# APPENDIX H

Survey Data and Survey Data Report

**SURVEY METHOD FOR ATTU ISLAND ENVIROMENTAL CLEAN UP**

**SURVEY PERFORMED 3 JUNE 2016 THRU 9 JULY 2016**

Horizontal Control:

Existing survey monuments were recovered using National Geodetic Data Sheets. Current survey control was found listed by PIDs Permanent Identifiers, TT6147, TT6151, TT6145 and TT6139.

Using a Lecia TS06 Total Station conventional traverse method was used to traverse between found monuments and enclose the work site limits. Basis of horizontal position was TT6147 using TT6151 as a back site. From TT6147 a horizontal traverse was performed to enclose the site limits. In this process the NGS survey control listed was tied to this survey. (Held TT6151 OPUS Solution as basis of position for project coordinates.)

Vertical Control:

A local elevation was stamped on survey control point TT-6151 with an elevation of 21.81 feet.

Accepting the elevation 21.81 stamped on control monument TT-6151 a differential level loop was performed around the project sight through the horizontal control using a Lecia NA 2 level. This was a closed level loop.
Using the precise EPHEMERIS Opus solutions NAVD88 (Computed using Geoid 12B) elevation was 20.55 U.S. Survey Feet or 6.265 meters on TT 6151. To verify the opus solution a static secession was observed on work point 20 and differential loop was used to verify elevation of TT6151.

RTK GPS SURVEY:

A Topcon GR3 base and a Topcon GR3 rover was used to localize in the horizontal and vertical control established by conventional methods. Ten points were used in the localization with highest residuals being Horizontal =0.06 U.S. Survey Foot and Vertical = 0.04 U.S. Survey Foot.

RTK GPS was used to collect all data points.

Note: Bristol Survey established horizontal and vertical control. Bristol Environmental Remediation Scientist collected sample points from 12 June 2016 to 7 July 2016. Bristol Survey returned to site and reviewed the data collected. All data collected had a horizontal position. The Vertical position was off by 0.93 U.S. Survey Feet. The rover height was entered as 6.0 feet. The actual rover height was 5.07 feet.

Adjusted Point Elevations

On 8 July Elevations from point 1807 to 2707 were adjusted by adding 0.93 U.S. Survey feet to the elevations.

OPUS SOLUTIONS:

Opus solutions REF Frame: NAD88 (2011) SPC AK ZONE 10 do not exactly match the published NGS data sheets. Values from NGS data sheets were used as survey control to collect all survey data. After resending the data to OPUS when the Precise EPHEMERIS. All points were translated to the new solution.

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,    Retrieval Date = APRIL 21, 2016
 TT6139 ***********************************************************************
 TT6139  DESIGNATION -  GEO
 TT6139  PID         -  TT6139
 TT6139  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6139  COUNTRY     -  US
 TT6139  USGS QUAD   -
 TT6139
 TT6139                          *CURRENT SURVEY CONTROL
 TT6139
 TT6139* NAD 83(1986) POSITION- 52 51 03.72133(N) 186 49 10.09983(W)    ADJUSTED
 TT6139* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6139
 TT6139  LAPLACE CORR    -          -3.66  (seconds)                     DEFLEC12B
 TT6139  GEOID HEIGHT    -           8.345 (meters)                      GEOID12B
 TT6139  HORZ ORDER      -  SECOND
 TT6139
 TT6139.The horizontal coordinates were established by classical geodetic methods
 TT6139.and adjusted by the National Geodetic Survey in July 1986.
 TT6139.
 TT6139.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6139.GEOID12B height accuracy estimate available here.
 TT6139
 TT6139.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6139
 TT6139. The following values were computed from the NAD 83(1986) position.
 TT6139
 TT6139;                    North          East      Units Scale Factor Converg.
 TT6139;SPC AK10     -   260,692.577   273,971.309   MT  0.99984809   -8 37 20.2
 TT6139;UTM  59      - 5,857,926.920   646,829.630   MT  0.99986462   +1 44 18.0
 TT6139
 TT6139:                Primary Azimuth Mark                     Grid Az
 TT6139:SPC AK10     -  DOCK USN 1943                            137 16 15.3
 TT6139:UTM  59      -  DOCK USN 1943                            126 54 37.1
 TT6139
 TT6139|-----------------------------------------------------------------------|
 TT6139| PID    Reference Object                    Distance      Geod. Az   |
 TT6139|                                                          dddmmss.s  |
 TT6139| TT6127 DOCK USN 1943                     APPROX. 2.6 KM 1283855.1  |
 TT6139| CT4155 GEO RM 1                            4.716 METERS 13943      |
 TT6139| TT6157 FRONT RANGE WEST CHANNEL          APPROX. 2.7 KM 1784325.1  |
 TT6139| TT6150 REAR RANGE WEST CHANNEL           APPROX. 2.3 KM 1802044.4  |
 TT6139| CT4156 GEO RM 2                            4.030 METERS 22837      |
 TT6139|-----------------------------------------------------------------------|
 TT6139
 TT6139                          SUPERSEDED SURVEY CONTROL
 TT6139
 TT6139  NAD 27      -  52 51 09.64100(N)    186 48 59.19500(W) AD(       ) 2
 TT6139  NGVD 29 (07/19/86)  172.     (m)          564.     (f) VERT ANG
 TT6139
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6035 ***********************************************************************
 TT6035  DESIGNATION -  ACRE USN 1943
 TT6035  PID         -  TT6035
 TT6035  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6035  COUNTRY     -  US
 TT6035  USGS QUAD   -
 TT6035
 TT6035                         *CURRENT SURVEY CONTROL
 TT6035  ______________________________________________________________________
 TT6035* NAD 83(1986) POSITION- 52 50 54.85217(N) 186 45 09.73798(W)   ADJUSTED
 TT6035* NAVD 88 ORTHO HEIGHT -          **(meters)          **(feet)
 TT6035  ______________________________________________________________________
 TT6035  LAPLACE CORR    -         -5.40  (seconds)                    DEFLEC12B
 TT6035  GEOID HEIGHT    -          8.206 (meters)                     GEOID12B
 TT6035  HORZ ORDER      -  THIRD
 TT6035
 TT6035.The horizontal coordinates were established by classical geodetic methods
 TT6035.and adjusted by the National Geodetic Survey in July 1986.
 TT6035.
 TT6035.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6035.GEOID12B height accuracy estimate available here.
 TT6035
 TT6035.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6035
 TT6035. The following values were computed from the NAD 83(1986) position.
 TT6035
 TT6035;                    North         East     Units Scale Factor Converg.
 TT6035;SPC AK10     -   259,749.346   278,377.242   MT  0.99984808   -8 34 08.7
 TT6035;UTM  59      - 5,857,791.440   651,333.471   MT  0.99988110   +1 47 29.5
 TT6035
 TT6035:                Primary Azimuth Mark                     Grid Az
 TT6035:SPC AK10     -  FLAG USN 1943                            202 31 17.1
 TT6035:UTM  59      -  FLAG USN 1943                            192 09 38.9
 TT6035
 TT6035|-----------------------------------------------------------------------|
 TT6035| PID    Reference Object                    Distance      Geod. Az   |
 TT6035|                                                          dddmmss.s  |
 TT6035| TT6041 CREE USN                          APPROX. 1.1 KM 1423130.0  |
 TT6035| TT6043 AL USN                            APPROX. 4.4 KM 1555124.3  |
 TT6035| TT6129 FLAG USN 1943                     APPROX. 5.7 KM 1935708.4  |
 TT6035| TT6034 LEE 1943                            4.500 METERS 33432      |
 TT6035|-----------------------------------------------------------------------|
 TT6035
 TT6035                          SUPERSEDED SURVEY CONTROL
 TT6035
 TT6035  NAD 27      -  52 51 00.76500(N)    186 44 58.83600(W) AD(       ) 3
 TT6035
 TT6035.Superseded values are not recommended for survey control.
 TT6035
```

```
TT6035.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TT6035.See file dsdata.txt to determine how the superseded data were derived.
TT6035
TT6035_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU5133357791(NAD 83)
TT6035
TT6035_MARKER: DH = HORIZONTAL CONTROL DISK
TT6035_SETTING: 66 = SET IN ROCK OUTCROP
TT6035_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
TT6035+STABILITY: POSITION/ELEVATION WELL
TT6035
TT6035  HISTORY     - Date     Condition        Report By
TT6035  HISTORY     - 1943     MONUMENTED       CGS
TT6035  HISTORY     - 1944     GOOD             CGS
TT6035
TT6035                          STATION DESCRIPTION
TT6035
TT6035'DESCRIBED BY COAST AND GEODETIC SURVEY 1943 (WMS)
TT6035'STATION IS LOCATED ON THE S SIDE OF ATTU ISLAND, ON THE NE
TT6035'SHORE OF MASSACRE BAY, ABOUT 1-1/2 MILES SE OF THE HEAD OF
TT6035'THE BAY, IN A SMALL BIGHT ABOUT MIDWAY BETWEEN TWO BLUNT POINTS.
TT6035'IT IS 75 FEET SW OF A SLIGHT POINT IN THE HIGH-WATER LINE,
TT6035'ON THE REEF ALONG THE SHORE, 15 FEET SE OF THE HIGHEST POINT
TT6035'OF THE ROCK, 14-1/2 FEET N OF THE HIGH POINT AT THE OUTER
TT6035'EDGE OF THE REEF, AND ABOUT 3 FEET ABOVE HIGH WATER.
TT6035'
TT6035'STATION MARK IS A BRONZE STATION DISK STAMPED USN ACRE 1943
TT6035'AND SET IN CONCRETE IN A DRILL HOLE IN ROCK.
TT6035'
TT6035'NO REFERENCE MARK WAS SET.
TT6035
TT6035                          STATION RECOVERY (1944)
TT6035
TT6035'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1944 (RDH)
TT6035'RECOVERED.
TT6035'
TT6035'STATION IS ON NE SHORE OF MASSACRE BAY, ABOUT ONE MILE SE OF
TT6035'THE HEAD OF THE BAY, ON RANGE WITH TRIANGULATION STATION MASS
TT6035'(U.S.N.) AND A POINT HALFWAY BETWEEN THE SEAWARD ENDS OF ARMY
TT6035'DOCKS NO. 1 AND NO. 2.  IT IS 75 FEET S OF A SMALL GRASY POINT
TT6035'ON THE HIGH-WATER LINE AND 15 FEET SE OF THE HIGHEST POINT OF
TT6035'THE ROCK WHERE MARK IS PLACED.  MARK IS LOCATED WHERE SPRAY AND
TT6035'STORM WAVES COVER THE AREA AND IS SOMEWHAT CONCEALED BY GROWTH
TT6035'OF SEAWEED OR MOSS.

*** retrieval complete.
Elapsed Time = 00:00:03
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6128 ***********************************************************************
 TT6128  DESIGNATION -  MASS USN 1943
 TT6128  PID         -  TT6128
 TT6128  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6128  COUNTRY     -  US
 TT6128  USGS QUAD   -
 TT6128
 TT6128                        *CURRENT SURVEY CONTROL
 TT6128
 TT6128* NAD 83(1986) POSITION- 52 50 58.42041(N) 186 46 46.76111(W)   ADJUSTED
 TT6128* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6128
 TT6128  LAPLACE CORR    -         -4.68  (seconds)                     DEFLEC12B
 TT6128  GEOID HEIGHT    -          8.256 (meters)                      GEOID12B
 TT6128  HORZ ORDER      -  SECOND
 TT6128
 TT6128.The horizontal coordinates were established by classical geodetic methods
 TT6128.and adjusted by the National Geodetic Survey in July 1986.
 TT6128.
 TT6128.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6128.GEOID12B height accuracy estimate available here.
 TT6128
 TT6128.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6128
 TT6128. The following values were computed from the NAD 83(1986) position.
 TT6128
 TT6128;                    North         East     Units Scale Factor Converg.
 TT6128;SPC AK10     -   260,129.236   276,598.577   MT  0.99984808   -8 35 26.0
 TT6128;UTM  59      - 5,857,845.258   649,515.432   MT  0.99987439   +1 46 12.2
 TT6128
 TT6128:                Primary Azimuth Mark                     Grid Az
 TT6128:SPC AK10     -  FRONT USE 1943                           291 28 18.3
 TT6128:UTM  59      -  FRONT USE 1943                           281 06 40.1
 TT6128
 TT6128|---------------------------------------------------------------------|
 TT6128| PID    Reference Object                    Distance      Geod. Az  |
 TT6128|                                                          dddmmss.s |
 TT6128| TT6154 FRONT USE 1943                   APPROX. 1.0 KM 2825252.3 |
 TT6128|---------------------------------------------------------------------|
 TT6128
 TT6128                          SUPERSEDED SURVEY CONTROL
 TT6128
 TT6128  NAD 27      -  52 51 04.33600(N)    186 46 35.85900(W) AD(       ) 2
 TT6128  NGVD 29 (07/19/86)    4.     (m)           13.     (f) VERT ANG
 TT6128
 TT6128.Superseded values are not recommended for survey control.
 TT6128
 TT6128.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TT6128.See file dsdata.txt to determine how the superseded data were derived.
```

```
TT6128
TT6128_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4951557845(NAD 83)
TT6128
TT6128_MARKER: Z = SEE DESCRIPTION
TT6128_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND
TT6128_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
TT6128
TT6128  HISTORY     - Date     Condition        Report By
TT6128  HISTORY     - 1943     MONUMENTED       CGS
TT6128  HISTORY     - 1943     SEE DESCRIPTION  DOD
TT6128  HISTORY     - 1944     GOOD             CGS
TT6128
TT6128                          STATION DESCRIPTION
TT6128
TT6128'DESCRIBED BY COAST AND GEODETIC SURVEY 1943 (WMS)
TT6128'STATION IS ON SE SHORE OF ATTU ISLAND, ABOUT 0.4 MILE SE OF
TT6128'THE BEACH AT HEAD OF MASSACRE BAY, AND ABOUT 0.6 MILE SW OF
TT6128'NE SHORE OF BAY.  IT IS ON THE LARGEST AND HIGHEST ROCK IN
TT6128'VICINITY, ABOUT 12 FEET ABOVE HIGH WATER, NEAR CENTER OF TOP
TT6128'OF ROCK.
TT6128'
TT6128'STATION IS MARKED BY A 2-INCH IRON PIPE CEMENTED TO TOP OF
TT6128'ROCK AND PROJECTING ABOUT 10 INCHES ABOVE ROCK.
TT6128'
TT6128'NO REFERENCE MARK WAS SET.
TT6128
TT6128                          STATION RECOVERY (1943)
TT6128
TT6128'RECOVERY NOTE BY US DEPARTMENT OF DEFENSE 1943
TT6128'STATION RECOVERED AS DESCRIBED.  A CORPS OF ENGINEERS, U.S.
TT6128'ARMY, BRONZE DISK WAS CEMENTED IN TOP OF A 1-INCH GALVANIZED-IRON
TT6128'PIPE CEMENTED TO ROCK.  STAMPED MASS 1943.
TT6128
TT6128                          STATION RECOVERY (1944)
TT6128
TT6128'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1944 (RDH)
TT6128'RECOVERED.  STATION IS LOCATED ON S SHORE OF ATTU ISLAND,
TT6128'ABOUT 0.4 MILE SE OF BEACH AT HEAD OF MASSACRE BAY, AND ABOUT
TT6128'0.5 MILE SW OF NE SHORE OF BAY.  IT IS ON THE LARGEST AND HIGHEST
TT6128'ROCK (ABOUT 10 FEET ABOVE HIGH WATER) IN THIS VICINITY, NEAR
TT6128'THE TOP OF ROCKY REEF.
TT6128'
TT6128'STATION IS MARKED BY A U.S.E. BRONZE DISK CEMENTED IN TOP OF
TT6128'A 1-INCH GALVANIZED-IRON PIPE CEMENTED IN ROCK.  STAMPED MASS
TT6128'1943.

*** retrieval complete.
Elapsed Time = 00:00:02
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6143 ***********************************************************************
 TT6143  DESIGNATION -  BELL USN 1947
 TT6143  PID         -  TT6143
 TT6143  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6143  COUNTRY     -  US
 TT6143  USGS QUAD   -
 TT6143
 TT6143                         *CURRENT SURVEY CONTROL
 TT6143  ______________________________________________________________________
 TT6143* NAD 83(1986) POSITION- 52 48 15.25306(N) 186 50 40.37452(W)   ADJUSTED
 TT6143* NAVD 88 ORTHO HEIGHT -          **(meters)          **(feet)
 TT6143  ______________________________________________________________________
 TT6143  LAPLACE CORR    -          1.67  (seconds)                    DEFLEC12B
 TT6143  GEOID HEIGHT    -          8.330 (meters)                     GEOID12B
 TT6143  HORZ ORDER      -  THIRD
 TT6143
 TT6143.The horizontal coordinates were established by classical geodetic methods
 TT6143.and adjusted by the National Geodetic Survey in July 1986.
 TT6143.
 TT6143.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6143.GEOID12B height accuracy estimate available here.
 TT6143
 TT6143.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6143
 TT6143. The following values were computed from the NAD 83(1986) position.
 TT6143
 TT6143;                    North         East     Units Scale Factor Converg.
 TT6143;SPC AK10     -   255,798.324   271,518.946   MT  0.99984823   -8 38 32.1
 TT6143;UTM  59      - 5,852,671.368   645,297.378   MT  0.99985912   +1 43 02.2
 TT6143
 TT6143                           SUPERSEDED SURVEY CONTROL
 TT6143
 TT6143  NAD 27      -  52 48 21.17700(N)    186 50 29.48900(W) AD(       ) 3
 TT6143
 TT6143.Superseded values are not recommended for survey control.
 TT6143
 TT6143.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TT6143.See file dsdata.txt to determine how the superseded data were derived.
 TT6143
 TT6143_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4529752671(NAD 83)
 TT6143
 TT6143_MARKER: I = METAL ROD
 TT6143_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 TT6143_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 TT6143+STABILITY: SURFACE MOTION
 TT6143
 TT6143  HISTORY     - Date     Condition        Report By
 TT6143  HISTORY     - 1944     MONUMENTED       DOD
 TT6143  HISTORY     - 1947     GOOD             CGS
```

```
TT6143
TT6143                          STATION DESCRIPTION
TT6143
TT6143'DESCRIBED BY COAST AND GEODETIC SURVEY 1947 (FBT)
TT6143'THE STATION IS LOCATED ABOUT 0.5 MILE W OF THE S PART OF CASCO
TT6143'COVE, ON THE LOWER PART OF THE SE RIDGE LEADING TO THE MOUNTAIN
TT6143'W OF CASCO COVE.  THE STATION IS ON A SMALL BENCH ABOUT 160
TT6143'FEET IN ELEVATION, THE LOWEST POINT WHICH WILL SEE BOTH TO THE
TT6143'N AND SW.
TT6143'
TT6143'STATION MAY BE REACHED BY LEAVING THE CASCO COVE ROAD AT THE
TT6143'RIFLE RANGE JUST S OF THE STONE QUARRY, THEN PROCEEDING SW
TT6143'TO THE RIDGE AND STATION.
TT6143'
TT6143'STATION MARK IS A CHISELED CROSS IN THE TOP OF A 3/4-INCH
TT6143'IRON ROD WHICH IS CENTERED IN THE TOP OF A 6- BY 6-INCH
TT6143'CONCRETE POST PROJECTING 4 INCHES ABOVE THE GROUND.
TT6143'
TT6143'THERE ARE NO REFERENCE MARKS.

