landfill (Figure 19-1).

A summary of the analytical results from 2014 and the endpoint criteria are provided for groundwater in Table 19-2. The analytical results for all 2014 analytes are provided in Appendix C-2. Analytical results for total and dissolved metals in groundwater are discussed below.

19.3.2.1 Metals

No dissolved or total metals included on the target analyte list for the White Alice Landfill were detected in the groundwater above the endpoint criteria.

19.3.2.2 Water Quality Parameters

Total alkalinity was measured in groundwater samples at concentrations of 29 and 86 mg/L. Sulfate was measured at estimated concentrations of 3.37 and 5.4 mg/L. Total dissolved solids were measured at concentrations of 72 and 155 mg/L. TKN was measured at concentrations of 0.50 and 0.52 mg/L. Chemical oxygen demand and ammonia were not measured above the method detection limits.

19.4 CONCLUSIONS

The analytical data for the period 2000 through 2014 were reviewed for the compounds included on the target analyte list, as well as those non-target analytes that exceeded the endpoint criteria during the 2014 sampling event. The purpose of the analysis of the recent historical data is to determine if trends exist in the concentration data for the White Alice Landfill.

19.4.1 Surface Water

No total or dissolved metals included on the target analyte list for the White Alice Landfill were detected above the endpoint criteria during the 1997 to 2014 time period. Arsenic was detected in one surface water sample collected from location WASW02 in 1996. Several metals not on the target analyte list exceeded endpoint criteria from 1996 to 2003 but concentrations have steadily decreased so endpoint criteria were not exceeded from 2004 to 2014.

19.4.2 Groundwater

No dissolved or total metals have been detected above the endpoint criteria since monitoring began in 1996. In general, detected concentrations of metals have remained steady with no observed increasing or decreasing trend.

19.5 RECOMMENDATIONS

It is recommended that sampling for target dissolved and total metals (arsenic, barium, chromium, and nickel) be continued every five years as prescribed, while 10 nontarget dissolved and total metals (antimony, beryllium, cadmium, copper, lead, mercury, selenium, silver, thallium, and zinc) be discontinued because no monitoring endpoints are identified in the CMP, Revision 6 (Navy 2014a).

It is recommended that sampling for water quality parameters (alkalinity, ammonia, chemical oxygen demand, sulfate, total dissolved solids, and TKN) be discontinued because no monitoring endpoints are identified in the CMP, Revision 6 (Navy 2014a). The data are not used to assess the effectiveness of the remedy at the site.

Table 19-1. Summary of Surface Water Analytical Results at SWMU 19/19, White Alice Landfill, 2014 LTM

Target Analyte	Location WASW01	Location WASW02	Location WASW03	Endpoint Criteria	
				Alaska Water Quality Standards, 18 AAC 70 ¹	
				Aquatic Life	Human Health (Organisms Only)
Total Metals (µg/L)					
Arsenic	0.3 J	0.4 J	0.2 J	190	1.4 ²
Barium	6.60	5.44	2.94	None	2,000 ³
Chromium	0.20 U	0.18 J	0.11 J	210 ^{4,5}	None
Nickel	0.21	0.16 J	0.24	160	100
Dissolved Metals (µg/L)					
Arsenic	0.2 J	0.4 J	0.2 J	190	1.4 ²
Barium	5.98	5.51	2.83	None	2,000 ³
Chromium	0.20 U	0.20 U	0.14 J	210 ^{4,5}	None
Nickel	0.21	0.12 J	0.23	160	100
Water Quality Parameters (mg/L)					
Alkalinity	49	46	4.5	None	None
Sulfate	7.6	5.9	2.2	None	None
TDS	120	107	21	None	None
COD	7.4	5.0	9.4	None	None
TKN	0.59	0.42	0.53	None	None
Ammonia	0.05 U	0.05 U	0.05 U	None	None

Notes:

¹ Criteria existing in 18 AAC 70 when ROD for Operable Unit A and landfills were signed (Changes to some of these criteria were adopted in an 18 AAC 70 amendment on March 24, 2003.)

² Human health criteria for carcinogens come from EPA promulgation of human health criteria for carcinogens for Alaska at the 10⁻⁵ risk level in the National Toxics Rule (40 CFR 131.36) in accordance with ADEC guidance.

³ Barium was identified as an analyte in the OU A ROD for this site. Monitoring is conducted to identify concentration changes over time. The groundwater to surface water pathway is considered to be the pathway of concern. Therefore the groundwater cleanup level is applied to the human health column for a relative comparator.

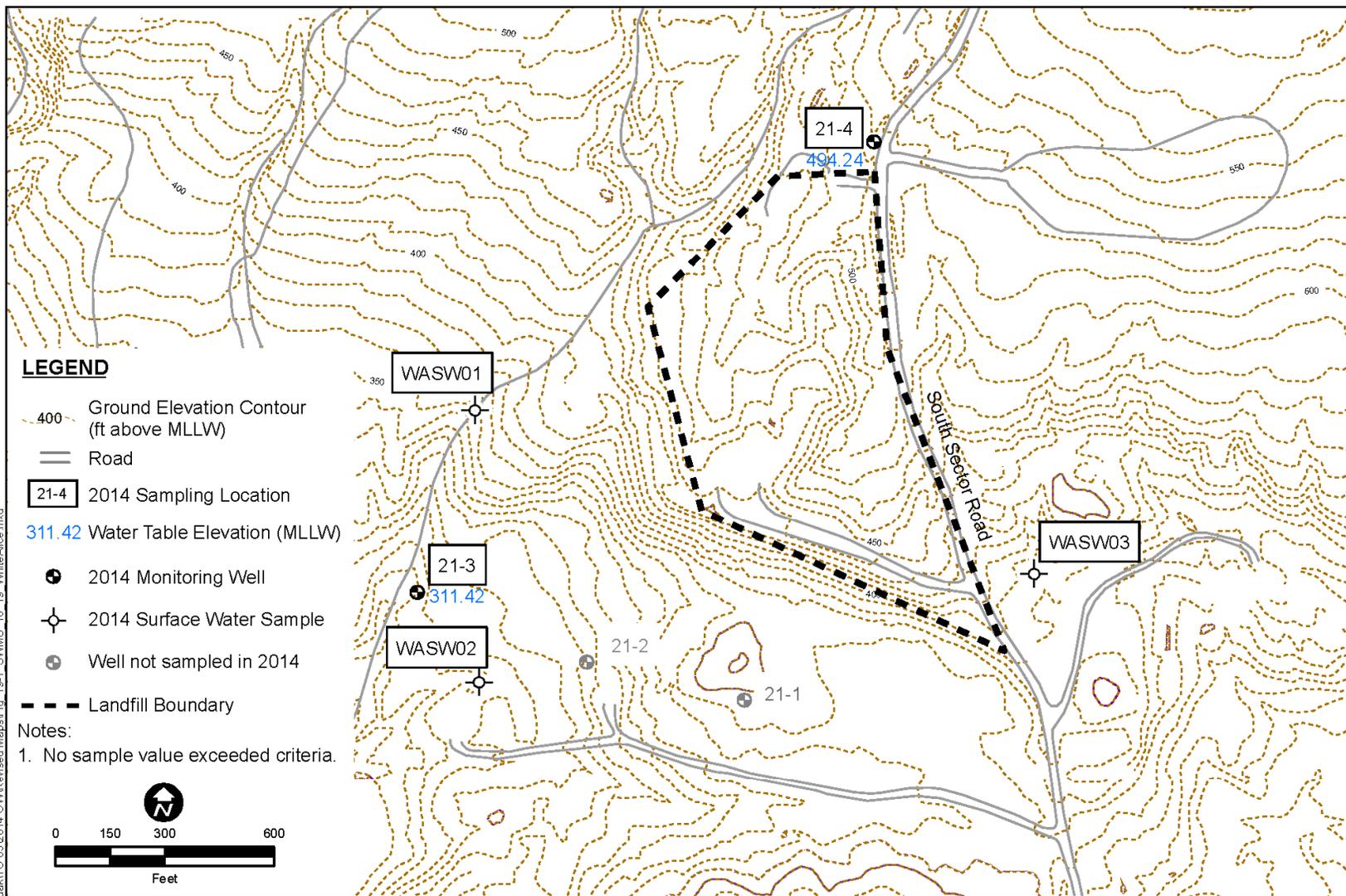
⁴ Value provided is for chromium III. The criterion for chromium VI is 11 µg/L.

⁵ At 100 milligrams per liter hardness

Table 19-2. Summary of Groundwater Analytical Results at SWMU 18/19, White Alice Landfill, 2014 LTM

Target Analyte	Well Location 21-3	Well Location 21-4	Endpoint Criterion
			Alaska Cleanup Level 18 AAC 75.345 ¹
Total Metals (µg/L)			
Arsenic	1.1	0.2 J	10
Barium	6.71	0.84	2,000
Chromium	0.33	0.17 J	100
Nickel	0.28	0.60	100
Dissolved Metals (µg/L)			
Arsenic	0.7	0.1 J	10
Barium	6.34	0.81	2,000
Chromium	0.87	0.19 J	100
Nickel	0.51	0.49	100
Water Quality Parameters (mg/L)			
Alkalinity	86	29 U	None
Sulfate	5.4	3.3	None
TDS	155	72	None
COD	5.0 U	5.0 U	None
TKN	0.50	0.52	None
Ammonia	0.05 U	0.05 U	None
<i>Notes:</i>			
¹ Cleanup levels shown are applicable if groundwater is a source of drinking water at the site.			

8-61



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<p>U.S. NAVY SEALASKA</p>	<p>U.S. NAVY SEALASKA</p>	<p align="center">Figure 19-1 SWMUs 18/19, White Alice Landfill Sample Locations</p>	<p align="center">Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report</p>
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20 SWMU 25, ROBERTS LANDFILL

20.1 BACKGROUND

Roberts Landfill (SWMU 25) is located approximately 1 mile southwest of the downtown area of Adak. The landfill covers approximately 15 acres. The landfill operated from the early 1950s until 1972 and from 1975 through 2002. During the initial operation, wastes included sanitary trash, metal debris, batteries, solvents, waste paints, and construction rubble. From 1975 until closure at the end of 2002, the landfill accepted only sanitary trash. Roberts Landfill is unlined (Navy 2001b).

Closure activities initially began at Roberts Landfill in April 1997 and included placing a low-permeability soil cover over the landfill, grading and contouring, implementing access restrictions, installing surface water/erosion controls, placing a vegetative cover, securing adjacent bunkers filled with asbestos materials, maintaining the cover, performing periodic monitoring, and providing ICs for land use. In March 2002, the Navy submitted a permit renewal application to extend operations at Roberts Landfill through 2002. The application was made to accommodate operation of an inert demolition waste mono-fill and one cell for disposal of approximately 10 cubic yards of asbestos-containing material. The fill operation was in support of the Navy's cabin demolition project, which was completed in September 2002, at which time the landfill was re-graded and covered. Following that activity, the Navy applied for and received approval for closure from ADEC at the end of 2002 (Navy 2002).

20.2 SAMPLING HISTORY RELATED TO CLOSURE MONITORING

Groundwater and surface water have been sampled at the Roberts Landfill periodically since March 1996. To date, 20 sampling events have occurred from 1996 through 2014 (see Table 2-2). Historically, sampling at Roberts Landfill has consisted of four quarterly rounds (1996) and 15 annual rounds (1997 through 2011) of sampling at four monitoring wells and five surface water locations. Sampling was then reduced to biennially, and sampling occurred in 2013 and again in 2014 to support the 5-year review. In 2011, a seep was identified northwest of the landfill in the Adak Fuels Facility and collection of surface water at this location was added to the sampling program. The analytical results from the sampling conducted at Roberts Landfill from 1996 through 2014 are summarized in Appendix C-2.

20.3 TARGET ANALYTE RESULTS

During the 2014 LTM field event, surface water and groundwater samples were collected at Roberts Landfill as specified in the CMP, Revision 6 (Navy 2014a). The locations where surface water and groundwater samples were collected during 2014 are shown on Figures 20-1 and 20-2. Field forms and logbooks are provided in Appendix A. Photographs of the site and sampling locations are presented in Appendix I. Field water quality parameters and monitoring well methane readings collected during sampling are presented in Appendix D-3. The analytical results from 2014 for surface water and groundwater are summarized in Tables 20-1 and 20-2, respectively. Analytical results were compared to the endpoint criteria listed in Table 3-4. The results for all analytes are provided in Appendix C-2.

Methane was measured in the head space of each well using a lower explosive limit meter and was recorded in the logbooks (Appendix A) and summarized in Appendix D-3. None of the well head spaces had measurable methane readings.

Visual inspections of the surface water sampling locations were completed during the LTM field event and field inspection forms are presented in Appendix A. Seven surface water samples were collected from Mitt Creek and unnamed perennial streams flowing from Roberts Landfill into Mitt Creek and Mitt Lake.

A groundwater seep first observed in 2011 north of SWMU 25, Roberts Landfill in the Adak Fuels Facility was sampled and visually inspected (Figure 20-1). Bright blue and white crystals among areas of black discoloring were observed at the seep and the ditch water was discolored milky white and brown (see sample NL-14). Visual inspections are discussed in more detail below and in Section 4.1.3. IC inspections were conducted during the 2014 monitoring event and are reported in the 2014 IC Site Inspection Report (Navy 2014b).

20.3.1 Surface Water

Surface water samples were collected from seven locations from Mitt Creek and perennial streams flowing from the landfill (RLSW02 through RLSW05, NL-11, NL-12, and NL-14). Surface water had been planned for collection from location RLSW01 (located in a landfill swale), but this location was dry during the field event.

Sample RLSW05 was collected from a small unnamed stream that flows downgradient from the southwest side of the landfill into Mitt Lake. The overland surface water pathway of this stream was visually confirmed in 2012 during the annual IC inspection (Navy 2013e). This inspection revealed that water from the small pond located on the southwest portion of the

landfill appeared to be flowing south into a roadside ditch and then overland via perennial streams southeast to sample location RLSW05. Analytical results for surface water collected at this location have indicated aluminum and copper concentrations exceeding endpoint criteria for several years.

Sample RLSW04 (includes duplicate RLSW14) was collected from Mitt Creek east of the landfill, east of Happy Valley Road, approximately 1,000 feet downstream of Mitt Lake and RLSW05 and upstream of the confluence of two intermittent streams that flow from RLSW03 location into Mitt Creek (Figure 20-2).

Sample RLSW03 was collected from an intermittent stream that flows from the east side of the landfill north of the old Veterans of Foreign Wars building. Analytical results have indicated aluminum and copper concentrations exceeding endpoint criteria for several years. The surface water pathway downgradient of location RLSW03 was confirmed during the 2009 field event to assess whether contaminants from this location could be impacting Mitt Creek or Sweeper Cove. Surface water was found to flow from the sampling location along two pathways, one to the northeast and one to the southeast. The surface water pathways are illustrated in Figure 20-2. Surface water travels along both pathways via ditches and overland sheet flow, passes under Happy Valley Road via culverts, and eventually converges with Mitt Creek at two separate locations downgradient of locations RLSW03 and RLSW04.

RLSW02 is located in the diversion channel that runs along the eastern edge of the landfill at the most upgradient point where free-flowing water existed.

Two surface water samples (NL-11 and NL-12) were collected at the two confluences of the overland surface water pathways and Mitt Creek. Surface water sample NL-11 is located in the southern drainage immediately upgradient of the confluence with Mitt Creek and was collected to determine whether contaminants from RLSW03 have migrated to the creek. Surface water sample NL-12 was collected in Mitt Creek immediately downgradient of the confluence with the northern drainage (Figure 20-2) and represents the most downgradient sampling location in Mitt Creek.

Surface water location NL-14 was sampled at the groundwater seep identified in 2011 northwest of the landfill in the Adak Fuels Facility (Figure 20-1). The seep is located approximately 10 feet southwest from the Adak Fuels Facility tank access road. The seep is approximately 20 feet by 4 feet in area, minimally flowing from the hillside 4 feet into a roadside ditch. The seep is characterized by brilliant blue, green, and white crystallization

with areas of black discoloring and henceforth referenced as “blue seep.” A blue-green tinted milky substance was observed seeping into the surface water of the ditch at the sample location NL-14 and diluting to a milky white to milky brown color. Photographs of all locations are included in Appendix I.

Surface water samples RLSW02, RLSW03, RLSW04, and RLSW05 were analyzed for the following:

- Total priority pollutant metals and aluminum
- Dissolved priority pollutant metals and aluminum
- VOCs
- Water quality parameters: alkalinity, sulfate, total dissolved solids, ammonia, TKN, and chemical oxygen demand

Surface water samples NL-11, NL-12, and NL-14 were analyzed for the following:

- Total priority pollutant metals and aluminum
- Dissolved priority pollutant metals and aluminum
- Water quality parameters: alkalinity, sulfate, total dissolved solids, ammonia, TKN, and chemical oxygen demand

A summary of the analytical results from the 2014 sampling event and the endpoint criteria are provided for surface water in Table 20-1. Analytical results for VOCs, total and dissolved metals, and the water quality parameters in the surface water samples are discussed below.

20.3.1.1 Metals Analytes

Two target metal analytes were detected at concentrations greater than the endpoint criteria: total and dissolved copper, and total and dissolved aluminum. Total copper was detected above the endpoint criteria at four locations: RLSW03, RLSW05, NL-11, and NL-14, at concentrations of 110 µg/L, 22.8 µg/L, 80.2 µg/L, and 2,330 µg/L, respectively. The endpoint criteria of total copper is 12 µg/L, which is based on the Alaska Water Quality Standard (18 AAC 70) for aquatic life.

Dissolved copper exceeded criteria in the same four sample locations RLSW03, RLSW05, NL-11, and NL-14 at concentrations of 111 µg/L, 20.4 µg/L, 20.8 µg/L, and 2,590 µg/L, respectively.

Total and dissolved aluminum were detected above endpoint criteria at location RLSW03 at concentrations of 1,970 µg/L and 1,150 µg/L, respectively, which are above the endpoint of 87 µg/L for aquatic life criteria. Total and dissolved aluminum were also detected above endpoint criteria at location NL-14 at 20,200 µg/L and 21,200 µg/L, respectively.

Total and dissolved cadmium and zinc were also detected above endpoint criteria at NL-14 at concentrations of 5.23 µg/L and 6.11 µg/L for total and dissolved cadmium and 1,240 µg/L and 1,370 µg/L for total and dissolved zinc.

20.3.1.2 Volatile Organic Compounds

VOCs were not detected at or above endpoint criteria in any of the Roberts Landfill surface water samples collected during 2014 (RLSW02, RLSW03, RLSW04, and RLSW05). Results for target VOCs are presented in Table 20-1. Results for the full VOC suite of analysis are included in Appendix C-2.

20.3.1.3 Water Quality Parameters

Total alkalinity was measured at concentrations greater than the quantitation limit of 2 mg/L in six of the seven surface water samples, up to a maximum concentration of 35 mg/L at RLSW02 and NL-12. Sulfate was measured in all surface water samples at concentrations ranging from 16 mg/L to 588 mg/L. Total dissolved solids were measured in all surface water samples at concentrations ranging from 57 mg/L to 850 mg/L.

Chemical oxygen demand was measured at concentrations greater than the quantitation limit of 5 mg/L in three samples (12 mg/L at RLSW04 5.9 mg/L, at NL-11 and 11 mg/L at NL-12). TKN was detected in all samples ranging from an estimated 0.46 mg/L to 0.81 mg/L. Ammonia was not detected above the quantitation limit of 0.05 mg/L in any of the surface water samples.

Table 20-1. Summary of Surface Water Analytical Results at SWMU 25, Roberts Landfill, 2014 LTM

Target Analyte	Location								Endpoint Criteria	
	RLSW01	RLSW02	RLSW03	RLSW04	RLSW05	NL-11	NL-12	NL-14	Alaska Water Quality Standards, 18 AAC 70 ¹	
									Aquatic Life	Human Health
Volatile Organic Compounds (µg/L)										
1,1-Dichloroethene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	320
1,3-Dichlorobenzene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	2,600
1,4-Dichlorobenzene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	2,600
Benzene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	710 ²
Chlorobenzene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	488
cis-1,2-Dichloroethene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	None
Ethylbenzene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	3,280
Tetrachloroethene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	88.5
Toluene	NC	0.060 J	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	424,000
trans-1,2-Dichloroethene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	None
Trichloroethene	NC	0.50 U	0.50 U	0.50 U	0.50 U	NP	NP	NP	None	810
Xylenes, total	NC	1.0 U	1.0 U	1.0 U	1.0 U	NP	NP	NP	None	None
Total Metals (µg/L)										
Aluminum	NC	20.7	1,970	80.4	19.2	77.6	36.9	20,200	87	None
Antimony	NC	0.120	0.050 U	0.317	0.229	0.148	0.230	0.050 U	None	45,000
Arsenic	NC	0.5 U	0.5 U	0.2 J	0.1 J	0.2 J	0.1 J	0.3 J	190	1.4 ²
Beryllium	NC	0.020 U	0.040	0.020 U	0.020 U	0.014 J	0.020 U	0.795	190	1.4
Cadmium	NC	0.012 J	0.060	0.008 J	0.025	0.045	0.020	5.23	1.1 ³	None
Chromium	NC	0.10 J	0.20 U	0.13 J	0.20 U	0.13 J	0.22	1.16	210 ^{3,4}	None
Copper	NC	3.30	110	3.12	22.8	80.2	2.77	2,330	12 ³	None
Lead	NC	0.040	1.08	0.308	0.012 J	0.044	0.116	0.481	3.2 ³	None
Mercury	NC	0.02 U⁵	0.012	0.15						
Nickel	NC	0.24	2.89	0.35	0.97	1.57	0.44	32.8	160 ³	100
Selenium	NC	1.0 U	0.5 J	0.4 J	0.6 J	0.4 J	0.3 J	1.4	5	None
Silver	NC	0.020 U	0.12	None						
Thallium	NC	0.020 U	0.027	0.006 J	0.009 J	0.017 J	0.020 U	0.083	None	48
Zinc	NC	1.1	12.5	2.3	4.5	10.6	2.3	1,240	110 ³	None

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Table 20-1. Summary of Surface Water Analytical Results at SWMU 25, Roberts Landfill, 2014 LTM (continued)

Target Analyte	Location								Endpoint Criteria	
	RLSW01	RLSW02	RLSW03	RLSW04	RLSW05	NL-11	NL-12	NL-14	Alaska Water Quality Standards, 18 AAC 70 ¹	
									Aquatic Life	Human Health
Dissolved Metals (µg/L)										
Aluminum	NC	12.3	1,150	35.5	15.7	5.0	25.5	21,200	87	None
Antimony	NC	0.132	0.069 U	0.356	0.259	0.190	0.238	0.050 U	None	45,000
Arsenic	NC	0.5 U	0.1 J	0.5 U	0.2 J	0.1 J	0.1 J	0.2 J	None	1.4 ²
Beryllium	NC	0.020 U	0.032	0.020 U	0.020 U	0.006 J	0.020 U	0.827	190	1.4
Cadmium	NC	0.020 U	0.062	0.020 U	0.024	0.045	0.014 J	6.11	1.14 ³	None
Chromium	NC	0.11 J	0.20 U	0.24	0.16 J	0.20 U	0.17 J	1.06	210 ^{3,4}	None
Copper	NC	3.03	111	2.32	20.4	20.8	3.44	2,590	12 ³	None
Lead	NC	0.015 J	1.06	0.101	0.011 J	0.020 U	0.054	0.456	3.2 ³	None
Mercury	NC	0.02 U⁵	0.012	0.15						
Nickel	NC	0.23	3.09	0.34	1.01	1.50	0.49	37.0	160 ³	100
Selenium	NC	1.0 U	0.6 J	1.0 U	0.7 J	0.5 J	0.3 J	1.5	5	None
Silver	NC	0.020 U	0.12	None						
Thallium	NC	0.020 U	0.028	0.006 J	0.009 J	0.016 J	0.020 U	0.094	None	48
Zinc	NC	0.9	13.6	1.5	4.6	9.8	2.9	1,370	110 ³	None
Water Quality Parameters (mg/L)										
Total alkalinity	NC	35	2.0 U	31	23 U	16	35 U	15 U	None	None
Sulfate	NC	16	55	20	25	42	26	588	None	None
TDS	NC	57	132	83	104	122	110	850	None	None
COD	NC	5.0 U	5.0 U	12	5.0 U	5.9	11	5.0 U	None	None
TKN	NC	0.64	0.42	0.58	0.58	0.52	0.81	0.46	None	None
Ammonia	NC	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.08 U	0.05 U	None	None

Notes:

¹ Criteria that existed in 18 AAC 70 when ROD for OU A and landfills were signed. (Changes to some of these criteria were adopted in an 18 AAC 70 amendment on March 24, 2003.)

² Human health criteria for carcinogens come from EPA promulgation of human health criteria for carcinogens for Alaska at the 10⁻⁵ risk level in the National Toxics Rule (40 CFR 131.36) in accordance with ADEC guidance.

³ At 100 milligrams per liter hardness

⁴ Value provided is for chromium III. The criteria for chromium VI is 11 µg/L.

⁵ Value is the method detection limit because the quantitation limit is greater than the endpoint criteria.

Bold indicates reported concentration is greater than the endpoint criteria.

NC – not collected because the surface water location was dry

NP – not planned

20.3.2 Groundwater

Groundwater samples were collected from four monitoring wells (A-2, A-3, A-5, and B-1). Two of the monitoring wells (A-3 and A-5) are located downgradient of Roberts Landfill along the eastern flank. Well A-2 is located downgradient of the western flank of the landfill, and well B-1 is located south of the landfill. All groundwater sampling locations are shown on Figure 20-1.

All groundwater samples were analyzed for the following:

- Total priority pollutant metals and aluminum
- Dissolved priority pollutant metals and aluminum
- VOCs
- Water quality parameters: alkalinity, sulfate, total dissolved solids, ammonia, TKN, and chemical oxygen demand

A summary of the analytical results for groundwater samples collected during the 2014 monitoring event and endpoint criteria are presented in Table 20-2 and discussed below. VOC samples are collected biennially as per the CMP, Revision 6 (Navy 2014a) and were collected during the 2014 LTM field event.

20.3.2.1 Metal Analytes

No dissolved or total metals included on the target analyte list for the Roberts Landfill were detected above the endpoint criteria in any groundwater sample. Analytical results for total and dissolved inorganic analytes are presented in Table 20-2. Groundwater daylighting from the landfill is suspected at least in part to be the source for the perennial streams and ‘blue seep’ at which surface water samples RLSW05, RLSW03, NL-11, and NL-14 were collected which exceeded endpoint criteria for one or more metals. It should therefore be noted that although no endpoint criteria exist for aluminum in groundwater, groundwater exceeded surface water endpoint criteria of 87 µg/L for aluminum in wells A-3 (2,030 µg/L total; 168 µg/L dissolved), A-5 (34.3 µg/L total; 4.3 µg/L dissolved), and B-1 (861 µg/L total; 856 µg/L dissolved) which are located upgradient of surface water locations RLSW05, RLSW03, and NL-11. Similarly, samples did not exceed copper groundwater endpoint criteria but did exceed the endpoint criteria for copper in surface water of 12 µg/L in wells A-3 (46.3 µg/L total; 36.3 µg/L dissolved) and B-1 (30.3 µg/L total; 30.2 µg/L dissolved).

20.3.2.2 Volatile Organic Compounds

VOCs were not detected at or above endpoint criteria in any of the Roberts Landfill groundwater samples. Results for select VOCs are presented in Table 20-2. Results for the full suite of VOCs are presented in Appendix C-2.

20.3.2.3 Water Quality Parameters

Total alkalinity was only detected in groundwater samples at locations A-2 and A-5 at concentrations of 114 and 40 mg/L, respectively and at an estimated value of 1.0 mg/L at well B-3. Sulfate was observed in all groundwater samples at concentrations ranging from 23 to 54 mg/L. Chemical oxygen demand was not detected at or above the quantitation limit of 5.0 mg/L in any of the groundwater samples. Total dissolved solids were observed in all groundwater samples from 64 to 195 mg/L. TKN was detected in all wells at concentrations below quantitation limits from 0.51 mg/L to 0.60 mg/L. Ammonia was not observed over the quantitation limit of 0.050 mg/L in any of the groundwater samples.

Table 20-2. Summary of Groundwater Analytical Results at SWMU 25, Roberts Landfill, 2014 LTM

Target Analyte	Location				Endpoint Criteria
	A-2	A-3	A-5	B-1	Alaska Cleanup Level 18 AAC 75.345
Volatile Organic Compounds (µg/L)					
1,1-Dichloroethene	0.50 UJ	0.50 U	0.50 UJ	0.50 UJ	7
1,3-Dichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	None
1,4-Dichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	None
Benzene	0.50 U	0.50 U	0.50 U	0.50 U	5
Chlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	None
cis-1,2-Dichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	70
Ethylbenzene	0.50 U	0.50 U	0.50 U	0.50 U	700
Tetrachloroethene	0.50 U	0.50 U	0.50 U	0.50 U	5
Toluene	0.070 J	0.080 J	0.080 J	0.50 U	1,000
trans-1,2-Dichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	100
Trichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	5
Xylenes (total)	1.0 U	1.0 U	1.0 U	1.0 U	10,000
Total Metals (µg/L)					
Aluminum	22.0	2,030	34.3	861	None
Antimony	0.050 U	0.074 U	0.050 U	0.050 U	6
Arsenic	1.2	0.5 U	0.5 U	0.5 U	10
Beryllium	0.020 U	0.024	0.020 U	0.057	4
Cadmium	0.020 U	0.025	0.020 U	0.108	5
Chromium	0.16 J	8.56	0.14 J	0.11 J	100
Copper	0.51	46.3	1.03	30.3	1,000
Lead	0.026	0.669	0.013 J	0.010 J	15
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	2
Nickel	1.63	2.77	1.82	3.90	100
Selenium	1.0 U	0.4 J	1.0 U	1.0 U	50
Silver	0.020 U	0.020 U	0.020 U	0.020 U	100
Thallium	0.020 U	0.022	0.008 J	0.054	2
Zinc	4.0	3.8	4.1	16.8	5,000

Table 20-2. Summary of Groundwater Analytical Results at SWMU 25, Roberts Landfill, 2014 LTM (continued)

Target Analyte	Location				Endpoint Criteria
	A-2	A-3	A-5	B-1	Alaska Cleanup Level 18 AAC 75.345
Dissolved Metals (µg/L)					
Aluminum	5.1	168	4.3	856	None
Antimony	0.050 U	0.050 U	0.050 U	0.050 U	6
Arsenic	1.3	0.5 U	0.1 J	0.5 U	10
Beryllium	0.020 U	0.020 U	0.020 U	0.059	4
Cadmium	0.020 U	0.024	0.020 U	0.099	5
Chromium	0.09 J	0.08 J	0.03 J	0.10 J	100
Copper	0.12 UJ	36.3	0.42	30.2	1,000
Lead	0.020 U	0.007 J	0.020 U	0.007 J	15
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	2
Nickel	1.39	1.65	1.77	3.93	100
Selenium	1.0 U	0.3 J	1.0 U	1.0 U	50
Silver	0.020 U	0.020 U	0.020 U	0.020 U	100
Thallium	0.020 U	0.011 J	0.007 J	0.055	2
Zinc	4.8	1.7	4.1	16.7	5,000
Water Quality Parameters (mg/L)					
Total alkalinity	114	1.0 J	40	2.0 U	None
Sulfate	38	23	49	54	None
TDS	195	64	142	134	None
COD	5.0 U	5.0 U	5.0 U	5.0 U	None
TKN	0.60	0.52	0.51	0.53	None
Ammonia	0.05 U	0.05 U	0.05 U	0.05 U	None

Notes:
 COD – chemical oxygen demand
 TDS – total dissolved solids

20.4 CONCLUSIONS

The analytical data for the period 2001 through 2014 were reviewed for the compounds included on the target analyte list. The purpose of the recent historical data analysis is to determine whether trends exist in the concentration data for Roberts Landfill.

20.4.1 Surface Water Metals

At sample locations RLSW01, RLSW02, and RLSW04, aluminum and copper concentrations have remained below endpoint criteria since monitoring began in 2003. Total aluminum and copper have been detected at concentrations above the endpoint criteria at surface water location RLSW03, which is located downgradient from the eastern perimeter of the landfill, since monitoring began in 1996. Since 2003, total aluminum concentrations have ranged from 1,250 to 3,700 µg/L, and total copper concentrations have ranged from 65.5 to 161 µg/L, at this location. These aluminum and copper concentrations have been variable and do not appear to exhibit any increasing or decreasing trends. The continued

exceedance of copper endpoint criteria in surface water sample NL-11 collected downgradient from RLSW03 indicates that copper may be migrating toward Mitt Creek from this location. However, sample NL-12, which was collected further downstream in Mitt Creek, continues to not exceed copper endpoint criteria, indicating that contaminants from NL-11 and RLSW03 are not adversely impacting Mitt Creek.

Total copper concentrations have also exceeded endpoint criteria at location RLSW05, collected from an unnamed stream downgradient of the southeast side of Roberts Landfill that flows into Mitt Lake. Copper has ranged from 20.8 to 54.1 $\mu\text{g/L}$ at this location since 2001 and has exhibited no obvious trend in concentration. Total aluminum concentrations have not exceeded endpoint criteria at location RLSW05 since 2002 and have shown a steadily decreasing trend.

In seep sample NL-14 (blue seep), total copper analytical results were above the 12 $\mu\text{g/L}$ endpoint criteria at 2,330 $\mu\text{g/L}$ and dissolved copper, at 2,590 $\mu\text{g/L}$. These concentrations have increased significantly from 2013. Similarly, total and dissolved aluminum were above the 87 $\mu\text{g/L}$ endpoint criteria at 20,200 $\mu\text{g/L}$ and 21,200 $\mu\text{g/L}$, respectively. Total and dissolved cadmium and zinc were also detected above endpoint criteria at NL-14 at concentrations of 5.23 $\mu\text{g/L}$ and 6.11 $\mu\text{g/L}$ for total and dissolved cadmium and 1,240 $\mu\text{g/L}$ and 1,370 $\mu\text{g/L}$ for total and dissolved zinc. The seep is characterized by bright blue and white crystals among areas of black discoloring on the hillside where the seep emerges and the ditch water located a few feet directly below was discolored milky white and brown. Most likely precipitation of metals is occurring when the groundwater daylight and oxidizes. The pH of NL-14 was 5.31 and slightly acidic. The low flow of the seep prevented the sample from being taken directly at the location that the groundwater daylight. However, the surface water in the ditch directly below this should be indicative of seep contamination.

In general, concentrations of other metals have steadily decreased or have remained steady at low concentrations in surface waters monitored from 1995 through 2014. Total zinc was detected during 2002, 2003, 2006, and 2014 sampling events at concentrations greater than the endpoint criteria, but it was not detected above the endpoint criteria during other sampling events. This is the first year cadmium has been detected at sample location NL-14 since sampling began at that location in 2012. Total mercury was detected above the endpoint criteria once at RLSW01, in 1997. Dissolved mercury was detected at a concentration above the endpoint criteria at only one location during the 2006 sampling event. Total beryllium was detected once above the endpoint criteria at RLSW05, in 1999. All of the other metals

included on the target analyte list for Roberts Landfill were either not detected or detected at concentrations less than the endpoint criteria.

20.4.2 Groundwater Metals

No dissolved or total inorganics included on the target analyte list for the Roberts Landfill groundwater samples were detected above the endpoint criteria during 2014. In 2010, total chromium was detected at a concentration above the endpoint criteria at sample location A-3. However, the total chromium exceedance was suspected to be biased high because A-3 was purged dry and did not stabilize and because turbidity was very high in the sample (608 NTUs). This suspicion was further confirmed by the low chromium concentration observed in the filtered (dissolved) sample. Well A-3 has historically contained insufficient water, and in the past has been purged dry and then allowed to recharge. In 2003, total chromium, lead, and nickel were detected above the endpoint criteria in well A-3 at concentrations of 323 µg/L, 36.9 µg/L, and 113 µg/L, respectively; while dissolved concentrations were observed at the much lower concentrations of 1.41 µg/L, 0.163 µg/L, and 2.29 µg/L, respectively. These analytes were not detected above the endpoint criteria during the 2001 through 2013 sampling events at the remaining locations, and the elevated 2003 concentrations are suspected to be attributable to particulate matter in the sample. In 2013, repairs were made to this well, which included redevelopment. All compounds were detected below their respective endpoint criteria in well A-3 in 2014.

Total aluminum has been measured in groundwater samples from 1997 through 2014 (Appendix C-2). An endpoint criterion has not been established for aluminum in groundwater. Total aluminum concentrations in groundwater samples from well A-3 have fluctuated regularly, beginning with 861 µg/L in 1997, a peak of 153,000 µg/L in 2003, a low of 822 µg/L in 2006, up to 3,210 µg/L in 2008, and falling to 1,020 µg/L in 2009. In 2010, total aluminum increased to 38,600 µg/L in groundwater at sample location A-3 but fell back to 508 µg/L in 2013. These fluctuations are likely attributable to the historical lack of sufficient water in this well and the resulting high particulate matter in the samples.

20.5 RECOMMENDATIONS

Groundwater collected from Roberts Landfill did not exceed any endpoint criteria. In order to continue to monitor the surface water contamination source, it is recommended to continue to monitor wells A-2, A-3, A-5, and B-1 biennially. Because of the continued exceedances of the endpoint criteria in surface water samples for copper and aluminum, the

Navy recommends that surface water monitoring for metals continue biennially at the prescribed locations RLSW01 through RLSW05.

