JACOBS

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Technical Memorandum

Date 14 December 2016

To Louis Howard (ADEC)
Richard Mauser (USAF)
Patrick Roth (USACE)

CC Craig Scola (USACE)
Kelly McGovern (Jacobs)
Greg Rutkowski (Jacobs)

Subject **Port Heiden 2016 Groundwater Monitoring After-Action Report (Final)**

Introduction

This Technical Memorandum summarizes the results of groundwater monitoring activities conducted at the former Radio Relay Station (RRS) (OT001 Composite Facility) and former pipeline corridor (FPC) (SS006 Petroleum, Oil, and Lubricate [POL] Pipeline) in Port Heiden, Alaska. Sampling was conducted by Jacobs Engineering Group, Inc. (Jacobs) under Contract No. W911KB-06-D-0006, Task Order No. 0046 following the *2016 Groundwater Monitoring Plan, Former Port Heiden Radio Relay Station* (U.S. Air Force [USAF] 2016) and the *Groundwater Monitoring 2013 Work Plan, Former Port Heiden Radio Relay Station* (USAF 2013). This effort supplements the annual groundwater sampling planned under a separate USAF contract.

The purpose of this sampling event was to implement the recommendations of the *2014 Annual Groundwater Monitoring Report, Former Radio Relay Station, Port Heiden, Alaska* (USAF 2015) regarding diesel-range organics (DRO) contamination at FPC-066 and potential 1,4-dioxane contamination collocated with trichloroethylene (TCE) contamination at the former RRS site. Figure 1 (Attachment 1) presents the location and vicinity map of the Port Heiden RRS site.

This Technical Memorandum includes the following attachments:

- Attachment 1: site figures
- Attachment 2: Alaska Department of Environmental Conservation Laboratory Data Review Checklists and laboratory data deliverables
- Attachment 3: field documentation
- Attachment 4: response to comments

Monitoring Well 066-MW-05

Monitoring Well 066-MW-05 is located at the FPC-066 site along Airport Road as shown in Figure 2 (Attachment 1). FPC-066 is a DRO-contaminated site, and DRO is the only contaminant of concern at the site. In 2014, Monitoring Well 066-MW-05 contained a DRO concentration of 1.3 milligrams per liter (mg/L), below the Alaska Department of Environmental Conservation (ADEC) Table C groundwater cleanup level of 1.5 mg/L (ADEC 2016). The 2014 groundwater monitoring report (USAF 2015) recommended an additional sampling event in spring or summer to determine if the DRO concentration remained below the cleanup level.

Monitoring Well 066-MW-05 was sampled on 25 June 2016 and a primary, duplicate, and matrix spike/matrix spike duplicate (MS/MSD) were submitted to EMAX Laboratories, Inc. (EMAX) of Torrance, California for analysis. Both the primary and duplicate sample result exceeded the ADEC cleanup level of 1.5 mg/L at 3.1 mg/L. As presented in Table 1, the previous results were showing a decreasing trend in the DRO concentration; however, this result was higher than the previous sampling events with the exception 2010.

Table 1
FPC-066 Comparison of DRO Concentrations

Well	October 2009 (mg/L)	October 2010 (mg/L)	2011 (mg/L)	October 2012 (mg/L)	September 2013 (mg/L)	September 2014 (mg/L)	June 2016 (mg/L)
ADEC Cleanup Level[1]	1.5	1.5	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	NS	NS
066-MW-05	2.25	4.5	NS	2.02	1.6	1.3	3.1
066-MW-06	ND [0.8]	ND [0.800]	NS	ND [0.360]	0.019 J	0.032 J	NS
066-MW-07	ND [0.8]	ND [0.899]	NS	ND [0.360]	0.024 J	NS	NS

Notes:
[1]ADEC Cleanup Level based on Table C, Groundwater Cleanup Levels (ADEC 2016).
J = analyte was positively identified, but associated result was less than the LOQ and greater than or equal to the DL.
ND = nondetect
NS = not sampled
Bold = Laboratory reported concentration exceeds ADEC cleanup level.
The LOQ is provided in [ ]
For additional definitions, see Acronyms and Abbreviations section.

The 2016 DRO exceedance may represent seasonal fluctuation in the groundwater contaminant levels. A review of the field parameters did not identify a significant variation

between the field parameters previously recorded during the fall sampling events and those measured during this summer sampling event, including the depth to groundwater. Field sampling forms, including the field parameters measures are included in Attachment 3.

Monitoring Well DSA-MW-02

Monitoring Well DSA-MW-02 is located at the former RRS site near the drum storage area (DSA). During 2014 sampling, Monitoring Well DSA-MW-02 contained the highest concentration of TCE at 0.49 mg/L. The 2014 report (USAF 2015) cited a USAF study (Anderson et al. 2012) indicating a high probability of 1,4-dioxane to be collocated with TCE contamination. Monitoring Well DSA-MW-02 was selected for sampling based on the high TCE concentration in the well. Figure 3 shows the location of Monitoring Well DSA-MW-02.

Monitoring Well DSA-MW-02 was sampled on 25 June 2016 and primary, duplicate, and MS/MSD were submitted to EMAX for analysis. 1,4-dioxane was not detected in the primary or duplicate groundwater samples collected from this well. The limit of quantitation (LOQ) for 1,4-dioxane in the primary and duplicate samples were 0.0020 and 0.0021 mg/L, respectively, which are below the ADEC Table C groundwater cleanup level of 0.077 mg/L. Based on these sample results, 1,4-dioxane is not considered a contaminant of potential concern at this site.

