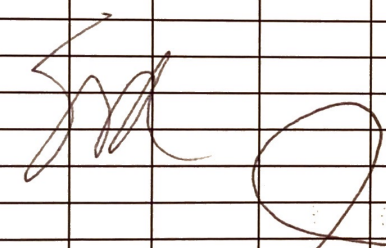


Low-Flow Groundwater Sample & Stabilization Form

Well ID: <u>BLO-MW66</u>	Sample ID: <u>20PH-BLO-MW66</u>	Sample Time: <u>0925</u>
Date: <u>9/19/2020</u>	Dup. Sample ID: <u>—</u>	Dup. Sample Time: <u>—</u>
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0907	START PURGING									
0909	1.8	6.8	0.2	14.63	6.73	225.9	59.2	45.22	0.6	
0912	3.6	6.8	0.2	14.53	6.7	226.0	106.0	45.79	1	
0915	5.4	6.6	0.2	14.32	6.69	223.6	92.4	46.47	1	
0918	7.2	6.7	0.2	13.67	6.72	221.4	104.0	46.71	1	
0925										Three parameters stabilized Sample Collected
										

Sampled?: Yes No

Initial of Sampler: SO

Client/ Site: USACE/ Port Heiden RRS Well No.: BLO-MW01
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/1006/000608
 Date: 09/19/2020 Samplers: S. Arnold, L. Kenyon
 Time Start: 1020
 Time Finish: 1325 Checked By: Christy Kenyon

Well & Purge Information

TD (ft. bTOC):	<u>54.09</u>	ft	DTW (ft. bTOC):	<u>47.05</u>	ft
Water Column:	<u>7.04</u>	ft	TD-DTW=Water Column		
Liter/Foot:	<u>0.605</u>	L/ft	See ***Well Volume Calculation*** table		
Liters in Well:	<u>4.26</u>	L	Water Column x L/ft		
Three Well Volumes:	<u>12.78</u>	L	Liters in Well x 3		
Sample Depth:	<u>49.02</u>	ft	Depth of Pump Intake		

Well Volume Calculation	
Well Diameter	L/ft
<u>2"</u>	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736
 Water Level Meter: I/F Probe 100ft 5/8" Serial No.: 464-1
 Turbidity Meter: 2100P Turbidity meter Serial No.: SN 38573
 Pump Type: S.S. Hurricane Serial No.: 2583

Purge Method:

Peristaltic Pump Inertial Other: Submersible Pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: Submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information MS/MSD? : Yes No

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
<u>DRO</u>	<u>2</u>	<u>HCl</u>	<u>AK102</u>	<u>100ml amber</u>	
<u>VOCs</u>	<u>3</u>	<u>HCl</u>	<u>SW8260C</u>	<u>40ml VOA</u>	
<u>Metals (Fe, Mn)</u>	<u>1</u>	<u>HNO3</u>	<u>SW6010</u>	<u>HDPE 250ml</u>	
<u>NO2, NO3, TKN</u>	<u>1</u>	<u>H2SO4</u>	<u>355.2/351.2</u>	<u>HDPE 250ml</u>	
<u>Sulfate/Alkalinity</u>	<u>1</u>	<u>None</u>	<u>3069/50320B</u>	<u>HDPE 250ml</u>	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: <u>BLO-MW01</u>	Sample ID: <u>ZOPH-BLO-MW01</u>	Sample Time: <u>1310</u>
Date: <u>9/19/2020</u>	Dup. Sample ID: <u>—</u>	Dup. Sample Time: <u>—</u>

Notes: Strong NAPL odor and siven when bailing top of water column. No visible NAPL Layer ~~is~~ in 1 inch bailer thickness no more than 0.01 ft.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
START PURGING										
<u>1239</u> <u>1242</u>	<u>1.5</u>	<u>6.4</u>	<u>1645</u>	<u>2.27</u>	<u>6.73</u>	<u>94.3</u>	<u>27.5</u>	<u>47.5</u>	<u>0.5</u>	<u>Strong hydrocarbon odor & siven</u>
<u>1245</u>	<u>3.0</u>	<u>6.5</u>	<u>1545</u>	<u>2.63</u>	<u>6.71</u>	<u>53.0</u>	<u>18.1</u>	<u>48.4</u>	<u>0.5</u>	<u>48.09 ft "</u>
<u>1248</u>	<u>4.5</u>	<u>6.6</u>	<u>1543</u>	<u>1.51</u>	<u>6.70</u>	<u>40.3</u>	<u>13.8</u>	<u>48.46</u>	<u>0.5</u>	<u>"</u>
<u>1251</u>	<u>6.0</u>	<u>6.7</u>	<u>1545</u>	<u>0.85</u>	<u>6.70</u>	<u>23.3</u>	<u>15.4</u>	<u>48.81</u>	<u>"</u>	<u>"</u>
<u>1254</u>	<u>7.5</u>	<u>7.0</u>	<u>1545</u>	<u>0.74</u>	<u>6.70</u>	<u>9.4</u>	<u>13.7</u>	<u>48.94</u>	<u>"</u>	<u>"</u>
<u>1257</u>	<u>9.0</u>	<u>7.2</u>	<u>1545</u>	<u>0.66</u>	<u>6.70</u>	<u>-8.5</u>	<u>12.0</u>	<u>49.09</u>	<u>"</u>	<u>"</u>
<u>1300</u>	<u>10.5</u>	<u>7.4</u>	<u>1544</u>	<u>0.54</u>	<u>6.70</u>	<u>-14.7</u>	<u>10.6</u>	<u>49.06</u>	<u>"</u>	<u>"</u>
<u>1303</u>	<u>12.0</u>	<u>8.0</u>	<u>1543</u>	<u>0.48</u>	<u>6.70</u>	<u>-19.9</u>	<u>9.40</u>	<u>49.03</u>	<u>"</u>	<u>"</u>
<u>1306</u>	<u>13.5</u>	<u>8.3</u>	<u>1537</u>	<u>0.49</u>	<u>6.70</u>	<u>-26.0</u>	<u>9.60</u>	<u>49.08</u>	<u>"</u>	<u>"</u>
<u>Three well volumes purged.</u>										

Sampled? : Yes No

Initial of Sampler: LK

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RAS Well No.: RRS - MW06
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701 / 0006/0006B
 Date: 9/19/2020 Samplers: L. Kenyon / S. Arnold
 Time Start: 1350
 Time Finish: 1456 Checked By: Aimee Keny

Well & Purge Information

TD (ft. bTOC): 67.19 ft DTW (ft. bTOC): 58.33 ft

Water Column: 8.80 ft TD-DTW=Water Column
 Liter/Foot: 0.605 L/ft See ***Well Volume Calculation*** table
 Liters in Well: 5.36 L Water Column x L/ft
 Three Well Volumes: 16.08 L Liters in Well x 3
 Sample Depth: 59.15 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI Pro Plus Serial No.: 3736
 Water Level Meter: 1/2 Probe - 100ft 5/8" Serial No.: 4164-1
 Turbidity Meter: 2100P Turbidimeter Serial No.: 38573
 Pump Type: S.S. Hurricane Serial No.: 2583

Purge Method:

Peristaltic Pump Inertial Other: Submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: Submersible pump.
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

Parameter	# Containers (fill in for each well)	Preservative	Method	MS/MSD? :	
				Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
DRO	(2) x 100ml	HCl	AL02	amber glass	
VOCs	(3) x 40ml	HCl	SW8260C	VOA vial	
Metals (Fe, Mn)	(1) x 250 ml	HNO ₃	SW601D	HDPE	
NO ₃ , NO ₂ , TRN	(1) x 250 ml	H ₂ SO ₄	353.2 / 351.2	HDPE	
Sulfate / Alkalinity	(1) x 250 ml	None	300.0 / SM330B	HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: RRS-MW06	Sample ID: 20PH-RRS-MW06	Sample Time: 1435
Date: 9/19/2020	Dup. Sample ID: 20PH-OT061-0919	Dup. Sample Time: 1445
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1412	START PURGING									
1415	0.75	7.8	319.2	12.09	7.33	132.3	9.60	58.72	0.25	clear, no odor
1417	1.50	6.5	279.3	12.79	6.52	138.7	12.0	58.86	0.25	
1420	2.25	7.0	276.4	12.79	6.49	139.6	10.0	58.65	"	
1423	3.00	7.7	276.6	10.69	6.48	140.1	7.67	58.60		
1426	3.75	8.3	276.9	10.55	6.52	138.2	5.69	58.55		
1429	4.50	8.0	277.1	11.17	6.51	139.9	4.85	58.69		
1430	<i>These four parameters are stable. Stop purge.</i>									
1435	<i>Sample collection</i>									

Sampled?: Yes No

Initial of Sampler: *SJA*

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RPS Well No.: GLO-MW04
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/00016/00016B
 Date: 9/19/2020 Samplers: L. Kenyon / S. Arnold
 Time Start: 1550
 Time Finish: 1645 Checked By: L. Kenyon

Well & Purge Information

TD (ft. bTOC): 61.25 ft DTW (ft. bTOC): 56.91 ft

Well Volume Calculation	
Well Diameter	L/ft
<u>2"</u>	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Water Column: 4.34 ft TD-DTW=Water Column
 Liter/Foot: 0.605 L/ft See ***Well Volume Calculation*** table
 Liters in Well: 2.63 L Water Column x L/ft
 Three Well Volumes: 7.89 L Liters in Well x 3
 Sample Depth: 59.65 ft Depth of Pump Intake

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736
 Water Level Meter: HF Probe - 1000ft 5/8" Serial No.: 4047 IF-09.010464-1
 Turbidity Meter: 2100P Turbidimeters Serial No.: 38573
 Pump Type: Hurricane Serial No.: 2583

Purge Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes No

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
DRO	<u>(2) x 100mL</u>	<u>HCl</u>	<u>AV102</u>	<u>amber glass</u>	
VOCs	<u>(3) x 40mL</u>	<u>HCl</u>	<u>SW8260C</u>	<u>NDA vial</u>	
Metals (Fe, Mn)	<u>(1) x 250mL</u>	<u>HNO3</u>	<u>SW16010</u>	<u>HDPE</u>	
NO ₂ , NO ₃ , TrN	<u>(1) x 250mL</u>	<u>H2SO4</u>	<u>353.2/351.2</u>	<u>HDPE</u>	
Sulfate/Alkalinity	<u>(1) x 250 mL</u>	<u>NONE</u>	<u>300.0km, 2320B</u>	<u>HDPE</u>	
<i>[Handwritten signature]</i>					

Low-Flow Groundwater Sample & Stabilization Form

Well ID: <u>GLO-MW04</u>	Sample ID: <u>20PH-GLO-MW04</u>	Sample Time: <u>1630</u>
Date: <u>9/19/2020</u>	Dup. Sample ID: <u>—</u>	Dup. Sample Time: <u>—</u>