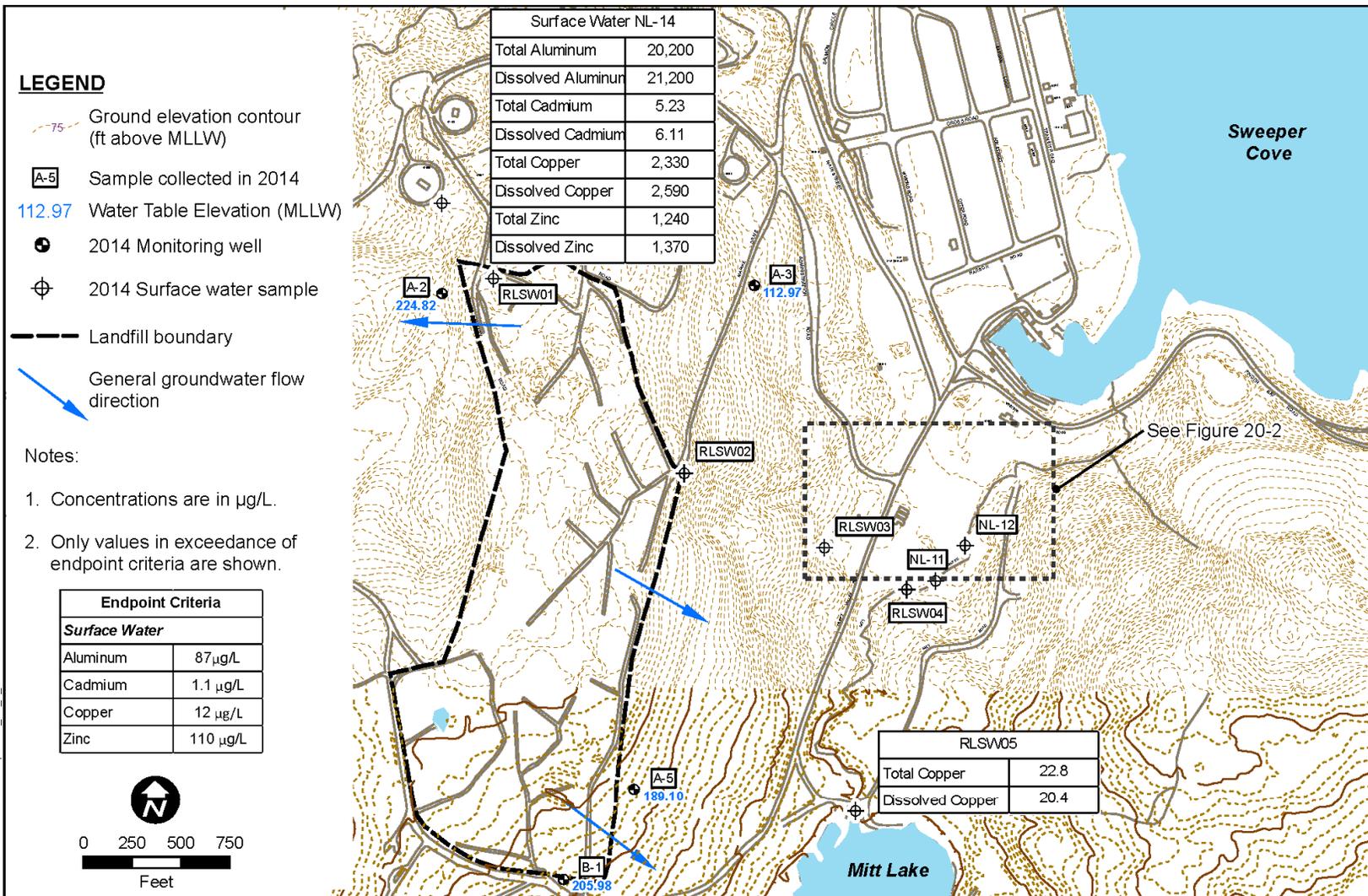
On the basis of these observations, it is recommended that all surface water locations continue to be sampled biennially in the Mitt Creek watershed to monitor target compound concentrations in Mitt Creek.

Sample NL-14 was collected from the blue seep northwest of the landfill in the Adak Fuels Facility. It is recommended that sampling at this location for total and dissolved priority pollutant metals and aluminum be continued.

It is recommended that sampling for target VOCs (1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene, trichloroethene, and BTEX) in groundwater be continued on a once-every-five-year schedule (prior to the five-year review). Sampling for 21 nontarget VOCs should be discontinued because no monitoring endpoints are identified in the CMP, Revision 6 (Navy 2014a).

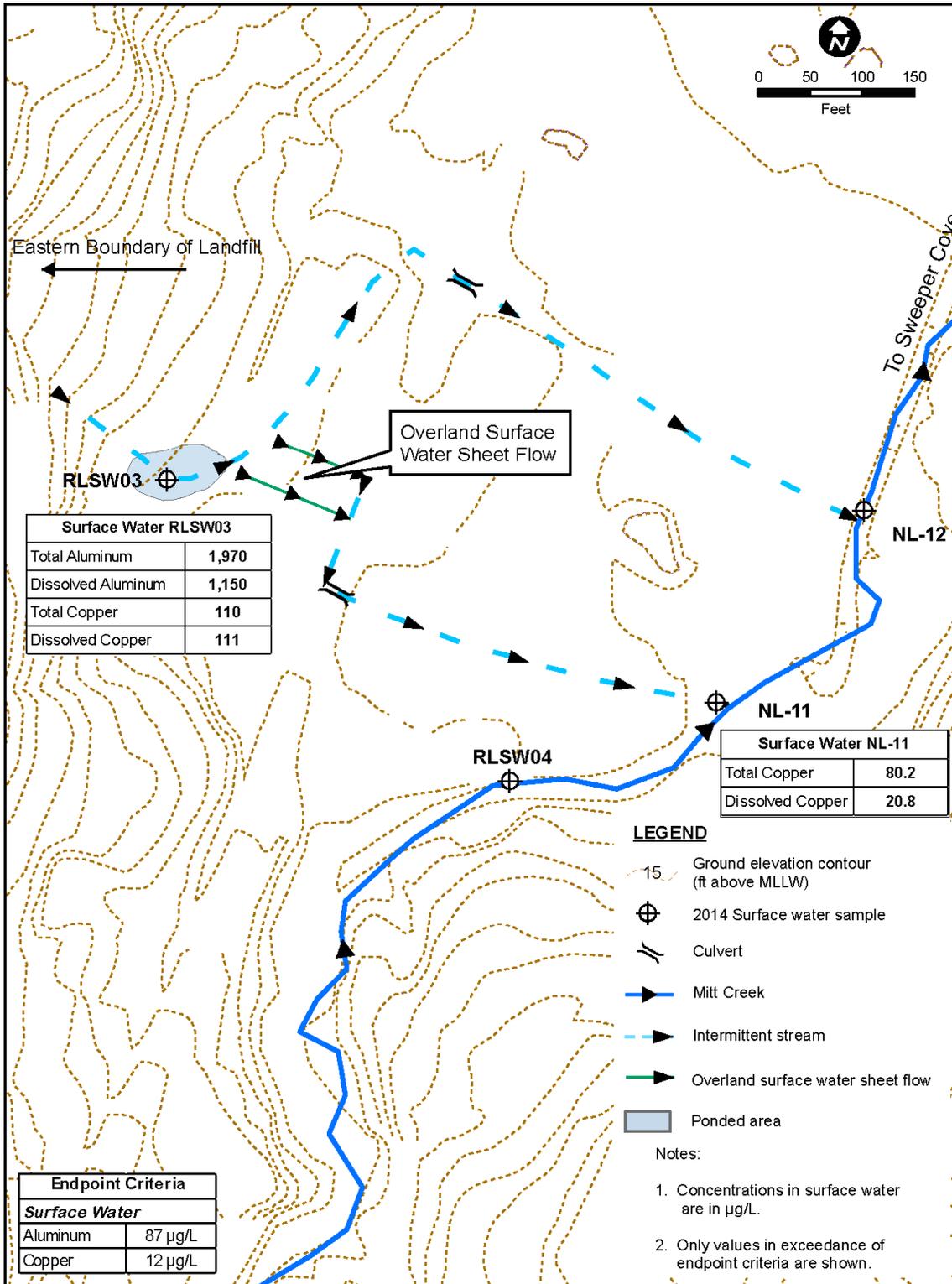
It is recommended that sampling for water quality parameters (alkalinity, ammonia, chemical oxygen demand, sulfate, total dissolved solids, and TKN) be discontinued because no monitoring endpoints are identified in the CMP, Revision 6. The data are not used to assess the effectiveness of the remedy at the site.

20-15



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U.S. NAVY SEALASKA	Figure 20-1 SWMU 25, Roberts Landfill Sample Locations	Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report
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U.S. NAVY	SEALASKA	Figure 20-2 SWMU 25, Roberts Landfill Overland Surface Water Pathway and Sample Locations	Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report
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21 SWMU 55, PUBLIC WORKS TRANSPORTATION DEPARTMENT WASTE STORAGE AREA

This section presents the results of groundwater monitoring performed at the SWMU 55, Public Works Transportation Department Waste Storage Area site during September 2014. Compliance monitoring is the selected remedy for this site (Navy, ADEC, and EPA 2000). To comply with requirements specified for this remedy, the Navy conducts periodic groundwater sampling and water level/product thickness monitoring at this site. Groundwater samples were collected in 2014 to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345).

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

21.1 FIELD MEASUREMENTS

Two monitoring wells were gauged on September 5, 2014. Table 21-1 provides the measured depth-to-water and the calculated groundwater elevations. Figure 21-1 shows the location of the wells, site topography and features, and the interpreted groundwater flow direction. The historic groundwater elevation data, combined with the data obtained from wells in nearby SWMU 14, indicate that the direction of groundwater flow beneath the site is to the south-southeast, toward Sweeper Cove. Groundwater elevations collected in 2014 were compared with historical data and are consistent with this interpretation.

Groundwater sampling was conducted in 2014 at one monitoring well (55-145) on September 5, 2014. Field measurements were recorded in the field forms and logbook during monitoring well sampling activities (Appendix A). Table 21-1 lists the final field measurements recorded at the monitoring well prior to sample collection. A review of the sampling data reported for this site indicates that prior to sample collection at well 55-145, groundwater parameters stabilized to within specified criteria.

Table 21-1. 2014 Field Measurements for SWMU 55 Public Works Transportation Department Waste Storage Area

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to-Water (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
55-145	21.40	16.85	4.55	0	6.82	0.342	0	7.51	7.82	0.02	234
55-146	21.25	17.76	3.49	0	NP	NP	NP	NP	NP	NP	NP

Notes:

NP – not planned

The reported casing elevation is the surveyed elevation resident within the NIRIS database.

The last groundwater parameter measurement prior to sample collection is reported.

21.2 TARGET ANALYTE RESULTS

A groundwater sample was collected from well 55-145 and analyzed for select chlorinated VOCs. Table 21-2 presents the analytical results and laboratory data qualifiers. Figure 21-1 shows the location of the well and the analytical results that exceeded the endpoint criteria. Historical analytical results obtained for this location are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

PCE was detected above the endpoint criterion (5 µg/L) at a concentration of 57 µg/L in well 55-145. Daughter product TCE was detected at 0.21 µg/L, which is below the endpoint criterion (5 µg/L). All other daughter products, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in the sample.

Table 21-2. Analytical Results for Volatile Organic Compounds for SWMU 55, Public Works Transportation Department Waste Storage Area

Well Location	Year	PCE (µg/L)	TCE (µg/L)	1,1-DCE (µg/L)	Cis-1,2-DCE (µg/L)	Trans-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)
55-145 Source Plume	2001	180	1 U	1 U	1 U	1 U	2 U
	2002	130	2 U	2 U	2 U	2 U	2 U
	2003	170	4 U	4 U	4 U	4 U	4 UJ
	2004	112	0.3 J	1 U	1 U	1 U	1U
	2005	90.3	1 U	1 U	1 U	1 U	1 U
	2006	110	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	2007	71 D	0.27 J	0.50 U	0.50 U	0.50 U	0.50 U
	2008	61	0.32 J	0.50 U	0.50 U	0.50 U	0.50 U
	2009	57	0.17 J	0.50 U	0.50 U	0.50 U	0.50 U
	2010	49	0.22 J	0.50 U	0.50 U	0.50 U	0.50 U
	2011	39	0.17 J	0.50 U	0.50 U	0.50 U	0.50 U
	2012	NP	NP	NP	NP	NP	NP
	2013	38	0.13 J	0.50 U	0.50 U	0.50 U	0.50 U
	2014	57 J	0.21 J	0.50 U	0.50 U	0.50 U	0.50 U
Endpoint Criteria		5	5	7	70	100	2

Notes:

Bold indicates reported concentration is greater than the endpoint criteria for groundwater used as a drinking water source.

NP – not planned

21.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 21-3. The 2014 data showed only weak evidence that biodegradation may be occurring at the site, possibly by aerobic digestion. PCE has been decreasing with time, as discussed below in Section 21.4. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 21-3. 2014 Analytical and Field Measurement Data for NAPs for SWMU 55, Public Works Transportation Department Waste Storage Area

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
55-145	MNA	81	14	1.3 U	12	0	6

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

21.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation was conducted only for analytes that exceeded the endpoint criteria within the last two sampling events and had a minimum of four data points. Results of the Mann-Kendall and Sen's trend evaluations (worksheets and graphs provided in Appendix H) are summarized in Table 21-4. Based on statistical evaluation:

- Well 55-145: The PCE concentration exhibits a decreasing trend at both the 80 and 95 percent confidence intervals. The Sen's evaluation indicates a statistically significant decreasing trend, with a median slope of -10.1.

21.5 CONCLUSIONS

This section presents conclusions based on the groundwater monitoring conducted at the SWMU 55, Public Works Transportation Department Waste Storage Area in 2014. The conclusions are as follows:

- Groundwater Flow: The groundwater flow direction is interpreted to be south-southeast toward Sweeper Cove.
- Free Product: No free product was observed at this site in 2014.

- Well 55-145: PCE was detected at a concentration of 57 µg/L, which exceeded the endpoint criterion of 5 µg/L. PCE exhibits a decreasing trend at both the 80 and 95 percent confidence intervals. The Sen's evaluation confirms this trend is statistically significant. Degradation products of PCE have not been detected above the laboratory minimum quantitation limit, with the exception of TCE, which had estimated detections less than 1.0 µg/L from 2007 through 2014, which is below the endpoint criterion.

21.6 RECOMMENDATIONS

PCE concentrations exceed the endpoint criterion in well 55-145 but show statistically significant decreasing trends at the 80 and 95 percent confidence intervals and have met the CMP, Revision 6 (Navy 2014a) secondary endpoint criterion. It is therefore recommended that sampling for daughter products TCE; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; and vinyl chloride at the site be discontinued.

Table 21-4. Concentration Trend Evaluation for SWMU 55, Public Works Transportation Department Waste Storage Area

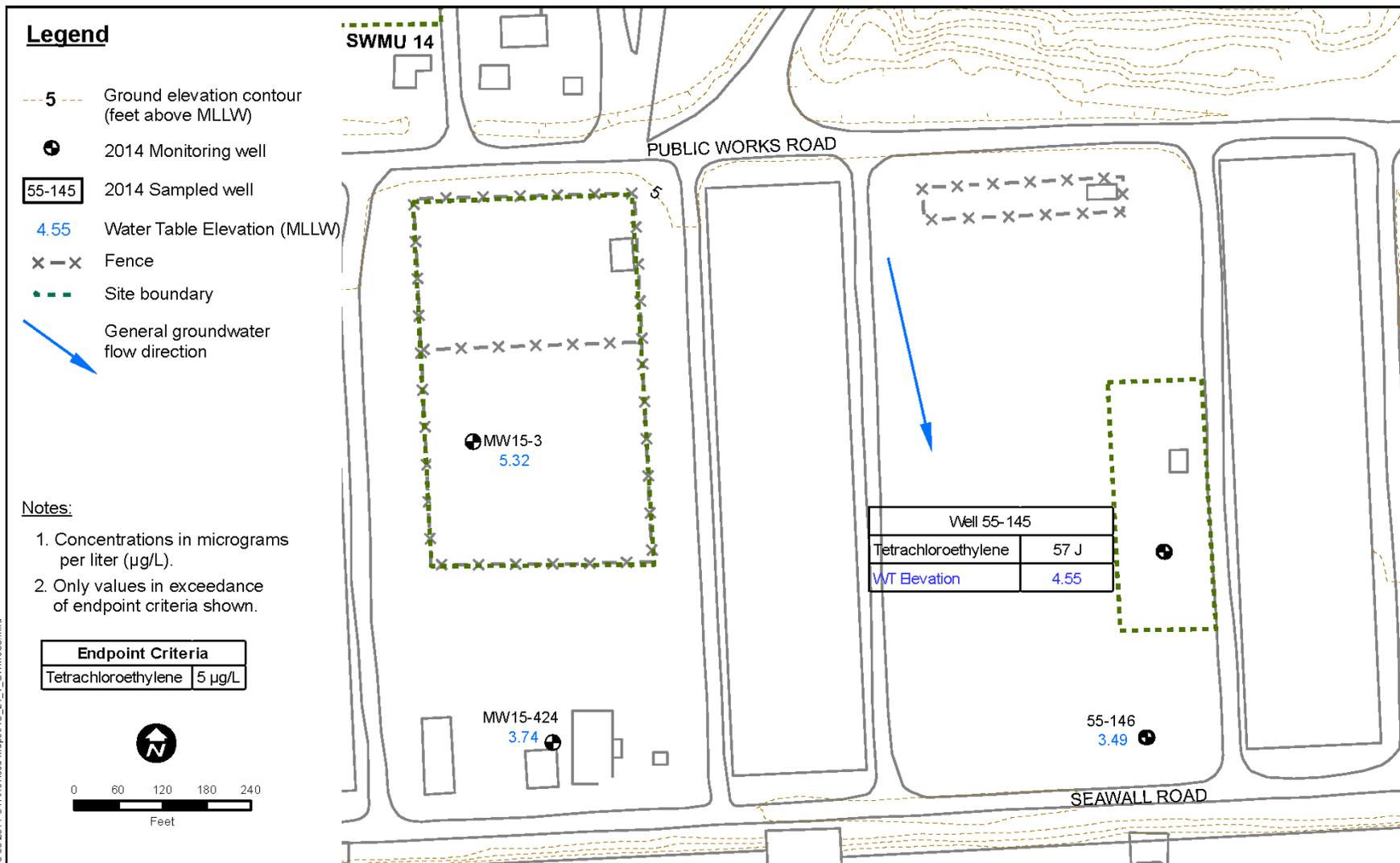
Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		2-Tailed Test at 80% C.I.			
										Median Slope	Statistically Significant Trend	Lower Limit	Upper Limit
55-145	PCE	Yes	57 J	5	10	-36	Decreasing	Decreasing	NA	-10.1	Yes	-12	-8

Notes:

¹ Endpoint criteria are established from Alaska cleanup levels for groundwater used as a drinking water source.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

21-7



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<p>U.S. NAVY SEALASKA</p>	<p>SWMU 55, Public Works Transportation Department Waste Storage Area</p>	<p>Figure 21-1 Sample Locations</p>	<p>Task Order 05 Adak Island, AK 2014 Annual Groundwater and Landfill Monitoring Report</p>
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22 SWMU 60, TANK FARM A

This section presents the results of groundwater monitoring performed at the SWMU 60, Tank Farm A site during 2014. MNA is the remedy selected for this site (Navy, ADEC, and EPA 2000). To comply with requirements specified for this remedy, the Navy has conducted periodic groundwater sampling and water level/product thickness monitoring at the site. Groundwater samples have been collected to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345), to verify that natural attenuation is occurring, and to monitor for surface water protection.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

22.1 FIELD MEASUREMENTS

Depth-to-water and product thickness measurements were collected at five monitoring wells on August 26, 2014. Table 22-1 provides the measured depths-to-water (corrected for product thickness, if present) and the calculated groundwater elevations. Four monitoring wells were sampled on August 26 and 27, 2014. One well, 653, had measurable free product greater than 0.02 feet in thickness; therefore samples were not collected as planned. Figure 22-1 shows the locations of the wells relative to surface features, analytical results that exceeded endpoint criteria, and site topography.

The site is bounded between the hillside to the west and South Sweeper Creek/Sweeper Cove to the east. The analysis of limited historic groundwater elevation data and the hydrogeological setting of the site indicate that the groundwater flow direction is southeast toward South Sweeper Creek. Groundwater elevation data collected in 2014 were compared to historical data and are consistent with this interpretation.

Table 22-1. 2014 Field Measurements for SWMU 60, Tank Farm A

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to- Water ¹ (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
Groundwater Samples											
650	13.11	9.48	3.63	0	6.10	0.582	29	0.00	8.47	0.00	-33
651	12.08	8.81	3.27	0	6.06	0.477	37	0.00	8.61	0.00	-31
652	12.37	9.12	3.25	0	5.87	0.877	3	0.00	9.41	0.00	-105
653	15.10	11.03	4.07	0.16	FP	FP	FP	FP	FP	FP	FP
LC5A	10.86	6.62	4.24	0	6.14	0.699	3	0.00	10.74	0.00	-85
Surface Water Samples											
852	NA	NA	NA	NA	5.41	7.21	5	7.33	12.28	0.10	183

Notes:

¹Corrected if presence of product in the well.

FP – free product, unable to be sampled

The reported casing elevation is the surveyed elevation residing in the NIRIS database.

The last groundwater parameter measurement prior to sample collection is reported.

22-2

Field measurements were recorded on field data forms and logbooks during monitoring well sampling activities (Appendix A). Table 22-1 lists the final field measurements recorded at each water sampling location prior to sample collection. A review of the sampling data reported for the site indicates that the four wells stabilized prior to sample collection.

A shoreline inspection was performed from the mouth of South Sweeper Creek along the western shoreline to the top of Sweeper Creek lagoon. One petroleum seep is located in South Sweeper Creek on the western shoreline of the lagoon downgradient of SWMU 60, Tank Farm A, well LC5A. The area of shoreline affected by the seep is approximately 15 feet by 5 feet in area and located north and adjacent to the culvert (Figure 22-1). This seep is characterized by oily sediments, sheen on surface water, and moderate petroleum odors which were noted during the shoreline inspection performed in 2014. A second area with sheen approximately 4 feet by 3 feet in area was observed inside the north end of boom 10.

A surface water/sediment sample was collected at the seep at location 852 on August 27, 2014 and analyzed for petroleum hydrocarbons to determine if natural recovery is progressing. In 2012, the culvert at boom location 10 partially collapsed and water ceased flowing through the culvert into Sweeper Creek next to sample location 852. During the 2014 sampling event, surface water and sediment was collected during an ebbing high tide so that the two samples could be collected relatively adjacent to each other. DRO concentrations in surface water at this location fell below endpoint criteria for the third time since 2008. Petroleum sheen and odor were observed when sediments were disturbed during the sample collection at location 852. Results of visual inspections are summarized in Section 4.1.3.

Well 653 had measurable free product of 0.16 feet in thickness; therefore samples were not collected as planned. Boom 10 is being maintained at the seep on a monthly basis to control the migration of sheen into downstream waters (Sweeper Cove). Additionally, periodic free product recovery was performed at wells 652 and 653 during October 2013 through September 2014. No product was recovered from site wells during this time period. The monthly free product recovery activities are summarized in Appendix J. A summary of boom maintenance for this site is presented in the Remedial Action Summary Report, Free Product Recovery (Navy 2014c).

22.2 TARGET ANALYTE RESULTS

Surface water sample 852 and groundwater samples collected from monitoring wells 650, 651, and 652 were analyzed for DRO, BTEX, and PAHs. BTEX and PAHs were used to calculate TAH and TAqH for the samples. The groundwater sample collected from well LC5A was analyzed for BTEX and PAHs, which were used to calculate TAH and TAqH. Sediment sample 852 was analyzed for DRO and PAHs. Tables 22-2, 22-3, and 22-4 present the groundwater, surface water, and sediment analytical results, respectively. Historical analytical results obtained for these locations are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

DRO concentrations for the surface water protection well 652 (4,600 µg/L) exceeded the endpoint criteria of 1,500 µg/L. The remaining surface water protection wells 650 and 651 were below the endpoint criteria at concentrations of 1,100 µg/L and 1,300 µg/L, respectively. All BTEX constituents were detected below their respective endpoint criteria in wells 650, 651, 652, and LC5A except for benzene which was detected above the endpoint criteria in well 650 and 652 at concentrations of 6.3 µg/L and 6.1 µg/L, respectively. TAH and TAqH concentrations exceeded the respective water quality standards of 10 µg/L and 15 µg/L in surface water protection well 651 (58 µg/L and 85 µg/L, respectively), well 652 (152 µg/L and 228 µg/L, respectively) and well LC5A (84 µg/L and 159 µg/L, respectively).

DRO (80 µg/L) was detected below the risk-based cleanup level of 250 µg/L in the surface water sample collected at sample location 852. TAH, TAqH, and indeno(1,2,3-cd)pyrene also did not exceed endpoint criteria in this sample.

DRO was detected in sediment sample 852 at 1,100 mg/kg, which exceeded the endpoint criteria of 90.6 mg/kg. Phenanthrene and 2-methylnaphthalene did not exceed the endpoint criteria of 0.0202 mg/kg and 0.225 mg/kg, respectively.

Table 22-2. Analytical Results for Petroleum-Related Chemicals for Groundwater at SWMU 60, Tank Farm A

Well Location	Year	DRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TAH ¹ (µg/L)	TAqH ² (µg/L)
650 Downgradient	2011	1,100 Y	4.6	0.28 J	0.29 J	1.1 J	6.3 J	8.7 JX
	2012	1,600 Y	10	0.70 U	0.25 J	0.61 J	10.9 J	12 JX
	2013	2,400 Y	7.2	0.50 U	0.080 J	0.11 J	7.4 J	8.7
	2014	1,100 Y	6.3	0.22 J	0.11 J	1.0 J	7.6 J	8.2 JBX
651 Downgradient	2011	1,200 Y	2.7	1.2	24	79	107	137 D
	2012	1,300 Y	2.9	1.7	22	67	93	127 D
	2013	1,300 Y	3.3	1.6	33	97	135	167 D
	2014	1,300 Y	2.5	1.0	14	41	58	85 D
652 Plume Source Area	2011	FP	FP	FP	FP	FP	FP	FP
	2012	4,000 Y	4.9	1.4	32 J	52 J	90 J	127 JD
	2013	FP	FP	FP	FP	FP	FP	FP
	2014	4,600 Y	6.1	1.8	32	112	152	228 D
653 Plume Source Area	2011	FP	FP	FP	FP	FP	FP	FP
	2012	1,900 Y	0.50 U	0.50 U	1.2	6.2 J	7.4 J	10.3 J
	2013	FP	FP	FP	FP	FP	FP	FP
	2014	FP	FP	FP	FP	FP	FP	FP
LC5A Downgradient	2002	1,100	NP	NP	NP	NP	NP	NP
	2003	1,800	1.6 J	1.8 J	24 J	70 J	NP	NP
	2004	2,170	NP	NP	NP	NP	NP	NP
	2005	1,500 J	NP	NP	NP	NP	NP	NP
	2006	3,000	NP	NP	NP	NP	NP	NP
	2007	1,500 Y	NP	NP	NP	NP	NP	NP
	2008	1,100	1.6 J	2.6 J	21 D	48 DJ	73	123
	2009	1,000 Y	1.3	1.7	26	59	88	123 DJ
	2010	860 Y	1.1	2.3	26	47	77	115 DJ
	2011	1,200 Y	1.6	2.3	32	54	90	132 DJ
	2012	NP	1.4 J	3.0 J	22 J	29 J	56 J	106 DJ
2013	NP	2.0	3.9	55	60	121	196 DJ	
2014	NP	2.5 J	4.0 J	44 D	33 D	84 DJ	159 DJ	
Endpoint Criteria		1,500	5	1,000	700	10,000	10 ³	15 ³

Notes:

- ¹ TAH results were calculated by summing the detected concentrations of BTEX when one or more were detected and by summing the quantitation limits when none were detected.
 - ² TAqH results were calculated by summing the detections of BTEX and 16 PAHs when one or more were detected and by summing the quantitation limits when none were detected.
 - ³ TAH and TAqH endpoint criteria are based on the ADEC water quality standard as specified in 18 AAC 70.
- NP – not planned
 FP – free product, unable to be sampled
Bold indicates reported concentration is greater than the endpoint criteria based on ADEC cleanup levels for groundwater used as a drinking water source.

Table 22-3. Analytical Results for Petroleum-Related Chemicals in Surface Water at SWMU 60, Tank Farm A

Location	Year	DRO (µg/L)	Indeno(1,2,3-cd)pyrene (µg/L)	TAH ¹ (µg/L)	TAqH ² (µg/L)
852 Downgradient	2006	900	0.10 U	6.0 U	0.45 J
	2007	93 Z	0.020 U	1.3 J	1.4 J
	2008	84 J	0.0017 J	0.070 J	0.26 J
	2009	1,000 Y	0.020 U	2.6 J	6.7 J
	2010	580 Y	0.020 U	1.1 J	4.9 J
	2011	1,200 Y	0.020 U	1.2 J	4.7 J
	2012	130	0.020 U	2.5 U	0.07 J
	2013	63 Y	0.0097 J	2.5 U	0.37 JX
	2014	80 Y	0.019 U	0.05 J	0.07 J
Endpoint Criteria		250	0.28	10 ³	15 ³

Notes:

- ¹ TAH results were calculated by summing the detected concentrations of BTEX when one or more were detected and by summing the quantitation limits when none were detected.
 - ² TAqH results were calculated by summing the detections of BTEX and 16 PAHs when one or more were detected and by summing the quantitation limits when none were detected.
 - ³ The TAH and TAqH endpoint criteria are based on ADEC water quality standards as specified in 18 AAC 70.
- Bold** indicates reported concentration is greater than endpoint criteria.

Table 22-4. Analytical Results for Sediment at SWMU 60, Tank Farm A

Location	Year	DRO (mg/kg)	2-Methylnaphthalene (mg/kg)	Phenanthrene (mg/kg)
852 Downgradient	2006	260 J	0.0068 J	0.031
	2007	1,300 DY	0.014	0.600
	2008	500 YJ	0.0055 U	0.081 J
	2009	2,900 Y	0.020	0.120 U
	2010	4,100 DY	0.190	0.160
	2011	1,400 DY	0.041	0.130
	2012	10,000 DY	0.013 JD	0.470 U¹
	2013	2,000 Y	0.0064	0.022 U
	2014	1,100 DY	0.0064	0.099
Endpoint Criteria		90.6	0.0202	0.225

Notes:

- ¹ Quantitation limit is elevated due to matrix interference. (The method detection limit is elevated to the same value due to the interference.)
- Bold** indicates reported concentration is greater than the endpoint criteria.

22.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 22-5. The 2014 data indicated that biodegradation of petroleum hydrocarbons is occurring by iron (II) reduction; sulfate reduction; and strong evidence of methanogenesis as shown by elevated ferrous iron

concentrations, depleted sulfates, and elevated methane concentrations in comparison to background conditions. Water quality parameters presented in Table 22-1 collected during 2014 support evidence of continued natural attenuation as shown by the reducing environment (negative ORP) and depleted dissolved oxygen (0.0 mg/L) at the site. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 22-5. 2014 Analytical and Field Measurement Data for NAPs for SWMU 60, Tank Farm A

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
650	MNA	72	0.33	130	23	10	0.3
651	MNA	53	4.3	270	490	15	5
652	MNA	190	1.7	170	250	40	0.15
653	MNA	FP	FP	FP	FP	FP	FP
LC5A	MNA	71	1.3	1,600	25	10	0.3

Notes:

FP – free product, unable to be sampled

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

22.4 TREND EVALUATION

Statistical trend evaluations are only conducted for target analyte concentrations in groundwater for analytes that exceeded endpoint criteria within the last two sampling events, in accordance with the CMP, Revision 6 (Navy 2014a). Additionally, a minimum of four data points are required for the analysis. Results of the Mann-Kendall and Sen’s trend evaluations (worksheets and graphs provided in Appendix H) are summarized in Table 22-6. Based on statistical evaluation:

- Well 650: The DRO and benzene concentrations are both stable with no trends at the 80 and 95 percent confidence intervals.

Table 22-6. Concentration Trend Evaluation for SWMU 60, Tank Farm A

Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		Median Slope	Statistically Significant Trend	2-Tailed Test at 80% C.I.	
												Lower Limit	Upper Limit
650	DRO	Yes	2,400 Y	1,500	4	1	No Trend	No Trend	Stable	NC	NC	NC	NC
	Benzene	Yes	7.2	5	4	0	No Trend	No Trend	Stable	NC	NC	NC	NC

Notes:

¹ Endpoint criteria are established from ADEC cleanup levels for groundwater used as a drinking water source.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.

22.5 CONCLUSIONS

This section presents the conclusions based on a review of groundwater monitoring conducted at SWMU 60, Tank Farm A in 2014. The conclusions are as follows:

Groundwater Flow: The groundwater flow direction at the site is interpreted to be directly southeast toward South Sweeper Creek.

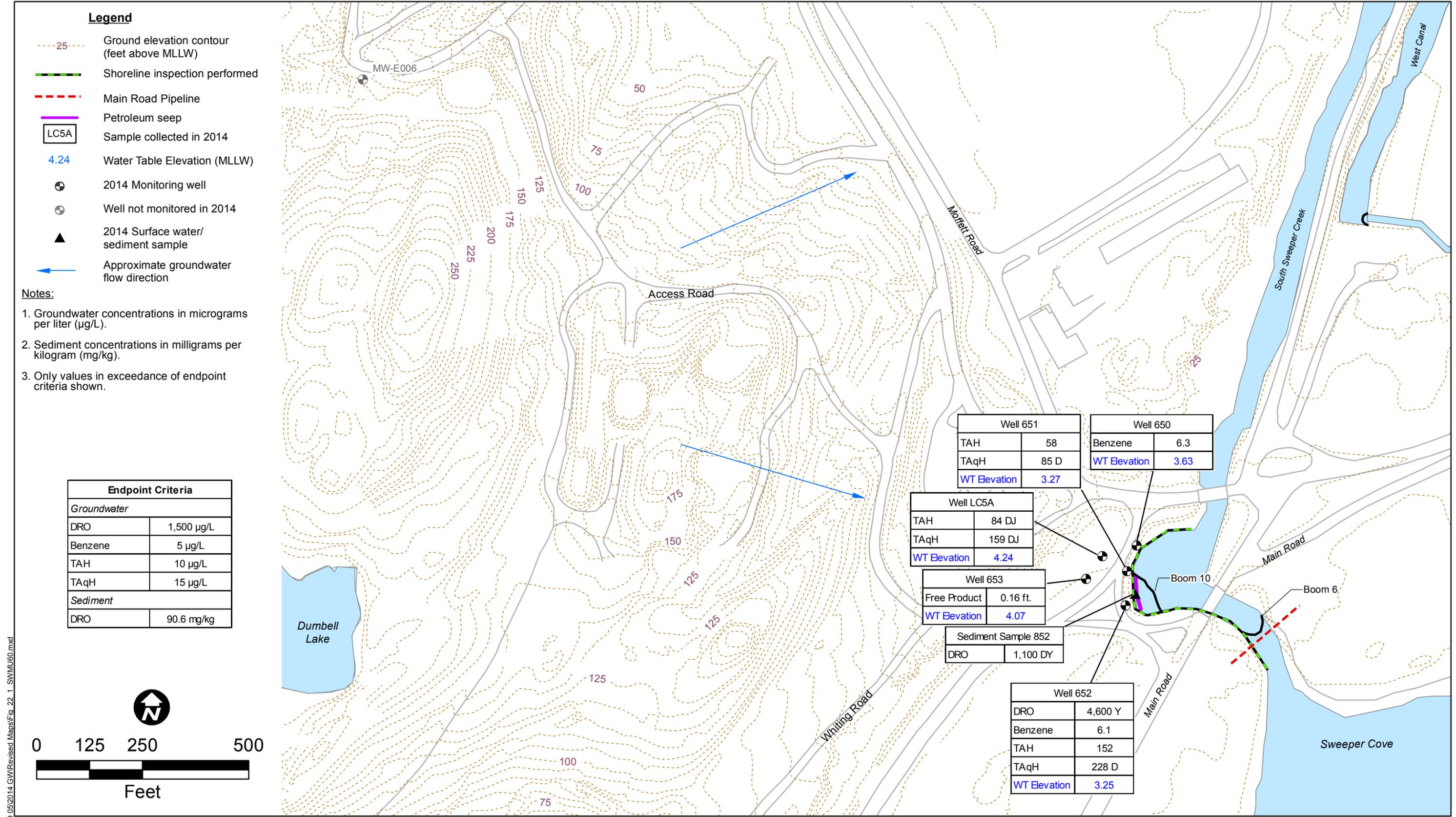
- **MNA:** The groundwater parameters obtained during 2014 provide evidence that natural attenuation of petroleum hydrocarbons continues to occur at the site.
- **Free Product:** Free product was observed in well 653 at a thickness of 0.16 feet. No free product was removed from the site during October 2013 through September 2014.
- **Well 650:** This well is located within the contaminant plume. The benzene concentration was observed at a concentration of 6.3 µg/L, which was above endpoint criteria. DRO, toluene, ethylbenzene, total xylenes, TAH, and TAqH concentrations were below endpoint criteria. The statistical analysis exhibits a stable trend.
- **Well 651:** This well is located within the contaminant plume. The DRO and BTEX concentrations were observed at concentrations below endpoint criteria. TAH and TAqH concentrations exceeded ADEC water quality standards at 58 µg/L and 85 µg/L, respectively.
- **Well 652:** This well is located within the contaminant plume. The DRO and benzene concentrations were observed at concentrations of 4,600 µg/L and 6.3 µg/L, respectively, which were above endpoint criteria. The TAH and TAqH concentrations exceeded ADEC water quality standards at 152 µg/L and 228 µg/L, respectively. Toluene, ethylbenzene, and total xylenes concentrations were below endpoint criteria.
- **Wells 653:** Planned sampling at this well, which is located within the contaminant plume, was not conducted due to the presence of free product that was greater than or equal to 0.02 feet in thickness.
- **Well LC5A:** BTEX concentrations were observed below endpoint criteria for the seventh consecutive sampling event in this well. TAH and TAqH concentrations exceeded ADEC water quality standards at 84 µg/L and 159 µg/L, respectively.