Conclusion and Recommendations

Monitoring Well 066-MW-05 at FPC-066 (SS006 POL Pipeline) continues to exceed the ADEC groundwater cleanup level for DRO (ADEC 2016). Sample results from three downgradient monitoring wells (066-MW-04, 066-MW-06, and 066-MW-07) no longer exceed the groundwater cleanup levels indicating that the DRO plume is stable and likely decreasing in concentration overall. Based on these results, the USAF recommends conducting long-term monitoring of Well 066-MW-05 until the results of two consecutive sampling events find DRO concentrations below the ADEC Table C groundwater cleanup level (ADEC 2016). These sampling events will alternate between spring/summer and fall/winter timeframes to account for seasonal fluctuations. Sampling events will be scheduled for October 2017, June 2018, and October 2019 when the next five-year review will occur (May 2019). At that point, the data will be evaluated to determine if there is indeed a summer/fall fluctuation and if monitoring can be reduced to every five years or eliminated completely if there are two consecutive sample results below the ADEC Table C cleanup level for DRO. In the year prior

to the five-year review (June 2018), Wells 066-MW-04, 066-MW-06, and 066-MW-07 will also be sampled for DRO. The next five-year review will be completed by May 2019.

Monitoring Well DSA-MW-02 at the former RRS site (OT001 Composite Facility) was nondetect for 1,4-dioxane in both the primary and duplicate samples and the LOQs reported by the laboratory was below both the current ADEC Table C groundwater cleanup level of 0.077 mg/L (ADEC 2016) and the proposed ADEC groundwater cleanup level of 0.00459 mg/L. The USAF recommends that no additional sampling be conducted for 1,4-dioxane at the site.

References

ADEC (Alaska Department of Environmental Conservation). 2016 (May). *Oil and Other Hazardous Substances Pollution Control.* 18 AAC 75.

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

USAF. 2015 (May). *2014 Annual Groundwater Monitoring Report (Final).* Former Radio Relay Station, Port Heiden, Alaska. Prepared by Jacobs Engineering Group Inc.

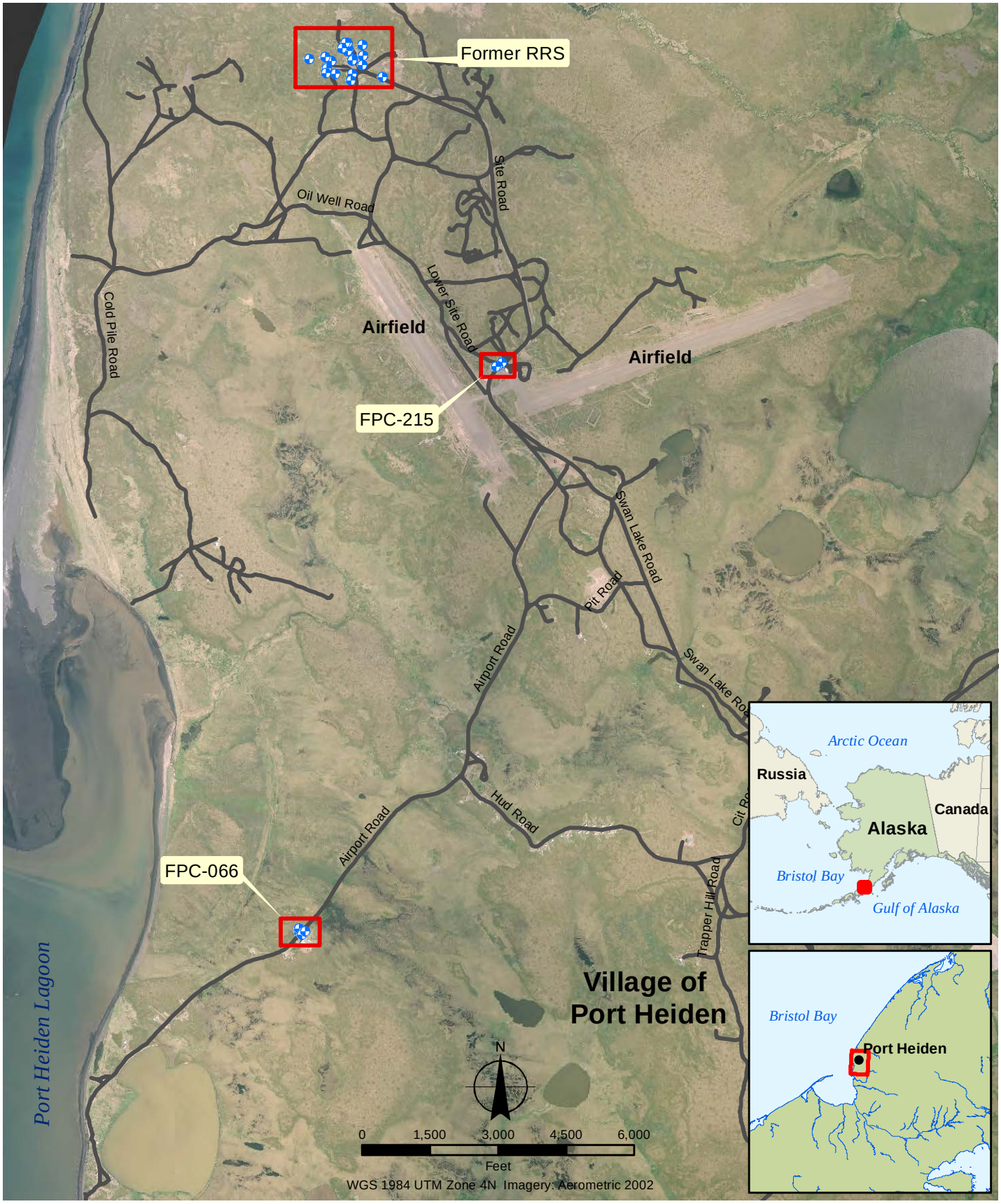
USAF. 2016 (May). *Port Heiden Former Radio Relay Station 2016 Groundwater Monitoring Plan (Final)*. Prepared by Jacobs Engineering Group Inc.