*** retrieval complete.
Elapsed Time = 00:00:02
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6145 ***********************************************************************
 TT6145  DESIGNATION -  SHICK USN 1944
 TT6145  PID         -  TT6145
 TT6145  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6145  COUNTRY     -  US
 TT6145  USGS QUAD   -
 TT6145
 TT6145                         *CURRENT SURVEY CONTROL
 TT6145  ______________________________________________________________________
 TT6145* NAD 83(1986) POSITION- 52 48 56.92566(N) 186 49 24.89694(W)   ADJUSTED
 TT6145* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6145  ______________________________________________________________________
 TT6145  LAPLACE CORR    -          0.58  (seconds)                    DEFLEC12B
 TT6145  GEOID HEIGHT    -          8.325 (meters)                     GEOID12B
 TT6145  HORZ ORDER      -  THIRD
 TT6145
 TT6145.The horizontal coordinates were established by classical geodetic methods
 TT6145.and adjusted by the National Geodetic Survey in July 1986.
 TT6145.
 TT6145.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6145.GEOID12B height accuracy estimate available here.
 TT6145
 TT6145.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6145
 TT6145. The following values were computed from the NAD 83(1986) position.
 TT6145
 TT6145;                   North         East     Units Scale Factor Converg.
 TT6145;SPC AK10     -   256,859.507   273,109.834   MT  0.99984813   -8 37 32.0
 TT6145;UTM  59      - 5,854,001.354   646,671.522   MT  0.99986405   +1 44 03.3
 TT6145
 TT6145:                Primary Azimuth Mark                     Grid Az
 TT6145:SPC AK10     -  SARANAC USN 1945                         211 16 34.4
 TT6145:UTM  59      -  SARANAC USN 1945                         200 54 59.1
 TT6145
 TT6145|---------------------------------------------------------------------|
 TT6145| PID    Reference Object                    Distance      Geod. Az   |
 TT6145|                                                          dddmmss.s  |
 TT6145| TT6150 REAR RANGE WEST CHANNEL           APPROX. 1.6 KM 0091724.0  |
 TT6145| TT6157 FRONT RANGE WEST CHANNEL          APPROX. 1.3 KM 0153956.7  |
 TT6145| TT6133 WATERTANK NEAR SHICK USN 1945      92.400 METERS 03352      |
 TT6145| TT6164 SARANAC USN 1945                  APPROX. 2.0 KM 2023902.4  |
 TT6145|---------------------------------------------------------------------|
 TT6145
 TT6145                          SUPERSEDED SURVEY CONTROL
 TT6145
 TT6145  NAD 27      -  52 49 02.84700(N)    186 49 14.00600(W) AD(       ) 3
 TT6145  NGVD 29 (07/19/86)   30.     (m)          98.     (f) VERT ANG
 TT6145
 TT6145.Superseded values are not recommended for survey control.
```

```
TT6145
TT6145.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TT6145.See file dsdata.txt to determine how the superseded data were derived.
TT6145
TT6145 U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4667154001(NAD 83)
TT6145
TT6145 MARKER: I = METAL ROD
TT6145 SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TT6145 STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
TT6145
TT6145  HISTORY     - Date     Condition        Report By
TT6145  HISTORY     - 1944     MONUMENTED       CGS
TT6145  HISTORY     - 1945     GOOD             CGS
TT6145  HISTORY     - 1947     GOOD             CGS
TT6145  HISTORY     - 1968     GOOD             USCG
TT6145
TT6145                          STATION DESCRIPTION
TT6145
TT6145'DESCRIBED BY COAST AND GEODETIC SURVEY 1944 (RDH)
TT6145'STATION IS LOCATED ON THE S SHORE OF ATTU ISLAND, ON THE TOP
TT6145'CENTER OF A PROMINENT PENINSULA HEAD ON THE E SIDE OF CASCO
TT6145'BAY, AND ABOUT 80 FEET ABOVE HIGH WATER.  AS ONE APPROACHES FROM
TT6145'W SIDE OF THE PENINSULA, THE STATION IS ON THE SECOND LITTLE
TT6145'KNOLL, JUST AFTER COMPLETING THE STEEP PART OF THE CLIMB.  A
TT6145'KNOLL TO THE NE AND ONE TO THE S ARE ABOUT 20 FEET HIGHER THAN
TT6145'THE STATION.  A SMALL WATER TANK IS 92.4 METERS NE OF THE
TT6145'STATION AND TRIANGULATION STATION DOCK (U.S.N.) IS 11 DEG 16 MIN
TT6145'CLOCKWISE OF THE TANK FROM THE STATION.
TT6145'
TT6145'STATION MARK IS A CHISELED CROSS ON THE TOP OF A 3/4-INCH IRON
TT6145'ROD WHICH IS CENTERED IN THE TOP OF A CONCRETE POST SET ABOUT
TT6145'FLUSH WITH THE GROUND.
TT6145'
TT6145'NO REFERENCE MARK WAS SET.
TT6145
TT6145                          STATION RECOVERY (1945)
TT6145
TT6145'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1945 (RDH)
TT6145'ORIGINAL DESCRIPTION IS ADEQUATE BUT IS REWRITTEN WITH ADDITIONAL
TT6145'DETAILS.
TT6145'
TT6145'STATION IS LOCATED ON THE S SHORE OF ATTU ISLAND, ON THE TOP CENTER
TT6145'OF A PROMINENT PENINSULA HEAD ON THE E SIDE OF CASCO BAY, 98
TT6145'FEET ABOVE HIGH-WATER LINE.  APPROACHING FROM THE W SIDE OF
TT6145'THE PENINSULA, THE STATION IS ON THE SECOND LITTLE KNOLL, JUST
TT6145'AFTER COMPLETING THE STEEP PART OF THE CLIMB.  A KNOLL TO THE
TT6145'NE AND ONE TO THE S ARE 20 FEET HIGHER THAN THE STATION.  A
TT6145'SMALL WATER TANK IS 92.4 METERS TO THE NE OF THE STATION AND
TT6145'TRIANGULATION STATION DOCK IS 11 DEG 16 MIN TO THE E OF THE TANK.
TT6145'
TT6145'STATION MARK IS A CHISELED CROSS IN THE TOP OF A 3/4-INCH IRON
TT6145'ROD WHICH IS CENTERED IN THE TOP OF A 6- BY 6-INCH CONCRETE
TT6145'POST.  THE TOP OF THE MONUMENT WAS ORIGINALLY FLUSH WITH THE
TT6145'GROUND BUT IS NOW IN THE CENTER OF AND PROJECTS 6 INCHES ABOVE
TT6145'THE BOTTOM OF A 6- BY 6-FOOT HOLE.
TT6145'
TT6145'NO REFERENCE MARK WAS SET.
TT6145
TT6145                          STATION RECOVERY (1947)
TT6145
```

```
TT6145'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1947 (FBT)
TT6145'LOCATED ON THE S SHORE OF ATTU ISLAND, ON THE TOP CENTER OF A
TT6145'PROMINENT PENINSULA ON THE E SIDE OF CASCO BAY, 98 FEET
TT6145'ABOVE HIGH-WATER LINE.  APPROACHED FROM THE W SIDE OF THE
TT6145'PENINSULA, THE STATION IS ON THE SECOND LITTLE KNOLL, JUST AFTER
TT6145'COMPLETING THE STEEP PART OF THE CLIMB.  A KNOLL TO THE NE AND
TT6145'ONE TO THE S ARE 20 FEET HIGHER THAN THE STATION.  A SMALL
TT6145'WATER TANK IS 92.4 METERS TO THE NE OF THE STATION.
TT6145'
TT6145'STATION MARK IS A CHISELED CROSS IN THE TOP OF A 3/4-INCH IRON
TT6145'ROD CENTERED IN THE TOP OF A 6- BY 6-INCH CONCRETE POST
TT6145'PROJECTING 6 INCHES IN A 6- BY 6-FOOT HOLE.  THERE ARE NO REFERENCE
TT6145'MARKS.
TT6145
TT6145                          STATION RECOVERY (1968)
TT6145
TT6145'RECOVERY NOTE BY US COAST GUARD 1968 (JMH)
TT6145'CHISELED CROSS ON TOP OF 3/4 IN IRON ROD
TT6145'
TT6145'GOOD - AS DESCRIBED WATER TANK IS NOW A PILE OF DEBRIS

*** retrieval complete.
Elapsed Time = 00:00:02
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6147 ***********************************************************************
 TT6147  DESIGNATION -  JUDY K 6 USN 1945
 TT6147  PID         -  TT6147
 TT6147  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6147  COUNTRY     -  US
 TT6147  USGS QUAD   -
 TT6147
 TT6147                         *CURRENT SURVEY CONTROL
 TT6147  ______________________________________________________________________
 TT6147* NAD 83(1986) POSITION- 52 49 49.73216(N) 186 50 39.46806(W)   ADJUSTED
 TT6147* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6147  ______________________________________________________________________
 TT6147  LAPLACE CORR    -        -15.76  (seconds)                    DEFLEC12B
 TT6147  GEOID HEIGHT    -          8.387 (meters)                     GEOID12B
 TT6147  HORZ ORDER      -  THIRD
 TT6147
 TT6147.The horizontal coordinates were established by classical geodetic methods
 TT6147.and adjusted by the National Geodetic Survey in July 1986.
 TT6147.
 TT6147.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6147.GEOID12B height accuracy estimate available here.
 TT6147
 TT6147.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6147
 TT6147. The following values were computed from the NAD 83(1986) position.
 TT6147
 TT6147;                   North         East     Units Scale Factor Converg.
 TT6147;SPC AK10     -   258,682.704   271,974.507   MT  0.99984807   -8 38 31.4
 TT6147;UTM  59      - 5,855,590.681   645,226.815   MT  0.99985887   +1 43 05.1
 TT6147
 TT6147:               Primary Azimuth Mark                     Grid Az
 TT6147:SPC AK10     -  DOCK USN 1943                           088 27 57.7
 TT6147:UTM  59      -  DOCK USN 1943                           078 06 21.2
 TT6147
 TT6147|---------------------------------------------------------------------|
 TT6147| PID    Reference Object                    Distance      Geod. Az  |
 TT6147|                                                          dddmmss.s |
 TT6147| TT6127 DOCK USN 1943                     APPROX. 3.8 KM 0794926.3 |
 TT6147| TT6150 REAR RANGE WEST CHANNEL           APPROX. 1.7 KM 0904906.7 |
 TT6147| TT6157 FRONT RANGE WEST CHANNEL          APPROX. 1.8 KM 1035238.9 |
 TT6147|---------------------------------------------------------------------|
 TT6147
 TT6147                          SUPERSEDED SURVEY CONTROL
 TT6147
 TT6147  NAD 27      -  52 49 55.65600(N)    186 50 28.57300(W) AD(      ) 3
 TT6147  NGVD 29 (07/19/86)   52.     (m)          171.     (f) VERT ANG
 TT6147
 TT6147.Superseded values are not recommended for survey control.
 TT6147
```

```
TT6147.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TT6147.See file dsdata.txt to determine how the superseded data were derived.
TT6147
TT6147_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4522655590(NAD 83)
TT6147
TT6147_MARKER: M = AMMO SHELL CASING
TT6147_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TT6147_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TT6147+STABILITY: SURFACE MOTION
TT6147
TT6147  HISTORY     - Date     Condition        Report By
TT6147  HISTORY     - 1944     MONUMENTED       DOD
TT6147  HISTORY     - 1945     GOOD             CGS
TT6147  HISTORY     - 1968     GOOD             USCG
TT6147
TT6147                          STATION DESCRIPTION
TT6147
TT6147'DESCRIBED BY COAST AND GEODETIC SURVEY 1945 (RDH)
TT6147'STATION IS LOCATED ON SE SHORE OF ATTU ISLAND, 1/2 MILE NW
TT6147'OF HEAD OF CASCO BAY, 0.3 MILE NE OF W END OF E-W AIRFIELD
TT6147'RUNWAY, 0.6 MILE WNW OF INTERSECTION OF E-W AND N-S AIRFIELD
TT6147'RUNWAYS, ON HIGHEST POINT OF SMALL KNOLL, AND APPROXIMATELY
TT6147'10 METERS N OF REMAINS OF GUN AND LOOKOUT EMPLACEMENT.
TT6147'ELEVATION OF STATION IS 171 FEET.
TT6147'
TT6147'STATION IS MARKED BY A 40-MILLIMETER SHELL CENTERED IN TOP OF
TT6147'AN 8- BY 8-INCH CONCRETE POST.  IT IS STAMPED K 6 1944 AND
TT6147'PROJECTS 3 INCHES ABOVE THE GROUND.  STATION K-6 AND JUDY ARE
TT6147'ONE AND THE SAME.
TT6147'
TT6147'NO REFERENCE MARK WAS SET.
TT6147
TT6147                          STATION RECOVERY (1968)
TT6147
TT6147'RECOVERY NOTE BY US COAST GUARD 1968 (JMH)
TT6147'40 MM SHELL CASING STAMPED K6 1944-GOOD - AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:01
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6148 ***********************************************************************
 TT6148  DESIGNATION -  BIRDSI USN 1947
 TT6148  PID         -  TT6148
 TT6148  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6148  COUNTRY     -  US
 TT6148  USGS QUAD   -
 TT6148
 TT6148                         *CURRENT SURVEY CONTROL
 TT6148  ______________________________________________________________________
 TT6148* NAD 83(1986) POSITION- 52 48 45.02281(N) 186 50 33.53049(W)   ADJUSTED
 TT6148* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6148  ______________________________________________________________________
 TT6148  LAPLACE CORR    -          2.17  (seconds)                    DEFLEC12B
 TT6148  GEOID HEIGHT    -          8.351 (meters)                     GEOID12B
 TT6148  HORZ ORDER      -  THIRD
 TT6148
 TT6148.The horizontal coordinates were established by classical geodetic methods
 TT6148.and adjusted by the National Geodetic Survey in July 1986.
 TT6148.
 TT6148.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6148.GEOID12B height accuracy estimate available here.
 TT6148
 TT6148.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6148
 TT6148. The following values were computed from the NAD 83(1986) position.
 TT6148
 TT6148;                   North         East     Units Scale Factor Converg.
 TT6148;SPC AK10     -   256,688.718   271,783.917   MT  0.99984815   -8 38 26.7
 TT6148;UTM  59      - 5,853,594.906   645,397.916   MT  0.99985948   +1 43 08.3
 TT6148
 TT6148:               Primary Azimuth Mark                     Grid Az
 TT6148:SPC AK10     -  SHICK USN 1944                          082 39 36.9
 TT6148:UTM  59      -  SHICK USN 1944                          072 18 01.9
 TT6148
 TT6148|-----------------------------------------------------------------------|
 TT6148| PID    Reference Object                    Distance      Geod. Az  |
 TT6148|                                                          dddmmss.s |
 TT6148| TT6145 SHICK USN 1944                   APPROX. 1.3 KM 0740110.2 |
 TT6148|-----------------------------------------------------------------------|
 TT6148
 TT6148                          SUPERSEDED SURVEY CONTROL
 TT6148
 TT6148  NAD 27      -  52 48 50.94600(N)    186 50 22.64200(W) AD(       ) 3
 TT6148
 TT6148.Superseded values are not recommended for survey control.
 TT6148
 TT6148.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TT6148.See file dsdata.txt to determine how the superseded data were derived.
 TT6148
```

```
TT6148 U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4539753594(NAD 83)
TT6148
TT6148 MARKER: I = METAL ROD
TT6148 SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TT6148 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TT6148+STABILITY: SURFACE MOTION
TT6148
TT6148  HISTORY     - Date     Condition        Report By
TT6148  HISTORY     - 1944     MONUMENTED       DOD
TT6148  HISTORY     - 1947     GOOD             CGS
TT6148  HISTORY     - 1963     SEE DESCRIPTION  USCG
TT6148
TT6148                          STATION DESCRIPTION
TT6148
TT6148'DESCRIBED BY COAST AND GEODETIC SURVEY 1947 (FBT)
TT6148'STATION IS LOCATED ON A KNOLL ON THE W SIDE OF CASCO COVE,
TT6148'DIRECTLY ABOVE THE STONE QUARRY.  THE KNOLL IS THE HIGHEST
TT6148'ON THAT PART OF THE RIDGE, E OF THE LINE OF TELEPHONE POLES.
TT6148'STATION IS BEST REACHED BY CLIMBING THE TRAIL ON THE N SIDE
TT6148'OF THE STONE QUARRY, THEN PROCEEDING S TO THE HIGHEST KNOLL
TT6148'AND STATION.
TT6148'
TT6148'STATION MARK IS A CHISELED CROSS IN THE TOP OF A 3/4-INCH
TT6148'IRON ROD WHICH IS CENTERED IN THE TOP OF A 6- BY- 6-INCH
TT6148'CONCRETE POST PROJECTING 6 INCHES ABOVE THE GROUND.
TT6148'
TT6148'THERE ARE NO REFERENCE MARKS.
TT6148
TT6148                          STATION RECOVERY (1963)
TT6148
TT6148'RECOVERY NOTE BY US COAST GUARD 1963 (JMH)
TT6148'CHISELED CROSS ON TOP OF 3/4 IN IRON ROD - ROD IS STILL SOLID
TT6148'HOWEVER CONCRETE IS DISINTEGRATING.  TELEPHONE POLES HAVE
TT6148'BEEN CUT DOWN.