- Sample location 852: Surface water and sediment were collected at the observed petroleum seep in South Sweeper Creek downgradient of the site. No contaminant of concern exceeded endpoint criteria in the surface water. DRO exceeded the endpoint criteria in sediment at this location in 2014 at a concentration of 1,100 µg/L. This is a decrease compared to the 2013 concentration, which was 2,000 mg/kg. The increase in DRO concentration in 2012 coincided with the collapse of the adjacent culvert which released a large amount of visible sheen. Phenanthrene and 2-methylnaphthalene have remained below their respective endpoint criteria for at least two consecutive sampling events.
- A petroleum seep is located downgradient of well 652 on the northwestern shoreline of South Sweeper Creek lagoon. Sorbent booms are being maintained monthly at this location to control sheen on surface water from the shoreline petroleum seep. Oily sediments, petroleum odor, and sheen were observed behind the boom.

22.6 RECOMMENDATIONS

It is recommended that surface water sampling at location 852 be discontinued because no endpoint criteria have been exceeded for three consecutive sampling events. It is also recommended that sampling for 2-methylnaphthalene and phenanthrene in sediment sample 852 be discontinued because there have been no exceedences in the past three consecutive sampling events.

DRO, benzene, TAH, and TAqH have continued to exceed endpoint criteria in various site wells. Additionally, free product continues to be observed in site wells, although at a reduced volume and frequency. Because of this, it is recommended that all other monitoring continue annually as prescribed to allow for natural attenuation to progress and to gather the necessary data to see if secondary endpoints have been reached.



Legend

- - - 25 Ground elevation contour (feet above MLLW)
- - - Shoreline inspection performed
- - - Main Road Pipeline
- - - Petroleum seep
- LC5A Sample collected in 2014
- 4.24 Water Table Elevation (MLLW)
- ⊕ 2014 Monitoring well
- ⊕ Well not monitored in 2014
- ▲ 2014 Surface water/sediment sample
- ← Approximate groundwater flow direction

Notes:

1. Groundwater concentrations in micrograms per liter (µg/L).
2. Sediment concentrations in milligrams per kilogram (mg/kg).
3. Only values in exceedance of endpoint criteria shown.

Endpoint Criteria	
<i>Groundwater</i>	
DRO	1,500 µg/L
Benzene	5 µg/L
TAH	10 µg/L
TAqH	15 µg/L
<i>Sediment</i>	
DRO	90.6 mg/kg

Well 651	
TAH	58
TAqH	85 D
WT Elevation	3.27

Well 650	
Benzene	6.3
WT Elevation	3.63

Well LC5A	
TAH	84 DJ
TAqH	159 DJ
WT Elevation	4.24

Well 653	
Free Product	0.16 ft.
WT Elevation	4.07

Sediment Sample 852	
DRO	1,100 DY

Well 652	
DRO	4,600 Y
Benzene	6.1
TAH	152
TAqH	228 D
WT Elevation	3.25

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U.S. NAVY

SEALASKA

**Figure 22-1
SWMU 60, Tank Farm A
Sample Locations**

Task Order 05
Adak Island, AK
2014 Annual Groundwater and
Landfill Monitoring Report

23 SWMU 61, TANK FARM B

This section presents the results of groundwater monitoring performed at the SWMU 61, Tank Farm B site during 2014. The remedy specified for this site in the OU A ROD is MNA (Navy, ADEC, and EPA 2000). To comply with requirements specified for this remedy, the Navy has conducted periodic groundwater sampling and water level/product thickness monitoring at the site. Groundwater samples have been collected from wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345), to verify that natural attenuation is occurring in groundwater, to verify that natural recovery is occurring in surface water and sediment, and to monitor for surface water protection.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

23.1 FIELD MEASUREMENTS

Three monitoring wells were gauged and sampled on September 4, 2014. Depth-to-water and product thickness measurements were collected at the three monitoring wells.

Table 23-1 provides the measured depths-to-groundwater and the calculated groundwater elevations. No free product was detected in any of the site wells. Figure 23-1 shows the locations of the wells, analytical results that exceeded endpoint criteria, site topography and features, and potential sources of contamination (e.g., fuel lines).

Historic groundwater elevation data and the hydrogeological setting of the site indicate that the groundwater flows southeast following site topography in the upland area and directly east toward North Sweeper Creek in the lowland area and riverine wetland. Groundwater elevations collected in 2014 were compared to historical data and support this interpretation.

Table 23-1. 2014 Field Measurements for SWMU 61, Tank Farm B

Physical Measurements					Water Quality Parameters						
Well Location	Casing Elevation (ft MLLW)	Depth-to-Water (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
Groundwater Samples											
14-113	9.14	3.44	5.70	0	6.05	0.555	0	1.72	9.61	0.00	-78
14-210	12.12	3.10	9.02	0	7.16	0.500	42	0.60	12.31	0.02	-81
TFB-MW4B	37.44	4.54	32.90	0	6.91	0.439	0	0.00	8.02	0.02	-32
Surface Water Samples											
NL-04	NA	NA	NA	NA	5.99	0.221	0	8.21	10.14	0.00	84

Notes:

The reported casing elevation is the surveyed elevation residing in the NIRIS database.
 The last groundwater parameter measurement prior to sample collection is reported.

Three wells were sampled on September 4, 2014. Field measurements were recorded on field data forms and logbooks during monitoring well sampling activities (Appendix A). Table 23-1 lists the final field measurements recorded at each water sampling location prior to sample collection. A review of the sampling data reported for the site indicates that groundwater parameters at well TFB-MW4B stabilized prior to sample collection. The parameters at wells 14-113 and 14-210 did not stabilize, so three well casing volumes were removed from well 14-113 prior to sampling per CMP, Revision 6 (Navy 2014a). Monitoring well 14-210 was purged dry. Sufficient water for sampling was available after the well was allowed to recharge then sampled after three hours per CMP, Revision 6. The 2014 analytical results in these wells are consistent with past analytical results and appear to be unaffected by the lack of stabilization.

On September 4, 2014, surface water and sediment samples (location NL-04) were collected from the western shoreline of North Sweeper Creek downgradient of monitoring well 14-113 (Figure 23-1) to determine whether petroleum contamination from groundwater is impacting surface water. Sample NL-04 was collected immediately downgradient of well 14-113.

An inspection of the western shoreline of North Sweeper Creek was performed in 2014 at SWMU 61, Tank Farm B site between monitoring well 14-113 and the confluence with an unnamed stream approximately 100 feet to the north. No visual evidence of petroleum contamination was observed during the inspection or during sampling at location NL-04; however, a light petroleum odor was observed during the sediment sampling. Shoreline inspection information is also summarized in Section 4.1.3.

23.2 TARGET ANALYTE RESULTS

The following sections describe the analytical results for the samples collected in 2014. Historical analytical results obtained for these locations are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

23.2.1 Groundwater

The groundwater samples collected from wells 14-113, 14-210, and TFB-MW4B were analyzed for GRO and BTEX. The groundwater sample from surface water protection monitoring well 14-113 was also analyzed for PAHs. TAH and TAqH results for well 14-113 were calculated from the BTEX and PAH results. Groundwater analytical results were compared to the endpoint criteria for groundwater at petroleum-release sites presented in Appendix F of the CMP, Revision 6 (Navy 2014a). Table 23-2 presents the groundwater analytical results.

GRO was detected above the endpoint criteria (2,200 µg/L) in the samples collected from wells 14-210 (3,700 µg/L) and TFB-MW4B (40,000 µg/L). GRO was detected below the endpoint criteria in the sample collected from well 14-113 (1,900 µg/L). Groundwater collected from well TFB-MW4B also exceeded endpoint criteria with the observed concentrations of benzene (20 µg/L), toluene (4,300 µg/L), ethylbenzene (1,900 µg/L) and total xylenes (14,200 µg/L). TAH and TAqH were detected above the endpoint criteria (10 µg/L and 15 µg/L, respectively) in the sample collected from surface water protection well 14-113, both at a concentration of 339 µg/L and 340 µg/L, respectively.

Table 23-2. Analytical Results for Petroleum-Related Chemicals for Groundwater Samples at SWMU 61, Tank Farm B

Well Location	Year	GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Total Xylenes (µg/L)	TAH ¹ (µg/L)	TAqH ² (µg/L)	
14-113 Surface Water Protection Well	2003	2,000	34	8.2	150	583 J	NP	NP	
	2004	6,880 J	30.8 J	21.6	54 J	1,290 J	NP	NP	
	2005	3,900 J	22.7 J	11 J	65.9 J	1,590 J	NP	NP	
	2006	6,300	16	5.7	43	1,700	NP	NP	
	2007	3,900 Z	14	4.4	20	812 D	850 D	850 D	
	2008	2,700 Z	9.6 D	3.2 D	14 D	722 DJ	748 DJ	748 DJ	
	2009	5,100 Z	13 D	7.2 D	30 D	1403 D	1,453 D	1,453 DJ	
	2010	3,800 Y	12	4.5	17	1,202 D	1,235 D	1,236 DJ	
	2011	3,400 Y	8.3	2.8	11	842 D	864 D	865 DJ	
	2012	2,000 Y	6.9 J	2.8 J	12 J	682 DJ	704 DJ	704 DJ	
	2013	2,800 Z	6.9	2.0	12	631 D	652 D	652 DJX	
	2014	1,900 Y	4.3	1.2	3.5	330 DJ	339 DJ	340 DJ	
	14-210 Downgradient	2001	5,900	17.4	3.65	2.31	5.33	NP	NP
		2002	2,300	4	1.1 J	2 U	3.1 J	NP	NP
2003		3,300	10 U	4.1 J	3.5 J	21	NP	NP	
2004		5,220J	0.5 U	0.5 U	0.12 J	0.55J	NP	NP	
2005		3,560	1 U	1 U	0.24 J	4.94 J	NP	NP	
2006		3,700 J	1.0 U	1.0 U	1.0 U	5.8	NP	NP	
2007		3,400 Y	1.0 U	0.26 DJ	1.0 U	0.50 DJ	NP	NP	
2008		3,800 Y	0.50 U	1.4 UJ	0.50 U	1.04 J	NP	NP	
2009		4,500 Y	0.50 U	0.50 U	0.070 J	0.35 J	NP	NP	
2010		4,200 Y	0.50 U	0.66	0.14 J	0.90 J	NP	NP	
2011		1,600 Y	0.50 U	0.13 J	0.12 J	0.60 J	NP	NP	
2012		2,400 Y	0.080 J	0.50 UJ	0.10 J	0.56 J	NP	NP	
2013		3,200 Z	0.50 U	0.10 J	0.060 J	0.40 J	NP	NP	
2014		3,700 Y	0.50 UJ	0.19 J	2.5 UJ	5.0 UJ	NP	NP	

Table 23-2. Analytical Results for Petroleum-Related Chemicals for Groundwater Samples at SWMU 61, Tank Farm B (continued)

Well Location	Year	GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Total Xylenes (µg/L)	TAH ¹ (µg/L)	TAqH ² (µg/L)
TFB-MW4B Plume Source Area	2001	36,500	54	3,270	1,100	7,850	NP	NP
	2002	29,000	50 J	3,000	990	7,600	NP	NP
	2003	30,000	73 J	5,600	2,200	13,456	NP	NP
	2004	50,600 J	69 J	6,110 J	1,660 J	12,100 J	NP	NP
	2005	46,700 J	49.5 J	4,580 J	1,750 J	12,500 J	NP	NP
	2006	40,000 J	31	3,500	1,400	10,800	NP	NP
	2007	41,000 DY	39 D	4,100 D	1,700 D	12,800 D	NP	NP
	2008	53,000 DY	29 D	4,400 D	1,600 D	12,600 D	NP	NP
	2009	50,000 DY	31 D	4,800 D	2,000 D	14,900 D	NP	NP
	2010	46,000 DY	30 D	4,600 D	2,100 D	15,700 D	NP	NP
	2011	51,000 DY	23 D	4,100 D	1,900 D	15,300 D	NP	NP
	2012	36,000 DY	24 D	4,800 DJ	2,100 D	15,600 D	NP	NP
	2013	43,000 DZ	20 D	4,000 D	1,900 D	13,900 D	NP	NP
	2014	40,000 DYJ	20 D	4,300 D	1,900 D	14,200 D	NP	NP
Endpoint Criteria		2,200	5	1,000	700	10,000	10 ³	15 ³

Notes:

- ¹ TAH results were calculated by summing the detected concentrations of BTEX when one or more were detected and by summing the quantitation limits when none were detected.
- ² TAqH results were calculated by summing the detections of BTEX and 16 PAHs when one or more were detected and by summing the quantitation limits when none were detected.
- ³ TAH and TAqH endpoint criteria are based on the ADEC water quality standard as specified in 18 AAC 70.

NP – not planned

Bold indicates reported concentration is greater than the endpoint criteria or water quality standard.

23.2.2 Surface Water

The surface water sample collected at location NL-04 was analyzed for GRO, BTEX, and PAHs (for calculation of TAH and TAqH). Surface water analytical results were compared to CMP, Revision 6 (Navy 2014a) South Sweeper Creek endpoint criteria and State of Alaska surface water criteria. Table 23-3 presents the surface water analytical results.

GRO was not detected above the reporting limit at the surface water sample location. TAH and TAqH were not detected above surface water endpoint criteria or water quality standards (10 µg/L and 15 µg/L, respectively) at the surface water sample location.

Table 23-3. Analytical Results for Petroleum-Related Chemicals in Surface Water at SWMU 61, Tank Farm B

Location	Year	GRO (µg/L)	Total Aromatic Hydrocarbons ¹ (µg/L)	Total Aqueous Hydrocarbons ² (µg/L)
NL-04	2007	100 U	0.36 J	0.36 J
	2008	100 U	0.23 J	0.23 J
	2009	100 U	2.5 U	0.048
	2010	16 J	0.35 J	0.35 J
	2011	100 U	0.59 J	0.60 J
	2012	100 U	1.2 J	1.2 J
	2013	100 U	0.17 J	0.17 J
	2014	100 U	0.37 J	0.38 J
Endpoint Criteria ^{3,4}		114	10	15

Notes:

¹ TAH results were calculating by summing the detected concentrations of BTEX when one or more were detected and by summing the quantitation limits when none were detected.

² TAqH were calculated by summing the detections of BTEX and 16 PAHs when one or more were detected and by summing the quantitation limits when none were detected.

³ TAH and TAqH endpoint criteria are based on the ADEC water quality standard as specified in 18 AAC 70.

⁴ Endpoint criteria for North Sweeper Creek have not been established so endpoints for South Sweeper Creek were used.

23.2.3 Sediment

Sediment sample NL-04 was analyzed for GRO and BTEX. Sediment analytical results were compared to CMP, Revision 6 (Navy 2014a) South Sweeper Creek endpoint criteria. Table 23-4 presents the sediment analytical results. GRO and BTEX were not detected in the sediment sample; however, the GRO method detection limit for this sample exceeded the 12.2 mg/kg endpoint criteria due to a high water content in the sample.

Table 23-4. Analytical Results for Petroleum-Related Chemicals in Sediment Samples at SWMU 61, Tank Farm B

Location	Year	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)
NL-04	2007	2.8 UJ	0.012 U	0.012 U	0.012 U	0.035 U
	2008	300 ZJ	0.058 J	0.24 U	0.27	26 J
	2009	13 J	0.066 U	0.066 U	0.066 U	0.062 J
	2010	60 J¹	0.70 U	0.70 U	0.70 U	1.4 U
	2011	16 U^{2,3}	0.50 U	0.50 U	0.50 U	1.0 U
	2012	20 U^{2,3}	0.67 UJ	0.67 UJ	0.67 UJ	1.3 UJ
	2013	16 U^{2,3}	0.54 U	0.54 U	0.54 U	1.1 U
	2014	23 U^{2,3}	0.69 U	0.69 U	0.69 U	1.4 UJ
Endpoint Criteria ⁴		12.2	None	None	None	None

Notes:

¹ Value is reported from the field duplicate sample because the sample result was a non-detect with a quantitation limit greater than the endpoint criteria.

² Value is the method detection limit because the quantitation limit is greater than the risk-based endpoint criteria.

³ Method detection limit is elevated due to high moisture in the sample.

⁴ Endpoint criteria for North Sweeper Creek have not been established so endpoints for South Sweeper Creek were used.

Bold indicates reported concentration is greater than the endpoint criteria.

23.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 23-5. The 2014 data indicated that biodegradation of petroleum hydrocarbons is occurring by iron (II) reduction; sulfate reduction; and methanogenesis as shown by elevated ferrous iron concentrations, depleted sulfates, and elevated methane concentrations in comparison to background conditions. A large, riverine wetland is located along the shoreline of North Sweeper Creek and fills the flat bed of the stream valley below the site. Wetland methanogenesis, which is caused by the microbiological degradation of naturally occurring organic matter in saturated surface soils, occurs here, resulting in a geochemical signature that may be indistinguishable from petroleum hydrocarbon degradation. Wetland methanogenesis is suspected to occur at the low-lying sample locations (wells 14-113 and 14-210) and surface water/sediment locations (NL-04 and NL-D-04).

The water quality parameters presented in Table 23-1, which were collected during 2014, support evidence of continued natural attenuation as shown by the reducing environment (negative ORP) and reduced dissolved oxygen concentrations (0.0 mg/L) in the upland onsite source area well TFB-MW4B, which is outside the wetland.

It should be noted that wetland methanogenesis will not prevent petroleum degradation from occurring, but may obscure the ability to monitor its occurrence. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 23-5. 2014 Analytical and Field Measurement Data for NAPs for SWMU 61, Tank Farm B

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
14-113	MNA	146	0.19 J	1,300	45	27.5	1.5
14-210	MNA	55	0.19 J	730	80	40	5
TFB-MW4B	MNA	141	0.39	410	42	10	1.0

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

23.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation is conducted only for analytes that exceeded the endpoint criteria within the last two sampling events and had a minimum of four data points. Results of the Mann-Kendall and Sen's trend evaluations are summarized in Table 23-6. Worksheets and graphs are provided in Appendix H.

The following are the results of the statistical evaluation:

- Well 14-113:
 - The GRO concentration exhibits a decreasing trend at both the 80 and 95 percent confidence intervals. The Sen's evaluation for GRO indicates a statistically significant decreasing trend with a median slope of -295.
 - The benzene concentration exhibits a decreasing trend at both the 80 and 95 percent confidence intervals with a Sen's evaluation indicating a statistically significant decreasing trend with a median slope of -2.2.
- Well 14-210:
 - The GRO concentration exhibits no trend at the 80 or 95 percent confidence intervals. The coefficient of variation indicates the concentration is stable.
- Well TFB-MW4B:
 - The GRO and toluene concentrations exhibit no trend at both the 80 or 95 percent confidence intervals with stable concentrations.
 - The benzene concentration exhibits a decreasing trend at both the 80 and 95 percent confidence intervals. Sen's evaluation also indicates a statistically significant decreasing trend, with a median slope of -2.7.
 - The ethylbenzene concentration exhibits an increasing trend at the 80 percent confidence interval.
 - The total xylene concentration exhibits increasing trends at the 80 and 95 percent confidence intervals.

Table 23-6. Concentration Trend Evaluation for SWMU 61, Tank Farm B

Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		2-Tailed Test at 80% C.I.			
										Median Slope	Statistically Significant Trend	Lower Limit	Upper Limit
14-113	GRO	No	2,800 Z	2,200	10	-28	Decreasing	Decreasing	NA	-295	Yes	-497	-83
	Benzene	Yes	6.9	5	10	-40	Decreasing	Decreasing	NA	-2.2	Yes	-2.7	-1.5
14-210	GRO	Yes	3,700 Y	2,200	10	-4	No Trend	No Trend	Stable	NC	NC	NC	NC
TFB-MW4B	GRO	Yes	43,000 DZ	2,200	10	-8	No Trend	No Trend	Stable	NC	NC	NC	NC
	Benzene	Yes	20 D	5	10	-35	Decreasing	Decreasing	NA	-2.7	Yes	-3.5	-2
	Toluene	Yes	4,300 D	1,000	10	3	No Trend	No Trend	Stable	NC	NC	NC	NC
	Ethylbenzene	Yes	1,900 D	700	10	17	Increasing	No Trend	NA	NC	NC	NC	NC
	Total Xylenes	Yes	14,200 D	10,000	10	21	Increasing	Increasing	NA	NC	NC	NC	NC

Notes:

¹ Endpoint criteria are established from risk-based cleanup levels.

² Concentration Stability determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.

23.5 CONCLUSIONS

This section presents the conclusions based on a review of monitoring performed at the SWMU 61, Tank Farm B site in 2014. The conclusions are as follows:

- **Groundwater Flow:** The groundwater flow direction is interpreted to be to the southeast in the upland area and appears to follow the site topography. Groundwater flows directly east toward North Sweeper Creek in the lowland area.
- **MNA:** The groundwater parameters obtained during 2014 provide evidence that natural attenuation of petroleum hydrocarbons continues to occur at the site.
- **Free Product:** Product was not observed in any well at the site in 2014.
- **Well 14-113:** GRO and benzene have been detected above the endpoint criteria since 2003 but were detected below the endpoint criteria this year. The GRO concentration exhibited a statistically significant decreasing trend for the first time in 2012, and continues to show a decreasing trend in 2014. Benzene also exhibits a statistically significant decreasing trend at both the 80 and 95 percent confidence intervals. The Sen's analyses for both GRO and benzene also indicate statistically significant decreasing trends. TAH and TAqH have both exceeded endpoint criteria since sampling began in 2007. Toluene, ethylbenzene, and total xylenes have remained below endpoint criteria since 2003. This well, which represents downgradient conditions, is located within the wetland and adjacent to North Sweeper Creek.
- **Well 14-210:** GRO has been detected above the endpoint criteria since 2001 and exhibits a stable trend. BTEX has remained below endpoint criteria since 2002. This well is located at the base of the hill between the plume source area and North Sweeper Creek, and it is located within the riverine wetland.
- **Well TFB-MW4B:** GRO and BTEX have been detected above the endpoint criteria since 2001 (with the exception of total xylenes, which were below the endpoint criteria in 2001 and 2002). Based on the results of statistical analysis, the benzene concentration is decreasing, with statistical significance at the 80 and 95 percent confidence levels. Ethylbenzene and total xylenes concentrations show increasing concentration trends. GRO and toluene concentrations are stable.
- **Sample location NL-04:** Surface water and sediment samples were collected immediately downgradient of well 14-113 in North Sweeper Creek. Surface water has not exceeded the endpoint criteria since sampling began in 2007. GRO was not

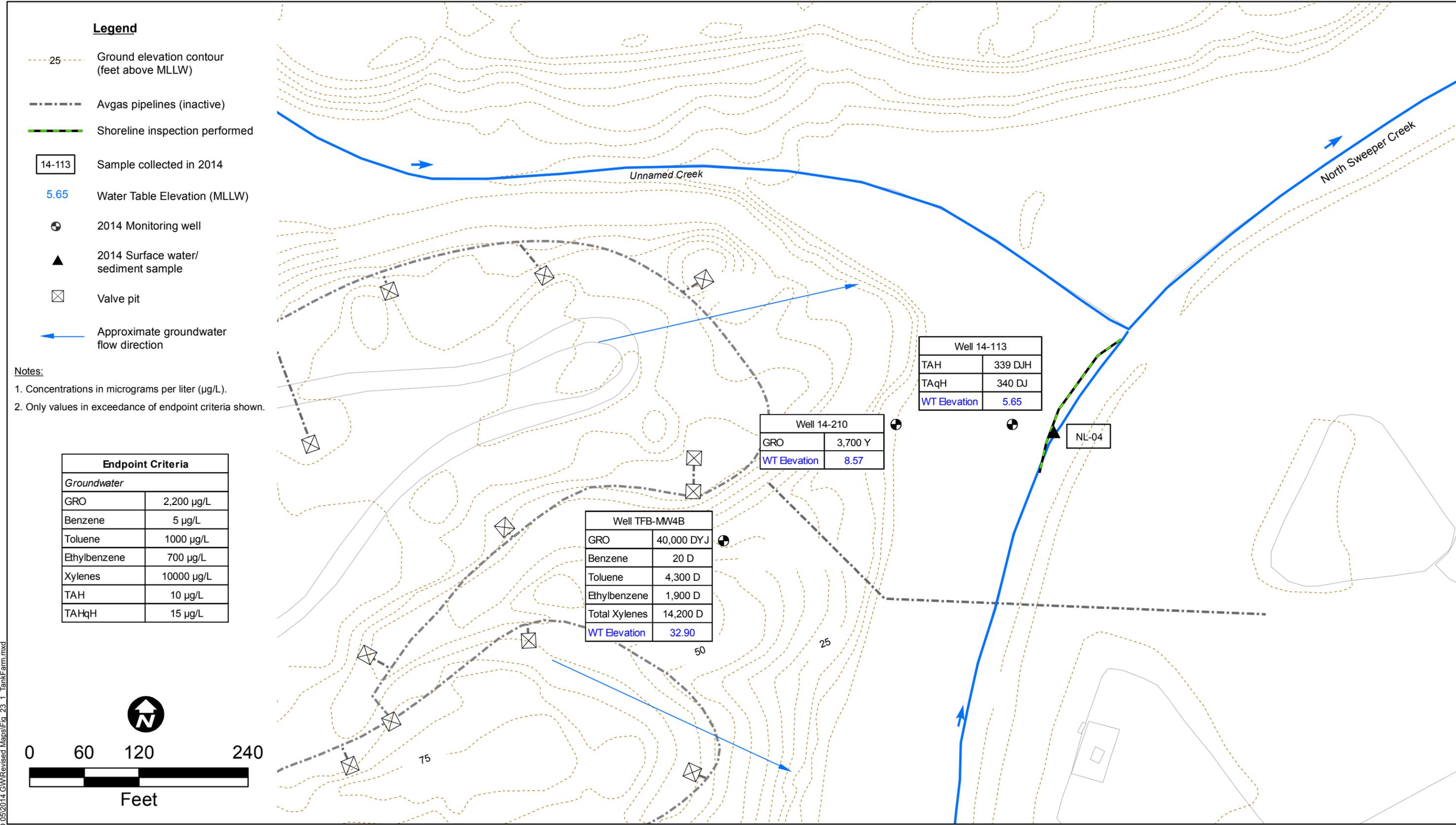
detected in sediment, but the method detection limit exceeded the endpoint criteria due to high water content in the sample.

- A shoreline inspection of North Sweeper Creek revealed no observed petroleum contamination.

23.6 RECOMMENDATIONS

GRO, BTEX, TAH, and TAqH concentrations in groundwater collected from monitored wells at this site remain above their respective endpoint criteria. Concentrations of ethylbenzene and total xylenes show increasing trends in well TFB-MW4B but are not statistically significant. Natural attenuation is progressing at the site as evidenced by elevated dissolved methane and ferrous iron in downgradient wells and onsite anaerobic groundwater conditions as well as the decreasing concentration trends of GRO and benzene in source area well TFB-MW4B. Endpoint criteria have not been exceeded in either the surface water or sediment collected from North Sweeper Creek sample NL-04 since 2011 (four consecutive sampling events). Because of this and in conjunction with the decreasing trends of contaminant concentrations in adjacent source area well TFB-MW4B, it is recommended that surface water and sediment sampling at NL-04 be discontinued but that shoreline inspections for visible evidence of contamination continue as prescribed.

It is recommended that all other monitoring at this site continue biennially as prescribed to allow time for the remedy of MNA to be effective.



**Figure 23-1
SWMU 61, Tank Farm B
Sample Locations**

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24 SWMU 62, NEW HOUSING FUEL LEAK

This section presents the results of groundwater monitoring performed at the SWMU 62, New Housing Fuel Leak site during September 2014. The remedy specified for this site in the OU A ROD is free product recovery (Navy, ADEC, and EPA 2000). Additional post free product recovery and MNA remedy are specified in the Final Decision Document for SWMU 62, New Housing Fuel Leak (Navy 2006e). To comply with requirements specified for this remedy, the Navy has conducted annual groundwater sampling and water level/product thickness monitoring at the site. Groundwater samples are collected from wells at the site to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345), to determine whether natural attenuation is occurring, and to monitor for surface water protection.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

24.1 FIELD MEASUREMENTS

Depth-to-water and product thickness measurements were collected at 26 monitoring wells at Sandy Cove on September 6, 2014 and at Eagle Bay on September 8 and 9, 2014. Eight of the wells are located in the Sandy Cove Housing Area, and eighteen wells are located in the Eagle Bay Housing Complex. Table 24-1 provides the measured depths-to-water (corrected for product thickness, if present), the calculated groundwater elevations and the product thicknesses if present. Groundwater elevations have been corrected for the presence of free product in the wells with detectable thicknesses (Appendix D-1). Figures 24-1 and 24-2 show the locations of the wells in Sandy Cove and Eagle Bay Housing, respectively, relative to the site features, the site topography and the interpreted groundwater flow directions.

The historic water level data indicate that the direction of groundwater flow in the main aquifer beneath the site is to the west-southwest beneath Sandy Cove and to the west-northwest toward East Canal beneath Eagle Bay. Groundwater elevations collected in 2014 were compared with historical data and are consistent with this interpretation.

Table 24-1. 2014 Field Measurements for SWMU 62, New Housing Fuel Leak

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to-Water ¹ (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
Sandy Cove Housing Complex											
<i>Groundwater</i>											
03-155	26.27	19.02	7.25	0	6.56	0.283	4	1.90	7.52	0.01	47
03-619	23.38	16.37	7.01	0	6.40	0.434	1	0.30	7.15	0.02	101
HMW-146-1	23.52	16.71	6.81	0	NP	NP	NP	NP	NP	NP	NP
MW-107-1	25.645	18.27	7.38	0.04	FP	FP	FP	FP	FP	FP	FP
MW-134-10	23.94	16.84	7.10	0	NP	NP	NP	NP	NP	NP	NP
MW-134-11	26.53	18.18	8.35	0	6.95	0.799	1	0.00	7.95	0.04	-55
MW-146-1	24.42	17.20	7.22	0	6.56	0.371	6	0.00	8.76	0.02	18
MW-187-1	26.86	19.16	7.70	0	6.36	1.080	25	0.00	8.39	0.00	-89
Eagle Bay Housing Complex											
<i>Groundwater</i>											
03-101	26.01	22.20	3.81	0	NP	NP	NP	NP	NP	NP	NP
03-102	17.27	13.72	3.55	0	NP	NP	NP	NP	NP	NP	NP
03-103	18.93	15.47	3.46	0	NP	NP	NP	NP	NP	NP	NP
03-109	33.69	29.65	4.04	0	NP	NP	NP	NP	NP	NP	NP
03-898	14.83	12.26	2.57	0	NP	NP	NP	NP	NP	NP	NP
AMW-704	8.21	6.14	2.07	0	5.98	0.286	0	1.44	10.17	0.00	90
CTO-124-MW15	20.96	17.37	3.59	0	NP	NP	NP	NP	NP	NP	NP
HMW-303-3	31.64	27.47	4.17	0	NP	NP	NP	NP	NP	NP	NP
HMW-303-4	30.20	25.84	4.36	0	NP	NP	NP	NP	NP	NP	NP
HMW-303-11	30.35	26.35	4.00	0	NP	NP	NP	NP	NP	NP	NP
MW-303-7	26.07	21.51	4.56	0	5.91	0.347	0	0.00	8.81	0.00	-52
MW-303-8	27.20	22.56	4.64	0	NP	NP	NP	NP	NP	NP	NP
MW-303-12	25.64	21.18	4.46	0	NP	NP	NP	NP	NP	NP	NP
RW-303-4	26.31	21.87	4.44	0	NP	NP	NP	NP	NP	NP	NP
RW-303-13	8.98	6.13	2.85	0	6.20	0.384	0	3.95	11.75	0.00	191
RW-303-14	10.53	7.48	3.05	0	NP	NP	NP	NP	NP	NP	NP

24-2

Table 24-1. 2014 Field Measurements for SWMU 62, New Housing Fuel Leak (continued)

Well Location	Physical Measurements				Water Quality Parameters						
	Casing Elevation (ft MLLW)	Depth-to-Water ¹ (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
Eagle Bay Housing Complex (continued)											
<i>Groundwater</i>											
RW-303-15	31.26	27.30	3.96	0	NP	NP	NP	NP	NP	NP	NP
RW-303-16	11.02	7.41	3.61	0.61	FP	FP	FP	FP	FP	FP	FP
<i>Surface Water</i>											
NL-09	NA	NA	NA	NA	6.31	0.705	33	7.27	9.04	0.00	94
<i>Notes:</i>											
¹ Corrected if presence of product in the well.											
NP – not planned to be measured											
FP – free product, unable to be sampled											
The reported casing elevation is the surveyed elevation residing in the NIRIS database.											
The last groundwater parameter measurement prior to sample collection is reported.											

Eight wells were sampled for petroleum contaminants between September 6 and 9, 2014. Monitoring was performed at five well locations in Sandy Cove (03-155, 03-619, MW-134-11, MW-146-1, and MW-187-1). Surface water protection monitoring was performed at three well locations in Eagle Bay (AMW-704, MW-303-7, and RW-303-13). To assess the effectiveness of the sorbent booms maintained in East Canal, one surface water sample (NL-09) was collected in East Canal on September 9, 2014 downgradient of the free product recovery trench and booms. Sediment was also collected at this location on September 9, 2014. Field measurements were recorded on the field forms and logbooks during monitoring well sampling activities (Appendix A). Table 24-1 lists the final field measurements recorded at each monitoring well prior to sample collection.

A review of the sampling data reported for the site indicates that parameters from three wells (03-155, 03-619, and MW-187-1) did not stabilize and were sampled after three well volumes were removed. The 2014 analytical results in these wells are generally consistent with past analytical results and appear to be unaffected by the lack of stabilization.

Free product was detected in two wells, which were subsequently not sampled: MW-107-1 (Sandy Cove) and RW-303-16 (Eagle Bay) at 0.04 feet and 0.61 feet, respectively. At well RW-303-16, 1.61 gallons (6.08 liters) of product was recovered during the 2014 LTM event and managed per the Final Waste Management Plan (Navy 2014e). This well was not planned to be sampled. Periodic free product recovery activities were performed in the Eagle Bay Housing area at this site during October 2013 through September 2014. A total of 12.41 gallons of free product was recovered from the site during this time frame. Additionally, sorbent booms (booms 2, 3 and 8) are being maintained monthly in East Canal at the petroleum shoreline seep located immediately downgradient of the site's product recovery trench. Periodic free product recovery activities for this site are summarized in Appendix J and the Remedial Action Summary Report, Free Product Recovery (Navy 2014c).

A visual inspection of the East Canal shoreline was conducted to identify potential petroleum migration from groundwater to East Canal. The eastern shoreline of East Canal was inspected from the SWMU 62, New Housing Fuel Leak Area product recovery trench to the culvert at the location of boom 9 downgradient from the Former Power Plant, Building T-1451 site. A large petroleum seep, approximately 130 feet in length, is located along the eastern canal shoreline immediately downgradient of the free product recovery trench. Periodic free product recovery is currently ongoing in several upgradient wells at the Eagle Bay site, and booms 2, 3, and 8 are maintained monthly to manage the seep. Oily sediments,

surface water sheen, petroleum odor, stressed vegetation, and iron staining were observed at this location. Sheen and a light petroleum odor were also observed during the collection of surface water/sediment sample NL-09 downstream of boom 3. This area was inundated during the 2014 inspection due to the elevated water levels in East Canal. Water levels in East Canal were uncharacteristically high due to irregular canal pump operation, which affected inspection observations. Frequently elevated water levels in East Canal were causing the upgradient booms to be less effective in controlling the migration of sheen. Results of the visual shoreline inspections are summarized in Section 4.1.3.

24.2 TARGET ANALYTE RESULTS

Five groundwater samples collected from Sandy Cove wells and three groundwater samples collected from Eagle Bay wells were analyzed for DRO. Tables 24-2 and 24-3 present the analytical results for groundwater samples collected from Sandy Cove and Eagle Bay Housing Areas, respectively. Figures 24-1 and 24-2 show the locations of the wells sampled and the analytical results that exceeded endpoint criteria for the Sandy Cove and Eagle Bay Housing Areas, respectively. Historical analytical results obtained for these locations are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

24.2.1 Sandy Cove Housing

DRO was detected above the endpoint criteria of 1,500 µg/L in groundwater collected from four of the five wells sampled, ranging from 2,400 µg/L (well 03-155) to 9,000 µg/L (well MW-134-11).