Attachments

Attachment 1	Figures
Attachment 2	ADEC Laboratory Data Review Checklists, Analytical Data Table, and Laboratory Data Deliverables
Attachment 3	Field Documentation
Attachment 4	Response to Comments

ATTACHMENT 1

Figures



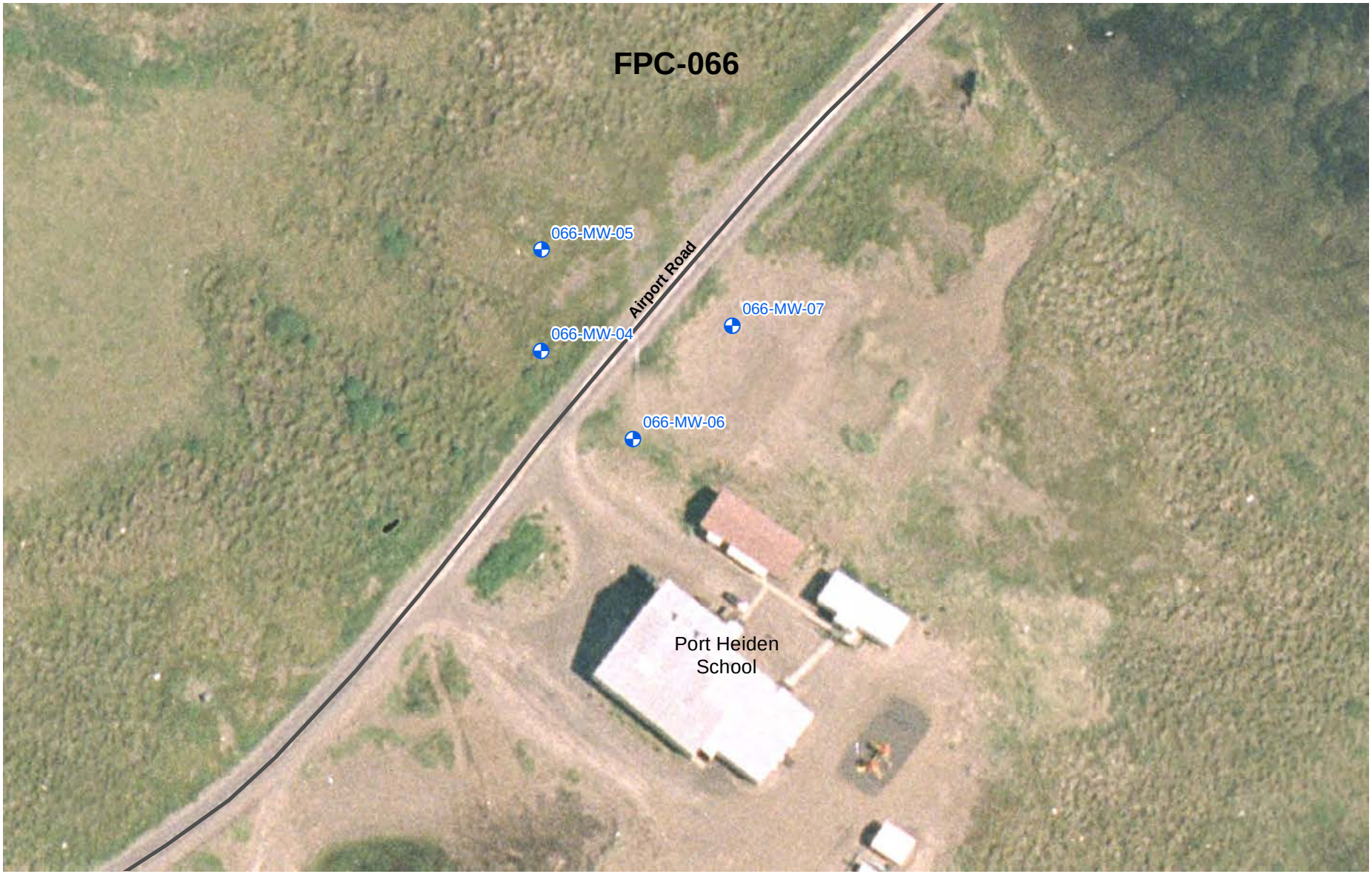
Monitoring Well

SITE LOCATION AND VICINITY FOR PORT HEIDEN HTRW GROUNDWATER SAMPLING

PORT HEIDEN, ALASKA

JACOBS	DATE: 8 Sept 2016	PROJECT MANAGER: G. Rutkowski	FIGURE NO: 1

P:\PortHeiden\GIS\MXD\HTRW_TO06\13RRS_2013Workplan_GWFig A-1 Location&Vicinity.mxd jochenhr