*** retrieval complete.
Elapsed Time = 00:00:01
```

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6149 ***********************************************************************
 TT6149  DESIGNATION -  NEAR
 TT6149  PID         -  TT6149
 TT6149  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6149  COUNTRY     -  US
 TT6149  USGS QUAD   -
 TT6149
 TT6149                          *CURRENT SURVEY CONTROL
 TT6149  ______________________________________________________________________
 TT6149* NAD 83(1986) POSITION- 52 48 23.44641(N) 186 50 27.44609(W)   ADJUSTED
 TT6149* NAVD 88 ORTHO HEIGHT -          **(meters)          **(feet)
 TT6149  ______________________________________________________________________
 TT6149  LAPLACE CORR    -          2.17  (seconds)                    DEFLEC12B
 TT6149  GEOID HEIGHT    -          8.331 (meters)                     GEOID12B
 TT6149  HORZ ORDER      -  THIRD
 TT6149
 TT6149.The horizontal coordinates were established by classical geodetic methods
 TT6149.and adjusted by the National Geodetic Survey in July 1986.
 TT6149.
 TT6149.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6149.GEOID12B height accuracy estimate available here.
 TT6149
 TT6149.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6149
 TT6149. The following values were computed from the NAD 83(1986) position.
 TT6149
 TT6149;                   North         East     Units Scale Factor Converg.
 TT6149;SPC AK10     -   256,012.302   271,796.394   MT  0.99984820   -8 38 21.8
 TT6149;UTM  59      - 5,852,931.753   645,531.828   MT  0.99985996   +1 43 12.7
 TT6149
 TT6149:                Primary Azimuth Mark                     Grid Az
 TT6149:SPC AK10     -  BIRDSI USN 1947                          358 56 35.8
 TT6149:UTM  59      -  BIRDSI USN 1947                          348 35 01.3
 TT6149
 TT6149|----------------------------------------------------------------------|
 TT6149| PID    Reference Object                    Distance      Geod. Az   |
 TT6149|                                                          dddmmss.s  |
 TT6149| TT6144 FAR                                182.077 METERS 15454      |
 TT6149| TT6143 BELL USN 1947                      350.430 METERS 22343      |
 TT6149| TT6148 BIRDSI USN 1947                    APPROX. 0.7 KM 3501814.0  |
 TT6149|----------------------------------------------------------------------|
 TT6149
 TT6149                          SUPERSEDED SURVEY CONTROL
 TT6149
 TT6149  NAD 27      -  52 48 29.36900(N)    186 50 16.55900(W) AD(       ) 3
 TT6149
 TT6149.Superseded values are not recommended for survey control.
 TT6149
 TT6149.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
```

TT6149.See file dsdata.txt to determine how the superseded data were derived.
TT6149
TT6149_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4553152931(NAD 83)
TT6149
TT6149_MARKER: Z = SEE DESCRIPTION
TT6149_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND
TT6149_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TT6149+STABILITY: SURFACE MOTION
TT6149
TT6149 HISTORY - Date Condition Report By
TT6149 HISTORY - 1947 MONUMENTED CGS
TT6149
TT6149 STATION DESCRIPTION
TT6149
TT6149'DESCRIBED BY COAST AND GEODETIC SURVEY 1947 (FBT)
TT6149'THE STATION IS LOCATED JUST W OF CASCO COVE IN THE LOW AREA
TT6149'JUST S OF THE STONE QUARRY. IT IS ABOUT 60 YARDS W OF THE RIFLE
TT6149'RANGE. IT MAY BE REACHED BY LEAVING THE CASCO COVE ROAD AT
TT6149'THE RIFLE RANGE, CROSSING THE RANGE, THEN PROCEEDING W TO THE
TT6149'STATION.
TT6149'
TT6149'STATION MARK IS A CROSS IN THE CENTER OF A COPPER PLATE STAMPED
TT6149'USCG CEMENTED IN TOP OF A 4-INCH GALVANIZED-IRON PIPE WHICH
TT6149'IS CEMENTED IN THE GROUND AND PROJECTS 6 INCHES ABOVE THE
TT6149'GROUND.
TT6149'
TT6149'THERE ARE NO REFERENCE MARKS.

*** retrieval complete.
Elapsed Time = 00:00:02

# The NGS Data Sheet

**See file dsdata.txt for more information about the datasheet.**

```
PROGRAM = datasheet95, VERSION = 8.8
1        National Geodetic Survey,   Retrieval Date = APRIL 21, 2016
 TT6151 ***********************************************************************
 TT6151  DESIGNATION -  KARL
 TT6151  PID         -  TT6151
 TT6151  STATE/COUNTY-  AK/ALEUTIANS WEST CENSUS
 TT6151  COUNTRY     -  US
 TT6151  USGS QUAD   -
 TT6151
 TT6151                         *CURRENT SURVEY CONTROL
 TT6151  ______________________________________________________________________
 TT6151* NAD 83(1986) POSITION- 52 49 10.27293(N) 186 49 25.81025(W)   ADJUSTED
 TT6151* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 TT6151  ______________________________________________________________________
 TT6151  LAPLACE CORR    -         -2.93  (seconds)                    DEFLEC12B
 TT6151  GEOID HEIGHT    -          8.332 (meters)                     GEOID12B
 TT6151  HORZ ORDER      -  THIRD
 TT6151
 TT6151.The horizontal coordinates were established by classical geodetic methods
 TT6151.and adjusted by the National Geodetic Survey in July 1986.
 TT6151.
 TT6151.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT6151.GEOID12B height accuracy estimate available here.
 TT6151
 TT6151.The Laplace correction was computed from DEFLEC12B derived deflections.
 TT6151
 TT6151. The following values were computed from the NAD 83(1986) position.
 TT6151
 TT6151;                    North         East     Units Scale Factor Converg.
 TT6151;SPC AK10     -   257,269.932   273,154.796   MT  0.99984811   -8 37 32.7
 TT6151;UTM  59      - 5,854,413.180   646,641.943   MT  0.99986394   +1 44 02.9
 TT6151
 TT6151:                Primary Azimuth Mark                     Grid Az
 TT6151:SPC AK10     -  DOCK USN 1943                            059 36 13.8
 TT6151:UTM  59      -  DOCK USN 1943                            049 14 38.2
 TT6151
 TT6151|----------------------------------------------------------------------|
 TT6151| PID    Reference Object                  Distance      Geod. Az      |
 TT6151|                                                        dddmmss.s     |
 TT6151| TT6127 DOCK USN 1943                   APPROX. 3.0 KM 0505841.1     |
 TT6151| TT6136 POLLY USCG 1947                 154.794 METERS 11226         |
 TT6151|----------------------------------------------------------------------|
 TT6151
 TT6151                           SUPERSEDED SURVEY CONTROL
 TT6151
 TT6151  NAD 27      -  52 49 16.19400(N)    186 49 14.91800(W) AD(       ) 3
 TT6151
 TT6151.Superseded values are not recommended for survey control.
 TT6151
 TT6151.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TT6151.See file dsdata.txt to determine how the superseded data were derived.
```

```
TT6151
TT6151_U.S. NATIONAL GRID SPATIAL ADDRESS: 59UPU4664154413(NAD 83)
TT6151
TT6151_MARKER: Z = SEE DESCRIPTION
TT6151_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND
TT6151_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TT6151+STABILITY: SURFACE MOTION
TT6151
TT6151  HISTORY     - Date     Condition        Report By
TT6151  HISTORY     - 1947     MONUMENTED       CGS
TT6151
TT6151                          STATION DESCRIPTION
TT6151
TT6151'DESCRIBED BY COAST AND GEODETIC SURVEY 1947 (FBT)
TT6151'LOCATED ON THE S SHORE OF ATTU ISLAND, ON A PROMINENT PENINSULA
TT6151'ON THE E SIDE OF CASCO BAY, AT N END OF TURN-AROUND DRIVE, IN
TT6151'FRONT OF FLAG OFFICERS, COMMANDING FLEET AIR WING, FORMER QUARTERS.
TT6151'30 FEET NE OF NE CORNER OF BUILDING, 2 FEET S OF FOURTH GUARD
TT6151'POST E OF BUILDING.
TT6151'
TT6151'STATION MARK IS A CROSS IN THE CENTER OF A COPPER PLATE STAMPED
TT6151'USCG CEMENTED IN TOP OF A 4-INCH GALVANIZED-IRON PIPE WHICH
TT6151'IS CEMENTED IN THE GROUND AND PROJECTS 6 INCHES.
TT6151'
TT6151'THERE ARE NO REFERENCE MARKS.

*** retrieval complete.
Elapsed Time = 00:00:01
```

# Shared Solution

**PID:** TT6151
**Designation:** KARL
**Stamping:**
**Stability:** May hold commonly subject to ground movement
**Setting:** Set into or on top of metal pipe driven into ground
**Mark Condition:** G
**Description:** THE STATION IS LOCATED JUST WEST OF CASCO COVE IN THE LOW AREA AND + OR - 491 METERS SOUTH FROM THE CENTERLINE OF RUNWAY 2/20. SAID POINT IS LOCATED IN THE NW QUADRANT AT THE END OF OLD GRAVEL ROAD TURN AROUND. + OR - 1.15 METERS SE FROM A 1 METER TALL AND 0.3 DIAMETER WOODEN POST.

STATION MARK IS A CROSS IN THE CENTER OF A COPPER PLATE STAMPED(USGS EL = 21.81)CEMENTED IN THE TOP OF A 4-INCH GALVANIZED PIPE WHICH IS CEMENTED IN THE GROUND AND PROJECTS 6 INCHES ABOVE THE GROUND.

**Observed:** 2016-07-09T21:47:00Z See Also 1947
**Source:** OPUS - page5 1209.04



**Close-up View**

| REF_FRAME: NAD_83(2011) | EPOCH: 2010.0000 | SOURCE: NAVD88 (Computed using GEOID12B) | UNITS: m | SET PROFILE | DETAILS |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **LAT:** | 52° 49' 10.28426" | ± 0.014 m | | | |
| **LON:** | 173° 10' 34.08160" | ± 0.014 m | | | |
| **ELL HT:** | 14.597 | ± 0.021 m | | | |
| **X:** | -3835346.449 | ± 0.008 m | | | |
| **Y:** | 458957.763 | ± 0.014 m | | | |
| **Z:** | 5058442.882 | ± 0.023 m | | | |
| **ORTHO HT:** | 6.265 | ± 0.036 m | | | |

| | | |
|---|---|---|
| | **UTM** 59 | **SPC** 5010(AK10) |
| **NORTHING:** | 5854413.469m | 257270.582m |
| **EASTING:** | 646639.909m | 273152.846m |
| **CONVERGENCE:** | 1.73411061° | -8.62578133° |
| **POINT SCALE:** | 0.99986393 | 0.99984811 |
| **COMBINED FACTOR:** | 0.99986164 | 0.99984582 |

**CONTRIBUTED BY**

fpaulson
Bristol Environmental Remediation Services, LLC

**Horizon View**




The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

34160012

ERS ATTU RA

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ALL-WEATHER

**CROSS SECTION**

**FIELD BOOK**

№ 370-6F

FB1650

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| | JM | |

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2-15

ATM LEVELS

| STA | + | HI | − | RDO | ELEV |
|---|---|---|---|---|---|
| WP-20 | 2 75 | ~~7 14 58~~ | | | ~~100~~ 7 93 |
| TP1 | | ~~5 89 91~~ | 16 35 | | ~~86 40~~ 58 33 |
| | 0 58 | ~~86 68~~ | | | |
| TP2 | | | 15 22 | | ~~71 76~~ 43 69 |
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| | 0 28 | ~~62 42~~ 34 35 | ~~0 51~~ | | |
| ~~TP4~~ | | | | 7 63 | 26 72 |
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| TP | | | 15 89 | | ~~46 53~~ 10 96 |
| | 0 59 | 19 05 | | | |
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| TP | | | 0 27 | | 62 15 |
| | 9 03 | 35 77 | | | |
| TP | | | 0 29 | 0 29 | |
| | 14 41 | | | | |
| TP | | | 0 85 | | |
| | 13 65 | | | | |
| TP | | | 1 95 | | |
| | 7 49 | | | | |
| WP-20 | | | 3 53 | | 100 96 |

3 JUNE 2016
F Pawson
J MUIR
LEICA NA/2 LOAN
SPIKE AT CAMP

1/1650

| STA | + | HI | − | ROD | BRG |
|---|---|---|---|---|---|
| WP-21 | | 33~~20~~21 | | | 2672 |
| | 649 | | | | |
| TP | | | 232 | | 3089 |
| | 415 | 3504 | | | |
| TP | | | 461 | | 3043 |
| | 114 | 3157 | | | |
| TP | | | 570 | | 2587 |
| | 485 | 3073 | | | |
| TP | | | 149 | | 2923 |
| | 489 | 3412 | | | |
| WP-~~23~~24 | | | 489 | | 2923 |

3 JUNE 2016
P. PAULSON
I. MUIR

Leica NA/2 level

2/1650

Rite in the Rain

3/1650

Rita in the Rain

4/1650

Rite in the Rain

5/1650

Rite in the Rain

6/1650

Rite in the Rain

7/1650

Rite in the Rain

ATU TRAVERSE

SEE FB165/9

ΔE WP-21

BSE WP-20

BS=Ø HD= 1056 61

| | | | |
|---|---|---|---|
| WP-22 | 241-26-42 | 118-33-10 | 416 52 |
| | 122-53-27 | | 416 52 |
| | 241-26-43 E | | |
| WP-23 | 158-01-55 | 201-58-00 | 1167 59 |
| | 316-03-53 | | 1167 59 |
| | 158-01-56 E | | |

ΔE WP-23

BSE WP-21

BS=Ø HD=

| | | | |
|---|---|---|---|
| WP 24 | 177-18-18 | 182-41-26 | 996 773 |
| | 354-36-50 | | |
| | 177-18-25 | | |

ΔE WP-24

BSE WP-23

HD= 996 768

| | | | |
|---|---|---|---|
| WP 25 | 1) 197-09-31 | 162-50-27 | 1226 44 |
| | 2) 34-19-04 | | 1226 435 |
| | M) 197-09-32 | | |
| WP-26 | 1) 114-08-33 | 245-51-29 | 471 93 |
| | 2) 228-10-07 | | 471 93 |
| | M) 114-08-335 | | |

3 JUNE 2016

F PAULSON

J. MUIR

LEICA TS06

8/1650

~~#26 N 851703~~

N 851073.5204

E 900212.9105

TRAVERSE

TOP

TR TT 6147

BSC TT 6151

BS=0° HD= 6,040.426

6040.425

TOP (1)

TT 6145 1) 07-58-04 352-01-54 7047.48

2) 15-56-09 7047.75

M) 07-58-04

BS 0 HD= 0040.42

WP-20 1) 306-07-15 53-52-48 5299.281

2) 252-14-39 5299.27

M) 306-07-15

TR WP-20

BSC WP- TT

BS 0 HD= 5299.274

WP-21 1) 169-31-14 190-28-46 1056.63

2) 339-02-29 1056.63

M) 169-31-14

3 JUNE 2016

P. DAWSON

J. MUIR

LEICA TS06

9/1650

Rite in the Rain

ATTY

TRAVERSE
CLOSE ✱

NEWP25
BSEWP-20
BS≠ØHOZ 45°79'66"

GLO
TODOS EL HIJO

T 1) 85-47-38 274-12-08 4963'58"
2) 171-35-21 4964'03"

4 June 2016
FPAULSEN
JMUIR
BLECIATSOC

10/1650

Rite in the Rain

ATM LEVEL Loop

| STA | + | HI | − | ROD | ELEV |
|---|---|---|---|---|---|
| TT-6151 | | | | | 2181 |
| | 474 | 2655 | | | |
| TP | | | 1553 | | 1102 |
| | 158 | 1260 | | | |
| TP | | | 358 | | 902 |
| | 1097 | 1999 | | | |
| TP | | | 086 | | 1913 |
| | 800 | 2713 | | | |
| MAG | | | 450 | | 2263 |
| | 442 | 2705 | | | |
| TP | | | 792 | | 1913 |
| | 255 | 2168 | | | 902 |
| TP | | | 1266 | | |
| | 380 | 1288 | | | |
| TP | | | 180 | | 1102 |
| | 1523 | 2625 | | | |
| TT-6151 | | | 444 | | 2181 |

4 JUNE 2016
E. PAULSON
J MUIR
LEICA NA12 LEVEL
46°F

1/1650

ELEV STAMPED 2181 / 7-10-16 OPUS SOLUTION = 2070

Δ = 1.11

* SET MAG SOUTH SIDE EW PUNNEN

ERROR OF CLOSURE = 000

ATH LEVEL Comm

| STN | + | HT | − | R.O.D | ELEV |
|---|---|---|---|---|---|
| MAG 1 | | | | | 2263 |
| | 567 | 7830 | | | |
| MAG 2 | | | 505 | | 2325 |
| | 544 | 2869 | | | |
| MAG 3 | | | 290 | | 2579 |
| | 573 | 3152 | | | |
| MAG 4 | | | 280 | | 2872 |
| | 762 | 3634 | | | |
| MAG 5 | | | 210 | | 3424 |
| | 754 | 4178 | | | |
| MAG 6 | | | 240 | | 3938 |
| | 768 | 4706 | | | |
| MAG 7 | | | 187 | | 4519 |
| | 721 | 5790 | | | |
| TP | | | | | |
| TIE-DOWN | | | 035 | | 5255 |
| | 045 | 5300 | | | |
| MAG 7 | | | 782 | | 4518 |
| | 214 | 4732 | | | |
| MAG 6 | | | 726 | | 3936 |
| | 251 | 4187 | | | |
| MAG 5 | | | 764 | | 3423 |
| | 218 | 3641 | | | |
| MAG 4 | | | 770 | | 2871 |
| | 288 | 3459 | | | |
| MAG 3 | | | 583 | | 2526 |
| | 282 | 2858 | | | |
| MAG 2 | | | 537 | | 2321 |
| | 462 | 2783 | | | |
| | | | 524 | | |

4 JUNE 2016 12/1650

EPAULSON X
JAMUR Ø
LEICA NA/2
Cloudy/windy
46°F

INT RW

| | ATM | LEUCHLOOP | | ROD | DIST |
|---|---|---|---|---|---|
| HP STN TIEDOWN | + | WE | − | | 52 55 |
| TP | 16 04 | 68 59 | 0 27 | | 68 32 |
| WP-20 | 7 19 | 75 51 | 3 58 | | 71 93 |
| TP | 3 50 | 75 43 | 7 11 | | 68 32 |
| TIEDOWN | 0 80 | 69 12 | 16 56 | | 52 56 |

4 JUNE 2016
FDAMSON
J MUIR
LECH MK/2

13/1650

- OPUS = JD 80 4=1 13

ATM LEVEL LOOP

| STN | + | HI | − | ROD | EDM − |
|---|---|---|---|---|---|
| WP-24 | | | | | 2923 |
| TP | 3 89 | 33 12 | 785 | | 25 27 |
| | 662 | 3194 | | | |
| WP-23 | | | 251 | | 2943 |
| | 578 | 3521 | | | |
| TP | | | 486 | | 3035 |
| | 331 | 3366 | | | |
| WP-21 | | | 689 | | |

4 JUNE 2016

F PAULSEN

I. MUIR

LEICA NA12

14/1650

RAC
2672

ATM LEVEL LOOP

| | + | HI | − | ROD | ELEV = |
|---|---|---|---|---|---|
| STO WP-24 | | | | | 2923 |
| | 173 | 3096 | | | 1964 |
| TP | | | 1132 | | |
| WP25 | 1296 | 3260 | | | 3038 |
| | | | 222 | | |
| TP | 212 | 3250 | | | 1964 |
| WP-24 | | | 1286 | | |
| | 1125 | 3089 | | | |
| | | | 166 | | |

4 JUNE 2016 15/1650

F PARISIO
J MUIR
LOOP N/A

LEVEL LOOP

| STA | + | HI | − | ROD | EL = 2923 |
|---|---|---|---|---|---|
| WP-24 | | 4471 | | | |
| TP | 1548 | | 740 | | 3731 |
| | ~~4471~~ | 5284 | 123 | | 5161 |
| WP-26 | 1553 | | | | |
| | 119 | 5280 | | | |
| TP | | | 1549 | | 3732 |
| | 254 | 3985 | | | |
| WP-24 | | | 1062 | | 2923 |