Table 24-2. Analytical Results for Petroleum-Related Chemicals at SWMU 62, New Housing Fuel Leak – Sandy Cove Housing

Well Location	Year	DRO (µg/L)
03-155 Plume Area	2003	750
	2004	1,660
	2005	2,070
	2006	1,500
	2007	2,400 Y
	2008	3,300 Y
	2009	1,600 Y
	2010	2,500 Y
	2011	3,100 Y
	2012	2,500 Y
	2013	4,400 DY
	2014	2,400 Y
03-619 Downgradient	2007	510 Y
	2008	590 Y
	2009	510 Y
	2010	660 Y
	2011	540 Y
	2012	430 Y
	2013	360 Y
	2014	380 Y
MW-107-1 Plume Area	2006	3,400
	2007	4,000 Y
	2008	4,100 Y
	2009	3,400 Y
	2010	4,400 Y
	2011	3,600 Y
	2012	2,900 Y
	2013	2,700 Y
2014	FP	
MW-134-11 Plume Area	2001	7,450
	2002	NP
	2003	NP
	2004	NP
	2005	3,500
	2006	6,300 J
	2007	5,600 Y
	2008	4,700 Y
	2009	5,600 Y
	2010	4,900 Y
	2011	4,800 Y
	2012	7,100 Y
	2013	4,300 Y
2014	9,000 Y	
Endpoint Criteria		1,500

Table 24-2. Analytical Results for Petroleum-Related Chemicals at SWMU 62, New Housing Fuel Leak – Sandy Cove Housing (continued)

Well Location	Year	DRO (µg/L)
MW-146-1 Plume Area	2007	12,000 Y
	2008	12,000 Y
	2009	6,800 Y
	2010	13,000 Y
	2011	11,000 Y
	2012	7,700 Y
	2013	9,000 Y
	2014	6,100 Y
MW-187-1 Plume Area	2006	3,900
	2007	3,300 Y
	2008	3,500 Y
	2009	2,400 Y
	2010	4,400 Z
	2011	2,400 Y
	2012	2,300 Y
	2013	2,800 Y
2014	4,700 Y	
Endpoint Criteria		1,500

Notes:
 NP – not planned
 FP – free product, unable to be sampled
Bold indicates reported concentration is greater than the endpoint criteria.

Table 24-3. Analytical Results for Petroleum-Related Chemicals at SWMU 62, New Housing Fuel Leak – Eagle Bay Housing

Well Location	Year	DRO (µg/L)
AMW-704 Plume Area	2006	2,500
	2007	1,600 Y
	2008	2,700 Y
	2009	1,200 Y
	2010	3,800 Y
	2011	3,700 Y
	2012	820 Y
	2013	1,500 Y
MW-303-7 Plume Area	2011	21,000 DY
	2012	14,000 Y
	2013	15,000 Y
	2014	16,000 Y
RW-303-13 Plume Area	2006	3,400
	2007	NP
	2008	1,800 Y
	2009	200 Y
	2010	2,100 Y
	2011	2,300 Y
	2012	56 Y
	2013	430 Y
RW-303-16 Plume Area	2006	10,000 J
	2007	2,500 Y
	2008	6,300 Y
	2009	2,900 Y
	2010	8,600 Y
	2011	6,100 Y
	2012	2,700 Y
	2013	4,800 Y
	2014	FP
Endpoint Criteria		1,500

Notes:

NP – not planned

FP – free product, unable to be sampled

Bold indicates reported concentration is greater than ADEC cleanup levels for groundwater used as a drinking water source.

24.2.2 Eagle Bay Housing

Two of the three wells sampled (MW-303-7 and AMW-704) had DRO concentrations above the endpoint criteria (1,500 µg/L) at 16,000 µg/L and 1,700 µg/L, respectively. DRO did not exceed endpoint criteria in well RW-303-13.

Surface water collected at East Canal location NL-09, located downgradient of the recovery trench boom, was analyzed for DRO, GRO, BTEX, and PAHs (for calculation of TAH and TAqH). Because risk-based criteria have not been established for this site, surface water

results were compared to the South of Runway 18-36 endpoint criteria and State of Alaska surface water criteria. Table 24-4 presents the surface water analytical results.

Concentrations of GRO (150 µg/L), TAH (21 µg/L), and TAqH (21 µg/L) were detected in the surface water sample collected at location NL-09 above endpoint criteria of 114 µg/L, 10 µg/L, and 15 µg/L, respectively. DRO and indeno(1,2,3-cd)pyrene were not detected in the surface water sample.

The sediment sample at location NL-09, located downstream of the recovery trench boom, was analyzed for DRO, GRO, BTEX, and PAHs. Because risk-based criteria have not been established for this site, sediment results were compared to the South Sweeper Creek endpoint criteria. Table 24-5 presents the surface water analytical results.

DRO was detected in the sediment sample above the endpoint criteria (90.6 mg/kg) at a concentration of 1,900 mg/kg. GRO and BTEX were not detected in the sediment sample; however, the GRO method detection limit for this sample exceeded the 12.2 mg/kg endpoint criteria due to a high water content in the sample. Phenanthrene and 2-methylnaphthalene were detected below the endpoint criteria at concentrations of 0.0033 mg/kg and 0.0035 mg/kg, respectively.

Table 24-4. Analytical Results for Surface Water at SWMU 62, New Housing Fuel Leak

Location	Year	DRO (µg/L)	GRO (µg/L)	Indeno(1,2,3-cd)pyrene (µg/L)	TAH ¹ (µg/L)	TAqH ² (µg/L)
NL-09	2010	280 J	230 Y	0.020 U	29	29 J
	2011	1,500 Y	260 Y	0.021 U	36	37 J
	2012	110 Y	150 Y	0.020 U	21	22 J
	2013	390 Y	130 Y	0.020 UJ	19	19 JX
	2014	160 Y	150 Y	0.020 U	21	21 J
Endpoint Criteria ^{3,4}		250	114	0.28	10	15

Notes:

¹ TAH results were calculated by summing the detected concentrations of BTEX when one or more were detected and by summing the quantitation limits when none were detected.

² TAqH were calculated by summing the detections of BTEX and 16 PAHs when one or more were detected and by summing the quantitation limits when none were detected.

³ The TAH and TAqH endpoint criteria are based on Alaska water quality standards as specified in 18 AAC 70.

⁴ Endpoint criteria for East Canal have not been established so endpoints for South Sweeper Creek were used.

Bold indicates reported concentration is greater than endpoint criteria.

Table 24-5. Analytical Results for Sediment at SWMU 62, New Housing Fuel Leak

Location	Year	DRO (mg/kg)	GRO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl- Benzene (mg/kg)	Total Xylenes (mg/kg)	2-Methyl- naphthalene (mg/kg)	Phenanthrene (mg/kg)
NL-09	2010	39 Y	6.9 UJ	0.072 U	0.072 U	0.072 U	0.14 U	0.0032 U	0.0032 U
	2011	210 Y	2.6 J	0.036 U	0.036 U	0.036 U	0.06 J	0.0010 J	0.0033 U
	2012	69 Y	4.7 U	0.051 U	0.051 U	0.051 U	0.10 U	0.0035 U	0.0035 U
	2013	NC	NC	NC	NC	NC	NC	NC	NC
	2014	1,900 DY	15 U^{2,3}	0.51 U	0.51 U	0.51 U	1.0 U	0.0033 J	0.085 X
Endpoint Criteria ¹		90.6	12.2	None	None	None	None	0.0202	0.225

Notes:

NC – not collected due to elevated water level

¹ Endpoint criteria for East Canal have not been established so endpoints for South Sweeper Creek were used.

² Value is the method detection limit because the quantitation limit is greater than the risk-based endpoint criteria.

³ Method detection limit is elevated due to high moisture in the sample.

Bold indicates reported concentration is greater than endpoint criteria.

24.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 24-6. The 2014 data indicated that that biodegradation of petroleum hydrocarbons is likely occurring by iron (II) reduction; sulfate reduction; and methanogenesis as shown by elevated ferrous iron concentrations, depleted sulfates, and elevated methane concentrations in comparison to background conditions. Water quality parameters presented in Table 24-1, which were collected during 2014 support the evidence of continued natural attenuation as shown by the reducing environment (low ORP) and dissolved oxygen concentrations depleted within contaminant plumes. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

Table 24-6. 2014 Analytical and Field Measurement Data for NAPs for SWMU 62, New Housing Fuel Leak

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
<i>Sandy Cove Housing</i>							
03-155	MNA	66	2.1	210	27	20	2
03-619	MNA	141	4.8	13	52	0	1.5
MW-107-1	MNA	FP	FP	FP	FP	FP	FP
MW-134-11	MNA	293	0.14 J	8,900	100	70	0.05
MW-146-1	MNA	125	0.14 J	5,900	100	30	1
MW-187-1	MNA	190	0.47	12,000	160	105	0
<i>Eagle Bay Housing Complex</i>							
AMW-704	MNA	64	4.5	2,300	18	0.3	0.3
MW-303-7	MNA	119	1.4	2,500	500	37.5	0.05
RW-303-13	MNA	40	6.1	1.3 U	37	0.1	4.5
RW-303-16	MNA	FP	FP	FP	FP	FP	FP

Notes:

FP – free product, unable to be sampled

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

24.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation is conducted only for analytes that exceeded the endpoint criteria within the last three sampling events and had a minimum of four data points. Results of Mann-Kendall and Sen’s trend evaluations are summarized in Table 24-7. Worksheets and graphs are provided in Appendix H.

Table 24-7. Concentration Trend Evaluation for SWMU 62, New Housing Fuel Leak

Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Three Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		Median Slope	Statistically Significant Trend	2-Tailed Test at 80% C.I.	
												Lower Limit	Upper Limit
Sandy Cove Housing													
03-155	DRO	Yes	4,400 DY	1,500	10	17	Increasing	No Trend	NA	NC	NC	NC	NC
MW-134-11	DRO	Yes	9,000 Y	1,500	10	8	No Trend	No Trend	Stable	NC	NC	NC	NC
MW-146-1	DRO	Yes	9,000 Y	1,500	8	-13	Decreasing	No Trend	NA	-821	Yes	-1333	-140
MW-187-1	DRO	Yes	4,700 Y	1,500	9	-3	No Trend	No Trend	Stable	NC	NC	NC	NC
Eagle Bay Housing													
AMW-704	DRO	Yes	1,700 Y	1,500	9	-4	No Trend	No Trend	Stable	NC	NC	NC	NC
MW-303-7	DRO	Yes	16,000 Y	1,500	4	0	No Trend	No Trend	Stable	NC	NC	NC	NC

Notes:

¹ Endpoint criteria are established from risk-based cleanup levels.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.

The following are the results of the statistical evaluation:

Sandy Cove Housing Wells:

- Well 03-155: DRO exhibits an increasing trend at the 80 percent confidence interval.
- Wells MW-134-11 and MW-187-1: The DRO concentrations exhibit no trend at either the 80 or 95 percent confidence interval. The coefficients of variation indicate the concentration is stable at each well.
- Well MW-146-1: The DRO concentration exhibits a decreasing trend at the 80 percent confidence interval. The Sen's evaluation indicates that the decreasing trend is statistically significant, with a median slope of -821.

Eagle Bay Housing Wells:

- Wells AMW-704 and MW-303-7: The DRO concentrations exhibit no trend at either the 80 or 95 percent confidence intervals. The coefficients of variation indicate the concentrations are stable.

24.5 CONCLUSIONS

This section presents the conclusions based on a review of groundwater monitoring conducted at the SWMU 62, New Housing Fuel Leak site in 2014. The conclusions are as follows:

- **Groundwater Flow:** The groundwater flow direction beneath Sandy Cove Housing is interpreted to be west-southwest and to the west-northwest toward East Canal beneath Eagle Bay Housing.
- **MNA:** The groundwater parameters obtained during the 2014 LTM event provide evidence that natural attenuation of petroleum hydrocarbons continues to occur at the site.
- **Free Product:** Free product was observed in one Sandy Cove Housing well (MW-107-1) at a thickness of 0.04 feet, and observed in one Eagle Bay Housing well (RW-303-16) at a thickness of 0.61 feet. During the 2014 LTM event, 1.61 gallons (6.08 liters) of product was recovered from this well. Periodic free product recovery performed at the site from October 2013 through September 2014 recovered 12.41 gallons of product from wells 03-101, 303-102, and RW-303-15 and two recovery sumps (Appendix J).
- **Sandy Cove Housing 102, 107, and 146 Areas:** Three areas of contamination that exceeded endpoint criteria persist in the Sandy Cove Housing Area in 2014: an area of DRO contamination on the southern side of the residential area encompassing wells

03-155, MW-134-11, and MW-187-1; an area of DRO contamination on the north-central portion of the residential area west of the General Store encompassing wells MW-146-1 and MW-107-1; and an area of DRO and GRO west of Main Road, upgradient of the airport terminal, encompassing wells MRP-MW2, MRP-MW3, 03-104, and 03-778 (Figure 24-1). The area west of Main Road consisting of DRO and GRO is also part of the northern portion of the Area 303 contaminant plume (see Figure 7-2). All areas of contamination appear to have not changed in size since 2013. Conclusions for individual wells that are monitored are presented below:

- Well 03-155: DRO was detected above the endpoint criteria in 2014 for the eighth consecutive sampling event and shows an increasing trend in concentration at the 80 percent confidence interval. This well is located in the southern-most plume.
- Well 03-619: DRO has remained below the endpoint criteria for eight sampling events. This well is downgradient of the southern DRO contaminant plume.
- Well MW-107-1: DRO has been detected above the endpoint criteria since 2006 and exhibits a decreasing concentration at the 80 percent confidence interval. This well is located within the central DRO contaminant plume.
- Well MW-134-11: DRO has been detected above the endpoint criteria in this well from 2005 through 2014. This well exhibits no trend at either the 80 or 95 percent confidence interval. This well is located within the southern-most contaminant plume.
- Well MW-146-1: DRO has been detected above the endpoint criteria since 2007 and exhibits a decreasing concentration at the 80 percent confidence interval. This well is located within the central DRO contaminant plume.
- Well MW-187-1: DRO has been detected above the endpoint criteria since 2006, however it now exhibits no trend at either the 80 or 95 percent confidence interval. This well is located in the southern DRO contaminant plume.
- **Eagle Bay Housing:** Three main areas of groundwater contamination were observed at the Eagle Bay Housing Area in 2014. These areas were determined from 2014 LTM results and free product recovery activities performed between October 2013 and September 2014 (Appendix J). One area is associated with the East Canal shoreline petroleum seep that is located downgradient of the product recovery trench and encompasses the recovery trench and surface water/sediment sample location NL-09. Wells sampled immediately east of RW-303-13 did not exceed endpoint

criteria in 2014 (Figure 24-2). Contaminant concentrations in this area historically have exhibited a “seesawing” effect which is illustrated specifically in the Mann-Kendall trend graph for RW-303-13 (Appendix H). Similarly, the areal exceedance of endpoint criteria has expanded and contracted over time. This change may be related to year-to-year groundwater fluctuations.

The second area is located on the southeastern portion of the site crossing Main Road and encompasses wells MW-303-07, MW-303-12, MW-303-8, RW 303-4, HMW-303-03, and RW-303-16. This plume consists of floating free product and dissolved-phase DROs. This plume appears to not have expanded in 2013 to include well MW-303-8 due to the observance of free product.

The third area is located on the northern portion of the site encompassing the monitoring locations (counter-clockwise on Figure 24-2): MW-303-39 (Area 303 well), 03-502, 03-107 (Area 303 well), HMW-303-11, RW-303-15, 03-102, CTO-124-MW15, and 03-101. This groundwater contamination plume contains both dissolved-phase gasoline-range components and floating free product. Based on 2013 monitoring data from Area 303, it is the southern portion of the newly defined Area 303 plume.

- Conclusions for individual wells that are monitored are presented below:
 - Well AMW-704: The DRO concentration exceeded the endpoint criteria in 2014. Statistical analysis shows the concentration is stable. This well is downgradient and adjacent to East Canal.
 - Well MW-303-7: DRO was detected above the endpoint criteria during all four sampling events. The DRO concentrations exhibit no trend at either the 80 or 95 percent confidence intervals. This well is east of the Main Road in the southeastern plume area.
 - Well RW-303-13: DRO was detected below the endpoint criteria again in 2014, which is the third consecutive event. The Mann-Kendall test indicates a decreasing trend at the 80 percent confidence level, Sen’s evaluation indicates a statically significant decreasing trend. This well is located upgradient and adjacent to the free product recovery trench.
 - Well RW-303-16: The DRO concentration has exceeded the endpoint criteria since 2006. This well had free product and was not sampled in 2014. This well is located on the south side of the site within the southeastern plume.

- A shoreline inspection of East Canal again observed the presence of a petroleum seep with extensive petroleum contamination located downgradient of the free product recovery trench where booms are maintained to control sheen. Oily and iron-stained sediments, stressed vegetation, surface water sheen, and petroleum odor were observed along approximately 130 feet of the shoreline during the inspection. Booms 2, 3, and 8 are maintained monthly in East Canal to manage the seep.
- Surface water and sediment sample (NL-09): This sample was collected downgradient of the maintained boom at this seep to determine the effectiveness of the boom in preventing migration of sheen downstream. The surface water sample exceeded criteria for GRO, TAH, and TAqH. The sediment sample exceeded criteria for DRO in 2014.

24.6 RECOMMENDATIONS

Sandy Cove Housing Area

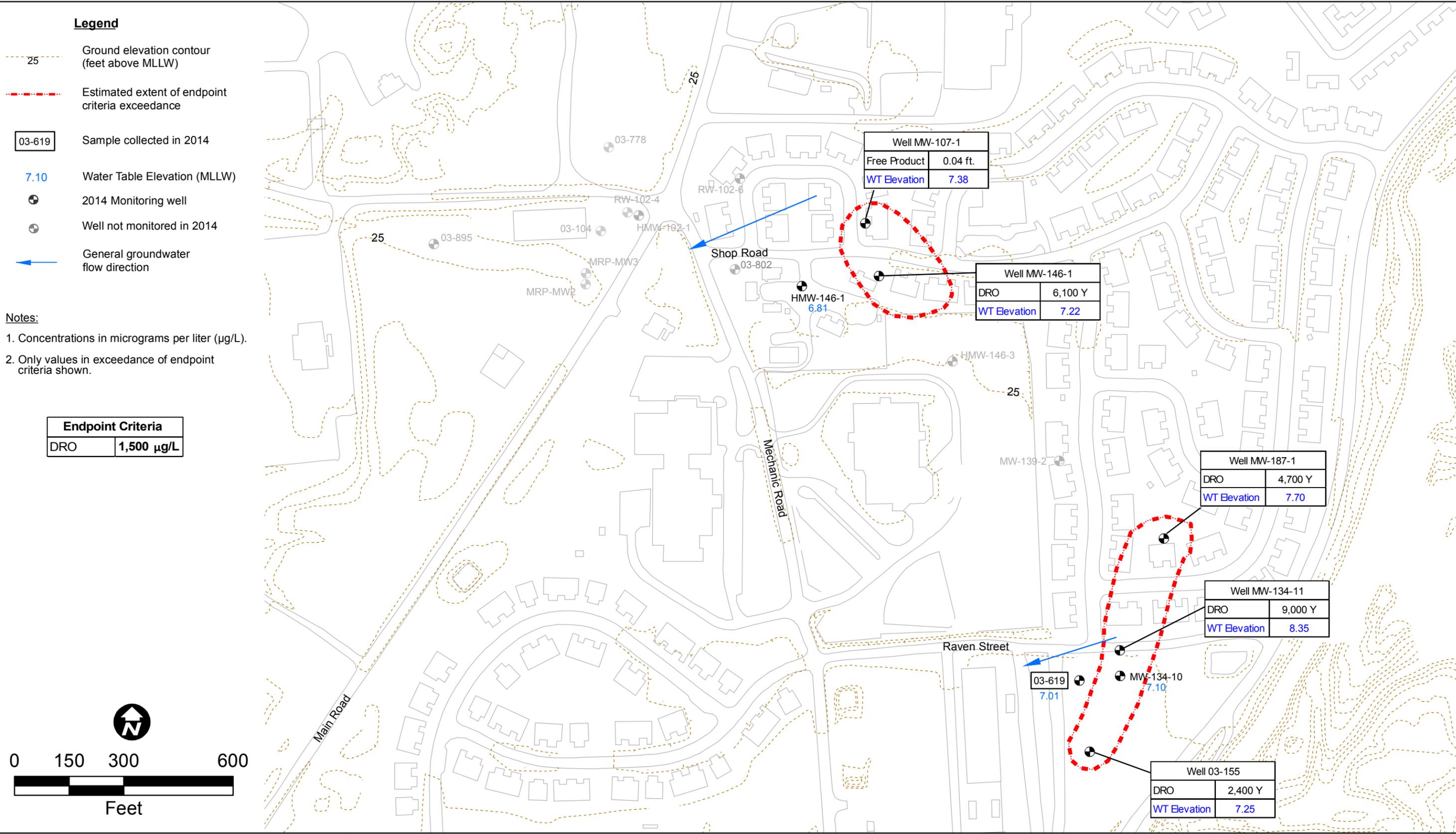
The central and southern areas of groundwater contamination in Sandy Cove Housing appeared to be stable in size. This is confirmed by stable or decreasing contaminant concentrations trends in all wells statistically analyzed in these two areas. Based on these observations, it is recommended that monitoring at this site should continue as prescribed for wells 03-155, 03-619, MW-107-1, MW-134-10, MW-134-11, MW-146-1, and MW-187-1 to allow time for the remedy of MNA to affect changes to groundwater contamination.

Eagle Bay Housing Area

Areas of groundwater contamination at Eagle Bay Housing Area appear to be stable or decreasing in concentrations. Wells adjacent to the shoreline seep, AM-704 and RW-303-13, remained at or below endpoint criteria for the second consecutive sampling event and showed both stable and decreasing concentration trends, respectively. The petroleum shoreline seep continues to flow and surface water and sediment (NL-09) collected downgradient exceeded endpoint criteria for DRO, GRO, TAH, and TAqH. Indeno(1,2,3-cd)pyrene has not exceeded endpoint criteria in surface water, but should be continued to support the TAH/TAqH calculation. GRO, BTEX, 2-methylnaphthalene, and phenanthrene have not exceeded endpoint criteria in sediment at NL-09 for the last five sampling events. Therefore, it is recommended that sampling for these contaminants be discontinued. Sediment at NL-09 will continue to be sampled for DRO.

Because natural attenuation is progressing at this site and because past monitoring has shown incremental changes to the site, it is recommended that all other monitoring at this site continue as prescribed.

Because of the continued exceedance of groundwater criteria and because of the large petroleum shoreline seep in East Canal downgradient from the site, the Navy may conduct an additional remedial alternative analysis at SWMU 62, New Housing Fuel Leak site in the future.



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**Figure 24-1
SWMU 62, New Housing Fuel Leak
(Sandy Cove Housing)
Sample Locations**

Task Order 05
Adak Island, AK
2014 Annual Groundwater and
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25 TANKER SHED, UST 42494

This section presents the results of groundwater monitoring performed at the Tanker Shed, UST 42494 site during 2014. The remedy specified for this site in the OU A ROD is free product recovery (Navy, ADEC, and EPA 2000). The Navy and ADEC have selected MNA with ICs as the post-free product recovery remedy for this site (Navy and ADEC 2005). To comply with requirements specified for this remedy, the Navy conducts annual groundwater sampling and water level/product thickness monitoring at the site. Groundwater samples are collected from the wells to evaluate groundwater quality relative to Alaska groundwater cleanup levels (18 AAC 75.345), to verify that natural attenuation is occurring, and to monitor for surface water protection.

The following sections present field and laboratory data resulting from monitoring activities conducted at this site including: field measurements with an interpretation of groundwater flow direction based on groundwater levels, a comparison of target analyte concentration data to endpoint criteria specified in Section 3, a discussion of natural attenuation conditions, evaluations of trends, conclusions based on the analyses, and recommendations for future monitoring activities at the site. Site photographs are presented in Appendix I.

25.1 FIELD MEASUREMENTS

Depth-to-water and product thickness measurements were collected at nine monitoring wells on August 30, 2014. Table 25-1 provides the measured depths-to-water (corrected for product thickness, if present), the calculated groundwater elevations and, if present, the product thicknesses. Figure 25-1 shows the locations of the wells relative to the potential source areas, site topography, and interpreted groundwater flow direction, which is to the west-southwest, toward East Canal. Groundwater elevation data collected in 2014 were compared to historical data and are consistent with this interpretation. Free product was observed at one well (04-312) at a thickness of 0.01 feet.

Four groundwater samples were collected on August 30, 2014. One of these wells (04-601) is a surface water protection monitoring well. Field measurements were recorded on the field forms and logbooks during monitoring well sampling activities (Appendix A). Table 25-1 lists the final field measurements recorded at each monitoring well prior to sample collection. A review of the sampling data reported for this site indicates that prior to sample collection the groundwater parameters at all wells stabilized to within specified criteria.

Table 25-1. 2014 Field Measurements for Tanker Shed, UST 42494

Physical Measurements					Water Quality Parameters						
Well Location	Casing Elevation (ft MLLW)	Depth-to-Water ¹ (ft BTOC)	Groundwater Surface Elevation (ft MLLW)	Measured Product Thickness (ft)	pH (SU)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Salinity (%)	ORP (mV)
04-175	11.34	6.44	4.90	0	6.86	0.305	1	0.00	9.68	0.01	-15
04-290	11.19	6.91	4.28	0	6.47	0.339	0	0.00	9.54	0.02	-9
04-301	11.35	6.55	4.80	0	NP	NP	NP	NP	NP	NP	NP
04-302	11.13	6.32	4.81	0	NP	NP	NP	NP	NP	NP	NP
04-306	11.17	6.79	4.38	0	5.91	0.792	0	0.00	10.47	0.00	-17
04-312	11.21	6.42	4.79	0.01	NP	NP	NP	NP	NP	NP	NP
04-313	11.35	6.46	4.89	0	NP	NP	NP	NP	NP	NP	NP
04-601	13.72	10.12	3.60	0	6.07	0.420	12	7.80	8.71	0.00	221
TS-03	9.61	6.42	3.19	0	NP	NP	NP	NP	NP	NP	NP

Notes:

¹Corrected if presence of product in the well.

NP – not planned

The reported casing elevation is the surveyed elevation residing in the NIRIS database.

The last groundwater parameter measurement prior to sample collection is reported.

25-2

25.2 TARGET ANALYTE RESULTS

The groundwater samples collected from wells 04-175, 04-290, 04-306, and 04-601 were analyzed for DRO. Table 25-2 presents the analytical results. Figure 25-1 presents the locations of the wells sampled and the analytical results that exceeded endpoint criteria. Historical analytical results obtained for these locations are summarized in Appendix C-1. Laboratory reports presenting the 2014 results are provided in Appendix F.

Groundwater collected from wells 04-175 (2,900 µg/L), 04-290 (3,800 µg/L), and 04-306 (4,600 µg/L) contained DRO exceeding the endpoint criteria of 1,500 µg/L. DRO in downgradient well 04-601 was below the endpoint criteria.

25.3 MONITORED NATURAL ATTENUATION

NAPs were collected at this site in 2014 to determine whether natural attenuation was occurring in groundwater and to support the 5-year review process. Both laboratory analytical and field test kit results are presented in Table 25-3. The 2014 data indicated that biodegradation of petroleum hydrocarbons is occurring by iron (II) reduction; sulfate reduction; and methanogenesis as shown by elevated ferrous iron concentrations, depleted sulfates, and elevated methane concentrations in comparison to background conditions. Water quality parameters presented in Table 25-1, which were collected during 2014 support evidence of continued natural attenuation as shown by the reducing environment (negative ORP) and depleted dissolved oxygen concentrations (0.0 mg/L) within the plume at the site. A more in-depth discussion of natural attenuation is presented in Section 4.1.2.

25.4 TREND EVALUATION

Statistical trend evaluations were conducted for target analyte concentrations in groundwater in accordance with the CMP, Revision 6 (Navy 2014a). Trend evaluation is conducted only for analytes that exceeded the endpoint criteria within the last two sampling events and had a minimum of four data points. Results of the trend evaluations are summarized in Table 25-4. Worksheets and graphs are provided in Appendix H.

The following are the results of the statistical evaluation:

- Well 04-175: The DRO concentration exhibits a decreasing trend at the 80 percent confidence interval. However, the Sen's evaluation does not indicate a statistically significant downward trend.
- Wells 04-290 and 04-306: The DRO concentrations exhibit no trend at the 80 or 95 percent confidence intervals. The coefficients of variation indicate that the concentrations are stable.

Table 25-2. Analytical Results for Petroleum-Related Chemicals for Tanker Shed, UST 42494

Well Location	Year	DRO (µg/L)
04-175 Plume Area	2001	16,900
	2002	NP
	2003	NP
	2004	NP
	2005	7,080 J
	2006	11,000
	2007	6,600 Y
	2008	4,700 Y
	2009	7,700 Y
	2010	6,100 Y
	2011	5,600 Y
	2012	5,500 Y
	2013	11,000 Y
	2014	2,900 Y
04-290 Plume Area	2001	9,220
	2002	NP
	2003	NP
	2004	NP
	2005	2,890 J
	2006	9,000
	2007	1,000 Y
	2008	2,600 Y
	2009	4,300 Y
	2010	4,300 Y
	2011	5,900 Y
	2012	5,600 Y
	2013	5,000 Y
	2014	3,800 Y
04-306 Plume Area	2005	2,500 J
	2006	FP
	2007	FP
	2008	5,200 Y
	2009	4,400 Y
	2010	4,300 Y
	2011	7,200 Y
	2012	4,700 Y
	2013	4,000 Y
	2014	4,600 Y
04-601 Surface Water Protection Well	2001	2,620 J
	2002	2,600
	2003	1,000
	2004	2,520
	2005	2,850
	2006	1,100
	2007	180 Y
	2008	120 Y
	2009	100 YJ
	2010	97 U
	2011	98 Y
	2012	280 Y
	2013	55 H
	2014	60 Y
Endpoint Criteria		1,500

Note:

NP – not planned

FP – free product, unable to sample

Bold indicates reported concentration is greater than the endpoint criteria.

Table 25-3. 2014 Analytical and Field Measurement Data for NAPs for Tanker Shed, UST 42494

Well Location	Monitoring Purpose	Laboratory-Reported Results			Field Test Kit Results		
		Alkalinity SM 2320B (mg/L)	Sulfate 300.0 (mg/L)	Dissolved Methane RSK175 (µg/L)	Carbon Dioxide ¹ (mg/L)	Ferrous Iron ² (mg/L)	Dissolved Oxygen ³ (mg/L)
04-175	MNA	120	0.53	1,600	32	40	0.2
04-290	MNA	106	0.97	1,000	60	40	0.05
04-306	MNA	97	0.20 U	2,300	70	27.5	1.0
04-601	MNA	50	5.0	1.0 J	17	0.0	7.0

Notes:

¹ Field test kit, CHEMetrics K-1910 and K-1920

² Field test kit, CHEMetrics K-6210

³ Field test kit, CHEMetrics K-7501 and K-7512

25.5 CONCLUSIONS

This section presents conclusions based on a review of groundwater monitoring conducted at the Tanker Shed, UST 42494 site in 2014. The conclusions are as follows:

- Groundwater Flow: Based on the water levels measured in 2014, the interpreted groundwater flow direction at the site is to the west, toward East Canal.
- MNA: The groundwater parameters obtained during 2014 showed evidence that natural attenuation of petroleum hydrocarbons continues to occur at the site.
- Free Product: Free product was detected at one well (04-312) at a thickness of 0.01 feet.
- Well 04-175: DRO has been detected at a concentration above the endpoint criteria every year sampled since sampling started in 2001. The DRO concentration exhibits a decreasing trend at the 80 percent confidence interval. However, the Sen's evaluation does not indicate a statistically significant downward trend. Well 04-175 represents the upgradient, eastern edge of the contaminant plume.
- Well 04-290: DRO has been detected above the endpoint criteria every year sampled since 2001, except for 2007. The DRO concentrations exhibit no trend at the 80 or 95 percent confidence intervals. The coefficients of variation indicate that the concentrations are stable.
- Well 04-306: DRO remained above the endpoint criteria in 2013. DRO exhibits statistically stable concentrations at the 80 and 95 percent confidence intervals. This well is located within the center of the contaminant plume.
- Well 04-601: DRO remained below the endpoint criteria since 2006 (eight consecutive sampling events). This well is a surface water protection well located downgradient of the plume.

25.6 RECOMMENDATIONS

Because natural attenuation is progressing at this site, it is recommended that all monitoring at this site be continued as prescribed.

Table 25-4. Concentration Trend Evaluation for Tanker Shed, UST 42494

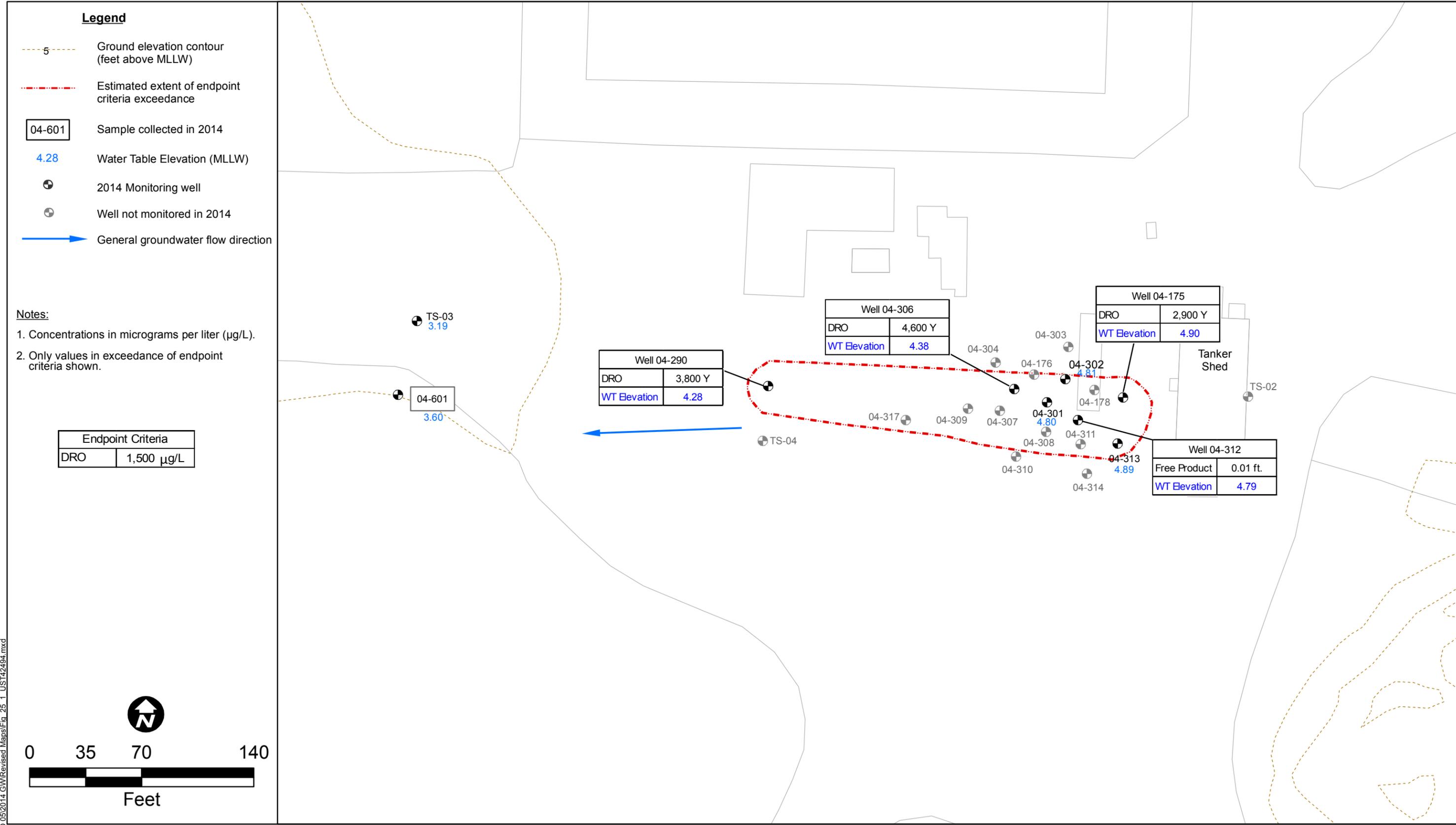
Well	Target Analyte	Exceeds Endpoint Criteria	Highest Concentration Last Two Sampling Periods (µg/L)	Endpoint Criteria ¹ (µg/L)	Sampling Periods (n)	Mann-Kendall Statistic (S)	Mann-Kendall Trend		Concentration Stability ²	Sen's Slope			
							Trend at 80% C.I.	Trend at 95% C.I.		Median Slope	2-Tailed Test at 80% C.I.		
											Statistically Significant Trend	Lower Limit	Upper Limit
04-175	DRO	Yes	11,000 Y	1,500	10	-16	Decreasing	No Trend	NA	-250	No	-800	0
04-290	DRO	Yes	5,000 Y	1,500	10	8	No Trend	No Trend	Stable	NC	NC	NC	NC
04-306	DRO	Yes	4,600 Y	1,500	8	2	No Trend	No Trend	Stable	NC	NC	NC	NC

Notes:

¹ Endpoint criteria are established from risk-based cleanup levels.