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
<u>1612</u>	<u>START PURGING</u>									
<u>1615</u>	<u>1.80</u>	<u>6.5</u>	<u>169.0</u>	<u>11.14</u>	<u>6.39</u>	<u>177.4</u>	<u>174</u>	<u>58.98</u>	<u>0.6</u>	<u>Cloudy</u>
<u>1618</u>	<u>3.60</u>	<u>6.1</u>	<u>164.2</u>	<u>11.63</u>	<u>6.34</u>	<u>177.1</u>	<u>40.5</u>	<u>59.07</u>	<u>0.6</u>	<u>clear</u>
<u>1621</u>	<u>5.40</u>	<u>6.9</u>	<u>165.3</u>	<u>11.86</u>	<u>6.34</u>	<u>176.3</u>	<u>24.7</u>	<u>57.06</u>	<u>"</u>	<u>"</u>
<u>1624</u>	<u>7.20</u>	<u>5.8</u>	<u>166.1</u>	<u>12.33</u>	<u>6.38</u>	<u>173.7</u>	<u>12.8</u>	<u>57.03</u>	<u>"</u>	<u>"</u>
<u>Three parameters stabilized.</u>										

John K...
 9/19/20

Sampled? : Yes No

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RRS Well No.: GLU-MW03
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701
 Date: 9/19/2020 Samplers: S. Arnold/L. Kenyon
 Time Start: 1648
 Time Finish: 20151755 Checked By: Chimney Pump

Well & Purge Information

TD (ft. bTOC): 65.25 ft DTW (ft. bTOC): 59.18 ft

Water Column: 6.07 ft TD-DTW=Water Column

Liter/Foot: 0.605 L/ft See ***Well Volume Calculation*** table

Liters in Well: 3.67 L Water Column x L/ft

Three Well Volumes: 11.01 L Liters in Well x 3

Sample Depth: 61.02 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
<u>2"</u>	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736

Water Level Meter: I/F Probe 100 ft 5/8" Serial No.: 464-1

Turbidity Meter: 2100P Turbiditymeter Serial No.: 38573

Pump Type: S.S. Hirschman Serial No.: 2583

Purge Method:

Peristaltic Pump Inertial Other: Submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: Submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information MS/MSD? : Yes No

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
DRO	<u>2</u>	<u>HCl</u>	<u>AK10Z</u>	<u>100ml amber</u>	
VOCs	<u>3</u>	<u>HCl</u>	<u>SW8260C</u>	<u>40ml VOA</u>	
Metal (Fe, Mn)	<u>1</u>	<u>HNO3</u>	<u>SW6010</u>	<u>HDPE 250ml</u>	
NO2, NO3, TKN	<u>1</u>	<u>H2SO4</u>	<u>3532/351.2</u>	<u>HDPE 250ml</u>	
Sulfate/Alkalinity	<u>1</u>	<u>None</u>	<u>300.0/5W0320B</u>	<u>HDPE 250ml</u>	
<u>2583</u>					

Low-Flow Groundwater Sample & Stabilization Form

Well ID: <u>GLO-MW03</u>	Sample ID: <u>20PH-GLO-MW03</u>	Sample Time: <u>1730</u>
Date: <u>9/19/2020</u>	Dup. Sample ID: <u>—</u>	Dup. Sample Time: <u>—</u>

Notes: N/A

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp ± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) * ± 10%	pH * ± 0.1	ORP (mV) * ± 10 mV	Turbidity (NTU) * ± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
<u>1708</u>	<u>START PURGING</u>									
<u>1711</u>	<u>1.2</u>	<u>6.9</u>	<u>277.3</u>	<u>15.79</u>	<u>6.81</u>	<u>187.8</u>	<u>13.4</u>	<u>60.00</u>	<u>0.4</u>	<u>Clear, no odor</u>
<u>1714</u>	<u>2.4</u>	<u>6.4</u>	<u>276.7</u>	<u>15.25</u>	<u>6.63</u>	<u>186.1</u>	<u>12.8</u>	<u>59.91</u>		
<u>1717</u>	<u>3.6</u>	<u>6.6</u>	<u>275.7</u>	<u>16.33</u>	<u>6.65</u>	<u>182.3</u>	<u>16.8</u>	<u>59.99</u>		
<u>1720</u>	<u>4.8</u>	<u>6.9</u>	<u>279.0</u>	<u>15.50</u>	<u>6.65</u>	<u>179.9</u>	<u>21.1</u>	<u>60.33</u>		
<u>1723</u>	<u>6.0</u>	<u>6.7</u>	<u>286.5</u>	<u>14.89</u>	<u>6.65</u>	<u>179.2</u>	<u>17.8</u>	<u>60.52</u>		
<u>1730</u>	<u>Parameters have stabilized</u> <u>Sample Collected</u>									

66

8A

Sampled?: Yes No

Initial of Sampler: SSJ

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden PRS Well No.: 215-MW12
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/0006/0006B
 Date: 9/14/2020 Samplers: L. Kenyon, S. Arnold
 Time Start: 0928
 Time Finish: 1120 Checked By: Jimmy Keny

Well & Purge Information

TD (ft. bTOC): 19.91 ft DTW (ft. bTOC): 14.53 ft

Well Volume Calculation	
Well Diameter	L/ft
<u>2"</u>	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Water Column: 5.39 ft TD-DTW=Water Column
 Liter/Foot: 0.605 L/ft See ***Well Volume Calculation*** table
 Liters in Well: 3.25 L Water Column x L/ft
 Three Well Volumes: 9.75 L Liters in Well x 3
 Sample Depth: 17.50 ft Depth of Pump Intake

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3730
 Water Level Meter: 11F Probe -100ft 9/8 Serial No.: 464-1
 Turbidity Meter: 2100F Turbidimeter Serial No.: SN 38573
 Pump Type: Geopump 2 Serial No.: 6319

Purge Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

Parameter	# Containers (fill in for each well)	Preservative	Method	MS/MSD? :	
				Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Container Type	Note				
DRO	<u>(2) x 100 mL amber glass</u>	<u>HCl</u>	<u>AX102</u>	<u>amber glass</u>	
BTEX	<u>(3) x 40 mL</u>	<u>HCl</u>	<u>SNB260C</u>	<u>VDA vial</u>	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 215-MW12	Sample ID: 20PH-215-MW12	Sample Time: 1030
Date: 9/20/2020	Dup. Sample ID: 20PH-55006-0920	Dup. Sample Time: 1040

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) * ± 10%	pH * ± 0.1	ORP (mV) * ± 10 mV	Turbidity (NTU) * ± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
START PURGING										
0944										
0949		6.7	78.0	13.2	6.79	212.0	28	16.07		No color. No Odor SJA
1003										Switch to 3/8" tubing and restart purge
1008	2.0	7.4	110.9	15.77	6.95	214.1	38	16.73	0.4	No color or odor
1011	3.2	6.8	123.5	15.52	6.96	213.9	41	16.77		
1014	4.4	7.7	128.9	12.92	7.25	212.4	37	16.77		
1017	5.6	8.1	133.5	15.34	7.33	209.1	36	16.77		
1020	6.8	8.3	140.3	14.46	7.44	208.4	37	16.77		
1023	8.0	8.4	137.8	14.04	7.52	206.5	36	16.77		
										↓
										↓
										↓
1030										Multiple Parameters Stabilized Sample Collected (MS/MSD)

SJA

Sampled?: Yes No

Initial of Sampler: SJA

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RAS Well No.: 215-MWD9
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/0006/0006B
 Date: 9/20/2020 Samplers: L. Vernon, S. Arnold
 Time Start: 1141
 Time Finish: 1221 Checked By: Whiskey Kemp

Well & Purge Information

TD (ft. bTOC): 20.81 ft DTW (ft. bTOC): 14.04 ft

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Water Column: 6.77 ft TD-DTW=Water Column
 Liter/Foot: 0.348 (1.5" well) ft See ***Well Volume Calculation*** table
 Liters in Well: 2.36 L Water Column x L/ft
 Three Well Volumes: 7.08 L Liters in Well x 3
 Sample Depth: 16.50 ft Depth of Pump Intake

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736
 Water Level Meter: HF Probe - 100 FE 5/8 Serial No.: 464-1
 Turbidity Meter: 2100P Turb. monitor Serial No.: 38573
 Pump Type: Geo Pump 2 Serial No.: 6319

Purge Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes No

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
DRO	(2) x 100 mL	HCl	AK102	amberglass	
BTEX	(3) x 40 mL	HCl	SW8260C	VOA vial	
<i>[Large handwritten signature]</i>					

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RRS Well No.: 215-MN08
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/0006/0006B
 Date: 9/20/2020 Samplers: L. Kenyon, S. Arnold
 Time Start: 1230
 Time Finish: 1320 Checked By: Christy King

Well & Purge Information

TD (ft. bTOC): 26.22 ft DTW (ft. bTOC): 12.61 ft

Water Column: 7.61 ft TD-DTW=Water Column

Liter/Foot: 0.348 (1.5" well)/ft See ***Well Volume Calculation*** table

Liters in Well: 2.64 L Water Column x L/ft

Three Well Volumes: 7.94 L Liters in Well x 3

Sample Depth: _____ ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736

Water Level Meter: 1/2 Probe - 100 ft 5/8 Serial No.: 464-1

Turbidity Meter: 2100P Turbidimeter Serial No.: 38573

Pump Type: Geopump 2 Serial No.: 6319

Purge Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information MS/MSD? : Yes No

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
<u>DRD</u>	<u>(2) x 100 mL</u>	<u>HCl</u>	<u>AL102</u>	<u>amber glass</u>	
<u>BTEX</u>	<u>(3) x 40 mL</u>	<u>HCl</u>	<u>SW8260C</u>	<u>VOA vial</u>	

Low-Flow Groundwater Sampling & Stabilization Form

Client/ Site: USACE/ Port Heiden RRS Well No.: 0100 215 MW07
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/000610006B
 Date: 9/20/2020 Samplers: L. Venyon, S. Arnold
 Time Start: 1340
 Time Finish: 1428 Checked By: Whitney Kemp

Well & Purge Information

TD (ft. bTOC): 12.88 ft DTW (ft. bTOC): 6.13 ft

Water Column: 6.75 ft TD-DTW=Water Column
 Liter/Foot: 0.348 (1.5" well) L/ft See ***Well Volume Calculation*** table
 Liters in Well: 2.349 L Water Column x L/ft
 Three Well Volumes: 7.05 L Liters in Well x 3
 Sample Depth: 7.00 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736
 Water Level Meter: 11F Probe -100 ft 5/8 Serial No.: 404-1
 Turbidity Meter: 2100P Turbidimeter Serial No.: 38573
 Pump Type: Geopump 2 Serial No.: 6319

Purge Method:
 Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:
 Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information		MS/MSD? :		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
DRO	(2) x 100ml	HCl	AP-107	amber glass	
BTEX	(3) x 40ml	HCl	SW8200C	VOA vial	
<i>[Handwritten signature]</i>					

Client/ Site: USACE/ Port Heiden RRS Well No.: 060-MW04
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701 / 00010006B
 Date: 01 20 2020 Samplers: L. Kenyon, S. Arnold
 Time Start: 1435
 Time Finish: 1525 Checked By: [Signature]