Monitoring well

0 50 100 150 200
Feet

WGS 1984 UTM Zone 4N Imagery: Aerometric 2002

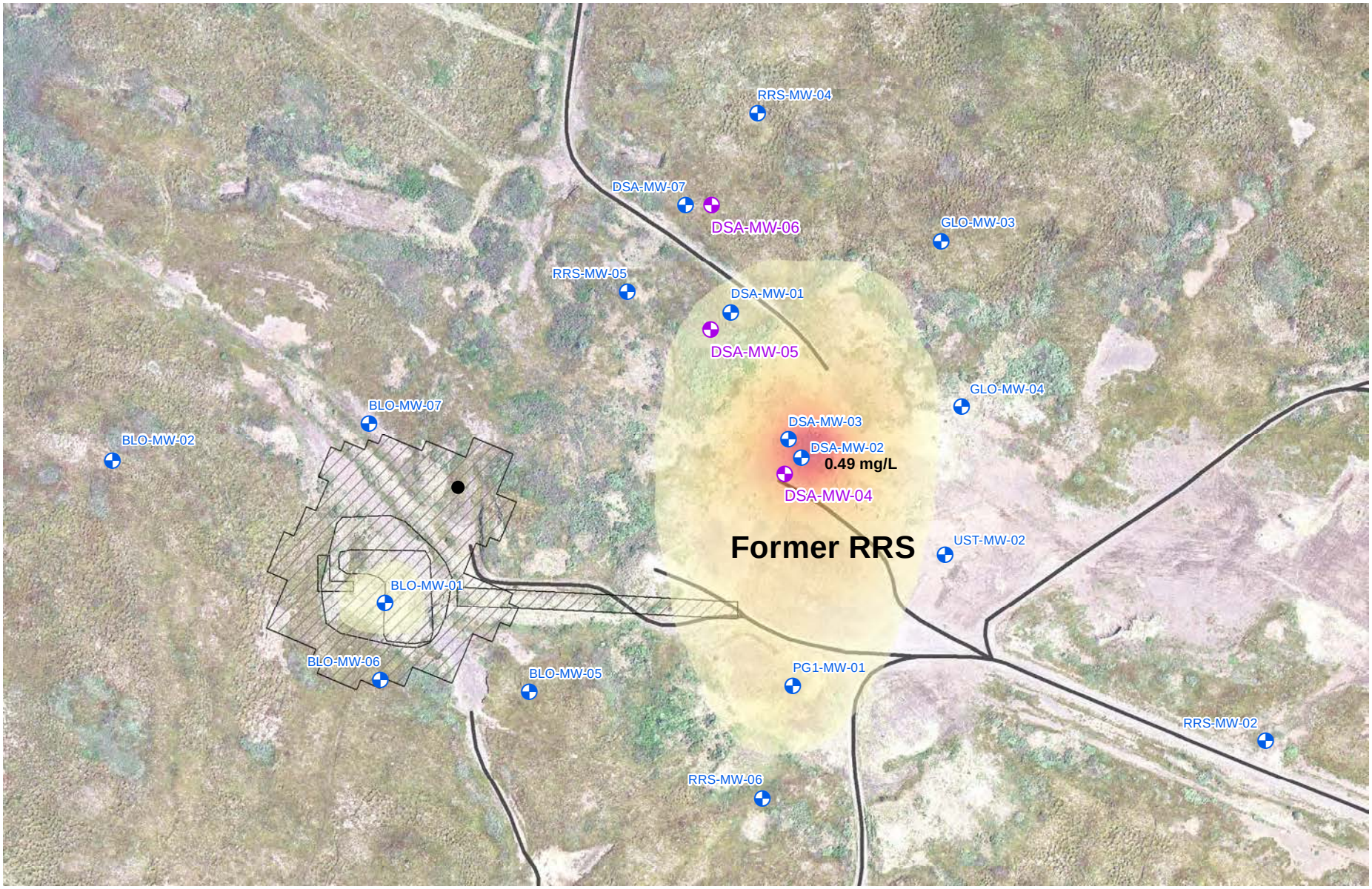
N

MONITORING WELL LOCATIONS AT FPC SITE 066

PORT HEIDEN, ALASKA

JACOBS	DATE: 09 Sep 2016	PROJECT MANAGER: K. McGovern	FIGURE NO: 2

P:\PortHeiden\GIS\MXD\ERS_UR_TO46\16PH_GWM_PlanningReporting\Fig_2_MWs_FPC_Site_066.mxd eggerikt



Water-table well
Deep well
Black Lagoon Outfall

TCE Plume (mg/L)
5 — 500

0 100 200 300
Feet

N

WGS 1984 UTM Zone 4N Imagery: Aerometric 2002

MONITORING WELLS AND 2014 TCE RESULT IN MONITORING WELL DSA-MW-02

PORT HEIDEN, ALASKA

JACOBS	DATE: 09 Sep 2016	PROJECT MANAGER: K. McGovern	FIGURE NO: 3

P:\PortHeiden\GIS\MXD\ERS_UR_TO46\16PH_GWM_PlanningReporting\Fig_3_MWs_RRS_Site_TCE.mxd eggerikt

ATTACHMENT 2

ADEC Laboratory Data Review Checklists, Analytical Data Table, and Laboratory Data Deliverables

(Laboratory Data Deliverables are provided separately on the accompanying CD)

Laboratory Data Review Checklist

Completed by:	Matt Heiser		
Title:	Chemist	**Date:**	8/23/2016
CS Report Name:	2016 Port Heiden TO-46	**Report Date:**	September 2016
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	EMAX Laboratories, Inc.	**Laboratory Report Number:**	16F240
ADEC File Number:	2637.38.002.02	**ADEC RecKey Number:**	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 received and analyzed by EMAX Laboratories, Inc. of Torrance, CA.

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 sample temperatures were:

Cooler: 2016PH001: 2.8 °C

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

☑ 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:

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:

Data quality and usability were not affected.

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

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 samples were submitted with this SDG.

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:

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

One duplicate were submitted and 1 primary samples with this SDG.

ii. Submitted blind to lab?

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

Sample/field duplicate ID: 16PH-066-MW-05/16PH-066-MW-059.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

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

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

Comments:

The data quality and usability not affected.

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

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

A decontamination/equipment blank was not submitted with this SDG.

