PACIFIC AIR FORCES
REGIONAL SUPPORT CENTER

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

2013 ANNUAL GROUNDWATER MONITORING REPORT

FORMER RADIO RELAY STATION
PORT HEIDEN, ALASKA

FINAL
MARCH 2014

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFCEC	Air Force Civil Engineer Center
BLO	Black Lagoon Outfall
COC	contaminant of concern
DL	detection limit
DQA	Data Quality Assessment
DRO	diesel-range organics
DSA	Drum Storage Area
DTW	depth to water
FPC	Former Pipeline Corridor
GLO	Grey Lagoon Outfall
GPS	global positioning system
GRO	gasoline-range organics
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
NVPH	Native Village of Port Heiden
POL	petroleum, oil, and lubricants
RI/FS	Remedial Investigation/Feasibility Study
RRO	residual-range organics
RRS	Radio Relay Station
TBM	temporary benchmark
TCE	trichloroethene
TOC	top of casing
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
VOC	volatile organic compound

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1.0 INTRODUCTION

This Annual Groundwater Monitoring Report describes the groundwater monitoring activities conducted September 2013 at the Former Port Heiden Radio Relay Station (RRS) and Former Pipeline Corridor (FPC) sites. Jacobs Engineering Group Inc. performed this work for the Air Force Civil Engineer Center (AFCEC) under U.S. Army Corps of Engineers (USACE), Alaska District Hazardous, Toxic, and Radioactive Waste Contract Number W911KB-11-D-0005, Task Order 06.

Activities were conducted in accordance with the plans and procedures outlined in the *Groundwater Monitoring 2013 Work Plan* (U.S. Air Force [USAF] 2013). Deviations to this Work Plan are described in Section 2.0.

1.1 REPORT ORGANIZATION

This report is organized as follows:

- Section 1.0 presents the project, the site history and background, and the scope of work.
- Section 2.0 presents work plan deviations.
- Section 3.0 presents the project execution approach.
- Section 4.0 presents a summary of the analytical data.
- Section 5.0 presents a summary of the historical data.
- Section 6.0 presents waste management.
- Section 7.0 presents conclusions and recommendations.
- Section 8.0 lists documents referenced in this report.
- Appendix A contains a log of project photographs.
- Appendix B contains the Data Quality Assessment (DQA), analytical data, and laboratory documentation associated with sampling.
- Appendix C contains the field documentation including groundwater monitoring forms and field logbooks.
- Appendix D contains the survey data and field survey logbook.
- Appendix E contains the comments received on the Draft version of this Report, and responses as incorporated into this Final Report.

1.2 SITE BACKGROUND

The Former RRS site is approximately 3.5 miles north of the village of Port Heiden on the northern coast of the Alaska Peninsula (Figure 1-1). The Former RRS site was a Distant Early Warning Line radar station active until 1981. It was constructed between 1955 and 1960, over a footprint of several square miles. This area occupied a small portion of the former Fort Morrow Army installation, which housed up to 5,000 personnel during World War II.

Historical activities supporting the Former RRS occurred at the Marine Terminal Area (a former petroleum tank farm and pump house where Airport Road reaches the Port Heiden Lagoon), and the FPC connecting the Marine Terminal Area to the Former RRS along Airport Road and Site Road. Both FPC-066 and FPC-215 are associated with spills along the FPC that were identified during the 2008 pipeline removal and soil remediation actions (Native Village of Port Heiden [NVPH] 2009).

A Remedial Investigation/Feasibility Study (RI/FS) was conducted in 2004 on behalf of the 611th Civil Engineer Squadron that characterized the condition of groundwater throughout Port Heiden (USAF 2006). NVPH, under the *Remediate Former Port Heiden RRS* Cooperative Agreement administered by USACE, carried out subsequent groundwater monitoring events at the FPC sites in 2008/2009, and at the Former RRS and the FPC sites in 2010, 2011 and 2012.

In 2008, the fuel pipeline was removed from the Marine Terminal to the former composite building located at the Former RRS (NVPH 2009). Two diesel-range organics (DRO)-contaminated sites along the FPC are still known to exist and are annually monitored. These areas are FPC-066 located near the Port Heiden School, and FPC-215 located near the airport (Figure 1-1). DRO-contaminated groundwater exists at both locations. At the Former RRS, historical effluent discharged via a garage floor drain in the composite building was piped downslope and discharged into the Black Lagoon Outfall (BLO) berm-reinforced ponding area, which has contributed to significant contamination at the BLO.

Additional areas of concern at the Former RRS include the Grey Lagoon Outfall (GLO), Drum Storage Area (DSA), former underground storage tanks, septic system and septic system outfall, and various landfills and debris burial areas.

Based on historical information, contamination plumes have been identified atop the groundwater at the BLO and DSA. The plume identified at the BLO is composed of DRO and trichloroethene (TCE). A separate TCE contamination plume is located beneath the former composite building and DSA (NVPH 2013).

1.3 PROJECT OBJECTIVE

The primary project objectives for the 2013 groundwater sampling event were to:

- Conduct groundwater sampling and analysis to provide data for the evaluation of the current contamination levels
- Evaluate trends in the groundwater at the Former RRS sites to support management decisions.

1.4 SCOPE OF WORK

The definable features of work for this project included the following:

- **Site setup including site controls and integrated data management facilities**: Site controls were used to mitigate potential migration of contaminants of concern (COC), while data management procedures were used to organize and protect data generated by field activities.
- **Geodetic Surveying**: the locations of existing monitoring wells and top of casing (TOC) elevations were geodetically surveyed to provide spatial coordinates for reporting, figure generation, and future monitoring.
- **Annual Groundwater Monitoring**: Field monitoring included turbidity, conductivity, pH, dissolved oxygen, and oxidation-reduction potential. Water samples were submitted for laboratory analysis of gasoline-range organics (GRO), DRO, residual-range organics (RRO), volatile organic compound (VOC), and monitored natural attenuation (MNA) parameters.
- **Waste Management and Decontamination**: Investigation-derived waste generated during the field activities were managed as contaminated wastes.

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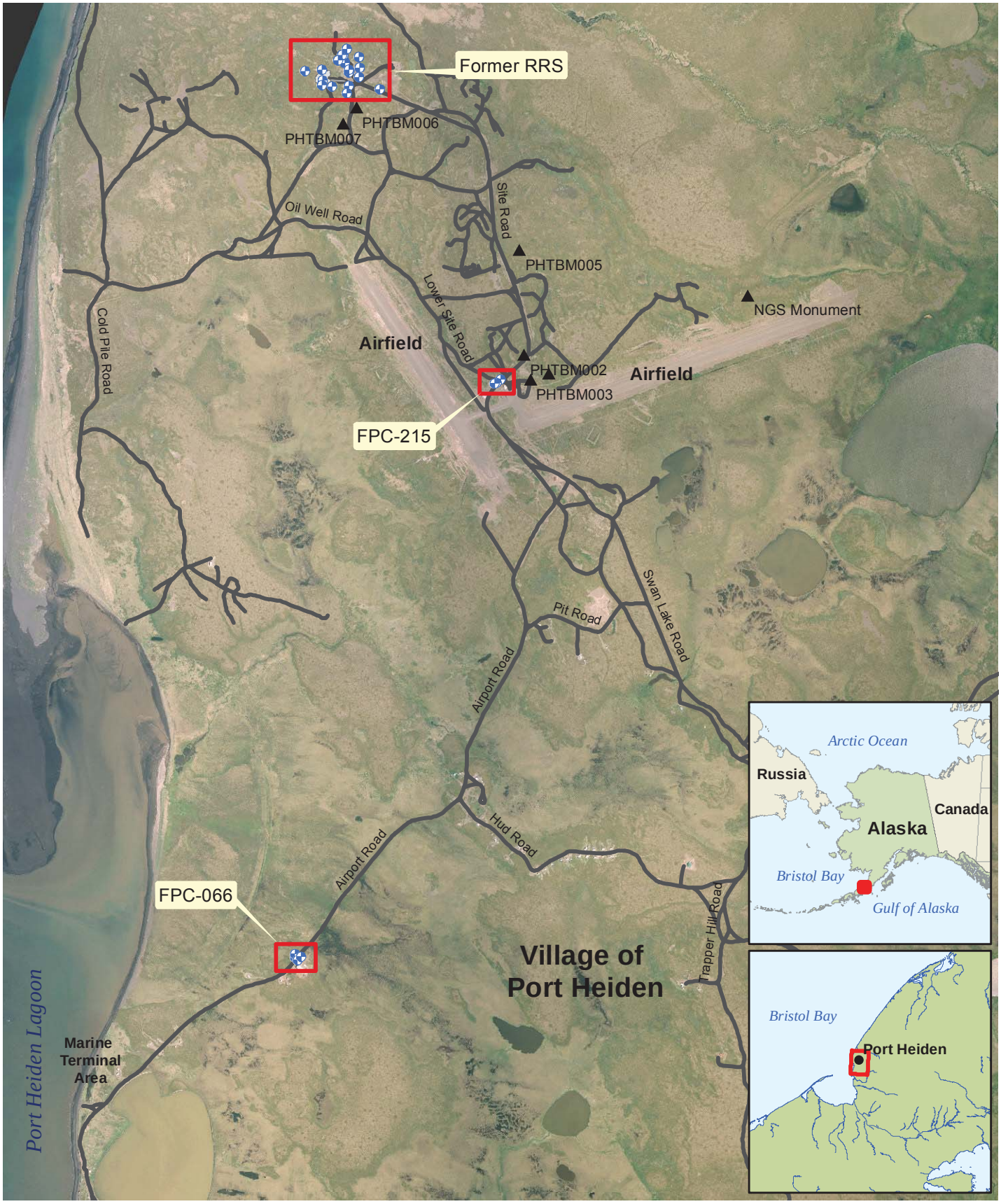

N

0 1,250 2,500 3,750 5,000

Feet

WGS 1984 UTM Zone 4N Imagery: Aerometric 2002

▲ Survey Control Point

Monitoring Well

SITE LOCATION AND VICINITY FOR PORT HEIDEN HTRW GROUNDWATER MONITORING

PORT HEIDEN, ALASKA

JACOBS	DATE: 14 Jan 2014	PROJECT MANAGER: K. McGovern	FIGURE NO: 1-1

P:\PortHeiden\GIS\MXD\HTRW_TO06\13GW_Mon_Report\Fig A-1 Location&Vicinity.mxd jochenhr

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2.0 WORK PLAN DEVIATIONS

This section describes deviations from the *Groundwater Monitoring 2013 Work Plan* (USAF 2013) during the 2013 groundwater sampling effort:

- Monitoring wells DSA-MW-03 and RRS-MW-04 could not be located during the 2013 field effort and appear to have been removed. Global positioning system (GPS) coordinates were used to confirm that both wells are no longer present at the site.
- Well BLO-MW-07 was purged dry during sampling activities, and did not recharge to a level that was sufficient for sample collection. Thus, no samples were collected from the above-mentioned wells.
- Monitoring well DSA-MW-04 was scheduled to be analyzed for VOCs and GRO (Sample ID 13PH-DSA-MW-04); however, an error was made on the chain-of-custody that resulted in a duplicate VOC analysis and no analysis for GRO. As a result, GRO analyses were not performed on samples collected at monitoring well DSA-MW-04.

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3.0 PROJECT EXECUTION APPROACH

In September 2013, groundwater monitoring was conducted at the FPC-066, FPC-215, and the Former RRS sites as part of the annual sampling program required by the *Record of Decision for Port Heiden Radio Relay Station* (USAF 2009). A total of 27 monitoring wells were scheduled for sampling; results were compared to cleanup levels from the Alaska Department of Environmental Conservation (ADEC) Table C, Groundwater Cleanup Levels (ADEC 2012) as listed under Chapter 18 of the Alaska Administrative Code (AAC), Chapter 75, Part 345 (18 AAC 75.345). Sampling was conducted by ADEC qualified personnel. Names and resumes of onsite personnel are available upon request. Groundwater samples were analyzed for COCs that had been previously detected above ADEC cleanup levels, in addition to those outlined in the *Record of Decision* (USAF 2009).

3.1 2013 GROUNDWATER MONITORING

Prior to sampling, depth to water (DTW) was measured using an electronic oil-water interface probe in order to determine whether any petroleum, oil, and lubricants (POL) product was present and to determine the DTW relative to the TOC. POL product was only encountered in one monitoring well, BLO-MW-01, at the Former RRS site, where approximately 0.65 feet of product was measured. On 2 and 4 September 2013, a bailer was used in an attempt to remove the product from the monitoring well. A total of approximately 2.5 liters (0.66 gallons) of POL product and emulsified liquid was removed prior to sampling. An additional DTW measurement was recorded, and product was no longer detected on top of the water column. POL product was not detected in any other wells sampled.

In accordance with the Work Plan (USAF 2013), samples were collected from each well using dedicated Teflon®-lined tubing under low-flow sampling procedures. DRO samples were collected from wells located at FPC-066 and FPC-215 sites. A peristaltic pump was used because VOCs were not scheduled for analysis at these wells, and because the inner well casings were only 1.5 inches in diameter. A submersible pump was used to collect samples from monitoring wells at the Former RRS.

During well purging, the parameters listed in Table 3-1 were recorded and monitored in accordance with the Work Plan until either stabilization criteria were met, or a minimum of three well casing volumes had been extracted (USAF 2013). Water quality parameters were considered stable when three successive readings, collected 3 to 5 minutes apart, were within the stabilization range.

Table 3-1
Stabilization Parameters for Groundwater Sampling

Parameter	Stabilization Range
Temperature	± 3 percent (minimum of ± 0.2 ºC)
pH	± 0.1
Conductivity	± 3 percent
Redox Potential	± 10 mV
Dissolved Oxygen	± 10 percent
Turbidity	± 10 percent

Notes:
ºC = degrees Celsius
mV = millivolts

Well sampling logs and associated logbook notes are presented in Appendix C.

Table 3-2 summarizes the monitoring wells sampled in 2013 with their respective screened intervals, depth to water, TOC elevations, coordinates, and targeted analytes.

Table 3-2
Detailed Breakdown of Wells Sampled in 2013

Well ID	Screened Interval (feet)	Depth to Water (feet)	TOC Elevation (feet)	Easting (meters)	Northing (meters)	Analytical Suites
Former RRS Monitoring Wells[1]						
GLO-MW-03	52.0 to 62.0	60.35	143.142	520997.61	6315008.07	VOCs, MNA
GLO-MW-04	35.0 to 45.0	58.05	140.914	521005.26	6314937.55	VOCs, MNA
DSA-MW-02	57.5 to 67.5	63.92	146.200	520937.64	6314915.38	GRO, DRO, RRO, VOCs, MNA
DSA-MW-03	This well was damaged and removed from the ground in 2011.					
DSA-MW-07	45.0 to 55.0	48.75	133.763	520888.41	6315021.82	VOCs, MNA
DSA-MW-05	82.0 to 87.0	58.45	137.366	520904.89	6314968.99	VOCs, MNA
DSA-MW-06	85.0 to 90.0	56.79	134.708	520898.70	6315022.41	VOCs, MNA
UST-MW-02	54.5 to 69.5	66.59	148.311	520999.27	6314873.83	GRO, DRO, RRO, VOCs, MNA
DSA-MW-01	45.0 to 58.0	54.40	137.145	520907.40	6314977.64	VOCs, MNA
RRS-MW-02	52.5 to 62.5	66.59	143.899	521136.69	6314793.94	VOCs, MNA
RRS-MW-04	This well was damaged and removed from the ground in 2011.					
RRS-MW-05	46.0 to 56.0	51.21	136.851	520863.08	6314986.41	VOCs, MNA
RRS-MW-06	55.0 to 56.0	59.15	142.373	520921.19	6314769.31	VOCs, MNA
PG1-MW-01	51.9 to 61.9	59.79	142.431	520934.06	6314817.47	VOCs, MNA
BLO-MW-01	40.0 to 50.0	47.30	131.505	520759.35	6314853.20	GRO, DRO, RRO, VOCs, MNA
BLO-MW-02	36.0 to 46.0	31.46	125.136	520642.33	6314914.04	VOCs, MNA
BLO-MW-05	42.5 to 52.5	50.98	135.602	520821.00	6314815.05	GRO, DRO, RRO, VOCs, MNA
BLO-MW-06	38.5 to 48.5	44.11	131.499	520757.29	6314820.13	GRO, DRO, RRO, VOCs, MNA
BLO-MW-07	35.0 to 45.0	43.00	128.549	520753.59	6314922.47	GRO, DRO, RRO, VOCs, MNA

Table 2-2
2013 Groundwater Monitoring Sampling Plan (Continued)

Well ID	Screened Interval (feet)	Depth to Water (feet)	TOC Elevation (feet)	Easting (meters)	Northing (meters)	Analytical Suites
FPC-066 Monitoring Wells[2]						
066-MW-04	2.5 to 12.5	6.04	37.10	520576.19	6309052.99	DRO
066-MW-05	2.5 to 12.5	7.85	39.09	520576.29	6309074.67	DRO
066-MW-06	2.5 to 12.5	4.37	35.44	520595.92	6309034.14	DRO
066-MW-07	2.5 to 12.5	5.10	36.13	520617.20	6309058.55	DRO
FPC-215 Monitoring Wells[2]						
215-MW-08	9.0 to 150.0	12.87	82.45	521937.88	6312877.23	DRO
215-MW-09	9.0 to 18.0	14.31	83.79	521910.45	6312852.43	DRO
215-MW-10	12.0 to 22.0	15.07	84.40	521897.05	6312848.65	DRO

Notes:
PVC = polyvinyl chloride
[1]Wells at the RRS are 2 inch PVC.
[2]Wells at Sites FPC-006 and FPC-215 are 1.5 inch PVC.
For additional definitions, see the Acronyms and Abbreviations section.

3.2 SURVEY OF TOP OF CASING ELEVATIONS

A National Geodetic Survey monument served as a reference for temporary benchmarks (TBM) while establishing a control network. The TBMs utilized for this effort were PHTBM006 and PHTBM007 (Figure 1-1).

Monitoring wells included in the 2013 sampling program were surveyed in August and November 2013. Survey quality met the required horizontal accuracy of 1.0 foot and a vertical accuracy of 0.01 feet per tripod setup. Horizontal data were collected using a Leica real-time kinematic GPS and vertical data were collected with a level loop survey. Survey data were reported with horizontal coordinates based on the World Geodetic System of 84, using the Universal Transverse Mercator Zone 4 North projection. Vertical coordinates were reported as orthometric heights based on the North American Vertical Datum of 1988, as calculated using GEOID09. Coordinates were recorded in meters to two decimal places.

Due to field error during the August survey event, wells scheduled for sampling at the Former RRS were re-surveyed in November 2013. Data were post-processed using check shots of known TBMs and analyzing variances between recorded and known coordinates. All data were of acceptable quality. Measured features with coordinates are provided in the survey data summary table (Appendix D). Field notes recorded during survey activities are included in Appendix C.

3.3 GROUNDWATER FLOW MODELING

Groundwater flow direction was modeled using RockWare® Surfer 11 software. GPS easting and northing coordinates, DTW measurements, and TOC elevations were input into this software, and gridded using a radial base function and thin plate spline.

Groundwater flow at FPC-066 is to the south. An accurate numerical groundwater flow solution cannot be obtained from the existing wells at the FPC-215 and Former RRS sites due to the number of wells and/or their spatial distribution.

Modeling at the Former RRS suggests that the direction of primary groundwater flow is east-northeast and that of secondary flow is northwest. FPC-215 wells are located linearly and accurate flow directions cannot be modeled from that type of well arrangement. Modeling at FPC-215 suggests the flow direction is to the southeast.

All groundwater flow directions are approximate and should be used only as estimates of the site conditions (refer to Sections 4.1, 4.2, and 4.3).

4.0 RESULTS

This section summarizes analytical results from the September 2013 groundwater sampling effort. Groundwater samples were successfully collected from 24 of the 27 wells at FPC-066, FPC-215, and the Former RRS sites.

4.1 FPC-066

In September 2013, groundwater samples were collected from the four wells at FPC-066 and analyzed for DRO. Monitoring well 066-MW-05 contained a DRO concentration of 1.6 milligrams per liter (mg/L), which exceeds the ADEC Table C cleanup level of 1.5 mg/L (ADEC 2012). The field duplicate sample exhibited an identical concentration. The remaining wells contained DRO at levels significantly less than 1.5 mg/L, ranging from 0.018 to 0.024 mg/L. These results were reported below the limit of quantitation (LOQ) but above the detection limit (DL). As such, the results are qualified J and are considered estimated quantities. All 2013 results for the FPC-066 site are presented in Table 4-1; analytical exceedances are displayed on Figure 4-1. The complete analytical results and laboratory data deliverables are included with the DQA (Appendix B).

Table 4-1
FPC-066 Groundwater Sample Results

Location	Sample ID	Analyte	Cleanup Level (mg/L)	Result (mg/L)
066-MW-04	13PH-066-MW-04	DRO	1.5	0.18 J
066-MW-05	13PH-066-MW-05	DRO	1.5	**1.6**
	13PH-066-MW-059*	DRO	1.5	**1.6**
066-MW-06	13PH-066-MW-06	DRO	1.5	0.019 J
066-MW-07	13PH-066-MW-07	DRO	1.5	0.024 J

Notes:
18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012)
* = Field duplicate sample
J = The result was reported between the LOQ and the DL and should be considered as an estimated quantity.
Bold = Result exceeded the ADEC Table C, Groundwater Cleanup Levels
For definitions, see Acronyms and Abbreviations

4.2 FPC-215 SITE

In September 2013, groundwater samples were collected from the three wells at FPC-215 and analyzed for DRO. Monitoring well 215-MW-09 contained a DRO concentration of 11 mg/L, which exceeded the ADEC Table C cleanup level of 1.5 mg/L (ADEC 2012). The remaining wells contained DRO at concentrations less than 1.5 mg/L, ranging from 0.019 mg/L to 0.032 mg/L. These results were reported below the LOQ but above the DL. As such, the results were qualified J and considered to be estimated. Results for FPC-215 are summarized in Table 4-2; analytical exceedances are displayed on Figure 4-2. Complete analytical results and laboratory data deliverables are included with the DQA (Appendix B).

Table 4-2
FPC-215 Groundwater Sample Results

Location	Sample ID	Analyte	Cleanup Level (mg/L)[1]	Result (mg/L)
215-MW-08	13PH-066-MW-08	DRO	1.5	0.019 J
215-MW-09	13PH-066-MW-09	DRO	1.5	**11**
215-MW-10	13PH-066-MW-10	DRO	1.5	0.032 J

Notes:
[1] 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012)
J = The result was reported between the LOQ and the DL and should be considered as an estimated quantity.
Bold = Result exceeded the ADEC Table C, Groundwater Cleanup Levels
For definitions, see the Acronyms and Abbreviations section.

4.3 FORMER RADIO RELAY STATION

Sample results identified multiple wells with contaminant constituents above applicable ADEC Table C cleanup levels (ADEC 2012). In monitoring well BLO-MW-01, DRO, and RRO were detected at 1,300 mg/L and 78 mg/L, respectively. These analytes exceeded the ADEC cleanup levels of 1.5 mg/L for DRO and 1.1 mg/L for RRO.

TCE was detected above the ADEC cleanup level of 0.005 mg/L in four wells. The reported concentrations of TCE ranged from 0.0062 mg/L (monitoring well DSA-MW-01) to 0.5 mg/L (monitoring well DSA-MW-02). All other target analytes at the Former RRS were either detected at concentrations that were less than the ADEC Table C cleanup levels or were reported as not detected, with a laboratory DL below the applicable cleanup levels. The

laboratory results that exceeded ADEC Table C cleanup levels are shown in Table 4-3; analytical exceedances are displayed on Figure 4-3. The complete analytical results and laboratory data deliverables are included with the DQA (Appendix B).

Table 4-3
Former RRS Groundwater Exceedances

Location	Sample ID	Analyte	ADEC Cleanup Level (mg/L)[1]	Result (mg/L)
BLO-MW-01	13PH-BLO-MW-01	DRO	1.5	1,300
		RRO	1.1	78
DSA-MW-01	13PH-DSA-MW-01	TCE	0.005	0.0062
DSA-MW-02	13PH-DSA-MW-02	TCE	0.005	0.490
	13PH-DSA-MW-029*	TCE	0.005	0.500
DSA-MW-04	13PH-DSA-MW-04	TCE	0.005	0.12
PG1-MW-01	13PH-PG1-MW-01	TCE	0.005	0.021

Notes:
[1] 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).
For definitions, see the Acronyms and Abbreviations section.
* = field duplicate sample

All monitoring wells at the Former RRS site were sampled for MNA parameters including alkalinity, iron, manganese, nitrogen (as nitrate/nitrite), and sulfate. Sample results for these parameters are used to assess the potential for biodegradation and natural attenuation of contaminants in the groundwater, primarily TCE.

Chlorinated solvents biodegrade primarily via reductive dechlorination, which occurs under anaerobic conditions. The presence of TCE degradation products indicates that some dechlorination is likely occurring; however, based on the presence of nitrate/nitrite and sulfate, as well as elevated levels of dissolved oxygen, the process of natural attenuation via reductive dechlorination is most likely impeded in groundwater at the Former RRS. The presence of DRO (an anthropogenic carbon source critical to the biodegradation of chlorinated solvents, such as TCE) suggests that natural attenuation is occurring at monitoring well BLO-MW-01.

Although the potential for biodegradation exists, the data do not show a significant decreasing trend in TCE concentrations over time. According to the RI/FS, the timeframe required for

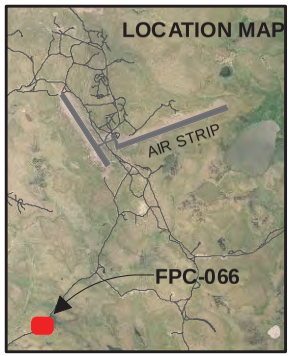
TCE concentrations to fall below 0.005 mg/L was estimated at 25.7 years (i.e. in the year 2032) (USAF 2006). An additional discussion regarding contaminant concentration trends is presented in Section 5.3. Table 4-4 presents MNA results for wells at the Former RRS.

Table 4-4
Former RRS Monitored Natural Attenuation Results

Sample ID	Well ID	Total Alkalinity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nitrogen, Nitrate-Nitrite (mg/L)	Sulfate (mg/L)
13PH-BLO-MW-01	BLO-MW-01	918	21.8	10.7	0.017	4.5
13PH-BLO-MW-02	BLO-MW-02	39.6	0.92	0.0184	0.063	3.02
13PH-BLO-MW-05	BLO-MW-05	49.2	45.2	1.02	0.0 56	2.22
13PH-BLO-MW-06	BLO-MW-06	53.9	23.1	0.492	0.086	6.16
13PH-DSA-MW-01	DSA-MW-01	72.3	1.82	0.0732	0.122	3.99
13PH-DSA-MW-02	DSA-MW-02	131	77.4	1.55	1.44	6.93
13PH-DSA-MW-029*	DSA-MW-02	132	69.3	1.38	1.45	7.43
13PH-DSA-MW-04	DSA-MW-04	97.9	4.45	0.168	0.027	10.9
13PH-DSA-MW-05	DSA-MW-05	74.9	6.05	0.201	0.053	9.72
13PH-DSA-MW-06	DSA-MW-06	69.1	2.3	0.441	0.033	5.04
13PH-DSA-MW-069*	DSA-MW-069	68.4	2.64	0.465	0.017	5.02
13PH-DSA-MW-07	DSA-MW-07	62.1	20.7	0.326	0.064	6.15
13PH-GLO-MW-03	GLO-MW-03	65	9.1	0.227	0.097	2.69
13PH-GLO-MW-04	GLO-MW-05	44.9	53.9	2.07	0.13	2.95
13PH-PG-1-MW-01	PG-1-MW-01	137	44.2	0.881	0.191	4.51
13PH-RRS-MW-02	RRS-MW-02	44.8	1.67	0.0484	0.169	3.13
13PH-RRS-MW-05	RRS-MW-05	56.8	25.6	0.497	0.053	3.34
13PH-RRS-MW-06	RRS-MW-06	162	0.71	0.0139	0.351	3.12
13PH-UST-MW-02	UST-MW-02	137	70.3	1.3	0.375	5.66

Notes:
*-Field duplicate sample
For definitions, see the Acronyms and Abbreviations section.

Imagery: Aerometric 2002



Location ID	Contaminant	Action level (mg/L)	Concentration (mg/L)
066-MW-05	DRO	1.5	**1.6**

Note: ADEC 18 AAC 75 Table C Groundwater Cleanup Levels (ADEC 2012)

- Monitoring Well with Groundwater Exceedance
- Monitoring Well Sampled in 2013
- Road
- *Approximate Groundwater Flow Direction*

NOTE: Not enough information is available at this time to accurately model the contamination plume at this site.