Well & Purge Information

TD (ft. bTOC): 15.01 ft DTW (ft. bTOC): 6.92 ft

Water Column: 8.09 ft TD-DTW=Water Column

Liter/Foot: 0.348 (1.5" well) L/ft See ***Well Volume Calculation*** table

Liters in Well: 2.82 L Water Column x L/ft

Three Well Volumes: 8.46 L Liters in Well x 3

Sample Depth: 9.50 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736

Water Level Meter: 11 Probe - 100 ft 5/8" Serial No.: 464-1

Turbidity Meter: 2100P Turbidimeter Serial No.: 38513

Pump Type: Geopump 2 Serial No.: 6319

Purge Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

Parameter	# Containers (fill in for each well)	Preservative	Method	MS/MSD? :	
				Yes <input type="checkbox"/>	No <input type="checkbox"/>
DRO	(2) x 100mL	HCl	AV102		
BTEX	(3) x 40mL	HCl	SN8210C		

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 766-MW04	Sample ID: 20PH-066-MW04	Sample Time: 1515
Date: 9/20/2020	Dup. Sample ID: —	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1447	START PURGING									
1450	1.5	7.0	191.7	2.31	5.91	184.4	27.3	7.00	0.500	No color, No odor ↓ ↓ ↓ Three well volumes purged. Sample collected
1453	3.0	6.9	205.9	2.12	5.88	184.9	42.8	7.01		
1456	4.5	6.8	227.3	1.82	5.96	181.7	26.0	7.01		
1459	6.0	6.8	239.7	1.65	6.00	179.9	17.0	7.01		
1502	7.5	6.8	241.6	1.49	6.01	179.3	13.7	7.01		
1505	9.0	6.7	242.6	1.42	6.02	178.7	13.5	7.01		
1505										
1515										

Sampled?: Yes No

Initial of Sampler: *JA*

Client/ Site: USACE/ Port Heiden RRS Well No.: Oldo-MNDS
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701/0006/0006B
 Date: 9/21/2020 Samplers: L. Kenyon, S. Arnold
 Time Start: 0930
 Time Finish: 1045 Checked By: Amasey Kenyon

Well & Purge Information

TD (ft. bTOC): 15.31 ft DTW (ft. bTOC): ~8.15* ft
 Water Column: 7.26 ft TD-DTW=Water Column
 Liter/Foot: 0.348 (1.5" Well)/ft See ***Well Volume Calculation*** table
 Liters in Well: 2.53 L Water Column x L/ft
 Three Well Volumes: 7.59 L Liters in Well x 3
 Sample Depth: 11.00 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3736
 Water Level Meter: 11F Probe -100ft 5/8 Serial No.: 464-1
 Turbidity Meter: 2100A Turbiditymeter Serial No.: 876312 38573
 Pump Type: Geopump 2 Serial No.: 6319

Purge Method: Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method: Peristaltic Pump Inertial Other: submersible pump
 Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	MS/MSD? :	
					Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
DRO	(2) x 100ml	HCl	Ax102	amber glass		
BTEX	(3) x 40ml	HCl	SW8260C	VOA Vial		
<i>[Handwritten signature]</i>						
<i>[Large handwritten scribble]</i>						

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 066-MW05 Sample ID: 20PH-066-MW05 Sample Time: 1025
 Date: 9/21/2020 Dup. Sample ID: 20PH-SS006-0921 Dup. Sample Time: 1035

Notes: Iron precipitates discovered on water-level meter. Not able to get accurate depth to water level.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp ± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0957	START PURGING									
1001	1.6	7.7	163.4	14.7	6.37	96.4	29.1	9.74	0.4	No color. No Odor
1004	2.8	7.5	167.4	4.69	6.48	-33.9	24.2	9.76		
1007	4.0	7.4	169.1	3.18	6.54	-71.8	20.1	9.75		
1010	5.2	7.3	169.0	2.48	6.61	-82.7	13.1	9.75		
1013	6.4	7.3	172.0	2.47	6.63	-84.9	11.8	9.75		
1016	7.6	7.3	172.8	2.04	6.68	-73.0	8.90	9.75		
1025										Three well volumes purged. Sample collected

Sampled?: Yes No

Initial of Sampler: SPD

Client/ Site: USACE/ Port Heiden RRS Well No.: 066-MWD6
 Contract No.: W911KB18D0017/W911KB20F0067 EA Project No.: 6333701 / 00061 0006B
 Date: 8/29/2020 ~~9/2/2020~~ 9/2/2020 Samplers: L. Kenyon, S. Arnold
 Time Start: 0810387050 1030
 Time Finish: 1115 Checked By: Hindsey Kenyon

Well & Purge Information

TD (ft. bTOC): 12.28 ft DTW (ft. bTOC): 5.00 ft

Water Column: 7.28 ft TD-DTW=Water Column

Liter/Foot: 0.348 (1.5" well) L/ft See ***Well Volume Calculation*** table

Liters in Well: 2.53 L Water Column x L/ft

Three Well Volumes: 7.60 L Liters in Well x 3

Sample Depth: 7.00 ft Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
2"	0.605
2.5"	0.946
3"	1.4
4"	2.46
6"	5.526

Field Equipment

Multiparameter Water Quality Meter: YSI ProPlus Serial No.: 3734

Water Level Meter: 1/2 Probe - 100 ft 5/8 Serial No.: 464-1

Turbidity Meter: 2100A Turbidity meter Serial No.: 38573

Pump Type: Geo pump 2 Serial No.: 4319

Purge Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

Peristaltic Pump Inertial Other: submersible pump

Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

Parameter	# Containers (fill in for each well)	Preservative	Method	MS/MSD? :	
				Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
DRO	(2) x 100 mL	HCl	AL102	amber glass	
BTEX	(3) x 40 mL	HCl	SWR260C	VOA vial	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: <u>EX06-MW06</u>	Sample ID: <u>20PH-066-MW06</u>	Sample Time: <u>1055</u>
Date: <u>9/21/2020</u>	Dup. Sample ID: <u> </u>	Dup. Sample Time: <u> </u>

Notes: Well was locked w/ a master key lock. Field team had to cut monument cap in order to access the well. Well monument capcover will need to be replaced and locked with a combo lock next year.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) * ± 10%	pH * ± 0.1	ORP (mV) * ± 10 mV	Turbidity (NTU) * ± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
<u>1042</u>	<u>START PURGING</u>									
<u>1045</u>	<u>1.5</u>	<u>6.7</u>	<u>252.6</u>	<u>4.13</u>	<u>6.46</u>	<u>135.3</u>	<u>10.6</u>	<u>5.03</u>	<u>0.5</u>	<u>No odor, clear</u>
<u>1048</u>	<u>3.0</u>	<u>6.7</u>	<u>264.4</u>	<u>3.75</u>	<u>6.44</u>	<u>136.3</u>	<u>9.61</u>	<u>"</u>	<u>0.5</u>	<u>"</u>
<u>1051</u>	<u>4.5</u>	<u>6.7</u>	<u>265.3</u>	<u>3.48</u>	<u>6.44</u>	<u>138.4</u>	<u>5.31</u>	<u>"</u>	<u>0.5</u>	<u>"</u>
<u>Three parameters stabilized</u>										
<div style="font-size: 2em; opacity: 0.5; transform: rotate(-45deg); position: absolute; top: 50%; left: 50%;"> Friday Key 9/21/20 </div>										

Sampled?: Yes No

Initial of Sampler: W/SA

**Appendix C – Data Usability Assessment Report and ADEC
Laboratory Data Review Checklist**

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APPENDIX C

DATA USABILITY ASSESSMENT REPORT

The purpose of this Data Usability Assessment Report is to determine whether the data set collected in 2020 at Sites OT001 and SS006 at Port Heiden Radio Relay Station in Port Heiden, Alaska meets the data quality objectives outlined in the Supplemental Work Plan (United States Army Corps of Engineers [USACE] 2020).

A quality assurance (QA)/quality control (QC) program was implemented during the field investigation to ensure the generation of data of adequate and defensible quality. The specifications for the QA/QC program are outlined in the Supplemental Work Plan (USACE 2020). The QA/QC program was designed to minimize error, provide early identification and correction of potential problems, control the data acquisition process, and evaluate the performance of the sampling program. The QA/QC procedures were followed in the field as well as at the offsite laboratory.

The data evaluation in this report focuses on environmental samples collected for offsite laboratory analysis. Field data (including measurements of water quality parameters in water) were collected using standard operating procedures and manufacturer-recommended procedures to provide reliable results.

A summary of the samples collected in September 2020 is presented in Table C-1. Twenty groundwater samples and five field duplicates, four trip blanks, and three equipment blanks were collected in September 2020.

C.1 TEST METHODS AND LABORATORY QUALIFICATIONS

The groundwater and associated QC samples collected in 2020 were analyzed by Pace Analytical National (Pace) located in Mt. Juliet, Tennessee. The laboratory performed the following analyses:

- Volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) SW-846 Method (SW)8260D.
- Diesel range organics (DRO) by Alaska Method AK102.
- Iron and manganese by SW6010D.
- Nitrate and nitrite as nitrogen (nitrate/nitrite) by EPA 353.2.
- Sulfate by EPA 300.0.
- Alkalinity by Standard Methods (SM)2320B.
- Total Kjeldahl Nitrogen (TKN) by EPA 351.2.

Pace holds current accreditation for the scope of testing listed above through the Department of Defense Environmental Laboratory Accreditation Program as well as the State of Alaska Department of Environmental Conservation Contaminated Site Program.

C.2 FIELD QUALITY CONTROL SAMPLES

In accordance with Supplemental Work Plan (USACE 2020), field QC samples included field duplicates for groundwater, trip blanks for VOCs, and equipment blanks. The required field QC samples and additional volume were collected for preparation of MS/MSD samples. A description and evaluation of each field QC sample type is presented in the following section.

C.2.1 Field Duplicates

A field duplicate set consists of two samples (an original and duplicate) of the same matrix collected at the same time and location, to the extent possible, using the same sampling technique. The purpose is to evaluate the precision of the overall sample collection and analysis process by comparing the results for the two samples, including the calculation of the relative percent difference (RPD) values for detected analytes. For the 2020 sampling event, field duplicate and associated primary sample sets were collected as follows:

- Groundwater sample 20PH-DSA-MW02 and field duplicate sample 20PH-OT001-0917.
- Groundwater sample 20PH-DSA-MW06 and field duplicate sample 20PH-OT001-0918.
- Groundwater sample 20PH-RRS-MW06 and field duplicate sample 20PH-OT001-0919.
- Groundwater sample 20PH-066-MW05 and field duplicate sample 20PH-SS006-0921.
- Groundwater sample 20PH-215-MW12 and field duplicate sample 20PH-SS006-0920.

RPDs for the results of field duplicates and associated primary samples are within QC limits, with the following exceptions:

- The RPDs are outside the QAPP-specified QC limit of 30% for DRO, iron, and tetrachloroethene results for the primary sample 20PH-DSA-MW02 and field duplicate sample 20PH-OT001-0917. These results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.
- The RPD is outside the QAPP-specified QC limit of 30% for iron and manganese for results of primary sample 20PH-RRS-MW06 and field duplicate sample 20PH-OT001-0919. These results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.
- The RPD exceeds the QAPP-specified QC limit of 30% for the results of primary sample 20PH-DSA-MW06 and the associated field duplicate sample 20PH-OT001-0918 for tetrachloroethene. The primary sample and associated field duplicate sample results have been qualified with J, indicating uncertain bias due to the poor precision between the

primary and field duplicate results.