4 JUNE 2016
F PAWLSON
J. MUIR
LOOP MA/2
RANGER / CAMSON

16/1650

Rite in the Rain

LOCALIZATION

TC BASE HT = 5.02

ROVER HT = 5.07

LOCALIZE ON CONTROL POINTS

| | HORIZ | VERT |
|---|---|---|
| WP 20 | 0.03 | 0.02 |
| WP 21 | 0.01 | 0.02 |
| WP-22 | 0.02 | 0.04 |
| WP-23 | 0.05 | 0.01 |
| WP-24 | 0.06 | 0.00 |
| ~~WP-25~~ | | |
| ~~WP-26~~ | | |
| ~~TT~~ TT 6139 | 0.01 | 0.00 |
| TT 6151 | 0.00 | 0.01 |
| TT 6147 | 0.00 | 0 |

5 JUNE 2016

F. RAULSON

① MUR

TOPCON GR-3

RANGER / CARLSON SOFTWARE

17/1650

Rite in the Rain

ATTA

LOCATE - SHORELINE -
LOCATE BOTOM PIT

⊼ BASE HT = 5 02

ROVER HI = 5 07

LNECR IN WP #22 #STORE PT #1000

STORE PT HIGH TIDE LINE 1001 → 1003
= HIGHTIDE

BPB = BURN PIT BOTOM

STORE POINT 1004 → 1007

TOP WATERLANE WTR LVL = #1008 ~
SND = SAND LINE #1009 =

#1010 CHK OUT

5 JUNE 2016

R. PAULSON

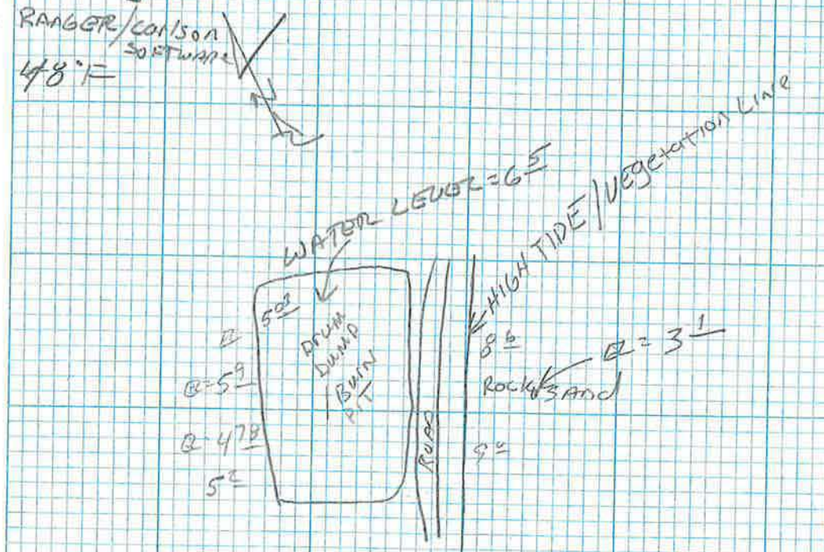
B. BARNHILL

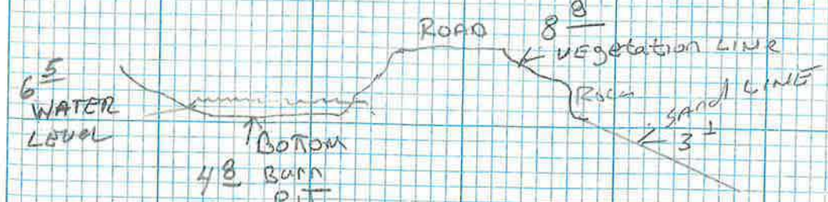
J.

TOPCON GR3

RANGER/CARLSON SOFTWARE

48°F




18/1650

Rite in the Rain

- ATTA -

STATIC
ANTENNA HT = 5 12 FEET
1.562 METERS

START 2:00
8:25

OPUS
1.397

5 JUNE 2016
EPAULSON
50° F
Cloudy

19/1650

6 June 2016
5H600I ORIGINAL ground surface
T Base HI - 4.60ft (1.403 m)
Rover HI = 5.07ft
Check in #24 Store Point 1011

OG = ORGINAL GROUND

Topo of AOI #1

~~STORE PT: 2025P 1012~~
OG 1012 → 1137
~~TOE PT. 6-6-16 HB~~
TOE-6-6-16 PT 1138 → 1149
ST = SURFACE TAR = 1150-1153
SW = SURFACE H2O SAMPLE, AOI #3 PT 4-1154
EW = EDGE OF WATER = 1155 — 1164
(-0.35)
1165 - 1187
1188 - 1224
1225 - 1260 1259
1260 - 1268
1269 - 1278
1278 - 1286
1287 ~~1~~ - 1295
1296 - 1301
1302 - 1324

6 JUNE 2016
ORIGINAL ground surface - shoot
T Base HI = 4.60 ft
~~Rover HI -~~
Check in =
40°/15-20 Knot wind
Frank Paulson
Bobby Beckman
Eric Barnhill

1325 - 1331
1332 - 1336
1337 - 1340
1341 - 1355
1356 - 1366
AOI #1 TOPO (BURN PIT Depression)

TOP 6-6-16 → 1367 — 1384 TOP = Top of depression
TOE = TOE OF BURN PIT DEPRESSION
TOE-6-6-16 → 1385 — 1408
OG = Original Ground burn pit depression
1404 - 1502 1501
CHK OUT @ #23 → 1502 Store Pt.



Rite in the Rain

7 June 2016 ATTU ISLAND

I #1866 TC WP21 HI 460 FEET
HI 140 METERS

#1865 Rover BI = 5m

Check in WP#22, ~~Stone point~~ 1503

AOI #1
Surface
Tar
Topo

OG-6-7-16 → 1504-1703 Stone point:

OG= original surveyed

OG, continued
OG-6-7-16 → 1704-1752

COF WTR-6-7-16 → 1753-1783
(EDGE Found)

OG continued
OG-6-7-16 → 1784-1806

SB = Spot Battery
SB-6-7-16 → 1802-1805
Check out WP#22 - SP=1806
(Edit out)

7 JUNE 2016
F. PAULSON
B. BECKMAN
E. BARNHILL
WINDS ≈ 30 MPH
CLOUDY, SPRINKLES
40°F
TOPCON GR3

21/1650

Rite in the Rain

STATIC

~~ANTe~~ WP-Z1 HI = 4.60 FT
HI 1.402 M

START TIME: 8:04 AM
STOP TIME: 6:20 PM

STATIC
~~ANTe~~ TT 6151 HI 4.11 FT
1.252 M
START TIME 8 36 AM
4 8:30 PM

STATIC K6
~~ANTe~~ TT 6147 HI = 3.77 FT.
HI = 1.148 M
START TIM 5:00 PM

~~ANTe~~

8 JUNE 2016
F PAWLSON

22/1650

1.402 - .170 = 1.232 M

-.170 (OPUS HI = 1.082)

1.140 - .170 = .978

Rite in the Rain

STATIC OBSERVATION

ANT WP=20 HI=4.75 START TIME
HT=1.448m 1.48 mm

1.448 - .170 = 1.278

9 JUNE 16

FP

23/1650

Rite in the Rain

ATTU ISLAND

BASE HI 4.62 feet
HI 1.410 Meters

River height 5.07

START TIME 0830 - check IN → WP 22

AOI 4 Tank area Grey Soil → GS (Grey Soil)

GS-06-12-16 → 1808 → 1811

Machine Stopped

12 JUNE

E. BARNHILL

Light breeze, dry overcast

24/1650

Rite in the Rain

Attn Island KA
June 14, 2016

BASE HI = 4.62 BASE = WP21

Rover HI = 5.07

Check In = WP.22 Store Point 1811

START TIME: 1500 hours
STOP TIME:

CRGT= Road Geotextile Placement Over Culvert
CRGT-6-14-16
1812 → 1815

RGT= Road Geotextile Placement (RGT-6-14-16)
1816- 1844

TRC = Temporary Road Center
TRC-6-14-16
1845 → 1852

CHK - Checkout 1853

14 June
Eric Barnhill

25/1650

TOPCON GR3

Partly Cloudy - @ 45°
light breeze

Rite in the Rain

HI 4.62 FT

WP 21 HI 1.410 M

START TIME - 1515

STOP TIME 1830

Rover HI 5.07

Check IN WP-22 STORE POINT 1854

MI01 = MI Sample Corners for Sample 16AT04TARMOISS

MI01-6-16 → Points 1855 → 1867

MI03 = MI Sample Corners for Decision Unit 3

MI03-6-17-16 → Points 1868 → 1871

17 JUNE 2016

E BARNHILL

26/1650

TopCon GR3

sunny ≈ 46° ; light breeze

18 June 2016
E. Barn hill
Top Con 3
Sunny ≈ 45°
Slight breeze from the South

27/1650

Base WP21 HI 4.62 feet
HI 1.410 meters

Rover height: 5.07'
Start time 1425
Stop time 1927

Check IN WP22 point: 1873

AI04

MI01E = Outer extent of increment sample 01
1874 → 897

MI01I = Interior of incremental sample 01
1898 → 1920

~~MI01T → toe of slope incremental sample 01~~

MI03E = Outer extent of Decision Unit 3 (swale)
1921 → 1939

MI03B = Bottom of Decision Unit 3 (swale)

Rite in the Rain

Sample ID: 16AT04TARG01SS/02SS
Sidewall sample
Point 1953

Sample ID: 16AT04TARG03SS
Point 1954

Check out wp.22 → Point 1955

18 June 2016
Eric Barnhill



Rite in the Rain

22 June 2016
Eric Barnhill
Fog, 40°, calm

29/1650

Base WP 21

HI 4.62 feet
HI 1.40 meters

Rover Height 5.07
Start time: 1202
STOP time:
AQI 4

Check IN:
WP23
Check IN Point
1956

MEOE - Main excavation outer extent
MEOE-6-22-16
1957 → 2010

MEB - Main Excavation Bottom
MEB-6-22-16
2011 → 2050

Asphalt Pond Extent - APE-6-22-16
2051 → 2070

Asphalt Pond Bottom - APB-6-22-16
2071-2078

Rite in the Rain

DTEE - Dual tank Excavation Extent
Excavation where two tanks sat a long

DTEE = 6-22-16

2079 → 2093

DTEB - Dual tank Excavation Bottom

DTEB - 6-22-16

2094 → 2101

Chkout = 2102 WP23

22 June 2016
Eric Barnhill
Sunny, Calm

30/1650

Rite in the Rain

Base WP 21

HI Feet - 462

HI Meters -

CHECKIN: WP23

Point 2103

START TIME: 1440

STOP TIME

Test Pitting, Post 1 for drums

2104 LN1E - Edge of burn pit

2105 LN1ETP1 - Line 1 test Pit 1 → drum present

2106 LN1ETP2 - Line 1 test Pit 2 → No drum

2107 LN1ETP3 - Line 1 test Pit 3 - No drum

2108 LN2ETP1 - Drum - Line 1 test Pit 1 - Drum Edge corrected by drum station/zone

2109 LN2ETP2 - Drum - Line 2 test Pit 2 - Drum

2110 LN2ETP3 - Drum - Line 2 test Pit 3 - Drum

2111 LN2ETP4 - NO DRUM - Line #2 test Pit 4 - NO DRUM

2112 LN3E - Edge of burn Pit

2113 LN3ETP1 - Drum - Line 3 test pit 1

2114 LN3ETP2 - Drum - Line 3 test Pit 2 - Drum

23 JUNE 2016

Eric Barnhill

sunny, light breeze

31/1650

Rite in the Rain

~~2115~~ LN3ETP3 - Drum - Line 3 test pit 3 Drum 2115
~~2116~~ LN3ETP4 - NO Drum - line 3 TP 4 No Drum 2116
LN4E - Line 4 edge of burn Pit 4 2118
~~2117~~ LN4ETP1 - DRUM - line 4 TP 1 Drum 2117
~~2118~~ LN4ETP2 - Drum - line 4 TP2 Drum 2119
~~2119 LN4ETP3 - Drum~~
2120 LN4ETB4 - NO DRUM
2121 LN5E - Edge of burn pit, line 5
2122 LN5ETP1 - Drum line 5 TP1
2123 LN5ETP2 - No Drum
2124 LN5ETP3 NO Drum
2125 LN6E Line 6 edge of excavation
2126 LN6ETP1 Drum
2127 LN6ETP2 NO DRUM
2128 LN7E Edge
2129 LN7ETP1 - NO Drum/Dirt clod
2130 LN7ETP2 - NO DRUM
2131 LN4ETP3 - Drum
CHKOUT - 2132 → WP21

24 June
Eric Barnhill
Sunny

A = WP21

start 1445
stop 2000

Check IN - WP~~23~~22 # 2132

DU2 = Outer Corners of Decision Unit 2
2133 → 2147

DUC - Decision Unit Corners
→ 2148 - 2451 - Asphalt bottom Pond DU6

DU2 SW 2452 → 2163 Decision unit 2 Sidewall Samples

~~DU2 SW~~
~~DU2~~

DUC 2164 → 2167 — smaller Swale DU 4

DUC 2168 → 2176 — 2 tank DU 5

DUC 7 2177 - 2199

Check out WP23 → 2200

Rite in the Rain

July 5 2016

Eric Barnhill

Sunny, light breeze



⅄ = WP 21

HI Feet 4662

Start 1130

HI Meters 1410

STOS 2050

CHKIN - WP-23 point → 2201

CHK OUT - WP 23 point → 2499

Lead-Extent-7-5-16 → upper edge of lead excavation

2202 → 2220

Lead toe 7-5-16 → toe of lead excavation

2221 → 2229

Lead bottom-7-5-16 → bottom of lead excavation

2230 → 2235

~~AOI4-7-5-16~~ AOI4EX-7-5-16 → Main Excavation extent

2236 → 2283

AOI4-Floor-7-5-16 → Main Excavation floor

2284 - 2313

2AOI4 EX-7-5-16
Extent of Excavation where two tarps sat
2314 → ~~2337-2333~~ 2327

2AOI4 FLOOR-7-5-16
Floor of 2 tarps excavation.
~~2339 → 233~~ 2328 → 2333

TEMP ROAD EDGE-7-5-16
AOI4 EDGE of Temporary Road
2334 → 2347

Bag lay down area → BAG01-7-5-16
2348 → 2359

Bag lay down area → BAG02-7-5-16
2360 → 2399

Extent AOI 1 Main North excavation - AOI1EX
2400 → 2440

Bottom AOI 1 main North excavation - AOI1BTM
2441 → 2491



July 5, 2016
Eric Barnhill
sunny, light breeze

Rite in the Rain

2492 - FL 16
2493 - FL 5
2494 - FL 7
2495 - FL 9
2496 - FL 2
2497 - FL 1
2498 - FL 3

Chk out WP23 → Part #2499

July 5, 2016
partly cloudy
Eni Bardhi

37/1650

Rite in the Rain

Base WP-21

START 1030
STOP 1730
CHECK IN → WP22

HI Feet 4.62
HI meters 1.410

POINT #2500

2501 → FL10
2502 → FL11
2503 → FL12
2504 → FL9
2505 → FL27
2506 → FL25
2507 → FL22
2508 → FL28
2509 → FL13
2510 → FL14
2511 → FL15
2512 → FL29
2513 → FL16
2514 → FL17
2515 → FL18
2516 → FL20
2517 → FL21
2518 → FL24
2519 → FL23
2520 → FL8
2521 → FL21
2522 → SW1
2523 → SW2
2524 → SW3
2525 → SW4

[FL = Northern AOI 1 excavation floor sample]

[SW = Northern AOI 1 excavation floor sample]

July 6, 2014



Rite in the Rain

2526 → SW 5
2527 → SW 6
2528 → SW 7
2529 → SW 8
2530 → SW 13
2531 → SW 9
2532 → SW 10
2533 → SW 11
2534 → SW 14
2535 → SW 15
2536 → SW 16
2537 → SW 17
2538 → SW 18
2539 → 2542 → METAL DEBRIS PILE

corner of metal debris pile in AOI 1 excavation

BAG LAT DOWN AREA - BAG 02-7-C-16
2543 → 2556

Borrow Area - Borrow area and load area
2557 → 2577

Borrow Pit ex - Borrow pit extent
2578 - 2593

Borrow Pit - toe - Borrow pit toe of slope
2594 → 2600

Borrow Pit - Bottom
2601 → 2606

AOI 1 Entrance Road → Borrow created entrance area
2607 → 2611
Bag frame access road centerline
2613 → 2622
Bag frame access road width
2623 → 2624

CHKOUT WP22 → POINT # 2625

July 6, 2016
cool, breezy
Eric Barnhill

39/1650

Δ base WP 21

HIfeet 4.62 feet
HImeter 1.410 meters

START: 0830
STOP : 1030

Check IN WP 22 → part # 2626

2626 CHKIN
2627 → BPFL1
2628 → BPFL3
2629 → BPFL4
2630 → BPFL5
2631 → BPFL8
2632 → BPFL7
2633 → BPFL6
2634 → BPFL11
2635 → BPFL10
2636 → BPFL9
2637 → BPFL13/14
2638 → BPFL12
2639 → BPFL15
2640 → BPFL16
2641 → BPFL17
2642 → BPFL18
2643 → BPFL19
2644 → BPFL20
2645 → BPFL21
2646 → BPFL23
2647 → BPFL24
2648 BPFL-25

BPFL = Burn Pit Floor Sample

July 7, 2016
Cloudy, breezy, light rain

Eric Barnhill

40/1650

Riot in the Ruins

2649 → BPFL26
2650 → BPSW 9
2651 → BPSW 8
2652 → BPSW 6
2653 → BPSW 5
2654 → BPSW4
2655 → BPSW 3
2656 → BPSW 2
2657 → BPSW 1

BPSW = Burn Pit Sidewall

BPEX-7-7-16 → AOI 1 Extent of burn Pit / drum dump excavation
2658 → 2675

BPTOE-7-7-16 → AOI 2 Toe of excavated area slope, burn pit
2676 → 2689

BPFLOOR-7-7-16 → AOI 3 Floor of burn pit/drum dump excavated area
2690 → 2706

WATER-DISP 2707 → First water dispersal area

July 7, 2016
Cloudy, breezy, light rain
Eric Barnhill

41/1650

Rite in the Rain

ATTU ISCAND
DATA COLLECTION CHECK H&V POSITIONS

TIE WP-21 HI = 4' 62/100 FT.
H = 1' 410/1000 M

ROVER = 5' 07

CHKIN 2708

7000 → 7026 = 06 -
06 7027 → 7062 / 7063 EX-TOE-7-8-16

EX-TOE = EXCAVATION TOE → 7063
CHKIN → 7064
Boundary Disturbed Area ADI 1 - BDA-7-8-16
Post Grading
~~7066~~ → 7065 → 7126