² Concentration stability is determined from the coefficient of variation when no trend exists at the 80% confidence interval (C.I.).

Sen's Slope is calculated for target analytes with decreasing concentration trends only.



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**Figure 25-1
Tanker Shed, UST 42494
Sample Locations**

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APPENDICES
(PROVIDED ON DISC)

- APPENDIX A FIELD FORMS AND LOGBOOKS
- APPENDIX B SAMPLING DEVIATION FORMS
- APPENDIX C-1 GROUNDWATER SITES DATA SUMMARY TABLE – 1999 THROUGH 2014
- APPENDIX C-2 LANDFILL SITES DATA SUMMARY TABLE – 1996 THROUGH 2014
- APPENDIX D-1 SUMMARY OF 2014 DEPTH-TO-WATER MEASUREMENTS
- APPENDIX D-2 HISTORICAL DEPTH-TO-WATER MEASUREMENTS
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APPENDIX A
FIELD FORMS AND LOGBOOKS



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BOB : 360-298-4872 CELL
SHERRI: 360-337-0780 CELL
ANNETTE: 206-946-7675 CELL
AARON: 907-592-2204 ADAK HOUSE
STEVE S: 253-279-0212 CELL
STEVE F: 206-214-8990

HOUSING

	<u>PHONE</u>
ANDY/BOB III A	907-592-2328
SHERRI/BARB III B	
Will/KEREMIAH III C	

Auto Jan 11-6-14

BOOK # HEALTH AND SAFETY

TASK ORDER: 05

CONTRACT: N44255-14-D-9011

PROJECT: ADAK LTM 2014

NAVY INSTALLATION: FORMER NAVAL
COMPLEX, ADAK, AK

SITE NAME: OUA

START DATE: 8/22/14

END DATE: 09/19/14

BOOK ASSIGNMENT H'S

BARB SCHLEICER

JOAN HIGHSTONE

COMPANY: SEALASKA ENVIRONMENTAL
SERVICES LLC

ADDRESS: 18743 FRONT STREET
STE 201
POULSBRO, WA 98370

PHONE: 360-930-3300

REVIEWED BY: *Auto Jan*

DATE REVIEWED: 11-6-14

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ONF

TO 05 ADAK LTM 2014 8-22-14
 0900 - SAFETY ORIENTATION MEETING HELD
 ATTENDEES: S. WUNDERLICH, J. HIGHTSTONE,
 ANDY LEWIS, B. BOYD, J. SAUTINI, W. KAGE,
 A. VERNICK, B. SCHLEIGER

ITEMS DISCUSSED FOLLOW:

EARTHQUAKES, TSUNAMI, WARNING
 ALARMS MUSTER LOCATIONS READINESS
 PROCEDURES AND ROUTES. VEHICLE
 PARKING INTO WIND AND OPENING ONE
 DOOR AT A TIME. SLIP TRIP AND
 FALL HAZARDS ON THE ISLAND.
 ALL SIGNED THE APP AND
 WATCHED THE ADAK ORDNANCE.
 AWARENESS VIDEO. COMMUNICATIONS
 AND BUDAY SYSTEM DISCUSSED
 MEDICAL FORMS PASSED OUT
 AND TURNED IN. PROPER
 VENTING OF HAZARDOUS WASTE
 BUNKER AND TAKING INITIAL
 PID READINGS DISCUSSED. GOOD
 HOUSEKEEPING AND GARBAGE
 CONTROLS TO REDUCE RAT INFESTATIONS
 USE OF WAKE TAKERS IN TEAM
 VEHICLES AND AT HOME BASE AS
 WELL AS SATURATE PHONE AND

John A. Hight 8/30/14

TO 05 ADAK LTM 2014 8-22-14
 UNIT PHONE. SHORE INSPECTIONS
 AND PROPER PPE INCLUDING LIFE VEST
 AND ROGUE WAVE WATCH. GOOD
 FOOTING AT SHORELINE. HIGH WIND
 AWARENESS OF FLYING DEBRIS AND
 750 MPH SUSTAINED WIND STOP
 WORK. DRIVING SAFELY AND WATCH
 FOR DEBRIS ON THE ROADS. HIKING
 CAUTION OF ROMMEL STAKES AND
 TRENCHES AND HOLES WHILE OUT
 ON TRAILS AND SITES.

1300 - DROVE OUT TO PERFORM SITE
 ROUTES AND EMERGENCY EVALUATION
 ROUTES AND VISIT LOCATION OF
 THE MEDICAL CLINIC. WE STOPPED
 1/4 MILE SHORT OF THE MUSTER ASSEMBLY
 LOCATION AT BERING HILL CHAPEL
 THE BRAKE IN TEAM 2 VAN BEGAN
 TO SMELL AND A. LEWIS HAD
 VEHICLES GO BACK TO HOME BASE
 TO EVALUATE REPAIR OPTIONS
 1900 - END OF DAY

John A. Hight 8/22/14
 8/22/14

TO OS ADAK LTM 2014 8/23/14
 0745 WEATHER FORECAST FOR TODAY
 HIGH OF 54°F, WIND N 8 MPH WITH
 GUST 15-25 MPH NNW IN THE AFTERNOON
 60% CHANCE OF RAIN DROPPING TO
 40% LATE AFTERNOON.

0900 - MORNING MEETING

1128 - ONSITE AT BERING HILL CHAPEL
 NOTED THE FRONT DOOR TO CHAPEL HAS
 HAD THE GLASS BROKEN THROUGH.
 BROKEN GLASS HAZARD ON SITE.

1148 - ONSITE AT WASTE BUNKER
 WENT OVER HAZARDS AT THE BUNKER
 LET AREA BREATHE AND DITCH POINTS
 OF THE DOOR. AND LOCKING THE
 DOOR OPEN PRIOR TO ENTRY.

THOSE PRESENT AT MORNING
 SAFETY BRIEF: JOHN HIGHSTONE,
 B. SCHLEIBER, S. WUNDERLICH, B. BOYD,
 A. LEWIS, J. SANTINI, W. KAAGE, A. VERNICK

1700 - END OF DAY

~~John Highstone
 8/23/14~~

TO OS ADAK LTM 2014 8/25/14
 0700 - MORNING MEETING HELD
 WEATHER: HIGH 55°F, WIND 8-11 MPH
 WITH GUST UP TO 18 MPH S TO SW
 LOW CLOUD COVER VIS. 1 MILE
 5% CHANCE OF RAIN.

ATTENDEES: B. SCHLEIBER, J. HIGHSTONE,
 A. LEWIS, S. WUNDERLICH, R. BOYD,
 W. KAAGE, J. SANTINI, A. VERNICK.

ITEMS COVERED: SLIPS, TRIPS, FALLS
 WIND HAZARD, CALIBRATION
 EQUIPMENT, SAMPLES AND HANDLING,
 PROPER MODIFIED LEVEL D PPE

1000 - J. HIGHSTONE AND J. SANTINI FIXED
 THE FRONT BRAKES ON TEAM 2
 VAN.

1900 - END OF DAY

~~John Highstone
 8/25/14~~

TO OS ADAK UTM 2014 8/26/14
0700-MORNING MEETING HEALTH
AND SAFETY HELD.

WEATHER 57°F WIND 11-18WSW
WITH GUST 22 MPH. ATTENDEES:

A. VERNICK, A. LEWIS, S. WUNDERLICH,
W. KAAGE, J. SANTINI, R. BOYD,
B. SCHLEIGER, J. HIGSTONE.

SAFETY COVERED:

- SLIPS TRIPS FALLS
- PARK INTO THE WIND
- DOORS CLOSED
- DEBRIS AT WELLS AND ON
ROADS

PPE: SAFETY GLASSES, STB, VESTS
NITRILE GLOVES.

1900 - END OF DAY

John A. Vernick
8-26-14 8/26/14

TO OS ADAK UTM 2014 8/27/14
0715-MORNING MEETING HELD
A. LEWIS, S. WUNDERLICH, J. HIGSTONE,
R. BOYD, J. SANTINI, W. KAAGE,
A. VERNICK ATTENDED.

SAFETY BRIEF HELD.

- COMMUNICATIONS
- SLIPS TRIPS FALLS
- HYDRATION

• TEST KITS AND HAZARDOUS
MATERIAL / WASTE HANDLING

WEATHER 56° RAIN, WIND
FROM SSW 8 MPH.

DISCUSSION ABOUT THE AHA FOR
SHORELINE INSPECTION ON THE
BREAKWATER AND LARGE ROCK
WHEN WET AND SLIPPERY.

A. VERNICK STATED IT IS BEING
VERY HAZARDOUS. ~~POSSIBLY~~ (18)
MAYBE FUTURE CHANGE THE
INSPECTION TO BE FROM ABOVE
AND ONLY IF SEEN SEEN
THEN GO BELOW. AREA
IS STATED AS VERY HAZARDOUS
AND MAKE SURE COMMUNICATIONS
IS WORKING.

John A. Vernick 8/26/14

TO OS ADAK LTM 2014 8/27/14
 A. VERNICK STATED THE DRIVING
 SPEED HAZARD. 15 MPH IN
 TOWN. CHILDREN COME HOME
 FOR LUNCH AND CAUTION
 SINCE SCHOOL WILL BE IN
 SESSION NEXT WEEK. MUST
 FOLLOW THE POSTED SPEED
 LIMITS, BE VIGILANT MUST
 TAKE CAUTIONS.

1900 - END OF DAY

~~John Night~~

~~8/27/14
8/27/14~~

TO OS ADAK LTM 2014 8/28/14
 0700 - MORNING MEETING HELD.
 A. LEWIS, B. SCHLEUBER, J. HUBBARD
 S. WUNDERLICH, R. BOYD, A. VERNICK,
 W. KAABE, J. SANTINI ATTENDING
 WX 56°F WIND 14 MPH W/
 GUST OF 25 MPH SW, RAIN.
 NO TSUNAMI WARNINGS.

SAFETY MEETING HELD. COVER
 HIGH WINDS AND VANS
 PARKED INTO WIND,

- WINDS CHANGE FUMES MAY
 ENTER THE VAN. TAKE CAUTION
- SHARP OBJECTS CAUTION
 USING KNIVES OR BLADES
 AND TOOLS. ESPECIALLY WHILE
 WRAPPING AND SHIPPING

1900 - END OF DAY

~~John Night~~

~~8/28/14~~

TO OS ADAK LTM 2014 8/29/14

0700 - MORNING MEETING HELD

A. LEWIS, B. SCHUBERT, S. WUNDERLICH
J. HUBSTONE, R. BOYD, W. KAAGE,
J. SANTINI, A. VERMILION ATTENDANCE.
SAFETY BRIEF.

WEATHER 56° F, WIND 14 mph SW
WITH GUSTS UP TO 21 mph 43%
CHANCE OF RAIN.

- NO HEAVY LIFTING
- SLIPS, TRIPS, FALLS.
- PROPER ERGONOMICS
- GOOD COMMUNICATION AND TESTING EQUIPMENT
- PINCH POINTS
- PID AND VAPORS AT WELL HEADS.

1030 - WHILE AT THE WASTE BUNKER
AFTER 5 MIN BUNKER BREATHS
PID READINGS TAKEN (PPM)

BREATHING ZONE	0.0
14" OFF GROUND	2.6
AT OIL BOOMS	3.6
AT WASTE CONTAINERS	2.6

NEED TO HAVE 4 GAS METER
MEASUREMENTS TAKEN TO CHECK

John A. Light *[Signature]* 8/29/14

TO OS ADAK LTM 2014 8/29/14

THE AIR AT THE BUNKER

BOTH W. KAAGE AND BSCHUBERT
HAVE MILD HEADACHES AFTER

DUMPING WASTE FROM CONTAINER
AT 0900 J. SANTINI MENTIONED
HE GOT A HEADACHE AT THE
BUNKER ALSO.

1045 - MADE RADIO CONTACT WITH
TEAM 3 AND ASKED FOR THE
MESSAGE TO BE PASSED ALONG FOR
NO ONE TO ENTER THE BUNKER
UNTIL MORE AIR TESTING IS
PERFORMED

1200 - EMAILED STEVE FROST TO CHECK
ANY CONTROLS WE ^{SHOULD} ~~CAN~~ BE
DOING AT THE BUNKER ^{8/29/14}

PHOTOLOG WR 8-29-14

1400 - ROBERT BOYD SAID HE TOOK
THE FOUR GAS METER READING
AND THE AIR WAS FINE.

1900 END OF DAY

John A. Light *[Signature]* 8/29/14

TOOS ADAK LTM 2014 8/30/14

0700 - MORNING MEETING HELD

A. LEWIS, S. WUNDERLICK,
J. HIGHSTONE, B. SCHLEIBER,
R. BOYD, W. KAAS, J. SATINI,
A. UBERLICK ATTENDED

SSHO SAFETY BRIEF HELD

WX 54°F, OVERCAST AND
40% CHANCE OF RAIN,
WIND 12 MPH WITH GUST
UP TO 18 MPH NW.

TOPICS:

- SLIP & TRIP FALLS
- USE OF PPE AT BUNKER
- NO HEAVY LIFTING
- WASTE MANAGEMENT
- PINCH POINTS
- PROPER PROCEDURES
- COMMUNICATIONS

1700 - END OF DAY

John Highstone

8/30/14

TO OS ADAK LTM 2014 8/31/14

1000 - NO OFFICIAL MEETING HELD

PACK UP COOLERS TO SEND
OUT TODAY.

1100 - JOBS COMPLETED

1700 - END OF DAY

John Highstone

John Highstone

9/1/14

TOOS ADAK LTM 2014 9/11/14

0700 - MORNING MEETING

HELD. A. Lewis, S. Wunderlich,
B. Schlegel, J. Highstone,
R. Boyd, W. Kaage, J. Santini,
A. Franzen, A. Vernick.

SAFETY BRIEF HELD TOPICS
COVERED:

- SLIPS TRIPS FALLS
- PINCH POINTS
- KNEE PROTECTION USE OF PAD
- COMMUNICATIONS
- PPE: STB, NITRILE GLOVES, SAFETY GLASSES

WEATHER 54°F, SE WIND 4 mph
SUNNY. TSUNAMI WARNING -
NONE. EARTHQUAKE OFR CLAW
OF 4.3 MAGNITUDE.

1700 - END OF DAY

~~John Highstone~~

9/11/14

TOOS ADAK LTM 2014 9/11/14

0700 - MORNING BRIEF HELD

A. Lewis, B. Schlegel, S. Wunderlich,
A. Franzen, R. Boyd, W. Kaage,
J. Santini, A. Vernick

SAFETY BRIEF HELD COVER

- SLIPS TRIPS FALLS
- OBSTACLES IN THE GROUND AND
SOFT SURFACES
- PRODUCT RECOVERY AND
POSITIONING WHILE RECOVERING
- BUDDY SYSTEM & NO
HEAVY LIFTING
- PINCH POINTS

PPE: STB, SAFETY GLASSES,
NITRILE GLOVES, SAFETY VEST

WEATHER - PARTLY SUNNY
56°F, WIND 4 mph E.

NOTED WIND AND CAUTIONS
AND EARTHQUAKES AND
BOULDERS AROUND WORKING
AREA. REMOVED STACOS AND
FOOTING.

1900 - END OF DAY

~~John Highstone~~

9/11/14

TO OS ADAK LTM 2014 9/13/14

0700 - SAFETY MEETING HELD

MORNING BRIEF HELD.

A. VERDUK, A. FRANZEN, A. LEWIS,
S. WUNDERLICH, B. SCHLEIGER, R. BOYD
J. SANTINI

• SLIPS TRIPS FALLS

• NO HEAVY LIFTING

• PINCH POINTS

• MATERIAL HANDLING

PPE: SAFETY GLASSES, NITRILE
GLOVES, STB, SAFETY VEST

WEATHER: 55°F, WIND NE
8-10 MPH, SUN AND CLOUDS

1900 - END OF DAY

John A. Light

9/13/14

TO OS ADAK LTM 2014 9/14/14

0700 - MORNING MEETING HELD

A. LEWIS, A. FRANZEN, S. WUNDERLICH,
J. SANTINI, W. CHASE, A. VERDUK,
B. SCHLEIGER, R. BOYD

SAFETY BRIEF HELD

• EARTHQUAKE REMINDER

• HIGH WINDS REMINDER

• WIND CHILL & HYDRATION

• WASTE MATERIAL HANDLING

• SAFE DRIVING

• PROPER PPE: STB, SAFETY GLASSES
NITRILE GLOVES, SAFETY VEST

• COMMUNICATIONS CHECKED

WEATHER: 54°F WIND N TO
NNE 5MPH W/ GUSTS TO 8MPH
CLOUDY WITH 30% CHANCE OF
RAIN

Tsunami WARNING - NONE
DAILY BRIEF SIGN IN SHEET
PRESSED AROUND.

John A. Light

9/14/14

TO OS ADAK LTM 2014 9/5/14

0700-MORNING MEETING HELD

A. Lewis, A. Franzen,
A. Vernek, S. Wunderlich
W. Kaage, J. Santini,
R. Boyd, J. Highstone
B. Schlegel.

SAFETY BRIEF HELD

- o NO HEAVY LIFTING
- o WASTE/MATERIAL HANDLING
- o WIND AND CONTROLS
- o Slip, Trips, Falls
- o PINCH POINTS
- o PPE: STB, SAFETY GLASSES
SAFETY VEST, NITRILE AND
LEATHER (WHEN NEEDED) GLOVES

~~John Highstone~~
9/5/14

TO OS ADAK LTM 2014 9/6/14

0830-MORNING MEETING HELD

ATTENDED: A. Lewis, J. Highstone,
S. Wunderlich, B. Schlegel,
A. Franzen, R. Boyd, W. Kaage
J. Santini, A. Vernek

SAFETY BRIEF HELD TALKING POINTS

- o Slip, trip, falls
- o NO heavy lifting
- o High wind & Hazards
- o STAYING WARM AND HYDRATED

WEATHER - 54°F Cloudy, RAIN

WIND 20mph GUST 40 mph E

NO TSUNAMI WARNINGS, 4.3 MAG

EARTH QUAKE Little Sitka

CONDUCTED A LONG TALK ON

ACTIONS TO CONSIDER SAFE

BREATING ZONES AT THE

WASTE MANAGEMENT BUNKER.

KEEP PID BELOW 1.0 ppm PRIOR

TO ENTRY.

1900 END OF DAY

~~John Highstone~~
9/6/14

TO OS ADAK LTM 2014 9/7/14
 0800 - RECEIVED AN EMAIL FROM
 STEVE FROST - RESPONSE TO THE
 GENERATOR BEING USED INSIDE AT
 THE BUNKER FOR DRYING THE BOOM.
 WITH STEVE FROST SAYS "NO
 USE OF THE GENERATOR INSIDE THE
 BUNKER," NEED TO FOLLOW UP WITH EMAIL
 1130 - CLEANED UNIT AND POSTED
 "WET FLOOR" SIGNS.
 1430 - END OF DAY

John A. High
 9/8/14

TO OS ADAK LTM 2014 9/8/14
 0730 - MORNING MEETING HELD
 A. Lewis, A. Franzen, S. Wunderlich,
 B. Schlegel, F. ~~Boyd~~ ^{9/8/14}, J. Satini
 W. Kaase, R. Boyd, J. Highstone
 WX: 54°F, Cloudy chance of RAIN
 7% AM - 47% AFTER 1600,
 WIND 18 MPH WSW GUSTS UP TO
 23 MPH.
 SAFETY TALKING ~~FOOT~~ ²⁴ ~~points~~ ^{causing} POINTS
 • WIND GUST AND VAN DOORS
 • SLIPS, TRIPS, FALLS
 • BUDDY SYSTEM AND LIFTING
 • KEEP WARM, STAY DRY
 • VOLCANO ACTIONS TO TAKE
 IF VISIBLE ASH IN AIR - BACK
 TO UNITS.
 0830 - DETERMINED NO USE OF
 GENERATOR INSIDE BUNKER CONFIRMED
 THROUGH DISCUSSION WITH A. FRANZEN
 J. HIGHSTONE AND A. LEWIS WILL
 ENGINEER AN OUTSIDE ALTERNATIVE
 LOCATION FOR GENERATOR USE WHILE
 RUNNING FOR PURPOSE OF DRYING
 THE ~~WETS~~ ^{9/8/14} ROOMS.
 1800 - SENT EMAIL TO STEVE FROST
John A. High *JL* 9/8/14

TO OS ADAL CTM 2014 9/8/14
 CONT. EXPLAINING DETAILS OF THE
 EVENTS AND CONFIRMED THE
 GENERATOR WILL NOT BE
 USED INSIDE THE BUNKER.
 THE READINGS FROM THE γ
 GAS METER WHILE THE GENERATOR
 WAS IN USE ON SEP. 3, 2014
 WERE TAKEN AFTER THE
 UNIT WAS SHUT OFF AND
 THE BUNKER WAS ALLOWED TO
 VENTILATE. READINGS FOLLOW:
 INITIAL CO₂ 333 ^{@ 9:41 AM} AT
 ENTRY, 16 ^{@ 9:41 AM} AFTER 12 MINUTES
 AND THE HEADACHES WERE
 NOT RELATED TO THE GENERATOR
 SINCE THE GENERATOR HAD
 NOT BEEN RUN FOR THE
 WEEK AND THE CO₂ READING
 BOB TOOK WAS 0% THE
 AFTERNOON AFTER TWO REPORTED
 HEADACHES OCCURRED.

1930 - END OF DAY

John A. Night

9/8/14

TO OS ADAL CTM 2014 9/8/14
 0700 - MORNING MEETING HELD.
 A. Lewis, S. Wunderlich, R. Boyd
 A. Franzen, J. SATINI, W. Kaase
 B. Schleiger, A. VERME, SIKKHAJ, J. HANSTON
 WEATHER: 54° F, WIND 8 mph WSW
 GUSTS 17 mph IN AM AND SW 12 mph
 Cloudy. NO TSUNAMI WARNINGS
 • SHIPS, TRIPS, FALLS
 • WIND GUSTS AND JAN POSITION
 • DEBRIS AVOIDANCE
 • MATERIAL HANDLING
 • NO GENERATOR RUN INSIDE BUNKER
 1900 END OF DAY

John A. Night

9/8/14

TO OS ADAK LTM 2014 9/10/14
 0700 MORNING MEETING HELD
 A. Lewis, S. Wunderlich, R. Boyd
 B. Schlegel, J. Satim, W. Kaage
 A. Verneck, S. Skeehan, J. Highstone
 A. Frazer.

SAFETY BRIEF:

WEATHER 52°F, wind WSW
 17 mph w/ gusts up to 25 mph,
 Cloudy and chance of Rain.
 NO TSUNAMI WARNINGS.

- Slips trips falls
- NO Heavy lifting
- TEST KIT HANDLING AND WASTE
- MATERIAL HANDLING
- PINCH POINTS

MOG - END OF DAY

John Highstone
 9/10/14

TO OS ADAK LTM 2014 9/10/14
 0700 - MEETING HELD
 WEATHER: 53° SUN AND
 Clouds 18 mph wind WSW
 GUSTS UP TO 24 mph.

RAIN IN THE AFTERNOON
 ATTEND: A. Lewis, S. Wunderlich,
 J. Highstone, B. Schlegel
 R. Boyd, W. Kaage, J. Satim
 A. FRAZER, A. VERNECK
 S. Skeehan.

SAFETY BRIEF:

- NO HEAVY LIFTING
- MATERIAL HANDLING
- POSITION AT WELLS
- Spills to face and body
- PINCH POINTS
- ERGONOMICS

PPE: STB, NITRILE GLOVES,
 SAFETY VEST, SAFETY GLASSES.
 EARTHQUAKE WAKE UP KIT IN 5.3
 0700 UTC. NO TSUNAMI WARNING
 - DISCUSSION OF WELLS AT ^{AREA} 303
 WITH HIGH PIED FACE UP WIND
 LET WELL BREATHE ZONE

1900 END OF DAY

John Highstone

EC 9/10/14

TO OS ADAK UTM 2014 9/12/14

0700 - MORNING MEETING HELD
A. Lewis, S. Wunderlich, B. Schlegel
J. Highstone, R. Boyd, W. Keage
J. SATINI.

WEATHER - 51°F FEELS LIKE
35°F (WINDCHILL) CLOUDY AND
CHANCE OF SHOWERS, WIND
FROM WEST 20+ MPH WITH
GUSTS UP TO 38+ MPH AND
40+ IN THE EVENING.

SAFETY BRIEF COVERED

- o High WIND CAUTIONS
- o LOSS OF POWER PREP
- o Slips, TRIPS, FALLS
- o Product AND PURGE WATER
- o MATERIAL HANDLING AND
- o TEST KIT CAUTIONS
- o NO HEAVY LIFTING
- o STAYING WARM

1900 - END OF DAY

~~John Highstone~~

9/12/14

TO OS ADAK UTM 2014 9/13/14

1015 - MORNING MEETING HELD
AND SAFETY BRIEF GIVEN
A. Lewis, S. Wunderlich,
J. Highstone, B. Schlegel, W. Keage
J. Satini, R. Boyd, Attend

WEATHER: 54°F CLOUDY w/
RAIN SHOWERS, WINDS 25 MPH
WNW AND GUST OF 38-45 MPH
LATE IN DAY GUST MAY BE UP
TO 54 MPH WNW. MOSTLY OFFWORK.

- o LADDER SAFETY
- o NO HEAVY LIFTING
- o OUTDOOR CAUTIONS IF NECESSARY
- o PRE WHEN NECESSARY
- o POWER TOOLS AND CAUTIONS

1800 - END OF DAY

~~John Highstone~~

9/13/14

TO OS ADAK LTM 2014 9/15/14
 0700 - MORNING MEETING HELD
 A. Lewis, J. Highstone, S. Wunderlich
 B. Schlegel, R. Boyd, J. Satini,
 W. Kaage SAFETY BRIEF
 Wx: 51° - 54° Feels like 42°F
 winds wnw 13 mph w/ gust
 17 mph up to 21 mph.

Cloudy and chance of Rain

- o PID AT BACKGROUND LEVEL
- o MATERIAL HANDLING
- o Muscle strains
- o Vehicle operation and
on even surfaces
- o EXPOSURE FEELINGS

Nausea

dizzy

headaches

- o position ~~DOWN~~^{UP} ~~or~~ ^{slightly} upward
of collection

NO TSUNAMI OR EARTHQUAKE
 WARNINGS OR CURRENT REGISTERED
 OCCURRENCES.

PPE STIB, SAFETY GLASSES, SAFETY
 VEST.

AT WELLS MW-303-30 AND

John Highstone 9/15/14

TO OS ADAK LTM 2014 9/15/14
 03-107 IN AREA 303 THE BREATHING
 ZONE PID READING WAS 0.0 PPM
 THERE WERE PID READINGS IN
 THE PURGE BUCKET OF 7.2 AND
 5.0 PPM DURING PURGING.
 Will Kaage complaining OF A
 HEADACHE AT MW-303-30 AND
 THE PURGE BUCKET WAS MOVED
 TO HELP HIM COLLECT SAMPLES
 AND PID CHECK. 0.0 PPM BREATHING
 ZONE. AT 03107 THE WASTE
 BRUM WAS OPENED TO PLACE THE
 PURGE WATER AND WILL NOTE ANOTHER
 HEADACHE. DONTED VAN AND
 LEFT SITE. CAUTION WILL BE TAKEN
 WHEN PURGE WATER IS TAKEN TO
 THE WASTE COLLECTION BUNKER.

1900 - END OF DAY

~~John Highstone~~

9/15/14
 9/15/14

TO OS ADAC LTM 2014 9/16/14

0700 MORNING MEETING HELD
A. Lewis, S. Wunderlich, B. Schlegel
J. Highstone, R. Boyd, W. Kaage
J. Santin

SAFETY BRIEF:

NO TSUNAMI WARNINGS OR
EARTHQUAKE ACTIVITY.

STRENGTH VOLCANO BLOW ASH

AND STREAM 9/14/14 UPDATED

• NOTE ASH PLUME 9,800-11,000 FT
AT 0124Z 9/16/14.

• PURGE RECOVERY DOWN WIND

• PID BACKGROUND CHECKS

• POURING PURGE AT WASTE
BUNKER, PID & BREATHE!

• AHA VEHICLE OPERATIONS

• ERGONOMICS

• NO HEAVY LIFTING

1900 - END OF DAY

9/16/14

TO OS ADAC LTM 2014 9/17/14

0900 MORNING MEETING HELD
A. Lewis, S. Wunderlich, B. Schlegel,
R. Boyd, W. Kaage, J. Highstone,
J. Santin

SAFETY BRIEF:

• SLIPS, TRIPS, FALLS

• MATERIAL HANDLING

• NO HEAVY LIFTING

• DRUM HANDLING

• SPLASHES/SPILLS

• PINCH POINTS

NO TSUNAMI WARNINGS, RUSSIAN
VOLCANOS QUIET TODAY.

1900 - END OF DAY

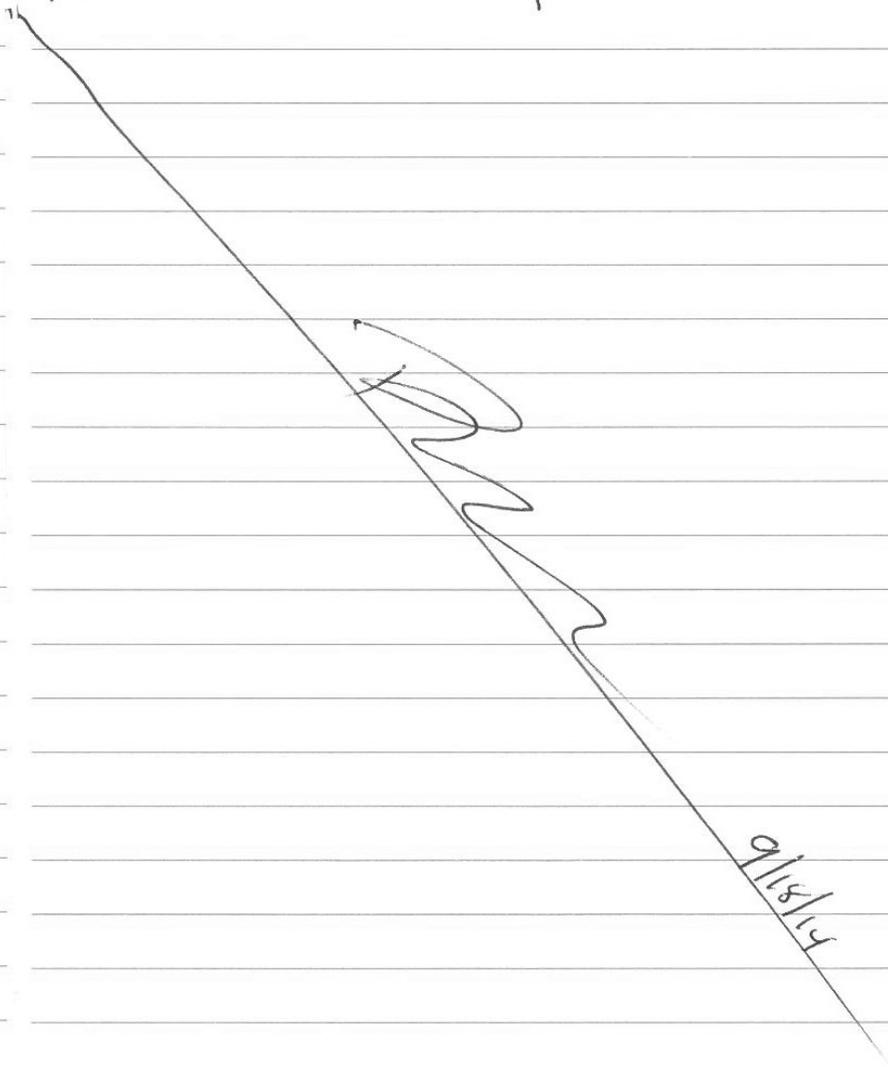
9/17/14

TO OS ADAK LTM 2014 9/18/14

1100-~~PREP~~ TO SHIP

- NO HEAVY LIFTING
- SHARP OBJECTS
- VEHICLE OPERATIONS

1900 END OF DAY



TO OS ADAK LTM 2014 9/19/14

0800-MORNING MEETING HELD

A. Lewis, Sk Wunderlich, J. Satin

B. Schlegel,

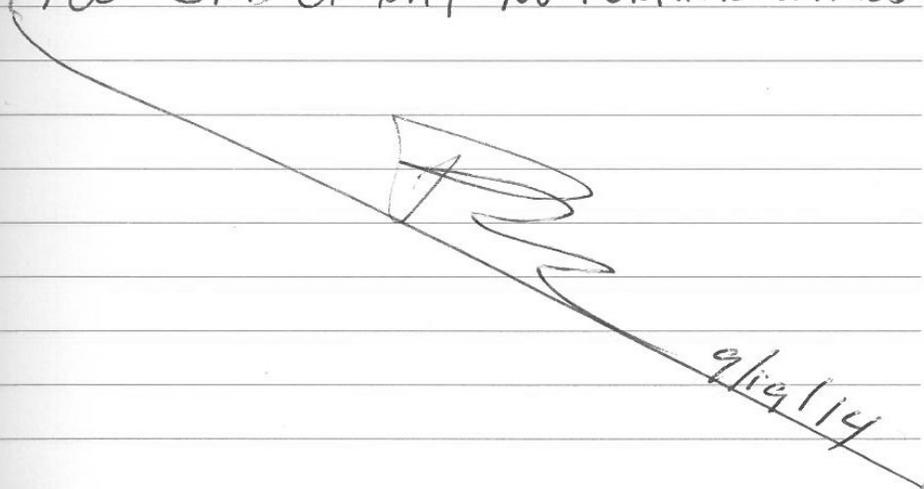
WEATHER 53°F Wind 7 mph
From West, Rain, Cloudy and
Sun in the afternoon.

SAFETY BRIEF -

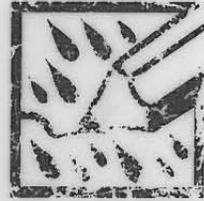
- NO HEAVY LIFTING
- SHARP OBJECTS - CAUTION
- PROPER ERGONOMICS - LEGS NOT
BACK WHILE LIFTING
- PRODUCT RECOVERY - SPILLS
TO FACE AND BODY
- LAB BOTTLES RINSE - SPLASHES

② 9/19/14 PPE - SAFETY GLASSES, STB, SAFETY
GLASSES & GLOVES AND LEATHER GLOVES

1700- END OF DAY NO FURTHER ENTRIES



TO 05 Adak LTM 2014 TEAM 1



Rite in the Rain
ALL-WEATHER
JOURNAL
No. 390N

TO 05 Adak LTM 2014
TEAM 1 OUA

Start: 08/22/2014
End: 09/18/14

(1) 3WGK3

390

No. 390N Journal Numbered - Poly

39031
978-1-932149-38-9

Book #1 - Team 1

Project: Adak LTM 2014

Contract # N44255-14-D9011

Task Order # 05

Navy Installation: Former Naval
Complex Adak, AK

Site Name: OU A

Start Date: 08/22/2014

End Date: 09/18/2014

Book Assignment: Team 1

Andy Lewis

Robert Boyd

Company: Sealaska Environmental
Services

Address: 18743 Front St NE, Ste. 201
Poulsbo, WA 98370

Phone #: 360-930-3300

Reviewed by: *Chet Ju*

Date Reviewed: 11-6-14

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34-40	SWMU 25, Roberts LF	08/30/14
42-46	SWMU 13, Metals LF	09/01/14
48-51	SWMU 61, Tank Farm B	09/04/14
52-55	SWMU 11, Palisades LF	09/05/14
56-59	SWMU 62, Sandy Cove	09/06/14
61-64	SWMU 62, Eagle Bay	09/08/14
65-72	SWMU 62, Eagle Bay + Former Power Plant, Bldg F-1451	09/09/14
73-76	Former Power Plant, Bldg T-1451	09/10/14
77-79	Area 303/GCI Compound	09/11/14
80-83	Area 303/GCI Compound	09/12/14
86-90	Area 303/GCI Compound	09/15/14
91-95	Area 303/GCI Compound	09/16/14

Chet Ju 11-6-14

TO 05 Adak LTM 2014 08/22/14

0900 - Onsite office.

Conduct tailgate health & safety briefing.

See SSITD logbook

Topics include:

- Slips, trips, & falls
- Hazardous materials
- Vehicle operations

Health & safety review (APP/SSHP),
site orientation.

1145 - Equipment check and sample
container inventory.

Check Horiba U-52 HGS No. UADHWCV6
and HGS No. WTSVPRG1 and

HGS No. TP5PE1PE.

1330 - Site tour.

1715 - End of day.

Paul Briel 08/22/14

TO 05 Adak LTM 2014 08/23/14

0900 - Onsite office.

Conduct tailgate health & safety briefing.

See SSITD logbook

Topics include:

- Slips, trips, & falls
- Proper PPE
- Wind hazards

Continue site orientation and
work plan review.

1115 - Continue site tour.

1215 - On site office, continue
orientation & equipment review.

1400 - Mob Team 1 sample van.

1700 - End of day.

Paul Briel 08/23/14

TO 05 Adak LTM 2014 08/24/14
 1800 - Receive Goldstreak shipment
 at Alaska Air (2 Horiba W-22xD
 Mfg # 9116010 & Mfg # 9116003, VSI 556-02,
 & HACH 2100Q (Asset #'s 1118340,
 1109656, 1147386, & 1130301)).
 Check equipment.
 2000 - End of day.