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:

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

iii. If above PQL, what samples are affected?

Comments:

NA

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

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

All results below LOD.

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

Comments:

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

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:

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

One duplicate were submitted and 1 primary samples with this SDG.

ii. Submitted blind to lab?

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

Sample/field duplicate ID: 16PH-066-MW-05/16PH-066-MW-059.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

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

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

Comments:

The data quality and usability not affected.

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

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

A decontamination/equipment blank was not submitted with this SDG.

Laboratory Data Review Checklist

Completed by:	Matt Heiser		
Title:	Chemist	**Date:**	8/23/2016
CS Report Name:	2016 Port Heiden TO-46	**Report Date:**	September 2016
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	EMAX Laboratories, Inc.	**Laboratory Report Number:**	16F240
ADEC File Number:	2637.38.002.02	**ADEC RecKey Number:**	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 received and analyzed by EMAX Laboratories, Inc. of Torrance, CA.

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 sample temperatures were:

Cooler: 2016PH001: 2.8 °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

No discrepancies were noted.

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

Comments:

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

No discrepancies were noted.

c. Were all corrective actions documented?

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

There were no corrective actions documented.

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

Comments:

According to the case narrative, 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 soil samples were submitted with this SDG.

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

No discrepancies were noted.

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

Comments:

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

No discrepancies were noted.

c. Were all corrective actions documented?

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

There were no corrective actions documented.

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

Comments:

According to the case narrative, 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 soil samples were submitted with this SDG.

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:

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

iii. If above PQL, what samples are affected?

Comments:

NA

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

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

All results below LOD.

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

Comments:

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

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:

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:

Data quality and usability were not affected.

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

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 samples were submitted with this SDG.

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:

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

One duplicate were submitted and 1 primary samples with this SDG.

ii. Submitted blind to lab?

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

Sample/field duplicate ID: 16PH-DSA-MW-02/16PH-DSA-MW-029.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

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

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

Comments:

The data quality and usability not affected.

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

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

A decontamination/equipment blank was not submitted with this SDG.

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:

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

Data qualifiers are defined in the Data Quality Assessment appendix of this report.

2016 Groundwater Sample Results - Port Heiden

			Location ID	066-MW-05	066-MW-05	DSA-MW-02	DSA-MW-02
			Sample ID	16PH-066-MW-05	16PH-066-MW-059	16PH-DSA-MW-02	16PH-DSA-MW-029
			Lab Sample ID	F240-01	F240-02	F249-01	F249-02
			SDG	16F240	16F240	16F249	16F249
			Sample Date	6/25/2016	6/25/2016	6/26/2016	6/26/2016
			Matrix	W	W	W	W
			Laboratory	EMXT	EMXT	EMXT	EMXT
			QA/QC	Primary	Duplicate	Primary	Duplicate
Method	Analyte	ADEC Cleanup Level[1]	Units				
8270SIM	1,4-Dioxane	0.077	mg/L	–	–	ND [0.00035]	ND [0.00036]
AK102	DRO	1.5	mg/L	**3.1 [0.1]**	**3.1 [0.1]**	–	–

Notes:

[1] 18 AAC 75 Table C, Groundwater cleanup level (ADEC 2016).

[ ] = limit of detection

Bold = The result exceeds the ADEC Action Level.

EMXT = EMAX Laboratories, Inc. of Torrance, CA

ND= non-detect

mg/L=milligram per liter

QA/QC=quality assurance/quality control

SDG=Sample Delivery Group

ATTACHMENT 3
Field Documentation

Groundwater Sampling Data Sheet

JACOBS

Site Name	Site ID	Well ID	Project Number
Sept 2014 Port Heiden GW Sampling	FPC-066	066-MW05	05F45601
Weather Conditions	**Type of Well**	**Date**	**Sampler Initials**
P/C, 55°F, 5-10mph mnd	(Monitoring Well) Groundwater Monitoring Probe	9/6/2014	DM

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	2.4	(PVC) SS	1 / 0.041 (1.5 / 0.092) 2 / 0.163 4 / 0.653
Depth to GW (ft btoc)	**Total Depth of Casing (ft btoc)**	**Depth to Product (ft)**	**Product Thickness (ft) and Volume Recovered (mL)**
8.15	15.00	NO PRODUCT	N/A

Max purge volume (3 well casing volumes) = [previous† total depth of casing (ft) – depth to water (ft)] * gallons per linear foot of casing * 3

SHOW WORK Max Purge Volume = (15.00† ft – 8.15 ft) * 0.092 gal/ft * 3 = 1.89 gal * 3.785 L/gal = 7.16 L

Well Purging Information

Start Time	Finish Time	Depth of Tubing (ft btoc)	Equipment Used for Purging
1039	1106	~ 9.5	Bailer (Peristaltic Pump) Submersible Pump

Color	Odor	Sheen	Purged Dry	Meter Used During Purging
(Clear) Cloudy Brown Other:	None Moderate (Faint) Strong	Yes (No)	Yes (No)	(YSI Multi Meter) Horiba Water Quality Meter

Purging reached: Stability (Max Vol.) Purge water was: (Treated) Stored Other Note:

Time (HH:mm)	Volume (Gallons or Liters) Change	Volume (Gallons or Liters) Total	Acceptable Range to Demonstrate Stability: ±0.2 °C Temperature (°C)	±3% Conductivity (µS/cm)	±10% or 0.2 mg/L (whichever is greater) DO (mg/L)	±0.1 pH (std units)	±10 mV ORP (mV)	<10 NTU and ±1 NTU Turbidity (NTU)	Drawdown < 0.3 ft Water Level (feet btoc)
1043	1.5	1.5	6.27	112	4.51	6.39	-66.0	17.3	8.25 -.1
1048	1.0	2.5	6.19	111	1.05	6.28	-61.5	9.68	8.31 -.1
1053	1.2	3.7	6.09	110 ✓	0.66	6.34	-67.0	7.18	8.35 -.2
1058	1.1	4.8	6.05	109 ✓	0.44	6.41	-92.7	4.57	8.37 -.2
1102	1.1	5.9	5.96	109 ✓	0.29	6.53	-109.2	3.26	8.36 -.2
1106	1.6	7.5	5.96	109 ✓	0.27 ✓	6.59	-117.5	2.40	8.37 -.2
		MAX							

Sample Collection Information

Start Time	Finish Time / Date	Depth of Tubing (ft btoc)	Equipment Used for Sampling
1108	1127	~ 9.5	(Peristaltic Pump) Submersible Pump

SAMPLE ID: 14PH-066-MW-05 QC: (Dup) (MS/MSD) None Duplicate ID: 14PH-066-MW-059

Container/Preservative	Analysis Requested	Notes
8 x 1-L Ambers (HCl, stored at 4°C ± 2°C)	DRO by AK102	MS/MSD

"——" = not measured "✓" = stable "+" = rising "-" = falling "*" = all parameters stable ____ Additional observations on back

Groundwater Sampling Data Sheet

JACOBS

Site Name	Site ID	Well ID	Project Number
Sept 2014 Port Heiden GW Sampling	Drum Storage Area	DSA-MW02	05F45601
Weather Conditions	**Type of Well**	**Date**	**Sampler Initials**
OVERCAST, 50s, 10-20 mph WIND	(Monitoring Well) Groundwater Monitoring Probe	9/8/2014	DM

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor		(PVC) SS	1 / 0.041 1.5 / 0.092 (2 / 0.163) 4 / 0.653
Depth to GW (ft btoc)	**Total Depth of Casing (ft btoc)**	**Depth to Product (ft)**	**Product Thickness (ft) and Volume Recovered (mL)**
63.33	68.34	NO PRODUCT	N/A

Max purge volume (3 well casing volumes) = [previous† total depth of casing (ft) – depth to water (ft)] * gallons per linear foot of casing * 3

SHOW WORK Max Purge Volume = (68.34† ft – 63.33 ft) * 0.163 gal/ft * 3 = 2.45 gal * 3.785 L/gal = 9.27 L

Well Purging Information

Start Time	Finish Time	Depth of Tubing (ft btoc)		Equipment Used for Purging
1352	1485	~65 TO 67		Bailer Peristaltic Pump (Submersible Pump)
Color	**Odor**	**Sheen**	**Purged Dry**	**Meter Used During Purging**
Clear Cloudy (Brown) Other:	(None) Moderate Faint Strong	Yes (No)	Yes No	~~YSI Multi Meter~~ Horiba Water Quality Meter

Purging reached: (Stability) Max Vol. Purge water was: Treated (Stored) Other Note:

Time (HH:mm)	Volume (Gallons or Liters)		Acceptable Range to Demonstrate Stability						
			± 0.2 °C	± 3%	± 10% or 0.2 mg/L (whichever is greater)	± 0.1	± 10 mV	<10 NTU and ±1 NTU	Drawdown < 0.3 ft
	Change	Total	Temperature (°C)	Conductivity (µS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turbidity (NTU)	Water Level (feet btoc)
1357	1.5	1.5	6.63	229	10.85	6.45	-35.4	+99.9	64.75
1400	0.8	2.3	6.69	229	10.41	6.44	-36.3	+99.9	64.81
1403	1.0	3.3	6.78	230	9.91	6.47	-38.4	+99.9	65.02
1406	0.8	4.1	6.99	233	9.58	6.49	-40.2	+99.9	65.10
1410	1.0	5.1	7.50	237	9.24	6.52	-44.6	+99.9	65.17
1413	0.5	5.6	7.59	237	8.91	6.57	-48.9	+99.9	65.23
	+0.2	5.8		STABLE	STABLE	STABLE	STABLE		
NOTE: DTW @ END OF SAMPLING = 65.82									

Sample Collection Information

Start Time	Finish Time / Date	Depth of Tubing (ft btoc)	Equipment Used for Sampling
1415	1527	~67	Peristaltic Pump (Submersible Pump)
SAMPLE ID: 14PH-DSA-MW-02		QC: (Dup) MS/MSD None	Duplicate ID: 14PH-DSA-MW-029

Container/Preservative	Analysis Requested	Notes
12 ~~3~~ x 40mL VOA (HCl, stored at 4°C ± 2°C)	GRO by AK101	MS/MSD
12 ~~3~~ x 40mL VOA (HCl, stored at 4°C ± 2°C)	VOCs by SW8260	MS/MSD
8 ~~2~~ x 1-L Ambers (HCl, stored at 4°C ± 2°C)	DRO/RRO by AK101/102	MS/MSD
2 1 x 250 mL Poly (HNO_3 stored at 4°C ± 2°C)	EPA 200.8	
2 1 x 250 mL Poly (unpreserved stored at 4°C ± 2°C)	EPA 300.0 and SM21 2320B	
2 1 x 250 mL Poly (H_2SO_4 stored 4°C ± 2°C)	EPA 353.2	

"____" = not measured "✓"= stable "+" = rising "-" = falling "*" = all parameters stable ____ Additional observations on back

No 550 Environmental—Poly
32281 55011 2
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T046 Sampling #1 2014 / 2016

Port Heiden
T046 Sampling #1
2014/2016

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№ 550

DREW MCCLURE (DM)
JULIA COHEN (JC)
Genevieve Pettit (GP) 2016

AKERS-UR-05F546-H01-0032

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)