AREA ADI 1 - 7127 → 7139 TOE -7-8-16
7140 → 7150
7151 → 7152
7163 → 7184 TOP - 7-8-16
7185 → 7189
7190 → 7209 TOE - 7-8-16
7210 → 7228 GS - 7-8-16
7229 → 7239 EW - 7-8-16

GS = GROUND SHOT
EW = EDGE WATER

8 JULY 2016
F PAWSON
E. BARNHILL
POSS RAIN

TOPCON
GR3 / RANGER
CAMSON

42/1650

*NOTE: CHECKED HORIZONTAL AND VERTICAL POSITIONS COLLECTED BY BERS CREW WITH GPS - FROM 12 JUNE 2016 to 7 JULY 2016 ALL DATA COLLECTED WAS GOOD HORIZONTAL POSITION - VERTICAL POSITION WAS OFF 0 93/100 FEET. / THE ROVER HEIGHT WAS ENTERED AS 6.0 FEET. THE ACTUAL ROVER HEIGHT WAS 5' 07"

# POINT ELEVATION FROM POINT 1807 → 2707
ADD 0 93/100 FEET TO ELEVATIONS.

~~##~~

** # 7240 LOCATED STANDPIPE / Rifle BARREL ± 7R Above 06
Reloed - BARREL

CON-AREA 7-8-16 = CONTAINMENT AREA 7241 → 7246
DEMO PAD - 7-8-16 7247 → 7250
CHKIN - 7251

TEWA-20 HI = 520 FEET
1585 Meters

CHAIN STORE PT 7252

CONE/ - 7253 → 7260

BUILDING CON 306 7261 → 7264

WATER DISP - 7265

7266 → 7286 PCL = Proposed Centerline

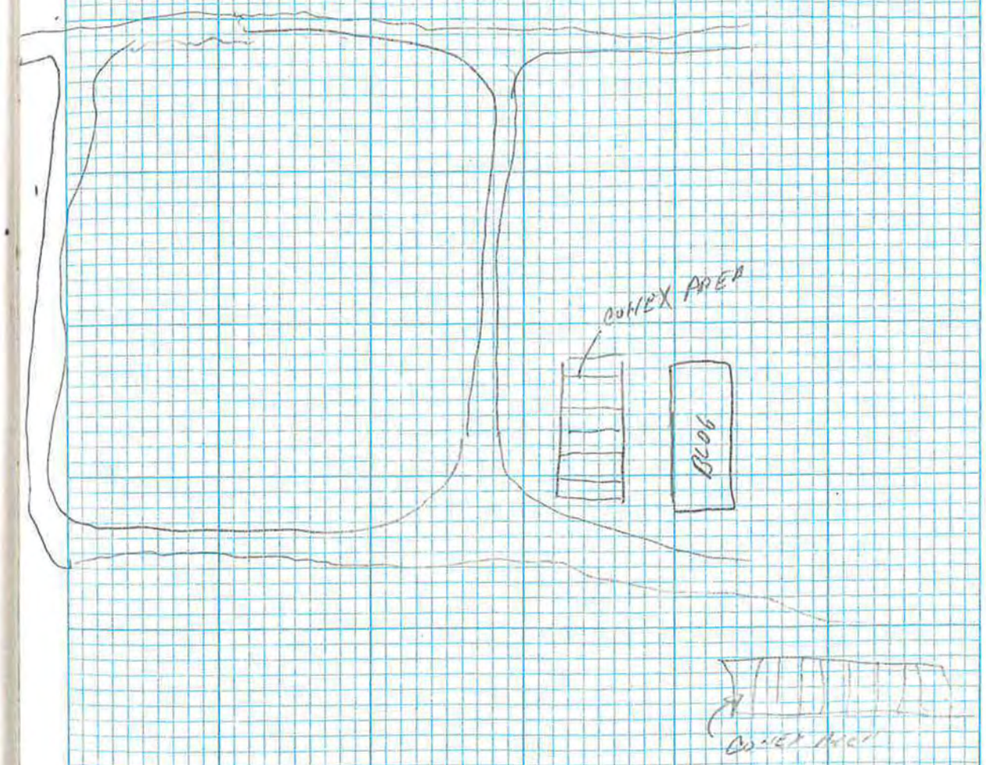
7278 PCL - INT

7287 ⇒ 7290 B.D = BARREL DUMP

7291 → 7326 TA = TAR AREA

7-9-2016
F. PAULSON
E. BARNHILL

43/1656



STATIC

BASE
⊼ @ WP-20 HI = 5.20 FT
1.585 M

START TIME: 12:23 PM
STOP TIME: 8:31 PM

ROVER
⊼ @ π-6151 HI = 4.62 FT.
HI 1.409 M.

START TIME 12:47 PM
8:47 PM

7-9-16
F PAULSON



WP-20 - 1.585 - .170 = 1.415
70.86

π-6151 1.409 - 0.170 = 1.239

OPUS SOLUTION 6.31 M ORTHO HT
20.70 FT.

NOTHING Follows



Rite in the Rain

Survey Data Table

Attu Island Environmental Clean Up 2016

| Location ID | Latitude | Longitude | Elevation | Description | Date Time | Survey Type |
|---|---|---|---|---|---|---|
| 20 | 52.833596 | 173.179070 | 70.67 | WP-20 | | RTK GPS |
| 21 | 52.834720 | 173.183475 | 25.46 | WP-21 | | RTK GPS |
| 22 | 52.834009 | 173.184947 | 10.89 | WP-22 | | RTK GPS |
| 23 | 52.836975 | 173.187221 | 28.17 | WP-23 | | RTK GPS |
| 24 | 52.838988 | 173.190267 | 27.97 | WP-24 | | RTK GPS |
| 25 | 52.840686 | 173.195055 | 29.12 | WP-25 | | RTK GPS |
| 26 | 52.840175 | 173.189420 | 50.35 | WP-26 | | RTK GPS |
| 50 | 52.832860 | 173.178857 | 74.22 | BASE | | RTK GPS |
| 54 | 52.851059 | 173.180107 | 551.14 | REF MON | DATE:11-18-2005 TIME:12:00:45 | RTK GPS |
| 1812 | 52.838491 | 173.189564 | 17.66 | CRGT-6-14-16 | DATE:06-14-2016 TIME:15:26:29 | RTK GPS |
| 1813 | 52.838499 | 173.189495 | 17.57 | CRGT-6-14-16 | DATE:06-14-2016 TIME:15:26:51 | RTK GPS |
| 1814 | 52.838608 | 173.189538 | 17.90 | CRGT-6-14-16 | DATE:06-14-2016 TIME:15:27:21 | RTK GPS |
| 1815 | 52.838603 | 173.189603 | 17.91 | CRGT-6-14-16 | DATE:06-14-2016 TIME:15:27:40 | RTK GPS |
| 1816 | 52.839188 | 173.189748 | 31.46 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:33:38 | RTK GPS |
| 1817 | 52.839136 | 173.189696 | 30.63 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:34:11 | RTK GPS |
| 1818 | 52.839133 | 173.189902 | 30.64 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:34:43 | RTK GPS |
| 1819 | 52.839082 | 173.189878 | 29.59 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:35:28 | RTK GPS |
| 1820 | 52.839081 | 173.190076 | 29.63 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:35:55 | RTK GPS |
| 1821 | 52.839032 | 173.190070 | 29.08 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:36:27 | RTK GPS |
| 1822 | 52.839032 | 173.190070 | 29.02 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:40:58 | RTK GPS |
| 1823 | 52.839038 | 173.190300 | 29.04 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:41:28 | RTK GPS |
| 1824 | 52.838990 | 173.190280 | 28.30 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:41:52 | RTK GPS |
| 1825 | 52.838995 | 173.190501 | 26.91 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:42:21 | RTK GPS |
| 1826 | 52.838949 | 173.190490 | 26.73 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:42:43 | RTK GPS |
| 1827 | 52.838961 | 173.190708 | 25.57 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:43:21 | RTK GPS |
| 1828 | 52.838915 | 173.190719 | 25.22 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:43:42 | RTK GPS |
| 1829 | 52.838972 | 173.190887 | 24.47 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:44:57 | RTK GPS |
| 1830 | 52.838932 | 173.190920 | 23.86 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:45:19 | RTK GPS |
| 1831 | 52.839002 | 173.191078 | 23.55 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:45:48 | RTK GPS |
| 1832 | 52.838968 | 173.191117 | 23.24 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:46:04 | RTK GPS |
| 1833 | 52.839049 | 173.191274 | 23.66 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:47:36 | RTK GPS |
| 1834 | 52.839016 | 173.191317 | 22.60 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:47:57 | RTK GPS |
| 1835 | 52.839112 | 173.191455 | 23.68 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:48:27 | RTK GPS |
| 1836 | 52.839079 | 173.191508 | 22.99 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:48:45 | RTK GPS |
| 1837 | 52.839175 | 173.191616 | 23.24 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:49:29 | RTK GPS |
| 1838 | 52.839142 | 173.191667 | 23.01 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:49:49 | RTK GPS |
| 1839 | 52.839239 | 173.191783 | 22.55 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:50:35 | RTK GPS |
| 1840 | 52.839218 | 173.191856 | 22.97 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:51:40 | RTK GPS |
| 1841 | 52.839315 | 173.191970 | 21.87 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:52:11 | RTK GPS |
| 1842 | 52.839286 | 173.192027 | 22.00 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:52:31 | RTK GPS |
| 1843 | 52.839387 | 173.192158 | 20.21 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:53:23 | RTK GPS |
| 1844 | 52.839356 | 173.192218 | 19.97 | RGT-6-14-16 | DATE:06-14-2016 TIME:15:53:45 | RTK GPS |
| 1855 | 52.839959 | 173.193217 | 17.50 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:05:44 | RTK GPS |
| 1856 | 52.839953 | 173.193082 | 16.77 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:32:34 | RTK GPS |
| 1857 | 52.839974 | 173.193074 | 16.70 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:32:54 | RTK GPS |
| 1858 | 52.839966 | 173.193051 | 16.79 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:33:13 | RTK GPS |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1859 | 52.839986 | 173.193043 | 17.16 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:33:32 | RTK GPS |
| 1860 | 52.839994 | 173.193064 | 16.94 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:34:19 | RTK GPS |
| 1861 | 52.840010 | 173.193075 | 16.86 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:34:39 | RTK GPS |
| 1862 | 52.840082 | 173.193019 | 17.43 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:35:03 | RTK GPS |
| 1863 | 52.840091 | 173.193070 | 16.75 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:35:20 | RTK GPS |
| 1864 | 52.840171 | 173.192995 | 17.87 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:35:50 | RTK GPS |
| 1865 | 52.840189 | 173.193070 | 18.14 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:36:16 | RTK GPS |
| 1866 | 52.840083 | 173.193127 | 16.70 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:36:43 | RTK GPS |
| 1867 | 52.840087 | 173.193153 | 19.25 | MI01-6-16-06 | DATE:06-17-2016 TIME:16:37:06 | RTK GPS |
| 1868 | 52.840600 | 173.193220 | 16.36 | MI03-6-17-06 | DATE:06-17-2016 TIME:17:58:06 | RTK GPS |
| 1869 | 52.841073 | 173.192879 | 15.82 | MI03-6-17-06 | DATE:06-17-2016 TIME:18:04:57 | RTK GPS |
| 1870 | 52.841082 | 173.192915 | 15.17 | MI03-6-17-06 | DATE:06-17-2016 TIME:18:07:54 | RTK GPS |
| 1871 | 52.840608 | 173.193254 | 16.43 | MI03-6-17-06 | DATE:06-17-2016 TIME:18:21:18 | RTK GPS |
| 1872 | 52.834009 | 173.184947 | 10.91 | CHKOUT | DATE:06-17-2016 TIME:19:19:30 | RTK GPS |
| 1873 | 52.834009 | 173.184947 | 10.90 | CHKIN | DATE:06-18-2016 TIME:14:37:47 | RTK GPS |
| 1874 | 52.839956 | 173.193176 | 17.96 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:11:41 | RTK GPS |
| 1875 | 52.839942 | 173.193124 | 17.56 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:12:02 | RTK GPS |
| 1876 | 52.839944 | 173.193060 | 17.59 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:12:27 | RTK GPS |
| 1877 | 52.839948 | 173.193045 | 17.49 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:12:43 | RTK GPS |
| 1878 | 52.839973 | 173.193025 | 17.46 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:13:05 | RTK GPS |
| 1879 | 52.840005 | 173.193061 | 17.72 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:14:09 | RTK GPS |
| 1880 | 52.840049 | 173.193023 | 17.58 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:14:27 | RTK GPS |
| 1881 | 52.840071 | 173.193013 | 17.51 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:14:43 | RTK GPS |
| 1882 | 52.840099 | 173.193054 | 17.70 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:15:06 | RTK GPS |
| 1883 | 52.840131 | 173.193040 | 18.16 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:15:29 | RTK GPS |
| 1884 | 52.840155 | 173.193003 | 17.49 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:15:46 | RTK GPS |
| 1885 | 52.840165 | 173.192998 | 17.53 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:15:59 | RTK GPS |
| 1886 | 52.840172 | 173.193004 | 17.65 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:16:11 | RTK GPS |
| 1887 | 52.840188 | 173.193070 | 17.63 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:16:30 | RTK GPS |
| 1888 | 52.840157 | 173.193079 | 17.75 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:16:50 | RTK GPS |
| 1889 | 52.840127 | 173.193108 | 17.63 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:17:09 | RTK GPS |
| 1890 | 52.840102 | 173.193120 | 18.11 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:17:41 | RTK GPS |
| 1891 | 52.840086 | 173.193153 | 19.14 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:18:03 | RTK GPS |
| 1892 | 52.840060 | 173.193170 | 18.51 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:18:18 | RTK GPS |
| 1893 | 52.840053 | 173.193191 | 18.29 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:18:29 | RTK GPS |
| 1894 | 52.840023 | 173.193203 | 18.65 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:18:57 | RTK GPS |
| 1895 | 52.840005 | 173.193208 | 18.02 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:19:19 | RTK GPS |
| 1896 | 52.839999 | 173.193214 | 17.68 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:19:34 | RTK GPS |
| 1897 | 52.839969 | 173.193224 | 17.54 | MI01E-6-18-16 | DATE:06-18-2016 TIME:15:19:54 | RTK GPS |
| 1898 | 52.839954 | 173.193075 | 16.30 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:26:29 | RTK GPS |
| 1899 | 52.839973 | 173.193056 | 16.47 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:26:52 | RTK GPS |
| 1900 | 52.839999 | 173.193071 | 16.88 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:27:09 | RTK GPS |
| 1901 | 52.839954 | 173.193097 | 16.46 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:27:27 | RTK GPS |
| 1902 | 52.839992 | 173.193092 | 16.78 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:27:45 | RTK GPS |
| 1903 | 52.840033 | 173.193068 | 16.97 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:28:00 | RTK GPS |
| 1904 | 52.840068 | 173.193044 | 16.80 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:28:16 | RTK GPS |
| 1905 | 52.840090 | 173.193060 | 17.04 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:28:33 | RTK GPS |