All Locations Are Approximate

0 25 50 75 100
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

N

FPC-066 Groundwater Monitoring
Groundwater Exceedances

Port Heiden, Alaska

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	10 JAN 2014	Kelly McGovern	4-1

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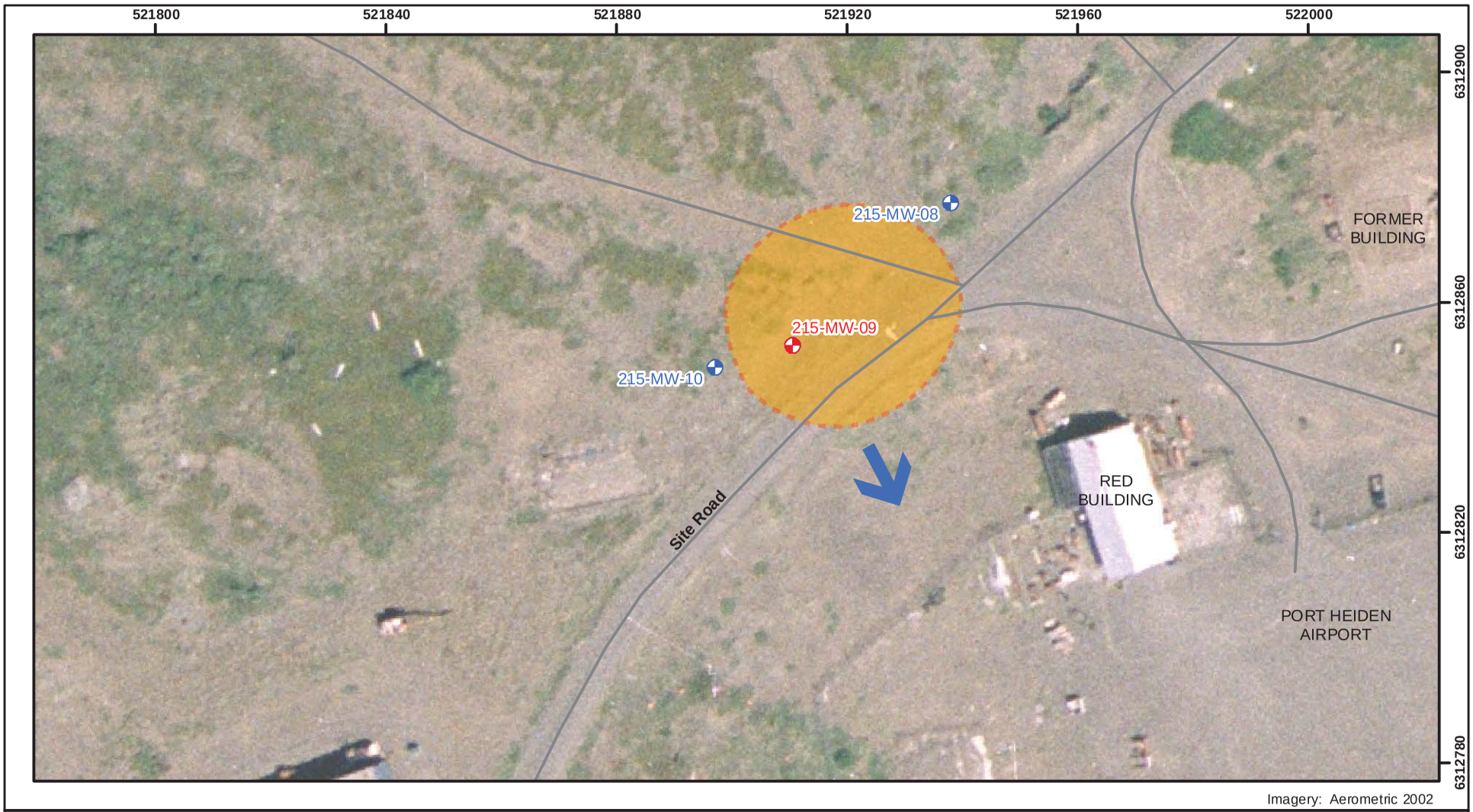

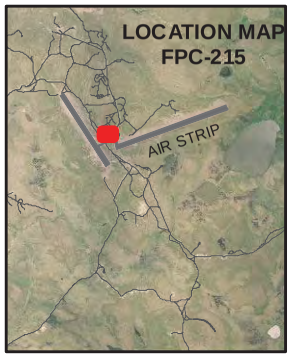

Location ID	Contaminant	Action level (mg/L)	Concentration (mg/L)
215-MW-09	DRO	1.5	**11**

Note: ADEC 18 AAC 75 Table C Groundwater Cleanup Levels (ADEC 2012)

Approximate Groundwater Flow Direction

Monitoring Well with Groundwater Exceedance

Monitoring Well Sampled in 2013

Road

Interpolated DRO Groundwater Plume

All Locations Are Approximate

0 25 50 75 100

Feet

WGS 1984 UTM Zone 4N Transverse Mercator

N

FPC-215 Groundwater Monitoring
Groundwater Exceedance

Port Heiden, Alaska

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	10 JAN 2014	Kelly McGovern	4-2

P:\PortHeiden\GIS\MXD\HTRW_TO06\13GW_Mon_Report\13PH_FPC215_GW_Exceedances.mxd jochenhr

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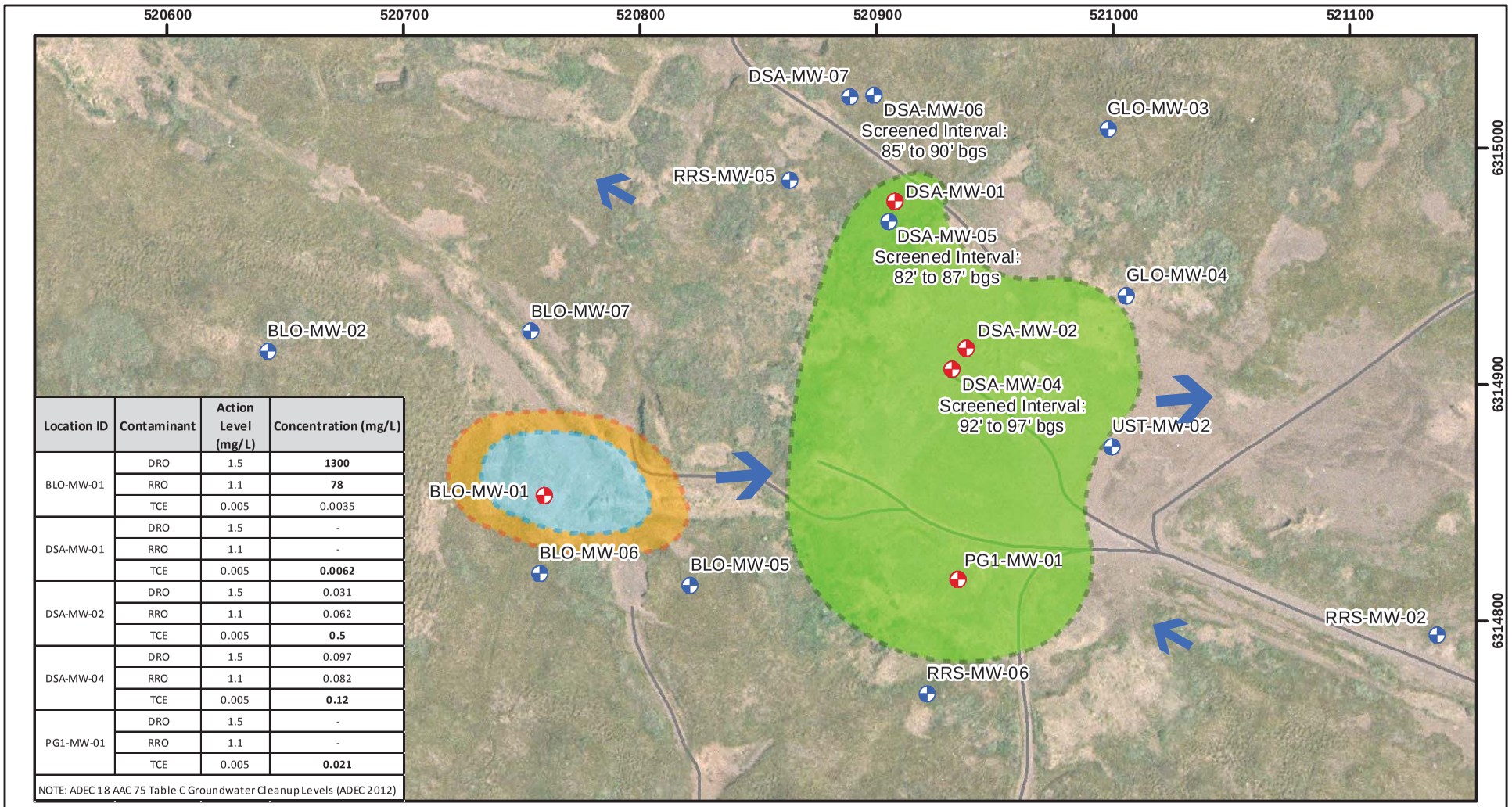

Location ID	Contaminant	Action Level (mg/L)	Concentration (mg/L)
BLO-MW-01	DRO	1.5	**1300**
	RRO	1.1	**78**
	TCE	0.005	0.0035
DSA-MW-01	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	**0.0062**
DSA-MW-02	DRO	1.5	0.031
	RRO	1.1	0.062
	TCE	0.005	**0.5**
DSA-MW-04	DRO	1.5	0.097
	RRO	1.1	0.082
	TCE	0.005	**0.12**
PG1-MW-01	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	**0.021**

NOTE: ADEC 18 AAC 75 Table C Groundwater Cleanup Levels (ADEC 2012)

Imagery: Aerometric 2002

Approximate Groundwater Flow Direction

Monitoring Well with Groundwater Exceedance

Monitoring Well Sampled in 2013

Interpolated TCE Groundwater Plume Boundary

Interpolated RRO Groundwater Plume Boundary

Interpolated DRO Groundwater Plume Boundary

Road

Note: Primary flow direction is E NE, as annotated by larger flow direction arrows. Secondary groundwater flow direction is NW.

All Locations Are Approximate

0 125 250 500 Feet

WGS 1984 UTM Zone 4N Transverse Mercator

N

Former RRS Groundwater Monitoring
Groundwater Exceedances

Port Heiden, Alaska

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	10 JAN 2014	Kelly McGovern	4-3

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5.0 HISTORICAL RESULTS

This section presents a comparison between the 2013 groundwater sampling results and historical sampling data at sites FPC-066, FPC-215, and the Former RRS.

5.1 FPC-066 SITE

DRO is currently the only COC monitored at this site. Table 5-1 provides a comparison of the DRO concentrations over time. Groundwater samples were collected from the four monitoring wells at the FPC-066 site in 2009, 2010, 2011, 2012, and 2013 (NVPH 2010, 2011, 2012, 2013). Note that in 2011, the FPC-066 wells were not sampled for DRO.

Table 5-1
FPC-066 Comparison of DRO Concentrations

Well	2009 (mg/L)	2010 (mg/L)	2011 (mg/L)	2012 (mg/L)	2013 (mg/L)
ADEC Cleanup Level[1]	1.5	1.5	1.5	1.5	1.5
066-MW-04	0.504 J	ND [0.851]	NS	ND [0.360]	0.018 J
066-MW-05	**2.25**	**4.5**	NS	**2.02**	**1.6**
066-MW-06	ND [0.8]	ND [0.800]	NS	ND [0.360]	0.019 J
066-MW-07	ND [0.8]	ND [0.899]	NS	ND [0.360]	0.024 J

Notes:
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2012).
J = analyte was positively identified, but associated result was less than the LOQ and greater than or equal to the DL.
ND = non detect
NS = not sampled
Bold = Laboratory reported concentration exceeds ADEC cleanup level.
The LOQ is provided in [ ]
For additional definitions, see Acronyms and Abbreviations section.

Historically, DRO has only exceeded ADEC cleanup levels in one of the four wells at this site. In 2011, analysis for DRO was scheduled for all wells; however, laboratory samples were not collected for this analyte. The concentration of DRO in monitoring well 066-MW-05 has ranged from 4.5 mg/L in 2010 to 1.6 mg/L in 2013, and has exhibited a net decreasing trend since 2009.

5.2 FPC-215 SITE

DRO is currently the only COC monitored at this site. Table 5-2 provides a comparison of DRO concentrations over time. Groundwater samples were collected from the three monitoring wells at the FPC-215 site in 2009, 2010, 2011, 2012, and 2013 (NVPH 2010, 2011, 2012, 2013).

Table 5-2
FPC-215 Comparison of DRO Concentrations

Well	2009 (mg/L)	2010 (mg/L)	2011 (mg/L)	2012 (mg/L)	2013 (mg/L)
ADEC Cleanup Level[1]	1.5	1.5	1.5	1.5	1.5
215-MW-08	**4.18**	ND [0.879]	1.17	ND [0.360]	0.019 J
215-MW-09	**3.99**	**9.68**	**14**	**8.85**	**11**
215-MW-10	ND [0.8]	ND [0.856]	0.524 J	0.853	0.032 J

Notes:
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2012).
J = analyte was positively identified, but associated result was less than the LOQ and greater than or equal to the DL.
ND = non detect
Bold = laboratory reported concentration exceeds ADEC cleanup level.
The LOQ is provided in [ ]
For definitions, see Acronyms and Abbreviations

DRO was historically detected above the ADEC cleanup level in two of the three monitoring wells. In 2009, monitoring wells 215-MW-08 and 215-MW-09 contained DRO concentrations of 4.18 and 3.99 mg/L, respectively. Since 2009, DRO has decreased to 0.019 mg/L in monitoring well 215-MW-08, as reported from the most recent sampling event. This is below the ADEC cleanup level of 1.5 mg/L (ADEC 2012). DRO concentrations in monitoring well 215-MW-09 have increased significantly, from 3.99 mg/L in 2009 to 11 mg/L in 2013; the maximum detected concentration (14 mg/L) was reported in 2011. Reported levels of DRO have never exceeded the ADEC cleanup level in monitoring well 215-MW-10.

5.3 FORMER RADIO RELAY STATION

In 2004, 2010, 2011, 2012 and 2013, samples were collected from wells located in the Former RRS (USAF 2006; NVPH 2010, 2011, 2012, 2013). Six wells were installed in 2012

(GLO-MW-04, DSA-MW-04, DSA-MW-05, DSA-MW-06, DSA-MW-07, and BLO-MW-07) and were only sampled in 2012 and 2013. Of the wells sampled in 2013, BLO-MW-01, DSA-MW-01, DSA-MW-02, DSA-MW-04, DSA-MW-05, DSA-MW-07, and PG1-MW-01 have historically exceeded ADEC cleanup levels. The current COCs at the Former RRS site are GRO, DRO, RRO, and VOCs. However, only TCE, DRO, and RRO exceeded ADEC cleanup levels in 2013. TCE, DRO, and RRO were detected above ADEC cleanup levels in monitoring well BLO-MW-01 and in the five remaining wells that have had current and/or historical TCE exceedances.

Concentrations of DRO in monitoring well BLO-MW-01 have ranged from 17 mg/L to 15,600 mg/L. As discussed in Section 3.1, approximately 0.65 feet of free product were encountered in this well during the 2013 sampling effort. In addition to DRO, RRO has historically exceeded cleanup levels in monitoring well BLO-MW-01; RRO concentrations have ranged from 2.8 mg/L in 2012 to 1,890 mg/L in 2010. During the most recent sampling event, RRO exhibited a concentration of 78 mg/L. Table 5-3 provides a comparison of DRO concentrations and Table 5-4 provides a comparison of RRO concentrations over time.

Table 5-3
Former RRS Site Comparison of DRO Concentrations for Wells Sampled in 2013

Well	2004 (mg/L)	2009 (mg/L)	2010 (mg/L)	2011 (mg/L)	2012 (mg/L)	2013 (mg/L)
ADEC Cleanup Level[1]	1.5	1.5	1.5	1.5	1.5	1.5
BLO-MW01	**17**	NS	**15,600[2]**	**70.5**	**26.5**	**1,300[2]**
BLO-MW05	**2[3]**	NS	ND [0.860]	0.242 J	ND [0.360]	0.075
BLO-MW06	NS	NS	ND [0.889]	0.883	ND [0.360]	0.074
UST-MW-02	NS	NS	ND [0.842]	ND [0.378]	0.213	0.093
DSA-MW02	0.086	NS	NS	0.479 J	ND [0.360]	0.031
DSA-MW02*	-	-	-	-	-	0.047
DSA-MW04	NS	NS	NS	NS	ND [0.360]	0.097

Notes:
* Field duplicate sample
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2012).
[2] Elevated concentration indicative of free product
[3] The result was reported as total petroleum hydrocarbons.
J = analyte was positively identified, but the associated result was less than the LOQ and greater than or equal to the DL.
NS = not sampled
Bold = laboratory reported concentration exceeds ADEC cleanup level.
The LOQ is provided in [ ]
For definitions, see Acronyms and Abbreviations

Table 5-4
Former RRS Site Comparison of RRO Concentrations for Wells Sampled in 2013

Well	2004 (mg/L)	2010 (mg/L)	2011 (mg/L)	2012 (mg/L)	2013 (mg/L)
ADEC Cleanup Level[1]	1.1	1.1	1.1	1.1	1.1
BLO-MW01	**2.3 J**	**1,890**	**8.14**	**2.8**	**78.0 J**
BLO-MW05	NS	ND [0.860]	ND [0.306]	ND [0.3]	0.180 J
BLO-MW-06	NS	ND [0.889]	0.223 J	ND [0.3]	0.360 J
DSA-MW-02	ND [0.039]	NS	ND [0.340]	0.252	0.062 J
DSA-MW-029*	**-**	**-**	-	-	0.087 J
DSA-MW-04	NS	NS	NS	ND [0.31]	0.082 J
UST-MW-02	NS	ND [0.526]	ND [0.316]	0.372	0.140 J

Notes:
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2012).
J = analyte was positively identified, but the associated result was less than the LOQ and greater than or equal to the DL.
NS = not sampled
Bold = laboratory reported concentration exceeds ADEC cleanup level
The LOQ is provided in [ ]
* - Field duplicate sample
For definitions, see Acronyms and Abbreviations

Seven of the 18 wells sampled in 2013 at the Former RRS have a current and/or historical reported TCE concentration above the ADEC cleanup level of 0.005 mg/L (ADEC 2012). Table 5-5 provides a comparison of TCE concentrations over time.

The highest historical TCE concentration at this site (0.690 mg/L) was a 2004 result from monitoring well DSA-MW-02. This concentration is approximately two orders of magnitude above the cleanup level. The TCE concentrations reported between 2010 and 2013 were relatively consistent, ranging from 0.499 to 0.508 mg/L.

In each of the five annual sampling events, monitoring well PG1-MW-01 exhibited TCE results significantly greater than the ADEC cleanup level. The lowest TCE exceedance in this well (0.0078 mg/L) was reported in 2004, while the highest (0.0447 mg/L) was reported in 2012. There have been significant variations during interim monitoring events. All results reported between 2010 and 2013 were significantly higher than the 2004 reported concentration of 0.0078 mg/L.

Table 5-5
Former RRS Site Comparison of TCE Concentrations

Well	2004 (mg/L)	2010 (mg/L)	2011 (mg/L)	2012 (mg/L)	2013 (mg/L)
ADEC Cleanup Level[1]	0.005	0.005	0.005	0.005	0.005
BLO-MW-01	**0.0056**	*ND [0.020]*	0.0036 J	**0.0053**	0.0035
BLO-MW-02	ND [0.00021]	ND [0.001]	NS	ND [0.00062]	ND [0.0001]
BLO-MW-05	0.00019	ND [0.001]	ND [0.00062]	ND [0.00062]	ND [0.0001]
BLO-MW-06	ND [0.00018]	ND [0.001]	ND [0.00062]	ND [0.00062]	0.00088
BLO-MW-07	Installed 2012	Installed 2012	Installed 2012	DRY	DRY
DSA-MW-01	**0.017**	**0.0117**	**0.479 J**	0.00047	**0.0062**
DSA-MW-02	**0.690 J**	**0.508**	**0.499**	**0.506**	**0.5[2]**
DSA-MW-04	Installed 2012	Installed 2012	Installed 2012	**0.0717**	**0.12**
DSA-MW-05	Installed 2012	Installed 2012	Installed 2012	**0.00525**	0.0028
DSA-MW-06	Installed 2012	Installed 2012	Installed 2012	0.00054	ND [0.00010]
DSA-MW-07	Installed 2012	Installed 2012	Installed 2012	**0.0447**	ND [0.00010]
GLO-MW-03	NS	NS	ND [0.00062]	ND [0.00062]	ND [0.00010]
GLO-MW-04	Installed 2012	Installed 2012	Installed 2012	ND [0.00062]	ND [0.00010]
PG1-MW-01	**0.0078**	**0.0423**	**0.0325**	**0.0447**	**0.021**
RRS-MW-02	NS	ND [0.001]	ND [0.00062]	ND [0.00062]	ND [0.00010]
RRS-MW-05	NS	ND [0.001]	ND [0.00062]	ND [0.00062]	0.00011 J
RRS-MW-06	NS	ND [0.001]	ND [0.00062]	ND [0.00062]	ND [0.00010]
UST-MW-02	NS	ND [0.001]	ND [0.00062]	ND [0.00062]	0.00010 J

Notes:
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2012).
[2] Sample collected 1 to 2 feet below groundwater interface but 23.5 to 28.5 feet above screened interval; TCE results are biased low
J = analyte was positively identified, but the associated result was less than the LOQ and greater than or equal to the DL.
NS = not sampled
Bold = laboratory reported concentration exceeds ADEC cleanup level
Italics= The LOQ exceeded ADEC cleanup levels
The LOQ is provided in [ ]
The highest historical TCE concentration at this site (0.690 mg/L) was a 2004 result from monitoring well DSA-MW-02. This concentration is approximately two orders of magnitude above the cleanup level. The TCE concentrations reported between 2010 and 2013 were relatively consistent, ranging from 0.499 to 0.508 mg/L.
For definitions, see Acronyms and Abbreviations

In monitoring well DSA-MW-01, elevated TCE concentrations existed in four of the five sampling events between 2004 and 2013. The maximum detected concentration (0.479 mg/L) was in 2011. A dramatic decrease in TCE concentrations within this well occurred during the two most recent sampling events in 2012 and 2013.

Historically, TCE concentrations in monitoring well BLO-MW-01 have only slightly exceeded the ADEC cleanup level of 0.005 mg/L with exceedances ranging from 0.0056 mg/L in 2004 to 0.0053 mg/L in 2012. TCE was not detected in 2010; however, the laboratory DL exceeded the cleanup level, meaning that TCE could have been present at levels above the cleanup level, yet still not detectable during laboratory analyses. During site investigation activities conducted in 2013, TCE-contaminated soil was identified in the vicinity of this well. TCE soil concentrations from samples collected during a 2013 site investigation exceeded the ADEC cleanup level (0.020 milligrams per kilogram [mg/kg]) at depths ranging from 6 feet below ground surface (0.015 mg/kg) to 31 feet below ground surface (0.00062 mg/kg) (USAF 2014). Excavation of approximately 3,500 cubic yards of TCE-contaminated soil in this area is scheduled for summer 2014 (USACE 2012). Based on available data from this monitoring well, there is no evidence that TCE is naturally attenuating or declining over time.

Six of the wells listed in Table 5-5 were installed in 2012. Between 2012 and 2013, the TCE concentration in monitoring well DSA-MW-04 increased by 0.0483 mg/L. This well is in close proximity to monitoring well DSA-MW-02, which exhibits the greatest TCE concentration at this site. Significant reductions in TCE concentrations occurred at all of the other 2012 wells from 2012 to 2013. There is currently insufficient data to assess any potential historical trends for these new wells.

Based on the available data, TCE concentrations in the areas surrounding monitoring wells DSA-MW-01, DSA-MW-02, DSA-MW-04, and PG1-MW-01 are not likely to attenuate within the proposed RI/FS timeframe of 25.7 years (USAF 2006). In areas where lower TCE concentrations were reported, natural attenuation may be successful in reducing concentrations to below the ADEC cleanup level within the proposed timeframe. It is recommended that additional data be collected in order to assess whether the downward trend can be attributed to natural attenuation.

6.0 WASTE MANAGEMENT

Purge water and wastewater generated during sampling activities was stored in two 55-gallon drums. Additionally, the POL product removed from monitoring well BLO-MW-01 was added to a third drum that contained wastewater from drilling activities at the BLO site. Two samples were collected for waste characterization: a composite sample collected from both drums, which contained solely purge and decontamination water; and a sample collected from the drum that contained both wastewater from drilling activities and the small quantity of product removed from monitoring well BLO-MW-01. The two samples were analyzed for VOCs using the Resource Conservation and Recovery Act test method SW8260.

Sample results were below ADEC thresholds for hazardous waste (ADEC 2012). All three wastewater drums are currently being stored onsite and will be removed upon completion of the 2014 field effort. Other investigation-derived waste (e.g., disposable sampling supplies, used personal protective equipment, etc.) were combined with waste generated during drilling activities and disposed offsite as nonhazardous waste.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

This section provides conclusions and recommendations that support the primary objectives from both the 2013 annual groundwater sampling effort and the *Record of Decision* (USAF 2009).

7.1 FPC-066

DRO is the only COC currently monitored at the FPC-066 site. Monitoring well 066-MW-05 contained DRO at concentrations above the ADEC cleanup level of 1.5 mg/L (ADEC 2012). Historically, this is the only well at the FPC-066 site that has had a DRO concentration in excess of the cleanup level. Based on previous sampling results, it is recommended that monitoring well 066-MW-05 be retained on the sampling schedule.

The approximate groundwater flow at this site is to the south. Monitoring well 066-MW-06 is located south-southeast of 066-MW-05, and is the closest in proximity to Port Heiden School; it is recommended that monitoring well 066-MW-06 be retained (as a sentry well) on the 2014 sampling schedule. Because DRO has never been detected above the ADEC cleanup level in monitoring wells 066-MW-04 and 066-MW-07, these wells are recommended for removal from the sampling program. However, it is also recommended that the wells not be decommissioned until results from all wells at the FPC-066 site are below ADEC cleanup levels.

7.2 FPC-215

DRO is the only COC currently monitored at the FPC-215 site. Concentrations of DRO in monitoring well 215-MW-09 exceeded the ADEC cleanup level in 2013 and appear to be increasing over time. Based on this observation, it is possible that one or more contamination sources remain onsite. All three wells at the FPC-215 site should be retained on the sampling schedule and additional remediation activities should be considered if concentrations of DRO in groundwater do not begin to decrease within site wells.

7.3 FORMER RADIO RELAY STATION

Two contaminant plumes are present at the Former RRS site: a fuel contamination plume in the BLO area and a TCE plume in the vicinity of the former DSA, BLO, and surrounding areas. Of the 18 wells sampled at this site, four contained concentrations of target analytes above ADEC cleanup levels in 2013. Historically, seven wells have exhibited concentrations of target analytes in excess of the ADEC cleanup levels. In addition, approximately 0.65 feet of free product was observed in monitoring well BLO-MW-01. No significant downward trends in contaminant concentrations were observed. Based on the 2013 concentrations of TCE, DRO, and RRO, and lack of historical natural attenuation, MNA may not meet the timeframe proposed in the RI/FS (USAF 2006). It is recommended that all of the Former RRS wells that were sampled in 2013, excluding RRS-MW-02 and BLO-MW-02, be retained on the sampling schedule for 2014. COCs analyzed in monitoring wells RRS-MW-02 and BLO-MW-02 have historically been nondetect. These wells are not considered sentry wells and it is recommended that no further sampling occur at these Former RRS wells.

8.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2012 (April). *Oil and Other Hazardous Pollution Control Regulations – Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*. 18 AAC 75.

ADEC. 2010 (May). *Draft Field Sampling Guidance*.

NVPH (Native Village of Port Heiden). 2013 (June). *Draft Groundwater Monitoring Report at the Former Port Heiden Radio Relay Station.* Port Heiden, Alaska.

NVPH. 2012 (March). *Final Groundwater Monitoring Report.* Former Port Heiden Radio Relay Station, Port Heiden, Alaska.

NVPH. 2011 (May). *Final Groundwater Monitoring Report.* Former Port Heiden Radio Relay Station, Port Heiden, Alaska.

NVPH. 2010 (September). Final Report, *2009 Groundwater Investigation, Former Pipeline Corridor.* Port Heiden, Alaska.

USACE (U.S. Army Corps of Engineers). 2012 (September). *Scope of Work, Site Investigation and Treatability Study*. Port Heiden, Alaska. Contract No. W911KB-11-D-0005.

USAF (U.S. Air Force). 2014 (March). *2013 Black Lagoon Site Investigation Report*. Former Radio Relay Station, Port Heiden, Alaska. Prepared by Jacobs Engineering Group Inc. Draft.

USAF. 2013 (July). *Groundwater Monitoring 2013 Work Plan*. Former Radio Relay Station, Port Heiden, Alaska. Prepared by Jacobs Engineering Group Inc.

USAF. 2009 (February). *Record of Decision for Port Heiden Radio Relay Station*. Port Heiden, Alaska.

USAF. 2006 (April). *Final Remedial Investigation/Feasibility Study.* Port Heiden Radio Relay Station.

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APPENDIX A

Photograph Log

PHOTOGRAPH LOG
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Photo Number **Page**

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Photo No. 1 – 02 September 2013
FPC-066, showing MW04, Airport Road and the Port Heiden School. Facing southeast.

Photo No. 2 – 02 September 2013
Purging well MW-05 at FPC-066. Facing east.

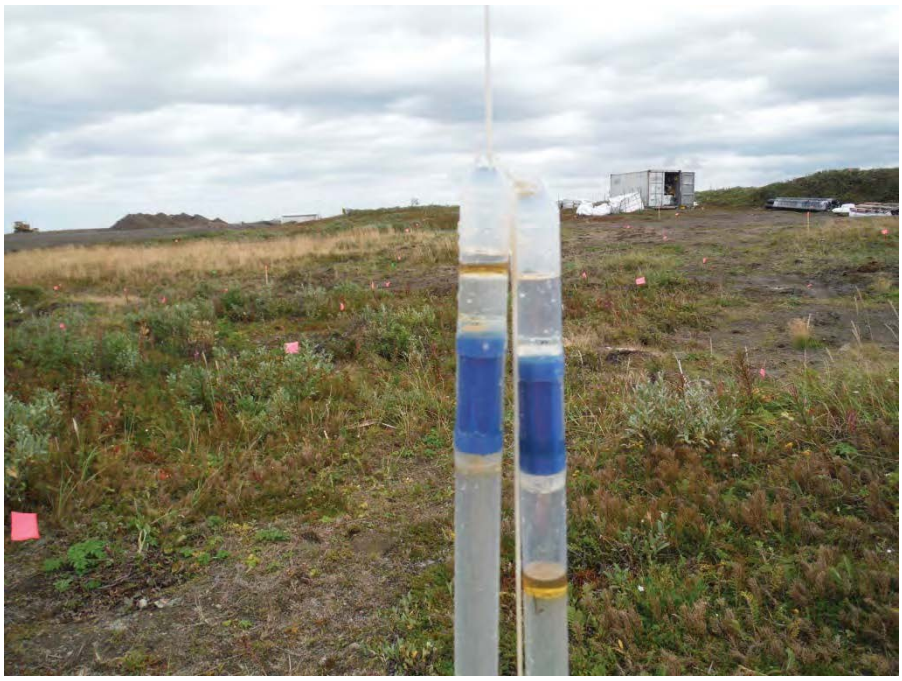

Photo No. 3 – 04 September 2013
Product bailed from well BLO-MW-01. Facing north.

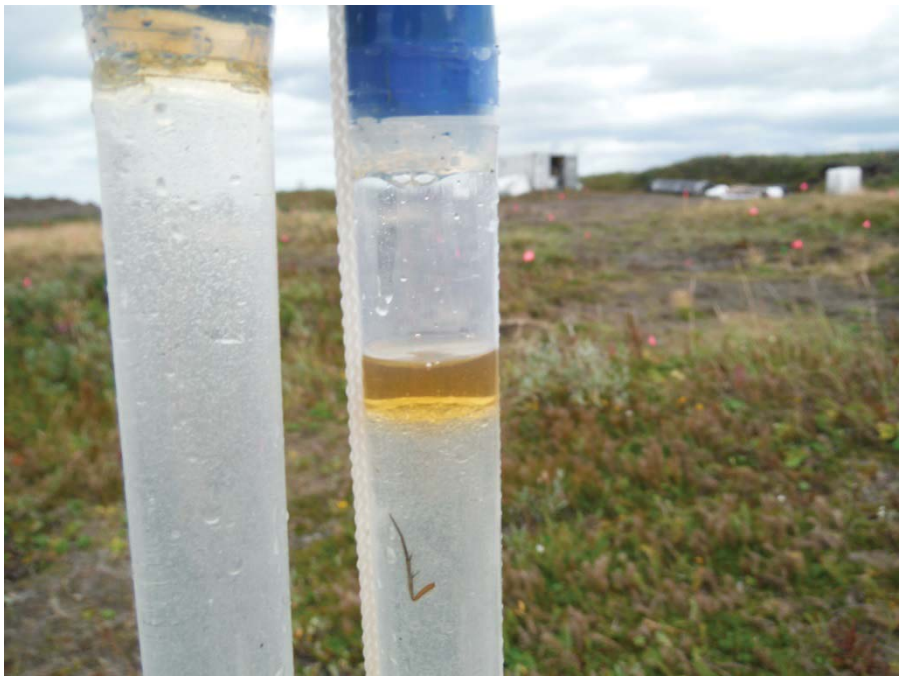

Photo No. 4 – 04 September 2013
Close-up of the product bailed from well BLO-MW-01. Facing north.