Port Heiden Medical Clinic Community Health Aide - Billie Schraffenberger Community Health Aide - Tisha Lind	907-837-2208 907-837-2900 907-837-2240
Kanakanak Hospital: Bristol Bay Area Health Corporation located in Dillingham Toll Free	907-842-5201 800-478-5201
Providence Kodiak Island Medical Center	907-486.3281
Providence Alaska Medical Center (ER)	907-212-3111
Providence LifeMed Air Ambulance (MEDEVAC Service)	800-478- 5433
Alaska Regional (ER)	907-264-1222
U.S. Coast Guard Search & Rescue	800-478-5555
Poison Control Center	800-222-1222
Transport and Evacuation	
Pen Air Cargo Desk, King Salmon	907-246-3372
U.S. Coast Guard Search & Rescue	800-478-5555
Alaska State Troopers, King Salmon Alaska State Troopers, Anchorage Alaska State Troopers, Dillingham	907-246-3307 907-269-5511 907-842-5641
Spills and Toxins	
National Response Center (Oil and Toxic Chemical Spills)	800-424-8802
Poison Control Center	800-222-1222
Volunteer Fire Chief - Andrew Lind Sr.	907-837-2240
Customer/Client	
Pat Roth	907-552-7893
David Jadhon	907-753-2595

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Project Port Heiden TO46
Sampling

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CONTENTS

PAGE	REFERENCE	DATE
	Drew McClure - DM - Jacobs	
	Penny Bullock - PB - Jacobs	

Reference Page Index

CONTENTS

PAGE	REFERENCE	DATE

Location _____ Date _____

Project / Client _____

Location _____ Date _____

Project / Client _____

Location Port Heiden Date 6/25/16

Project / Client 05F45601

2016 Groundwater Sampling

Personnel onsite due to project 05F60060 - Antinq

Sacdos: Drew McClure
Anny Iverson
Genevieve Pettit

level D modified PPE

weather - sunny

daily objective - sample well 060-MW-05

1700 calibrate YSI and PID to complete daily objective of sampling well 060-MW-05

YSI for all parameters

PID

zero gas - 0.0 ppm

100ppm isobutylene read 100.1 ppm

1809 begin purging

1844 begin sampling

1919 end purging

collected samples 16PH-060-MW-05(9)

~~VOA~~ 1L amber for AK102 w/ HCl

see groundwater form

G. Pettit 6/25/16

Location Port Heiden Date 6/26/16

Project / Client 05F45601 - 2016 Port Heiden GW effort

1100 GP Personnel: Drew McClure
Anna Iverson
Genevieve Pettit

weather: overcast
modified level D PPE
daily objective: sample well DSA-MW-02

1100 calibrate PID
zero gas read 0.0
100ppm isobutylene read 100.0ppm
run cofidence check solution on YSI