Rain & Rnd 08/24/14

TO 05 Adak LTM 2014 08/25/14
 0700 - On site office.
 Conduct tailgate health & safety briefing.
 See SSITD logbook.
 Topics include:

- Proper PPE
- Slips, trips, & falls
- Wind hazards

Discuss work plan.

0730 - Mob sample van.

- PID bump test: 102 ppm
- Horiba calibration check

Time	pH	SC ^{mS/cm}	Turb ^{NTU}	DO ^{mg/L}	Temp ^{°C}	Sal [‰]	ORP ^{mV}
N/A	no calibration, only collected sediment samples						

0825 - A. Lewis & R. Boyd on site

MRP-MW8 (SA 79), along w/
 Team 2. Conduct physical hazard
 survey, no hazards observed.
 Team 2 set up to sample via
 peristaltic pump.

0920 - S. Wunderlich on site.

0945 - R. Boyd on site office/111A.

1035 - A. Lewis & R. Boyd on site

NSWSD-55 (South of Runway 18-36)

Rain & Rnd 08/25/14

6
TO 05 Adak LTM 2014 08/25/14

1035 cont...

Conduct physical hazard survey,
Slick rocks on approach
to sample location. Set up to
collect sediment sample.

Conduct sediment sampling visual
inspection checklist: Weather 55°F,
wind 10mph S, rain.

1045 - Collect sediment sample

NSWSD-5S-2014

- 2-4 oz amber u/p DRO (AK 102) +
moisture content.

Sediment black in color w/
3/8 - 1/2 inch rock, medium grain,
no organic matter. Heavy petroleum
odor. Heavy petroleum sheen
on sediment surface and surface
water after collecting sample.

Sand fleas (invertebrates) in
sediment. Eagle, duck, raven,
shorebirds observed at or
nearby location.

1120 - A. Lewis & R. Boyd on site
NSWSD-4S (South of Runway 18-36).
Conduct physical hazard survey.

Robert Boyd 08/25/14

7
TO 05 Adak LTM 2014 08/25/14

1120 cont...

Slick rocks on approach to
sample location. Set up to collect
sediment sample. Conduct sediment
sampling visual inspection checklist:
Weather 55°F, wind 10 mph S,
rain.

1130 - Collect sediment sample

NSWSD-4S-2014

- 2-4 oz amber u/p DRO (AK 102) +
moisture content.

Sediment grey in color (top 1/8"
light brown in color), small
grain sand w/ 3/8" gravel
mixed in, no organic matter.
Moderate petroleum odor.

Petroleum sheen observed 1/2"
below sediment surface.

Eagles, salmon, sand flea (invertebrate),
shorebirds at or nearby location.

1140 - A. Lewis & R. Boyd on site
NSWSD-2S (South of Runway 18-36)

Conduct physical hazard survey,
Slick rocks on approach to
sample location. Set up to collect

Robert Boyd 08/25/14

TO 05 Adak LTM 2014 08/25/14

1140 cont...

Sediment sample. Conduct sediment sampling visual inspection checklist.

Weather 55°F, wind 10 mph S, rain,

1155 - Collect sediment sample

NSWSD-2S-2014

- 2-4oz amber up DRO (AK 102) + moisture content.

Sediment black in color, small grain sand w/ 1/4" rocks, no organic matter. Moderate petroleum odor. Petroleum sheen observed sediment surface after sediment was disturbed. Eagle, raven, teal salmon observed at or near sample location.

1220 - On site office/111A. Continue equipment check.

1600 - Demob sample van, QC paper work.

South of Runway 18-36 Photo Log

Date	Time	Description
08/25/2014	1108	NSWSD-5S close-up
08/25/2014	1108	NSWSD-5S facing north
08/25/2014	1133	NSWSD-4S close-up

Relut Brel 08/25/14

TO 05 Adak LTM 2014 08/25/14

1600 cont...

South of Runway 18-36 Photo Log

Date	Time	Description
08/25/2014	1133	NSWSD-4S facing north
08/25/2014	1207	NSWSD-2S close-up (1)
08/25/2014	1207	NSWSD-2S close-up (2)
08/25/2014	1207	NSWSD-2S facing north

1900 - End of day.

Relut Brel 08/25/14

TO 05 Adak LTM 2014 08/26/14

0700 - On site office.

Conduct tailgate health & safety briefing.

See SSHO log book.

Topics include:

- Wind awareness
- Slips, trips, & falls
- Proper PPE.

Discuss work plan.

0730 - Mob sample van

PID bump test: 103 ppm

Horiba Calibration Check

Time	pH	SC _m /cm	Turb NTUs	DO _{mg/L}	Temp ^o C	Sal%	ORP _{mV}
0735	4.00	4.50	0.0	10.14	14.43	0.2	224
1245	3.99	4.51	0.0	10.38	14.82	0.2	237
1710	3.99	4.50	0.0	10.48	13.95	0.2	237

0800 - Generate Trip Blanks

TB082614A VECs (Vinyl Chloride, cis-1,2-dichloroethene)

- 3 - 40 mL Amber VOA w/HCl BTEX (8260C)
- 3 - 40 mL Amber VOA w/HCl GRO (AK101)

0900 - A. Lewis & R. Boyd on site

652 (SWMU 60; Tank Farm A).

Conduct physical hazard survey,
low lying stainless steel guard
rail posing possible trip hazard.
Wellhead PID: 0.0 ppm, breathing zone: 0.0 ppm.

Robert Brel 08/26/14

08/26/14 Adak LTM 2014 08/26/14

0900 cont...

Weather: 52°F, overcast, light rain,

10 mph wind SW. Set up to

Sample via peristaltic pump.

0910 Collect [DTW = 9.12 ft btoC]

0924 - Collect water quality

parameters listed on purge form.

0944 - Parameters stabilize. Purge 2.0 gal,

pH - 5.87, SC - 0.877 mS/cm, Turb - 3 NTUs,

DO - 0.00 mg/L, Temp - 9.41°C,

Sal - 0.0%, ORP - -105 mV. Light Petroleum odor.

0950 - Collect sample 652-2014.

- 4 - 40 mL Amber VOA w/HCl BTEX (8260C)
- 4 - 40 mL Amber VOA w/HCl Methane (RSK17S)
- 2 - 1 L Amber w/HCl DRO (AK101)
- 2 - 1 L Amber w/p PAHs (16) (8270D SIM)
- 1 - 500 mL poly w/p Alkalinity (SIM 2320B) + Sulfate (300.0)

TEST KIT RESULTS		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.15	40 (dilution factor 5)	250

1045 - Collect DTW = 15.07 ft btoC (soft bottom)

Also complete Monitoring Well Gauging

Visual Inspection Checklist.

Robert Brel 08/26/14

TO 05 Adak LTM 2014 08/26/14

Late Entry

0916 - Start pump, set flow rate
to 400 mL/min.

1200 - A. Lewis & R. Boyd on site

MW-15-424 (SWMU 14, Old Pesticide Storage). Conduct physical hazard survey, well located between buildings & connex boxes w/ multiple pieces of debris nearby. Weather: 53°F, light rain, wind

10 mph W. PID wellhead: 0.0 ppm

Breathing Zone: 0.0 ppm. 3 bollards in place. Collect [DTW=18.20 ft btoc]
DTB=26.44 ft btoc (solid bottom).

1220 - A. Lewis & R. Boyd on site

MW15-3 (SWMU 14, Old Pesticide Storage). Conduct physical hazard survey, no hazards observed. Weather:

53°F, light rain, 10 mph wind W.

PID well head: 0.0 ppm, breathing zone: 0.0 ppm.

4 bollards present, only one bollard properly in place, other three have been broken free from ground. Appears to have been hit by vehicle or equipment.

Rabul Brel 08/26/14

TO 05 Adak LTM 2014 08/26/14

1220 cont...

Collect [DTW=13.58 ft btoc]

DTB=21.60 ft btoc (soft bottom).

Completed Monitoring Well Visual Inspection Checklist.

1345 - A. Lewis & R. Boyd on site

MW14-5-^{08/26/14}2 (SWMU 14, Old Pesticide Storage). Conduct

physical hazard survey, no hazards observed. Weather: 52°F,

overcast, wind 10 mph W. Set up to sample

Breathing zone PID: 0.0 ppm, wellhead: 0.0 ppm.

1350 - Collect [DTW=15.91 ft btoc]

1355 - Set flow rate 400 mL/min via peristaltic pump.

1402 - Collect water quality parameters listed on purge form.

1417 - Parameters stabilize: Purge 1.5 gal,

pH-6.15, SC-0.530 ms/cm, Turb-2 NTUs,

DO-0.00 mg/L, Temp-8.34°C,

Sal-0.0%, ORP--7 mV. Clear, light petroleum odor.

1420 - Collect sample MW14-5-2014

• 4-40 mL amber VOA w/ HCl GRO (AK 101)

• 4-40 mL amber VOA w/ HCl Methane (RSK 175)

Rabul Brel 08/26/14

TO 05 Adak LTM 2014 08/26/14

1420 cont...

- 2 - 1L amber w/HCl DRO (AK 162)
- 1 - 500ml poly w/HNO₃ Total Lead (6020A)
- 1 - 500ml poly w/p Alkalinity (SM 2320B) + Sulfate (300.0)
- 1 - 500ml poly w/HNO₃ Diss. Lead (6020A) (F)

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.60	6 (dilution factor 2)	30

1430 - Collect sample MW14-15-2014 (Dup)

- 1 - 500ml poly w/HNO₃ Total Lead (6020A)
- 1 - 500ml poly w/HNO₃ Diss Lead (6020A) (F)

1540 - Complete Monitoring Well

Gauging Visual Inspection Checklist

Collect DTB = 24.07 ft btoz (seal bottom)

1625 - A. Lewis & R. Boyd on site

Bunker to transfer pureg water to drums.

1645 - A. Lewis & R. Boyd on site

111A/office to de-mod, QC paperwork.

SWMU 60, Tank Farm A Photo Log

Date	Time	Description
08/26/2014	1101	652 close-up
08/26/2014	1101	652 facing east

Rebut Bred 08/26/14

TO 05 Adak LTM 2014 08/26/14

1645 cont...

SWMU 14, Old Pesticide Storage Photo Log

Date	Time	Description
08/26/14	1219	MW-15-424 facing west
08/26/14	1232	MW15-3 close-up (1)
08/26/14	1232	MW15-3 close-up (2)
08/26/14	1232	MW15-3 facing northeast
08/26/14	1232	MW15-3 facing north
08/26/14	1232	MW15-3 facing west
08/26/14	1613	MW14-5 close-up
08/26/14	1613	MW14-5 facing north
1900 - End of day.		

Rebut Bred 08/26/14

TO 05 Adak LTM 2014 08/27/14

0700 - On site office

Conduct tailgate health & safety briefing

See SSITO logbook

Topics include:

- Slips, trips, & falls
- Communication
- Hydration

Discuss work plan.

0745 - Mob sample van

PID bump test: 100 ppm

Horiba Calibration Check

Time	pH	Slmsan	Turbidus	DO _{mg/L}	Temp ^o C	Sal‰	ORP _{mV}
0800	3.49	4.50	0.0	10.30	14.00	0.2	253
1200	4.00	4.49	0.0	10.43	14.21	0.2	260
1740	4.00	4.50	0.0	10.57	14.38	0.2	248

0830 - A. Lewis & R. Boyd on site

852 (South of Runway 18-36) ^{PB 8/27/14} ^{SWMU 60.} Tank Farm A

Surface water location. Conduct physical hazard survey, location along shoreline; wear PFD, low lying stainless steel guard rail poses possible trip hazard. Weather: 55°F, overcast. On site during ebb tide.

Robert Buel 08/27/14

TO 05 Adak LTM 2014 08/27/14

0840 - Collect ~~surface~~ ^{PB 8/27/14} water

quality parameters via

Grab method: pH - 5.41, SC - 7.21 mS/cm,

Turb - 5 NTUs, DO - 7.33 mg/L,

Temp - 12.28°C, Sal - 0.1‰, ORP - 183 mV

Water clear w/ some particulate (black)

0845 - Collect surface water sample

852-2014

- 12-40 mL amber vial w/ HCl BTEX (8260L) MS/MSD
- 6-1 L amber w/ HCl DRO (AK 102) MS/MSD
- 2-1 L amber w/ PAHs (16) (8270D SIM)

0900 - Collect surface water sample

862-2014 (Dup)

- 2-1 L amber w/ PAHs (16) (8270D SIM)

Also complete Surface Water Sampling

Visual Inspection Checklist:

Visible sheening on surface water, moderate petroleum odor. Water body ~ 5 ft wide x 8" + 10" deep, light flow.

Bank of water body has orange particulate along top 1/4" of surface, below surface is black, located in area ~ 25' x 50' around Boom 10.

Robert Buel 08/27/14

TO 05 Adak LTM 2014 08/27/14

0930 - A. Lewis & R. Boyd on site

852 (~~South of Runway 18-30~~)^{08/27/14} SWMU 60,
Tank Farm A

Sediment location. Same hazards previously documented at surface water location.

Weather: 55°F, overcast, light rain.

0945 - Collect sediment sample

852S-2014

- 2-4 oz. amber w/p DRO (AK 102),
2-methylnaphthalene and phenanthrene (82700 Sim),
moisture content.

1000 - Collect sediment sample

862S-2014 (Dup)

- 2-4 oz. amber w/p DRO (AK 102),
2-methylnaphthalene and phenanthrene (82700 Sim),
Also, complete Sediment Sampling
Visual Inspection Checklist.

Sediment light brown top 1/4",

below sediment is black.

Small grain sand w/ organic matter along surface. Moderate petroleum odor. Sheering along surface before and after collecting sample.

Robert Brul 08/27/14

TO 05 Adak LTM 2014 08/27/14

1130 - A. Lewis & R. Boyd on site

SWMU 61 to assess access to sampling locations. Water levels currently too high to access locations.

1335 - A. Lewis & R. Boyd on site

05-735 (SWMU 17, Power Plant No. 3). Conduct physical hazard

survey, as seen in previous inspections multiple items near well including drums, used oil tank, batteries, transformer cables. Weather: 56°F, overcast.

1355 - Collect [DTW = 15.82 ft btoC]

1403 - Set flow rate 400ml/min via peristaltic pump.

1409 - Collect water quality parameters listed on purge form.

1439 - Parameters do not stabilize; purge three times casing volume.

Purge 3.0 gal, pH - 6.19, SC - 0.46 lms/cm,

Turb - 0 ntu, DO - 0.00 mg/L,

Temp - 8.71°C, Sal - 0.0‰, ORP - -70 mV.

Clear, odorless water.

Robert Brul 08/27/14

TO 05 Adak LTM 2014 08/27/14

1445 - Collect sample 05-735-2014

- 4-40mL amber VOA w/HCl VOCs (Vinyl chloride & cis-1,2-dichloro-ethene) (8260c)
- 4-40mL amber VOA w/HCl Methane (RSK175)
- 1-500mL poly u/p Alkalinity (SM 2320B) Sulfate (300-0).

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.5	18 (dilution factor 2)	20

Also, complete Monitoring Well Gauging Visual Inspection Checklist.

Well has broken collar.

Collect DTB = 21.80 ft btoc

1530 - A. Vernik on site. (NAVFAC RPM)

1545 - A. Vernik off site.

1615 - A. Lewis & R. Boyd on site

AS-1 (South of Runway 18-36).

Conduct physical hazard survey, no hazards observed.

Weather: 55°F, overcast, light rain.

Collect [DTW = 13.12 ft btoc]

Collect DTB = 29.35 ft btoc (Soft bottom).

No odors.

Reid Bnd 08/27/14

TO 05 Adak LTM 2014 08/27/14

1640 - A. Lewis & R. Boyd on site

02-232 (South of Runway 18-36).

Conduct physical hazard survey, no hazards observed. Well head PID - 61 ppm, breathing zone.

Weather 52°F, light rain, 10 mph

wind S. Collect [DTW = 16.34 ft btoc]

Collect DTB = 24.81 ft btoc (solid bottom)

Light petroleum odor.

1710 - A. Lewis & R. Boyd on site

Bunker. Transfer purge water to drums.

1730 - A. Lewis & R. Boyd on site

111A/office. De-mob sample

van, QC paperwork

South of Runway 18-36 Photo Log

Date	Time	Description
08/27/14	0950	852 facing east
08/27/14	0954	852S close-up
08/27/14	1635	AS-1 facing south ^{west} east
08/27/14	1635	AS-1 close-up
08/27/14	1645	02-232 facing ^{east} west

Reid Bnd 08/27/14

TO 05 Adak LTM 2014 08/27/14

1730 cont...

SWMU 17, Power Plant No. 3 Photo Log

Date	Time	Description
08/27/14	1523	05-735 facing west
08/27/14	1524	05-735 vicinity facing south (1)
08/27/14	1524	05-735 vicinity facing south (2)

SWMU 60, Tank Farm Photo Log

Date	Time	Description
08/27/14	0950	852 facing east <small>surface water and sediment, local (see spec)</small>
08/27/14	0954	852S close-up.

1900 - End of day.

Robert Brel 08/27/14

TO 05 Adak LTM 2014 08/28/2014

0700 - On site office.

Conduct tailgate health & safety briefing

See SSites log book.

Topics include:

- Proper PPE
- Wind awareness
- Purge water handling

Discuss work plan & QC topics.

0735 - Mols sample van

PID bump test: 9.7 ppm

4-gas meter bump test / Calibration

H₂S = 10 ppm, CO = 49 ppm, CH₄ LEL = 48%, Oxy = 18.1%

Horiba Calibration Check:

Time	pH	SC mS/cm	Turbidity	DO mg/L	Temp °C	Sal %	ORP mV
0750	3.49	4.50	0.0	9.91	15.25	0.2	268
1210	4.00	4.51	0.0	10.12	15.40	0.2	257
1750	3.99	4.49	0.0	9.52	15.67	0.2	268

0810 - A. Lewis & R. Boyd on site

AS-1 (South of Runway 18-36).

Conduct physical hazard survey,

no hazards observed. Weather!

51°F, overcast, 10 mph wind SW.

PID @ wellhead & breathing zone = 0.0 ppm.

0820 - Collect [DITW = 12.96 ft btoc]

Robert Brel 08/28/14

TO 05 Adak LTM 2014 08/28/14

0825 - Set flow rate 400 mL/min via peristaltic pump.

0832 - Collect water quality parameters listed on purge form.

0852 - Parameters stabilized: Purge 2.0 gal, pH - 6.29, Cond - 1.05 mS/cm, Turb - 0 NTU, DO - 0.00 mg/L, Temp - 8.48 °C, Sal - 0.0%, ORP - -126 mV. Clear & odorless water.

0900 - Collect sample AS-1-2014.

- 4-40 mL amber VOA w/HCl BTEX (8260C)
- 4-40 mL amber VOA w/HCl Methane (RSK175)
- 2-1 L amber w/p PAHs (16) (827005IM)
- 1-500 mL poly w/p Alkalinity (SM2320B) + Sulfate (300.0)

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.3	50 (dilution factor 10)	180

0915 - Collect sample AS-11-2014 (Dup)

- 4-40 mL amber VOA w/HCl Methane (RSK175)
- 1-500 mL poly w/p Alkalinity (SM2320B) + Sulfate (300.0)

Test Kit Results (Dup)

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.3	50 (dilution factor 10)	190

Robert B. 08/28/14

TO 05 Adak LTM 2014 08/28/14

0955 - A. Lewis & R. Boyd on site SWMU 17, Power Plant No. 3 to take site overview photos.

1002 - A. Lewis & R. Boyd on site SWMU 14, Old Pesticide Storage to take site overview photos.

1020 - A. Lewis & R. Boyd on site office/111A. QC paperwork & prep/pack samples for shipment to ALS Kelso.

1325 - A. Lewis, R. Boyd, & J. Santini on site Alaska Airlines to ship 9 coolers containing samples to ALS Kelso via Goldstreak (AWB# 027 1269 2422 total weight 433 lbs)

and equipment to Argus-Hazco Dallas-Ft. Worth via (AWB# 027 1268 7975)

Asset # 1147386 (VSI), 1130301 (HACH), 1116979 (u-sz), 1120875 (u-sz), 1135310 (u-sz), 1088743 (PID), 1088742 (PID), 7 items @

135 lbs gross weight & 155 chargeable weight

Robert B. 08/28/14

TO 05 Adak LTM 2014 08/28/14

1510 - A. Lewis, R. Boyd, & A. Vernik
on site. 21-4 (SWMUs 18/19,
White Alice Landfill). Conduct
physical hazard survey, no
hazards observed.

Weather: 51°F, Fog, 13 mph wind W.

PID @ well head & breathing zone: 0.0 ppm.

CO - 0 ppm, H₂S - 0 ppm, CH₄ - 0% LEL,

Oxy - 20.9% @ well head & breathing zone.

1520 - Collect [DTW = ~~20.9~~ 24.09 ft btoe]

1534 - Set flow rate 400 ml/min

via peristaltic pump.

1538 - Collect water quality parameters
listed on purge form.

1553 - Parameters stabilize: Purge 1.5 gal,
PH - 5.84, SC - 0.263 mS/cm, Turb - 5 NTUs,
DO - 7.19 mg/L, Temp - 7.36°C,
Sal - 0.0‰, ORP - 194 mV. Clear
odorless water.

1600 - Collect sample 21-4-2014

- 1-500 ml poly w/ HNO₃ Total PP Metals +
Barium (6020A/7470A)
- 1-500 ml poly w/ H₂SO₄ COD (SM 5220C),
TKN (ASTM D1426-93B), Ammonia
Nitrogen (SM 4500G)

Rebutzel 08/28/14

TO 05 Adak LTM 2014 08/28/14

1600 cont...

- 1-500 ml poly w/p Alkalinity (SM 2320B),
Sulfate (300.0), TDS (SM 2540C).
- 1-500 ml poly w/ HNO₃ Dissolved PP Metals +
Barium (6020A/7470A) (F)

Also complete Monitoring well
Gauging, Visual Inspection Checklist.
Concrete monument heaving/
cracking. Collect DTB = 32.62 ft btoe

1710 - A. Lewis & R. Boyd & A. Vernik
off site.

1735 - A. Lewis & R. Boyd on site

111A office. De-mob, QC paperwork
~~Scott~~ ^{pest/28/14} SWMU 17, Power Plant No. 3 Photo Log

Date	Time	Description
08/28/14	0957	SWMU 17 site overview facing east ^{pest/28/14} (F)
08/28/14	0957	SWMU 17 site overview facing south
		SWMU 14, Old Pesticide Storage Photo Log

Date	Time	Description
08/28/14	1003	SWMU 14 site overview facing south
		SWMUs 18/19, White Alice Landfill Photo Log

Date	Time	Description
08/28/14	1628	21-4 facing west
		1900 - End of day.

Rebutzel 08/28/14

TO 05

Adak LTM 2014

08/29/14

0630 - Equipment check.

0700 - On site office.

Conduct tailgate health & safety briefing

See SSHA log book

Topics include

- H&S equipment
- Pinch points
- Heavy lifting

Discuss work plan & QC topics

0740 - Mob sample van

PID bump test: 103 ppm

4 - Gas meter bump test/calibration

H₂S - 9 ppm, CO - 49 ppm, CH₄ LEL - 48% , Oxy - 18.4%

Horiba Calibration check!

Time	pH	SC _{ms/cm}	Turb _{ntus}	DO _{mg/L}	Temp ^o C	Sal%	ORP
0750	3.99	4.51	0.0	10.04	15.06	0.2	273
1245	3.99	4.51	0.0	10.12	14.86	0.2	275
1535	4.00	4.49	0.0	10.40	15.61	0.2	284

0920 - A. Lewis, R. Boyd, & S. Wunderlich on site WASW03 (SWMUs 18/19 White Alize Landfill). Conduct physical hazard survey, no hazards observed. Weather: 52°F, wind 10 mph W, overcast w/mist. Set up to collect surface water sample.

R. Luttrell 08/29/14

TO 05

Adak LTM 2014

08/29/14

0930 - Collect water quality parameters:

pH - 6.05, SC - 0.305 mS/cm, Turb - 0 NTUs,

DO - 9.85 mg/L, Temp - 12.10°C,

Sal - 0.0%, ORP - 110 mV. Clear odorless water.

0940 - Collect surface water sample

WASW03 - 2014

- 1-500 mL poly w/HNO₃ Total PP Metals + Barium (6020A/7470A)

- 1-500 mL poly w/H₂SO₄ COD (SM5220c), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G)

- 1-500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540c).

- 1-500 mL poly w/HNO₃ Dissolved PP Metals + Barium (6020A/7470A) (F)

1030 - S. Wunderlich off site.

1115 - A. Lewis & R. Boyd on site

21-3 (SWMUs 18/19, White Alize Landfill).

Conduct physical hazard survey, no hazards observed. Weather

50°F, fog, 10 mph wind W. PID @

Wellhead and breathing zone: 0.0 ppm,

H₂S - 0 ppm, CO - 0 ppm, CH₄ LEL - 0%, Oxy - 20.9%1120 - Collect [D₁W = 3.00 ft btoc].

R. Luttrell 08/29/14

TO 05 Adak LTM 2014 08/29/14

1125 - Set flow rate 400 mL/min

Via peristaltic pump.

1130 - Collect water quality parameters listed on purge form.

1150 - Parameters stabilize: Purge 2.0 gal,

pH - 6.37, SC - 0.739 mS/cm, Turb - 2 NTUs,

DO - 0.00 mg/L, Temp - 9.74°C,

Sal - 0.0‰, ORP - -80 mV. Clear odorless water.

1200 - Collect sample 21-3-2014

- 1 - 500 mL poly w/HNO₃ Total PP Metals + Barium (6020A/7470A).

- 1 - 500 mL poly w/H₂SO₄ COD (SM5220C)

TKN (ASTM D1426-93B), Ammonia

Nitrogen (SM4500G).

- 1 - 500 mL poly w/p Alkalinity (SM2320B),

Sulfate (300.0), TDS (SM2540C).

- 1 - 500 mL poly w/HNO₃ Dissolved PP Metals + Barium (6020A/7470A) (F)

Also complete Monitoring Well

Gauging Visual Inspection Checklist.

Collect DTB = 15.04 ft btoe. Vegetation

(roots) on interface meter probe,

possibly entering well through screen.

RalutBel 08/29/14

TO 05 Adak LTM 2014 08/29/14

1215 - A. Lewis & R. Boyd on site

WASW01 (SWMUs 18/19, White Alize

Landfill). Conduct physical hazard

survey, no hazards observed.

Weather: 50°F, Fog, 10 mph winds W.

Set up to collect surface water

sample.

1225 - Collect water quality parameters:

pH - 6.49, SC - 0.471 mS/cm, Turb - 13 NTUs,

DO - 9.31 mg/L, Temp - 9.50°C, Sal - 0.0‰,

ORP - -59 mV. Clear odorless water

w/ some orange particulate.

1230 - Collect surface water sample

WASW01 - 2014

- 1 - 500 mL poly w/HNO₃ Total PP Metals + Barium (6020A/7470A)

- 1 - 500 mL poly w/H₂SO₄ COD (SM5220C),

TKN (ASTM D1426-93B), Ammonia

Nitrogen (SM4500G).

- 1 - 500 mL poly w/p Alkalinity (SM2320B),

Sulfate (300.0), TDS (SM2540C).

- 1 - 500 mL poly w/HNO₃ Dissolved PP

Metals + Barium (6020A/7470A).

Also complete Surface Water Sampling

Visual Inspection Checklist. Stream 18" wide x 4-6" deep.

RalutBel 08/29/14

TO 05 Adak LTM 2014 08/29/14

1300 - A. Lewis & R. Boyd on site
 WASW02 (SWMU 18/19, White Alice
 Landfill). Conduct physical hazard
 survey, no hazards observed.

Weather: 50°F, fog, 10 mph winds W.

Set up to collect surface water
 sample.

1315 - Collect water quality parameters:

pH - 6.50, SC - 0.510 mS/cm, Turb - 4 NTUs,
 DO - 10.51 mg/L, Temp - 6.99°C, Sal - 0.0%,
 ORP - 41 mV. Clear odorless water.

1330 - Collect surface water sample

WASW02-2014

- 1 - 500 mL poly w/ HNO₃ Total PP Metals +
 Barium (6020A/7470A).
- 1 - 500 mL poly w/ H₂SO₄ COD (SM5220C),
 TKN (ASTM D1426-93B), Ammonia
 Nitrogen (SM4500G).
- 1 - 500 mL poly w/p Alkalinity (SM2320B),
 Sulfate (300.0), TDS (SM2540C).
- 1 - 500 mL poly ^{08/29/14} w/ HNO₃ Dissolved PP
 Metals + Barium (6020A/7470A).

Also complete Surface Water Sampling

Visual Inspection Checklist, stream 2' wide x
~~70~~ 8"-10" deep.

Ralm Bred 08/29/14

TO 05 Adak LTM 2014 08/29/14

1500 - A. Lewis & R. Boyd on site

Bunker to transfer purge water
 to drum and dispose of PPE, PID-copm

1525 - A. Lewis & R. Boyd on site

111A/office. De-mob, QC paperwork

SWMUs 18/19, White Alice Landfill Photo Log

Date	Time	Description
08/29/14	1006	WASW03 facing west
08/29/14	1219	21-3 facing west
08/29/14	1247	WASW01 facing east
08/29/14	1251	WASW01 close-up
08/29/14	1314	WASW02 facing east
08/29/14	1316	WASW02 close-up

1900 - End of day.

Ralm Bred 08/29/14

TO 05 Adak LTM 2014 08/30/14

0700 - On site office.

Conduct tailgate health & safety briefing

See SSITD log book.

Topics include:

- Slips, trips, & falls
- Bunker safety
- Proper labeling

Discuss work plan & OOC topics.

0730 - Mob sample van.

PID bump test. 101 ppm

4-Gas meter bump test/calibration

H₂S - 9 ppm, CO - 48 ppm, CH₄ LEL - 48%, Oxy - 18.3%

Horiba Calibration Check.

Time	pH	SC in/s/cm	Turb NTUs	DO mg/L	Temp °C	Sal %	ORP mV
0745	4.60	4.50	0.0	10.14	14.50	0.2	276
1220	3.99	4.50	0.0	10.31	14.82	0.2	271
1710	4.00	4.51	0.0	10.21	14.98	0.2	273

0800 - Generate trip blank

TB083014A

- 3 - 40 ml amber VOA w/ HCl VOCs(30) (8260C).

0900 - A. Lewis & R. Boyd on site

RLSW03-2014 (SWMU 25, Roberts Landfill)

Conduct physical hazard survey,
boards w/ nails in vicinity, moved
some out of area. Weather: 52°F

Reut/Bre 08/30/14

TO 05 Adak LTM 2014 08/30/14

0900 cont...

5 mph winds NW, partial sun. Set
up to collect surface water sample via
peristaltic pump.

0915 - Collect water quality parameters:

pH - 5.33, SC - 0.621 mS/cm, Turb - 14 NTUs,

DO - 6.94 mg/L, Temp - 9.17°C, Sal - 0.0‰,

ORP - 205 mV. Clear odorless water ^{no visible} _{particulate}

0930 - Collect surface water sample

RLSW03-2014

- 4 - 40 ml ^{amber} VOA w/ HCl VOCs(30) (8260C)
- 1 - 500 ml poly w/ HNO₃ Total PP Metals +
Aluminum (6020A/7470A)
- 3 - 500 ml poly w/ H₂SO₄ COD (SM5220C),
TKN (ASTM D1426-93B), Ammonia Nitrogen
(SM4500G) (MS/MSD)
- 3 - 500 ml poly w/ Alkalinity (SM2320B),
Sulfate (300.0), TDS (SM2540C) (MS/MSD)
- 1 - 500 ml poly w/ HNO₃ Dissolved PP Metals +
Aluminum (6020A/7470A) (F)

Also complete Surface Water Sampling

Visual Inspection Checklist: Stream

4' wide x 14" deep, white foam on surface,
some roofing material in water body,
likely not affecting sample.

Reut/Bre 08/30/14

TO 05 Adak LTM 2014 08/30/14

0950 - A. Vernik on site.

1015 - R. Boyd & A. Lewis on site

RLSW04 (SWMU 25, Roberts Landfill)

Conduct physical hazard survey,
no physical hazards. Weather: 55°F,
light wind NW, partial sun. Set
up to collect surface water sample
via peristaltic pump.

1030 - Collect water quality parameters:

pH - 6.35, SC - 0.401 mS/cm, Turb - 4 NTUs,
DO - 8.89 mg/L, Temp - 9.71°C, Sal - 0.0%,
ORP - 115 mV. Clear odorless water.

1045 - Collect surface water sample

RLSW04-2014

- 4-40 mL amber VOA w/HCl VOCs (30) (8260C)
- 1-500 mL poly w/HNO₃ Total PP metals + Aluminum (6020A/7470A)
- 1-500 mL poly w/H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G)
- 1-500 mL w/p poly Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C)
- 1-500 mL poly w/HNO₃ Dissolved PP metals + Aluminum (6020A/7470A) (F)

Rahut B 08/30/14

TO 05 Adak LTM 2014 08/30/14

1100 - Collect surface water sample

RLSW14-2014 (Dup)

- 1-500 mL poly w/H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G).
 - 1-500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C)
- Also complete Surface Water Sampling visual inspection. Stream size 5' wide x 3' deep, heavy flow.

1120 - A. Vernik offsite.

1320 - A. Lewis & R. Boyd on site

RLSW05 (SWMU 25, Roberts Landfill)

Conduct physical hazard survey,
no hazards observed.

Weather: 55°F, wind 5 mph NW,
overcast. Set up to collect
surface water sample.

1340 - Collect water quality parameters:

pH - 6.01, SC - 0.351 mS/cm, Turb - 0 NTUs,
DO - 9.10 mg/L, Temp - 11.97°C, Sal - 0.0%,
ORP - 122 mV. Clear odorless water.

Rahut B 08/30/14

TO 05 Adak LTM 2014 08/30/14

1400 - Collect surface water sample

RLSW05 - 2014

- 4-40 mL amber VOA w/HCl VOCs(30) 8260c
 - 1-500 mL poly HNO₃ Total PP Metals + Aluminum. 6020A/7470A.
 - 1-500 mL poly H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G)
 - 1-500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C)
 - 1-500 mL poly w/HNO₃ Dissolved PP Metals + Aluminum (6020A/7470A) (F)
- Also complete Surface Water Sampling Visual Inspection Checklist.
Stream size 1.5' wide x 4" to 5" deep.

1430 - A. Lewis & R. Boyd on site NL-11 (SWMU 25, Roberts Landfill). Conduct physical hazard survey, no hazards observed. Set up to collect surface water sample. Weather 55°F, 5 mph wind N, overcast.

1445 - Collect water quality parameters?
pH - 6.50, SG - 0.151 mS/cm, Turb - 7 NTUs,
DO - 8.05 mg/L, Temp - 12.54°C, Sed - 0.0%,
ORP - 134 mV. Clear odorless water.

Palutzel 08/30/14

TO 05 Adak LTM 2014 08/30/14

1500 - Collect surface water sample

NL-11-2014

- 1-500 mL poly w/HNO₃ Total PP Metals + Aluminum (6020A/7470A)
 - 1-500 mL poly w/H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G).
 - 1-500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C).
 - 1-500 mL poly ^{pp} w/HNO₃ Dissolved PP Metals + Aluminum (6020A/7470A) (F)
- Also complete Surface Water Sampling Visual Inspection Checklist.
Stream size 1' wide x 5" deep.

1615 - A. Lewis & R. Boyd on site IIIA/office. De-mob, OC paperwork.

SWMU 25, Roberts Landfill Photo Log

Date	Time	Description
08/30/14	1006	RLSW03 facing northwest
08/30/14	1006	RLSW03 close-up
08/30/14	1124	RLSW04 facing southeast
08/30/14	1419	RLSW05 facing south
08/30/14	1419	RLSW05 close-up
08/30/14	1506	NL-11 facing northeast
08/30/14	1506	NL-11 close-up (i)

Palutzel 08/30/14

TO 05 Adak LTM 2014 08/30/14

1615 cont...

SWMM 25, Roberts Landfill Photo Log

<u>Date</u>	<u>Time</u>	<u>Description</u>
08/30/14	1515	NL-11 cbse-up (2)
1900 - End of day.		

Robert Buel 08/30/14

TO 05 Adak LTM 2014 08/31/14

1200 - Pack sample coolers for shipment to ALS-Kelso via Goldstreak Alaska Air

1400 - A. Lewis & R. Boyd on site Alaska Airlines, Ship 8 coolers containing samples to ALS-Kelso via Goldstreak (AWB # 027 1270 3611 total weight 398 lbs).

1500 - On site WIA/office.

1615 - R. Boyd on site Alaska Airlines, Pickup Annette Franzen (SES TOM).

Bring to Unit # 168C. Contact ^{RP} _{8/31/14} for POC for unit Debra Shamah 907-572-9438 or 907-592-2347.

1715 - On site WIA/office. End of day.

Robert Buel 08/31/14

TO 05

Adak LTM 2014

09/01/14

0630 - Prep for day's activities.

0700 - On site office.

Conduct teitgate health & safety briefing.

See SSTO log book.

Topics include:

- PPE
- Driving safety
- Slips, trips, & falls.

Discuss work plans & QC topics.