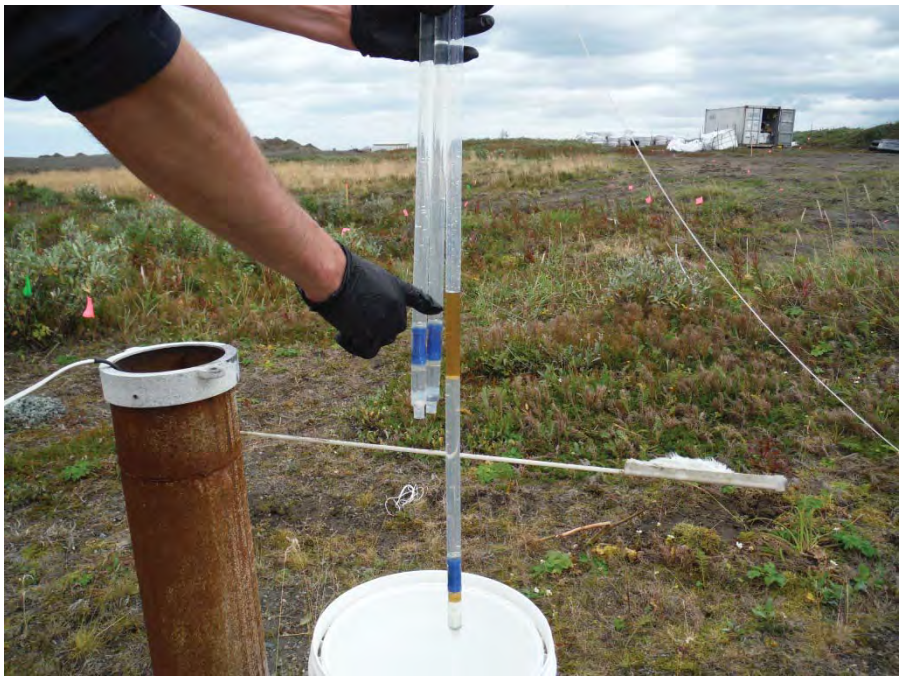

Photo No. 5 – 04 September 2013
Product bailed from well BLO-MW-01. Facing north.

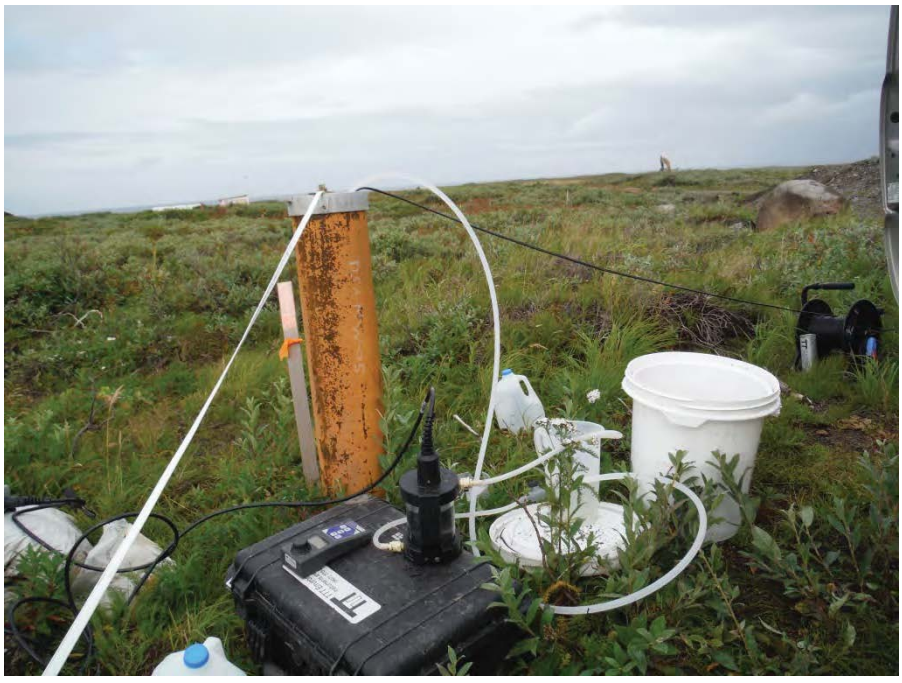

Photo No. 6 – 04 September 2013
Purging well DSA-MW-05 at the Former RRS. Facing east.

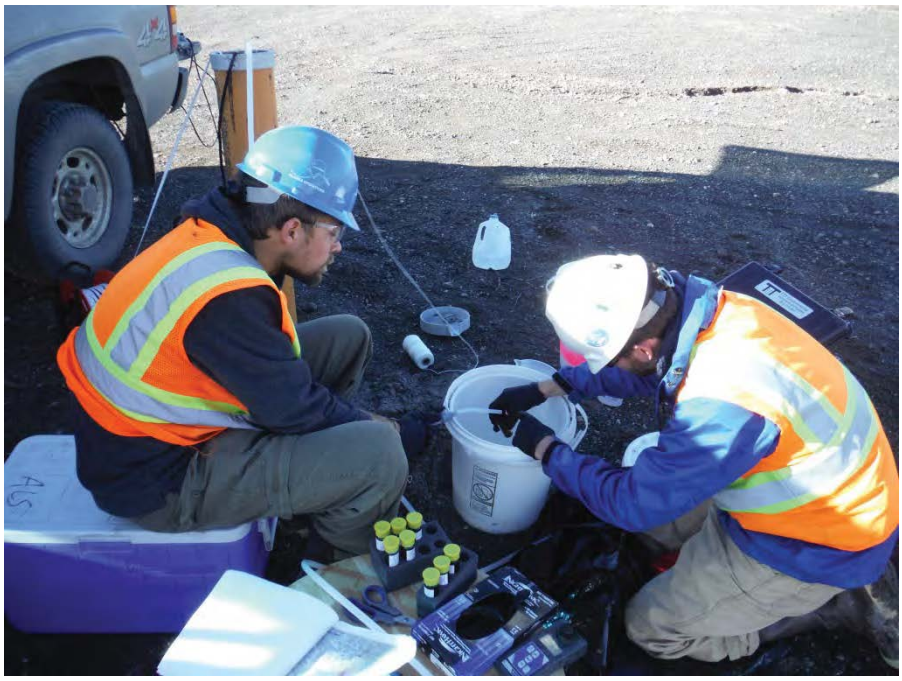

Photo No. 7 – 02 September 2013
Collection of groundwater samples from DSA-MW-04 at the Former RRS site.
Facing southwest.

APPENDIX B

Data Quality Assessment

PACIFIC AIR FORCES
REGIONAL SUPPORT CENTER

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

2013 ANNUAL GROUNDWATER MONITORING REPORT

PORT HEIDEN FORMER RADIO RELAY STATION, ALASKA

APPENDIX B: DATA QUALITY ASSESSMENT

FINAL
MARCH 2014

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TABLES

APPENDICES

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ACRONYMS AND ABBREVIATIONS

%D	percent difference
ADEC	Alaska Department of Environmental Conservation
DoD	Department of Defense
DQA	Data Quality Assessment
FD	field duplicate
Jacobs	Jacobs Engineering Group Inc.
LOD	limit of detection
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
RPD	relative percent difference
USAF	U.S. Air Force

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1.0 INTRODUCTION

The purpose of this Data Quality Assessment (DQA) and attached Alaska Department of Environmental Conservation (ADEC) Laboratory Data Review Checklists is to assess the overall quality and usability of data from the 2013 Annual Groundwater Monitoring at Port Heiden, Alaska.

As part of the 2013 Groundwater Monitoring effort, 24 primary groundwater samples were collected. These were submitted to the analytical laboratory, ALS Environmental in Kelso, Washington. Analyses and field quality control sample quantities are summarized in Table B-1; the specific list of methods/analytes for each well is summarized in Table 3-2 of the main report.

Table B-1
Field Quality Control Sample Quantities

Method	Analyte(s)	Primary Samples	Field Duplicates	MS/MSD	Trip Blanks
Groundwater Samples					
AK101	GRO	5	1	1	1
AK102	DRO	13	2	1	NA
AK103	RRO	6	1	1	NA
SW8260C	VOC	17	2	1	1
ASTM2320B, E200.7, E300.0, E353.2	MNA	17	2	NA	NA
Waste Characterization					
SW8260C	RCRA VOC	2	NA	NA	1

Notes:
DRO = diesel-range organics
GRO = gasoline-range organics
MNA = monitored natural attenuation
RCRA = Resource Conservation and Recovery Act
RRO = residual-range organics
VOC = volatile organic compound
For further definitions, see Acronyms and Abbreviations.

The attachments to this DQA contain the sample summary table and analytical data tables (Attachment B-1); tables of sample results that did not meet the project data quality objectives (Attachment B-2); ADEC Laboratory Data Review Checklists (Attachment B-3); and the complete laboratory deliverables (Attachment B-4, available on CD).

1.1 QUALITY CONTROL CRITERIA

Jacobs Engineering Group Inc. (Jacobs) performed this DQA and completed ADEC Laboratory Data Review Checklists for the records associated with the 2013 annual groundwater monitoring event, as per the *2013 Groundwater Monitoring Work Plan* (U.S. Air Force [USAF] 2013). Data quality was evaluated against the following requirements: U.S. Department of Defense (DoD) *Quality Systems Manual*, version 4.2 (DoD 2010); ADEC and U.S. Environmental Protection Agency analytical methods (ADEC 2002; U.S. Environmental Protection Agency 2008); and laboratory limits.

The Jacobs project chemist performed a completeness check of the laboratory deliverables to verify that data packages and electronic files included all of the requested information. All analytical data were reviewed, including the chain-of-custody and sample receipt records, laboratory case narratives, and laboratory data. Analytical data were reviewed for the following information:

- Methodology
- Sample holding times
- Laboratory blanks
- Limit of quantitation, limit of detection (LOD) and detection limits
- Surrogate recoveries, laboratory control sample recoveries and laboratory control sample duplicate recoveries
- Matrix spike (MS) and matrix spike duplicate (MSD) recoveries and precision

Analytical data quality objectives were considered met when the quality of the sample data met precision, accuracy, representativeness, completeness, comparability, and sensitivity requirements. Qualified data are considered usable but estimated for the purposes of this monitoring event. The following data qualifiers are applicable to the 2013 groundwater monitoring analytical data:

J The analyte was positively identified; however, the associated result was less than the limit of quantitation but greater than or equal to the detection limit.

JC- The continuing calibration percent difference (%D) was outside acceptable limits; results were qualified as estimated and may be biased low.

JM- The result was an estimated value because the analyte failed recovery criteria in the MS or MSD sample, or both; results were biased low because the recovery was less than the lower control limit.

JD The result was qualified because the relative percent difference (RPD) between the primary sample and the field duplicate (FD) sample exceeded 30 percent for water

E The result is nondetect and the LOD exceeds the ADEC cleanup level.

1.2 DATA QUALITY SUMMARY

In general, the overall quality of project data was acceptable. All analytical results were 100 percent complete and, for all parameters, the completeness goal of 95 percent was met.

The following sub-sections discuss anomalies that were associated with analytical data, resulting in the qualification of sample results.

1.2.1 Continuing Calibration

Continuing calibration verification recoveries for several volatile organic compound analytes were outside the 20 %D criterion (DoD 2010). Results from samples that were associated with failing continuing calibration verification recoveries (>20 %D) were qualified as estimated with a low bias (JC-). The impact on data quality is minimal; all sample results that were qualified JC- were nondetect and had LODs significantly less than the respective cleanup level, with the exception of carbon disulfide. The detected carbon disulfide result for sample 13PH-DSA-MW-07 (0.0001 milligrams per liter [mg/L], qualified JC-) is significantly below the ADEC cleanup level of 3.7 mg/L.

The affected samples and associated analytes, along with the %D results and applied qualifiers, are summarized in Table B-2-1 (Attachment B-2).

1.2.2 Matrix Spikes

The MS and/or MSD recoveries for diesel-range organics were outside of the quality control criteria (biased low) for parent samples 13PH-DSA-MW-04 and 13PH-215-MW-08. These sample results were qualified JM- to indicate an estimated result with a potentially low bias. The impact is minimal since the affected sample results are significantly less than the ADEC

Table C cleanup level of 1.5 mg/L (ADEC 2012). Table B-2-2 (Attachment B-2) provides a summary of the MS and MSD recovery outliers and the affected parent sample results.

1.2.3 Field Duplicates

Three FD samples were analyzed with the seventeen primary groundwater samples. FD precision was evaluated against the recommended RPD limit of 30 percent for water, as stated in the ADEC Laboratory Data Review Checklists (per ADEC 2009). RPD values for sample pair results where one was nondetect and the other was detected were calculated using the LOD value for the nondetect result. Results were qualified as estimated (JD) in several samples due to high FD RPD values, which can likely be attributed to the sample matrix or low-level detections. The higher value between the sample and the FD will be used for reporting. Table B-2-3 (Attachment B-2) provides a summary of JD-qualified sample results.

1.2.4 Reporting Limit Assessment

Laboratory LODs for nondetect samples were evaluated against the corresponding water cleanup level. Two analytes, 1,2-dibromoethane (ethylene dibromide) and 1,2,3-trichloropropane, had LODs greater than the ADEC Table C groundwater cleanup level (ADEC 2012). Neither analyte was detected in any sample, nor are they considered contaminants of concern (USAF 2009).

Nondetect samples that had LOD results exceeding the screening level were qualified E; these results shown in italics in Attachment B-1 and in Table B-2-4 (Attachment B-2).

1.3 CONCLUSION

In general, the overall quality of project data was acceptable. The completeness goal of 95 percent for all parameters was met. No sample results were rejected. All reported data were considered usable for the 2013 Annual Groundwater Monitoring at Port Heiden; any qualifications applied during data validation did not adversely impact data usability. Limitations are discussed in this DQA and the ADEC Laboratory Data Review Checklists (Attachment B-3).

2.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2012 (April).*Oil and Other Hazardous Substances Pollution Control*. 18 AAC 75.

ADEC. 2009 (March). *Environmental Laboratory Data and Quality Assurance Requirements; Technical Memorandum.* Division of Spill Prevention and Response. Contaminated Sites Program.

ADEC. 2002. *Underground Storage Tanks Procedures Manual*. Division of Spill Prevention and Response. Contaminated Sites Program.

DoD (U.S. Department of Defense). 2010 (October). *Quality Systems Manual for Environmental Laboratories*. DoD Environmental Quality Workgroup, Department of the Navy, Lead Service. Version 4.2

EPA (U.S. Environmental Protection Agency). 2008 (January).*Test Methods for Evaluating Solid Waste*. SW-846, Third Edition, Update IVB.

USAF (U.S. Air Force). 2013 (July). *Groundwater Monitoring, 2013 Work Plan*. Former Radio Relay Station, Port Heiden, Alaska .Final. Prepared by Jacobs Engineering Group Inc.

USAF. 2009 (February). *Record of Decision for Port Heiden Radio Relay Station*. Port Heiden, Alaska.

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ATTACHMENT B-1

Sample Summary and Analytical Data Tables

Table B-1-1
2013 Port Heiden Groundwater Monitoring Sample Summary

Location ID	COC Sample ID	Sample Depth (feet below TOC)	Collection Date	Collection Time	Sampler	Qty	Container Type	Container Volume	Preservative	Matrix	Analytical Method Requested	QC Type	TAT	Notes	COC Number	Cooler Name	Cooler Date	Lab	SDG
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103		30 day		13PHGW08	Crawford	9/5	ALS	K1309283
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
BLO-MW-01	13PH-BLO-MW-01	49	04-Sep-2013	1541	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-02	13PH-BLO-MW-02	36.5	03-Sep-2013	938	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-02	13PH-BLO-MW-02	36.5	03-Sep-2013	938	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-02	13PH-BLO-MW-02	36.5	03-Sep-2013	938	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-02	13PH-BLO-MW-02	36.5	03-Sep-2013	938	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103		30 day		13PHGW06	Keith	9/4	ALS	K1309194
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-05	13PH-BLO-MW-05	54.5	02-Sep-2013	1740	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103		30 day		13PHGW06	Keith	9/4	ALS	K1309194
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
BLO-MW-06	13PH-BLO-MW-06	48.5	02-Sep-2013	1810	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-01	13PH-DSA-MW-01	56.5	04-SEP-2013	1108	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-01	13PH-DSA-MW-01	56.5	04-SEP-2013	1108	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-01	13PH-DSA-MW-01	56.5	04-SEP-2013	1108	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-01	13PH-DSA-MW-01	56.5	04-SEP-2013	1108	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103		30 day		13PHGW04	Hossa	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-02	66	02-Sep-2013	1250	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101	DUP	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103	DUP	30 day		13PHGW08	Crawford	9/5	ALS	K1309283
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8	DUP	30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1	DUP	30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2	DUP	30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-02	13PH-DSA-MW-029	66	02-Sep-2013	1250	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260	DUP	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	6	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103	MS/D	30 day		13PHGW04	Hossa	9/4	ALS	K1309194
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	9	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260	MS/D	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-04	13PH-DSA-MW-04	69	02-Sep-2013	1038	DM/MP	9	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260	MS/D	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-05	13PH-DSA-MW-05	80	04-Sep-2013	1205	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-05	13PH-DSA-MW-05	80	04-Sep-2013	1205	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-05	13PH-DSA-MW-05	80	04-Sep-2013	1205	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-05	13PH-DSA-MW-05	80	04-Sep-2013	1205	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-06	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-06	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-06	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-06	82	04-Sep-2013	951	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-069	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8	DUP	30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-069	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1	DUP	30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-069	82	04-Sep-2013	951	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2	DUP	30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-06	13PH-DSA-MW-069	82	04-Sep-2013	951	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260	DUP	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
DSA-MW-07	13PH-DSA-MW-07	53.5	05-SEP-2013	840	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283

Table B-1-1
2013 Port Heiden Groundwater Monitoring Sample Summary

Location ID	COC Sample ID	Sample Depth (feet below TOC)	Collection Date	Collection Time	Sampler	Qty	Container Type	Container Volume	Preservative	Matrix	Analytical Method Requested	QC Type	TAT	Notes	COC Number	Cooler Name	Cooler Date	Lab	SDG
DSA-MW-07	13PH-DSA-MW-07	53.5	05-SEP-2013	840	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-07	13PH-DSA-MW-07	53.5	05-SEP-2013	840	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW07	Seabrook	9/5	ALS	K1309283
DSA-MW-07	13PH-DSA-MW-07	53.5	05-SEP-2013	907	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
FPC-066-04	13PH-066-MW-04	7	01-Sep-2013	940	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102		30 day		13PHGW01	Towes	9/4	ALS	K1309194
FPC-066-05	13PH-066-MW-05	9	01-Sep-2013	1203	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102		30 day		13PHGW01	Towes	9/4	ALS	K1309194
FPC-066-05	13PH-066-MW-059	9	01-Sep-2013	1203	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102	DUP	30 day		13PHGW08	Crawford	9/5	ALS	K1309283
FPC-066-06	13PH-066-MW-06	6	01-Sep-2013	1039	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102		30 day		13PHGW01	Towes	9/4	ALS	K1309194
FPC-066-07	13PH-066-MW-07	6	01-Sep-2013	1120	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102		30 day		13PHGW01	Towes	9/4	ALS	K1309194
FPC-215-08	13PH-215-MW-08	14	01-Sep-2013	1450	DM/MP	6	Amber	1 Liter	HCl, 4 ºC	W	AK 102	MS/D	30 day		13PHGW02	Kane	9/4	ALS	K1309194
FPC-215-09	13PH-215-MW-09	16	01-Sep-2013	1529	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	W	AK 102		30 day		13PHGW02	Kane	9/4	ALS	K1309194
FPC-215-10	13PH-215-MW-10	16.5	01-Sep-2013	1626	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK 102		30 day		13PHGW06	Keith	9/4	ALS	K1309194
GLO-MW-03	13PH-GLO-MW-03	62	03-Sep-2013	1148	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-03	13PH-GLO-MW-03	62	03-Sep-2013	1148	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-03	13PH-GLO-MW-03	62	03-Sep-2013	1148	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-03	13PH-GLO-MW-03	62	03-Sep-2013	1148	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
GLO-MW-04	13PH-GLO-MW-04	59	03-Sep-2013	1231	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-04	13PH-GLO-MW-04	59	03-Sep-2013	1231	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-04	13PH-GLO-MW-04	59	03-Sep-2013	1231	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
GLO-MW-04	13PH-GLO-MW-04	59	03-Sep-2013	1231	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
PG1-MW-01	13PH-PG1-MW-01	63	03-Sep-2013	1533	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
PG1-MW-01	13PH-PG1-MW-01	63	03-Sep-2013	1533	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
PG1-MW-01	13PH-PG1-MW-01	63	03-Sep-2013	1533	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
PG1-MW-01	13PH-PG1-MW-01	63	03-Sep-2013	1533	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
RRS-MW-02	13PH-RRS-MW-02	60.5	03-Sep-2013	1340	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-02	13PH-RRS-MW-02	60.5	03-Sep-2013	1340	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-02	13PH-RRS-MW-02	60.5	03-Sep-2013	1340	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-02	13PH-RRS-MW-02	60.5	03-Sep-2013	1340	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
RRS-MW-05	13PH-RRS-MW-05	54	03-Sep-2013	1703	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-05	13PH-RRS-MW-05	54	03-Sep-2013	1703	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-05	13PH-RRS-MW-05	54	03-Sep-2013	1703	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-05	13PH-RRS-MW-05	54	03-Sep-2013	1703	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
RRS-MW-06	13PH-RRS-MW-06	60.5	03-Sep-2013	1436	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-06	13PH-RRS-MW-06	60.5	03-Sep-2013	1436	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-06	13PH-RRS-MW-06	60.5	03-Sep-2013	1436	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
RRS-MW-06	13PH-RRS-MW-06	60.5	03-Sep-2013	1436	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
UST-MW-02	13PH-UST-MW-02	68.5	02-Sep-2013	1750	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
UST-MW-02	13PH-UST-MW-02	68.5	03-Sep-2013	1750	DM/MP	2	Amber	1 Liter	HCl, 4 ºC	WG	AK102/103		30 day		13PHGW06	Keith	9/4	ALS	K1309194
UST-MW-02	13PH-UST-MW-02	68.5	02-Sep-2013	1750	DM/MP	1	Poly	250 mL	HNO_3, 4 ºC	WG	E200.8		30 day		13PHGW05	Saad	9/4	ALS	K1309194
UST-MW-02	13PH-UST-MW-02	68.5	02-Sep-2013	1750	DM/MP	1	Poly	250 mL	4 ºC	WG	E300.0, E310.1		30 day		13PHGW05	Saad	9/4	ALS	K1309194
UST-MW-02	13PH-UST-MW-02	68.5	02-Sep-2013	1750	DM/MP	1	Poly	250 mL	H_2SO_4, 4 ºC	WG	E353.2		30 day		13PHGW05	Saad	9/4	ALS	K1309194
UST-MW-02	13PH-UST-MW-02	68.5	02-Sep-2013	1750	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260		30 day		13PHGW03	Sharp	9/5	ALS	K1309283
-	13PH-TB-01	-	02-Sep-2013	800	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	AK101	TB	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
-	13PH-TB-01	-	02-Sep-2013	800	DM/MP	3	Amber VOA	40mL	HCl, 4 ºC	WG	SW8260	TB	30 day		13PHGW03	Sharp	9/5	ALS	K1309283
WX-01	13PH-WX-01	-	16-Sep-2013	1145	CJ	3	Amber VOA	40 mL	HCl, 4 ºC	WW	RCRA SW8260		3 day	Decontamination water	58	This That and Everything	9/18	ALS	K139973
WX-02	13PH-WX-02	-	16-Sep-2013	1200	CJ	3	Amber VOA	40 mL	HCl, 4 ºC	WW	RCRA SW8260		3 day	Purge water (2 drums)	58	This That and Everything	9/18	ALS	K139973
-	13PH-TB02	-	16-Sep-2013	0800	CJ	3	Amber VOA	40 mL	HCl, 4 ºC	WW	RCRA SW8260	TB	3 day		58	This That and Everything	9/18	ALS	K139973

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	BLO-MW-01	BLO-MW-02	BLO-MW-02	BLO-MW-05	BLO-MW-05
				Sample ID	13PH-BLO-MW-01	13PH-BLO-MW-02	13PH-BLO-MW-02	13PH-BLO-MW-05	13PH-BLO-MW-05
				Lab Sample ID	K130928319	K130919414	K130928308	K130919406	K130928305
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/4/13	9/3/13	9/3/13	9/2/13	9/2/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
A2320B	Alkalinity, Total	mg/L	–		918 [60]	39.6 [6]	–	49.2 [6]	–
E200.7	Iron	mg/L	–		21.8 [0.008]	0.92 [0.008]	–	45.2 [0.008]	–
E200.7	Manganese	mg/L	–		10.7 [0.0004]	0.0184 [0.0004]	–	1.02 [0.0004]	–
E300.0	Sulfate	mg/L	–		4.5 [0.4]	3.02 [0.04]	–	2.22 [0.04]	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–		0.017 [0.02] J	0.063 [0.02]	–	0.056 [0.02]	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2		1.9 [0.025]	–	–	–	ND [0.025]
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5		**1300 [3.2]**	–	–	0.075 [0.02] J	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1		**78 [7.9]**	–	–	0.18 [0.05] J	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,1-Trichloroethane	mg/L	0.2		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2-Trichloroethane	mg/L	0.005		ND [0.0004]	–	ND [0.0004]	–	ND [0.0004]
SW8260C	1,1-Dichloroethane	mg/L	7.3		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloroethene	mg/L	0.007		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2,3-Trichlorobenzene	mg/L	–		ND [0.0004]	–	ND [0.0004]	–	ND [0.0004]
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012		*ND [0.0005] E*	–	*ND [0.0005] E*	–	*ND [0.0005] E*
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07		ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8		0.0017 [0.0002] J	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–		ND [0.0008]	–	ND [0.0008] JC-	–	ND [0.0008] JC-
SW8260C	1,2-Dibromoethane	mg/L	0.00005		*ND [0.0002] E*	–	*ND [0.0002] E*	–	*ND [0.0002] E*
SW8260C	1,2-Dichlorobenzene	mg/L	0.6		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dichloroethane	mg/L	0.005		ND [0.00015]	–	ND [0.00015]	–	ND [0.00015]
SW8260C	1,2-Dichloropropane	mg/L	0.005		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8		0.017 [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichlorobenzene	mg/L	3.3		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichloropropane	mg/L	–		ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	1,4-Dichlorobenzene	mg/L	0.075		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Butanone	mg/L	22		0.0048 [0.004] J	–	ND [0.004]	–	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Hexanone	mg/L	–		ND [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	4-Chlorotoluene	mg/L	–		ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	4-Isopropyltoluene	mg/L	–		0.0044 [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	BLO-MW-01	BLO-MW-02	BLO-MW-02	BLO-MW-05	BLO-MW-05
				Sample ID	13PH-BLO-MW-01	13PH-BLO-MW-02	13PH-BLO-MW-02	13PH-BLO-MW-05	13PH-BLO-MW-05
				Lab Sample ID	K130928319	K130919414	K130928308	K130919406	K130928305
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/4/13	9/3/13	9/3/13	9/2/13	9/2/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	ND [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	Acetone	mg/L	33	0.026 [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	Benzene	mg/L	0.005	0.0011 [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromochloromethane	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromodichloromethane	mg/L	0.014	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Bromoform	mg/L	0.11	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005] JC-
SW8260C	Bromomethane	mg/L	0.051	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Carbon disulfide	mg/L	3.7	0.00007 [0.0002] J	–	ND [0.0002]	–	0.00017 [0.0002] J
SW8260C	Carbon tetrachloride	mg/L	0.005	ND [0.0002]	–	ND [0.0002] JC-	–	ND [0.0002]
SW8260C	Chlorobenzene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroform	mg/L	0.14	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloromethane	mg/L	0.066	0.00024 [0.0002] J	–	0.0001 [0.0002] J	–	0.00013 [0.0002] J
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	0.0029 [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Dibromochloromethane	mg/L	0.01	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005]
SW8260C	Dibromomethane	mg/L	0.37	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005]
SW8260C	Dichlorodifluoromethane	mg/L	7.3	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Ethylbenzene	mg/L	0.7	0.0032 [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Hexachlorobutadiene	mg/L	0.0073	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	0.0043 [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Methylene Chloride	mg/L	0.005	0.00019 [0.0002] J	–	ND [0.0002]	–	ND [0.0002]
SW8260C	MTBE	mg/L	0.47	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Naphthalene	mg/L	0.73	0.14 [0.003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	n-Butylbenzene	mg/L	0.37	0.0072 [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	n-Propylbenzene	mg/L	0.37	0.0018 [0.0002] J	–	ND [0.0002]	–	ND [0.0002]
SW8260C	o-Xylene	mg/L	10	0.00032 [0.0002] J	–	ND [0.0002]	–	ND [0.0002]
SW8260C	sec-Butylbenzene	mg/L	0.37	0.00067 [0.0001] J	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Styrene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	tert-Butylbenzene	mg/L	0.37	0.0032 [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Tetrachloroethene	mg/L	0.005	0.0001 [0.0002] J	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Toluene	mg/L	1	0.00008 [0.0001] J	–	ND [0.0001]	–	0.00017 [0.0001] J
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	BLO-MW-01	BLO-MW-02	BLO-MW-02	BLO-MW-05	BLO-MW-05
				Sample ID	13PH-BLO-MW-01	13PH-BLO-MW-02	13PH-BLO-MW-02	13PH-BLO-MW-05	13PH-BLO-MW-05
				Lab Sample ID	K130928319	K130919414	K130928308	K130919406	K130928305
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/4/13	9/3/13	9/3/13	9/2/13	9/2/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Trichloroethene	mg/L	0.005	0.0035 [0.0001]	–	ND [0.0001]	–	0.00037 [0.0001] J
SW8260C	Trichlorofluoromethane	mg/L	11	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Vinyl Chloride	mg/L	0.002	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10	0.0028 [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	BLO-MW-06	BLO-MW-06	DSA-MW-01	DSA-MW-02	DSA-MW-02
			Sample ID	13PH-BLO-MW-06	13PH-BLO-MW-06	13PH-DSA-MW-01	13PH-DSA-MW-02	13PH-DSA-MW-02
			Lab Sample ID	K130919407	K130928306	K130928313	K130919409	K130928301
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/2/13	9/4/13	9/2/13	9/2/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
A2320B	Alkalinity, Total	mg/L	–	53.9 [6]	–	72.3 [6]	131 [6]	–
E200.7	Iron	mg/L	–	23.1 [0.008]	–	1.82 [0.008]	77.4 [0.008]	–
E200.7	Manganese	mg/L	–	0.492 [0.0004]	–	0.0732 [0.0004]	1.55 [0.0004]	–
E300.0	Sulfate	mg/L	–	6.16 [0.04]	–	3.99 [0.04]	6.93 [0.1]	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	0.086 [0.02]	–	0.122 [0.02]	1.44 [0.02]	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	ND [0.025]	–	–	0.22 [0.025]
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	0.074 [0.02] J	–	–	0.031 [0.02] J, JD	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	0.36 [0.05] J	–	–	0.062 [0.05] J, JD	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	–	ND [0.0002]	ND [0.0002]	–	0.0016 [0.0002]
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	–	ND [0.0004]	ND [0.0004]	–	ND [0.0004] JD
SW8260C	1,1-Dichloroethane	mg/L	7.3	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloroethene	mg/L	0.007	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	–	ND [0.0004]	ND [0.0004]	–	ND [0.0004]
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	–	*ND [0.0005] E*	*ND [0.0005] E*	–	*ND [0.0005] E*
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	–	ND [0.0008] JC-	ND [0.0008] JC-	–	ND [0.0008] JC-
SW8260C	1,2-Dibromoethane	mg/L	0.00005	–	*ND [0.0002] E*	*ND [0.0002] E*	–	*ND [0.0002] E*
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dichloroethane	mg/L	0.005	–	ND [0.00015]	ND [0.00015]	–	0.00008 [0.00015] J, JD
SW8260C	1,2-Dichloropropane	mg/L	0.005	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichloropropane	mg/L	–	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Butanone	mg/L	22	–	ND [0.004]	ND [0.004]	–	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Hexanone	mg/L	–	–	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	4-Chlorotoluene	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	4-Isopropyltoluene	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	BLO-MW-06	BLO-MW-06	DSA-MW-01	DSA-MW-02	DSA-MW-02
				Sample ID	13PH-BLO-MW-06	13PH-BLO-MW-06	13PH-DSA-MW-01	13PH-DSA-MW-02	13PH-DSA-MW-02
				Lab Sample ID	K130919407	K130928306	K130928313	K130919409	K130928301
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/3/13	9/2/13	9/4/13	9/2/13	9/2/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	–	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	Acetone	mg/L	33	–	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	Benzene	mg/L	0.005	–	0.00008 [0.0001] J	ND [0.0001]	–	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromochloromethane	mg/L	–	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromodichloromethane	mg/L	0.014	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Bromoform	mg/L	0.11	–	ND [0.0005] JC-	ND [0.0005]	–	ND [0.0005] JC-
SW8260C	Bromomethane	mg/L	0.051	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Carbon disulfide	mg/L	3.7	–	0.00009 [0.0002] J	ND [0.0002]	–	ND [0.0002]
SW8260C	Carbon tetrachloride	mg/L	0.005	–	ND [0.0002]	ND [0.0002] JC-	–	ND [0.0002]
SW8260C	Chlorobenzene	mg/L	0.1	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroform	mg/L	0.14	–	ND [0.0002]	ND [0.0002]	–	0.00023 [0.0002] J
SW8260C	Chloromethane	mg/L	0.066	–	0.00011 [0.0002] J	0.00009 [0.0002] J	–	0.00012 [0.0002] J
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	–	ND [0.0002]	ND [0.0002]	–	0.00007 [0.0002] J, JD
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Dibromochloromethane	mg/L	0.01	–	ND [0.0005]	ND [0.0005]	–	ND [0.0005]
SW8260C	Dibromomethane	mg/L	0.37	–	ND [0.0005]	ND [0.0005]	–	ND [0.0005]
SW8260C	Dichlorodifluoromethane	mg/L	7.3	–	ND [0.0002]	ND [0.0002]	–	0.00013 [0.0002] J, JD
SW8260C	Ethylbenzene	mg/L	0.7	–	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Hexachlorobutadiene	mg/L	0.0073	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Methylene Chloride	mg/L	0.005	–	ND [0.0002]	0.0001 [0.0002] J	–	0.00012 [0.0002] J
SW8260C	MTBE	mg/L	0.47	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Naphthalene	mg/L	0.73	–	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	n-Butylbenzene	mg/L	0.37	–	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	n-Propylbenzene	mg/L	0.37	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	o-Xylene	mg/L	10	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	sec-Butylbenzene	mg/L	0.37	–	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Styrene	mg/L	0.1	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	tert-Butylbenzene	mg/L	0.37	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Tetrachloroethene	mg/L	0.005	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Toluene	mg/L	1	–	0.00017 [0.0001] J	ND [0.0001]	–	ND [0.0001]
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	–	ND [0.0002]	ND [0.0002]	–	ND [0.0002] JD