Survey Data Table

Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 1906 | 52.840056 | 173.193083 | 17.00 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:28:49 | RTK GPS |
| 1907 | 52.840024 | 173.193109 | 16.86 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:29:06 | RTK GPS |
| 1908 | 52.839993 | 173.193135 | 16.62 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:29:20 | RTK GPS |
| 1909 | 52.839968 | 173.193153 | 16.88 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:29:35 | RTK GPS |
| 1910 | 52.839968 | 173.193185 | 17.04 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:29:56 | RTK GPS |
| 1911 | 52.840002 | 173.193161 | 16.62 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:30:18 | RTK GPS |
| 1912 | 52.840035 | 173.193132 | 16.59 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:30:35 | RTK GPS |
| 1913 | 52.840075 | 173.193104 | 16.72 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:31:05 | RTK GPS |
| 1914 | 52.840111 | 173.193079 | 17.08 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:31:20 | RTK GPS |
| 1915 | 52.840142 | 173.193052 | 17.02 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:31:36 | RTK GPS |
| 1916 | 52.840168 | 173.193034 | 17.00 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:31:51 | RTK GPS |
| 1917 | 52.840073 | 173.193142 | 16.57 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:32:51 | RTK GPS |
| 1918 | 52.840041 | 173.193165 | 15.96 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:33:07 | RTK GPS |
| 1919 | 52.840004 | 173.193189 | 16.72 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:33:36 | RTK GPS |
| 1920 | 52.839976 | 173.193202 | 16.88 | MI01I-6-18-16 | DATE:06-18-2016 TIME:15:33:53 | RTK GPS |
| 1921 | 52.840601 | 173.193219 | 16.30 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:43:57 | RTK GPS |
| 1922 | 52.840646 | 173.193187 | 15.82 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:44:19 | RTK GPS |
| 1923 | 52.840693 | 173.193155 | 15.66 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:44:42 | RTK GPS |
| 1924 | 52.840731 | 173.193131 | 14.07 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:46:01 | RTK GPS |
| 1925 | 52.840776 | 173.193097 | 15.65 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:46:24 | RTK GPS |
| 1926 | 52.840832 | 173.193059 | 14.78 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:46:58 | RTK GPS |
| 1927 | 52.840899 | 173.193021 | 14.58 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:48:05 | RTK GPS |
| 1928 | 52.840949 | 173.192980 | 15.18 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:49:15 | RTK GPS |
| 1929 | 52.840998 | 173.192939 | 15.71 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:49:36 | RTK GPS |
| 1930 | 52.841052 | 173.192895 | 15.82 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:50:02 | RTK GPS |
| 1931 | 52.841059 | 173.192934 | 15.58 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:50:42 | RTK GPS |
| 1932 | 52.840993 | 173.192979 | 15.23 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:51:20 | RTK GPS |
| 1933 | 52.840949 | 173.193012 | 15.28 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:51:47 | RTK GPS |
| 1934 | 52.840897 | 173.193052 | 14.96 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:52:19 | RTK GPS |
| 1935 | 52.840837 | 173.193098 | 15.52 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:53:00 | RTK GPS |
| 1936 | 52.840784 | 173.193138 | 15.62 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:53:44 | RTK GPS |
| 1937 | 52.840739 | 173.193165 | 15.43 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:54:17 | RTK GPS |
| 1938 | 52.840696 | 173.193191 | 15.87 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:54:42 | RTK GPS |
| 1939 | 52.840656 | 173.193218 | 16.18 | MI03E-6-18-16 | DATE:06-18-2016 TIME:15:55:09 | RTK GPS |
| 1940 | 52.840610 | 173.193229 | 12.96 | MI03B-6-18-16 | DATE:06-18-2016 TIME:15:57:27 | RTK GPS |
| 1941 | 52.840646 | 173.193202 | 11.95 | MI03B-6-18-16 | DATE:06-18-2016 TIME:15:58:22 | RTK GPS |
| 1942 | 52.840683 | 173.193179 | 11.88 | MI03B-6-18-16 | DATE:06-18-2016 TIME:15:59:52 | RTK GPS |
| 1943 | 52.840725 | 173.193152 | 11.70 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:00:56 | RTK GPS |
| 1944 | 52.840764 | 173.193128 | 12.18 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:02:07 | RTK GPS |
| 1945 | 52.840806 | 173.193099 | 11.66 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:02:49 | RTK GPS |
| 1946 | 52.840851 | 173.193065 | 11.49 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:03:16 | RTK GPS |
| 1947 | 52.840893 | 173.193037 | 11.49 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:04:21 | RTK GPS |
| 1948 | 52.840936 | 173.193007 | 12.05 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:04:45 | RTK GPS |
| 1949 | 52.840978 | 173.192975 | 11.72 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:07:48 | RTK GPS |
| 1950 | 52.841018 | 173.192943 | 11.65 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:08:46 | RTK GPS |
| 1951 | 52.841058 | 173.192917 | 11.94 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:10:29 | RTK GPS |
| 1952 | 52.841069 | 173.192908 | 11.93 | MI03B-6-18-16 | DATE:06-18-2016 TIME:16:11:45 | RTK GPS |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1953 | 52.840099 | 173.193121 | 17.70 | 16AT04TARG01SS | DATE:06-18-2016 TIME:16:25:24 | RTK GPS |
| 1954 | 52.840038 | 173.193193 | 17.62 | 16AT04TARG03SS | DATE:06-18-2016 TIME:16:26:24 | RTK GPS |
| 1955 | 52.834009 | 173.184947 | 10.91 | CHKOUT | DATE:06-18-2016 TIME:19:28:54 | RTK GPS |
| 1956 | 52.836975 | 173.187221 | 28.11 | CHKIN | DATE:06-22-2016 TIME:12:18:48 | RTK GPS |
| 1957 | 52.840212 | 173.192890 | 17.13 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:11:58 | RTK GPS |
| 1958 | 52.840257 | 173.192853 | 17.20 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:12:21 | RTK GPS |
| 1959 | 52.840267 | 173.192818 | 16.90 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:12:43 | RTK GPS |
| 1960 | 52.840322 | 173.192856 | 16.51 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:13:02 | RTK GPS |
| 1961 | 52.840436 | 173.192884 | 16.55 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:13:27 | RTK GPS |
| 1962 | 52.840469 | 173.192876 | 16.08 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:14:23 | RTK GPS |
| 1963 | 52.840478 | 173.192794 | 16.75 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:14:51 | RTK GPS |
| 1964 | 52.840497 | 173.192739 | 16.93 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:17:09 | RTK GPS |
| 1965 | 52.840519 | 173.192731 | 16.69 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:17:30 | RTK GPS |
| 1966 | 52.840539 | 173.192756 | 16.49 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:17:51 | RTK GPS |
| 1967 | 52.840595 | 173.192744 | 16.84 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:18:17 | RTK GPS |
| 1968 | 52.840604 | 173.192746 | 16.78 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:18:32 | RTK GPS |
| 1969 | 52.840611 | 173.192731 | 17.09 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:18:49 | RTK GPS |
| 1970 | 52.840617 | 173.192746 | 16.72 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:19:04 | RTK GPS |
| 1971 | 52.840629 | 173.192759 | 17.07 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:19:22 | RTK GPS |
| 1972 | 52.840647 | 173.192735 | 17.08 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:19:41 | RTK GPS |
| 1973 | 52.840691 | 173.192738 | 17.10 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:20:10 | RTK GPS |
| 1974 | 52.840691 | 173.192787 | 17.04 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:20:37 | RTK GPS |
| 1975 | 52.840708 | 173.192796 | 17.21 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:21:05 | RTK GPS |
| 1976 | 52.840721 | 173.192700 | 16.94 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:21:29 | RTK GPS |
| 1977 | 52.840768 | 173.192738 | 17.02 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:21:53 | RTK GPS |
| 1978 | 52.840785 | 173.192780 | 17.08 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:22:24 | RTK GPS |
| 1979 | 52.840780 | 173.192852 | 16.30 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:22:59 | RTK GPS |
| 1980 | 52.840847 | 173.192794 | 15.70 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:24:00 | RTK GPS |
| 1981 | 52.840930 | 173.192733 | 15.04 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:24:26 | RTK GPS |
| 1982 | 52.840994 | 173.192673 | 14.85 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:24:51 | RTK GPS |
| 1983 | 52.841003 | 173.192699 | 15.06 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:25:52 | RTK GPS |
| 1984 | 52.840946 | 173.192755 | 15.40 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:26:27 | RTK GPS |
| 1985 | 52.840899 | 173.192808 | 14.60 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:26:57 | RTK GPS |
| 1986 | 52.840826 | 173.192872 | 15.09 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:27:27 | RTK GPS |
| 1987 | 52.840841 | 173.192896 | 15.89 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:27:54 | RTK GPS |
| 1988 | 52.840873 | 173.192964 | 14.89 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:28:23 | RTK GPS |
| 1989 | 52.840899 | 173.193003 | 15.39 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:28:52 | RTK GPS |
| 1990 | 52.840829 | 173.193051 | 14.87 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:29:21 | RTK GPS |
| 1991 | 52.840757 | 173.193040 | 16.80 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:30:06 | RTK GPS |
| 1992 | 52.840755 | 173.193092 | 15.90 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:30:28 | RTK GPS |
| 1993 | 52.840704 | 173.193137 | 15.94 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:31:01 | RTK GPS |
| 1994 | 52.840684 | 173.193080 | 16.59 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:31:28 | RTK GPS |
| 1995 | 52.840622 | 173.193077 | 16.88 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:31:51 | RTK GPS |
| 1996 | 52.840596 | 173.193110 | 16.75 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:32:12 | RTK GPS |
| 1997 | 52.840543 | 173.193106 | 16.42 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:32:43 | RTK GPS |
| 1998 | 52.840525 | 173.193132 | 17.25 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:33:02 | RTK GPS |
| 1999 | 52.840509 | 173.193125 | 17.56 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:33:16 | RTK GPS |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 2000 | 52.840480 | 173.193076 | 17.38 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:33:34 | RTK GPS |
| 2001 | 52.840438 | 173.193088 | 17.53 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:33:53 | RTK GPS |
| 2002 | 52.840430 | 173.193044 | 16.77 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:34:13 | RTK GPS |
| 2003 | 52.840396 | 173.192998 | 16.40 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:34:35 | RTK GPS |
| 2004 | 52.840377 | 173.193020 | 17.08 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:34:54 | RTK GPS |
| 2005 | 52.840318 | 173.193034 | 17.72 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:35:25 | RTK GPS |
| 2006 | 52.840292 | 173.193029 | 17.28 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:35:58 | RTK GPS |
| 2007 | 52.840283 | 173.193033 | 18.35 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:36:14 | RTK GPS |
| 2008 | 52.840244 | 173.192949 | 16.85 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:36:37 | RTK GPS |
| 2009 | 52.840221 | 173.192951 | 16.94 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:36:54 | RTK GPS |
| 2010 | 52.840216 | 173.192924 | 16.66 | MEOE-6-22-16 | DATE:06-22-2016 TIME:14:37:13 | RTK GPS |
| 2011 | 52.840474 | 173.192784 | 16.67 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:32:19 | RTK GPS |
| 2012 | 52.840546 | 173.192775 | 16.40 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:32:42 | RTK GPS |
| 2013 | 52.840610 | 173.192769 | 16.11 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:33:04 | RTK GPS |
| 2014 | 52.840672 | 173.192763 | 16.40 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:33:25 | RTK GPS |
| 2015 | 52.840474 | 173.192844 | 16.63 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:34:02 | RTK GPS |
| 2016 | 52.840484 | 173.192876 | 16.19 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:34:29 | RTK GPS |
| 2017 | 52.840553 | 173.192870 | 15.96 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:34:49 | RTK GPS |
| 2018 | 52.840624 | 173.192870 | 15.28 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:35:09 | RTK GPS |
| 2019 | 52.840693 | 173.192873 | 16.25 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:35:30 | RTK GPS |
| 2020 | 52.840756 | 173.192861 | 15.89 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:35:54 | RTK GPS |
| 2021 | 52.840248 | 173.192909 | 16.45 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:37:11 | RTK GPS |
| 2022 | 52.840314 | 173.192928 | 16.53 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:37:29 | RTK GPS |
| 2023 | 52.840382 | 173.192943 | 16.42 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:37:50 | RTK GPS |
| 2024 | 52.840447 | 173.192960 | 16.26 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:38:17 | RTK GPS |
| 2025 | 52.840511 | 173.192966 | 15.79 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:39:15 | RTK GPS |
| 2026 | 52.840578 | 173.192984 | 15.34 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:39:40 | RTK GPS |
| 2027 | 52.840589 | 173.192980 | 14.11 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:39:57 | RTK GPS |
| 2028 | 52.840614 | 173.192975 | 13.14 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:40:19 | RTK GPS |
| 2029 | 52.840669 | 173.192970 | 12.31 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:40:39 | RTK GPS |
| 2030 | 52.840696 | 173.192974 | 13.36 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:43:30 | RTK GPS |
| 2031 | 52.840738 | 173.192957 | 13.01 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:43:48 | RTK GPS |
| 2032 | 52.840745 | 173.192953 | 14.19 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:44:05 | RTK GPS |
| 2033 | 52.840802 | 173.192925 | 14.47 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:44:22 | RTK GPS |
| 2034 | 52.840847 | 173.192912 | 14.68 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:44:43 | RTK GPS |
| 2035 | 52.840864 | 173.192993 | 14.05 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:45:09 | RTK GPS |
| 2036 | 52.840815 | 173.193031 | 14.91 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:45:28 | RTK GPS |
| 2037 | 52.840741 | 173.193078 | 13.96 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:46:08 | RTK GPS |
| 2038 | 52.840701 | 173.193109 | 13.73 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:47:05 | RTK GPS |
| 2039 | 52.840533 | 173.193091 | 15.94 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:47:44 | RTK GPS |
| 2040 | 52.840468 | 173.193057 | 16.44 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:48:03 | RTK GPS |
| 2041 | 52.840381 | 173.193003 | 15.87 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:48:31 | RTK GPS |
| 2042 | 52.840327 | 173.193010 | 16.12 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:48:50 | RTK GPS |
| 2043 | 52.840289 | 173.193009 | 16.38 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:49:10 | RTK GPS |
| 2044 | 52.840776 | 173.192886 | 13.98 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:53:07 | RTK GPS |
| 2045 | 52.840785 | 173.192878 | 11.93 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:54:01 | RTK GPS |
| 2046 | 52.840836 | 173.192835 | 11.45 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:55:06 | RTK GPS |

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|---|---|---|---|---|---|---|
| 2047 | 52.840879 | 173.192802 | 11.19 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:55:37 | RTK GPS |
| 2048 | 52.840930 | 173.192753 | 11.68 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:56:21 | RTK GPS |
| 2049 | 52.840988 | 173.192695 | 12.15 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:56:46 | RTK GPS |
| 2050 | 52.841000 | 173.192686 | 12.06 | MEB-6-22-16 | DATE:06-22-2016 TIME:15:57:02 | RTK GPS |
| 2051 | 52.840336 | 173.192735 | 16.34 | APE-6-22-16 | DATE:06-22-2016 TIME:16:07:27 | RTK GPS |
| 2052 | 52.840293 | 173.192730 | 16.61 | APE-6-22-16 | DATE:06-22-2016 TIME:16:07:46 | RTK GPS |
| 2053 | 52.840335 | 173.192693 | 16.68 | APE-6-22-16 | DATE:06-22-2016 TIME:16:08:20 | RTK GPS |
| 2054 | 52.840333 | 173.192675 | 16.90 | APE-6-22-16 | DATE:06-22-2016 TIME:16:08:35 | RTK GPS |
| 2055 | 52.840347 | 173.192654 | 16.67 | APE-6-22-16 | DATE:06-22-2016 TIME:16:08:52 | RTK GPS |
| 2056 | 52.840366 | 173.192653 | 16.55 | APE-6-22-16 | DATE:06-22-2016 TIME:16:09:11 | RTK GPS |
| 2057 | 52.840443 | 173.192604 | 16.14 | APE-6-22-16 | DATE:06-22-2016 TIME:16:09:43 | RTK GPS |
| 2058 | 52.840506 | 173.192551 | 16.57 | APE-6-22-16 | DATE:06-22-2016 TIME:16:10:05 | RTK GPS |
| 2059 | 52.840568 | 173.192513 | 16.74 | APE-6-22-16 | DATE:06-22-2016 TIME:16:10:26 | RTK GPS |
| 2060 | 52.840632 | 173.192460 | 16.66 | APE-6-22-16 | DATE:06-22-2016 TIME:16:10:47 | RTK GPS |
| 2061 | 52.840673 | 173.192440 | 16.02 | APE-6-22-16 | DATE:06-22-2016 TIME:16:11:08 | RTK GPS |
| 2062 | 52.840678 | 173.192465 | 15.80 | APE-6-22-16 | DATE:06-22-2016 TIME:16:11:28 | RTK GPS |
| 2063 | 52.840667 | 173.192482 | 16.16 | APE-6-22-16 | DATE:06-22-2016 TIME:16:11:43 | RTK GPS |
| 2064 | 52.840628 | 173.192510 | 16.36 | APE-6-22-16 | DATE:06-22-2016 TIME:16:12:05 | RTK GPS |
| 2065 | 52.840556 | 173.192574 | 16.47 | APE-6-22-16 | DATE:06-22-2016 TIME:16:12:27 | RTK GPS |
| 2066 | 52.840495 | 173.192620 | 16.78 | APE-6-22-16 | DATE:06-22-2016 TIME:16:12:50 | RTK GPS |
| 2067 | 52.840463 | 173.192652 | 16.68 | APE-6-22-16 | DATE:06-22-2016 TIME:16:13:09 | RTK GPS |
| 2068 | 52.840389 | 173.192700 | 15.96 | APE-6-22-16 | DATE:06-22-2016 TIME:16:13:30 | RTK GPS |
| 2069 | 52.840371 | 173.192694 | 16.21 | APE-6-22-16 | DATE:06-22-2016 TIME:16:13:46 | RTK GPS |
| 2070 | 52.840361 | 173.192718 | 16.40 | APE-6-22-16 | DATE:06-22-2016 TIME:16:14:03 | RTK GPS |
| 2071 | 52.840308 | 173.192730 | 16.22 | APB-6-22-16 | DATE:06-22-2016 TIME:16:16:00 | RTK GPS |
| 2072 | 52.840361 | 173.192690 | 15.58 | APB-6-22-16 | DATE:06-22-2016 TIME:16:16:21 | RTK GPS |
| 2073 | 52.840415 | 173.192652 | 15.85 | APB-6-22-16 | DATE:06-22-2016 TIME:16:16:40 | RTK GPS |
| 2074 | 52.840472 | 173.192607 | 15.96 | APB-6-22-16 | DATE:06-22-2016 TIME:16:17:02 | RTK GPS |
| 2075 | 52.840532 | 173.192558 | 15.74 | APB-6-22-16 | DATE:06-22-2016 TIME:16:17:27 | RTK GPS |
| 2076 | 52.840589 | 173.192517 | 15.37 | APB-6-22-16 | DATE:06-22-2016 TIME:16:17:49 | RTK GPS |
| 2077 | 52.840638 | 173.192478 | 15.26 | APB-6-22-16 | DATE:06-22-2016 TIME:16:18:08 | RTK GPS |
| 2078 | 52.840675 | 173.192453 | 15.24 | APB-6-22-16 | DATE:06-22-2016 TIME:16:18:32 | RTK GPS |
| 2079 | 52.840436 | 173.191940 | 17.30 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:29:50 | RTK GPS |
| 2080 | 52.840439 | 173.191885 | 18.02 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:30:20 | RTK GPS |
| 2081 | 52.840471 | 173.191855 | 17.84 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:30:40 | RTK GPS |
| 2082 | 52.840513 | 173.191854 | 17.98 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:30:57 | RTK GPS |
| 2083 | 52.840546 | 173.191886 | 17.91 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:31:13 | RTK GPS |
| 2084 | 52.840534 | 173.191944 | 17.81 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:31:36 | RTK GPS |
| 2085 | 52.840546 | 173.191974 | 18.25 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:31:52 | RTK GPS |
| 2086 | 52.840546 | 173.192017 | 17.84 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:32:15 | RTK GPS |
| 2087 | 52.840534 | 173.192081 | 18.01 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:32:45 | RTK GPS |
| 2088 | 52.840522 | 173.192101 | 17.60 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:32:58 | RTK GPS |
| 2089 | 52.840507 | 173.192102 | 17.54 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:33:12 | RTK GPS |
| 2090 | 52.840476 | 173.192020 | 16.89 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:33:31 | RTK GPS |
| 2091 | 52.840471 | 173.192039 | 17.07 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:33:42 | RTK GPS |
| 2092 | 52.840477 | 173.191976 | 16.79 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:34:00 | RTK GPS |
| 2093 | 52.840467 | 173.191978 | 17.12 | DTEE-6-22-16 | DATE:06-22-2016 TIME:16:34:12 | RTK GPS |