Field duplicate and primary sample results as well as RPDs for detected results are presented in Tables C-2 and C-3.

C.2.2 Trip Blanks

Trip blank results are used to evaluate the potential for sample cross-contamination or introduction of ambient contamination with volatile contaminants during sample handling, transportation, or storage onsite or at the laboratory. Three trip blanks were analyzed with project samples. Trip blank results are less than ½ the LOQ. The trip blank results are summarized in Tables C-4 and C-5.

C.2.3 Equipment Blanks

Equipment blank results are used to evaluate the potential for sample cross-contamination when using reusable sampling equipment. Three equipment blanks were analyzed with project samples for DRO, VOCs, , metals, alkalinity, TKN, and nitrate/nitrite.

Equipment blank results are less than ½ the LOQ, with the following exceptions:

- The results for equipment blank 20PH-EB-0917 for target analytes iron, benzene, ethylbenzene, tetrachloroethene, toluene, total xylenes, and TKN are greater than the QAPP-specified QC limit. Samples associated with this equipment blank include: 20PH-BLO-MW05, 20PH-BLO-MW07, 20PH-DSA-MW02, and 20PH-OT001-0917. Associated sample results less than 10 times that of the equipment blank have been flagged with a B qualifier, indicating high bias due to contamination present in an associated blank.
- The results for equipment blank 20PH-EB-0918 for target analytes benzene, tetrachloroethene, and toluene are greater than the QAPP-specified QC limit. Samples associated with this equipment blank include: 20PH-DSA-MW01, 20PH-DSA-MW05, 20PH-DSA-MW06, 20PH-OT001-0918, 20PH-DSA-MW07, and 20PH-RRS-MW05. Associated sample results less than 10 times that of the equipment blank have been flagged with a B qualifier, indicating high bias due to contamination present in an associated blank.
- The results for equipment blank 20PH-EB-0919 for target analytes iron, benzene, ethylbenzene, tetrachloroethene, toluene, and total xylenes are greater than the QAPP-specified QC limit. Samples associated with this equipment blank include: 20PH-BLO-MW01, 20PH-BLO-MW06, 20PH-GLO-MW03, 20PH-GLO-MW04, 20PH-RRS-MW06, and 20PH-OT001-0919. Associated samples with results less than 10 times that

of the equipment blank have been flagged with a B qualifier indicating high bias due to contamination present in an associated blank.

The equipment blank results are summarized in Table C-6.

C.3 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

The chemical analyses were performed in accordance with the Supplemental Work Plan (USACE 2020) by the selected offsite laboratory identified in Section C.1.

MS/MSD sample pairs were prepared by the analytical laboratory using samples designated on the chain-of-custody records at an appropriate frequency and for each preparatory batch. At the laboratory, known concentrations of target analytes were added to the sample material to prepare the MS/MSD samples. The MS/MSD samples were carried through the preparation and analytical procedures in the same manner as the associated field samples. The percent recoveries and RPDs of the spike analytes in the MS/MSD samples were used to evaluate the effect of the sample matrix on accuracy and precision.

Additional laboratory QC samples (method blanks, laboratory control samples, laboratory replicates, surrogates, internal standards, if applicable) were prepared as required by the analytical methods and analyzed as specified within the Supplemental Work Plan (USACE 2020). These samples were used to perform the internal laboratory QC as described in the 2019 Department of Defense and Department of Energy Quality System Manual, Version 5.3 prior to the delivery of data. The laboratory's evaluation of the QC results includes comparison to the internal statistically-generated control charts as well as the project limits presented in the Supplemental Work Plan (USACE 2020) to allow detections of trends or bias in the generated results.

C.4 DATA VALIDATION

In accordance with the Supplemental Work Plan (USACE 2020), the following items were reviewed during data verification and validation, as applicable to the test method:

- Completeness of the data analysis and deliverables
- Sample management, including chain of custody, temperature and condition at laboratory receipt, holding times, and sample preservation.
- Instrument performance check
- Calibration
- Blank
- Surrogate recovery
- Laboratory control samples (LCSs)
- Field QC samples
- Matrix spike (MS)/matrix spike duplicate (MSD)

- Internal standards
- Target analyte list, identification, and quantitation
- Data qualifiers
- Verification of a subset of the electronic data deliverable.

Associated sample results may be qualified when QC requirements are not achieved to determine the impact to associated sample results. The results of the data review are summarized in the Alaska Department of Environmental Conservation (ADEC) checklists presented in Attachment C-1.

Data were qualified during validation as described below.

- The %Rs for TKN and DRO are below limits for the MS/MSD prepared with project sample 20PH-DSA-MW02 MS/MSDs . The TKN results for primary sample 20PH-DSA-MW02 and associated field duplicate sample 20PH-OT001-0917 have been flagged UJ and qualified as estimated non-detect, due to QC failure. The DRO results for primary sample 20PH-DSA-MW02 and associated field duplicate sample 20PH-OT001-0917 have been flagged with the J qualifier, indicating the result is estimated with a low bias due to QC exceedance.
- The %R for the manganese is below the QAPP-specified QC limit for the MS prepared with project sample 20PH-DSA-MW02. The manganese results for primary sample 20PH-DSA-MW02 and associated field duplicate sample 20PH-OT001-0917 have been flagged with the J qualifier, indicating the result is estimated due to QC exceedance.
- RPDs for DRO for the results of the MS/MSD prepared with the project sample 20PH-DSA-MW02 MS/MSD results are outside QC criteria for DRO. The DRO result for has been flagged with a J qualifier indicating estimated value due to QC exceedance.
- The RPDs between the primary sample 20PH-DSA-MW02 results and associated field duplicate sample 20PH-OT001-0917 results for the DRO, iron, and tetrachloroethene are outside the QAPP-specified QC limit of 30%. The primary sample results and associated field duplicate sample results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.
- The RPDs between the primary sample 20PH-RRS-MW06 and field duplicate sample 20PH-OT001-0919 results are outside the QAPP-specified QC limit of 30% for iron and manganese. The primary sample results and associated field duplicate sample results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.
- The %R is below the QAPP-specified QC limit for the MSD prepared with project sample 20PH-BLO-MW01 for nitrate-nitrite. The nitrate-nitrite result is non-detect and has been flagged with the UJ qualifier, indicating the result is estimated as non-detect due

to QC exceedance.

- The %Rs for surrogate o-terphenyl is below project-specified QC limits in project sample 20PH-BLO-MW06. The DRO result is non-detect and qualified as estimated non-detect with the UJ flag due to QC exceedance.
- The %R is below the QAPP-specified QC limit for the MS prepared with project sample 20PH-OT001-0918 for nitrate-nitrite. The nitrate-nitrite sample result is non-detect for sample 20PH-OT001-0918 and has been flagged with the UJ qualifier, indicating the result is estimated as non-detect due to QC exceedance.
- The RPD exceeds the QAPP-specified QC limit of 30% for the results of primary sample 20PH-DSA-MW06 and the associated field duplicate sample 20PH-OT001-0918 for tetrachloroethene. The primary sample and associated field duplicate sample results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.

No other qualifiers were added to the analytical results for project samples during validation. The qualifier added to project data during data validation is summarized below.

- The B qualifier indicates that the associated analytical results are considered a high biased estimated value due to contamination present in an associated blank.
- The J qualifier indicates that the associated analytical results are estimated.
- The UJ qualifier indicates that the analyte results are non-detect and the quantitation limit is estimated due to QC failure.

Sample results as qualified are presented in Tables C-2 and C-3.

C.5 DATA QUALITY INDICATORS

A discussion of data quality indicators for this project in terms of precision, accuracy, representativeness, completeness, comparability, and sensitivity is provided in the following sections.

C.5.1 Precision

Precision is defined as the degree of agreement among repeated measurement of the same parameter. Precision also characterizes the natural variation of the matrix. Precision is evaluated through the use of field duplicate samples to assess the potential bias of field and laboratory conditions on the results, and also through the use of MS pairs or sample duplicates to assess the laboratory's precision. The quantitative indicator of precision is the RPD between the results of field duplicates and the associated original samples, the laboratory MS/MSD pairs, or laboratory replicates and original samples.

Field sample duplicate RPDs are within the Supplemental Work Plan (USACE 2020) QC limits, unless otherwise noted in Section C.2.1. Field duplicate samples were in control overall and show that the field activities adequately collected representative samples and that the laboratories were capable of evaluating the matrix consistently.

C.5.2 Accuracy

An evaluation of accuracy monitors the agreement of measured results with “true values” established by spiking applicable samples with a known quantity of analyte or surrogate; accuracy is measured by the %R for spiked samples (LCS, MS/MSD, and surrogates). LCS and MS/MSD samples were collected in accordance with the Supplemental Work Plan (USACE 2020) specifications. LCS, MS/MSD, and surrogate %Rs are within acceptable project-specified QC limits, unless otherwise noted in Attachment C-1 and in Section C.4. The project goal for accuracy was met.

C.5.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population, parameter, or environmental condition.

Representativeness is most concerned with the proper design of a sampling system and careful selection of sampling locations. Representative data were obtained through selection of sampling locations, sampling procedure, and analytical methods to meet the data quality objectives of the project. Proper collection and handling of samples and the use of established field and laboratory procedures as described in the Supplemental Work Plan (USACE 2020) were followed during the 2020 sampling event.

C.5.4 Completeness

Completeness is a measure of the amount of usable data obtained versus the total possible planned data. The evaluation includes a comparison of the number of valid results divided by the possible number of individual results, expressed in a percentage.

The data completeness is defined as the percentage of usable data (usable data divided by the total possible data):

$$\% \text{ completeness} = \frac{100 * \text{number of valid results (i.e., non-R flagged)}}{\text{number of results}}$$

Completeness for the project data set is calculated at 100%. The project goal of 95% for completeness was met.

C.5.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one dataset can be compared with another. Sample results should be comparable with other measurements for similar samples and sample conditions. Comparability for the project was achieved by using standard protocols for sampling and analysis.

C.5.6 Sensitivity

Sensitivity was evaluated by comparing the project action limits (PALs) with the limit of detection (LOD) for each 2020 sample result. As presented in the Supplemental Work Plan, LODs are below the PALs; therefore, the project goal for sensitivity was met.

The 2020 sample results were compared to current cleanup levels established in 18 Alaska Administrative Code (AAC) (updated in November 2020). LODs for nondetectable project sample results are below the current ADEC cleanup levels.

C.6 OVERALL ASSESSMENT OF DATA

During data validation, results were deemed usable as qualified. No results have been rejected. A complete summary of validated results of the 2020 environmental samples is provided in Tables C-2 and C-3. The analytical data associated with the 2020 field event are acceptable for use as qualified.