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	BLO-MW-06	BLO-MW-06	DSA-MW-01	DSA-MW-02	DSA-MW-02
				Sample ID	13PH-BLO-MW-06	13PH-BLO-MW-06	13PH-DSA-MW-01	13PH-DSA-MW-02	13PH-DSA-MW-02
				Lab Sample ID	K130919407	K130928306	K130928313	K130919409	K130928301
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/3/13	9/2/13	9/4/13	9/2/13	9/2/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085		–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Trichloroethene	mg/L	0.005		–	0.00088 [0.0001]	**0.0062 [0.0001]**	–	**0.49 [0.002]**
SW8260C	Trichlorofluoromethane	mg/L	11		–	ND [0.0002]	ND [0.0002]	–	0.0013 [0.0002]
SW8260C	Vinyl Chloride	mg/L	0.002		–	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10		–	ND [0.0002]	ND [0.0002]	–	ND [0.0002]

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	DSA-MW-02	DSA-MW-02	DSA-MW-04	DSA-MW-04	DSA-MW-05
			Sample ID	13PH-DSA-MW-029	13PH-DSA-MW-029	13PH-DSA-MW-04	13PH-DSA-MW-04	13PH-DSA-MW-05
			Lab Sample ID	K130919413	K130928302	K130919410	K130928303	K130928307
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/2/13	9/2/13	9/2/13	9/2/13	9/4/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Duplicate	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
A2320B	Alkalinity, Total	mg/L	–	132 [6]	–	97.9 [6]	–	74.9 [6]
E200.7	Iron	mg/L	–	69.3 [0.008]	–	4.45 [0.008]	–	6.05 [0.008]
E200.7	Manganese	mg/L	–	1.38 [0.0004]	–	0.168 [0.0004]	–	0.201 [0.0004]
E300.0	Sulfate	mg/L	–	7.43 [0.04]	–	10.9 [0.04]	–	9.72 [0.04]
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	1.45 [0.02]	–	0.027 [0.02] J	–	0.053 [0.02]
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	0.21 [0.025]	–	–	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	–	0.047 [0.02] J, JD	0.097 [0.02] J, JM-	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	–	0.087 [0.05] J, JD	0.082 [0.05] J	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	–	0.0014 [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	–	0.00014 [0.0004] J, JD	–	0.0002 [0.0004] J	ND [0.0004]
SW8260C	1,1-Dichloroethane	mg/L	7.3	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,1-Dichloroethene	mg/L	0.007	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	–	ND [0.0004]	–	ND [0.0004]	ND [0.0004]
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	–	*ND [0.0005] E*	–	*ND [0.0005] E*	*ND [0.0005] E*
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	–	ND [0.0008] JC-	–	ND [0.0008] JC-	ND [0.0008] JC-
SW8260C	1,2-Dibromoethane	mg/L	0.00005	–	*ND [0.0002] E*	–	*ND [0.0002] E*	*ND [0.0002] E*
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,2-Dichloroethane	mg/L	0.005	–	ND [0.00015] JD	–	ND [0.00015]	0.00022 [0.00015] J
SW8260C	1,2-Dichloropropane	mg/L	0.005	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	1,3-Dichloropropane	mg/L	–	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	2-Butanone	mg/L	22	–	ND [0.004]	–	ND [0.004]	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	2-Hexanone	mg/L	–	–	ND [0.01]	–	ND [0.01]	ND [0.01]
SW8260C	4-Chlorotoluene	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	4-Isopropyltoluene	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	DSA-MW-02	DSA-MW-02	DSA-MW-04	DSA-MW-04	DSA-MW-05
				Sample ID	13PH-DSA-MW-029	13PH-DSA-MW-029	13PH-DSA-MW-04	13PH-DSA-MW-04	13PH-DSA-MW-05
				Lab Sample ID	K130919413	K130928302	K130919410	K130928303	K130928307
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/2/13	9/2/13	9/2/13	9/2/13	9/4/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Duplicate	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	–	ND [0.01]	–	ND [0.01]	ND [0.01]
SW8260C	Acetone	mg/L	33	–	ND [0.01]	–	ND [0.01]	ND [0.01]
SW8260C	Benzene	mg/L	0.005	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Bromochloromethane	mg/L	–	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Bromodichloromethane	mg/L	0.014	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	Bromoform	mg/L	0.11	–	ND [0.0005] JC-	–	ND [0.0005] JC-	ND [0.0005]
SW8260C	Bromomethane	mg/L	0.051	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	Carbon disulfide	mg/L	3.7	–	ND [0.0002]	–	ND [0.0002]	0.00045 [0.0002] J
SW8260C	Carbon tetrachloride	mg/L	0.005	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002] JC-
SW8260C	Chlorobenzene	mg/L	0.1	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Chloroform	mg/L	0.14	–	0.00021 [0.0002] J	–	0.00008 [0.0002] J	ND [0.0002]
SW8260C	Chloromethane	mg/L	0.066	–	0.00011 [0.0002] J	–	0.0001 [0.0002] J	0.00012 [0.0002] J
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	–	0.00025 [0.0002] J, JD	–	0.0001 [0.0002] J	ND [0.0002]
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Dibromochloromethane	mg/L	0.01	–	ND [0.0005]	–	ND [0.0005]	ND [0.0005]
SW8260C	Dibromomethane	mg/L	0.37	–	ND [0.0005]	–	ND [0.0005]	ND [0.0005]
SW8260C	Dichlorodifluoromethane	mg/L	7.3	–	ND [0.0002] JD	–	0.00049 [0.0002] J	0.00023 [0.0002] J
SW8260C	Ethylbenzene	mg/L	0.7	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	Hexachlorobutadiene	mg/L	0.0073	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Methylene Chloride	mg/L	0.005	–	0.00013 [0.0002] J	–	0.00013 [0.0002] J	0.00084 [0.0002] J
SW8260C	MTBE	mg/L	0.47	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	Naphthalene	mg/L	0.73	–	ND [0.0003]	–	ND [0.0003]	ND [0.0003]
SW8260C	n-Butylbenzene	mg/L	0.37	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	n-Propylbenzene	mg/L	0.37	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	o-Xylene	mg/L	10	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	sec-Butylbenzene	mg/L	0.37	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	Styrene	mg/L	0.1	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	tert-Butylbenzene	mg/L	0.37	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Tetrachloroethene	mg/L	0.005	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Toluene	mg/L	1	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	–	0.00008 [0.0002] J, JD	–	ND [0.0002]	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	DSA-MW-02	DSA-MW-02	DSA-MW-04	DSA-MW-04	DSA-MW-05
				Sample ID	13PH-DSA-MW-029	13PH-DSA-MW-029	13PH-DSA-MW-04	13PH-DSA-MW-04	13PH-DSA-MW-05
				Lab Sample ID	K130919413	K130928302	K130919410	K130928303	K130928307
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/2/13	9/2/13	9/2/13	9/2/13	9/4/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Duplicate	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]
SW8260C	Trichloroethene	mg/L	0.005	–	**0.5 [0.002]**	–	**0.12 [0.001]**	0.0028 [0.0001]
SW8260C	Trichlorofluoromethane	mg/L	11	–	0.0012 [0.0002]	–	ND [0.0002]	0.00015 [0.0002] J
SW8260C	Vinyl Chloride	mg/L	0.002	–	ND [0.0001]	–	ND [0.0001]	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10	–	ND [0.0002]	–	ND [0.0002]	ND [0.0002]

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	DSA-MW-06	DSA-MW-06	DSA-MW-07	GLO-MW-03	GLO-MW-03
			Sample ID	13PH-DSA-MW-06	13PH-DSA-MW-069	13PH-DSA-MW-07	13PH-GLO-MW-03	13PH-GLO-MW-03
			Lab Sample ID	K130928309	K130928311	K130928315	K130919415	K130928310
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/4/13	9/4/13	9/5/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
A2320B	Alkalinity, Total	mg/L	–	69.1 [6]	68.4 [6]	62.1 [6]	65 [6]	–
E200.7	Iron	mg/L	–	2.3 [0.008]	2.64 [0.008]	20.7 [0.008]	9.1 [0.008]	–
E200.7	Manganese	mg/L	–	0.441 [0.0004]	0.465 [0.0004]	0.326 [0.0004]	0.227 [0.0004]	–
E300.0	Sulfate	mg/L	–	5.04 [0.04]	5.02 [0.04]	6.15 [0.04]	2.69 [0.04]	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	0.033 [0.02] J, JD	0.017 [0.02] J, JD	0.064 [0.02]	0.097 [0.02]	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	–	–	–	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	–	–	–	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	–	–	–	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	ND [0.0002]	ND [0.0002]	ND [0.0002] JC-	–	ND [0.0002]
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	ND [0.0004]	ND [0.0004]	ND [0.0004]	–	ND [0.0004]
SW8260C	1,1-Dichloroethane	mg/L	7.3	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloroethene	mg/L	0.007	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	ND [0.0004]	ND [0.0004]	ND [0.0004]	–	ND [0.0004]
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	*ND [0.0005] E*	*ND [0.0005] E*	*ND [0.0005] E*	–	*ND [0.0005] E*
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	ND [0.0008] JC-	ND [0.0008] JC-	ND [0.0008] JC-	–	ND [0.0008] JC-
SW8260C	1,2-Dibromoethane	mg/L	0.00005	*ND [0.0002] E*	*ND [0.0002] E*	*ND [0.0002] E*	–	*ND [0.0002] E*
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dichloroethane	mg/L	0.005	ND [0.00015]	ND [0.00015]	ND [0.00015]	–	ND [0.00015]
SW8260C	1,2-Dichloropropane	mg/L	0.005	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichloropropane	mg/L	–	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Butanone	mg/L	22	ND [0.004]	ND [0.004]	ND [0.004]	–	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Hexanone	mg/L	–	ND [0.01]	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	4-Chlorotoluene	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	4-Isopropyltoluene	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	DSA-MW-06	DSA-MW-06	DSA-MW-07	GLO-MW-03	GLO-MW-03
				Sample ID	13PH-DSA-MW-06	13PH-DSA-MW-069	13PH-DSA-MW-07	13PH-GLO-MW-03	13PH-GLO-MW-03
				Lab Sample ID	K130928309	K130928311	K130928315	K130919415	K130928310
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/4/13	9/4/13	9/5/13	9/3/13	9/3/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	ND [0.01]	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	Acetone	mg/L	33	ND [0.01]	ND [0.01]	ND [0.01]	–	ND [0.01]
SW8260C	Benzene	mg/L	0.005	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromochloromethane	mg/L	–	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromodichloromethane	mg/L	0.014	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Bromoform	mg/L	0.11	ND [0.0005]	ND [0.0005]	ND [0.0005] JC-	–	ND [0.0005]
SW8260C	Bromomethane	mg/L	0.051	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Carbon disulfide	mg/L	3.7	0.00015 [0.0002] J	0.00014 [0.0002] J	0.0001 [0.0002] J, JC-	–	ND [0.0002]
SW8260C	Carbon tetrachloride	mg/L	0.005	ND [0.0002] JC-	ND [0.0002] JC-	ND [0.0002]	–	ND [0.0002] JC-
SW8260C	Chlorobenzene	mg/L	0.1	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroform	mg/L	0.14	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloromethane	mg/L	0.066	0.00007 [0.0002] J	0.00009 [0.0002] J	ND [0.0002]	–	0.00009 [0.0002] J
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Dibromochloromethane	mg/L	0.01	ND [0.0005]	ND [0.0005]	ND [0.0005] JC-	–	ND [0.0005]
SW8260C	Dibromomethane	mg/L	0.37	ND [0.0005]	ND [0.0005]	ND [0.0005]	–	ND [0.0005]
SW8260C	Dichlorodifluoromethane	mg/L	7.3	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Ethylbenzene	mg/L	0.7	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Hexachlorobutadiene	mg/L	0.0073	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Methylene Chloride	mg/L	0.005	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	MTBE	mg/L	0.47	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	Naphthalene	mg/L	0.73	ND [0.0003]	ND [0.0003]	ND [0.0003]	–	ND [0.0003]
SW8260C	n-Butylbenzene	mg/L	0.37	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	n-Propylbenzene	mg/L	0.37	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	o-Xylene	mg/L	10	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	sec-Butylbenzene	mg/L	0.37	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Styrene	mg/L	0.1	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	tert-Butylbenzene	mg/L	0.37	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Tetrachloroethene	mg/L	0.005	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Toluene	mg/L	1	ND [0.0001]	ND [0.0001]	0.00008 [0.0001] J	–	ND [0.0001]
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	DSA-MW-06	DSA-MW-06	DSA-MW-07	GLO-MW-03	GLO-MW-03
				Sample ID	13PH-DSA-MW-06	13PH-DSA-MW-069	13PH-DSA-MW-07	13PH-GLO-MW-03	13PH-GLO-MW-03
				Lab Sample ID	K130928309	K130928311	K130928315	K130919415	K130928310
				Matrix	WG	WG	WG	WG	WG
				Collection Date	9/4/13	9/4/13	9/5/13	9/3/13	9/3/13
				Laboratory	ALS	ALS	ALS	ALS	ALS
				QA/QC	Primary	Duplicate	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**						
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Trichloroethene	mg/L	0.005	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Trichlorofluoromethane	mg/L	11	0.00078 [0.0002]	0.00078 [0.0002]	ND [0.0002]	–	ND [0.0002]
SW8260C	Vinyl Chloride	mg/L	0.002	ND [0.0001]	ND [0.0001]	ND [0.0001]	–	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10	ND [0.0002]	ND [0.0002]	ND [0.0002]	–	ND [0.0002]

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	GLO-MW-04	GLO-MW-04	PG1-MW-01	PG1-MW-01	RRS-MW-02
			Sample ID	13PH-GLO-MW-04	13PH-GLO-MW-04	13PH-PG-1-MW-01	13PH-PG1-MW-01	13PH-RRS-MW-02
			Lab Sample ID	K130928312	K130919416	K130919419	K130928317	K130919417
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]					
A2320B	Alkalinity, Total	mg/L	–	–	44.9 [6]	137 [6]	–	44.8 [6]
E200.7	Iron	mg/L	–	–	53.9 [0.008]	44.2 [0.008]	–	1.67 [0.008]
E200.7	Manganese	mg/L	–	–	2.07 [0.0004]	0.881 [0.0004]	–	0.0484 [0.0004]
E300.0	Sulfate	mg/L	–	–	2.95 [0.04]	4.51 [0.1]	–	3.13 [0.04]
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	–	0.13 [0.02]	0.191 [0.02]	–	0.169 [0.02]
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	–	–	–	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	–	–	–	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	–	–	–	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	ND [0.0002]	–	–	0.00064 [0.0002]	–
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	ND [0.0004]	–	–	ND [0.0004]	–
SW8260C	1,1-Dichloroethane	mg/L	7.3	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,1-Dichloroethene	mg/L	0.007	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,1-Dichloropropene	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	ND [0.0004]	–	–	ND [0.0004]	–
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	*ND [0.0005] E*	–	–	*ND [0.0005] E*	–
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	ND [0.0008] JC-	–	–	ND [0.0008] JC-	–
SW8260C	1,2-Dibromoethane	mg/L	0.00005	*ND [0.0002] E*	–	–	*ND [0.0002] E*	–
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,2-Dichloroethane	mg/L	0.005	ND [0.00015]	–	–	ND [0.00015]	–
SW8260C	1,2-Dichloropropane	mg/L	0.005	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	1,3-Dichloropropane	mg/L	–	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	2,2-Dichloropropane	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	2-Butanone	mg/L	22	ND [0.004]	–	–	ND [0.004]	–
SW8260C	2-Chlorotoluene	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	2-Hexanone	mg/L	–	ND [0.01]	–	–	ND [0.01]	–
SW8260C	4-Chlorotoluene	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	4-Isopropyltoluene	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	GLO-MW-04	GLO-MW-04	PG1-MW-01	PG1-MW-01	RRS-MW-02
			Sample ID	13PH-GLO-MW-04	13PH-GLO-MW-04	13PH-PG-1-MW-01	13PH-PG1-MW-01	13PH-RRS-MW-02
			Lab Sample ID	K130928312	K130919416	K130919419	K130928317	K130919417
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]					
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	ND [0.01]	–	–	ND [0.01]	–
SW8260C	Acetone	mg/L	33	ND [0.01]	–	–	ND [0.01]	–
SW8260C	Benzene	mg/L	0.005	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	Bromobenzene	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Bromochloromethane	mg/L	–	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Bromodichloromethane	mg/L	0.014	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	Bromoform	mg/L	0.11	ND [0.0005]	–	–	ND [0.0005]	–
SW8260C	Bromomethane	mg/L	0.051	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	Carbon disulfide	mg/L	3.7	0.00087 [0.0002]	–	–	0.00008 [0.0002] J	–
SW8260C	Carbon tetrachloride	mg/L	0.005	ND [0.0002] JC-	–	–	ND [0.0002] JC-	–
SW8260C	Chlorobenzene	mg/L	0.1	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Chloroethane	mg/L	0.29	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Chloroform	mg/L	0.14	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Chloromethane	mg/L	0.066	0.00007 [0.0002] J	–	–	0.0001 [0.0002] J	–
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Dibromochloromethane	mg/L	0.01	ND [0.0005]	–	–	ND [0.0005]	–
SW8260C	Dibromomethane	mg/L	0.37	ND [0.0005]	–	–	ND [0.0005]	–
SW8260C	Dichlorodifluoromethane	mg/L	7.3	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Ethylbenzene	mg/L	0.7	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	Hexachlorobutadiene	mg/L	0.0073	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	Isopropylbenzene	mg/L	3.7	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Methylene Chloride	mg/L	0.005	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	MTBE	mg/L	0.47	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	Naphthalene	mg/L	0.73	ND [0.0003]	–	–	ND [0.0003]	–
SW8260C	n-Butylbenzene	mg/L	0.37	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	n-Propylbenzene	mg/L	0.37	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	o-Xylene	mg/L	10	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	sec-Butylbenzene	mg/L	0.37	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	Styrene	mg/L	0.1	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	tert-Butylbenzene	mg/L	0.37	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Tetrachloroethene	mg/L	0.005	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Toluene	mg/L	1	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	ND [0.0002]	–	–	ND [0.0002]	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	GLO-MW-04	GLO-MW-04	PG1-MW-01	PG1-MW-01	RRS-MW-02
			Sample ID	13PH-GLO-MW-04	13PH-GLO-MW-04	13PH-PG-1-MW-01	13PH-PG1-MW-01	13PH-RRS-MW-02
			Lab Sample ID	K130928312	K130919416	K130919419	K130928317	K130919417
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	–	ND [0.0002]	–
SW8260C	Trichloroethene	mg/L	0.005	ND [0.0001]	–	–	**0.021 [0.0001]**	–
SW8260C	Trichlorofluoromethane	mg/L	11	ND [0.0002]	–	–	0.00027 [0.0002] J	–
SW8260C	Vinyl Chloride	mg/L	0.002	ND [0.0001]	–	–	ND [0.0001]	–
SW8260C	Xylene, Isomers m & p	mg/L	10	ND [0.0002]	–	–	ND [0.0002]	–

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	RRS-MW-02	RRS-MW-05	RRS-MW-05	RRS-MW-06	RRS-MW-06
			Sample ID	13PH-RRS-MW-02	13PH-RRS-MW-05	13PH-RRS-MW-05	13PH-RRS-MW-06	13PH-RRS-MW-06
			Lab Sample ID	K130928314	K130919420	K130928318	K130919418	K130928316
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
A2320B	Alkalinity, Total	mg/L	–	–	56.8 [6]	–	162 [6]	–
E200.7	Iron	mg/L	–	–	25.6 [0.008]	–	0.713 [0.008]	–
E200.7	Manganese	mg/L	–	–	0.497 [0.0004]	–	0.0139 [0.0004]	–
E300.0	Sulfate	mg/L	–	–	3.34 [0.04]	–	3.12 [0.1]	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	–	0.053 [0.02]	–	0.351 [0.02]	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	–	–	–	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	–	–	–	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	–	–	–	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	ND [0.0004]	–	ND [0.0004]	–	ND [0.0004]
SW8260C	1,1-Dichloroethane	mg/L	7.3	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloroethene	mg/L	0.007	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	ND [0.0004]	–	ND [0.0004]	–	ND [0.0004]
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	*ND [0.0005] E*	–	*ND [0.0005] E*	–	*ND [0.0005] E*
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	ND [0.0008] JC-	–	ND [0.0008] JC-	–	ND [0.0008] JC-
SW8260C	1,2-Dibromoethane	mg/L	0.00005	*ND [0.0002] E*	–	*ND [0.0002] E*	–	*ND [0.0002] E*
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,2-Dichloroethane	mg/L	0.005	ND [0.00015]	–	ND [0.00015]	–	ND [0.00015]
SW8260C	1,2-Dichloropropane	mg/L	0.005	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	1,3-Dichloropropane	mg/L	–	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Butanone	mg/L	22	ND [0.004]	–	ND [0.004]	–	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	2-Hexanone	mg/L	–	ND [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	4-Chlorotoluene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	4-Isopropyltoluene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	RRS-MW-02	RRS-MW-05	RRS-MW-05	RRS-MW-06	RRS-MW-06
			Sample ID	13PH-RRS-MW-02	13PH-RRS-MW-05	13PH-RRS-MW-05	13PH-RRS-MW-06	13PH-RRS-MW-06
			Lab Sample ID	K130928314	K130919420	K130928318	K130919418	K130928316
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]					
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	ND [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	Acetone	mg/L	33	ND [0.01]	–	ND [0.01]	–	ND [0.01]
SW8260C	Benzene	mg/L	0.005	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromochloromethane	mg/L	–	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Bromodichloromethane	mg/L	0.014	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Bromoform	mg/L	0.11	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005]
SW8260C	Bromomethane	mg/L	0.051	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Carbon disulfide	mg/L	3.7	ND [0.0002]	–	0.00009 [0.0002] J	–	ND [0.0002]
SW8260C	Carbon tetrachloride	mg/L	0.005	ND [0.0002] JC-	–	ND [0.0002] JC-	–	ND [0.0002] JC-
SW8260C	Chlorobenzene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloroform	mg/L	0.14	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Chloromethane	mg/L	0.066	0.0001 [0.0002] J	–	0.00009 [0.0002] J	–	0.0001 [0.0002] J
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Dibromochloromethane	mg/L	0.01	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005]
SW8260C	Dibromomethane	mg/L	0.37	ND [0.0005]	–	ND [0.0005]	–	ND [0.0005]
SW8260C	Dichlorodifluoromethane	mg/L	7.3	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Ethylbenzene	mg/L	0.7	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Hexachlorobutadiene	mg/L	0.0073	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Methylene Chloride	mg/L	0.005	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	MTBE	mg/L	0.47	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	Naphthalene	mg/L	0.73	ND [0.0003]	–	ND [0.0003]	–	ND [0.0003]
SW8260C	n-Butylbenzene	mg/L	0.37	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	n-Propylbenzene	mg/L	0.37	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	o-Xylene	mg/L	10	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	sec-Butylbenzene	mg/L	0.37	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Styrene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	tert-Butylbenzene	mg/L	0.37	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Tetrachloroethene	mg/L	0.005	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Toluene	mg/L	1	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	RRS-MW-02	RRS-MW-05	RRS-MW-05	RRS-MW-06	RRS-MW-06
			Sample ID	13PH-RRS-MW-02	13PH-RRS-MW-05	13PH-RRS-MW-05	13PH-RRS-MW-06	13PH-RRS-MW-06
			Lab Sample ID	K130928314	K130919420	K130928318	K130919418	K130928316
			Matrix	WG	WG	WG	WG	WG
			Collection Date	9/3/13	9/3/13	9/3/13	9/3/13	9/3/13
			Laboratory	ALS	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Primary	Primary	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]					
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Trichloroethene	mg/L	0.005	ND [0.0001]	–	0.00011 [0.0001] J	–	ND [0.0001]
SW8260C	Trichlorofluoromethane	mg/L	11	0.00094 [0.0002]	–	ND [0.0002]	–	ND [0.0002]
SW8260C	Vinyl Chloride	mg/L	0.002	ND [0.0001]	–	ND [0.0001]	–	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10	ND [0.0002]	–	ND [0.0002]	–	ND [0.0002]

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	UST-MW-02	UST-MW-02	WX-01	WX-02
			Sample ID	13PH-UST-MW-02	13PH-UST-MW-02	13PH-WX-01	13PH-WX-02
			Lab Sample ID	K130919405	K130928304	K130997301	K130997302
			Matrix	WG	WG	WW	WW
			Collection Date	9/2/13	9/2/13	9/16/13	9/16/13
			Laboratory	ALS	ALS	ALS	ALS
			QA/QC	Primary	Primary	Waste Characterization	Waste Characterization
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**				
A2320B	Alkalinity, Total	mg/L	–	137 [6]	–	–	–
E200.7	Iron	mg/L	–	70.3 [0.008]	–	–	–
E200.7	Manganese	mg/L	–	1.3 [0.0004]	–	–	–
E300.0	Sulfate	mg/L	–	5.66 [0.04]	–	–	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	0.375 [0.02]	–	–	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	–	ND [0.025]	–	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	0.093 [0.021] J	–	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	0.14 [0.053] J	–	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	–	ND [0.0002]	–	–
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	–	ND [0.0002]	–	–
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	–	ND [0.0002]	–	–
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	–	ND [0.0004]	–	–
SW8260C	1,1-Dichloroethane	mg/L	7.3	–	ND [0.0002]	–	–
SW8260C	1,1-Dichloroethene	mg/L	0.007	–	ND [0.0002]	ND [0.002] JC-	ND [0.002]
SW8260C	1,1-Dichloropropene	mg/L	–	–	ND [0.0002]	–	–
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	–	ND [0.0004]	–	–
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	–	*ND [0.0005] E*	–	–
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	–	ND [0.0003]	–	–
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	–	–
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	–	ND [0.0008] JC-	–	–
SW8260C	1,2-Dibromoethane	mg/L	0.00005	–	*ND [0.0002] E*	–	–
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	–	ND [0.0002]	–	–
SW8260C	1,2-Dichloroethane	mg/L	0.005	–	ND [0.00015]	ND [0.0015]	ND [0.0015]
SW8260C	1,2-Dichloropropane	mg/L	0.005	–	ND [0.0002]	–	–
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	–	ND [0.0002]	–	–
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	–	ND [0.0002]	–	–
SW8260C	1,3-Dichloropropane	mg/L	–	–	ND [0.0003]	–	–
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	–	ND [0.0002]	ND [0.002]	ND [0.002]
SW8260C	2,2-Dichloropropane	mg/L	–	–	ND [0.0002]	–	–
SW8260C	2-Butanone	mg/L	22	–	ND [0.004]	0.028 [0.04]	ND [0.04]
SW8260C	2-Chlorotoluene	mg/L	–	–	ND [0.0002]	–	–
SW8260C	2-Hexanone	mg/L	–	–	ND [0.01]	–	–
SW8260C	4-Chlorotoluene	mg/L	–	–	ND [0.0002]	–	–
SW8260C	4-Isopropyltoluene	mg/L	–	–	ND [0.0002]	–	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	UST-MW-02	UST-MW-02	WX-01	WX-02
				Sample ID	13PH-UST-MW-02	13PH-UST-MW-02	13PH-WX-01	13PH-WX-02
				Lab Sample ID	K130919405	K130928304	K130997301	K130997302
				Matrix	WG	WG	WW	WW
				Collection Date	9/2/13	9/2/13	9/16/13	9/16/13
				Laboratory	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Waste Characterization	Waste Characterization
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	–	ND [0.01]	–	–
SW8260C	Acetone	mg/L	33	–	ND [0.01]	–	–
SW8260C	Benzene	mg/L	0.005	–	ND [0.0001]	ND [0.001]	ND [0.001]
SW8260C	Bromobenzene	mg/L	–	–	ND [0.0002]	–	–
SW8260C	Bromochloromethane	mg/L	–	–	ND [0.0002]	–	–
SW8260C	Bromodichloromethane	mg/L	0.014	–	ND [0.0003]	–	–
SW8260C	Bromoform	mg/L	0.11	–	ND [0.0005] JC-	–	–
SW8260C	Bromomethane	mg/L	0.051	–	ND [0.0003]	–	–
SW8260C	Carbon disulfide	mg/L	3.7	–	0.0013 [0.0002]	–	–
SW8260C	Carbon tetrachloride	mg/L	0.005	–	ND [0.0002]	ND [0.002]	ND [0.002] JC-
SW8260C	Chlorobenzene	mg/L	0.1	–	ND [0.0002]	ND [0.002]	ND [0.002]
SW8260C	Chloroethane	mg/L	0.29	–	ND [0.0002]	–	–
SW8260C	Chloroform	mg/L	0.14	–	ND [0.0002]	ND [0.002]	0.0017 [0.002]
SW8260C	Chloromethane	mg/L	0.066	–	0.00012 [0.0002] J	–	–
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	–	ND [0.0002]	–	–
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	–	ND [0.0002]	–	–
SW8260C	Dibromochloromethane	mg/L	0.01	–	ND [0.0005]	–	–
SW8260C	Dibromomethane	mg/L	0.37	–	ND [0.0005]	–	–
SW8260C	Dichlorodifluoromethane	mg/L	7.3	–	ND [0.0002]	–	–
SW8260C	Ethylbenzene	mg/L	0.7	–	ND [0.0001]	–	–
SW8260C	Hexachlorobutadiene	mg/L	0.0073	–	ND [0.0003]	ND [0.003]	ND [0.003]
SW8260C	Isopropylbenzene	mg/L	3.7	–	ND [0.0002]	–	–
SW8260C	Methylene Chloride	mg/L	0.005	–	ND [0.0002]	–	–
SW8260C	MTBE	mg/L	0.47	–	ND [0.0003]	–	–
SW8260C	Naphthalene	mg/L	0.73	–	ND [0.0003]	–	–
SW8260C	n-Butylbenzene	mg/L	0.37	–	ND [0.0001]	–	–
SW8260C	n-Propylbenzene	mg/L	0.37	–	ND [0.0002]	–	–
SW8260C	o-Xylene	mg/L	10	–	ND [0.0002]	–	–
SW8260C	sec-Butylbenzene	mg/L	0.37	–	ND [0.0001]	–	–
SW8260C	Styrene	mg/L	0.1	–	ND [0.0002]	–	–
SW8260C	tert-Butylbenzene	mg/L	0.37	–	ND [0.0002]	–	–
SW8260C	Tetrachloroethene	mg/L	0.005	–	ND [0.0002]	ND [0.002]	ND [0.002]
SW8260C	Toluene	mg/L	1	–	ND [0.0001]	–	–
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	–	ND [0.0002]	–	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