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|---|---|---|---|---|---|---|
| 2094 | 52.840456 | 173.191902 | 14.96 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:37:28 | RTK GPS |
| 2095 | 52.840442 | 173.191907 | 15.55 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:37:43 | RTK GPS |
| 2096 | 52.840489 | 173.191893 | 15.71 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:38:14 | RTK GPS |
| 2097 | 52.840539 | 173.191907 | 16.37 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:38:34 | RTK GPS |
| 2098 | 52.840538 | 173.191994 | 16.80 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:38:53 | RTK GPS |
| 2099 | 52.840500 | 173.191992 | 16.35 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:39:09 | RTK GPS |
| 2100 | 52.840515 | 173.192057 | 16.95 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:39:24 | RTK GPS |
| 2101 | 52.840484 | 173.192029 | 17.07 | DTEB-6-22-16 | DATE:06-22-2016 TIME:16:39:36 | RTK GPS |
| 2102 | 52.836975 | 173.187221 | 28.05 | CHKOUT | DATE:06-22-2016 TIME:18:46:09 | RTK GPS |
| 2103 | 52.834009 | 173.184947 | 10.93 | CHKIN | DATE:06-23-2016 TIME:15:04:21 | RTK GPS |
| 2104 | 52.834683 | 173.185856 | 8.14 | LN1E | DATE:06-23-2016 TIME:15:15:10 | RTK GPS |
| 2105 | 52.834731 | 173.185947 | 7.00 | LN1ETP1 | DATE:06-23-2016 TIME:15:16:26 | RTK GPS |
| 2106 | 52.834781 | 173.186034 | 8.52 | LN1ETP2 | DATE:06-23-2016 TIME:15:22:06 | RTK GPS |
| 2107 | 52.834820 | 173.186114 | 8.83 | LN1ETP3 | DATE:06-23-2016 TIME:15:27:08 | RTK GPS |
| 2108 | 52.834802 | 173.185946 | 8.68 | LN2ETP1-DRUM | DATE:06-23-2016 TIME:15:30:58 | RTK GPS |
| 2109 | 52.834819 | 173.186005 | 8.33 | LN2ETP2-DRUM | DATE:06-23-2016 TIME:15:34:00 | RTK GPS |
| 2110 | 52.834856 | 173.186054 | 8.40 | LN2ETP3-DRUM | DATE:06-23-2016 TIME:15:36:24 | RTK GPS |
| 2111 | 52.834944 | 173.186204 | 8.73 | LN2ETP4-NO | DATE:06-23-2016 TIME:15:40:43 | RTK GPS |
| 2112 | 52.834773 | 173.185809 | 8.04 | LN2E | DATE:06-23-2016 TIME:15:45:37 | RTK GPS |
| 2113 | 52.834821 | 173.185916 | 8.76 | LN2ETP1-DRUM | DATE:06-23-2016 TIME:15:47:10 | RTK GPS |
| 2114 | 52.834857 | 173.185967 | 8.92 | LN2ETP2-DRUM | DATE:06-23-2016 TIME:15:50:44 | RTK GPS |
| 2115 | 52.834879 | 173.186017 | 8.66 | LN2ETP3-DRUM | DATE:06-23-2016 TIME:15:59:14 | RTK GPS |
| 2116 | 52.834953 | 173.186129 | 9.01 | LN2ETP4-NO | DATE:06-23-2016 TIME:16:03:06 | RTK GPS |
| 2117 | 52.834831 | 173.185806 | 8.93 | LN4ETP1-DRUM | DATE:06-23-2016 TIME:16:07:16 | RTK GPS |
| 2118 | 52.834812 | 173.185739 | 8.27 | LN4E | DATE:06-23-2016 TIME:16:09:27 | RTK GPS |
| 2119 | 52.834856 | 173.185851 | 9.15 | LN4ETP2-DRUM | DATE:06-23-2016 TIME:16:11:58 | RTK GPS |
| 2120 | 52.834890 | 173.185908 | 9.63 | LN4ETP4-NO | DATE:06-23-2016 TIME:16:25:04 | RTK GPS |
| 2121 | 52.834850 | 173.185700 | 9.29 | LN5E | DATE:06-23-2016 TIME:16:27:10 | RTK GPS |
| 2122 | 52.834873 | 173.185757 | 9.85 | LN5ETP1-DRUM | DATE:06-23-2016 TIME:16:27:57 | RTK GPS |
| 2123 | 52.834917 | 173.185834 | 10.01 | LN5ETP2-NO | DATE:06-23-2016 TIME:16:45:29 | RTK GPS |
| 2124 | 52.834944 | 173.185898 | 10.21 | LN5ETP3-NO | DATE:06-23-2016 TIME:16:46:18 | RTK GPS |
| 2125 | 52.834887 | 173.185663 | 9.42 | LN6E | DATE:06-23-2016 TIME:16:48:17 | RTK GPS |
| 2126 | 52.834911 | 173.185707 | 10.16 | LN6ETP1 | DATE:06-23-2016 TIME:16:51:24 | RTK GPS |
| 2127 | 52.834943 | 173.185815 | 10.41 | LN6ETP2-NO | DATE:06-23-2016 TIME:16:57:14 | RTK GPS |
| 2128 | 52.834903 | 173.185615 | 9.90 | LN7E | DATE:06-23-2016 TIME:17:00:31 | RTK GPS |
| 2129 | 52.834942 | 173.185625 | 10.37 | LN7ETP1-NO | DATE:06-23-2016 TIME:17:02:00 | RTK GPS |
| 2130 | 52.834976 | 173.185705 | 10.43 | LN7ETP2-NO | DATE:06-23-2016 TIME:17:04:58 | RTK GPS |
| 2612 | 52.834896 | 173.186156 | 8.81 | AOI1 | DATE:07-06-2016 TIME:16:16:05 | RTK GPS |
| 2613 | 52.834875 | 173.186102 | 9.07 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:17:58 | RTK GPS |
| 2614 | 52.834889 | 173.185977 | 9.35 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:18:19 | RTK GPS |
| 2615 | 52.834922 | 173.185852 | 10.14 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:18:35 | RTK GPS |
| 2616 | 52.834964 | 173.185778 | 10.39 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:18:54 | RTK GPS |
| 2617 | 52.835052 | 173.185762 | 10.31 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:19:15 | RTK GPS |
| 2618 | 52.835121 | 173.185773 | 10.87 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:19:34 | RTK GPS |
| 2619 | 52.835251 | 173.185903 | 11.63 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:20:21 | RTK GPS |
| 2620 | 52.835372 | 173.186068 | 12.75 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:20:46 | RTK GPS |
| 2621 | 52.835451 | 173.186212 | 13.42 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:21:08 | RTK GPS |

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| 2622 | 52.835537 | 173.186389 | 12.27 | BAGFRAMEACCESSROADCENTERLINE | DATE:07-06-2016 TIME:16:21:31 | RTK GPS |
| 2623 | 52.835504 | 173.186398 | 11.93 | BAGFRAMEACCESSROADWIDTH | DATE:07-06-2016 TIME:16:22:47 | RTK GPS |
| 2624 | 52.835562 | 173.186343 | 12.74 | BAGFRAMEACCESSROADWIDTH | DATE:07-06-2016 TIME:16:23:10 | RTK GPS |
| 2625 | 52.834009 | 173.184947 | 10.88 | CHKOUT | DATE:07-06-2016 TIME:16:33:51 | RTK GPS |
| 2626 | 52.834009 | 173.184947 | 10.93 | CHKIN | DATE:07-07-2016 TIME:09:07:04 | RTK GPS |
| 2627 | 52.834532 | 173.185550 | 2.96 | BPFL1 | DATE:07-07-2016 TIME:09:12:09 | RTK GPS |
| 2628 | 52.834559 | 173.185465 | 3.68 | BPFL3 | DATE:07-07-2016 TIME:09:12:58 | RTK GPS |
| 2629 | 52.834580 | 173.185496 | 3.28 | BPFL4 | DATE:07-07-2016 TIME:09:13:41 | RTK GPS |
| 2630 | 52.834613 | 173.185493 | 3.74 | BPFL5 | DATE:07-07-2016 TIME:09:15:14 | RTK GPS |
| 2631 | 52.834634 | 173.185548 | 3.72 | BPFL8 | DATE:07-07-2016 TIME:09:15:50 | RTK GPS |
| 2632 | 52.834609 | 173.185578 | 2.99 | BPFL7 | DATE:07-07-2016 TIME:09:17:35 | RTK GPS |
| 2633 | 52.834568 | 173.185617 | 2.90 | BPFL6 | DATE:07-07-2016 TIME:09:18:20 | RTK GPS |
| 2634 | 52.834593 | 173.185671 | 3.43 | BPFL11 | DATE:07-07-2016 TIME:09:19:24 | RTK GPS |
| 2635 | 52.834627 | 173.185628 | 3.53 | BPFL10 | DATE:07-07-2016 TIME:09:19:55 | RTK GPS |
| 2636 | 52.834654 | 173.185597 | 4.07 | BPFL9 | DATE:07-07-2016 TIME:09:20:33 | RTK GPS |
| 2637 | 52.834684 | 173.185646 | 4.24 | BPFL13/14 | DATE:07-07-2016 TIME:09:21:17 | RTK GPS |
| 2638 | 52.834656 | 173.185685 | 3.37 | BPFL12 | DATE:07-07-2016 TIME:09:25:58 | RTK GPS |
| 2639 | 52.834715 | 173.185723 | 3.78 | BPFL15 | DATE:07-07-2016 TIME:09:27:18 | RTK GPS |
| 2640 | 52.834690 | 173.185748 | 3.33 | BPFL16 | DATE:07-07-2016 TIME:09:28:53 | RTK GPS |
| 2641 | 52.834651 | 173.185801 | 2.58 | BPFL17 | DATE:07-07-2016 TIME:09:29:49 | RTK GPS |
| 2642 | 52.834732 | 173.185786 | 3.02 | BPFL18 | DATE:07-07-2016 TIME:09:30:36 | RTK GPS |
| 2643 | 52.834775 | 173.185765 | 3.48 | BPFL19 | DATE:07-07-2016 TIME:09:31:30 | RTK GPS |
| 2644 | 52.834781 | 173.185670 | 3.75 | BPFL20 | DATE:07-07-2016 TIME:09:34:53 | RTK GPS |
| 2645 | 52.834845 | 173.185630 | 4.10 | BPFL21 | DATE:07-07-2016 TIME:09:35:36 | RTK GPS |
| 2646 | 52.834880 | 173.185613 | 3.97 | BPFL23 | DATE:07-07-2016 TIME:09:36:25 | RTK GPS |
| 2647 | 52.834863 | 173.185558 | 3.93 | BPFL24 | DATE:07-07-2016 TIME:09:37:15 | RTK GPS |
| 2648 | 52.834822 | 173.185558 | 4.00 | BPFL25 | DATE:07-07-2016 TIME:09:38:58 | RTK GPS |
| 2649 | 52.834731 | 173.185533 | 3.82 | BPFL26 | DATE:07-07-2016 TIME:09:39:57 | RTK GPS |
| 2650 | 52.834546 | 173.185478 | 4.63 | BPSW9 | DATE:07-07-2016 TIME:09:43:33 | RTK GPS |
| 2651 | 52.834515 | 173.185543 | 4.57 | BPSW8 | DATE:07-07-2016 TIME:09:44:20 | RTK GPS |
| 2652 | 52.834651 | 173.185819 | 2.99 | BPSW6 | DATE:07-07-2016 TIME:09:45:44 | RTK GPS |
| 2653 | 52.834829 | 173.185721 | 4.48 | BPSW5 | DATE:07-07-2016 TIME:09:46:41 | RTK GPS |
| 2654 | 52.834864 | 173.185663 | 5.10 | BPSW4 | DATE:07-07-2016 TIME:09:48:11 | RTK GPS |
| 2655 | 52.834892 | 173.185588 | 5.19 | BPSW3 | DATE:07-07-2016 TIME:09:49:04 | RTK GPS |
| 2656 | 52.834835 | 173.185531 | 4.66 | BPSW2 | DATE:07-07-2016 TIME:09:49:37 | RTK GPS |
| 2657 | 52.834787 | 173.185570 | 4.84 | BPSW1 | DATE:07-07-2016 TIME:09:50:13 | RTK GPS |
| 2658 | 52.834753 | 173.185539 | 7.16 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:52:31 | RTK GPS |
| 2659 | 52.834735 | 173.185492 | 6.37 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:53:13 | RTK GPS |
| 2660 | 52.834706 | 173.185462 | 6.55 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:53:26 | RTK GPS |
| 2661 | 52.834593 | 173.185420 | 6.69 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:53:48 | RTK GPS |
| 2662 | 52.834549 | 173.185442 | 7.85 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:54:09 | RTK GPS |
| 2663 | 52.834500 | 173.185554 | 8.22 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:55:12 | RTK GPS |
| 2664 | 52.834623 | 173.185746 | 3.78 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:55:43 | RTK GPS |
| 2665 | 52.834615 | 173.185786 | 4.49 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:55:59 | RTK GPS |
| 2666 | 52.834673 | 173.185871 | 8.63 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:56:20 | RTK GPS |
| 2667 | 52.834760 | 173.185829 | 7.69 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:56:48 | RTK GPS |
| 2668 | 52.834826 | 173.185750 | 8.58 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:57:09 | RTK GPS |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

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| 2669 | 52.834861 | 173.185672 | 8.83 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:57:28 | RTK GPS |
| 2670 | 52.834896 | 173.185658 | 10.09 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:57:46 | RTK GPS |
| 2671 | 52.834893 | 173.185579 | 8.97 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:58:05 | RTK GPS |
| 2672 | 52.834890 | 173.185555 | 9.26 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:58:20 | RTK GPS |
| 2673 | 52.834858 | 173.185526 | 8.40 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:58:42 | RTK GPS |
| 2674 | 52.834787 | 173.185565 | 6.94 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:59:04 | RTK GPS |
| 2675 | 52.834761 | 173.185553 | 5.60 | BPEX-7-7-16 | DATE:07-07-2016 TIME:09:59:22 | RTK GPS |
| 2676 | 52.834747 | 173.185568 | 3.35 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:02:11 | RTK GPS |
| 2677 | 52.834710 | 173.185493 | 3.81 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:02:28 | RTK GPS |
| 2678 | 52.834644 | 173.185463 | 3.30 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:02:55 | RTK GPS |
| 2679 | 52.834607 | 173.185451 | 4.62 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:03:13 | RTK GPS |
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| 2681 | 52.834510 | 173.185566 | 4.57 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:03:52 | RTK GPS |
| 2682 | 52.834548 | 173.185614 | 4.42 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:04:10 | RTK GPS |
| 2683 | 52.834641 | 173.185798 | 2.95 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:04:35 | RTK GPS |
| 2684 | 52.834685 | 173.185829 | 3.04 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:04:55 | RTK GPS |
| 2131 | 52.834865 | 173.185871 | 9.59 | LN4ETP3-DRUM | DATE:06-23-2016 TIME:18:06:44 | RTK GPS |
| 2132 | 52.834009 | 173.184947 | 10.92 | CHKOUT | DATE:06-23-2016 TIME:19:09:16 | RTK GPS |
| 2133 | 52.840583 | 173.192884 | 14.75 | DU2 | DATE:06-24-2016 TIME:14:40:29 | RTK GPS |
| 2134 | 52.840606 | 173.193019 | 13.39 | DU2 | DATE:06-24-2016 TIME:14:40:52 | RTK GPS |
| 2135 | 52.840623 | 173.192999 | 12.60 | DU2 | DATE:06-24-2016 TIME:14:41:06 | RTK GPS |
| 2136 | 52.840631 | 173.193022 | 12.33 | DU2 | DATE:06-24-2016 TIME:14:41:18 | RTK GPS |
| 2137 | 52.840572 | 173.193083 | 12.73 | DU2 | DATE:06-24-2016 TIME:14:41:37 | RTK GPS |
| 2138 | 52.840586 | 173.193104 | 12.89 | DU2 | DATE:06-24-2016 TIME:14:42:17 | RTK GPS |
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| 2143 | 52.840751 | 173.193096 | 14.00 | DU2 | DATE:06-24-2016 TIME:14:43:43 | RTK GPS |
| 2144 | 52.840737 | 173.193048 | 13.25 | DU2 | DATE:06-24-2016 TIME:14:43:58 | RTK GPS |
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| 2146 | 52.840738 | 173.192957 | 12.99 | DU2 | DATE:06-24-2016 TIME:14:44:29 | RTK GPS |
| 2147 | 52.840590 | 173.192881 | 15.27 | DU2 | DATE:06-24-2016 TIME:14:44:54 | RTK GPS |
| 2148 | 52.840331 | 173.192738 | 16.74 | DUC | DATE:06-24-2016 TIME:14:46:39 | RTK GPS |
| 2149 | 52.840322 | 173.192697 | 16.87 | DUC | DATE:06-24-2016 TIME:14:46:56 | RTK GPS |
| 2150 | 52.840670 | 173.192434 | 16.37 | DUC | DATE:06-24-2016 TIME:14:47:48 | RTK GPS |
| 2151 | 52.840678 | 173.192468 | 15.94 | DUC | DATE:06-24-2016 TIME:14:48:06 | RTK GPS |
| 2152 | 52.840635 | 173.192901 | 15.69 | DU2SW | DATE:06-24-2016 TIME:14:49:56 | RTK GPS |
| 2153 | 52.840656 | 173.192912 | 15.27 | DU2SW | DATE:06-24-2016 TIME:14:50:09 | RTK GPS |
| 2154 | 52.840675 | 173.192922 | 14.84 | DU2SW | DATE:06-24-2016 TIME:14:50:24 | RTK GPS |
| 2155 | 52.840701 | 173.192932 | 14.65 | DU2SW | DATE:06-24-2016 TIME:14:50:46 | RTK GPS |
| 2156 | 52.840721 | 173.192934 | 13.88 | DU2SW | DATE:06-24-2016 TIME:14:51:01 | RTK GPS |
| 2157 | 52.840745 | 173.192969 | 14.06 | DU2SW | DATE:06-24-2016 TIME:14:51:17 | RTK GPS |
| 2158 | 52.840757 | 173.193004 | 14.58 | DU2SW | DATE:06-24-2016 TIME:14:51:31 | RTK GPS |
| 2159 | 52.840756 | 173.193038 | 16.15 | DU2SW | DATE:06-24-2016 TIME:14:51:49 | RTK GPS |
| 2160 | 52.840752 | 173.193060 | 15.53 | DU2SW | DATE:06-24-2016 TIME:14:52:08 | RTK GPS |
| 2161 | 52.840753 | 173.193096 | 14.58 | DU2SW | DATE:06-24-2016 TIME:14:52:31 | RTK GPS |