0740 - Mob sample van.

PID bump test: 10 ppm

4-Gas Meter bump test/calibration:

H₂S - 10 ppm, CO - 49 ppm, CH₄ LEL - 50%, O₂ - 18.2%

Horiba Calibration Check.

Time	pH	SCms/cm	Turbidity	DO mg/L	Temp °C	Sal %	ORP mV
0750	3.99	4.49	0.0	10.19	15.00	0.2	259
1347	4.00	4.49	0.0	10.81	17.72	0.2	264
Diel	not	Sample					

0900 - A. Lewis & R. Boyd on site
MW13-4 (SWMU 13, Metals Landfill).Conduct physical hazard survey,
no hazards observed. Weather58°F, light wind, Sun. CH₄ LEL - 0%

@ wellhead & breathing zone, PID - 0 ppm

@ wellhead & breathing zone.

RalmBrd 09/01/2014

TO 05

Adak LTM 2014

09/01/14

0920 - Collect [DTW = 23.32 ft btoC]

0939 - Set flow rate 400 ml/min
via peristaltic pump.0946 - Collect water quality parameters
listed on purge form.1011 - Parameters stabilize: Purge 2.5 gal,
pH - 6.21, SC - 1.16 mS/cm, Turb - 4 NTUs, DO - 2.19 mg/L,
Temp - 8.75°C, Sal - 0.1%, ORP - 169 mV.
Clear odorless water.

1015 - Collect sample MW13-4-2014

• 1-500 ml poly w/ HNO₃ Total Arsenic & Barium
(6020A).• 1-500 ml poly w/ H₂SO₄ COD (SM5220c),
TKN (ASTM D1420-93B), Ammonia
Nitrogen (SM4500G)• 1-500 ml poly w/p Alkalinity (SM2320B),
Sulfate (300-0), TDS (SM2540c)• 1-500 ml poly w/ HNO₃ Dissolved Arsenic &
Barium (6020A) (F)Also complete Monitoring Well Gauging
Visual Inspection Checklist.

Collect DTB = 30.98 ft btoC.

1035 - A. Lewis & R. Boyd on site MW13-5
(SWMU 13, Metals Landfill). Conduct physical
hazard survey, no hazards observed.

RalmBrd 09/01/14

TO 05

Adak LTM 2014

09/01/14

1035 cont...

Weather: 60°F, no wind, sun.

CH₄ LEL - 0% @ wellhead & breathing zone. PID - 0.0 ppm @ wellhead & breathing zone.

1045 - Collect [DTW = 24.05 ft bttc]

1055 - Set flow rate 400 mL/min via peristaltic pump.

1100 - Collect water quality parameters listed on purge form.

1115 - Parameters stabilize: Purge - 5 gal.

pH - 6.90, Se - 1.10 mS/cm, Turb - 4 NTUs, DO - 6.14 mg/L, Temp - 9.16°C, Sal - 0.1‰, ORP - 143 mV. Clear odorless water.

1120 - Collect sample MW13-5-2014

- 1 - 500 mL poly w/ HNO₃ Total Arsenic & Barium (6020A).
- 1 - 500 mL poly w/ H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G).
- 1 - 500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C)
- 1 - 500 mL poly w/ HNO₃ Dissolved Arsenic & Barium (6020A) (F)

Also complete Monitoring Well Gauging Visual Inspection Checklist. Collect [DTW = 28.99 ft bttc (soft bottom)]

RabutBel 09/01/14

TO 05

Adak LTM 2014

09/01/14

1140 - A. Lewis & R. Boyd on site MW-605 ~~SWMUB~~ (SWMUB, Metals Landfill).

Conduct physical hazard survey, no hazards observed. Weather: 60°F, light wind, sun.

CH₄ LEL - 0% @ well head & breathing zone. PID - 0.0 ppm @ well head & breathing zone.

1155 - Collect [DTW = 27.67 ft bttc]

1204 - Set flow rate 400 mL/min. via peristaltic pump.

1209 - Collect water quality parameters listed on purge form.

1229 - Parameters stabilize: Purge - 2.0 gal pH - 6.72, Se - 1.54 mS/cm, Turb - 15 NTUs, DO - 0.00 mg/L, Temp - 10.5°C, Sal - 0.1‰, ORP - 70 mV. Clear odorless water.

1235 - Collect sample MW-605-2014

- 1 - 500 mL poly w/ HNO₃ Total Arsenic & Barium (6020A).
- 1 - 500 mL poly w/ H₂SO₄ COD (SM5220C), TKN (ASTM D1426-93B), Ammonia Nitrogen (SM4500G).
- 1 - 500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0), TDS (SM2540C)

RabutBel 09/01/14
09/01/14

TU05 Adak LTM 2014 09/01/14

1235 cont...

- 1- 500ml poly w/HNO₃ Dissolved Arsenic & Barium (6020A).

1245 - Collect sample MW-615-2014 (Dup)

- 1- 500ml poly w/HNO₃ Total Arsenic & Barium (6020A).
- 1- 500ml poly w/H₂SO₄ COD (sm5220c), TKN (ASTM D1426-93B), Ammonia Nitrogen (sm4500G).
- 1- 500 ml poly w/p Alkalinity (sm2320B), Sulfate (300.G), TDS (sm2540c).
- 1- 500 ml poly w/HNO₃ ^{total} ~~Total~~ Arsenic & Barium (6020A).

Also complete Monitoring Well Gauging
Visual Inspection Checklist.

Collect DTB = 36.54 ft btoe.

1330 ^{on site} ~~1300~~ - On site 111A/office. De-mob,
QC paperwork.

SWMU 13, Metals Landfill Photo Log

Date	Time	Description
09/01/14	1044	MW13-4 facing northeast
09/01/14	1139	MW13-5 facing northeast
09/01/14	1316	MW-605 facing south
1900 - End of day		

Reluctant 09/01/14

TU05 Adak LTM 2014 09/02/14

0700 - on site office.

Conduct tailgate health & safety briefing.

See SSHE logbook.

Topics include:

- Proper PPE
- Pinch Points
- Slips, trips, & falls.

R. Boyd to work w/ IC Team.

1600 - R. Boyd on site SWMUs 18/19,

White Aize Landfill. Take Site
overview photos.

1745 - On site 111A/office.

SWMUs 18/19, White Aize Landfill Photo Log

Date	Time	Description
09/02/14	1611	SWMUs 18-19 Site Overview facing north
09/02/14	1641	SWMUs 18-19 Site Overview facing south
1900 - End of day.		

Reluctant 09/02/14

TO 05

Adak LTM 2014

09/04/14

0615 - Prep for sampling.

0700 - On site office.

Conduct tailgate health & safety briefing.

See SSITO logbook.

Topics include:

- Slips, trips, & falls
- No heavy lifting
- PFDs

Discuss work plan & QC topics.

0755 - Mobil sample van.

PID bump test - NA (Surface water/sed only)

Horiba Calibration Check

Time	pH	SCms/cm	Turb ^{NTU}	DOmg/L	Temp°C	Sed%	ORP _{FW}
0755	3.99	4.49	0.0	10.33	14.19	0.2	266
1230	4.00	4.50	0.0	10.39	14.92	0.2	271
Did not sample							

0800 - Generate Trip Blank TB090414A

- 3-40 mL ^{amber} VOA w/HCl GRO (AK 101)
- 3-40 mL Amber VOA w/HCl BTEX (8260c)

0805 - Generate sed Trip Blank TB090414B

- 2-4oz amber tared jar w/surrogated MeOH GRO (AK 101).
- 2-4oz amber tared jar w/non-surrogated MeOH BTEX (8260c).

Rebut Bzel 09/04/14

TO 05

Adak LTM 2014

09/04/14

1000 - A. Lewis & R. Bayd on site

NL-04 (SWMU 61, Tank Farm B).

Conduct physical hazard survey.

PFD worn around shoreline.

Weather: 54°F, light N wind,

overcast. Set up to collect

surface water sample via

grab method.

1020 - Collect water quality parameters:

pH - 5.99, SC - 0.221 ms/cm, Turb - 0.0 ^{NTU} ^{09/04/14}

DO - 8.21 mg/L, Temp - 10.14°C, Sal - 0.07‰

ORP - 84 mV. Clear odorless water.

1030 - Collect sample NL-04-2014

- 12-40 mL amber VOA w/HCl GRO (AK 101) MS/MSD
- 4-40 mL amber VOA w/HCl BTEX (8260c)
- 2-1L amber up PAHs (16) (8270D sim)

Also complete Surface Water

Sampling Visual Inspection Checklist.

Stream size 30ft wide X 3ft deep.

Slow moving.

1040 - A. Lewis & R. Bayd on site

NL-04S (SWMU 61, Tank Farm B). Samephysical hazard as NL-04. Weather: 55°F,

N wind 1 mph, overcast. Set up to collect

sediment sample via grab method.

Rebut Bzel 09/04/14

TO 05 Adak LTM 2014 09/04/14

1045 - Collect sample NL-04S-2014

- 2 - 4oz amber tared jar w/ surrogated MeOH GRO (AK 101). MS/MSD
- 2 - 4oz amber tared jar w/ non-surrogated MeOH BTEX (8260c). MS/MSD
- 2 - 2oz jar w/ Dry Weight.

1100 - Collect sample NL-14S-2014 (Dup)

- 2 - 4oz amber tared jar w/ surrogated MeOH GRO (AK 101).
 - 2 - 4oz amber tared jar w/ non-surrogated MeOH BTEX (8260c)
 - 2 - 2oz jar w/ Dry weight.
- Sediment sampling visual inspection checklist also completed.
Sediment dark brown, silty w/ organics (rocks).

1130 - Complete SWMU 61, Tank Farm B ^{09/04/14} Visual Shoreline Visual Inspection Checklist. Inspection location along North Sweeper Creek.

No note worthy observations.

1230 - A. Lewis & R. Boyd on site IIIA/office.

De-mob, QC paperwork, prep/pack samples for shipment to ALS-Kelso via Alaska Air Goldstreak.

Robert Boyd 09/04/14

TO 05 Adak LTM 2014 09/04/14

1400 - A. Lewis & R. Boyd on site

Alaska Airlines to ship 6 coolers containing samples to ALS-Kelso via Goldstreak (AWB #027 1271 4925, total weight 277 lbs).

1430 - A. Lewis & R. Boyd on site IIIA/Office, continue de-mob, QC paperwork, & prep for Palisades Landfill sampling.

SWMU 61, Tank Farm B Photo Log

Date	Time	Description
09/04/14	1041	NL-04 close-up
09/04/14	1041	NL-04 facing northwest
09/04/14	1128	NL-04S close-up
09/04/14	1128	NL-04S facing northwest
09/04/14	1131	SWMU 61, Tank Farm B Shoreline facing south
09/04/14	1131	SWMU 61, Tank Farm B Shoreline facing north
09/04/14	1134	SWMU 61, Tank Farm B Creek Confluence facing west
1900 - End of day.		

~~Robert Boyd 09/04/14~~

TO 05 Adak LTM 2014

09/05/14

0630 - Prep for sampling.

0700 - On site office.

Conduct tailgate health & safety briefing

See SS10 log book.

Topics include:

- Wind awareness
- Buddy system
- Slips, trips, & falls

Discuss work plan & QC topics.

0730 - MOB sample van.

PID bump test: 103 ppm

Horiba Calibration Check

Time	pH	SCM/cm	Turbidity	DO mg/L	Temp °C	Sal %	ORP mV
Diol	not	Sample	GW/SW				

0820 - A. Lewis, R. Boyd, A. Vernik on site 103S (SWMU II, Palisades Landfill)

Conduct physical hazard survey, slippery rocks on approach to location. Set up to collect sediment sample. Radio check good w/ Team 2 in town.

Robert Boyd 09/05/14

TO 05 Adak LTM 2014

09/05/14

0835 - Collect sediment sample

103S - 2014.

- 2 - 4 oz amber jar w/p PCB Aroclors (8082A Low Level), Metals (Antimony, Arsenic, Nickel) (6020A)
- Also complete Sediment Sampling Visual Inspection Checklist. Sediment: Fine to medium grain sand (little sediment) w/ dark colored rock.

0845 - A. Lewis, R. Boyd, A. Vernik on site 102S (SWMU II, Palisades Landfill). Conduct physical hazard survey, metal objects obscured from view in grass on approach to location.

0900 - Collect sediment sample

102S - 2014.

- 2 - 4 oz amber jar w/p PCB Aroclors (8082A Low Level), Metals (Antimony, Arsenic, Nickel) (6020A).

0920 - Collect sediment sample 112S - 2014 (Dup)

- 2 - 4 oz amber jar w/p PCB Aroclors (8082A Low Level), Metals (Antimony, Arsenic, Nickel) (6020A)

Robert Boyd 09/05/14

TO 05

Adak LTM 2014

09/05/14

0940 - Complete Sediment Sampling
 Visual Inspection Checklist. Sediment:
 Light brown sediment w/ fines,
 some 1/4" rock. Some metal from
 landfill < 200ft from sample
 location.

1005 - A. Lewis, R. Boyd, A. Vernik on site
 van.

1015 - On site IIIA/office.

1045 - A. Lewis & R. Boyd on site

101S (SWMU 11, Palisades Landfill)

Conduct physical hazard survey,
 ~ 30 mph winds, use caution.

1120 - Collect sediment sample 101S-2014
 (MS/MISD)

• 3- 8oz amber jar w/p PCB Aroclors
 (8082A Low Level), Metals (Antimony,
 Arsenic, Nickel) (6020A).

Also complete Sediment Sampling
 Visual Inspection Checklist.

Sediment brown & silty w/ vegetation,
 Observed physical hazard when
 leaving site, cut off sign post
 near Landfill posing trip hazard.

Robert Boyd 09/05/14

TO 05

Adak LTM 2014

09/05/14

1230 - A. Lewis & R. Boyd on site
 IIIA/office. De-mob from Palisades
 sampling.

1300 - A. Lewis & R. Boyd on site
 unidentified Roberts Landfill
 well. Coordinates:

N 51° 50.724'

W 176° 39.658'

1400 - On site Yakutat Hanger
 recovery system.

1500 - A. Lewis & R. Boyd on site
 IIIA/office. Continue de-mob,
 OC paperwork.

SWMU 11, Palisades Landfill Photo Log

Date	Time	Description
09/05/14	0840	103S close-up.
09/05/14	0844	103S facing southwest
09/05/14	0844	Creek from Palisades facing northeast
09/05/14	0911	Palisades LF Debris facing northeast
09/05/14	0919	102S facing northwest
09/05/14	0920	102S close-up
09/05/14	1110	101S close-up
09/05/14	1110	101S facing northeast
09/05/14	1110	Palisades LF near 101S facing north
1900 - End of day.		

Robert Boyd 09/05/14

TO 05 Adak LTM 2014 09/06/14

0730 - Prep for sampling.

0830 - On site office.

Conduct tailgate health & safety briefing

See SSite Log Book.

Topics include:

- Slips, trips, & falls
- Wind Hazards
- Heavy lifting

Discuss work plan & QC topics.

0930 - Mob for sampling

PID bump test: 99.4 ppm

Horiba Calibration Check.

Time	pH	SC mS/cm	Turb NTU	DO mg/L	Temp °C	Sal ‰	ORP mV
0940	3.99	4.51	0.0	10.30	14.21	0.2	261
1230	3.99	4.49	0.0	10.45	14.82	0.2	252
		Did not sample					

Team 1 is comprised of R. Boyd & J. Santini today.

1005 - R. Boyd & J. Santini on site

Bunker. Transfer CERCLA water to CERCLA drum

1030 - R. Boyd & J. Santini on site

MW-187-1 (SWMU 62, Sandy Cove).

Conduct physical hazard survey,

no hazards observed. Weather:

Rain, overcast, 55°F, 5-10 mph wind.

Robert Bred 09/06/14

TO 05 Adak LTM 2014 09/06/14

1045 - Collect [DTW = 19.16 ft btoe]

1050 - Set flow rate 200 mL/min

via peristaltic pump.

1101 - Collect water quality parameters listed on purge form.

1136 - Parameters do not stabilize;

Purge 3 x casing volume: Purge 1.75 gal,

pH = 6.36, SC = 1.08 mS/cm, Turb = 25.4 NTU,

DO = 0.00 mg/L, Temp = 8.39 °C,

Sal = 0.0 ‰, ORP = -89 mV.

1140 - Collect sample MW-187-1-2014

• 4 - 40 mL amber VOA w/HCl Methane (RSK175)

• 2 - 1 L amber w/HCl DRO (AK102)

• 1 - 500 mL poly w/p Alkalinity (SM2320B), Sulfate (300.0)

Test Kit Results

DO (ppm)	Fe ¹² (ppm)	CO ₂ (ppm)
0	105 (15x dilution)	160

Also complete Monitoring Well Visual Inspection Checklist.

Non-petroleum chemical odor, moderate intensity, Collect DTB = 22.45 ft btoe (soft bottom).

Robert Bred 09/06/14

TO 05 Adak LTM 2014 09/06/14

1335 - R. Boyd & J. Santini on site

03-619 (SWMU 62, Sandy Cove)

Conduct physical hazard survey,
no hazards observed.

Collect [DTW = 16.37 ft btoc]

DTB = 22.04 btoc. No odors.

1340 - R. Boyd & J. Santini on site

03-155 (SWMU 62, Sandy Cove)

Conduct physical hazard survey,
no physical hazards observed.

Collect [DTW = 19.02 ft btoc]

DTB = 24.99 ft btoc, orange

bio-fouling on probe tip.

1345 - R. Boyd & J. Santini on site

MW-134-10 (SWMU 62, Sandy Cove)

Conduct physical hazard survey,
well head PID - 49.7 ppm, breathing
zone 0.0 ppm. No other hazards.

Collect [DTW = 16.84 ft btoc]

DTB = 21.91 ft btoc.

4 RB 9/6/14

1355 - R. Boyd & J. Santini on site MW-134-11

(SWMU 62, Sandy Cove). Conduct physical
hazard survey, no hazards observed.

Collect [DTW = 18.18 ft btoc]

Robert Bel 09/06/14

TO 05 Adak LTM 2014 09/06/14

1355 cont...

Collect DTB = 21.62 ft btoc.

1 x 9/16" bolt is stripped.

1415 - R. Boyd & J. Santini on site

111A/office. De-mob, QC paperwork

SWMU 62, Sandy Cove Photo Log

Date	Time	Description
09/06/14	1220	MW-187-1 facing northwest
09/06/14	1247	03-619 facing north
09/06/14	1248	03-155 facing east
09/06/14	1350	MW-134-10 facing east
09/06/14	1359	MW-134-11 facing east
1900 - End of day.		

~~Robert Bel 09/06/14~~

TO 05 Adak LTM 2014 09/07/14

1200 - Pack samples for shipment to
ALS-Kelso.

1230 - Alaska Airlines cancels flight
out of Adak.

1300 - End of day.

Reutzel 09/07/14

TO 05 Adak LTM 2014 09/08/14

0630 - Prep for sampling

0730 - On site office.

Conduct tailgate health & safety briefing
See SSITO Log Book.

Topics include:

- Slips, trips, & falls
- Thermal stress
- Wind awareness

Discuss work plan & QC topics.

0800 - Mob Sample Van.

PID bump test: 103 ppm

Horiba Calibration Check

Time	pH	SCust/cm	Turbidity	DO mg/L	Temp °C	Sal %	ORP mV
0810	3.99	4.51	0.0	10.33	13.87	0.2	271
1200	4.00	4.50	0.0	10.51	14.02	0.2	274
1620	3.99	4.52	0.0	10.82	12.84	0.2	270

0850 - A. Lewis & R. Boyd on site

AMW-704 (SWMU 62, Eagle Bay).

Conduct physical hazard survey,
no hazards observed. Set up to
sample. Weather: 53°F, 10-15mph wind
overcast w/ rain.

0900 - Collect [DTW = 6.14 ft btoC]

0905 - Set flow rate 400 mL/min
via peristaltic pump.

Reutzel 09/08/14

TO 05 Adak LTM 2014 09/08/14

0911 - Collect water quality parameters listed on purge form.

0931 - Parameters stabilize: Purge

2.5 gal, pH - 5.98, SC - 0.286 mS/cm,

Turb - 0.0 NTUs, DO - 1.44 mg/L,

Temp - 10-17 °C, Sal - 0.0‰, ORP - 90 mV.

Odorless, clear water. Orange

particulate at initial purge.

0940 - Collect sample AMW-704-2014

• 4 - 40 mL amber VOA w/HeI Methane (RSK175).

• 2 - 1 L amber w/HeI DRO (AK102)

• 1 - 500 mL poly w/p Alkalinity (SM2320B)
Sulfate (300.0)

Test Kit Result		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.8	0.3	18

Also complete Monitoring Well

Gauging Visual Inspection Checklist

Collect DTB = 16.63 ft btoC (moderately soft).

1120 - A. Lewis & R. Boyd on site

11A/office - Pack samples for shipment to ALS - Kelso on make-up Alaska Airlines flight, via Goldstreak.

Dalut Brul 09/08/14

TO 05 Adak LTM 2014 09/08/14

1300 - A. Lewis & R. Boyd on site

Alaska Air. Ship 4 coolers to

ALS via Goldstreak (AWB#

027 1272 1844, total weight 212 lbs)

and 2 boxes to Angus - Hazco

containing PID & Toriba to

Dallas - Ft. Worth (AWB# 027 1272 1822,

gross weight 39 lbs, chargeable

weight 49 lbs).

1350 - A. Lewis & R. Boyd on site

RW-303-13 (SWMU 62, Eagle Bay).

Conduct physical hazard survey,

no physical hazards observed.

Weather: 51°F, 10 mph wind

overcast

1400 - Collect [DTB = 6.13 ft btoC]

1402 - Set flow rate 400 mL/min

via peristaltic pump.

1408 - Collect water quality parameters

listed on purge form. Steve Skeehan on site

1428 - Parameters stabilize: Purge 2.0 gal,

pH - 6.20, SC - 0.384 mS/cm, Turb - 0.0 NTUs,

DO - 3.95 mg/L, Temp - 11.75°C, Sal - 0.0‰,

ORP - 191 mV. Clear odorless water.

Dalut Brul 09/08/14

TO OS Adak LTM 2014 09/08/14
 1435 - Collect sample RW-303-13-2014 (MS/MSD)
 • 12-40 mL ^{canister}VOA w/HCl Methane (RSK 175)
 • 6-1 Lamber w/HCl DRO (AK102)
 • 3-500 mL poly w/p Alkalinity (SMZ320B)
 Sulfate (300.0)

Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
4.5	0.1	37

Also complete Monitoring Well Gauging
 Visual Inspection Checklist
 Collect DTB = 19.41 ft btoC (extremely
 soft bottom).

1500 - S. Skeehan off site.

1600 - A. Lewis & R. Boyd on site

111A/office. De-mob, O&C paperwork.

SWMU 62, Eagle Bay Photo Log

Date	Time	Description
09/08/14	1008	AMW-704 facing west
09/08/14	1538	RW-303-13 facing west

1700 - Notified by Alaska Airlines
 that flight off Adak was
 cancelled, pick up four sample
 coolers and two boxes of
 equipment.

1900 - End of day.

RelutBel 09/08/14

TO OS Adak LTM 2014 09/09/14
 0630 - Prep for sampling.
 0700 - On site office.
 Conduct tailgate health & safety briefing
 See SSItO Log book.

Topics include:

- Slips, trips, & falls
- Proper PPE
- Bunker safety

Discuss work plan & O&C topics

0725 - Mob sample truck.

PID bump test: 103 ppm

Haniba Calibration Check

Time	pH	SCm/s/cm	Turbidity	DO mg/L	Temp C	Sal%	ORP mV
0730	4.00	4.49	0.0	10.12	13.61	0.2	269
1230	3.99	4.50	0.0	10.51	13.68	0.2	268
1715	4.00	4.52	0.0	10.43	14.57	0.2	265

0810 - A. Lewis & R. Boyd on site

MW-303-7 (SWMU 62, Eagle Bay)

Conduct physical hazard survey, no
 physical hazards observed.

Collect [DTW = 21.51 ft btoC]

Complete Monitoring Well Gauging
 Visual Inspection Checklist.

0830 - A. Lewis & R. Boyd on site

RW-303-16 (SWMU 62, Eagle Bay).

RelutBel 09/09/14

TO 05 Adak LTM 2014 09/09/14

0830 cont...

Conduct physical hazard survey,
PID @ wellhead: 71.1 ppm, breathing
zone: 0.0 ppm. Weather 52°F

5 mph wind S, light rain. 7.91

0840 - Collect [DTW = ~~7.30~~ ^{7.30} ft btoc]

DTP = ^{7.30} 7.94 ft btoc. PT = 0.61 ft, DTB = ^{ft btoc} 17.50

Did not collect sample, notified
S. Wunderlich & J. Highstone. Complete inspection.

0900 - A. Lewis & R. Boyd on site

RW-303-15 (SWMU 62, Eagle Bay).

Conduct physical hazard survey,
no hazards observed. Complete inspection.

Collect [DTW = 27.30 ft btoc]

DTB = 34.11 ft btoc. Light petroleum
odor, Wellhead PID: 2-8 ppm,
breathing zone: 0.0 ppm.

0910 - A. Lewis & R. Boyd on site

CTO-124 - MW15 (SWMU 62, Eagle Bay).

Conduct physical hazard survey, no
hazards observed. Wellhead PID-8.0 ppm,
breathing zone: 0.0 ppm. Complete inspection.

Collect [DTW = 17.37 ft btoc]

DTB = 20.04 ft btoc.

Robert Bel 09/09/14

TO 05 Adak LTM 2014 09/09/14

0915 - A. Lewis & R. Boyd on site

03-102 (SWMU 62, Eagle Bay)

Conduct physical hazard survey, no
hazards observed. Complete inspection.

Collect [DTW = 13.72 ft btoc]

DTB = 21.28 ft btoc.

0920 - A. Lewis & R. Boyd on site

03-101 (SWMU 62, Eagle Bay), Conduct

physical hazard survey, no physical
hazards observed. Soak in well.

Collect [DTW = 22.20 ft btoc]

DTB = 26.93 ft btoc.

0930 - A. Lewis & R. Boyd on site

RW-303-14 (SWMU 62, Eagle Bay).

Conduct physical hazard survey, no
physical hazards observed. Complete
inspection. Collect [DTW = 7.48 ft btoc]

DTB = 19.55 ft btoc (extremely soft
bottom).

0940 - A. Lewis & R. Boyd on site

HMW-303-11 (SWMU 62, Eagle Bay).

Conduct physical hazard survey, no hazards
observed. Complete inspection. Soak in well.

Collect [DTW = 26.35 ft btoc]

DTB = 32.10 ft btoc (hard bottom).

Robert Bel 09/09/14

TO 05 Adak LTM 2014 09/09/14

1000 - A. Lewis & R. Boyd on site

MW-303-7 (SWMU 62, Eagle Bay).

Conduct physical hazard survey,
no hazards observed. Weather:

53°F, light wind, overcast.

1010 - Collect [DTW = 21.51 ft btoe].

1015 - Set flow rate 400 ml/min
via peristaltic pump.1021 - Collect water quality parameters
listed on purge form.1046 - Parameters stabilize: Purge 2.5 gal,
pH - 5.91, SC - 0.347 mS/cm, Turb - ONTUS,
DO - 0.00 mg/L, Temp - 8.81°C, Sal - 0.0‰,
ORP - -52 mV. Clear odorless water.

1055 - Collect sample MW-303-7-2014

• 4-40 ml amber VOA w/HCl Methane (RSK 175)

• 2-1L amber w/HCl DRO (AK 102)

• 1-500 ml poly w/p Alkalinity (Sim 2320B)

Sulfate (300.0)

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.05	37.5 (5x dilution)	500

Also complete Monitoring Well Visual
Inspection Checklist.

Collect DTB = 33.60 ft btoe.

Robert Bird 09/09/14

TO 05 Adak LTM 2014 09/09/14

Late Entry

0800 - Generate trip blank TB090914A

• 3-40 ml amber VOA w/HCl BTEX (8260c)

• 3-40 ml amber VOA w/HCl GRO (AK 101)

1200 - Generate trip blank TB090914C

• 2-4 oz amber w/surrogated MeOH GRO (AK 101)

• 2-4 oz amber w/non-surrogated MeOH
BTEX (8260c).1330 - A. Lewis, R. Boyd, S. Wunderlich
on site NL-09S (SWMU 62, Eagle Bay).

Set up to collect sediment sample.

Conduct physical hazard survey,
wear PFD along East Canal.

1410 - Collect sediment sample

NL-09S-2014

• 2-4 oz amber w/surrogated MeOH
GRO (AK 101)• 2-4 oz amber w/non-surrogated MeOH
BTEX (8260c)• 2-4 oz amber w/p DRO (AK 102),
2-methyl naphthalene and Phenanthrene (8270DSim)

Dry weight.

Also complete Inspection Checklist:

Fine grain, dark grey/black w/organics.

Light petroleum odor.

Robert Bird 09/09/14

TO 05

Adak LTM 2014

09/09/14

1450 - S. Wunderlich off site.

1500 - A. Lewis & R. Boyd on site

NL-09 (SWMU 62, Eagle Bay).

Conduct physical hazard survey, no hazards observed. Wear PFD along shoreline. Set up to collect surface water sample via grabs method.

1515 - Collect water quality parameters:

pH - 6.31, SC - 0.705 mS/cm, Turb - 33 NTUs,

DO - 7.27 mg/L, Temp - 9.04°C, Sal - 0.0‰,

ORP - 94 mV. Light petroleum odor & cloudy.

1530 - Collect sample NL-09-2014

- 4 - 40 ml amber VOA w/HCl GRO (AK 101)
- 4 - 40 ml amber VOA w/HCl BTEX (8260C)
- 2 - 1 L amber w/HCl DRO (AK 102)
- 2 - 1 L amber u/p PAHs (16) (8270D SIM).

1545 - Collect sample NL-19-2014 (Dup)

- 4 - 40 ml amber VOA w/HCl GRO (AK 101)
- 4 - 40 ml amber VOA w/HCl BTEX (8260C)

Also complete Inspection Checklist.

Sheen observed on surface of water after entering to collect sample.

Collected from East Canal, 25 ft wide x 14-16 inches deep.

Robert Boyd 09/09/14

TO 05

Adak LTM 2014

09/09/14

1620 - A. Lewis & R. Boyd on site NL-08S

(Former Power Plant, Building T-1451).

Conduct physical hazard survey, wear PFD along shoreline. Set up to collect sediment sample.

1635 - Collect sediment sample NL-08S-2014 (ms/msd)

• 3 - 8 oz amber u/p DRO (AK 102),

2-methylnaphthalene and phenanthrene (8270D SIM),

Dry weight

Also complete Inspection Checklist,

Black sediment w/organics, fine grain, top 1/4" medium brown sediment w/organics, fine grain. Light petroleum odor. Distressed vegetation ~50 ft upstream from sample location at Seep.

1700 - A. Lewis & R. Boyd on site

111A / office. De-mob, GC paperwork.

SWMU 62, Eagle Bay Photo Log

Date	Time	Description
09/09/14	0855	RW-303-16 facing south
09/09/14	0910	RW-303-15 facing east
09/09/14	0914	CR0-124-MW15 facing south
09/09/14	0918	03-102 facing south
09/09/14	0922	03-101 facing southwest
09/09/14	0927	RW-303-14 facing southwest

Robert Boyd 09/09/14

TO 05

Adak LTM 2014

09/09/14

1700 cont...

SWMU 62, Eagle Bay Photo Log

Date	Time	Description
09/09/14	0933	HMW-303-11 facing south
09/09/14	1140	^{RB 9/9/14} RW MW-303-7 facing east
09/09/14	1140	MW-303-7 close-up
09/09/14	1443	NL-09S close-up
09/09/14	1443	NL-09S facing north
09/09/14	1541	NL-09 facing west

Former Power Plant, Bldg T-1451 Photo Log

Date	Time	Description
09/09/14	1644	NL-08S facing west
09/09/14	1645	NL-08S close-up

1900 - End of day.

Relut Bul 09/09/14

TO 05

Adak LTM 2014

09/10/14

0630 - Prep for sampling.

0700 - On site office.

Conduct tailgate health & safety briefing
See SSHO log book.

Topics include:

- Slips, trips, & falls
- Material handling
- Pinch points

Discuss work plan and QC topics

0735 - Mob Sample van.

PID bump test: 101ppm

Horiba Calibration Check

Time	pH	SCms/cm	Turbidity	DO _{msk}	Temp _e	Sal%	ORP _{mV}
0745	3.99	4.50	0.0	10.41	13.54	0.2	260
1230	4.00	4.49	0.0	10.61	13.68	0.2	268
1655	4.00	4.51	0.0	10.61	13.71	0.2	284

0915 - A. Lewis & R. Boyd on site Bunker.

Allowed to ventilate for 10 minutes
prior to entering. PID reading - 0.1ppm
Transfer Test Kit waste to
designated waste container.0935 - A. Lewis & R. Boyd on site
NL-08 (^{RB 9/10/14} ~~SWMU~~ 62, Former Power
Plant, Building T-1451). Conduct
physical hazard survey, wear

Relut Bul 09/10/14

TO 05 Adak LTM 2014 09/10/14

0935 cont...

PFD along shoreline. Set up to collect surface water sample via grab method.

1000 - Collect water quality parameters: pH - 6.30, SC - 0.845 mS/cm, Turb - 31 NTUs, DO - 7.27 mg/L, Temp - 10.91°C, Sal - 0.0‰, ORP - -45 mV. Slightly cloudy water, light petroleum odor. Some orange particulate.

1010 - Collect sample NL-08-2014

- 4 - 40 ml amber VOA w/ HCl BTEX (8260C)
- 2 - 1 L amber w/ HCl DRO (AK 10Z)
- 6 - 1 L amber w/p PAHs(16) (8270051M) MS/MSD.

1020 - Collect sample NL-18-2014 (Dup)

- 2 - 1 L amber w/ HCl DRO (AK 10Z).

Also complete Surface Water sampling Visual Inspection Checklist. Sample collected from East Canal (40 ft wide x 20" deep).

1050 - A. Lewis & R. Boyd on site

MW-1451-6 (Former Power Plant, Building T-1451). Conduct physical hazard survey, no hazards observed.

1100 - Collect [DTW = 4.99 ft btoc]

Ralut Bred 09/10/14

TO 05 Adak LTM 2014 09/10/14

1105 - Set flow rate 400 mL/min

via peristaltic pump.

1110 - Collect water quality parameters listed on purge form.

1130 - Parameters stabilize. Purge 2-0 gal, pH - 6.17, SC - 0.742 mS/cm, Turb - 0 NTUs, DO - 0.00 mg/L, Temp - 10.75°C, Sal - 0.0‰, ORP - -62 mV. Clear odorless water.

1140 - Collect sample MW-1451-6-2014

- 4 - 40 ml amber VOA w/ HCl Methane (RSK 175)
- 2 - 1 L amber w/ HCl DRO (AK 10Z)
- 1 - 500 ml poly w/p Alkalinity (SM2320B), Sulfate (3000)

Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.05	35 (10x dilution)	14

1400 - A. Lewis & R. Boyd on site

E-701 (Former Power Plant, Building T-1451). Conduct physical hazard survey, no hazards observed.

1420 - Collect [DTW = 17.91 ft btoc]

1429 - Set flow rate 400 mL/min via peristaltic pump.

1434 - Collect water quality parameters listed on purge form.

Ralut Bred 09/10/14

TO 05 Adak LTM 2014 09/10/14

1449 - Parameters stabilize: Purge 1.5 gal,
 pH - 6.25, SC - 0.617 mS/cm, Turb - 0 NTUs,
 DO - 6.59 mg/L, Temp - 8.39 °C, Sal - 0.0%,
 ORP - 128 mV. Clear odorless water.

1500 - Collect sample E-701-2014 MS/MSD

- 12-40 mL amber VOA w/HCl methene (RSK175)
- 3-500 mL poly w/p Alkalinity (SMZ3203),
Sulfate (300.0)

Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
6.5	0	29

1550 - A. Lewis & R. Boyd on site Bunker.

Allowed to ventilate > 10 minutes

prior to entry, PID reading: 0.0 ppm

1640 - A. Lewis & R. Boyd on site

HA/office. De-mob, QC paperwork,
 re-ice samples.

Former Power Plant, Building T-1451 Photology

Date	Time	Description
09/10/14	1032	NL-08 facing west

1900 - End of day.

Robert Boyd 09/10/14

TO 05 Adak LTM 2014 09/11/14

0630 - Prep for sampling

0700 - On site office.

Conduct tailgate health & safety briefing

See SSITO log Book.

Topics include:

- Buddy system
- Splashes to face & body
- Allow high PID wells/odor wells to ventilate.

Discuss work plan & QC topics

0750 - Mob sample van

PID bump test: 102 ppm

Horiba Calibration Check

Time	pH	SC mS/cm	Turb NTUs	DO mg/L	Temp °C	Sal %	ORP mV
0800	3.99	4.50	0.0	10.42	13.15	0.2	265
1200	4.00	4.50	0.0	10.61	13.37	0.2	269

Dred not sample

0840 - A. Lewis & R. Boyd on site 03-778

(Area 303/GCI Compound). Conduct
 physical hazard survey, no hazards
 observed.

0845 - Collect [DTW = 19.31 ft btoc]

0852 - Set flow rate 400 mL/min
 via peristaltic pump.

0858 - Collect water quality parameters listed on purge form.