				Location ID	UST-MW-02	UST-MW-02	WX-01	WX-02
				Sample ID	13PH-UST-MW-02	13PH-UST-MW-02	13PH-WX-01	13PH-WX-02
				Lab Sample ID	K130919405	K130928304	K130997301	K130997302
				Matrix	WG	WG	WW	WW
				Collection Date	9/2/13	9/2/13	9/16/13	9/16/13
				Laboratory	ALS	ALS	ALS	ALS
				QA/QC	Primary	Primary	Waste Characterization	Waste Characterization
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**					
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085		–	ND [0.0002]	–	–
SW8260C	Trichloroethene	mg/L	0.005		–	0.0001 [0.0001] J	ND [0.001]	**0.014 [0.001]**
SW8260C	Trichlorofluoromethane	mg/L	11		–	ND [0.0002]	–	–
SW8260C	Vinyl Chloride	mg/L	0.002		–	ND [0.0001]	ND [0.001]	ND [0.001]
SW8260C	Xylene, Isomers m & p	mg/L	10		–	ND [0.0002]	–	–

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	TB-01	TB02
			Sample ID	13PH-TB-01	13PH-TB02
			Lab Sample ID	K130928320	K130997303
			Matrix	WG	WW
			Collection Date	9/2/13	9/16/13
			Laboratory	ALS	ALS
			QA/QC	Trip Blank	Trip Blank
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**		
A2320B	Alkalinity, Total	mg/L	–	–	–
E200.7	Iron	mg/L	–	–	–
E200.7	Manganese	mg/L	–	–	–
E300.0	Sulfate	mg/L	–	–	–
E353.2	Nitrogen, Nitrate-Nitrite	mg/L	–	–	–
AK101	Gasoline Range Organics (C6-C10)	mg/L	2.2	ND [0.025]	–
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	–	–
AK103	Residual Range Organics (C25-C36)	mg/L	1.1	–	–
SW8260C	1,1,1,2-Tetrachloroethane	mg/L	–	ND [0.0002]	–
SW8260C	1,1,1-Trichloroethane	mg/L	0.2	ND [0.0002]	–
SW8260C	1,1,2,2-Tetrachloroethane	mg/L	0.0043	ND [0.0002]	–
SW8260C	1,1,2-Trichloroethane	mg/L	0.005	ND [0.0004]	–
SW8260C	1,1-Dichloroethane	mg/L	7.3	ND [0.0002]	–
SW8260C	1,1-Dichloroethene	mg/L	0.007	ND [0.0002]	ND [0.0002]
SW8260C	1,1-Dichloropropene	mg/L	–	ND [0.0002]	–
SW8260C	1,2,3-Trichlorobenzene	mg/L	–	ND [0.0004]	–
SW8260C	1,2,3-Trichloropropane	mg/L	0.00012	*ND [0.0005] E*	–
SW8260C	1,2,4-Trichlorobenzene	mg/L	0.07	ND [0.0003]	–
SW8260C	1,2,4-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–
SW8260C	1,2-Dibromo-3-chloropropane	mg/L	–	ND [0.0008] JC-	–
SW8260C	1,2-Dibromoethane	mg/L	0.00005	*ND [0.0002] E*	–
SW8260C	1,2-Dichlorobenzene	mg/L	0.6	ND [0.0002]	–
SW8260C	1,2-Dichloroethane	mg/L	0.005	ND [0.00015]	ND [0.00015]
SW8260C	1,2-Dichloropropane	mg/L	0.005	ND [0.0002]	–
SW8260C	1,3,5-Trimethylbenzene	mg/L	1.8	ND [0.0002]	–
SW8260C	1,3-Dichlorobenzene	mg/L	3.3	ND [0.0002]	–
SW8260C	1,3-Dichloropropane	mg/L	–	ND [0.0003]	–
SW8260C	1,4-Dichlorobenzene	mg/L	0.075	ND [0.0002]	ND [0.0002]
SW8260C	2,2-Dichloropropane	mg/L	–	ND [0.0002]	–
SW8260C	2-Butanone	mg/L	22	ND [0.004]	ND [0.004]
SW8260C	2-Chlorotoluene	mg/L	–	ND [0.0002]	–
SW8260C	2-Hexanone	mg/L	–	ND [0.01]	–
SW8260C	4-Chlorotoluene	mg/L	–	ND [0.0002]	–
SW8260C	4-Isopropyltoluene	mg/L	–	ND [0.0002]	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	TB-01	TB02
			Sample ID	13PH-TB-01	13PH-TB02
			Lab Sample ID	K130928320	K130997303
			Matrix	WG	WW
			Collection Date	9/2/13	9/16/13
			Laboratory	ALS	ALS
			QA/QC	Trip Blank	Trip Blank
Method	Analyte	Units	ADEC Cleanup Level[1]		
SW8260C	4-Methyl-2-pentanone	mg/L	2.9	ND [0.01]	–
SW8260C	Acetone	mg/L	33	ND [0.01]	–
SW8260C	Benzene	mg/L	0.005	ND [0.0001]	ND [0.0001]
SW8260C	Bromobenzene	mg/L	–	ND [0.0002]	–
SW8260C	Bromochloromethane	mg/L	–	ND [0.0002]	–
SW8260C	Bromodichloromethane	mg/L	0.014	ND [0.0003]	–
SW8260C	Bromoform	mg/L	0.11	ND [0.0005] JC-	–
SW8260C	Bromomethane	mg/L	0.051	ND [0.0003]	–
SW8260C	Carbon disulfide	mg/L	3.7	ND [0.0002]	–
SW8260C	Carbon tetrachloride	mg/L	0.005	ND [0.0002]	ND [0.0002] JC-
SW8260C	Chlorobenzene	mg/L	0.1	ND [0.0002]	ND [0.0002]
SW8260C	Chloroethane	mg/L	0.29	ND [0.0002]	–
SW8260C	Chloroform	mg/L	0.14	0.00011 [0.0002] J	0.00011 [0.0002] J
SW8260C	Chloromethane	mg/L	0.066	0.00013 [0.0002] J	–
SW8260C	cis-1,2-Dichloroethene	mg/L	0.07	ND [0.0002]	–
SW8260C	cis-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–
SW8260C	Dibromochloromethane	mg/L	0.01	ND [0.0005]	–
SW8260C	Dibromomethane	mg/L	0.37	ND [0.0005]	–
SW8260C	Dichlorodifluoromethane	mg/L	7.3	ND [0.0002]	–
SW8260C	Ethylbenzene	mg/L	0.7	ND [0.0001]	–
SW8260C	Hexachlorobutadiene	mg/L	0.0073	ND [0.0003]	ND [0.0003]
SW8260C	Isopropylbenzene	mg/L	3.7	ND [0.0002]	–
SW8260C	Methylene Chloride	mg/L	0.005	ND [0.0002]	–
SW8260C	MTBE	mg/L	0.47	ND [0.0003]	–
SW8260C	Naphthalene	mg/L	0.73	ND [0.0003]	–
SW8260C	n-Butylbenzene	mg/L	0.37	ND [0.0001]	–
SW8260C	n-Propylbenzene	mg/L	0.37	ND [0.0002]	–
SW8260C	o-Xylene	mg/L	10	ND [0.0002]	–
SW8260C	sec-Butylbenzene	mg/L	0.37	ND [0.0001]	–
SW8260C	Styrene	mg/L	0.1	ND [0.0002]	–
SW8260C	tert-Butylbenzene	mg/L	0.37	ND [0.0002]	–
SW8260C	Tetrachloroethene	mg/L	0.005	ND [0.0002]	ND [0.0002]
SW8260C	Toluene	mg/L	1	ND [0.0001]	–
SW8260C	trans-1,2-Dichloroethene	mg/L	0.1	ND [0.0002]	–

Table B-1-2a
2013 Port Heiden Groundwater Analytical Results - Former RRS

			Location ID	TB-01	TB02
			Sample ID	13PH-TB-01	13PH-TB02
			Lab Sample ID	K130928320	K130997303
			Matrix	WG	WW
			Collection Date	9/2/13	9/16/13
			Laboratory	ALS	ALS
			QA/QC	Trip Blank	Trip Blank
Method	**Analyte**	**Units**	**ADEC Cleanup Level[1]**		
SW8260C	trans-1,3-Dichloropropene	mg/L	0.0085	ND [0.0002]	–
SW8260C	Trichloroethene	mg/L	0.005	ND [0.0001]	ND [0.0001]
SW8260C	Trichlorofluoromethane	mg/L	11	ND [0.0002]	–
SW8260C	Vinyl Chloride	mg/L	0.002	ND [0.0001]	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	10	ND [0.0002]	–

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

– = No cleanup level / not analyzed.

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

E and *Itallics* = The result was nondetect and the LOD was greater than the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JC- = The result was estimated because the analyted failed recovery criteria in the CCV.

JD = The result was estimated because the field duplicate relelative percent difference was greater than the precision limit.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

ND = nondetect

QA/QC = quality assurance / quality control

Table B-1-2b
2013 Port Heiden Groundwater Monitoring Analytical Results - Former Pipeline Corridor

			Location ID	FPC-066-04	FPC-066-05	FPC-066-05	FPC-066-06
			Sample ID	13PH-066-MW-04	13PH-066-MW-05	13PH-066-MW-059	13PH-066-MW-06
			Lab Sample ID	K130919401	K130919402	K130928321	K130919403
			Matrix	WG	WG	WG	WG
			Collection Date	9/1/13	9/1/13	9/1/13	9/1/13
			Laboratory	CASK	CASK	CASK	CASK
			QA/QC	Primary	Primary	Duplicate	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]				
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	0.018 [0.02] J	**1.6 [0.02]**	**1.6 [0.02]**	0.019 [0.02] J

			Location ID	FPC-066-07	FPC-215-08	FPC-215-09	FPC-215-10
			Sample ID	13PH-066-MW-07	13PH-215-MW-08	13PH-215-MW-09	13PH-215-MW-10
			Lab Sample ID	K130919404	K130919411	K130919412	K130919408
			Matrix	WG	WG	WG	WG
			Collection Date	9/1/13	9/1/13	9/1/13	9/1/13
			Laboratory	CASK	CASK	CASK	CASK
			QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	ADEC Cleanup Level[1]				
AK102	Diesel Range Organics (C10-C25)	mg/L	1.5	0.024 [0.02] J	0.019 [0.021] J, JM-	**11 [0.02]**	0.032 [0.02] J

Notes:

[1] Groundwater screening levels from 18 AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012).

[ ] = limit of detection (LOD)

Bold = The result exceeds the cleanup level.

J = The analyte was positively identified, and the associated result was less than the LOQ but great than or equal to the DL.

JM- = The The result was estimated and biased low because the analyted failed recovery criteria (low) in the matrix spike or matrix spike duplicate

mg/L = milligrams per liter

QA/QC = quality assurance / quality control

ATTACHMENT B-2

Qualified Sample Results Tables

Table B-2-1
Results Qualified Due to Continuing Calibration Outliers

Sample ID	Lab Sample ID	Method	Analyte	Result	Units	CCV Recovery (%)	%D Limits	Lab Lot Number	Analysis Date	Qualifier
13PH-TB-01	K130928320	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/10/2013	JC-
13PH-DSA-MW-04	K130928303	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/10/2013	JC-
13PH-UST-MW-02	K130928304	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/11/2013	JC-
13PH-DSA-MW-029	K130928302	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/11/2013	JC-
13PH-DSA-MW-02	K130928301	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/11/2013	JC-
13PH-BLO-MW-06	K130928306	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/11/2013	JC-
13PH-BLO-MW-05	K130928305	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	73	±20%	KWG1309758	9/11/2013	JC-
13PH-TB-01	K130928320	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/10/2013	JC-
13PH-DSA-MW-04	K130928303	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/10/2013	JC-
13PH-UST-MW-02	K130928304	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/11/2013	JC-
13PH-DSA-MW-029	K130928302	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/11/2013	JC-
13PH-DSA-MW-02	K130928301	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/11/2013	JC-
13PH-BLO-MW-06	K130928306	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/11/2013	JC-
13PH-BLO-MW-05	K130928305	SW8260C	Bromoform	ND	mg/L	75	±20%	KWG1309758	9/11/2013	JC-
13PH-GLO-MW-03	K130928310	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-BLO-MW-02	K130928308	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-01	K130928313	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-05	K130928307	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-06	K130928309	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-069	K130928311	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-06	K130928316	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-GLO-MW-04	K130928312	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-PG1-MW-01	K130928317	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-02	K130928314	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-05	K130928318	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	77	±20%	KWG1309944	9/13/2013	JC-
13PH-PG1-MW-01	K130928317	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-GLO-MW-04	K130928312	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-02	K130928314	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-BLO-MW-02	K130928308	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-069	K130928311	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-06	K130928309	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-05	K130928318	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-05	K130928307	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-DSA-MW-01	K130928313	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-RRS-MW-06	K130928316	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-
13PH-GLO-MW-03	K130928310	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1309944	9/13/2013	JC-

Table B-2-1
Results Qualified Due to Continuing Calibration Outliers

Sample ID	Lab Sample ID	Method	Analyte	Result	Units	CCV Recovery (%)	%D Limits	Lab Lot Number	Analysis Date	Qualifier
13PH-DSA-MW-07	K130928315	SW8260C	1,1,2,2-Tetrachloroethane	ND	mg/L	76	±20%	KWG1309997	9/14/2013	JC-
13PH-DSA-MW-07	K130928315	SW8260C	1,2-Dibromo-3-chloropropane	ND	mg/L	67	±20%	KWG1309997	9/14/2013	JC-
13PH-DSA-MW-07	K130928315	SW8260C	Bromoform	ND	mg/L	73	±20%	KWG1309997	9/14/2013	JC-
13PH-DSA-MW-07	K130928315	SW8260C	Carbon disulfide	0.0001	mg/L	76	±20%	KWG1309997	9/14/2013	J, JC-
13PH-DSA-MW-07	K130928315	SW8260C	Dibromochloromethane	ND	mg/L	76	±20%	KWG1309997	9/14/2013	JC-
13PH-WX-01	K130997301	SW8260C	1,1-Dichloroethene	ND	mg/L	65	±20%	KWG1310700	9/30/2013	JC-
13PH-WX-02	K130997302	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1310662	9/28/2013	JC-
13PH-TB02	K130997303	SW8260C	Carbon tetrachloride	ND	mg/L	74	±20%	KWG1310662	9/28/2013	JC-

Notes:

%D = percent difference

CCV = continuing calibration verification

mg/L = milligrams per liter

SDG = sample delivery group

J = The analyte was positively identified, and the associated result was less than the limit of quantitation but greater than or equal to the detection limit.

JC- = The result was estimated because the analyte failed recovery criteria in the continuing calibration verification. The result was either biased low because the continuing calibration verification recovery was less than the lower control limit or biased high because it exceeded the upper control limit.

ND = nondetect

Table B-2-2
Results Qualified Due to Matrix Spike/Matrix Spike Duplicate Outliers

SDG	Sample ID	Lab Sample ID	Method	Analyte	Result	Recovery (%)	LCL (%)	UCL (%)	Dilution Factor	Lab Lot Number	Units	Qualifier
K1309194	13PH-DSA-MW-04	K130919410	AK102	Diesel-Range Organics (C10-C25)	0.097	–	–	–	1	KWG1310186	mg/L	J, JM-
K1309194	MS	KWG13101866	AK102	Diesel-Range Organics (C10-C25)	1.19	69	75	125	1	KWG1310186	mg/L	–
K1309194	MSD	KWG13101867	AK102	Diesel-Range Organics (C10-C25)	1.3	75	75	125	1	KWG1310186	mg/L	–
K1309194	13PH-215-MW-08	K130919411	AK102	Diesel-Range Organics (C10-C25)	0.019	–	–	–	1	KWG1310186	mg/L	J, JM-
K1309194	MS	KWG13101861	AK102	Diesel-Range Organics (C10-C25)	1.24	76	75	125	1	KWG1310186	mg/L	–
K1309194	MSD	KWG13101862	AK102	Diesel-Range Organics (C10-C25)	1.2	74	75	125	1	KWG1310186	mg/L	–

Notes:

J = The analyte was positively identified, and the associated result was less than the limit of quantitation but great than or equal to the detection limit.

JM- = The result was estimated and biased low because the analyte failed recovery criteria (low) in the matrix spike or matrix spike duplicate.

mg/L = milligrams per liter

SDG = sample delivery group

LCL = lower control limit

UCL = upper control limit

Table B-2-3
Results Qualified Due to Field Duplicate Precision Outliers (>30% RPD)

Sample ID	Lab Sample ID	FD Sample ID	FD Lab Sample ID	Method	Analyte	Result (mg/L)	FD Result (mg/L)	Units	RPD (%)
13PH-DSA-MW-02	K130919409	13PH-DSA-MW-029	K130928302	AK102	Diesel-Range Organics (C10-C25)	0.031	0.047	mg/L	41.0
13PH-DSA-MW-02	K130919409	13PH-DSA-MW-029	K130928302	AK103	Residual-Range Organics (C25-C36)	0.062	0.087	mg/L	33.6
13PH-DSA-MW-02	K130928301	13PH-DSA-MW-029	K130928302	SW8260C	1,1,2-Trichloroethane	*0.0004*	0.00014	mg/L	96.3
13PH-DSA-MW-02	K130928301	13PH-DSA-MW-029	K130928302	SW8260C	1,2-Dichloroethane	0.00008	*0.00015*	mg/L	60.9
13PH-DSA-MW-02	K130928301	13PH-DSA-MW-029	K130928302	SW8260C	cis-1,2-Dichloroethene	0.00007	0.00025	mg/L	113
13PH-DSA-MW-02	K130928301	13PH-DSA-MW-029	K130928302	SW8260C	Dichlorodifluoromethane	0.00013	*0.0002*	mg/L	42.4
13PH-DSA-MW-02	K130928301	13PH-DSA-MW-029	K130928302	SW8260C	trans-1,2-Dichloroethene	*0.0002*	0.00008	mg/L	85.7
13PH-DSA-MW-06	K130928309	13PH-DSA-MW-069	K130928311	E353.2	Nitrogen, Nitrate-Nitrite	0.033	0.017	mg/L	64.0

Notes:

Itallics = The limit of detection was used in place of the nondetect result for the RPD calculation

FD = field duplicate

mg/L = milligrams per liter

RPD = relative percent difference

Table B-2-4
Limits of Detection Greater than the ADEC Cleanup Level

SDG	Sample ID	Lab Sample ID	Method	Analyte	ADEC Cleanup Level[1]	Result (mg/L)	LOD (mg/L)	LOQ (mg/L)	Dilution Factor	Qualifier
K1309283	13PH-DSA-MW-04	K130928303	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-06	K130928309	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-BLO-MW-02	K130928308	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-GLO-MW-03	K130928310	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-PG1-MW-01	K130928317	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-02	K130928301	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-BLO-MW-01	K130928319	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-RRS-MW-05	K130928318	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-05	K130928307	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-GLO-MW-04	K130928312	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-RRS-MW-06	K130928316	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-UST-MW-02	K130928304	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-01	K130928313	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-RRS-MW-02	K130928314	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-TB-01	K130928320	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-BLO-MW-06	K130928306	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-069	K130928311	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-BLO-MW-05	K130928305	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-07	K130928315	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-DSA-MW-029	K130928302	SW8260C	1,2-Dibromoethane	0.00005	ND	0.0002	0.002	1	E
K1309283	13PH-TB-01	K130928320	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-RRS-MW-02	K130928314	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-05	K130928307	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-04	K130928303	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-RRS-MW-05	K130928318	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-029	K130928302	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-01	K130928313	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-02	K130928301	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-BLO-MW-01	K130928319	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-GLO-MW-03	K130928310	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-07	K130928315	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-GLO-MW-04	K130928312	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-069	K130928311	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-BLO-MW-06	K130928306	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-BLO-MW-05	K130928305	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E

Table B-2-4
Limits of Detection Greater than the ADEC Cleanup Level

SDG	Sample ID	Lab Sample ID	Method	Analyte	ADEC Cleanup Level[1]	Result (mg/L)	LOD (mg/L)	LOQ (mg/L)	Dilution Factor	Qualifier
K1309283	13PH-UST-MW-02	K130928304	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-PG1-MW-01	K130928317	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-RRS-MW-06	K130928316	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-BLO-MW-02	K130928308	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E
K1309283	13PH-DSA-MW-06	K130928309	SW8260C	1,2,3-Trichloropropane	0.00012	ND	0.0005	0.0005	1	E

Notes:

[1] ADEC Cleanup Level from 18AAC 75, Table C, Groundwater Cleanup Levels (ADEC 2012)

E = The result was nondetect and the LOD exceeds the ADEC Cleanup Level.

LOD = limit of detection

LOQ = limit of quantitation

mg/L = milligrams per liter

ND = nondetect

SDG = sample delivery group

ATTACHMENT B-3

ADEC Laboratory Data Review Checklists

Laboratory Data Review Checklist

Completed by:	David Summerville		
Title:	Project Chemist	**Date:**	11-20-2013
CS Report Name:	2013 Port Heiden GW Monitoring Report	**Report Date:**	December 2013
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS Kelso, WA	**Laboratory Report Number:**	K1309194
ADEC File Number:	2637.38.002.02	**ADEC Hazard ID:**	179

1. Laboratory

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

All samples were analyzed by ALS Kelso.

2. Chain of Custody (CoC)

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. Correct Analyses requested?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank/cooler temperatures at receipt were:
Cooler Saad: 3.6/3.7° C
Cooler Towes: 3.2/2.0° C
Cooler Keith: 4.2/2.6° C
Cooler Hossa: 2.6/4.0° C
Cooler Kane: 3.7/3.9° C

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

Three samples were not listed on CoC 13PHGW05, but were present in cooler Saad. Samples 13PH-RRS-MW06, 13PH-PG-1-MW-01 and 13PH-RRS-MW-05 were logged in and analyzed.

e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

QC failures are discussed in the relevant sections of this checklist.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

Comments:

The data quality and usability were not affected.

5. Samples Results

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No soils reported

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

a. Method Blank

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

A2320: The Alkalinity method blank result for batch 357920 was above the LOD. SW8260: Hexachlorobutadiene was detected in the method blank for batch KWG1310700.

iii. If above PQL, what samples are affected?

Comments:

No samples were affected

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No flags were required. A2320: All sample results for Alkalinity were greater than 5 times the method blank concentration. SW8260: There was no sample detection of Hexachlorobutadiene.

v. Data quality or usability affected? (please explain)

Comments:

The data quality and usability were not affected.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

AK102: The 13PH-DSA-MW-04 MSD and the 13PH-215-MW-08 MS recoveries for DRO were less than the lower control limit.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

13PH-DSA-MW-04 and 13PH-215-MW-08

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The DRO results for samples 13PH-DSA-MW-04 and 13PH-215-MW-08 were flagged JM- due to low MS/MSD recoveries.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality was minimally affected. The DRO sample results flagged JM-, although considered estimated and biased slightly low, are both significantly below the ADEC cleanup level.

c. Surrogates – Organics Only

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No volatile analyses reported.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

iii. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

iv. If above PQL, what samples are affected?

Comments:

NA

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

The DRO and/or RRO results for the field duplicates of samples 13PH-066-MW-05 and 13PH-DSA-MW-02 are reported in SDG K1309283. The following analytes had RPDs greater than 30% in sample/field duplicate 13PH-DSA-MW-02/ 13PH-DSA-MW-029: Diesel Range Organics (C10-C25) (41%) and Residual Range Organics (C25-C36) (33.6%)

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected. The DRO/RRO results for samples 13PH-DSA-MW-02 and 13PH-DSA-MW-029 were flagged JD due to precision outside of criteria. The impact is minimal since all of the results flagged JD are significantly below the ADEC cleanup level.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

A decontamination blank was not collected.

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

7. <u>Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)</u>

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The data qualifiers applied are defined in the DQA of the 2013 Port Heiden Groundwater Monitoring Report.

Laboratory Data Review Checklist

Completed by:	David Summerville		
Title:	Project Chemist	**Date:**	11-20-2013
CS Report Name:	2013 Port Heiden GW Monitoring Report	**Report Date:**	December 2013
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS Kelso, WA	**Laboratory Report Number:**	K1309283
ADEC File Number:	2637.38.002.02	**ADEC Hazard ID:**	179

1. Laboratory

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

All samples were analyzed by ALS Kelso.

2. Chain of Custody (CoC)

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. Correct Analyses requested?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank/cooler temperatures at receipt were:
Cooler Sharp: 2.2/1.5° C
Cooler Seabrook: 1.0/-0.6° C
Cooler Crawford: 3.6/2.1° C

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

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

The pH of the HNO3 and H2SO4 bottles for sample 13PH-BLO-MW-01 was not below pH 2. 1 mL of the appropriate acid was added to adjust the pH at the laboratory.

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The collection time listed on the CoC for sample 13PH-DSA-MW-07 did not match the vial labels. The samples were logged in using the bottle label (correct collection time). The sample temperature outside of acceptable range was documented on the cooler receipt form.

e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected. The samples were received in good condition and there was no note of frozen samples.

4. <u>Case Narrative</u>

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

QC failures are discussed in the relevant sections of this checklist. Additional items identified by the lab were:

SW8260: CCV MS27\0910F004.D recoveries were outside of QC criteria for Bromoform (75%) and 1,2-Dibromo-3-chloropropane (73%).
CCV MS27\0912F003.D recoveries were outside of QC criteria for Dichlorodifluoromethane (59%) and Carbon Tetrachloride (77%). No Dichlorodifluoromethane or Carbon Tetrachloride sample results were reported from this CCV for this SDG.
CCV MS27\0913F003.D recoveries were outside of QC criteria for Carbon Tetrachloride (74%) and 1,2-Dibromo-3-chloropropane (77%).
CCV MS27\0914F033.D recoveries were outside of QC criteria for Carbon Disulfide (76%), Dibromochloromethane (76%), Bromoform (73%), 1,1,2,2-Tetrachloroethane (76%), and 1,2-Dibromo-3-chloropropane (67%).
CCV MS27\0917F003.D recovery was outside of QC criteria for Bromomethane (132%).

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

Comments:

The data quality was minimally affected. Sample results associated with low CCV recoveries were qualified JC- to indicate an estimated result with a potential low bias. The impact is minimal since all results except carbon disulfide are ND with LODs well below the cleanup level. The carbon disulfide result for sample 13PH-DSA-MW-07 (0.0001 mg/L) is significantly below the cleanup level of 3.7 mg/L.

5. Samples Results

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No soils reported

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

a. Method Blank

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

A2320: The Alkalinity method blank result for batch 357920 was above the LOD.

iii. If above PQL, what samples are affected?

Comments:

No samples were affected

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No flags were required. A2320: All sample results for Alkalinity were greater than 5 times the method blank concentration.

v. Data quality or usability affected? (please explain)

Comments:

The data quality and usability were not affected.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

AK101: No client specific MS/MSD was analyzed in batch KWG1310108 SW8260: No MS/MSD was analyzed in batches KWG1309868, KWG1309944, KWG1309997, and KWG1310087.

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

AK102: The 13PH-DSA-MW-04 MSD and the 13PH-215-MW-08 MS recoveries for DRO were less than the lower control limit. SW8260: The 13PH-DSA-MW-029 MS/MSD recoveries for Trichloroethene were outside of QC criterion due to high parent sample concentration.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

AK102: No samples in this SDG were affected. The parent samples for the batch MS/MSDs were reported in SDG K1309194.

SW8260: 13PH-DSA-MW-029

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

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

SW8260: The Trichloroethene result for 13PH-DSA-MW-029 was not flagged. The sample dilution factor was greater than 5.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

AK102/103: The o-terphenyl and n-triacontane surrogate recoveries in sample 13PH-BLO-MW-01 were outside of QC criteria due to sample dilution.

SW8260: The 4-BFB surrogate recovery in sample 13PH-BLO-MW-01 was outside of QC criteria due to matrix interference (biased high).

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No flags were required.

AK102/103: The DRO/RRO results for sample 13PH-BLO-MW-01were not flagged since the sample dilution factor was greater than 5.

SW8260: The 13PH-BLO-MW-01 sample results were not flagged. SW8260 sample results are only flagged when two or more surrogates are outside of QC criteria.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

iii. All results less than PQL?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

All trip blank results were less than the LOD.

iv. If above PQL, what samples are affected?

Comments:

NA

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

$$RPD\ (\%) = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☑ No ☐ NA (Please explain.) Comments:

The DRO and/or RRO results for samples 13PH-066-MW-05 and 13PH-DSA-MW-02 are reported in SDG K1309283. The field duplicate results are reported in this SDG. The LOD was used in place of ND results when one result was ND and one was detected. The following analytes had RPDs greater than 30% in sample/field duplicate 13PH-DSA-MW-02/ 13PH-DSA-MW-029: Diesel Range Organics (C10-C25) (41%), Residual Range Organics (C25-C36) (33.6%), 1,1,2-Trichloroethane (96.3%), 1,2-Dichloroethane (60.9%), cis-1,2-Dichloroethene (113%), Dichlorodifluoromethane (42.4%), and trans-1,2-Dichloroethene (85.7%)
The following analyte had a RPD greater than 30% in sample/field duplicate 13PH-DSA-MW-06/ 13PH-DSA-MW-069: Nitrogen, Nitrate-Nitrite (64%)

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

The data quality and usability were not affected. The sample results with RPDs greater than the precision limits were flagged JD. The impact is minimal since the results (or LOD of ND results) flagged JD are below the ADEC cleanup level.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

A decontamination blank was not collected.

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

ii. If above PQL, what samples are affected?
Comments:

NA

iii. Data quality or usability affected? (Please explain.)
Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The data qualifiers applied are defined in the DQA of the 2013 Port Heiden Groundwater Monitoring Report.

Laboratory Data Review Checklist

Completed by:	David Summerville		
Title:	Project Chemist	**Date:**	11-21-2013
CS Report Name:	2013 Port Heiden GW Monitoring Report	**Report Date:**	December 2013
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS Kelso, WA	**Laboratory Report Number:**	K1309973
ADEC File Number:	2637.38.002.02	**ADEC Hazard ID:**	179

1. Laboratory

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

All samples were analyzed by ALS Kelso.

2. Chain of Custody (CoC)

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. Correct Analyses requested?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

This checklist reviews the 3 waste water samples only.

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank/cooler temperature at receipt was:
Cooler "This That And Everything": 1.3/0.9° C.

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The sample temperature outside of acceptable range was documented on the cooler receipt form.

e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected. The samples were received in good condition and there was no note of frozen samples.