TABLE C-1. Sample Summary

Data Gap	Area No.	LocationID	Field SampleID	Lab SampleID	CollectedDate	Analytical Method	Matri x ID	Container Type/ Volume	NPDL Number	QC Type	MS/MSD	Primary Sample ID	Lab Name	LabReporting Batch	Field Preservation	Cooler ID	Samplers Initials	Turnaround Time
	OT001	GLO-MW04	20PH-GLO-MW04	L1265991-04	9/19/2020 16:30	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	GLO-MW04	20PH-GLO-MW04	L1265991-04	9/19/2020 16:30	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	GLO-MW04	20PH-GLO-MW04	L1265991-04	9/19/2020 16:30	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
	OT001	GLO-MW04	20PH-GLO-MW04	L1265991-04	9/19/2020 16:30	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C, HNO ₃	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
	OT001	GLO-MW03	20PH-GLO-MW03	L1265991-05	9/19/2020 17:30	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	AK102 (DRO)	W	2x 100mL amber glass jar	20-111	EB	No	--	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	SW8260C (VOCs)	W	3x 40mL VOA vial	20-111	EB	No	--	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	SW6010 (Metals)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1265991	<6°C, HNO ₃	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	353.2 (Nitrate/Nitrite)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	351.2 (TKN)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	300.0 (Sulfate)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-EB-0919	L1265991-06	9/19/2020 20:16	SM2320B (Alkalinity)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
--	FIELD QC		20PH-TB-0919	L1265991-07	9/19/2020 8:00	SW8260C (VOCs)	W	3x 40mL VOA vial	20-111	TB	No	--	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C, HCl	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C, HNO ₃	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	351.2 (TKN)	GW	250mL HDPE bottle	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C, H ₂ SO ₄	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
	OT001	RRS-MW06	20PH-OT001-0919	L1265991-08	9/19/2020 14:45	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	FD	No	20PH-RRS-MW06	PACE	L1265991	<6°C	PH-03	SA,LK	10 BD
	SS006	215-MW-12	20PH-215-MW12	L1266002-01	9/20/2020 10:30	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	Yes	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-12	20PH-215-MW12	L1266002-01	9/20/2020 10:30	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	Yes	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-09	20PH-215-MW09	L1266002-02	9/20/2020 12:15	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-09	20PH-215-MW09	L1266002-02	9/20/2020 12:15	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-08	20PH-215-MW08	L1266002-03	9/20/2020 13:05	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-08	20PH-215-MW08	L1266002-03	9/20/2020 13:05	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-07	20PH-066-MW07	L1266002-04	9/20/2020 14:20	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-07	20PH-066-MW07	L1266002-04	9/20/2020 14:20	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-04	20PH-066-MW04	L1266002-05	9/20/2020 15:15	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-04	20PH-066-MW04	L1266002-05	9/20/2020 15:15	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-05	20PH-066-MW05	L1266002-06	9/21/2020 10:25	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-05	20PH-066-MW05	L1266002-06	9/21/2020 10:25	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-06	20PH-066-MW06	L1266002-07	9/21/2020 10:55	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-06	20PH-066-MW06	L1266002-07	9/21/2020 10:55	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-12	20PH-SS006-0920	L1266002-08	9/20/2020 10:40	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	FD	No	20PH-215-MW12	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	215-MW-12	20PH-SS006-0920	L1266002-08	9/20/2020 10:40	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	FD	No	20PH-215-MW12	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-05	20PH-SS006-0921	L1266002-09	9/21/2020 10:35	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	FD	No	20PH-066-MW05	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	066-MW-05	20PH-SS006-0921	L1266002-09	9/21/2020 10:35	SW8260D (BTEX)	GW	3x 40mL VOA vial	20-111	FD	No	20PH-066-MW05	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	SS006	FIELD QC	20PH-TB-0920	L1266002-10	9/20/2020 8:00	SW8260D (BTEX)	W	3x 40mL VOA vial	20-111	TB	No	--	PACE	L1266002	<6°C, HCl	PH-04	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-07	20PH-DSA-MW07	L1266010-01	9/18/2020 10:25	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-DSA-MW06	L1266010-02	9/18/2020 11:30	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD

TABLE C-1. Sample Summary

Data Gap	Area No.	LocationID	Field SampleID	Lab SampleID	CollectedDate	Analytical Method	Matri x ID	Container Type/ Volume	NPDL Number	QC Type	MS/MSD	Primary Sample ID	Lab Name	LabReporting Batch	Field Preservation	Cooler ID	Samplers Initials	Turnaround Time
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	RRS-MW-05	20PH-RRS-MW05	L1266010-03	9/18/2020 13:30	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-05	20PH-DSA-MW05	L1266010-04	9/18/2020 15:40	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	N	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	351.2 (TKN)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-01	20PH-DSA-MW01	L1266010-05	9/18/2020 14:35	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	N	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	AK102 (DRO)	W	2x 100mL amber glass jar	20-111	EB	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	SW8260C (VOCs)	W	3x 40mL VOA vial	20-111	EB	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	SW6010 (Metals)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	353.2 (Nitrate/Nitrite)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	351.2 (TKN)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	300.0 (Sulfate)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-EB-0918	L1266010-06	9/18/2020 18:22	SM2320B (Alkalinity)	W	250mL HDPE bottle	20-111	EB	No	--	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	--	FIELD QC	20PH-TB-0918	L1266010-07	9/18/2020 8:00	SW8260C (VOCs)	W	3x 40mL VOA vial	20-111	TB	No	--	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	AK102 (DRO)	GW	2x 100mL amber glass jar	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	SW8260C (VOCs)	GW	3x 40mL VOA vial	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C, HCl	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	SW6010 (Metals)	GW	250mL HDPE bottle	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C, HNO ₃	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	353.2 (Nitrate/Nitrite)	GW	250mL HDPE bottle	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	351.2 (TKN)	GW	250mL HDPE bottle	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C, H ₂ SO ₄	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	300.0 (Sulfate)	GW	250mL HDPE bottle	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD
	OT001	DSA-MW-06	20PH-OT001-0918	L1266010-08	9/18/2020 11:40	SM2320B (Alkalinity)	GW	250mL HDPE bottle	20-111	FD	No	20PH-DSA-MW06	PACE	L1266010	<6°C	PH-02	SA,LK	10 BD

Notes:

° C = degrees Celsius
 BD = business days
 BTEX = volatile organic compounds (benzene, toluene, ethylbenzene, and xylenes)
 DRO = diesel range organics
 EB = equipment blank
 FD = field duplicate
 ft bgs = feet below ground surface
 GRO = gasoline range organics
 GW = groundwater

H₂SO₄ = sulfuric acid
 HCl = hydrochloric acid
 HNO₃ = nitric acid
 ID = identification
 mL = milliliter
 MS/MSD = matrix spike/matrix spike duplicate
 N = normal
 NPDL = North Pacific Division Laboratory
 oz = ounce

PCBs = polychlorinated biphenyls
 QC = quality control
 SE = sediment
 SW = surface water
 TB = trip blank
 TKN = total kjeldahl nitrogen
 VOCs = volatile organic compounds
 W = water

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Table C-2. Summary of Analytical Results for OT001 and WP002 Groundwater Samples

					Field Sample ID	20PH-BLO-MW01	20PH-BLO-MW05	20PH-BLO-MW06	20PH-BLO-MW07	20PH-DSA-MW01	20PH-DSA-MW02	20PH-OT001-0917	20PH-DSA-MW05							
					Location ID	BLO-MW01	BLO-MW05	BLO-MW06	BLO-MW07	DSA-MW01	DSA-MW02	DSA-MW02	DSA-MW05							
					Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Field duplicate of 20PH-DSA-MW02	Primary							
					Laboratory Sample Delivery Group	L1265991	L1264837	L1265991	L1264837	L1266010	L1264837	L1264837	L1266010							
					Laboratory Sample ID	L1265991-02	L1264837-03	L1265991-01	L1264837-02	L1266010-05	L1264837-01	L1264837-06	L1266010-04							
					Sample Collection Date	19-Sep-2020	17-Sep-2020	19-Sep-2020	17-Sep-2020	18-Sep-2020	17-Sep-2020	17-Sep-2020	18-Sep-2020							
Analyte	Analytical Method	CASRN	Units	ADEC Human Health Cleanup Levels ¹	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q			
Petroleum Hydrocarbons																				
Diesel Range Organics (C ₁₀ -C ₂₅)	AK102	NS	µg/L	1,500	15,000 [2,100]		ND [420]		ND [400]	UJ	ND [444]		ND [420]		402 [444]	J	245 [420]	J	78%	ND [420]
Volatile Organic Compounds																				
Benzene	SW8260D	71-43-2	µg/L	4.6	1.06 [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		NA	ND [0.0200]
1,2-Dichloroethene (cis)	SW8260D	156-59-2	µg/L	36	6.30 [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		NA	ND [0.0500]
1,2-Dichloroethene (trans)	SW8260D	156-60-5	µg/L	360	ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		NA	ND [0.100]
Ethylbenzene	SW8260D	100-41-4	µg/L	15	6.60 [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		NA	ND [0.0500]
Tetrachloroethene (PCE)	SW8260D	127-18-4	µg/L	41	0.254 [0.0500]	B	ND [0.0500]		ND [0.0500]		0.292 [0.0500]	B	ND [0.0500]		157 [0.0500]	J	224 [0.500]	J	35%	ND [0.0500]
Toluene	SW8260D	108-88-3	µg/L	1,100	0.129 [0.100]	J	ND [0.100]		0.0580 [0.100]	J,B	ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		NA	ND [0.100]
Trichloroethene (TCE)	SW8260D	79-01-6	µg/L	2.8	4.17 [0.0200]		0.0320 [0.0200]	J	ND [0.0200]		0.771 [0.0200]		7.14 [0.0200]		437 [0.0200]		440 [0.200]		0.68%	1.90 [0.0200]
Vinyl chloride	SW8260D	75-01-4	µg/L	0.19	ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		NA	ND [0.0500]
Xylenes (total)	SW8260D	1330-20-7	µg/L	190	3.42 [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		NA	ND [0.130]
Total Metals																				
Iron	SW6010D	7439-89-6	µg/L	NS	7,160 [50.0]		15,000 [50.0]		11,600 [50.0]		54,700 [50.0]		175 [50.0]		88,700 [50.0]	J	57,700 [50.0]	J	42%	1,250 [50.0]
Manganese	SW6010D	7439-96-5	µg/L	430	11,900 [5.00]		257 [5.00]		224 [5.00]		1,030 [5.00]		6.88 [5.00]	J	1,340 [5.00]	J	1,020 [5.00]	J	27%	71.3 [5.00]
General Chemistry																				
Alkalinity	SM2320B	NS	µg/L	NS	902,000 [10,000]		59,700 [10,000]		45,300 [10,000]		42,900 [10,000]		87,900 [10,000]		119,000 [10,000]		119,000 [10,000]		0.0%	63,400 [10,000]
Sulfate	E300.0	14808-79-8	µg/L	NS	801 [2,500]	J	2,020 [2,500]	J	4,940 [2,500]	J	2,370 [2,500]	J	6,270 [2,500]		8,120 [2,500]		8,500 [2,500]		4.6%	10,700 [2,500]
Total Kjeldahl Nitrogen	E351.2	NS	µg/L	NS	749 [150]	B	ND [125]		ND [150]		ND [125]		248 [125]	J	ND [150]	UJ	ND [150]	UJ	NA	ND [125]
Nitrate-Nitrite as Nitrogen	E353.2	NS	µg/L	NS	ND [50]	UJ	927 [50.0]		ND [50.0]		ND [50.0]		700 [50.0]		1,870 [50.0]		1,820 [50.0]		2.7%	ND [50.0]

Notes:

Results shown in bold and highlighted blue exceed the cleanup levels.