Temp 18.82°C
condux 6857 x
pH 6.84
ORP 237.6 ✓

calibrate for conductivity

1246 Begin purging well DSA-MW-02

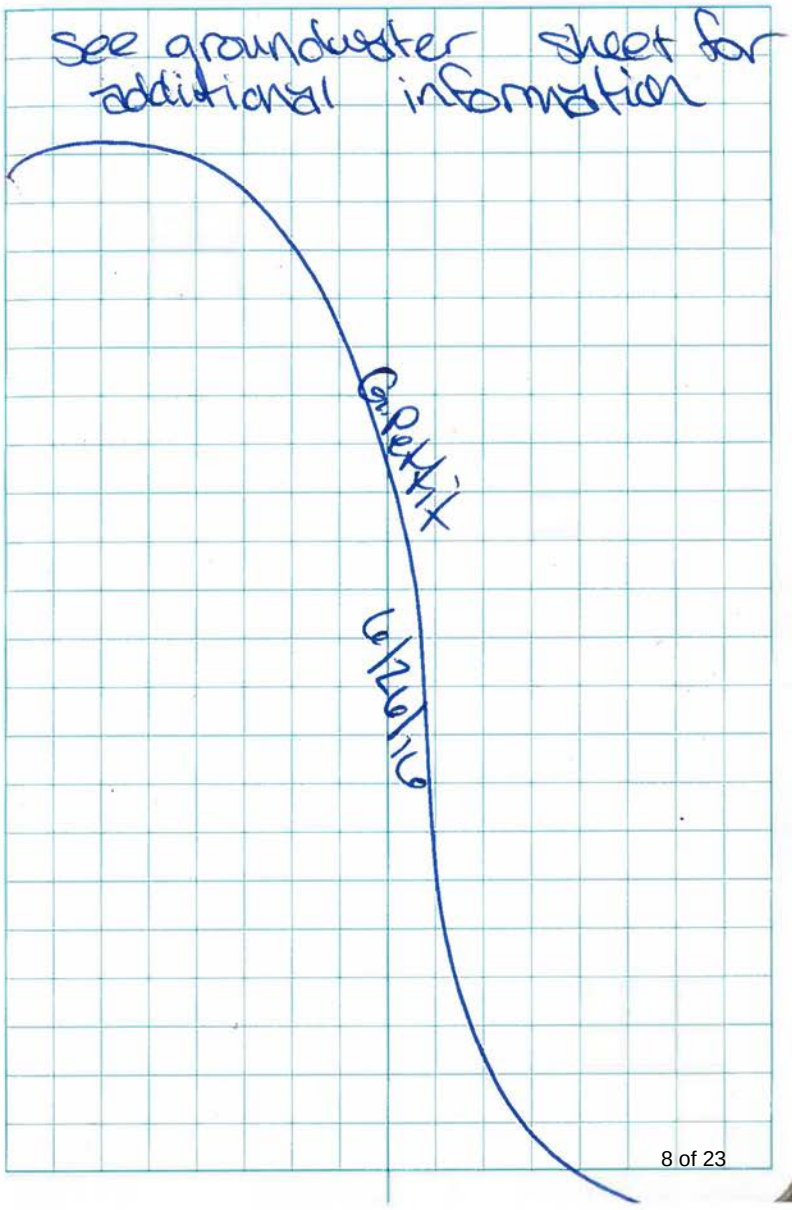
1335 collect sample

1412 end sample

Location Port Heiden Date 6/26/16

Project / Client 05F45601 2016 Port Heiden GW effort

see groundwater sheet for additional information



Location _____ Date _____

Project / Client _____

Location _____ Date _____

Project / Client _____

ATTACHMENT 4

Response to Comments

Alaska Department of Environmental Conservation
Comments on the Draft Tech Memo Groundwater Monitoring for Port Heiden RRS dated September 2016
Commenter: Louis Howard (ADEC), Comments Developed: October 26, 2016

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
1.	3 of the PDF		**Conclusions** The text states: "Sample results from three downgradient monitoring wells (066-MW-04, 066-MW-06, and 066-MW-07) no longer exceed the groundwater cleanup levels indicating that the DRO plume is stable and likely decreasing in concentration overall." ADEC requests clarification on whether the above wells have just reached cleanup levels in the most recent sampling round or have met in for several years of sampling. Please provide additional text on the exact year of when the wells have been below Table C cleanup levels or a table (more preferable) with the wells and specific lab results as in done for Table 1 for each of the wells.	**Agreed.** Table 1 will be revised to include the DRO results from the FPC-066 wells from 2009 through this sampling event. A copy of this table is included with this comment-response form for review.
			The text states: "Based on these results, the USAF recommends that long-term monitoring of Monitoring Well 066-MW-05 be conducted until two consecutive sampling events report DRO concentrations below the ADEC Table C groundwater cleanup level (ADEC 2016). These sampling events should alternate between spring/summer and fall/winter timeframes to account for seasonal fluctuations. The USAF also recommends that the sampling frequency be reduced to once every 5 years to coincide with the 5-Year Review cycle." ADEC disagrees. Instead the groundwater sampling shall be conducted every year until the next five year review (May 2019) with the next sampling event to be conducted in October 2017, June 2018 and October 2019. At that time, the data will be evaluated to see if there is indeed a summer/fall fluctuation and the monitoring can be reduced to every five years or eliminated completely if there are two consecutive sample results below Table C cleanup level for diesel range organics.	**Agreed.** The recommendation will be revised as follows: "Based on these results, the USAF recommends that long-term monitoring of Monitoring Well 066-MW-05 be conducted until two consecutive sampling events report DRO concentrations below the ADEC

Alaska Department of Environmental Conservation
Comments on the Draft Tech Memo Groundwater Monitoring for Port Heiden RRS dated September 2016
Commenter: Louis Howard (ADEC), Comments Developed: October 26, 2016

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
			One year prior to the five-year review, wells 66-MW-04, 66-MW-07, 66-MW-06 shall be sampled (in June 2018) for DRO in addition to 66-MW-05. Please clarify whether or not the wells were ever sample for PAHs (Method 8270 and 8270-SIM), GRO (AK 101), BTEX (Method 8260). If so, include the historical results when reporting sampling from June 2018. If not, then add these analytes and laboratory methods to the draft work plan that will be submitted no later than April 1, 2018 for review, comment and approval. Well 66-MW-06 shall also be sampled for BTEX, GRO, PAHs at this time. Also state in the text when the next five-year review will be conducted: "The next five-year review will be completed by May 2019." Based on the information provided, ADEC concurs with the conclusion that 1,4-dioxane sampling is no longer necessary for the site.	Table C groundwater cleanup level (ADEC 2016). These sampling events will alternate between spring/summer and fall/winter timeframes to account for seasonal fluctuations. Sampling events will be scheduled for October 2017, June 2018, and October 2019 when the next five-year review will occur (May 2019). At that point the data will be evaluated to determine if there is indeed a summer/fall fluctuation and if monitoring can be reduced to every five years or eliminated completely if there are two consecutive sample results below the ADEC Table C cleanup level for DRO. In the year prior to the five-year review (June 2018), Monitoring Wells 066-MW-04, 066-MW-06, and 066-MW-07 will also be sampled for DRO." **Clarification.** During the RI both soil and groundwater samples from the FPC-066 site were analyzed for GRO, DRO, RRO, VOCs, PAHs, and metals. Only DRO exceeded the cleanup level. The current wells were installed during the 2009 Groundwater Investigation and the groundwater and soil samples

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
				were analyzed for GRO, DRO, RRO, and BTEX. Again only DRO was found to exceed cleanup levels. As part of the 2009 Groundwater Investigation Report all stakeholders agreed that DRO is the only contaminant of concern and the analytical suite could be limited to DRO only going forward. **Agreed.** The sentence "The next five-year review will be completed by May 2019." Will be added as suggested.
2.			**General Comment** Please ensure the full laboratory data package, case narrative, chain of custody forms, sample receipt forms are included in every draft technical memorandum which refers to soil or groundwater sampling, laboratory analysis, and sampling results. The final electronic version (e.g. ADOBE PDF and/or MS WORD *.docx) of this memorandum shall include these documents for ADEC's files and be key word searchable and unsecured. ADEC will not require the submittal of a hard copy.	**Understood.** The requested documents will be included with the final report and will be provided with the draft documents going forward.