4. Case Narrative

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

QC failures are discussed in the relevant sections of this checklist. Additional items identified by the lab were:

SW8260: CCV MS27\0928F003.D recovery was outside of QC criteria for Carbon Tetrachloride (74%). CCV MS18\0930F003.D recovery was outside of QC criteria for 1,1-Dichloroethene (65%).

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

Comments:

Sample results associated with low CCV recoveries were qualified JC- to indicate an estimated result with a potential low bias. The impact is minimal since all results are ND with LODs well below the RCRA criteria.

5. Samples Results

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No soils reported

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. <u>QC Samples</u>

a. Method Blank

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. All method blank results less than PQL?

☐ Yes ☐ No ☐ NA (Please explain.) Comments:

SW8260: Hexachlorobutadiene was detected in the method blank for batch KWG1310700

iii. If above PQL, what samples are affected?

Comments:

No samples were affected

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No flags were required. SW8260: There were no sample detections of Hexachlorobutadiene.

v. Data quality or usability affected? (please explain)

Comments:

The data quality and usability were not affected.

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

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

SW8260: No client specific MS/MSD was requested for the waste water characterization samples. No client specific MS/MSD was analyzed. No MS/MSD was analyzed in batch KWG1310700 (An LCSD was performed).

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No metals/inorganics reported.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

NA

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

iii. All results less than PQL?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

All trip blank results were less than the LOD.

iv. If above PQL, what samples are affected?

Comments:

NA

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

No field duplicate was submitted with the waste water characterization samples

ii. Submitted blind to lab?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

A decontamination blank was not collected.

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments:

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

7. <u>Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)</u>

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments:

The data qualifiers applied are defined in the DQA of the 2013 Port Heiden Groundwater Monitoring Report.

ATTACHMENT B-4

Laboratory Deliverables

(Available separately on CD)

APPENDIX C

Field Logbooks and Groundwater Monitoring Sheets

T006 PORT HEIDEN GW MONITORING
AUG-SEPT 2013

PORT HEIDEN GROUNDWATER MONITORING

DCN#: HTRW-J07-05F45601-H04-0005

"Rite in the Rain"®
ALL-WEATHER
ENVIRONMENTAL
No. 550

DREW MCCLUSKY (DMM)
MICHAEL PELICH (MP)

BOOK 1 OF 1

Did you remember ... ???

Daily Logbook Checklist

- ☐ Project name / Site ID / Client
- ☐ Date
- ☐ Weather, site conditions, and other salient observations
- ☐ Level of PPE used
- ☐ Full names of onsite personnel and affiliations (including all visitors)
- ☐ Daily objectives
- ☐ Field measurements and calibrations
- ☐ Time and location of activity
- ☐ Field observations and comments
- ☐ Deviations from the Work Plan
- ☐ Site photographs
- ☐ Site sketches (with reference i.e. "N" arrow)
- ☐ Survey and location i.e. samples or debris (GPS coordinates when possible)
- ☐ For each sample record:
  - Date, time, sampler(s)
  - Sample ID
  - Media, container(s), preservatives
  - QC (dup/MS/MSD)
  - Analysis
  - MeOH lot #
  - Tare weight

- ☐ Sample shipments (when, what, destination)
- ☐ Waste tracking (when, how much, destination)
- ☐ Daily summary of activities (i.e. # of samples collected)

"Rite in the Rain®"
ALL-WEATHER WRITING PAPER

ALL-WEATHER
ENVIRONMENTAL FIELD BOOK

Name JACOBS ENGINEERING

Address

Phone

Project TO-06 2013 PORT HEDLAND
GROUNDWATER MONITORING

SEPTEMBER 2013

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikoid Cover
Columnar	1/4" Grid	Item No. 550	Item No. 550F

CONTENTS

Reference Page Index

CONTENTS

PAGE	REFERENCE	DATE

Location PORT HEIDEN Date AUG 30, 2013

Project / Client T006 - 2013 GW MONITORING - USACE USAF DM

2013 GROUNDWATER MONITORING UNDER CONTRACT NUMBER: W911KB-11-D-0005, TASK ORDER NO 06 → ALASKA DISTRICT HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE CONTRACT.

27 TOTAL WELLS WERE LISTED IN THE STATEMENT OF WORK / WORK PLAN TO BE MONITORED IN SEPTEMBER 2013. DURING AUGUST 2013 THE TOP OF CASING (TOC) ELEVATIONS WERE SURVEYED USING AN AUTO LEVELING LEVEL LOOP. TWO WELLS:

- DSA-MW-03
- RRS-MW-04

WERE UNABLE TO BE LOCATED; MOST LIKELY BECAUSE THEY HAVE BEEN REMOVED FROM THE GROUND DURING EXCAVATION / REMEDIATION ACTIVITIES.

* DEVIATION *

ONLY 25 WELLS WILL BE

Location PORT HOLDEN Date AUG 30, 2013

Project / Client 2013 GW MONITORING USACE

USAF DM

SAMPLED IN 2013 BECAUSE (2) WELLS DSA-MW-03 AND RRS-MW-04 NO LONGER EXIST / HAVE BEEN REMOVED FROM THE GROUND / DAMAGED / OR ARE BURIED UNDER A STOCKPILE.

GROUND WATER SAMPLES WILL BE COLLECTED IN THE FOLLOWING JARS FOR THE LISTED ANALYSIS ACCORDING TO THE FINAL WORK PLAN.

GRO - AK101 - (3) 40mL VOA (HCl)
DRO - AK102 - (2) 1L AMBER (HCl)
RRO - AK103 - CAN BE ANALYZED W/ DRO
VOCs - SW8260 - (3) 40mL VOA (HCl)
MNA - EPA 200.8 - (1) 250 mL Poly (HNO_3) NO Pres.
- EPA 300.0 - (1) 250mL Poly - NO Pres.
- SM21 2320B - (1) 250 mL Poly - NO Pres.
- EPA 353.2 - (1) 250 mL Poly (H_2SO_4)

* ADDITIONAL VOL. WILL BE COLLECTED FOR DUPs, MS AND MSDs. NO MS/MSD, ARE NEEDED FOR MNA.

Location PORT HOLDEN Date AUG 30, 2013 (DTW 31)

Project / Client 2013 GW MONITORING USACE

USAF DM

WEATHER: OVERCAST, 55°F, WIND 0-5MPH

PPE: LEVEL D

DREW MCCLURE (JACOBS)

DO: · LOCATE ALL WELLS, INSPECT THE INTEGRITY OF THE WELLS. RECORD DEPTH TO WATER (DTW) AND TOTAL DEPTH OF WELL (TDW). PREPARE TO COLLECT SAMPLES ON SEPT. 1, 2013.

1130 MOB TO FPC-66 (SCHOOL) TO RECORD DTW & TDW.

DM 9/31

SITE FPC-66 (SCHOOL)

WELL #	DTW	TDW	TIME RECORDED
FPC-066-MW-04	6.04	15.00	1140
066-MW-05	7.85	15.00	1143
066-MW-06	4.37	12.28	1145
066-MW-07	5.10	12.86	1148

* ALL WELLS IN EXCELLENT CONDITION

NOTE: KEY DID NOT WORK FOR ALL WELLS 4 LOCKS WERE CUT W/ BOLT CUTTERS.

Location PORT HEIDEN Date AUG 31, 2013

Project / Client 2013 GW MONITORING USACE USAF DM

1155 OFF SITE, MOB TO FPC-215 (AIRPORT)

1205 DTW AND TDW FOR FPC-215 WELLS

WELL #	DTW	TDW	TIME
215-MW-08	12.87	20.05	1212
215-MW-09	14.31	20.62	1215
215-MW-10	15.07	24.77	1217

* ALL WELLS IN EXCELLENT CONDITION

NOTE: NO LOCKS WERE ON THE WELLS

1223 OFF SITE (FPC-215) MOB. TO FORMER RRS.

DTW AND TDW MEASUREMENTS ARE ON THE NEXT PAGE FOR FORMER RRS WELLS.

DM

8/31

Location PORT HEIDEN Date AUG 31, 2013

Project / Client 2013 GW MONITORING USACE USAF DM

	WELL #	DTW	TDW	TIME
	RRS-MW-06	59.15	67.10	1240
	PGI-MW-01	59.79	65.40	1245
	RRS-MW-02	59.61	65.35	1252
*	UST-MW-02	66.59	70.03	1310
	GLO-MW-03	60.35	64.60	1323
*	GLO-MW-04	58.05	60.07	1326
	RRS-MW-05	51.21	58.65	1331
⊗	RRS-MW-04	REMOVED FROM GRND		
	DSA-MW-01	54.40	58.25	1352
	DSA-MW-02	63.92	68.34	1407
⊗	DSA-MW-03	REMOVED FROM GRND		
	DSA-MW-04	67.30	99.87	1410
	DSA-MW-05	58.45	88.49	1355
*	DSA-MW-06	56.79	90.81	1345
	DSA-MW-07	48.75	56.65	1340
!	BLO-MW-01	46.65 → 47.30	DID NOT MEASURE	1441
	BLO-MW-02	31.46	47.85	1426
*	BLO-MW-05	50.98	57.74	1418
	BLO-MW-06	44.11	51.47	1436
	BLO-MW-07	43.00	47.00	1432

* LOCK CUT W/ BOLT CUTTERS

⊗ DOES NOT EXIST. REMOVED

! 46.65 → 47.30 - POTENTIAL "FREE PRODUCT"

Location Fort Hayden Date AUG 31, 2013

Project / Client 2013 GW MONITORING USACE USAF DM

THE FREE PRODUCT IN BLO-MW-01 WILL BE ADDRESSED AND ATTEMPTED TO BE REMOVED BEFORE SAMPLING. NO "FREE PRODUCT" WAS ENCOUNTERED IN THE OTHER 24 WELLS.

ALL TDW MEASUREMENTS WERE TRANFERED TO THE GW SAMPLING FORMS.

APPROXIMATELY 0.5 CAL OF DECON WATER WAS GENERATED AND TRANSFERED TO A 55-GAL DRUM LOCATED IN A CONTAINMENT POND N OF THE FIELD OFFICE (AIRPORT). PURGE/DECON WASTE WATER WILL BE STAGED IN THIS AREA FOR EASIER LOAD-OUT AT THE END OF THE PROJECT.

1700 SAMPLE COOLERS PREPPED FOR TOMORROW.

BOD

DM 8/31

Location Port Hayden Date 1 SEPT 2013

Project / Client GW monitoring (2013) USACE DM/MP

WEATHER: OVERCAST, 56°F, 0-5 mph WIND

PPE: LEVEL D (MOD)

DREW McCLURE (JACOBS)
MIKE PELKA (JACOBS)

DO: COLLECT SAMPLES FROM FPC-066 AND FPC-215 WELLS.

COC: DRO

CALIBRATIONS:

PID: ZERO CAL = 0.0 ppm
100 ISO GAS = 100.1 ppm
BUMP TEST = 100.5 ppm

YSI: CONDUCTIVITY = 1,413 µS/cm
PH = 7.00
PH = 4.01
PH = 10.01
ORP = 240

Location PORT HUENEME Date 1 SEPT 13

Project / Client 2013 GW MONITORING USAF

DM/MP

Calibrate contd.

Confidence Solution:	Range	Actual
Conductivity =	7600-7900	7632
PH =	6.8-7.2	7.05
ORP:	229-261	234.2

0900 Began Groundwater Sampling/ PURGING W/ 066-MW-04 (DM 9/1)

★ REFER TO GW LOGS (DM 9/1)

1800 Encountered issue in ~~215~~ UST MW-02 Hurricane pump stuck in well.

1900 ALLOWED WELL TO RECHARGE. IT WAS PURGED DRY AT 1750. WHILE LOWERING GW INTERFACE PROBE IT WAS DETERMINED THAT THE PUMP WAS STUCK AT APPROX. 64 FT BTOC. WHILE MEASURING DEPTH TO WATER / PUMP, THE PUMP DISLODGED AND WAS REMOVED FROM THE WELL.

EOD SUMMARY ON NEXT PAGE

Location Port Hueneme Date 1 SEPT 13

Project / Client 2013 GW MONITORING USAF

DM/MP

EOD SUMMARY

7 - WELLS SAMPLED
- 4 AT FPC-066
- 3 AT FPC-215

- WELL UST-MW-02 PURGED DRY.
- WILL ALLOW WELL TO RECHARGE OVER NIGHT AND SAMPLE TOMORROW.

SAMPLE TIMES AND ANALYSES

SAMPLE ID #	SAMPLING START	SAMPLING FINISH	ANALYSIS
13PH-066-MW-04	0940	0950	AL 102/DRO
13PH-066-MW-06	1039	1046	
13PH-066-MW-07	1120	1129	
13PH-066-MW-05	1203	1230	* + DUPLICATE
13PH-215-MW-08	1417	1450	+ MS/MSD
13PH-215-MW-09	1529	1544	
13PH-215-MW-10	1626	1644	

(DM 9/1)

* DUPLICATE SAMPLE ID = 13PH-066-MW-059

EOD DM 9/1

Location PORT HOLDEN Date 2 SEPT 2013

Project / Client 2013 GW MONITORING USAF DM/MP

WEATHER: WINDY/ 25 mph, P/C, 55°F

PPE: MOD LEVEL D

DREW MCCLURE (JACOBS)

MIKE PELICA (JACOBS)

DO: SAMPLE ALL BLD, DSA, AND VST WELLS. THESE ARE ALL SAMPLED FOR GRO, DRO/RRO, VOCs, AND MNA.

CALIBRATIONS:

PID: ZERO GAS = 0.0 ppm
100 ISO GAS = 100.0 ppm
BUMP TEST = 99.9 ppm

YSI: CONDUCTIVITY = 1413 µS/cm
3 POINT pH = 7.00
4.01
10.01
ORP = 240 mV

Location PORT HOLDEN Date 2 SEPT 2013

Project / Client 2013 GW MONITORING USAF DM/MP

CONFIDENCE SOLUTION:

			ACCEPTANCE RANGE
CONDUCTIVITY	= 7.591	X	7600 - 7900
PH	= 6.97	✓	6.8 - 7.2
ORP	= 233	✓	229.261

Note: Could not get Conductivity within range after multiple attempts

* CONDUCTIVITY WILL NOT BE USED AS A STABILIZATION PARAMETER TODAY

0820 MOB TO BLD-MW-07 TO BEGIN GW SAMPLING.

* REFER TO ~~BOOK~~ Binder GW LOGS

1900 FINISHED SAMPLING ACTIVITIES AND PLACED FINAL SAMPLES INTO THE REFRIGERATOR AT THE FIELD OFFICE

LOD SUMMARY ON NEXT PAGE

Location Port Hueneme Date 2 SEPT 13

Project / Client 2013 GW SAMPLING USAF

DM/MP

EOD SUMMARY

3 WELLS SAMPLED

- UST-MW-02
- DSA-MW-02 + DUP
- DSA-MW-04 + MS/MSD

3 WELLS PURGED DRY

- BLO-MW-07
- BLO-MW-06
- BLO-MW-05

FREE PRODUCT IN BLO-MW-07

1.5 L REMOVED.

SAMPLE ID	TIME
* 13PH-DSA-MW-04	1038-1115
* 13PH-DSA-MW-02	1250-1918
* 13PH-DSA-MW-029	1250-1318 (DUP)
* 13PH-UST-MW-02	1750-1823

* ALL SAMPLES TO BE ANALYZED FOR

- AK 101
- AK 102/103
- SW8260
- MNA

9.38 gal - purge water stored

0.5 gal FREE PRODUCT STORED

Location Port Hueneme Date 3-SEPT 13

Project / Client 2013 GW SAMPLING USAF

DM/MP

WEATHER: OVERCAST, 52°F, 5 mph

PPE: MOD LEVEL D

DREW MCCLURE

MIKE PULICA

DO: COLLECT SAMPLES FROM WELLS THAT WERE PURGED DRY

2-SEPT

- BLO-MW-05
- BLO-MW-06
- BLO-MW-07

CALIBRATIONS:

CONDUCTIVITY = 1413 µS/cm

3 POINT PH = 7.00

4.01

10.01

ORP = 240 mV

7495

Confidence Solution	Range	Actual
Conductivity	7600-7900	~~7.02~~ 7495 9/03
Ph	6.8-7.2	7.02
ORP	229-261	234.7

Location PORT HOLDEN Date 3 SEPT 2013

Project / Client 2013 GW MONITORING USAF

DM/MP

0412 MOB. TO BLO MW-02.
REFER TO GW LOGS.

1050 ALLOWED BLO-MW-07 24-
HOURS TO RECHARGE. COULD
NOT SAMPLE DUE TO INSUFFIC-
IENT WATER
MOB. TO ~~PMS~~ GLO-MW-03
- REFER TO GW LOGS

1821 FINISHED COLLOCANT
LAST SAMPLE FROM
BLO-MW-06

EOD SUMMARY

- 9 WELLS SAMPLED
- 1 WELL NS - NOT ENOUGH WATER

81.27 L OR 21.47-gal OF
WASTE WATER
+ 5-GAL OF DECON WATER
TOTAL 26.47-GAL GENERATED

Location PORT HOLDEN Date 3 SEPT 2013

Project / Client 2013 GW MONITORING USAF

DM/MP

EOD SAMPLE SUMMARY

SAMPLE ID	START	END	
13PH-BLO-MW-02	0938	0947	VOCs MNA
13PH-BLO-MW-07	DID NOT SAMPLE		NO H2O
13PH-GLO-MW-03	1148	1152	VOCs MNA
13PH-GLO-MW-04	1231	1239	
13PH-RRS-MW-02	1340	1348	
13PH-RRS-MW-06	1436	1446	
13PH-PG1-MW-01	1533	1550	
13PH-RRS-MW-05	1703	1709	
13PH-BLO-MW-05	1740	1758	FULL SUITE *
13PH-BLO-MW-06	1810	1821	

* FULL SUITE = AK 101/102/103
SW 8260
FULL MNA (EPA 200.8
300.0
353.2
SM21 2320B)

EOD DM 9/3

Location Port Heiden Date 09/04/2013

Project / Client 2013 GW Monitoring USAF
DM/MP

Weather: Windy, M/C, 50's°F
PPE: Modified Level D

Drew McClure (Jacobs)
Michal Pelka (Jacobs)

Activities: Sampling of remaining 5 monitoring wells

Calibrations:

PID: No PID calibration yesterday or today resulting from the loss of hose & end piece of PID on 09/02/2013.

YSI:
Conductivity = 1413 µS/cm
3 point PH = 7.00
4.01
10.01
ORP = 240 mV

Location Port Heiden Date 09/04/2013

Project / Client 2013 GW Monitoring USAF
DM/MP

Confidence Solution:	Range	Actual
Conductivity =	7600-7900	7603
PH =	6.8-7.2	6.98
ORP =	229-261	234.2

0755 MOB. TO

1130 THREE PHOTOGRAPHS TAKEN AT DSA-MW-05.

1418 4- PICTURES TAKEN WHILE REMOVING 'FREE PRODUCT' FROM DCO-MW-01.

1604 COLLECTED FINAL SAMPLE OF THE DAY. WILL RETURN TO DSA-MW-07 IN THE MORNING (5 SEPT) TO COLLECT SAMPLES AFTER 24-HOUR RECHARGE

EOD Summary (on next page)

Location Port Hueneme Date 9/4/2013

Project / Client 2013 GW Monitoring USAF

DM/MP

EOD Summary

4 wells Sampled

1 well purged dry - ~~not enough~~ water MP 09/04

1 Liter product bailed from BLO-MW-01

51.3L or 13.55 Gallons of waste water generated in addition to 1 L of .26 Gallons of product and approximately 15 gallons of decon water generated

*excessive decon water generated due to heavy decon of pump and other instruments after sampling BLO-MW-01

MP

Location Port Hueneme Date 4 SEPT 2013

Project / Client 2013 GW MONITORING USAF

DM/MP

Sample ID	Start	End	
13PH-DSA-MW-06	0951	1001	VOCs/MNA
13PH-DSA-MW-01	1108	1119	VOCs/MNA
13PH-DSA-MW-05	1205	1214	VOCs/MNA
13PH-BLO-MW-01	1541	1604	VOCs/MNA GRO/DRO/RRO

TOTAL WASTE WATER:

28.81 - gal

EOD

DM 9/4

Location Port Heiden Date 09/05/13

Project / Client 2013 GW Monitoring USAF

DM/MP

Weather: 50°F, h/s, wind 5 mph

PPE: Modified Level D

Drew McClure (Jacobs)

Michal Polka (Jacobs)

Activities:

Sample DSA-MW-07

de-mob equipment

0810 Mob to DSA-MW-07

Summary

1 well sampled

Sample ID	Start	End	
13PH-DSA-MW-07	0840	0907	VOCs/MNA

Location PORT HEIDEN Date 10/3/13

Project / Client 2013 GW MONITORING USAF

DM/KG

1330 KELLY MCBOURNEY AND DREW MCCLURE ONSITE IN PORT HEIDEN TO COLLECT SAMPLE OF "FREE PRODUCT" IN BLO-MW-01 AND SURVEY WELLS (2nd) TOC ELEVATIONS.

1500 ONSITE AT BLO-MW-01 - MOD LEVEL D PPE A SAMPLE OF FREE PRODUCT WAS REMOVED FROM THE WELL W/ A 1.5" POLY BAILER. THE CONTENTS WERE TRANSFERRED TO 2-VIALS SUPPLIED BY SGS OF ANCHORAGE.

NOTE: IT WAS HARD TO DISCERN HOW MUCH PRODUCT IS IN THE WELL. ONLY A THIN "1" LAYER WAS ABLE TO BE REMOVED EACH TIME THE BAILER WAS INSERTED INTO THE WELL.

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PORT HEIDEN

TO06 - SURVEY

Rite in the Rain
ALL-WEATHER
LEVEL
№ 313

C. Jelle
M. Pelka

DCN #:
HTRW-J07-05F45601-H04-004

8/15 → ~~8/27/2013~~
11/5/2013

Rite in the Rain
ALL-WEATHER WRITING PAPER

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Project T&G Port Heiden

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RiteintheRain.com

CONTENTS

PAGE	REFERENCE	DATE
	Jacobs:	
	C. Fell	
	C. Jelle	
	M. Pelka	
	P. Bullock	
	D. Christensen	

PointID	Northing	Easting	Ell_Elev	Elev (Ft)
HeidenSEBase	6313432.61	523573.37	47.537	155.9613
RM1	6313407.58	523547.07	47.095	154.5112
RM2	6313435.03	523606.84	47.095	154.5112
PHTBM001	6312916.27	522259.72	44.969	147.5361
PHTBM002	6313040.86	522095.09	40.934	134.2979
PHTBM003	6312873.97	522136.88	37.595	123.3432
PHTBM004	0	0	0	0
PHTBM005	6313733.66	522062.94	43.587	143.002
PHTBM006	6314674.714	520985.8019	45.7039	149.9472
PHTBM007	6314567.942	520895.9981	44.1262	144.771
PHTBM008	6309095.113	520665.9693	23.6448	77.57481
PHTBM009	6309181.853	520571.9061	22.6947	74.45768

Rite in the Rain ®

8/15/13

0900 · Tailgate on JBER
Personell: C. Fell
C. Jelle
Weather: Clear, 65°F no breeze
PPE: Modified Level D

Objective. Teach C. Jelle how to properly level loop for PTH monitoring well elevations

0915 Begin training

1000 · End traing - C. Jelle leaves JBER

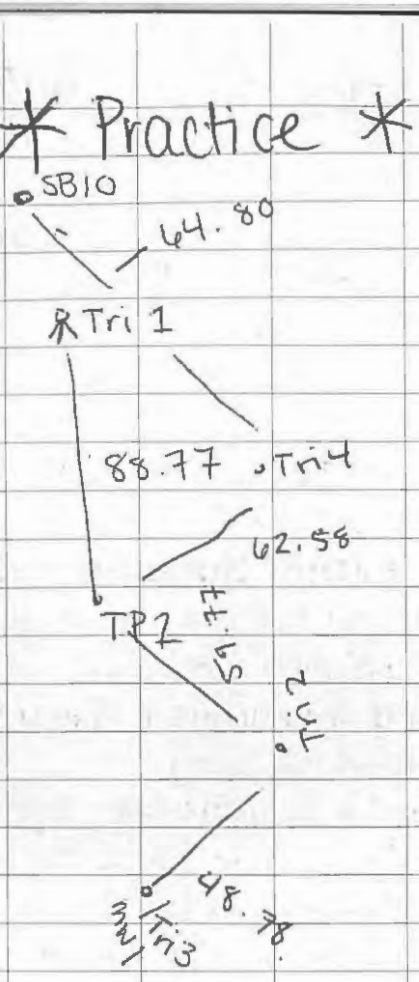
* PRACTICE *

8/15

PT	BS +	HI	FS -	Elev
SB 10				100
TP1	5.157	105.157		
TP 1			5.699	99.458
Tri 2	5.781	105.239		
mw 1			5.110	100.129
Tri 3	5.148	105.277		
TP 1 CHK			5.816	99.461
Tri 4	5.240	104.701		
SB 10			4.683	100.018

Accuracy needs to be w/in .01/ft x (triped setups)

Rite in the Rain



Port Holden
TO06 / USACE

8/19/13

0800 Tailgate & dwelope SPA
weather: Raining, 50°F, wind ± 25 mph

Personnel: C. Jelle
M. Pelka
PPE: Modified Level D
Equipment: Leica Sprinter 150M w/ barcode staff
Objective: Begin collecting elevations of mws via level looping
- will begin @ wells by Red Building
- Accuracy needs to be 0.01 ft x (# of tripod setups)

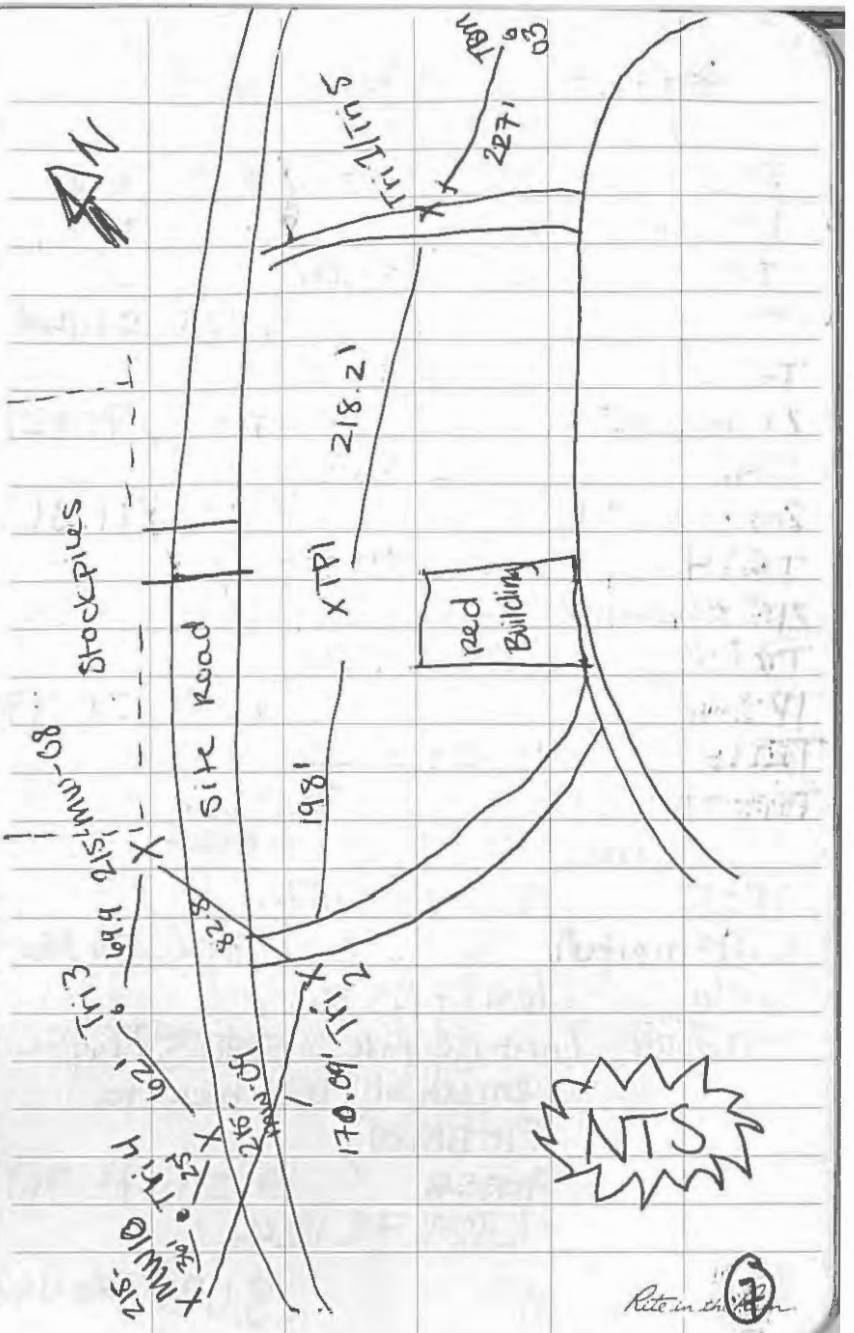
1310 - Arrive @ school to collect MW elevations + will try a level line

1630 - End of day

Port Heiden / TODU USACE 8/19/13

Point	BS (+)	HI	FS (-)	Elevation
TBM03				155.961
TRi 1	2.871	158.832		
TP 1			5.738	153.094
TRi 2	6.720	159.814		
215-mw-08			4.612	155.202
TRi 3	2.100	157.302		
215-mw-09			1.076	156.226
TRi 4	2.125	158.351		
215-mw-10			1.374	156.977
TRi 5	2.814	159.791		
TP 7 ONK			6.712	153.079
TRi 6	6.250	159.329		
TBM03			3.368	155.961

Accuracy = Awesome ✓

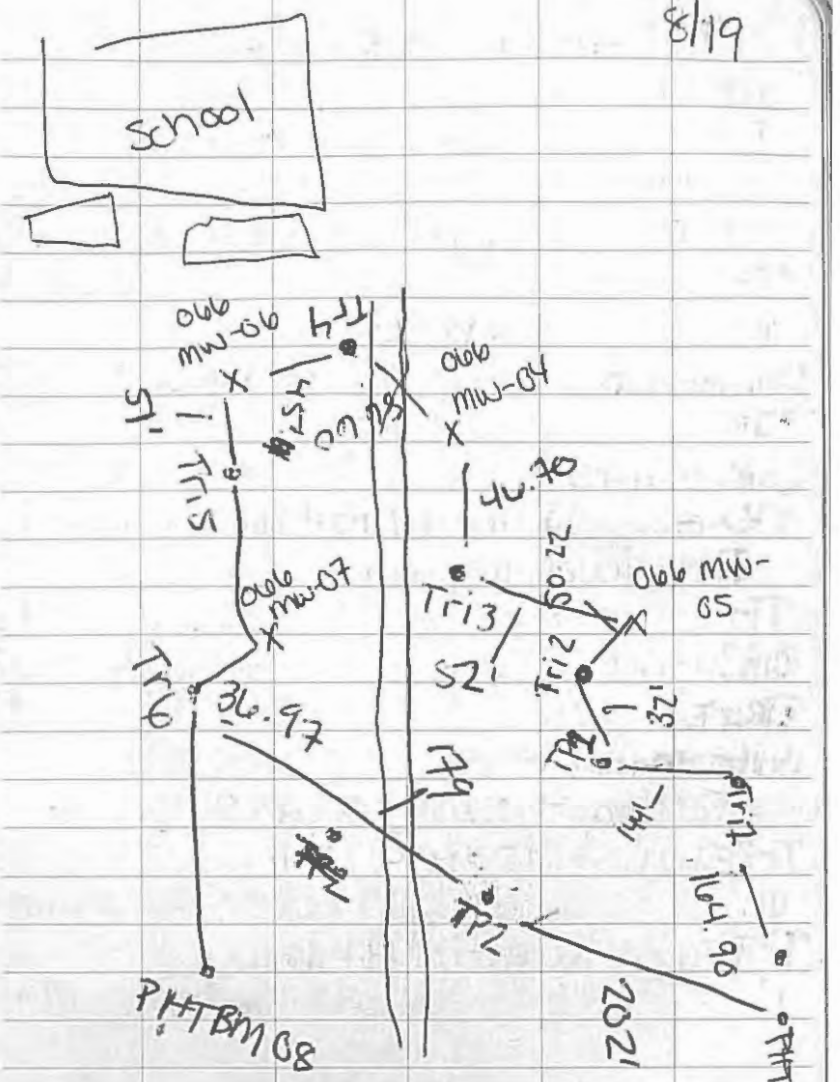


PORTHEIDEN / TO #6 USACE 8/19

Point	BS(+)	HI	FS(-)	Elev
PHTBM#9				74.458
Tri 7	2.692	77.150		
TP 2			2.986	74.164
Tri 2	5.682	79.846		
066-MW-05			0.725	79.121
TRI 3	1.112	80.233		
066-MW 04			2.920	77.313
~~TRI 4~~	~~3.899~~	~~81.212~~		
Tripod moved - had to reset				
Tri 4	3.851	81.194		
066-MW-06			5.411	75.783
~~TR15~~	~~4.832~~	~~80.615~~		
~~066 MW-07~~				
Tripod moved had to reset				
TrR15	5.004	80.787		
066-MW-07			3.897	76.890
TR16	6.477	83.367		
PHTBM08 (not accurate enough will loop back to PHTBM09)			~~5.625~~	~~77.742~~
TP2	~~9.598~~		9.598	73.769
Tri 7	4.383	78.152		
PHTBM09			3.671	74.481