Results are reported with the limit of detection (LOD) in brackets [].

¹ Alaska Department of Environmental Conservation (ADEC) November 2020 Groundwater Cleanup Levels, Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health.

CASRN = Chemical Abstracts Service Registry No.

NS = not specified

µg/L = microgram(s) per liter

Q = qualifier

ND = nondetectable

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in an associated blank. Results less than 10 times the reported blank concentration are flagged with the B qualifier to indicate potential bias.

J = The analyte was positively identified; the quantitation is estimated.

J- = The analyte was positively identified; the quantitation is estimated bias low.

UJ = The analyte was not detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria.

Table C-2. Summary of Analytical Results for OT001 and WP002 Groundwater Samples

Field Sample ID					20PH-DSA-MW06	20PH-OT001-0918			20PH-DSA-MW07	20PH-GLO-MW03	20PH-GLO-MW04	20PH-RRS-MW05	20PH-RRS-MW06	20PH-OT001-0919							
Location ID					DSA-MW06	DSA-MW06			DSA-MW07	GLO-MW03	GLO-MW04	RRS-MW05	RRS-MW06	RRS-MW06							
Sample Type					Primary	Field duplicate of 20PH-DSA-MW06			Primary	Primary	Primary	Primary	Primary	Field duplicate of RRS-MW06							
Laboratory Sample Delivery Group					L1266010	L1266010			L1266010	L1265991	L1265991	L1266010	L1265991	L1265991							
Laboratory Sample ID					L1266010-02	L1266010-08			L1266010-01	L1265991-05	L1265991-04	L1266010-03	L1265991-03	L1265991-08							
Sample Collection Date					18-Sep-2020	18-Sep-2020			18-Sep-2020	19-Sep-2020	19-Sep-2020	18-Sep-2020	19-Sep-2020	19-Sep-2020							
Analyte	Analytical Method	CASRN	Units	ADEC Human Health Cleanup Levels ¹	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD	
Petroleum Hydrocarbons																					
Diesel Range Organics (C ₁₀ -C ₂₅)	AK102	NS	µg/L	1,500	ND [400]		ND [444]		NA	ND [420]		ND [420]		ND [400]		ND [420]		185 [400]	J	ND [444]	NA
Volatile Organic Compounds																					
Benzene	SW8260D	71-43-2	µg/L	4.6	ND [0.0200]		ND [0.0200]		NA	ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]		ND [0.0200]	NA
1,2-Dichloroethene (cis)	SW8260D	156-59-2	µg/L	36	ND [0.0500]		ND [0.0500]		NA	ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]	NA
1,2-Dichloroethene (trans)	SW8260D	156-60-5	µg/L	360	ND [0.100]		ND [0.100]		NA	ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]	NA
Ethylbenzene	SW8260D	100-41-4	µg/L	15	ND [0.0500]		ND [0.0500]		NA	ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]	NA
Tetrachloroethene (PCE)	SW8260D	127-18-4	µg/L	41	3.90 [0.0500]	J	2.67 [0.0500]	J	37%	ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]	NA
Toluene	SW8260D	108-88-3	µg/L	1,100	ND [0.100]		ND [0.100]		NA	ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		ND [0.100]		0.0690 [0.100]	J,B
Trichloroethene (TCE)	SW8260D	79-01-6	µg/L	2.8	ND [0.0200]		ND [0.0200]		NA	0.0952 [0.0200]		ND [0.0200]		ND [0.0200]		0.110 [0.0200]		ND [0.0200]		ND [0.0200]	NA
Vinyl chloride	SW8260D	75-01-4	µg/L	0.19	ND [0.0500]		ND [0.0500]		NA	ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]		ND [0.0500]	NA
Xylenes (total)	SW8260D	1330-20-7	µg/L	190	ND [0.130]		ND [0.130]		NA	ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]		ND [0.130]	NA
Total Metals																					
Iron	SW6010D	7439-89-6	µg/L	NS	3,850 [50.0]		3,380 [50.0]		13%	1,810 [50.0]		1,910 [50.0]		1,330 [50.0]		1,530 [50.0]		343 [50.0]	J	232 [50.0]	J
Manganese	SW6010D	7439-96-5	µg/L	430	267 [5.00]		343 [5.00]		25%	24.9 [5.00]		43.6 [5.00]		44.5 [5.00]		22.3 [5.00]		8.40 [5.00]	J	5.03 [5.00]	J
General Chemistry																					
Alkalinity	SM2320B	NS	µg/L	NS	58,600 [10,000]		64,200 [10,000]		9.1%	99,700 [10,000]		125,000 [10,000]		55,700 [10,000]		55,000 [10,000]		112,000 [10,000]		111,000 [10,000]	0.90%
Sulfate	E300.0	14808-79-8	µg/L	NS	3,910 [2,500]	J	4,560 [2,500]	J	9.1%	3,010 [2,500]	J	3,220 [2,500]	J	3,460 [2,500]	J	2,650 [2,500]	J	4,080 [2,500]	J	3,920 [2,500]	J
Total Kjeldahl Nitrogen	E351.2	NS	µg/L	NS	176 [125]	J	ND [125]		NA	ND [125]		251 [150]	B	ND [150]		270 [125]		ND [150]		ND [150]	NA
Nitrate-Nitrite as Nitrogen	E353.2	NS	µg/L	NS	ND [50.0]		ND [50.0]	UJ	NA	55.0 [50.0]	J	220 [50.0]		475 [50.0]		ND [50.0]		746 [50.0]		763 [50.0]	2.3%

Notes:

Results shown in bold and highlighted blue exceed the cleanup levels.

Results are reported with the limit of detection (LOD) in brackets [].

¹ Alaska Department of Environmental Conservation (ADEC) November 2020 Groundwater Cleanup Levels, Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health.

CASRN = Chemical Abstracts Service Registry No. NS = not specified
µg/L = microgram(s) per liter Q = qualifier
ND = nondetectable RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in an associated blank. Results less than 10 times the reported blank concentration are flagged with the B qualifier to indicate potential bias.

J = The analyte was positively identified; the quantitation is estimated.

J- = The analyte was positively identified; the quantitation is estimated bias low.

UJ = The analyte was not detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria.

Table C-3. Summary of Analytical Results for SS006 Groundwater Samples

					Field Sample ID	20PH-066-MW04	20PH-066-MW05	20PH-SS006-0921	20PH-066-MW06	20PH-066-MW07	20PH-215-MW08	20PH-215-MW09	20PH-215-MW12	20PH-SS006-0920									
					Location ID	066-MW04	066-MW05	066-MW05	066-MW06	066-MW07	215-MW08	215-MW09	215-MW12	215-MW12									
					Sample Type	Primary	Primary	Field duplicate of 20PH-066-MW05	Primary	Primary	Primary	Primary	Primary	Field duplicate of 20PH-215-MW12									
					Laboratory Sample Delivery Group	L1266002	L1266002	L1266002	L1266002	L1266002	L1266002	L1266002	L1266002	L1266002									
					Laboratory Sample ID	L1266002-05	L1266002-06	L1266002-09	L1266002-07	L1266002-04	L1266002-03	L1266002-02	L1266002-01	L1266002-08									
					Sample Collection Date	20-Sep-2020	21-Sep-2020	21-Sep-2020	21-Sep-2020	20-Sep-2020	20-Sep-2020	20-Sep-2020	20-Sep-2020	21-Sep-2020									
Analyte	Analytical Method	CASRN	Units	ADEC Human Health Cleanup Levels ¹	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD	
					Petroleum Hydrocarbons																		
Diesel Range Organics (C ₁₀ -C ₂₅)	AK102	NS	µg/L	1,500	274 [400]	J	1,600 [400]		1,760 [400]		10%	211 [420]	J	ND [420]		ND [420]		3,960 [444]		ND [420]		475 [420]	NA
Volatile Organic Compounds																							
Benzene	SW8260D	71-43-2	µg/L	4.6	ND [0.500]		ND [0.500]		ND [0.500]		NA	ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]	NA
Ethylbenzene	SW8260D	100-41-4	µg/L	15	ND [0.500]		ND [0.500]		ND [0.500]		NA	ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]	NA
Toluene	SW8260D	108-88-3	µg/L	1,100	ND [0.500]		ND [0.500]		ND [0.500]		NA	ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]		ND [0.500]	NA
Xylenes (total)	SW8260D	1330-20-7	µg/L	190	ND [1.50]		ND [1.50]		ND [1.50]		NA	ND [1.50]		ND [1.50]		ND [1.50]		ND [1.50]		ND [1.50]		ND [1.50]	NA

Notes:

Results shown in bold and highlighted blue exceed the cleanup levels.

Results are reported with the limit of detection (LOD) in brackets [].

¹ Alaska Department of Environmental Conservation (ADEC) November 2020 Groundwater Cleanup Levels, Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health.

CASRN = Chemical Abstracts Service Registry No.

NS = not specified

µg/L = microgram(s) per liter

Q = qualifier

ND = nondetectable

RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

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Table C-4. Summary of Analytical Results for OT001 Trip Blank Sample

Field Sample ID				20PH-TB-0917	20PH-TB-0918	20PH-TB-0919			
Laboratory Sample Delivery Group				L1264837	L1266010	L1265991			
Laboratory Sample ID				L1264837-05	L1266010-07	L1265991-07			
Sample Collection Date				17-Sep-2020	18-Sep-2020	19-Sep-2020			
Analyte	Analytical Method	CASRN	Units	Results	Q	Results	Q	Results	Q
<i>Volatile Organic Compounds</i>									
Benzene	SW8260D	71-43-2	µg/L	ND [0.0200]		ND [0.0200]		ND [0.0200]	
1,2-Dichloroethene (cis)	SW8260D	156-59-2	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
1,2-Dichloroethene (trans)	SW8260D	156-60-5	µg/L	ND [0.100]		ND [0.100]		ND [0.100]	
Ethylbenzene	SW8260D	100-41-4	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
Tetrachloroethene	SW8260D	127-18-4	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
Toluene	SW8260D	108-88-3	µg/L	ND [0.100]		ND [0.100]		ND [0.100]	
Trichloroethene	SW8260D	79-01-6	µg/L	ND [0.0200]		ND [0.0200]		ND [0.0200]	
Vinyl chloride	SW8260D	75-01-4	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
Xylenes (total)	SW8260D	1330-20-7	µg/L	ND [0.130]		ND [0.130]		ND [0.130]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [].

CASRN = Chemical Abstracts Service Registry No.