Robert Boyd 09/11/14
 RB 9/11/14

TO 05 Adak LTM 2014 09/11/14

0913 - Parameters stabilize: Purge 1.5 L,
 PH-6.41, SC-0.291 ^{08/11/14} ~~mtm~~ S/cm, Turb-17 NTUS,
 DO-0.00 mg/L, Temp-7.15°C, Sal-0.0‰,
 ORP--99 mV: Clear odorless water.

0920 - Collect sample 03-778-2014

- 4-40 ml amber VOA w/HCl Methene (RSK175).
- 2-1 L amber w/HCl DRO (AK102)
- 1-500 mL poly w/p Alkalinity (SM2320B),
 Sulfate (300.0).

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0	37.5 (5x dilution)	14

1030 - A. Lewis & R. Boyd on site
 IIIA/office. QC paperwork,
 pack sample coolers for shipment
 to ALS-Kelso via Alaska Airlines
 Goldstreak.

1240 - A. Lewis, R. Boyd, S. Wunderlich on
 site Alaska Airlines to ship 14
 coolers containing samples to
 ALS-Kelso via Alaska Airlines
 Goldstreak (AWB# 027 7008 2773,
 Total weight 709 lbs).

1345 - Onsite office/IIIA, pick up
 equipment for Argus-Hazco

Robert Brel 09/11/14

TO 05 Adak LTM 2014 09/11/14

1400 - A. Lewis & R. Boyd on site
 Alaska Air to ship 2 pieces
 to Argus-Hazco in Dallas-Ft. Worth
 (PID & Horiba) via Goldstreak
 (AWB# 027 1272 1822, ^{08/11/14} ~~Gross~~
 Gross weight 39 lbs, chargeable
 weight 49 lbs)

1500 - On site IIIA/office. De-mob,
 QC paperwork, prep for sampling.

1800 - On site Alaska Airlines. Drop
 off A. Franzen, A. Vernik, & S. Skeehan.

1845 - on site IIIA. End of day.

Robert Brel 09/11/14

TO 05 Adak LTM 2014 09/12/14

0630 - Prep for sampling.

0700 - On site office.

Conduct tailgate health & safety briefing.

See SSITO log book.

Topics include:

- Wind awareness
- Pinch points
- Bunker safety

Discuss work plan & QC topics.

0800 - Mob sample van.

PID bump test: 103 ppm

Horiba Calibration Check.

Time	pH	SC (ms/cm)	Turb (ntus)	DO (mg/L)	Temp (°C)	Sal (%)	ORP (mV)
0815	3.99	4.49	0.0	10.34	13.46	0.2	263
1320	3.98	4.48	0.0	9.79	17.33	0.2	252
Did not sample							

0900 - A. Lewis & R. Boyd on site

MRP-MW2 (Area 303/GCI compound).

Conduct physical hazard survey.
use caution w/wind.

0920 - Collect [DTW = 21.17 ft btoc]

0930 - Set flow rate 400 mL/min
via peristaltic pump.0940 - Collect water quality parameters
instead on purge form.

Belut Bul 09/12/14

TO 05 Adak LTM 2014 09/12/14

1005 - Parameters ^{do not} stabilize! Purge

3x casing volume: Purge 3.5 gal,

pH - 5.89, SC - 0.358 ms/cm, Turb - 25 ntus,

DO - 0.00 mg/L, Temp - 7.37°C, Sal - 0.0‰,

ORP - -27 mV. Moderate petroleum odor

w/ orange particulate throughout
purge & sampling.1010 - Collect sample MRP-MW2-2014

- 4 - 40 mL amber VOA w/HCl GRO (AK 101)
- 4 - 40 mL amber VOA w/HCl BTEX (8260C)
- 4 - 40 mL amber VOA w/HCl Methane (RSK 175)
- 2 - 1 L amber w/HCl DRO (AK 102)
- 3 - 500 mL poly w/HNO₃ Total Lead (6020A) ^{MS/MSD}
- 1 - 500 mL poly w/p Alkalinity (SM 2320B)
- 3 - 500 mL poly w/HNO₃ Dissolved Lead
(6020A) (F) MS/MSD

1020 - Collect sample MRP-MW2-2014 (Dup)

- 4 - 40 mL amber VOA w/HCl BTEX (8260C)

Test Kit Results (Dup)		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.10		13

Late Entry		
1010 - Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.10		14

Belut Bul 09/12/14

TO 05 Adak LTM 2014 09/12/14

1115 - A. Lewis, R. Boyd, & S. Wunderlich
on site MRP-MW3 (Area 303/
GCI compound). Conduct physical
hazard survey, use caution
w/ wind.

1122 - Collect [DTW = 7.30 ft btoe]

1127 - Set flow rate 400 mL/min
via peristaltic pump.

1147 - Parameters stabilize: Purge 1.5 gal,
pH - 6.19, SC - 0.290 mS/cm, Turb - 0 NTUs,
DO - 0.00 mg/L, Temp - 10.41 °C, Sal - 0.0‰,
ORP - -67 mV. Clear water, light
petroleum odor.

1155 - Collect sample MRP-MW3-2014

- 4 - 40 mL amber VOA w/HCl GRO (AK 101)
- 4 - 40 mL amber VOA w/HCl BTEX (S260C)
- 4 - 40 mL amber VOA w/HCl Methane (RSK 175)
- 2 - 1 L amber w/HCl DRO (AK 102)
- 1 - 500 mL poly w/HNO₃ Total Lead (6020A)
- 1 - 500 mL poly w/p Alkalinity (SM2320B)
Sulfate (300.0)
- 1 - 500 mL poly w/HNO₃ Dissolved Lead (6020A) (F)

Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.05	30 (5x dilution)	13

Palutzel 09/12/14

TO 05 Adak LTM 2014 09/12/14

1310 - A. Lewis, R. Boyd on site

111A/office. De-mob, QC paperwork
2100 - End of day

Palutzel 09/12/14

TO 05 Adak LTM 2014 09/13/14

0900 - QC paperwork.

1000 - On site office.

Conduct tailgate health & safety briefing

See SSTO logbook.

Topics include:

- Wind awareness
- Proper PPE
- Slips, trips, & falls

Continue QC of paperwork
and start SCI forms.

1900 - End of day.

Robert Boyd 09/13/14

TO 05 Adak LTM 2014 09/14/14

1200 - Pack coolers for shipment
to ALS-Kelso

1330 - A. Lewis & R. Boyd on site

Alaska Airlines to ship 7 cooler
containing samples to ALS-Kelso

via Alaska Airlines Goldstreak
(AWB# 027 7008 2810, total
weight 333 lbs.)

1415 - On site office/111A. End
of day.

Robert Boyd 09/14/14

TO 05 Adak LTM 2014 09/15/14

0630 - Prep for sampling.

0700 - On site office.

Conduct tailgate health & safety briefing.
See SSHTS log book.

Topics include:

- Proper PPE
- Safe breathing zone
- Wind awareness

Discuss work plan & QC topics.

0730 - Moab sample van

PID bump test: 103 ppm

Horiba Calibration Check:

Time	pH	SCm/cm	Turbidus	DOmg/L	Temp°C	Sal%	ORPmV
0740	4.00	4.51	0.0	10.34	14.13	0.2	262
1145	4.00	4.51	0.0	10.55	14.37	0.2	264
1600	4.00	4.51	0.0	10.11	14.11	0.2	269

0800 - Generate trip blank TB091514A

- 3-40ml amber VOA w/HCl GRO (AK101).

0820 - A. Lewis & R. Boyd on site

04-701 (Area 303/GCI compound).

Conduct physical hazard survey,
no hazards observed.

0825 - Collect [DTW = 13.81 ft btoc]

0827 - Set flow rate 400 mL/min

via peristaltic pump.

Rebutel 09/15/14

TO 05 Adak LTM 2014 09/15/14

0832 - Collect water quality

parameters listed on purge form.

0912 - Parameters do not stabilize;
purge 3x casing volume: Purge 40gal,
pH - 6.10, SC - 0.262 mS/cm, Turb - 0 NTUs,
DO - 0.00 mg/L, Temp - 9.42°C,
Sal - 0.0‰, ORP - 25 mV. Clear
odorless water.

0920 - Collect sample 04-701-2014

- 4-40ml amber VOA w/HCl GRO (AK101)
- 4-40ml amber VOA w/HCl Methane (RSK175)
- 1-500ml poly u/p Alkalinity (SM2320B),
^{09/15/14} Sulfide (300.0).

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.4	17.5 (5x dilution)	14

0950 - A. Lewis & R. Boyd on site

03-104 (Area 303/GCI compound).

Conduct physical hazard survey,
no hazards observed.

1000 - Collect [DTW = 19.20 ft btoc]

1005 - Set flow rate 400 mL/min

via peristaltic pump.

1011 - Collect water quality parameters
listed on purge form.

Rebutel 09/15/14

TO 05 Adak LTM 2014 09/15/14

1041 - Parameters do not stabilize,
purge 3x casing volume: Purge
3.0 gal, pH - 6.04, SC - 0.226 mS/cm,
Turb - 3 NTUs, DO - 0.00 mg/L, Temp - 8.86°C,
Sal - 0.0‰, ORP - -38 mV. Clear
odorless water.

1050 - Collect sample 03-104-2014

- 4 - 40 ml amber VOA w/HCl Methane (RSK175)
- 2 - 2 L amber w/HCl DRO (AK 102)
- 1 - 500 ml poly w/p Alkalinity (SM2320B),
Sulfate (300.0)

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.05	35 (5x dilution)	13

1225 - A. Lewis & R. Boyd on site

MW-303-43 (Area 303/GCI

Compound). Conduct physical hazard
Survey, no hazards observed.

1235 - Collect [DTW = 28.38 ft btoC]

1242 - ~~Collect water quality parameters
listed on purge form~~

1307 - Set flow rate 400 mL/min
via peristaltic pump.

1247 - Collect water quality parameters
listed on purge form.

Palut Bro 09/15/14

TO 05 Adak LTM 2014 09/15/14

1307 - Parameters stabilize: Purge 2.0 gal,
pH - 5.64, SC - 0.451 mS/cm, Turb - 1 NTUs,
DO - 0.00 mg/L, Temp - 9.20°C, Sal - 0.0‰,
ORP - 119 mV. Clear odorless water.

1315 - Collect sample MW-303-43-2014

- 4 - 40 ml amber VOA w/HCl GRO (AK 101)
- 4 - 40 ml amber VOA w/HCl Methane (RSK175)
- 1 - 500 ml poly w/p Alkalinity (SM2320B),
Sulfate (300.0).

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.6	1	13

1345 - A. Lewis & R. Boyd on site

04-210 (Area 303, GCI Compound)

Conduct physical hazard survey,
no hazards observed.

1355 - Collect [DTW = 24.49 ft btoC]

1405 - Set flow rate 400 mL/min
via peristaltic pump.

1412 - Collect water quality parameters
listed on purge form.

1427 - Parameters stabilize: Purge 1.5 gal,
pH - 6.20, SC - 0.208 mS/cm, Turb - 5 NTUs,
DO - 0.00 mg/L, Temp - 7.94°C, Sal - 0.0‰,
ORP - -49 mV. Clear odorless water.

Palut Bro 09/15/14

TO 05 Adak LTM 2014 09/15/14

1445 - Collect sample 04-210-2014

- 4-40 ml amber VOA w/HCl GRO (AK101)
- 4-40 ml amber VOA w/HCl Methane (RSKITS)
- 1-500 ml poly cup Alkalinity (SM 2320B), Sulfate (300.0)

Test Kit Results

DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.05	35 (5x dilution)	12

1545 - A. Lewis & R. Boyd on site

111A/office. De-mob, QC paperwork,
1900 - End of day.

Robert B. O 09/15/14

TO 05 Adak LTM 2014 09/15/14

0630 - Prep for sampling.

0700 - On site office

Conduct tailgate health & safety briefing

See SSite log book.

Topics include:

- Slips, trips, & falls
- Vehicle operations
- Breathing zone safety

Discuss work plan & QC topics.

0740 - Mob sample van.

PID bump test: 101 ppm

Horiba Calibration Check.

Time	pH	Scout	Turbidity	DO (mg/L)	Temp (°C)	Sal (%)	ORP (mV)	
0750	3.91	4.48	0.0	10.42	13.64	0.2	248	
1245	4.00	4.49	0.0	10.60	13.71	0.2	251	
			Did not sample					

0840 - A. Lewis & R. Boyd on site

04-211 (Area 303/GCI Compound)

Conduct physical hazard survey.

PID at wellhead: 160 ppm, breathing
zone: 0.0 ppm. Allow to ventilate.

0850 - Collect [DHW = 23.49 ft btoe]

0853 - Set flow rate 400 ml/min

via peristaltic pump.

Robert B. O 09/16/14

TO 05 Adak LTM 2014 09/16/14

0858 - Collect water quality parameters listed on purge form.

0913 - Parameters stabilize: Purge 1.5 L,
pH - 6.13, SC - 0.386 mS/cm, Turb - 3 NTUs,
DO - 0.00 mg/L, Temp - 6.30°C, Sal - 0.0‰,
ORP - -5 mV. Clear odorless water.

0920 - Collect sample 04-211-2014

- 4-40 mL amber VOA w/HCl GRC (AK101)
- 4-40 mL amber VOA w/HCl Methane (RSK175)
- 1-500 mL poly up Alkalinity (SM2320B), Sulfate (300.0)

Test Kit Results		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
0.1	12.5 (5x dilution)	28

1000 - On site 111A/office. De-mob.

1015 - Leave 111A, collect site overview photos.

1145 - A. Lewis & R. Boyel on site

Bunker. Allow to ventilate >10 minutes.
PID breathing zone: 0.2 ppm. Transfer
purge water, PPE, and test kit waste
to appropriate containers.

1230 - A. Lewis & R. Boyel on site
111A/office. Continue De-mob.

Rafael Boyel 09/16/14

TO 05 Adak LTM 2014 09/16/14

1230 cont...

Sort Argus - Hazco Equipment

Items to be returned on

09/18/14 flight:

- 2 peristaltic pumps (Asset# 1133935, 1088354)
- 2 PIDs (Asset# 1095679, 1113692)
- 2 interface meters (Asset# 1119303,
- 1 Horiba W-22 (Asset# 1118340)
- 1 Horiba U-52 (Asset# 1135312) ^{w/pH probe(s)}

Items to likely be returned
on 09/21/14 flight:

- 2 peristaltic pumps (Asset# 1088358, 1128276)
- 1 PID (Asset# 1111979)
- 1 Horiba U-22 (Asset# 1097992)
- 1 Horiba U-52 (Asset# 1123783)

Items Sealaska will likely
withhold and purchase from Argus-Hazco:

- 1 PID (Asset# ~~1111980~~ 1111980)
- 1 Cal Gas Regulator (Asset# 1124653)

Rafael Boyel 09/16/14

TO 05 Adak LTM 2014 09/16/14

1230 cont...

Site Overview Photo Log

Date	Time	Description	Site Overview
09/16/14	1021	Area 303 - BCI Compound	facing north
09/16/14	1021	Area 303 - BCI Compound	facing south
09/16/14	1023	Former Power Plant, Building T-1451	facing north
09/16/14	1026	NMCB	Site Overview facing south
09/16/14	1027	NMCB	Site Overview facing east
09/16/14	1029	South of Runway 15-34	Site Overview facing north
09/16/14	1029	SWMU 60, Tank Farm A	Site Overview facing south
09/16/14	1031	SA79, Main Road Pipeline	Site Overview facing south
09/16/14	1034	SWMU 25, Roberts Landfills	Site Overview facing south
09/16/14	1036	SWMU 25, Roberts Landfills	Site Overview facing west
09/16/14	1135	ROICC	Site Overview facing northeast
09/16/14	1214	SA80, Steam Plant	Site Overview facing southwest
09/16/14	1215	SA80, Steam Plant	Site Overview facing east
09/16/14	1218	Arctic Acres Housing Area	Site Overview facing east
09/16/14	1218	Arctic Acres Housing Area	Site Overview facing northeast
09/16/14	1222	SWMU 62, Sandy Cove	Site Overview facing south
09/16/14	1228	SWMU 55, Public Transportation	Site Overview facing north
09/16/14	1233	SWMU 62, Eagle Bay	Site Overview facing south
09/16/14	1235	SWMU 62, Sandy Cove	Site Overview facing east

1800 - Inventory test kits:

- High Range DO - 122, exp 06/19
- Low Range DO - 17, exp 06/19

Delbert 09/16/14

TO 05 Adak LTM 2014 09/16/14

1800 cont...

- Fe²⁺ - 128, exp 05/19
- Low Range CO₂ - 63, exp 11/14
- High Range CO₂ - 54, exp 11/14

1930 - End of day.

Delbert 09/16/14

TO 05 Adak LTM 2014 09/17/14

0900 - On site office.

Conduct tailgate health & safety briefing.

See SSite logbook.

Topics include:

- Proper PPE
- Heavy lifting
- Slips, trips, & falls.

Discuss work plan & QC topics.

0930 - Continue de-mob.

Add regulator for Cal-Gas

to PID to be returned on

09/18/14 flight. Regulator

(Asset # 1123530). De-mob

sample vans. Inventory

supplies

1900 - End of day.

Robert Brul 09/17/14

TO 05 Adak LTM 2014 09/18/14

0900 - Continue de-mob. Prepare well repair list.

1100 - Pack sample coolers for shipment to ALS-Kelso.

1300 - On site Alaska Airlines.

Ship 6 coolers containing samples to ALS-Kelso

via Goldstreak (AWB# 027

1274 9030, total weight 265 lbs),

and ship 8 boxes containing

2 Horibas, 2 peristaltic pumps,

2 PIDs, and 2 interface meters

to Argus-Hazco in Dallas-Ft. Worth

via Goldstreak (AWB# 027 ^{09/18/14}

1274 9030, Gross weight 265 lbs,

174 lbs, chargeable weight 213 lbs.)

1410 - Onsite 111A/ office. Continue de-mob.

1700 A. Lewis brought B. Boyd to airport.

1800 A. Lewis - End of day

Amy 09/18/14

NO FURTHER COPIES

John D. Smith



Rite in Rain

ALL-WEATHER
JOURNAL

№320N

TO O5 ADAR LTM

2014 OVA

TEAM 2

START: 8/23/14

END: 09/18/14



BOOK # 1 - TEAM 2

PROJECT: ADAK LTM 2014

CONTRACT: N44255-14-D-9011

PROJECT ^{8/13/14}

TASK ORDER # 05

NAVAL INSTALLATION: FORMER

NAVAL COMPLEX ADAK, AK

SITE NAME: OVA

START DATE: 8/22/14

END DATE: 09/18/14

BOOK ASSIGNMENT: TEAM 2

BARB SCHLEIGER

WILL KAAGE

COMPANY: SEALASKA ENVIRONMENTAL
SERVICE

ADDRESS: 18143 FRONT ST NE
STE 201

POOLS BO, WA 98370

PHONE: 360-930-3300

REVIEWED BY: *Autto Jim*

DATE REVIEWED: 11-6-14

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12-13	PHOTO LOG SA 79 & SWMU 60	8/26/14
14-19	SWMU 60 TANK FARM A + NMCB	8/30/14
" "	T1416 EXPANDED AREA WELLS	
19 20	SOUTH OF RUNWAY 18	8/28/14
20-26	ARCTIC ACRES	8/28-8/29/14
26-27	SA 80, STEAM PLANT 4	8/29/14
28-31	ROICC Construction Area	8/29-8/30/2014
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40-47	SWMU 25 Roberts Landfill	9/2-9/3 2014
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[Signature]

9/14/14

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	PUMP - PELICAN 1430 474-0060 SER # 1088354. Δ TO SN # 08-08458 (PAGE 25) @ 9/19/14	
	MULTIMETER - HORIBA WATER QUALITY METER MODEL # W-22 XD, MFG 91810 SER # 1118340 Δ US2 WTEVPR 61 PRIMARY (PAGE 5)	
	5 @ 9/19/14 GAS METER - Rae Systems Multi RAE PLUS Model # P6-M50-SP SERIAL # 095-S10661	
	INTERFACE METER - Solinst Interface Probe Model 122 Asset #	
	NOTE: HORIBA MEASUREMENTS TAKE IN: TEMP = °C, SC = M/s/cm, TURB = NTU, DO = mg/L, Sal = ‰, ORP = MV TEST KIT VALUES IN PPM.	

PR 9/19/14



ALL-WEATHER WRITING PAPER

ALL-WEATHER
JOURNAL
FIELD BOOK

Numbered Pages

Name TEAM 2
BARB SCHLEIGER, WILL KAASE

Address _____

Phone TO OS ADAK UTM 2014

Project _____

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PR 9/19/14

2
TO OS ADAK LTM 2014 8/23/14

0900 - CONTINUE SITE PREP
SEE SSHP LOGBOOK FOR HEALTH &
SAFETY WORK PLAN REVIEWS
AND EQUIPMENT REVIEW, REVIEW
ROADMAPS, FIELD FORMS AND
SAMPLE PACKING PROCEDURE.
SET UP SAMPLE VAN PREP.
1115 - DRIVE TO TSUNAMI MUSTER AND
WASTE BUNKER.

1213 - BACK AT HOME BASE

1700 - END OF DAY

8/23/14

3
TO OS ADAK LTM 2014 8/25/14

0700 - MORNING MEETING HELD

SEE SSHO LOG BOOK

TOPICS COVERED: SLIPS TRIPS FALLS,
PROPER PPE, SAMPLING AT WELLS,
PID USE.

0741 - CONDUCT CALIBRATIONS

PID - 105 ppm BUMP TEST

HORIBA CALIBRATION

TIME	PH	COND ^{8/25/14} 8/23/14	TURB	DO ml	TEMP	SAL	ORP
0744	4.0	4.5	0.0	10.32	13.29	0.2	274
1250	4.06	4.18	0.6	11.08	13.21	0.2	269

SWITCHED PUMP SEE PA #5

0825 - AT SA 79 MAIN ROAD PIPELINE

PID 1.7 ppm AT WELLS HEAD, 1.6 ppm
AT BREATHING LEVEL AT

MRP-MW-08 [DTW 10.01' ^{water}]

CONDUCT PHYSICAL HAZARD
ANALYSIS. METAL DEBRIS BETWEEN
MW-08 AND 601. RINSE HORIBA.

1005 COLLECT WATER QUALITY
PARAMETERS: Purged 1 gallons,
PH 6.07, Cond 0.899 ^{ns/cm}, Turb 16.4 ^{ntu},
DO 0.06 ^{mg/L}, Temp 8.08 °C, Sal 0.0%,
Redox -85 mV

1015 Collect Water Samples MRP-MW8-2014

8/25/14

4
TOOS ADAK LTM 2014 8/25/14

CONT.

- (2) 1L Amber w/HCL DRO (AK102)
- (1) 500ml Poly Alkalinity (SM 2320B)
Sulfate (300.0)
- (4) 40 ml VOC amber vials w/HCL

1020-COLLECT FIELD DUPLICATE

MRP-MW18-2014

- (2) 1L Amber w/HCL DRO (AK102)

TEST KIT RESULTS		
DO ppm	Fe ²⁺ ppm	CO ₂ ppm
0.6	22.5*	60

* DILUTION FACTOR = 5 ml well water ^{plus} 20 ml DI
DTB 16.15' 5x dilution

115 - PHOTO TAKEN AT WELL SITE FACING NNW

1250 - CALIBRATE PID, READING 0.6 ppm

1300 - ON SITE 02-230

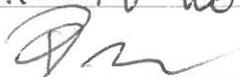
PID AT WELL HEAD 3.7 ppm,

BREATHING ZONE 0.0 ppm.

CONDUCT PHYSICAL HAZARD ANALYSIS: AREA IS CLEAR OF DEBRIS. [DTW 11.73']

- COLLECT WATER QUALITY PARAMETERS
HORIBA COND. READING 0.99 AND 0.90

CHANGING OUT HORIBA UNIT
REVIEW OF ROAD TO WELLS

 8/25/14

5
TOOS ADAK LTM 2014 8/25/14

BETWEEN TWO ROCKS THERE

IS A LOAD OF SOIL IN THE

TRACKS THAT LOOKS LIKE BENTONITE

1440 - STUBSKEEHAN CAME BY

THE SITE. CHANGING OUT HORIBA

HGS WITFVPR61 U52

TIME	PH	COND ^{SC}	TURB	DO	TEMP	SAL	ORP
1430	4.0	4.50	0.0	9.15	13.76	0.24	302
1804	4.26	4.60	50	8.33	13.69	0.24	272

1519 - WATER QUALITY PARAMETERS STABILIZED

COLLECTED: PURGED 1 GALLOW,

PH 6.67, COND 0.729 US/cm, TURB 0.0,

DO 0.00, TEMP 11.69 °C, SAL 0.0‰,

Redox - 79.

1520 - COLLECT SAMPLES 02-230-2014

- (2) 1L Amber glass w/HCL DRO (AK102)

- (1) 500ml Poly Alkalinity (SM 2320B)

AND SULFATE (300.0)

- (4) 40 ml VOC Amber w/HCL

METHANE (RSK 175) DTB 18.97'

TEST KIT RESULTS		
DO ppm	Fe ²⁺ ppm	CO ₂ ppm
0.4	20.0 (5+2.9)	50

1611 - ON SITE 601 TO COLLECT
WELL SAMPLES. [DTW 11.35']

 8/25/14

6 TO OS ADAK LTM 2014 8/25/14

CONT: VISUAL ANALYSIS OF AREA CLEAR FROM DEBRIS, SAMPLING WILL BE COLLECTED USING PARISTATIL PELICAN PUMP.

LATE ENTRY: USED DILUTION FACTOR 5 ml WELL WATER TO 20 ml DI WATER FOR Fe²⁺ AT 601-2014 WELL Dilution FACTORS

CDTW 11.03' PIP 3.5 ppm well head 0.0 ppm BREATHING ZONE

1700 PARAMETERS STABILIZED

0.75 GALLONS WATER PURGED, PH 6.54, COND 0.331 ms/cm, TURB 0.50 U DO 0.00 mg/L, TEMP 8.11 °C, SAL 0.0 ‰ Redox - 30.

1710 - COLLECTED SAMPLES 601-2014

(2) 1L AMBER GLASS w/ HCL DROPLAK 102

(1) 500 ml poly ALKALINITY (SM 2320B), SULFATE (300.0)

(4) 40 ml VOC AMBER w/ HCL METHANE (RSK 175)

DTB 18.03'

TEST KIT RESULTS		
D ppm	Fe ²⁺ ppm	CO ₂ ppm
0.0	30.0	75

[Signature] 8/25/14

7 TO OS ADAK LTM 2014 8/25/14

CONT. DILUTION FACTOR 5 ml WELL plus 20 ml DI WATER. Dilution FACTOR = 5

NOTE: END OF THE DAY CALIBRATION FOR US2 HORIBA HAS HIGH READINGS FOR PH AND TURB AFTER CLEANING AND CHANGING CALIBRATION LIQUID

RECALIBRATED HORIBA US2

TIME	PH	SC	TURB	DO	TEMP	SAL	ORP
1827	3.98	4.54	0.0	10.09	13.81	0.24	310

1830 - DECON COMPLETED DEMOB COMPLETE

1840 - SA 79 PHOTO LOG ~~(8/25)~~ 8/26/14

DATE — TIME — DESCRIPTION

1900 END OF DAY, PHOTOS AT SA 79 WILL BE ADDED IN 8/26/14 ENTRIES AT THE END WITH 8/26/ PHOTOS

[Signature]
8/25/14

TO 05 ADAK LTM 2014 8/26/14

0700 MORNING MEETING HELD

SAFETY MEETING HELD AND LOGGED
IN SSATO LOG BOOK

122 HORIBA CALIBRATION

TIME	PH	SC	TURB	DO	TEMP	SAL	ORP
0815	3.91	4.63	0.0	10.48	13.50	0.2	270
1338	3.97	4.91	0.0	10.44	13.14	0.2	255
1710	3.94	4.51	0.0	10.31	13.41	0.2	254

PID CALIBRATION FAILURE. THERE
IS NOT A WORKING THIRD PID.

WG WILL BE SHARING A PID FROM
TEAM 1, AND ^{vendor} ~~LAB~~ ^{will} BE SENDING
OUT A REPLACEMENT PID.

0915 ON SITE AT ~~SWMU~~ ^{Production} SWMU 60,
TANK FARM A.

0920 ON SITE AT WELL 650

[LDTW 9.48] PID WELL HEAD 0.0 ppm

PID BREATHING ZONE 0.0 ppm

CONDUCT HAZARD ANALYSIS OF
SITE. LOCATED NO DEBRIS AT SITE.
SET UP TO SAMPLE WATER USING
PELLICAN PERISTALTIC PUMP. NOTED

A PETROLEUM ODOR IN PURGE WATER

1005-BEGIN COLLECTING ~~PAR~~ ^{shelly} PARAMETERS

1020 ^{shelly} PARAMETERS STABILIZED

1025

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TO 05 ADAK LTM 2014 8/26/14
1030-BEGIN SAMPLING. 050-2014

PARAMETERS ARE: PURGE 1 gal.

PH 6.01, COND 0.60 us/cm, TURB 20.7 NTU

DO 0.00 mg/L, TEMP 9.14, SAL 0.0 ‰

REDOX -26. SAMPLES COLLECTED IN

(1) 40 ml VOC amber w/HCL BTEX (2260C)

(2) 1L amber glass w/ HCL DRO (AX10Z)

(2) 1L glass amber pH# (16) (82700 SWM)

(1) 500 ml Poly ~~PAR~~ ^{shelly} ALKALINITY (SN 23 20B)

AND SULFATE (300.0)

(4) 40 ml VOC amber w/HCL METHANE

(RSK175)

TEST KIT RESULTS		
DO (ppm)	Fe ²⁺ (ppm)*	CO ₂ (ppm)
0.3	15.0	30.0

* DILUTION FACTOR Fe²⁺ = 5 ml
DTB = 15.83' _{SW 8/26/14}

PURGE WATER COLLECTED FOR
TRANSPORT TO WASTE BUNKER
DUE TO ~~PETROLEUM~~ ^{shelly} HYDROCARBON
ODOR. APPROX ^{shelly} EST 2.5 GAL

1128- ON SITE SWMU 60 TANK FARM

A WELL 651 FOR WATER
SAMPLING. CONDUCT HAZARD
ANALYSIS OF SITE. NO DEBRIS

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TO OS ADAK LTM 2014 8/26/14
 CONT. [DTW 8.81] PID AT WELL
 HEAD 0.0 ppm PID IN BREATHING
 ZONE 0.0 ppm. CONDUCT HAZARD
 ANALYSIS OF WELL ARBA. NO
 DEBRIS AT LOCATION.

1140 - SET UP TO SAMPLE USING
 PELICAN PERISTALTIC PUMP. NOTE:
 THERE IS A STRONG HYDROCARBON
 ODOR AT THIS WELL.

1200 - BEGIN COLLECTING PARAMETERS

1230 - PARAMETERS STABILIZED PURGE (5 GAL),
 PH 6.06, COND 0.477, TURB 37.2 NTU,
 DO 0.00 mg/L, TEMP 8.61°C, SAL 0.0%
 Redox - 31.

1235 - COLLECT SAMPLES 651 - 2014

(4) 40 ml VOC Amber w/ HCL BTEX (8260L)

(2) 1L AMBER GLASS w/ HCL DRO (AK102)

(2) 1L AMBER PATHS (16) (8200 SIN)

(1) 500 ml POLY ALKALINITY (SM 23203)
 & SULFATE (300.0)

(4) 40 ml VOC AMBER w/ HCL
 METHANE (RSK 175)

TEST KIT RESULTS		
DO (ppm)	Fe ²⁺ (ppm)	CO ₂ (ppm)
5.0	15.0	49.0

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TO OS ADAK LTM 2014 8/26/14
 DILUTION FACTOR FOR Fe²⁺ = 5 ml
 [DTB 14.65] ^{SW} 8/26/14
 COLLECTED 2.5 GALLONS PULSE WATER
 TO TAKE TO WASTE BUNKER FOR
 DISPOSAL.

1500 - ON SITE AT SWMU 60 TANK
 FARM A WELL 653

[DTW 11.16] BTP 11:00 SINCE
 THERE IS A 0.16" THICKNESS

COMPLETED HAZARD ANALYSIS
 OF THE SITE, NO DEBRIS AT THE

WELL SITE, PID 2.5 ppm well 0.0 ppm, [DTB 17.49]

1515 - ON SITE SWMU 60 TANK FARM
 A LC5A. CONDUCT HAZARD

ANALYSIS OF THE SITE ^{Metal Canister} ~~Other~~ DEBRIS

FOUND AT THE SITE [DTW 6.62] ^{SW}

PID AT WELL HEAD 0.0 ppm, PID
 AT BREATHING ZONE 0.0 ppm.

1525 - SET UP TO SAMPLE USING PERISTALTIC
 PUMP.

1545 - BEGIN COLLECTING PARAMETERS

1600 - PARAMETERS STABILIZED

PURGE 0.75 GALLONS, PH 6.14
 COND 0.699 ms/cm, TURB 2.5 NTU,
 DO 0.0 mg/L, TEMP 10.74°C, Redox - 85

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TO OS ADAK LTM 2014 8/26/14

1610- BEGIN COLLECTING SAMPLES

(4) 40 ml VOC BTEX (8260C) IN AMBER w/ HCL

(2) 1L AMBER w/ PAA (16) (827D SIM)

(1) 500ml POLY ALKALINITY (SM 2320 B) +
SULFATE (300.0)

(4) 40 ml VOC w/ HCL AMBER METHANE
(RSK 175)

TEST KIT RESULTS		
DO ppm	Fe ²⁺ ppm	CO ₂ ppm
0.3	10.0	25.0

*Fe²⁺ DILUTION FACTOR = 5ml 5ml 8/26/14

COLLECTED 1 GAL FOR WASTE WATER
FROM DECON WATER,

DTB 12.60'

1640- SWMU60 OFF SITE

~~DTB~~ 8/26/14

PHOTOLOG (8-25-14, 8-26-14)

• SA 79

DATE	TIME	DESCRIPTION
8-25-14	1128	MRP MW8 LOOKING NW
8-25-14	1600	02 230 LOOKING S
8-25-14	1738	601 LOOKING NW
8-25-14	1739	601 WELL CAP

~~8/26/14~~

TO OS ADAK LTM 2014 8/26/14

PHOTOLOG CONT

• SWMU60 FIELD FARM A

DATE	TIME	DESCRIPTION
8-26-14	1130	650 LOOKING E
8-26-14	1129	650
8-26-14	1325	651
8-26-14	1325	651 LOOKING E
8-26-14	1648	653 LOOKING NW
8-26-14	1649	LC5A LOOKING NW

1900 END OF DAY

~~8/26/14~~

TO OS ADAK UTM 2014 8/27/14
 0715 - MORNING MEETING HELD
 SAFETY BRIEF LOGGED IN SS40
 LOG BOOK.

HORIBA U92 CALIBRATION

TIME	PH	SC	TURB	DO	TEMP	SAL	OP
0828	4.00	4.51	0.0	10.38	13.70	0.2	267
1241	3.98	4.50	0.0	10.12	13.26	0.2	257
1818	4.0	4.48	0.0	10.19	14.53	0.2	259

PPD IS NOT WORKING PROPERLY
 WELL INSPECTIONS PERFORMED 8/26/14,
 WE WILL OPEN AND VENT WELLS
 PRIOR TO SAMPLING.

0845 - ON SITE 650 SWMO 60
 TANK FARM A [DTW 9.26 BOTC]
 SET UP TO SAMPLE USING PERISTALTIC
 PUMP. 8/26/14 SAMPLE DID NOT STABILIZE

0920 - BEGIN COLLECTING PARAMETERS
 RE-SAMPLE OF 650-2014

0935 - PARAMETERS STABILIZED

0940 - BEGIN COLLECTING SAMPLES

650-2014 PARAMETERS ARE

PH 6.10, COND 0.582 us/cm, Turb 29,
 DO 0.00 ug/L, TEMP 8.47°C, Sal 0.09‰,
 REDOX -33 mV

(4) 40 ml amber HCL BTEX (8260C)

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TO OS ADAK UTM 2014 8/27/14
 (2) 1 L AMBER UP PATHS (16) (82700 SIM)
 (1) 500 ml poly ALKALINITY (SM 2320 B) +
 SULFATE (300.0)
 (4) 40 ml VOC w/ HCL AMBER METHANE
 (PSK 175)

(2) 1 L AMBER w/ HCL DRO (AK102)

TEST KIT RESULTS		
DOPPM	Fe ²⁺ ppm	CO2 ppm
0.3	10.0	23

Fe²⁺ DILUTION FACTOR = 5, 2.5 gal waste Ruck
 DTB RECORDED 8/26/14 COLLECTION.

1030 - ON SITE NMCB BUILDING T-1416
 EXPANDED AREA WELL NMCB-09

1055 - SET UP TO SAMPLE USING PERISTALTIC
 PUMP. [DTW 9.20 BOTC]

1140 - BEGIN COLLECTING PARAMETERS
 SLIGHT ODOR WHILE COLLECTING
 PARAMETERS.

1155 - PARAMETERS STABILIZED

1200 - BEGIN COLLECTING PARAMETERS
 SAMPLES NMCB-09-2014

(4) 40 ml amber w/ HCL BTEX (8260C) (AK102)

(4) 40 ml amber w/ HCL Methane
 (PSK 175)

(1) 500 ml poly ~~Methane~~ ALKALINITY (SM 2320 B)

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