8

8/19



Rite in the Rain

9

Port Heiden / T006 / USACE 8/20

0800 - Tailgate

Weather: ≈25mph, raining, 300 ft ceiling, 50°

PPE: modified Level D

Personnel: C. Jelle
M. Pelka

Objective: Set up RTK @ RRS site to try to find & confirm locations of all wells

→ once confirmed will get elevations via level looping

0930 - Set up RTK base station @ PHTBM006

Northing → 6314674.714

Easting → 520985.802

Elev → 45.704

Tripod height = 97.6 cm
= .976 m

Check shot @ PHTBM007

Pt ID = GPS002

Δx = .026 Δy = .015 Δz = .005

Port Heiden T006 USACE 8/20/13

1025. Will stakeout & get X, Y of wells

→ Elevation from RTK will be inaccurate due to rover head removed from staff

→ this will allow for more accurate X' & Y

→ UST-MW-02 = pt ID
USTMW02

1035 - Collect Pt ID -
RRS-MW-02

✱ → Stakeout file has GLOMW04 & no well → one nearby / will check

- mark Pt ID - GLO-MW-03

- Collect Pt ID - DSA-MW-02

- Collect PT-ID-DSA-MW-04

✱ DSA-MW-03 does not exist
Stock pile covering rough' location

TO Øle Port Hedin 8/20/13

- Collect PT ID - DSA-MW-04

- Collect PT ID-DSA-MW-05
  → well about 5m away from stakeout location

- Collect PT ID- DSA-MW-06
- Collect PT ID-DSA-MW-07

* found lid to ~~DSA~~ RRS MW-04
  + QQ well

- Collect PT ID- RRSMW05

- Collect PTID-RRS-MW-06

- Collect PTID- 215MW-10

- Collect PT ID-215MW-09

- Collect PT ID-215MW08

1200- Break for warm up + lunch

TO Øle Port Heidin 8/20/13

1300- Return to site → will collect BLO monitoring well locations

- Collect PT ID - BLOMWØ7
- Collect PTID - BLOMWØ2
- Collect PTID - BLOMW01
- Collect PTID BLOMWØ6
  Collect PTID BLOMW05
  Collect PTID PGMW01
  Collect UNKMW01
  → collect @ well 30m from stakeout location of GLOMW04
  + found stake near well labeled GLO MW 4 *
- Collect PT ID -006MW05
- Collect PT ID - 006 MW 04
- Collect PT ID -006MW06
- Collect PT ID - 006MW07

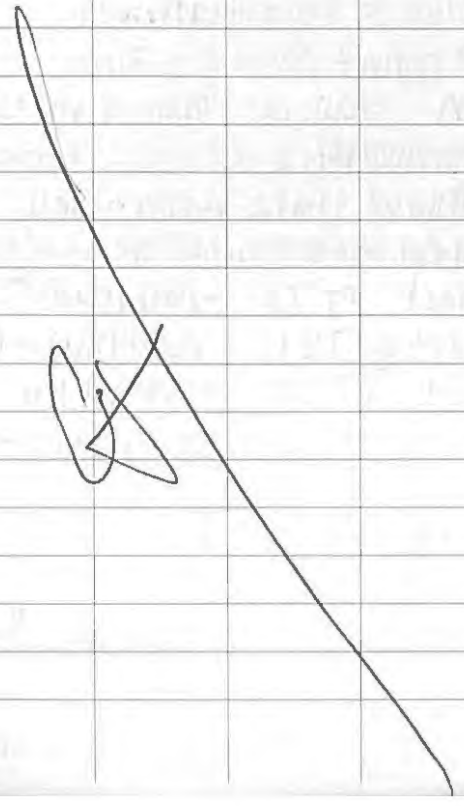
1545- End of day check
Shot @ PHTBM07
ΔX= .030m ΔY=.019m Δz= .000m

Rite in the Rain (13)

TOGO Port Heiden 8/20/13

Take down base station

1600 - ~~Eto~~ Heavy fog has moved in & will not allow for use of the level looping equipment
→ End of day



(14)

Port Heiden TOGO USACE 8/21/13

0800 - Tailgate
Weather: °F, 25-35 mph wind, overcast
Personnel: C. Jelle
M. Pelka
Equipment: Leica Sprinter
Objective: Collect elevations ~~@ B~~ of MWS @ KRS using level looping method

900 - Begin measuring → will make a temporary control point on concrete pad so that loops do not become too long

1130 - Begin measuring 1st well loop

1230 - Begin measuring @ OSA well loop

1400 - Begin measuring @ BLO well loop

1700 - Re-measure well loop

1830 - EOD

Rite in the Rain

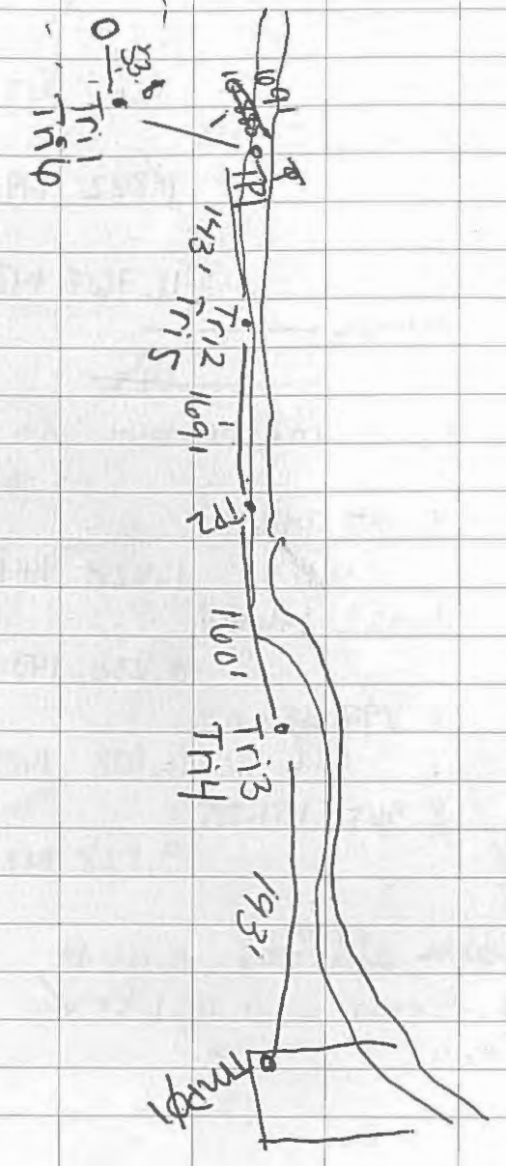
(15)

TO06 Port Heiden 8/21/13

Point	BS(+)	HI	FS(-)	Elev(ft)
PHTBM06				149.947
Tri 2	0.357	150.304		
TP 1			10.885	139.419
Tri 2	4.601	141.020		
TP 2			2.832	141.188
Tri 3	12.162	153.35 ~~150.350~~		147.458
TMP01			5.892	~~147.458~~
Tri 4	6.189	153 ~~150~~.647		
TP2 ck			12.458	141.189
Tri 5	2.725	143.914		
TP1 ck			4.464	139.450
Tri 6	11.247	150.697		
PHTBM06			0.701	149.996

Allowable error = 0.06 ft
Error = .049 ft

TMP01 = 147.458 ft



Rite in the Rain 17

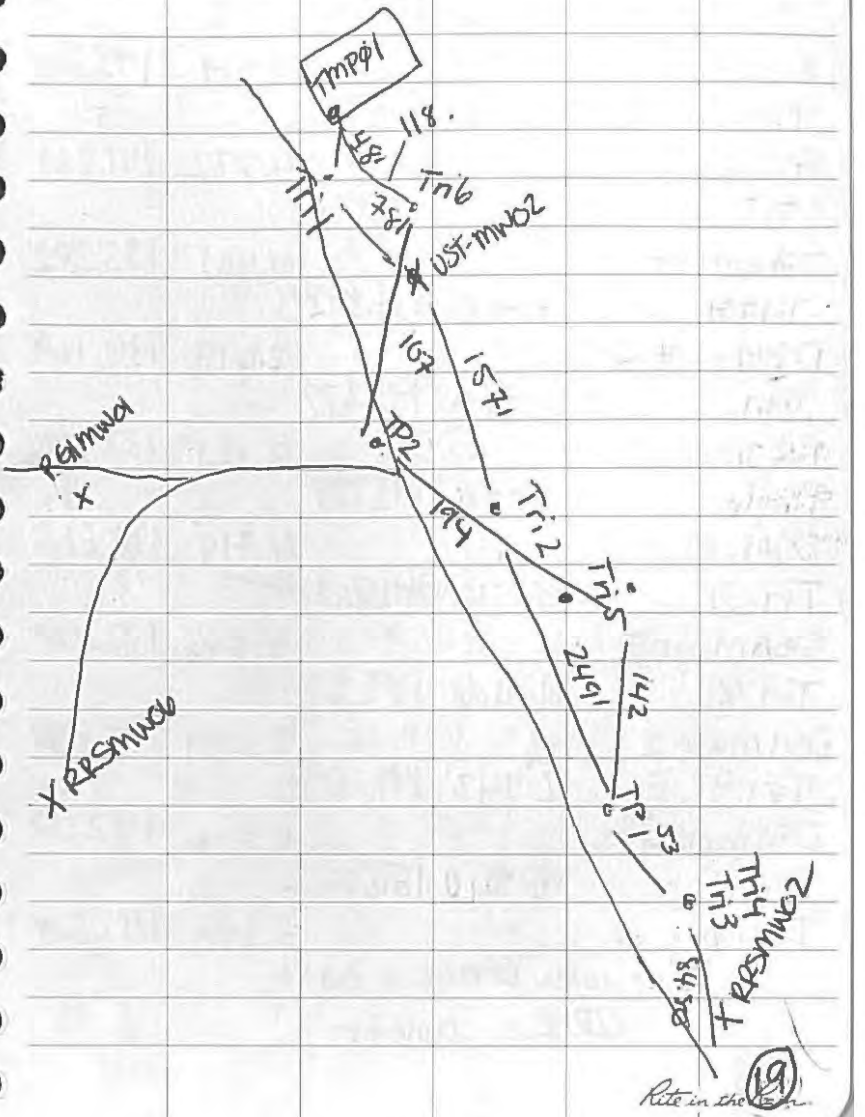
TO#6 Port Heiden 8/21/13

Point ID	BS(+)	HI	FS(-)	Elev
TMP#1				147.458
TRI 1	3.425	150.883		
UST-MW-02			1.822	149.061
Tri 2	5.93	154.991		
TP 1			11.767	143.224
~~Tri 3~~	~~3.247~~			
~~RRS-MW-02~~			~~84.80~~	
~~Tri 4~~ Recorded wrong numbers will redo Tri 3 + MW				
Tri 3	3.035	146.259		
RRSMW02			1.820	144.439
Tri 4	2.022	146.461		
TP1CK			3.230	143.231
Tri 5	8.797	152.028		
TP 2			6.108	145.920
Tri 6	5.365	151.285		
TMP#1			3.828	147.457

Allowable ~~accuracy~~ error = 0.06 ft

Actual Error = 0.001 ft ✓

TO#6 Port Heiden 8/21/13



Rite in the Rain

8/21/13

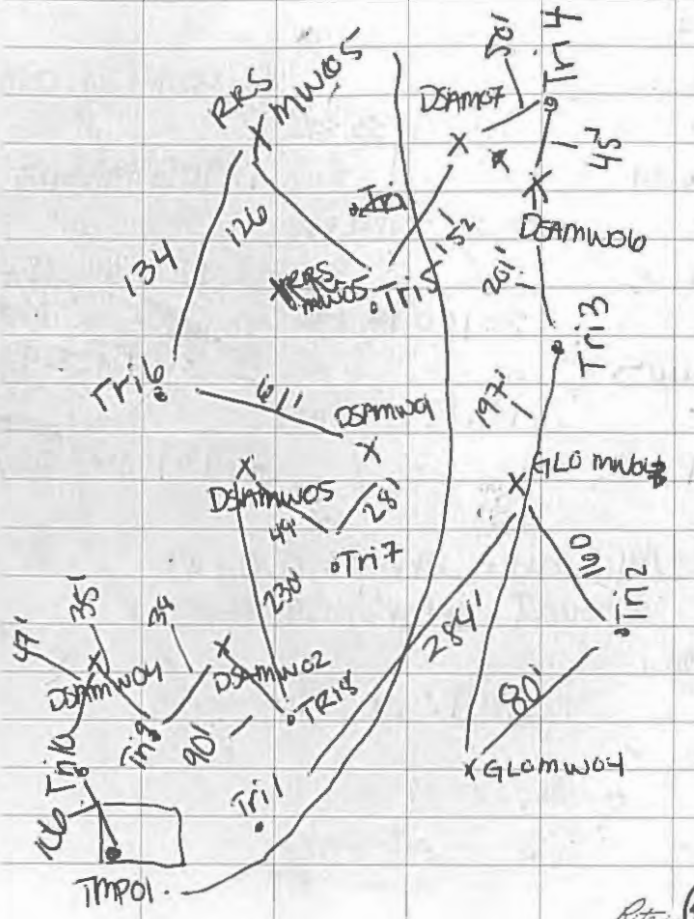
Point ID	BS (+)	HI	FS (-)	Elev.
TMP01				147.458
Tri 7	4.975	152.433		
GLOMW03			8.519	143.914
Tri 2	1.624	145.538		
GLOMW04			4.272	141.266
Tri 3	0.607	141.873		
DSAMW06			6.491	135.382
Tri 4	1.460	136.842		
DSAMW07			2.673	134.169
Tri 5	8.508	142.677		
RRSMW05			5.121	137.556
Tri 6	5.778	143.334		
DSAMW09			4.719	138.615
Tri 7	3.154	141.769		
DSAMW05			3.546	138.223
Tri 8	11.166	149.389		
DSAMW02			2.539	146.850
Tri 9	2.943	149.793		
DSAMW04			2.556	147.237
Tri 10	3.540	150.777		
TMP01			3.253	147.524

Allowable Error = 0.1 ft

ERROR = .066 ft

8/21/13

NTS



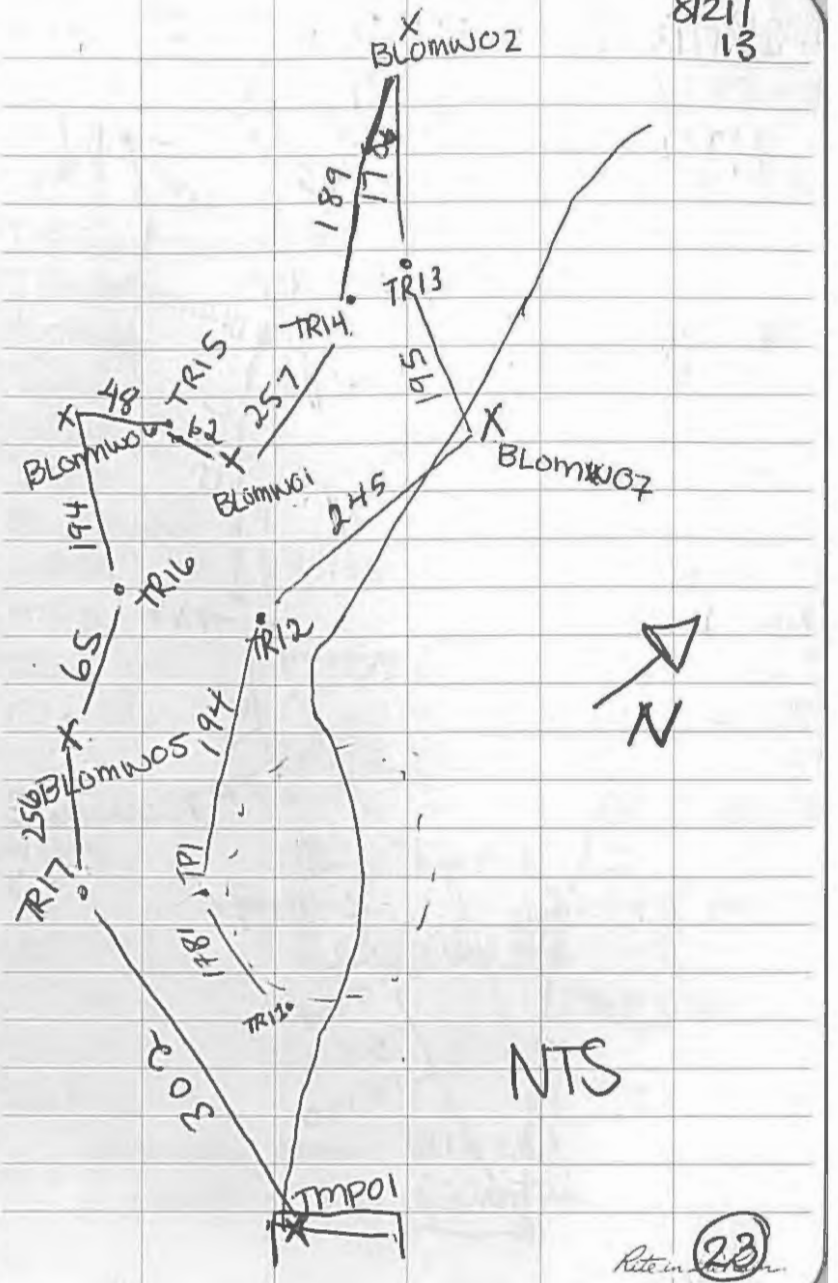
TOØ4 - PORT HEDEN 8/21/13

Point ID	BS(+)	HI	FS(-)	Elev
TMP01				147.458
TR11	3.947	151.405		
TP1			13.359	138.046
TR12	.791	138.837		
BLOMWØ7			9.854	128.983
TR13	4.081	133.064		
BLOMW02			7.021	126.043
TR14	7.509	133.552		
BLOMW01			1.905	131.647
TR15	3.215	134.862		
BLOMWØ6			3.128	131.734
TR16	8.100	139.834		
BLOMW05			3.864	135.970
TR17	14.177	150.147		
TMP01			2.787	147.360

Allowable Error = 0.07 ft
Actual Error = .098ft

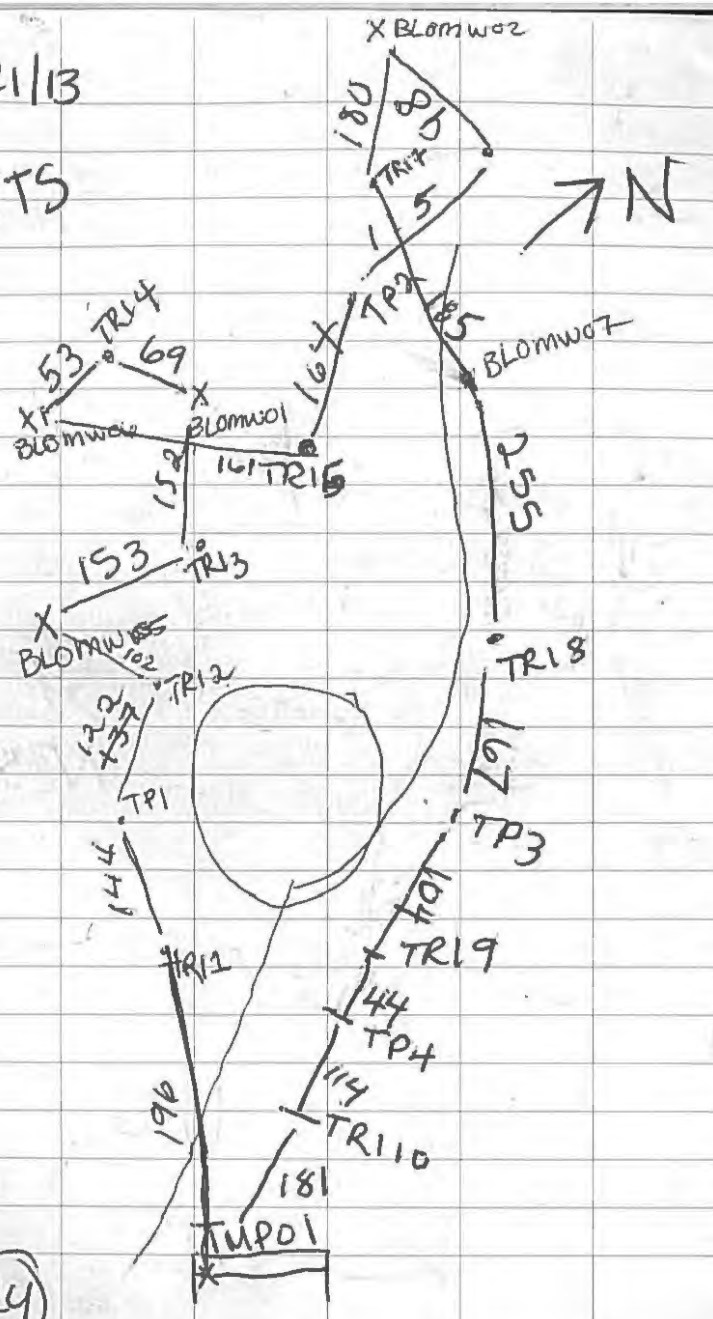
Will re-do

8/21/13



8/21/13

NTS



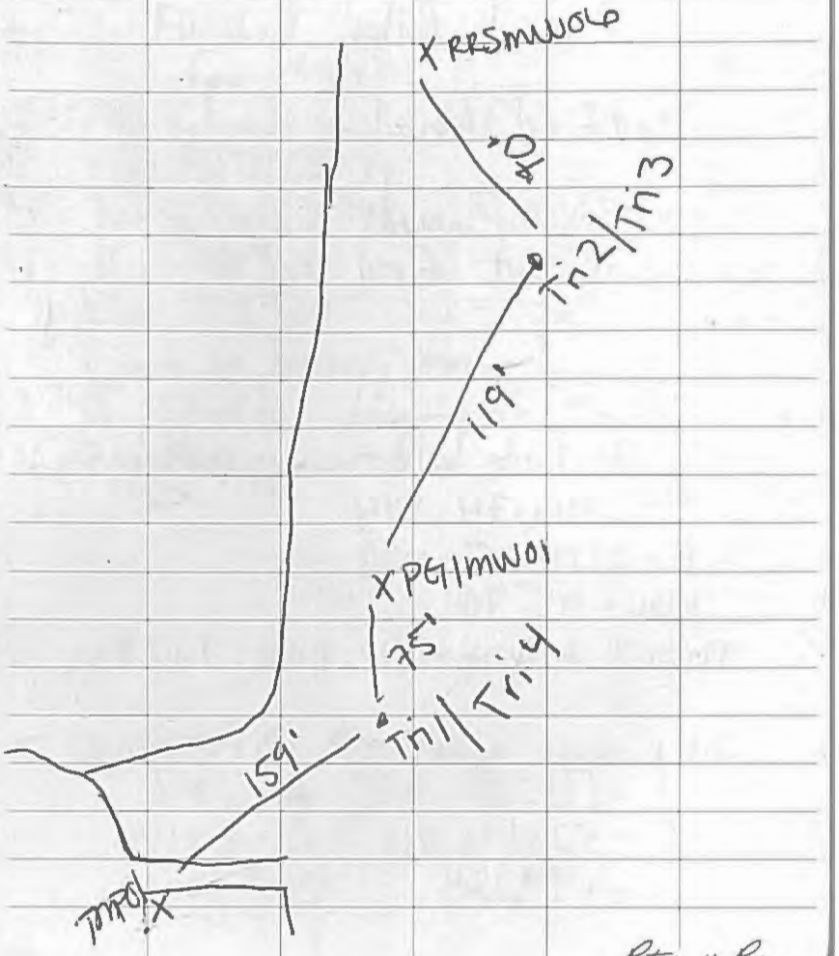
Point ID	BS+	HI	FS-	Elev
TMP01				147.458
TR11	4.574	152.032		
TP1			9.794	142.238
~~TR12~~	~~4.424~~	tripod not level		
TR12	3.304	145.542		
BLOMW05			9.498	136.044
TR13	4.346	140.390		
BLOMW01			8.642	131.748
TR14	2.732	134.480		
BLOMW06			2.641	131.839
TR15	1.488	133.327		
TP2			8.238	125.089
TR16	7.738	132.827		
BLOMW02			6.799	126.028
TR17	4.171	130.199		
BLOMW07			1.262	128.937
TR18	11.147	140.084		
TP3			2.162	137.922
TR19	8.282	146.204		
TP4			1.693	144.511
TR110	6.889	151.400		
TMP01			3.993	147.407

Allowable error = 0.10 ft
Actual error = 0.051 ft ✓

Port Heiden TO#6 8/22/13

0800 - Tailgate
Weather: 50°F, 16-20 mph wind
overcast + raining
Personnel: C. Jette
M. Pelka
Objective: Collect elevations of last two wells
→ begin to set grid for PCB characterization @ drilling site.

Point ID	BS (+)	HI	FS (-)	Elevn.
TMP01				147.458
Tri 1	3.315	150.773		
PG1MW01			7.688	143.085
Tri 2	2.461	145.546		
RRSMW06			2.561	142.985
~~Tri 3~~	~~2.478~~			
~~PG1MW01 chk~~			~~2.378~~	
Barcode staff not locked in place need to re-do				
Tri 3	2.623	145.608		
PG1MW01 chk			2.525	143.083
Tri 4	8.467	151.550		
TMP01 chk			4.679	147.471



Port Hedden TO6 08/23/2013

Weather: 50's F, Overcast w/ rain, little to no wind

Personnel:
Caitlin Jelle
Michal Pelka

PPE:
Modified Level D

Activities Planned:
Lay out Grid

1045 Set base station @ PHTBM006
N - 6314674.714
E - 520985.802
Elev - 45.704
Tripod Height - 112.7 cm = 1.127 m

Check shot = GPS007 @ PHTBM007
N - 6314567.958 Δ - .016
E - 520896.016 Δ - .0179
Elev - 44.124 Δ - .0022

1115 Began laying out grid
1250 Went back to Red Building for lunch
1400 Finished lunch
1735 Battery died in rover. Finished laying out grid for today
1740 Check shot = GPS003 @ PHTBM007
N - 6314567.948 Δ - .006
E - 520896.013 Δ - .0149
Elev - 44.124 Δ - .0022
(borrowed battery from base station)
1745 Took down base station
1800 Back at Red building

MP

Rite in the Rain

Port Heiden T006 8/24/13

Weather: Mostly Cloudy, 50's, No Wind
Personnel:
Caitlin Jelle
Michal Pelka

PPE:
Modified level D

Activities Planned:
Finish Laying out Grid

0800 Tailgate Safety Meeting

1030 - Setup base station on PHTBM006
N = 6314674.714
E = 520985.802
Elev = 45.704
Tripod Height = 92.4 cm
.924 m

1036
Check Shot - GPS003 PHTBM007
N - 6314567.963 Δ - .021
E - 520896.09 Δ - .0211
Elev - 44.122 Δ - .0042

1045 Continued laying out Grid

1530 Penny Bullock replaces Caitlin Jelle as Caitlin left for Anchorage

1630 Finished laying out grid minus points for changed grid

1635 Picture #1 Black Lagoon Staked & Pinflagged Grid facing West

1643 GPS003 PHTBM007
Checkshot
N 6314567.983 Δ - .001
E 520896.012 Δ - .0139
Elev 44.12 Δ - .0062

1700 Back at Red Building.

Rite in the Rain

Port Heiden Ak T006 08/27/13

Weather: Cloudy, light winds, 50's

Personnel: Daniel Christensen
Michal Pelka

PPE: Modified Level D

Activities Planned:

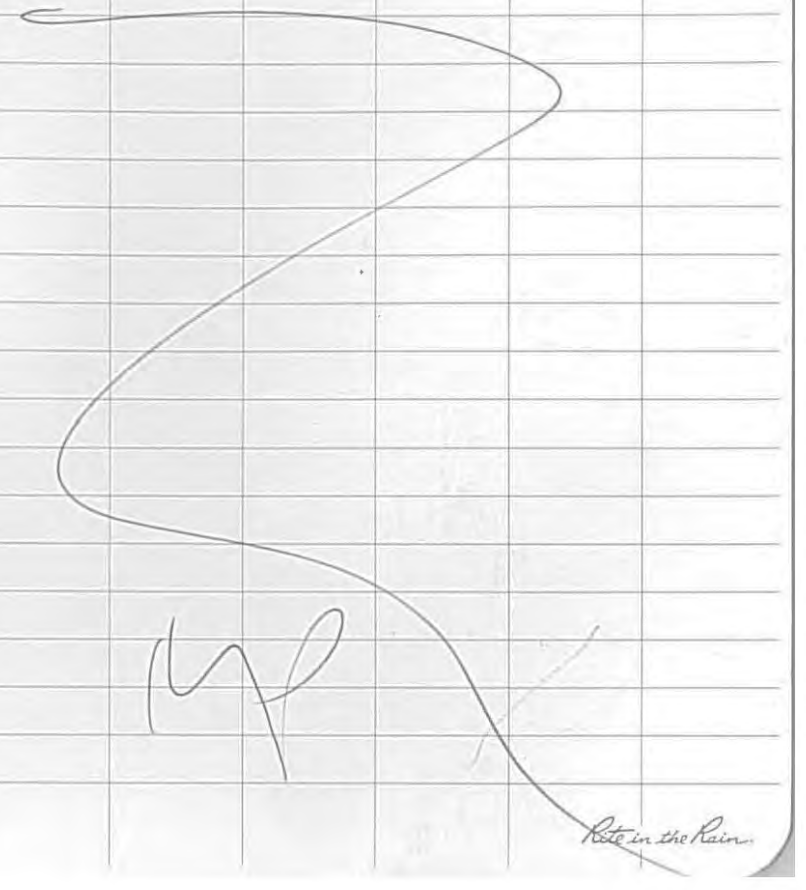
0800 Tailgate Safety meeting

0910 Set up Gas Station on PHTBM006
N 6314674.714
E 520985.802
Elev -45.704
Tripod Height = .932 m

0925 Check Shot PHTBM007
N - 6314567.966 Δ- .024
E - 520896.027 Δ- .029
Elev - 44.123 Δ- .003

1740 ~~BB~~ Check Shot PHTBM007
N - 6314567.964 Δ- .022
E - 520896.023 Δ- .025
Elev - 44.125 Δ- .001

1800 Back at Red Building



Port Aberdeen TO06 11/4/13

WEATHER: 35°F, RAIN, WIND 5-15 MPH

PERSONNEL: Kelly McGowen
Drew McClure

OBJECTIVES: GET TOC ELEVATIONS FROM ALL RRS/BCO WELLS USING LEVEL LOOPS ~~FROM~~ OFF PHTBM006 (CLOSEST BENCHMARK)

EQUIPMENT: LEICA DNA 003 AUTO LEVEL
TRIPOD & BAR CODE ROD

PPE: MODIFIED LEVEL D

LOOP: TBM-01 (DM 11/4)

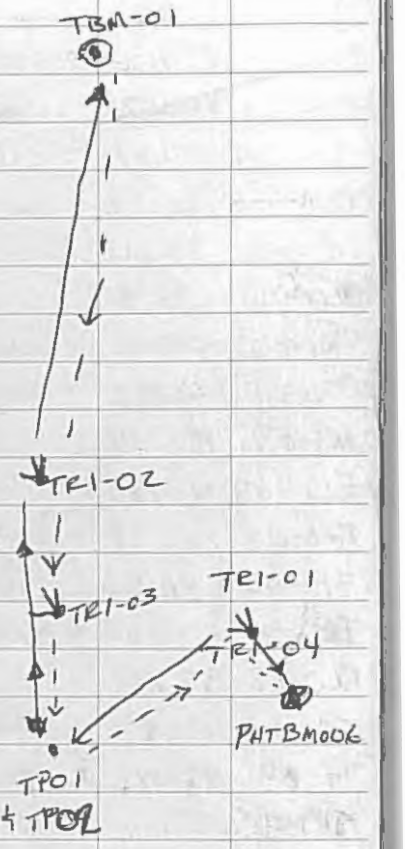
POINT ID	DIST	BS(+)	HI	FS(-)	ELEV
PHTBM006					100.000
TRI-01	39.54	2.589	102.589		
TP-01	112.35			11.958	90.630
TRI-02	133.44	2.816	93.446		
TBM-01	/			3.948	89.498
TRI-03	190.07	4.109	93.607		
TP-02	92.11			2.971	90.636
TRI-04	113.41	~~11.053~~ 11.649	102.285		
PHTBM006				2.279	100.006

ERROR = 0.006
ACCEPT = 0.04

11/4/13

TBM-01 LOOP

PHTBM006 = 149.9427 feet in elevation
TBM-01 = 139.4407 feet in elevation



= ESTABLISHED BENCH MARK
= TRIPOD SETUP
= TEMP. BENCHMARK
= TURNING POINT

Rite in the Rain.