NS = not specified

µg/L = microgram(s) per liter

Q = qualifier

ND = nondetectable

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Table C-5. Summary of Analytical Results for SS006 Trip Blank Sample

Field Sample ID				20PH-TB-0920	
Laboratory Sample Delivery Group				L1266002	
Laboratory Sample ID				L1266002-10	
Sample Collection Date				20-Sep-2020	
Analyte	Analytical Method	CASRN	Units	Results	Q
<i>Volatile Organic Compounds</i>					
Benzene	SW8260D	71-43-2	µg/L	ND [0.500]	
Ethylbenzene	SW8260D	100-41-4	µg/L	ND [0.500]	
Toluene	SW8260D	108-88-3	µg/L	ND [0.500]	
Xylenes (total)	SW8260D	1330-20-7	µg/L	ND [1.50]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [].

CASRN = Chemical Abstracts Service Registry No.

NS = not specified

µg/L = microgram(s) per liter

Q = qualifier

ND = nondetectable

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Table C-6. Summary of Analytical Results for Equipment Blank Samples

Field Sample ID Laboratory Sample Delivery Group Laboratory Sample ID Sample Collection Date				20PH-EB-0917 L1264837 L1264837-04 17-Sep-2020	20PH-EB-0918 L1266010 L1266010-06 18-Sep-2020	20PH-EB-0919 L1265991 L1265991-06 19-Sep-2020			
Analyte	Analytical Method	CASRN	Units	Results	Q	Results	Q	Results	Q
Petroleum Hydrocarbons									
Diesel Range Organics (C ₁₀ -C ₂₅)	AK102	NS	µg/L	ND [400]		ND [400]		ND [420]	
Volatile Organic Compounds									
Benzene	SW8260D	71-43-2	µg/L	0.0829 [0.0200]		0.0800 [0.0200]		0.0490 [0.0200]	
1,2-Dichloroethene (cis)	SW8260D	156-59-2	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
1,2-Dichloroethene (trans)	SW8260D	156-60-5	µg/L	ND [0.100]		ND [0.100]		ND [0.100]	
Ethylbenzene	SW8260D	100-41-4	µg/L	0.0840 [0.0500] J		0.0350 [0.0500] J		0.0420 [0.0500] J	
Tetrachloroethene	SW8260D	127-18-4	µg/L	0.165 [0.0500]		0.103 [0.0500]		0.0930 [0.0500] J	
Toluene	SW8260D	108-88-3	µg/L	0.523 [0.100]		0.242 [0.100]		0.404 [0.100]	
Trichloroethene	SW8260D	79-01-6	µg/L	ND [0.0200]		ND [0.0200]		ND [0.0200]	
Vinyl chloride	SW8260D	75-01-4	µg/L	ND [0.0500]		ND [0.0500]		ND [0.0500]	
Xylenes (total)	SW8260D	1330-20-7	µg/L	0.358 [0.130]		ND [0.130]		0.185 [0.130] J	
Total Metals									
Iron	SW6010D	7439-89-6	µg/L	201 [50.0]		ND [50.0]		ND [50.0]	
Manganese	SW6010D	7439-96-5	µg/L	ND [5.00]		ND [5.00]		ND [5.00]	
General Chemistry									
Alkalinity	SM2320B	NS	µg/L	ND [10,000]		ND [10,000]		ND [10,000]	
Sulfate	E300.0	14808-79-8	µg/L	ND [2,500]		ND [2,500]		ND [2,500]	
Total Kjeldahl Nitrogen	E351.2	NS	µg/L	211 [150]		ND [125]		353 [150]	
Nitrate-Nitrite as Nitrogen	E353.2	NS	µg/L	ND [50.0]		ND [50.0]		ND [50.0]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [].

CASRN = Chemical Abstracts Service Registry No.

NS = not specified

µg/L = microgram(s) per liter

Q = qualifier

ND = nondetectable

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Laboratory Data Review Checklist

Completed By:

Sean Arnold, EA Engineering, Science, and Technology, Inc., PBC

Title:

Scientist II

Date:

4 January 2021

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

Pace Analytical, in Mt. Juliet, Pennsylvania (Pace)

Laboratory Report Number:

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ADEC File Number:

OT001 2637.38.002.05
SS006 2637.38.002.02

Hazard Identification Number:

OT001 185 and SS006 179

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

Yes No N/A Comments:

Samples were shipped to Pace in Mt Juliet, TN, which is ADEC approved (17-026) and DoD ELAP accredited (certificate number 1461.01) for the scoped methods

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 N/A Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

CoC information was complete.

b. Correct analyses requested?

Yes No N/A Comments:

Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No N/A Comments:

One cooler was received at Pace at a temperature of 1.3 degrees Celsius (°C).

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

Yes No N/A Comments:

Samples were received properly preserved.

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CS Site Name:

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

Yes No N/A Comments:

Samples were received in good condition.

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 N/A Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

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

Yes No N/A Comments:

QC failures identified are discussed further in this checklist.

c. Were all corrective actions documented?

Yes No N/A Comments:

QC issues and corrective actions are discussed further in this checklist.

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

Comments:

Issues identified and their effect on data usability are discussed further in relevant sections of this checklist.

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

5. Samples Results

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

Yes No N/A Comments:

Samples were analyzed for DRO, VOCs, metals, nitrate/nitrite, TKN and sulfate.

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

No soils submitted for analysis in this SDG.

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

Yes No N/A Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes No N/A Comments:

Project limit for method blank results is less than 1/2 LOQs.

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes No N/A Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are 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 N/A Comments:

No LCS duplicates were prepared for DRO AK102 as required by project planning document and methodology. No qualification of associated sample data has been performed because MS/MSD QC samples were prepared in preparatory batch to evaluate precision.

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

Yes No N/A Comments:

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

Yes No N/A Comments:

%Rs are within QC limits for LCS.

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

RPDs are within QC limits for LCS/LCSD.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes No N/A Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

Project sample 20PH-DSA-MW02 was used to prepare MS/MSD samples.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

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Laboratory Report Date:

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CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A Comments:

%Rs are within QC limits for MS/MSD sample results with the following exceptions:

The %Rs for the MS and/or MSD for manganese, TKN, and DRO are below the QAPP-specified QC limit. For project sample 20PH-DSA-MW02 and associated field duplicate sample, the detectable results for manganese and DRO have been flagged with the J qualifier, indicating that the results are estimated and the nondetectable results for TKN are qualified as estimated non-detect with the UJ qualifier.

The %Rs for the MS/MSD for tetrachloroethene, trichloroethene, and iron are outside the QAPP-specified QC limits. The associated sample results do not require additional qualification as the parent sample results are greater than four times the spike concentration.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes No N/A Comments:

RPDs are within QC limits for MS/MSD sample results with the exception of DRO. The DRO MS/MSD RPD exceeded criteria and the DRO results for project sample 20PH-DSA-MW02 and associated field duplicate sample have been flagged with a J qualifier indicating estimated value due to QC failure.

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

Comments:

Sample result exceedances are discussed in Section 6.c.iii and 6.c.iv.

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

Yes No N/A Comments:

Data are qualified as discussed above.

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Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes No N/A Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A Comments:

The %Rs are within the project-specified QC limits for the project samples.

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

Yes No N/A Comments:

No sample data are affected.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes No N/A Comments:

One trip blank identified as 20PH-TB-0917 was analyzed for VOCs.

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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 N/A Comments:

iii. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No project samples affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

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

Yes No N/A Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes No N/A Comments:

The original and field duplicate samples are identified as follows: 20PH-DSA-MW02 and field duplicate sample 20PH-OT001-0917

L1264837

Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Precision – All relative percent differences (RPD) less than specified project objectives?
(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 N/A Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits with the following exceptions:

The RPDs for DRO, iron, and tetrachloroethene results are outside the QAPP-specified QC limit of 30%. These results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.

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

Comments:

Data are usable as qualified.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes No N/A Comments:

One equipment blank (20PH-EB-0917) was collected. Samples associated with the equipment blank include: 20PH-BLO-MW05, 20PH-BLO-MW07, 20PH-DSA-MW02, and 20PH-OT001-0917

i. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

No equipment blank results were reported above the 1/2 LOQs, with the following exceptions: The equipment blank results for iron, benzene, ethylbenzene, tetrachloroethene, toluene, total xylenes, and TKN are greater than the QAPP-specified QC limits. For the associated samples listed above, results within 10-times the blank detections have been flagged with a B qualifier indicating bias high estimated value due to contamination present in associated blank.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Affected sample results are discussed above.

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Laboratory Report Date:

15 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes No N/A

Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold, EA Engineering, Science, and Technology, Inc., PBC

Title:

Scientist II

Date:

4 January 2021

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

Pace Analytical, in Mt. Juliet, Pennsylvania (Pace)

Laboratory Report Number:

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ADEC File Number:

OT001 2637.38.002.05 and
SS006 2637.38.002.02

Hazard Identification Number:

OT001 185 and SS006 179

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

Yes No N/A Comments:

Samples were shipped to Pace in Mt Juliet, TN, which is ADEC approved (17-026) and DoD ELAP accredited (certificate number 1461.01) for the scoped methods

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 N/A Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

CoC information was complete.

b. Correct analyses requested?

Yes No N/A Comments:

Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No N/A Comments:

One cooler was received at Pace at a temperature of 0.2 degrees Celsius (°C).

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

Yes No N/A Comments:

Samples were received properly preserved.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

Samples were received in good condition.

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 N/A Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

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

Yes No N/A Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes No N/A Comments:

QC issues and corrective actions identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

5. Samples Results

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

Yes No N/A Comments:

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

No soils submitted for analysis in this SDG.

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

Yes No N/A Comments:

The LODs are below cleanup levels for nondetectable results.

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes No N/A Comments:

Project limit for method blank results is less than 1/2 LOQs.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes No N/A Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are 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 N/A Comments:

No LCS duplicates were prepared for DRO AK102 as required by project planning document and methodology. No qualification of associated sample data has been performed because MS/MSD QC samples were prepared in preparatory batch.

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

Yes No N/A Comments:

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

Yes No N/A Comments:

%Rs are within QC limits for LCS.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

RPDs are within QC limits for LCS/LCSD.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes No N/A Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

- i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

MS/MSD samples were not prepared with a project samples in preparatory batch WG1552773 for VOCs. The following samples in batches WG1550840 and WG1552773 were analyzed without associated project MS/MSD: 20PH-OT001-0919, 20PH-EB-0919, 20PH-RRS-MW06, 20OH-BLO-MW01, and 20PH-BLO-MW06. No qualification has been performed on the basis of missing MS/MSD in these preparatory batches.

- ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

No MS/MSD set for metals was associated with a project sample submitted in this SDG. Project sample 20PH-BLO-MW06 was used to prepare MS/MSD samples for sulfate. Project sample 20PH-BLO-MW01 was used to prepare MS/MSD samples for nitrate-nitrite.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A Comments:

%Rs are within QC limits for MS/MSD sample results with the following exceptions:
The %R for the MSD prepared for nitrate-nitrite is below the QAPP-specified QC limit. The associated sample result was non-detect for 20PH-BLO-MW01 and has been flagged with the UJ qualifier, indicating the result is estimated as non-detect.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes No N/A Comments:

RPDs are within QC limits for MS/MSD sample results.

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

Comments:

Sample result exceedances are discussed in section 6.c.iii.

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

Yes No N/A Comments:

Data are qualified as discussed above.

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes No N/A Comments:

Surrogates were added to the environmental, QC samples, and standards as required.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:
The %R for the surrogate o-terphenyl for DRO is below project-specified QC limits in project sample 20PH-BLO-MW06. The associated sample result is below the LOD and are qualified as estimated non-detect with the UJ flag.

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

Yes No N/A Comments:

Data are qualified as discussed above.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes No N/A Comments:

One trip blank is identified as 20PH-TB-0919.

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 N/A Comments:

iii. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No project samples affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

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

Yes No N/A Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes No N/A Comments:

The original and field duplicate samples are identified as follows:
20PH-RRS-MW06 and field duplicate sample 20PH-OT001-0919

iii. Precision – All relative percent differences (RPD) less than specified project objectives?
(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 N/A Comments:

RPDs for field duplicate and original sample results, above the LOQs, were within QC limits with the following exception: The RPDs for the iron and manganese results are outside the QAPP-specified QC limit of 30%. These results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.

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

Comments:

Data are usable as qualified.

L1265991

Laboratory Report Date:

16 December 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes No N/A Comments:

One equipment blank was analyzed and identified as 20PH-EB-0919. Samples associated with the equipment blank include: 20PH-BLO-MW01, 20PH-BLO-MW06, 20PH-GLO-MW03, 20PH-GLO-MW04, 20PH-RRS-MW06, and 20PH-OT001-0919.

i. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

No equipment blank results were reported above the 1/2 LOQs with the following exception: The equipment blank results for iron, benzene, ethylbenzene, tetrachloroethene, toluene, and total xylene are greater than the QAPP-specified QC limits. Associated samples listed above, with results within 10-times the blank detection have been flagged with a B qualifier indicating bias high estimated value due to contamination present in associated blanks.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Affected sample results are discussed above.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes No N/A Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold, EA Engineering, Science, and Technology, Inc., PBC

Title:

Scientist II

Date:

04 December 2020

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

Pace Analytical, in Mt. Juliet, Pennsylvania (Pace)

Laboratory Report Number:

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ADEC File Number:

OT001 2637.38.002.05
SS006 2637.38.002.02

Hazard Identification Number:

OT001 185 and SS006 179

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

Yes No N/A Comments:

Samples were shipped to Pace in Mt Juliet, TN, which is ADEC approved (17-026) and DoD ELAP accredited (certificate number 1461.01) for the scoped methods

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 N/A Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

CoC information was complete.

b. Correct analyses requested?

Yes No N/A Comments:

Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No N/A Comments:

One cooler was received at Pace at a temperature of 0.1 degrees Celsius (°C).

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

Yes No N/A Comments:

Samples were received properly preserved.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

Samples were received in good condition.

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 N/A Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

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

Yes No N/A Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes No N/A Comments:

QC issues and corrective actions identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

5. Samples Results

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

Yes No N/A Comments:

Samples were analyzed for DRO and BTEX.

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

No soils submitted for analysis in this SDG.

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

Yes No N/A Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes No N/A Comments:

Project limit for method blank results is less than 1/2 LOQs.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes No N/A Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are 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 N/A Comments:

No LCS duplicates were prepared for DRO AK102 as required by project planning document and methodology. No qualification of associated sample data has been performed because MS/MSD QC samples were prepared in preparatory batch.

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

Yes No N/A Comments:

No inorganics or metals are included in this report.

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

Yes No N/A Comments:

%Rs are within QC limits for LCS.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

RPDs are within QC limits for LCS/LCSD.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes No N/A Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

- i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

Project sample 20PH-215-MW12 was used to prepare MS/MSD samples.

- ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

No metals/inorganics analyses were submitted in this SDG.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A Comments:

%Rs are within QC limits for MS/MSD sample results.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes No N/A Comments:

RPDs are within QC limits for MS/MSD sample results.

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

Comments:

No sample results affected.

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

Yes No N/A Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

- d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes No N/A Comments:

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A Comments:

The %Rs are within the project-specified QC limits for the project samples

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

Yes No N/A Comments:

No sample results affected.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes No N/A Comments:

One trip blank is identified as 20PH-TB-0920.

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 N/A Comments:

iii. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No sample results affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

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

Yes No N/A Comments:

Two field duplicate sample was included in this SDG.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ii. Submitted blind to lab?

Yes No N/A Comments:

The original and field duplicate samples are identified as follows:
20PH-215-MW12 and field duplicate sample 20PH-SS006-0920
20PH-066-MW05 and field duplicate sample 20PH-SS006-0921.

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

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

Where R₁ = Sample Concentration
R₂ = Field Duplicate Concentration

Yes No N/A Comments:

RPDs for field duplicate and original sample results above the LOQs are within QC limits.

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

Comments:

Data quality and data usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes No N/A Comments:

No decontamination or equipment blanks required as new sampling equipment was used for each project sample.

i. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

No decontamination or equipment blanks required as new sampling equipment was used for each project sample.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No decontamination or equipment blanks required as new sampling equipment was used for each project sample.

L1266002

Laboratory Report Date:

29 October 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Data quality or usability affected?

Comments:

No decontamination or equipment blanks required as new sampling equipment was used for each project sample.

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

a. Defined and appropriate?

Yes No N/A

Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold, EA Engineering, Science, and Technology, Inc., PBC

Title:

Scientist II

Date:

4 December 2020

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

Pace Analytical, in Mt. Juliet, Pennsylvania (Pace)

Laboratory Report Number:

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ADEC File Number:

OT001 2637.38.002.05
SS006 2637.38.002.02

Hazard Identification Number:

OT001 185 and SS006 179

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

Yes No N/A Comments:

Samples were shipped to Pace in Mt Juliet, TN, which is ADEC approved (17-026) and DoD ELAP accredited (certificate number 1461.01) for the scoped methods

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 N/A Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

CoC information was complete.

b. Correct analyses requested?

Yes No N/A Comments:

Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No N/A Comments:

One cooler was received at Pace at a temperature of 0.2 degrees Celsius (°C).

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

Yes No N/A Comments:

Samples were received properly preserved.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

Samples were received in good condition.

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 N/A Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

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

Yes No N/A Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes No N/A Comments:

QC issues and corrective actions identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

5. Samples Results

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

Yes No N/A Comments:

Samples were analyzed for DRO, VOCs, Metals, Nitrate/Nitrite, TKN and Sulfate.

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

No soils submitted for analysis in this SDG.

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

Yes No N/A Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes No N/A Comments:

Project limit for method blank results is less than 1/2 LOQs.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes No N/A Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are 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 N/A Comments:

No LCS duplicates were prepared for DRO AK102 as required by project planning document and methodology. No qualification of associated sample data has been performed because MS/MSD QC samples were prepared in preparatory batch.

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

Yes No N/A Comments:

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

Yes No N/A Comments:

%Rs are within QC limits for LCS.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

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

Yes No N/A Comments:

Sample duplicates were analyzed with project samples in this SDG.

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

Comments:

No %R results are outside QC limits.

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

Yes No N/A Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

- i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

MS/MSD samples were not prepared with a project samples in preparatory batches for VOCs (WG1550053 and WG1552773) and DRO batch WG1551413. The following samples in batches WG1550053, WG1552773 and WG155141 were analyzed without associated project MS/MSD: 20PH-OT001-0919, 20PH-EB-0919, 20PH-RRS-MW06, 20OH-BLO-MW01, and 20PH-BLO-MW06. No qualification has been performed on the basis of missing MS/MSD in these preparatory batches.

- ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

Project sample 20PH-OT001-0918 was used to prepare an MS sample for nitrate-nitrite. MS/MSD samples were not prepared with a project samples in preparatory metals batch WG1550840.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A Comments:

The %R for the MS prepared for nitrate-nitrite is below the QAPP-specified QC limit. The associated sample result is non-detect for sample 20PH-OT001-0918 and has been flagged with the UJ qualifier, indicating the result is estimated.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes No N/A Comments:

No MSD samples were prepared with project samples submitted in this SDG.

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

Comments:

Sample result exceedances are discussed in section 6.c.iii.

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

Yes No N/A Comments:

Data are qualified as discussed above.

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes No N/A Comments:

Surrogates were added to the environmental, QC samples, and standards as required:
SW8260: Toluene-d8, 4-bromofluorobenzene, and 1,2-dichloroethane-d4;
AK102: o-terphenyl

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A Comments:

The %Rs are determined to be within the project-specified QC limits for the project samples.

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

Yes No N/A Comments:

No sample data are affected.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes No N/A Comments:

One trip blank. analyzed for VOCs, is identified as 20PH-TB-0918.

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 N/A Comments:

iii. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No project samples affected.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

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

Yes No N/A Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes No N/A Comments:

The original and field duplicate samples are identified as follows:
20PH-DSA-MW06 and field duplicate sample 20PH-OT001-0918

iii. Precision – All relative percent differences (RPD) less than specified project objectives?
(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 N/A Comments:

RPDs for field duplicate and original sample results, above the LOQs, were within QC limits with the following exception: The RPD between primary and field duplicate the tetrachloroethene results exceeds the QAPP-specified QC limit of 30%. These results have been qualified with J, indicating uncertain bias due to the poor precision between the primary and field duplicate results.

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

Comments:

Data are usable as qualified.

L1266010

Laboratory Report Date:

06 November 2020

CS Site Name:

Long Term Maintenance – Multiple Bases, Southern Alaska (Port Heiden RRS),
Contract #: W911KB-18-D-0017 TO #: W911KB20F0067

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes No N/A Comments:

One equipment blank was analyzed and identified as 20PH-EB-0918. Samples associated with the equipment blank include: 20PH-DSA-MW01, 20PH-DSA-MW05, 20PH-DSA-MW06, 20PH-OT001-0918, 20PH-DSA-MW07, and 20PH-RRS-MW05.

i. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

No equipment blank results were reported above the 1/2 LOQs with the following exception: The equipment blank results for benzene, tetrachloroethene, and toluene are greater than the QAPP-specified QC limits. Associated samples listed above, with results within 10-times the blank detection have been flagged with a B qualifier indicating bias high estimated value due to contamination present in associated blanks.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No project samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes No N/A Comments:

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**Appendix D – Laboratory Analytical Reports
(provided on CD)**

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Appendix E – Response to ADEC Comments

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THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

Department of Environmental Conservation

Spill Prevention and Response
Contaminated Sites

555 Cordova Street
Anchorage, Alaska 99501
Main: 907-269-7528
Fax: 907-269-7687

File No. 2637.38.002

August 17, 2021

Robert Johnston
AFCEC/CZOP
10471 20th Street, Suite 347
JBER, AK 99506-2201

Re: **DRAFT 2020 Remedial Action Operations, Land Use/Institutional Control Report, Port Heiden Radio Relay Station, Alaska, Sites OT001, WP002, SS006, and LF007; Dated May 2021.**

Dear Mr. Johnston:

The Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program received a copy of the above referenced document on August 16, 2021.

On behalf of ADEC, I have reviewed the draft report in its entirety and have no further comments. I am looking forward to review the final of this report.

If you have any questions regarding this letter; please feel free to contact me at (907) 269-7552 or email me at daniela.fawcett@alaska.gov.

Sincerely,
Daniela Fawcett
Daniela Fawcett
Environmental Program Specialist