LOOP 1 — 11/4

PT ID	DIST	BS	HI	FS	ELEV
TBM-01	ACTUAL = 89.498			OFF PH TBM006	100.000
TRI-01	124.39	5.685	105.685		
RRS-06	42.74			2.757	102.928
TRI-02	43.35	2.610	105.~~447~~ 538		
PGI-01	123.61			2.552	102.~~895~~ 986
TRI-03	127.36	2.519	105.~~414~~ 505		
~~TRI~~ TP-01 (DM)	141.79			6.389	99.025 116
TRI-04	134.41	5.016	104.~~041~~ 132		
BLO-~~[illegible]~~ 05 (DM)	156.82			7.975	96.066 157
TRI-05	94.64	3.175	99.~~241~~ 332		
BLO-06	123.81			7.278	91.~~963~~ 2.054
TRI-06	152.18	2.147	94.~~110~~ 201		
BLO-01	82.86			2.141	9~~1.969~~ 2.060
TRI-07	152.77	2.757	94.~~726~~ 817		
BLO-07	83.53			5.713	89.~~013~~ 104
TRI-08	149.29	1.724	90.~~737~~ 828		
TP-02	80.52			4.571	86.~~166~~ 257
TRI-09	52.09	4.872	91.~~038~~ 129		
BLO-02	77.79			5.*38	85.~~600~~ 691
TRI-10	106.62	6.221	91.~~821~~ 912		
TP-03	157.82			8.151	83.~~670~~ 761
TRI-11	157.46	9.327	9~~2.997~~ 3.088		
TP-04	147.54			0.941	92.~~056~~ 147
TRI-12	171.81	8.724			100.~~78~~ 871

LOOP 1 — 11/4

PT ID	DIST	BS(+)	HI	FS(-)	ELEV
TRI-12 FROM LAST PAGE					
TRI-12	171.81	8.724	100.78		~~100.78~~ (DM)
TP-05	116.83			1.593	99.~~187~~ 278
TRI-13	141.75	5.127	104.~~314~~ 405		(DM)
TP-06	143.15			3.734	100.~~580~~ 671
TRI-14	68.63	4.982	105.~~562~~ 653		
TBM-01	92.53			5.645	~~99.917~~ 100.008

ERROR = 0.008 ~~0.083~~ ✓

ACCEPTABLE = 0.14 (DM)

★ ALL CHANGES MADE ON 11/4 @1400

MAP ON NEXT PAGE

DM 11/4

LOOP 2 (PAGE 2) 11/5

PT ID	DIST	BS (+)	HI	FS (-)	ELEV
TRI-12	100.86	5.855	101.118		
DSA-07	113.85			6.800	94.318
TRI-13	113.22	6.835	101.153		
RRS-05	149.65			3.747	97.406
TRI-14	171.05	4.840	102.246		
DSA-01	55.70			4.546	97.700
TRI-15	71.35	4.719	102.419		
DSA-05	45.79			4.498	97.921
TRI-16	168.51	6.935	104.856		
TP-05	58.96			0.416	104.440
TRI-17	185.92	6.531	110.971		
TP-06	166.53			6.530	104.141
TRI-18	69.59	2.319	106.460		
TBM-01	69.20			6.442	100.018

ERROR = 0.018 ✓

ACCEPTABLE = 0.18

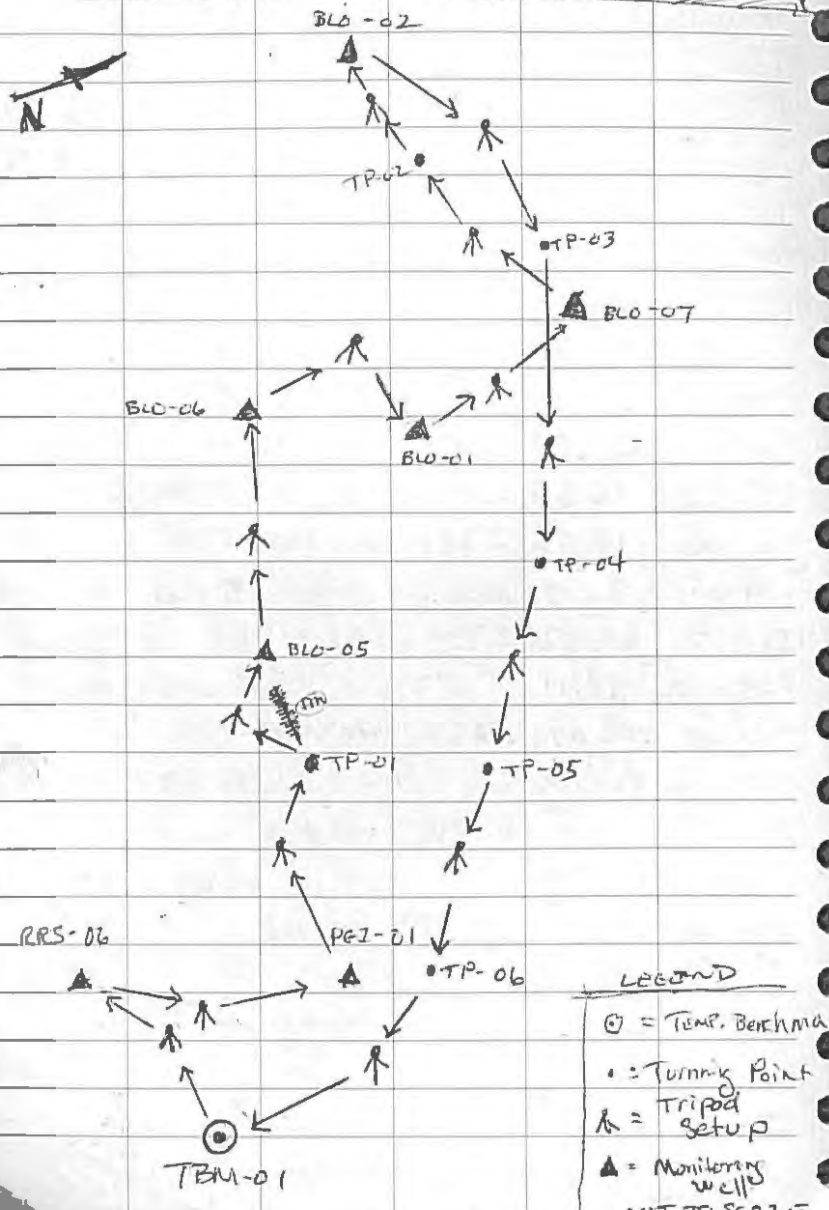
LOOP 2 (PAGE 1) N/S

PT ID	DIST	BS (+)	HI	FS (-)	ELEV
TBM-01	ACTUAL =	89.498	OFF PHTBM006		100.000
TRI-01	141.91	7.820	107.820		
TP-01	122.77			4.344	103.476
TRI-02	138.90	7.409	110.885		
TP-02	167.45			6.821	104.064
TRI-03	75.35	4.011	108.075		
RRS-02	118.78			3.621	104.454
TRI-04	157.41	4.368	108.822		
TP-03	185.84			2.829	105.993
TRI-05	117.88	6.655	112.648		
VST-02	86.65			3.782	108.866
TRI-06	116.87	2.889	111.755		
DSA-04	132.80			5.166	106.589
TRI-07	118.77	2.784	109.373		
DSA-02	88.11			2.618	106.755
TRI-08	107.07	1.237	107.992		
GLO-04	223.88			6.523	101.469
TRI-09	181.03	4.324	105.793		
GLO-03	205.48			2.096	103.697
TRI-10	181.60	2.209	105.906		
TP-04	145.35			9.149	96.757
TRI-11	116.82	4.182	100.939		
DSA-06	100.81			5.676	95.263
TRI-12	100.86	5.855	101.118		

CONTINUED ON PREVIOUS PAGE

11/5

LOOP 1 MAP

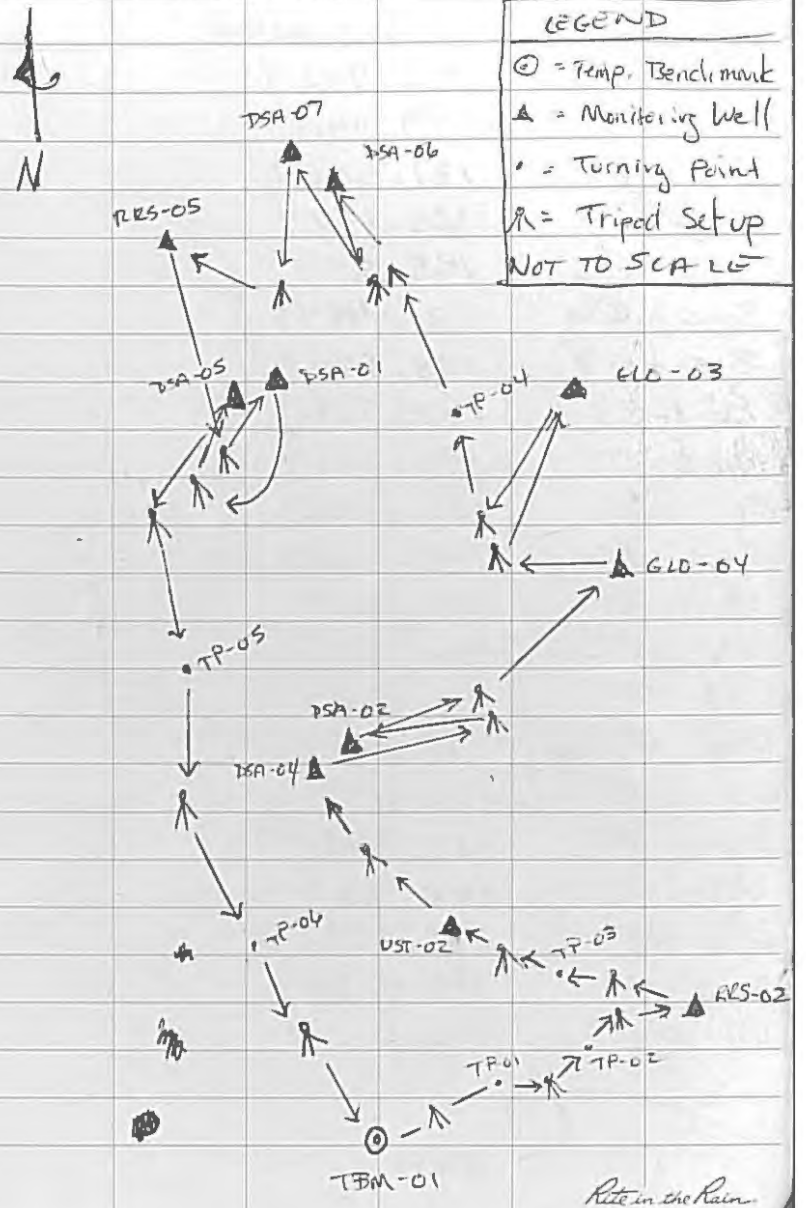


LEGEND
- ⊙ = Temp. Benchmark
- • = Turning Point
- = Tripod Setup
- ▲ = Monitoring Well

NOT TO SCALE

11/5

LOOP 2 MAP



LEGEND
- ⊙ = Temp. Benchmark
- ▲ = Monitoring Well
- • = Turning Point
- = Tripod Setup

NOT TO SCALE

Rite in the Rain

ME

CALCULATED WELL ELEVATIONS

POINT ID	ELEVATION (ft)
PHTBM006	149.9427
TBM-01	139.4407
BLO-01	131.5007
BLO-02	125.1317
BLO-05	135.5977
BLO-06	131.4947
BLO-07	128.5447
PG1-01	142.4267
RRS-02	143.8947
RRS-05	136.8467
RRS-06	142.3687
DSA-01	137.1407
DSA-02	146.1957
DSA-04	146.0297
DSA-05	137.3617
DSA-06	134.7037
DSA-07	133.7587
UST-02	148.3067
GLO-03	143.1377
GLO-04	140.9097
UST-02	148.3067

DM

Port Heiden
Survey Logbook #1

Rite in the Rain®
ALL-WEATHER
ENVIRONMENTAL FIELD BOOK
№ 550F

6/1/2013 –

C. Fell
C. Jelle
P. Bullock
K. Peck
G. Rutkowski
A. McClure
J. Orczewska
C. Welbourne

AKERS-UR-05F546-H04-0025

Did you remember ... ???

Daily Logbook Checklist

- ☐ Project name / Site ID / Client
- ☐ Date
- ☐ Weather, site conditions, and other salient observations
- ☐ Level of PPE used
- ☐ Full names of onsite personnel and affiliations (including all visitors)
- ☐ Daily objectives
- ☐ Field measurements and calibrations
- ☐ Time and location of activity
- ☐ Field observations and comments
- ☐ Deviations from the Work Plan
- ☐ Site photographs
- ☐ Site sketches (with reference i.e. "N" arrow)
- ☐ Survey and location i.e. samples or debris (GPS coordinates when possible)
- ☐ For each sample record:
  - Date, time, sampler(s)
  - Sample ID
  - Media, container(s), preservatives
  - QC (dup/MS/MSD)
  - Analysis
  - MeOH lot #
  - Tare weight

- ☐ Sample shipments (when, what, destination)
- ☐ Waste tracking (when, how much, destination)
- ☐ Daily summary of activities (i.e. # of samples collected)

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

ALL-WEATHER
ENVIRONMENTAL FIELD BOOK

Name Jacobs Engineering

Address 4300 B Street Suite 600
Anchorage, AK 99503

Phone 907-563-3322

Project Port Heiden T046
Surveying

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikold Cover
Columnar	1/4" Grid	Item No. 550	Item No. 550F

CONTENTS

Reference Page Index

CONTENTS

PAGE	REFERENCE	DATE

Location Port Heiden Date 6/1/2013

Project / Client T046 ~~T006~~ 6/4/13 J10 USACE KP

For naming locations of utilities in Zerca

Pt ID #: (anything) GPSØØ1, Ø Ø2, etc.

Code: BUL

~~Attribute~~

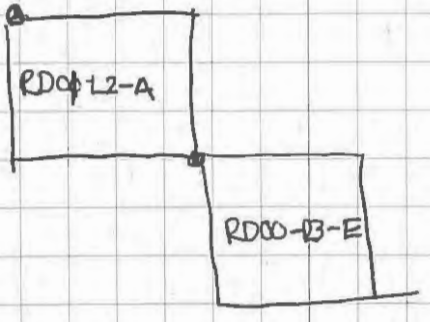
Description SEC##

SPACE grid numbers

Utility type (choose from pull down menu)

For finds: corners

Description = name by NW corner



Location Port Heiden
Project / Client T046 ~~T006~~ 6/4/13 JJD
Date 6/1/2013 USACE

Calculations for change in Northing, Easting, and Elevation.

6312916.334
522259.696
44.938

Location Port Heiden
Project / Client T046 ~~T006~~ 6/4/13 JJD
Date 6/1/2013 USACE

Temporary Control Point

PointID	Northing Y	Easting X	Ell_Elev	Code
HeidenSEBase	6313432.61	523573.37	47.537	SCP
RM1	6313407.58	523547.07	47.095	SCP
RM2	6313435.03	523606.84	47.095	SCP
PHTBM001	6312916.27	522259.72	44.969	SCP
PHTBM002	6313040.86	522095.09	40.934	SCP
PHTBM003	6312873.97	522136.88	37.595	SCP
PHTBM004	0	0	0	SCP
PHTBM005	6313733.66	522062.94	43.587	SCP
PHTBM006	6314674.714	520985.8019	45.7039	SCP
PHTBM007	6314567.942	520895.9981	44.1262	SCP
PHTBM008	6309095.113	520665.9693	23.6448	SCP
PHTBM009	6309181.853	520571.9061	22.6947	SCP

PHTBM004 was ~~wape~~ wiped out by excavation activities in 2012

PHTBM00

Location Port Hueneme Date 6/1/2013

Project / Client TO46/~~TO06~~ 6/4/13 JTO USACE

0730 Tailgate

Personnel

C. Jelle	Jacobs	QA/QC
* C. Fell	Jacobs	Survey

Objectives.

- Check 2012 control network
- Set new control points

Equipment.

- Leica Viva

PPE

- Modified level D

Weather: M. Cloudy, foggy, 40s F

Location Port Hueneme Date 6/1/2013

Project / Client TO46/~~TO06~~ 6/4/13 JTO USACE

Survey Control (Check)

Base station Setup

Pt# Heuneme SE Base

N: 6313432.609 m

E: 523573.370 m

Ell: 47.537 m

Tri Ht: 83.7cm 0.837m

Check Shot #1

Pt# RM2 ~~CHK~~

ΔX 0.007 m

ΔY 0.014 m OK

ΔZ 0.004 m

Check Shot #2

Pt# RM1 ~~CH~~

ΔX 0.002 m

ΔY 0.006 m OK

ΔZ 0.007 m

~~407~~ 547.665

407.582

47.095

.102

Check Shot #3

Pt# PHTBM001

ΔX 0.006 m OK

ΔY 0.009 m

ΔZ 0.013 m

259.719

916.274

44.969

713

293

.192

Location Port Heiden Date 6/1/2013

Project / Client T046/~~T006~~ 6/4/13 USACE

Survey Control (Check)

1140 Check Shot #4

Pt# PHTBM003

ΔX 0.013 m

ΔY 0.005 m OK

ΔZ 0.033 m

1200 Check Shot #5

Pt# PHTBM002

ΔX 0.01 m 095 090 101

ΔY 0.010 m OK 040 864 874

ΔZ 0.040 m 40 934 894

1212 Check Shot #6

Pt# PHTBM005

ΔX 0.006 m 062 936 928

ΔY 0.005 m OK 733 661 656

ΔZ 0.012 m 43 587 575

Location Port Heiden Date 6/1/2013

Project / Client T046/~~T006~~ 6/4/13 USACE

Survey Control (Establish)

1225 PHTBM006

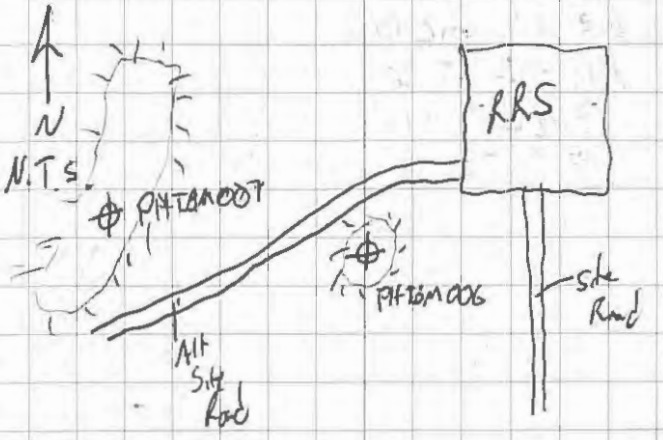
N: 6314674.714 m

E: 520985.802 m

ell: 45.704 m

rod ht: 1.60m

Desc: 8inch wooden hub set on a small hill to the south of the alternate Site Road (~50ft) and approximately 400ft W from the RRS



Location Port Haden Date 6/1/2013

Project / Client T046 ~~/T007~~ JJ 6/4/13 USACE
Survey Control (Establish)

1234 PHTBM007
N: 6314567.942 m
E: 520895.998 m
Ell: 44.126 m
Rod Hgt: 1.60m

Desc: 8 inch wooden hub set on small hill on the North side of the alternate Site Road (70ft) and approx 1000ft W from the RRS

1302 PHTBM008
N: 6309095.113 m
E: 520665.969 m
Ell Hgt: 23.645 m
Rod Hgt: 1.60m

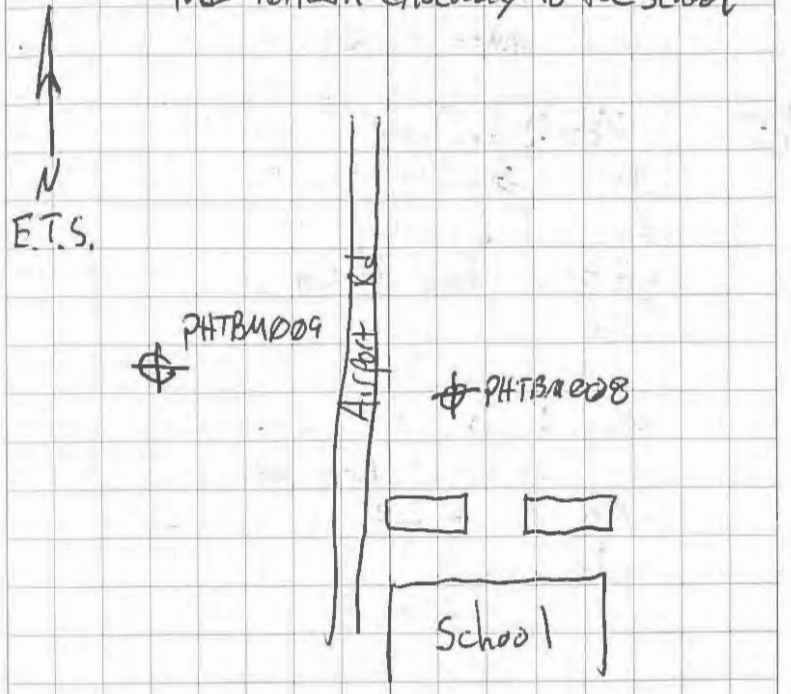
Desc: 8 inch wooden hub set approx 60ft east of Airport Road and approx 800ft north of the northern driveway to the school.

Location Port Haden Date 6/1/2013

Project / Client T046 ~~/T007~~ JJ 6/4/13 USACE
Survey Control (Establish)

1314 PHTBM009
N: 6309181.853 m
E: ~~520714~~ 520571.906 m
Ell hgt: 22.695 m
Rod hgt: 1.60m

Desc: 8 inch wooden hub set approx 300ft west of Airport Road and 300ft north of the northern driveway to the school



Location Port Heiden Date 6/1/2013

Project / Client TO46 ~~/ TO07~~ JT 6/4/13 USACE

Survey Control (CHeck)

1343 Check Shot (Close out)

Pt# : RM2
ΔX : 0.015 m
ΔY : 0.005 m
ΔZ : 0.002 m

1350 Shut down base station

1415 Lunch

1445 Prep to stakeout Stationing (Section Lines) in STA 00 to STA 10.

1531 Set up base station

Pt# : PHTBM003
N : 6312873.973
E : 522136.876
Ell Hgt : 37.595
Tri Hgt : 1.223m

Location Port Heiden Date 6/1/2013

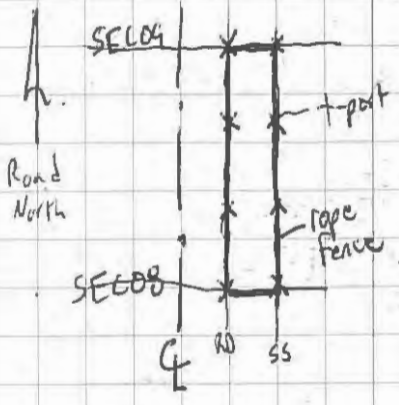
Project / Client TO46 USACE

1546 Check Shot (Initial)

Pt# : PHTBM003 007 969
ΔX : 0.007
ΔY : 0.017 OK
ΔZ : 0.038

WX: M. Cloudy, 10-15 mph wind, gusting to 20 mph

Staked out sec08R side shoulder
↳ placed t-posts around SEC08R and ran rope and caution tape to fence off



Location Port Hueneme Date 6/1/2013

Project / Client T046 USACE

1709 Check Shot (Final)

Pt #

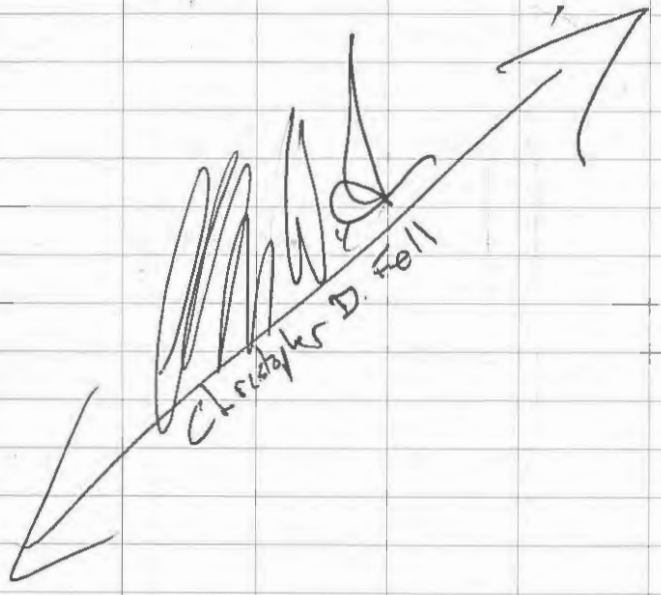
ΔX 0.028 m

ΔY 0.021 m

ΔZ 0.044 m

1715 Shut down base station

Left site for the day



Location Port Hueneme Date 6/2/2013

Project / Client T046 USACE

1000 Mobe to survey section lines.

Personnel

C. Jelle	Jacobs	QA/QC
* C. Fell	Jacobs	Survey

Objectives

- Place section line hubs in SEC 00 & 01

Equipment

- Leica Viva

PPE

- Modified level D

WX: Cloudy, wind SSE 5-15 mph.

16

Location Port Heiden Date 6/2/2013

Project / Client TO46
Survey

1030 Base Station Setup
Pt # : PHTBM003
N : 6312873 973
E : 522136 876
Ell hgt: 37 595
Tri hgt: 904 cm 0 904 m

Check Shot #1 (initial)
Pt # PHTBM001 CHK
ΔX 0 001 m
ΔY 0 017 m OK
ΔZ ~~0 048~~ 0 043 m

Set ℄ & road edge stakes from Sec00 to Sec05. Set misc. tundra grid stakes.

Check Shot #2 (final)
Pt # PHTBM001 CHK2
ΔX 0.001 m
ΔY 0.012 m
ΔZ 0.046 m

1215 Done

Christopher Feck

17

Location Port Heiden Date 6/3/2013

Project / Client TO46
Survey

Personnel: C. Jelle
J. Orczewska
H. Jochens
C. Welbourne
PPE: Modified Level D
Equipment: Leica Viva

Weather: 5 mph, cloudy, ~45° F

Base station Setup
Pt #: PHTBM003
N: 6312873 973
E: 522136 876
Ell hght: 37 595
Tri hght: 1023 cm 1.023 m

Check shot #1 initial
Pt # GPS002 → PHTBM001
ΔX 0 002 m
ΔY 0 001 m
ΔZ 0 040 m

Location Port Heiden Date 6/3/13

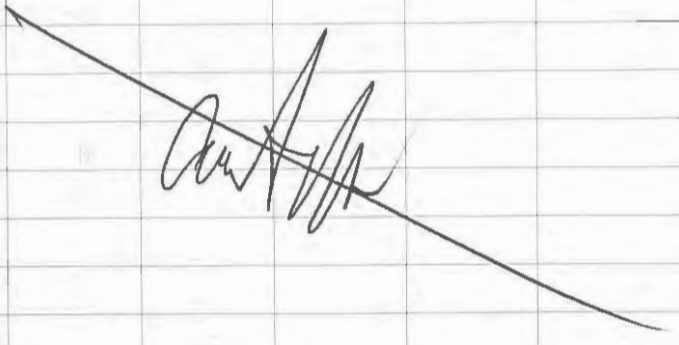
Project / Client T046 ~~T006~~ USACE
JTO 6/4/13
Survey

Checkshot #2 Final
PHTBM001

ΔX	0.003	
Δ Y	0.007	
ΔZ	0.039	45.008

1645 · Complete CL → road shoulder marking through Section 18.

1700 · End of day



Location Port Heiden Date 6/04/13

Project / Client ~~T046 / T006~~ USACE
JTO 6/4/13
Survey

0830:
Personnel: P. Bullock
C. Welbourne
* J. Orczewska
PPE: Modified Level D
Equipment: Leica viva

Weather: <5mph, overcast, light mist
≈ 45°F

Base Station Setup:
PT #: PHTBM001
N: 6312911.274
E: 522259.719
El: 44969
Tri Height: 81.2 cm
0.812 m

Checkshot #1 (initial)
PT# GPS002 PHTBM003
ΔX: .018
ΔY: .010
ΔZ: .056

Location Port Heiden Date 6/4/13

Project / Client TO416

Sec 19 CL + 111L Point not in Leica - will return to this point later

Sec 35 CL + 111L in driving path - hub is flush in place marker is offset slightly from hub.

Checkshot #2
Pt # GPS004 PHTBM003
ΔX = 0.011 .876
ΔY = 0.017 .859
ΔZ = 0.053 17

1500 Checkshot #3
Pt # GPS005 PHTBM007
ΔX = 0.007
ΔY = 0.018
ΔZ = 0.0002
0.0219

3 Photos taken today

Location Port Heiden Date 6/4/13

Project / Client TO416 PB

1515 Checkshot #4
Pt # GPS006 PHTBM006
ΔX = 0.009
ΔY = 0.0219
ΔZ = 0.0149

1645 Checkpoint #5
Pt # GPS007 PHTBM003
ΔX = 0.017
ΔY = 0.038
ΔZ = 0.053

Shut down base station
Stkpouts and
CL completed

Penny Pullen