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| 2162 | 52.840710 | 173.193131 | 14.63 | DU2SW | DATE:06-24-2016 TIME:14:52:57 | RTK GPS |
| 2163 | 52.840694 | 173.193098 | 14.76 | DU2SW | DATE:06-24-2016 TIME:14:53:09 | RTK GPS |
| 2164 | 52.840770 | 173.192857 | 16.21 | DUC | DATE:06-24-2016 TIME:14:56:55 | RTK GPS |
| 2165 | 52.840994 | 173.192672 | 14.92 | DUC | DATE:06-24-2016 TIME:14:58:26 | RTK GPS |
| 2166 | 52.841004 | 173.192699 | 15.20 | DUC | DATE:06-24-2016 TIME:14:58:48 | RTK GPS |
| 2167 | 52.840787 | 173.192904 | 14.62 | DUC | DATE:06-24-2016 TIME:15:02:16 | RTK GPS |
| 2168 | 52.840516 | 173.192098 | 17.60 | DUC | DATE:06-24-2016 TIME:15:07:55 | RTK GPS |
| 2169 | 52.840489 | 173.192046 | 17.04 | DUC | DATE:06-24-2016 TIME:15:08:11 | RTK GPS |
| 2170 | 52.840469 | 173.192034 | 17.33 | DUC | DATE:06-24-2016 TIME:15:08:28 | RTK GPS |
| 2171 | 52.840463 | 173.191968 | 17.02 | DUC | DATE:06-24-2016 TIME:15:08:51 | RTK GPS |
| 2172 | 52.840438 | 173.191890 | 17.93 | DUC | DATE:06-24-2016 TIME:15:09:18 | RTK GPS |
| 2173 | 52.840473 | 173.191855 | 17.85 | DUC | DATE:06-24-2016 TIME:15:09:39 | RTK GPS |
| 2174 | 52.840547 | 173.191886 | 17.92 | DUC | DATE:06-24-2016 TIME:15:09:58 | RTK GPS |
| 2175 | 52.840536 | 173.191943 | 17.98 | DUC | DATE:06-24-2016 TIME:15:10:10 | RTK GPS |
| 2176 | 52.840541 | 173.192030 | 17.58 | DUC | DATE:06-24-2016 TIME:15:10:26 | RTK GPS |
| 2177 | 52.840484 | 173.192787 | 16.68 | DUC7 | DATE:06-24-2016 TIME:15:17:32 | RTK GPS |
| 2178 | 52.840537 | 173.192755 | 16.64 | DUC7 | DATE:06-24-2016 TIME:15:18:06 | RTK GPS |
| 2179 | 52.840606 | 173.192738 | 16.82 | DUC7 | DATE:06-24-2016 TIME:15:18:38 | RTK GPS |
| 2180 | 52.840632 | 173.192761 | 16.67 | DUC7 | DATE:06-24-2016 TIME:15:18:57 | RTK GPS |
| 2181 | 52.840678 | 173.192749 | 16.53 | DUC7 | DATE:06-24-2016 TIME:15:19:15 | RTK GPS |
| 2182 | 52.840694 | 173.192836 | 16.21 | DUC7 | DATE:06-24-2016 TIME:15:19:44 | RTK GPS |
| 2183 | 52.840733 | 173.192729 | 16.61 | DUC7 | DATE:06-24-2016 TIME:15:20:06 | RTK GPS |
| 2184 | 52.840765 | 173.192774 | 16.35 | DUC7 | DATE:06-24-2016 TIME:15:20:24 | RTK GPS |
| 2185 | 52.840770 | 173.192856 | 16.23 | DUC7 | DATE:06-24-2016 TIME:15:53:16 | RTK GPS |
| 2186 | 52.840787 | 173.192903 | 14.60 | DUC7 | DATE:06-24-2016 TIME:15:53:46 | RTK GPS |
| 2187 | 52.840815 | 173.192905 | 14.86 | DUC7 | DATE:06-24-2016 TIME:15:54:01 | RTK GPS |
| 2188 | 52.840846 | 173.192927 | 14.52 | DUC7 | DATE:06-24-2016 TIME:15:54:15 | RTK GPS |
| 2189 | 52.840876 | 173.192996 | 14.09 | DUC7 | DATE:06-24-2016 TIME:15:54:48 | RTK GPS |
| 2190 | 52.840811 | 173.193048 | 14.87 | DUC7 | DATE:06-24-2016 TIME:15:55:12 | RTK GPS |
| 2191 | 52.840711 | 173.192921 | 15.24 | DUC7 | DATE:06-24-2016 TIME:15:55:43 | RTK GPS |
| 2192 | 52.840603 | 173.192878 | 15.70 | DUC7 | DATE:06-24-2016 TIME:15:56:06 | RTK GPS |
| 2193 | 52.840575 | 173.192996 | 15.33 | DUC7 | DATE:06-24-2016 TIME:15:56:25 | RTK GPS |
| 2194 | 52.840562 | 173.193063 | 16.14 | DUC7 | DATE:06-24-2016 TIME:15:56:44 | RTK GPS |
| 2195 | 52.840542 | 173.193107 | 16.31 | DUC7 | DATE:06-24-2016 TIME:15:56:59 | RTK GPS |
| 2196 | 52.840403 | 173.193001 | 16.19 | DUC7 | DATE:06-24-2016 TIME:15:57:23 | RTK GPS |
| 2197 | 52.840357 | 173.192995 | 15.88 | DUC7 | DATE:06-24-2016 TIME:15:57:42 | RTK GPS |
| 2198 | 52.840407 | 173.192896 | 16.49 | DUC7 | DATE:06-24-2016 TIME:15:58:27 | RTK GPS |
| 2199 | 52.840497 | 173.192862 | 16.52 | DUC7 | DATE:06-24-2016 TIME:15:58:48 | RTK GPS |
| 2200 | 52.836975 | 173.187221 | 28.07 | CHKOUT | DATE:06-24-2016 TIME:20:19:01 | RTK GPS |
| 2201 | 52.836975 | 173.187221 | 28.08 | CHKIN | DATE:07-05-2016 TIME:11:42:55 | RTK GPS |
| 2202 | 52.836647 | 173.190939 | 8.11 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:34:38 | RTK GPS |
| 2203 | 52.836664 | 173.190980 | 8.54 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:35:20 | RTK GPS |
| 2204 | 52.836680 | 173.191043 | 8.05 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:35:43 | RTK GPS |
| 2205 | 52.836669 | 173.191049 | 7.87 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:36:07 | RTK GPS |
| 2206 | 52.836670 | 173.191054 | 7.84 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:36:24 | RTK GPS |
| 2207 | 52.836674 | 173.191052 | 7.90 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:36:38 | RTK GPS |
| 2208 | 52.836679 | 173.191082 | 7.81 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:36:55 | RTK GPS |

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| 2210 | 52.836665 | 173.191106 | 7.57 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:37:27 | RTK GPS |
| 2211 | 52.836651 | 173.191108 | 7.68 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:37:45 | RTK GPS |
| 2212 | 52.836641 | 173.191130 | 7.40 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:38:05 | RTK GPS |
| 2213 | 52.836631 | 173.191109 | 7.22 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:38:23 | RTK GPS |
| 2214 | 52.836623 | 173.191093 | 7.28 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:38:38 | RTK GPS |
| 2215 | 52.836635 | 173.191068 | 7.64 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:38:56 | RTK GPS |
| 2216 | 52.836637 | 173.191051 | 7.77 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:39:15 | RTK GPS |
| 2217 | 52.836620 | 173.191010 | 8.08 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:39:35 | RTK GPS |
| 2218 | 52.836628 | 173.190992 | 9.04 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:39:56 | RTK GPS |
| 2219 | 52.836623 | 173.190963 | 8.21 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:40:13 | RTK GPS |
| 2220 | 52.836633 | 173.190950 | 8.10 | LEAD-EXTENT-7-5-16 | DATE:07-05-2016 TIME:13:40:31 | RTK GPS |
| 2221 | 52.836651 | 173.190952 | 6.64 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:44:06 | RTK GPS |
| 2222 | 52.836663 | 173.190993 | 6.48 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:44:21 | RTK GPS |
| 2223 | 52.836674 | 173.191042 | 6.43 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:44:41 | RTK GPS |
| 2224 | 52.836666 | 173.191071 | 6.18 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:44:59 | RTK GPS |
| 2225 | 52.836653 | 173.191098 | 5.88 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:45:24 | RTK GPS |
| 2226 | 52.836637 | 173.191097 | 5.50 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:45:42 | RTK GPS |
| 2227 | 52.836640 | 173.191039 | 5.56 | LEAD-TOE-7-5-16 | DATE:07-05-2016 TIME:13:46:04 | RTK GPS |
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| 2336 | 52.839807 | 173.192658 | 20.47 | TEMPROADEDGE-7-5-16 | DATE:07-05-2016 TIME:15:30:56 | RTK GPS |
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| 2342 | 52.840218 | 173.192711 | 19.78 | TEMPROADEDGE-7-5-16 | DATE:07-05-2016 TIME:15:33:07 | RTK GPS |
| 2343 | 52.840217 | 173.192778 | 19.63 | TEMPROADEDGE-7-5-16 | DATE:07-05-2016 TIME:15:33:20 | RTK GPS |
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| 2356 | 52.836212 | 173.188895 | 9.62 | BAG01-7-5-16 | DATE:07-05-2016 TIME:18:04:23 | RTK GPS |
| 2357 | 52.836094 | 173.188868 | 9.81 | BAG01-7-5-16 | DATE:07-05-2016 TIME:18:05:00 | RTK GPS |
| 2358 | 52.836271 | 173.188503 | 11.20 | BAG01-7-5-16 | DATE:07-05-2016 TIME:18:06:20 | RTK GPS |
| 2359 | 52.836417 | 173.188406 | 10.83 | BAG01-7-5-16 | DATE:07-05-2016 TIME:18:06:56 | RTK GPS |
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| 2361 | 52.836318 | 173.189463 | 10.65 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:10:55 | RTK GPS |
| 2362 | 52.836360 | 173.189623 | 10.76 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:11:23 | RTK GPS |
| 2363 | 52.836376 | 173.189611 | 11.31 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:11:43 | RTK GPS |
| 2364 | 52.836402 | 173.189721 | 10.72 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:12:02 | RTK GPS |
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| 2366 | 52.836688 | 173.189753 | 10.52 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:13:05 | RTK GPS |
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| 2379 | 52.836620 | 173.190567 | 9.02 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:17:56 | RTK GPS |
| 2380 | 52.836641 | 173.190694 | 9.12 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:18:23 | RTK GPS |
| 2381 | 52.836603 | 173.190724 | 9.05 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:18:40 | RTK GPS |
| 2382 | 52.836610 | 173.190778 | 9.23 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:18:58 | RTK GPS |
| 2383 | 52.836583 | 173.190848 | 7.85 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:19:15 | RTK GPS |
| 2384 | 52.836515 | 173.190891 | 9.09 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:19:37 | RTK GPS |
| 2385 | 52.836522 | 173.191073 | 9.85 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:20:03 | RTK GPS |
| 2386 | 52.836484 | 173.191080 | 10.96 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:20:20 | RTK GPS |
| 2387 | 52.836504 | 173.191407 | 10.12 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:20:50 | RTK GPS |
| 2388 | 52.836515 | 173.191699 | 8.80 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:21:18 | RTK GPS |
| 2389 | 52.836546 | 173.191906 | 7.59 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:22:27 | RTK GPS |
| 2390 | 52.836489 | 173.191923 | 8.79 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:22:47 | RTK GPS |
| 2391 | 52.836451 | 173.191686 | 10.01 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:23:20 | RTK GPS |
| 2392 | 52.836444 | 173.191432 | 10.41 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:23:49 | RTK GPS |
| 2393 | 52.836423 | 173.190961 | 11.46 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:24:33 | RTK GPS |
| 2394 | 52.836319 | 173.191007 | 11.46 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:25:04 | RTK GPS |
| 2395 | 52.836272 | 173.190697 | 9.53 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:25:47 | RTK GPS |
| 2396 | 52.836241 | 173.190413 | 8.27 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:26:28 | RTK GPS |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

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| 2397 | 52.836176 | 173.190080 | 8.18 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:27:06 | RTK GPS |
| 2398 | 52.836294 | 173.190004 | 9.94 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:27:36 | RTK GPS |
| 2399 | 52.836197 | 173.189713 | 9.64 | BAG02-7-5-16 | DATE:07-05-2016 TIME:18:28:17 | RTK GPS |
| 2400 | 52.835087 | 173.186708 | 9.73 | AOI1EX | DATE:07-05-2016 TIME:19:50:50 | RTK GPS |
| 2401 | 52.835028 | 173.186606 | 10.29 | AOI1EX | DATE:07-05-2016 TIME:19:51:15 | RTK GPS |
| 2402 | 52.834990 | 173.186485 | 10.86 | AOI1EX | DATE:07-05-2016 TIME:19:51:42 | RTK GPS |
| 2403 | 52.834973 | 173.186430 | 8.90 | AOI1EX | DATE:07-05-2016 TIME:19:51:59 | RTK GPS |
| 2404 | 52.834932 | 173.186400 | 8.68 | AOI1EX | DATE:07-05-2016 TIME:19:52:16 | RTK GPS |
| 2405 | 52.834930 | 173.186319 | 8.22 | AOI1EX | DATE:07-05-2016 TIME:19:52:36 | RTK GPS |
| 2406 | 52.834906 | 173.186253 | 8.06 | AOI1EX | DATE:07-05-2016 TIME:19:52:55 | RTK GPS |
| 2407 | 52.834922 | 173.186184 | 8.35 | AOI1EX | DATE:07-05-2016 TIME:19:53:19 | RTK GPS |
| 2408 | 52.834929 | 173.186089 | 9.08 | AOI1EX | DATE:07-05-2016 TIME:19:53:42 | RTK GPS |
| 2409 | 52.834954 | 173.186040 | 10.49 | AOI1EX | DATE:07-05-2016 TIME:19:54:00 | RTK GPS |
| 2410 | 52.834931 | 173.185941 | 9.57 | AOI1EX | DATE:07-05-2016 TIME:19:54:21 | RTK GPS |
| 2411 | 52.834948 | 173.185884 | 9.80 | AOI1EX | DATE:07-05-2016 TIME:19:54:36 | RTK GPS |
| 2412 | 52.834981 | 173.185835 | 10.47 | AOI1EX | DATE:07-05-2016 TIME:19:54:50 | RTK GPS |
| 2413 | 52.835047 | 173.185816 | 10.56 | AOI1EX | DATE:07-05-2016 TIME:19:55:10 | RTK GPS |
| 2414 | 52.835089 | 173.185841 | 10.79 | AOI1EX | DATE:07-05-2016 TIME:19:55:28 | RTK GPS |
| 2415 | 52.835116 | 173.185911 | 10.78 | AOI1EX | DATE:07-05-2016 TIME:19:55:47 | RTK GPS |
| 2416 | 52.835212 | 173.185999 | 11.24 | AOI1EX | DATE:07-05-2016 TIME:19:56:10 | RTK GPS |
| 2417 | 52.835258 | 173.186043 | 11.34 | AOI1EX | DATE:07-05-2016 TIME:19:56:29 | RTK GPS |
| 2418 | 52.835268 | 173.186085 | 11.47 | AOI1EX | DATE:07-05-2016 TIME:19:56:44 | RTK GPS |
| 2419 | 52.835342 | 173.186111 | 12.47 | AOI1EX | DATE:07-05-2016 TIME:19:57:08 | RTK GPS |
| 2420 | 52.835415 | 173.186295 | 12.65 | AOI1EX | DATE:07-05-2016 TIME:19:57:34 | RTK GPS |
| 2421 | 52.835401 | 173.186341 | 11.14 | AOI1EX | DATE:07-05-2016 TIME:19:57:55 | RTK GPS |
| 2422 | 52.835414 | 173.186376 | 10.79 | AOI1EX | DATE:07-05-2016 TIME:19:58:11 | RTK GPS |
| 2423 | 52.835413 | 173.186407 | 10.07 | AOI1EX | DATE:07-05-2016 TIME:19:58:29 | RTK GPS |
| 2424 | 52.835398 | 173.186438 | 9.57 | AOI1EX | DATE:07-05-2016 TIME:19:58:43 | RTK GPS |
| 2425 | 52.835413 | 173.186450 | 9.52 | AOI1EX | DATE:07-05-2016 TIME:19:58:57 | RTK GPS |
| 2426 | 52.835431 | 173.186487 | 9.46 | AOI1EX | DATE:07-05-2016 TIME:19:59:12 | RTK GPS |
| 2427 | 52.835448 | 173.186508 | 9.43 | AOI1EX | DATE:07-05-2016 TIME:19:59:25 | RTK GPS |
| 2428 | 52.835440 | 173.186546 | 8.21 | AOI1EX | DATE:07-05-2016 TIME:19:59:39 | RTK GPS |
| 2429 | 52.835417 | 173.186546 | 8.03 | AOI1EX | DATE:07-05-2016 TIME:20:00:02 | RTK GPS |
| 2430 | 52.835404 | 173.186568 | 7.98 | AOI1EX | DATE:07-05-2016 TIME:20:00:14 | RTK GPS |
| 2431 | 52.835406 | 173.186591 | 8.34 | AOI1EX | DATE:07-05-2016 TIME:20:00:29 | RTK GPS |
| 2432 | 52.835391 | 173.186625 | 8.87 | AOI1EX | DATE:07-05-2016 TIME:20:00:46 | RTK GPS |
| 2433 | 52.835395 | 173.186639 | 8.85 | AOI1EX | DATE:07-05-2016 TIME:20:01:01 | RTK GPS |
| 2434 | 52.835378 | 173.186674 | 8.54 | AOI1EX | DATE:07-05-2016 TIME:20:01:15 | RTK GPS |
| 2435 | 52.835308 | 173.186752 | 8.34 | AOI1EX | DATE:07-05-2016 TIME:20:01:39 | RTK GPS |
| 2436 | 52.835289 | 173.186729 | 8.18 | AOI1EX | DATE:07-05-2016 TIME:20:01:55 | RTK GPS |
| 2437 | 52.835253 | 173.186781 | 7.87 | AOI1EX | DATE:07-05-2016 TIME:20:02:14 | RTK GPS |
| 2438 | 52.835219 | 173.186827 | 7.15 | AOI1EX | DATE:07-05-2016 TIME:20:02:32 | RTK GPS |
| 2439 | 52.835187 | 173.186901 | 10.23 | AOI1EX | DATE:07-05-2016 TIME:20:02:57 | RTK GPS |
| 2440 | 52.835136 | 173.186812 | 10.52 | AOI1EX | DATE:07-05-2016 TIME:20:03:18 | RTK GPS |
| 2441 | 52.835186 | 173.186795 | 4.64 | AOI1BTM | DATE:07-05-2016 TIME:20:06:08 | RTK GPS |
| 2442 | 52.835239 | 173.186719 | 4.96 | AOI1BTM | DATE:07-05-2016 TIME:20:06:30 | RTK GPS |
| 2443 | 52.835310 | 173.186645 | 5.06 | AOI1BTM | DATE:07-05-2016 TIME:20:06:51 | RTK GPS |

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| 2444 | 52.835375 | 173.186547 | 5.00 | AOI1BTM | DATE:07-05-2016 TIME:20:07:17 | RTK GPS |
| 2445 | 52.835408 | 173.186487 | 5.77 | AOI1BTM | DATE:07-05-2016 TIME:20:07:37 | RTK GPS |
| 2446 | 52.835395 | 173.186358 | 8.28 | AOI1BTM | DATE:07-05-2016 TIME:20:08:03 | RTK GPS |
| 2447 | 52.835372 | 173.186376 | 5.81 | AOI1BTM | DATE:07-05-2016 TIME:20:08:19 | RTK GPS |
| 2448 | 52.835323 | 173.186462 | 5.21 | AOI1BTM | DATE:07-05-2016 TIME:20:08:37 | RTK GPS |
| 2449 | 52.835271 | 173.186535 | 4.94 | AOI1BTM | DATE:07-05-2016 TIME:20:08:57 | RTK GPS |
| 2450 | 52.835209 | 173.186629 | 4.69 | AOI1BTM | DATE:07-05-2016 TIME:20:09:18 | RTK GPS |
| 2451 | 52.835167 | 173.186700 | 4.39 | AOI1BTM | DATE:07-05-2016 TIME:20:09:35 | RTK GPS |
| 2452 | 52.835125 | 173.186761 | 4.41 | AOI1BTM | DATE:07-05-2016 TIME:20:09:55 | RTK GPS |
| 2453 | 52.835074 | 173.186667 | 4.43 | AOI1BTM | DATE:07-05-2016 TIME:20:10:16 | RTK GPS |
| 2454 | 52.835126 | 173.186551 | 4.59 | AOI1BTM | DATE:07-05-2016 TIME:20:10:39 | RTK GPS |
| 2455 | 52.835168 | 173.186459 | 5.10 | AOI1BTM | DATE:07-05-2016 TIME:20:10:58 | RTK GPS |
| 2456 | 52.835219 | 173.186357 | 5.04 | AOI1BTM | DATE:07-05-2016 TIME:20:11:18 | RTK GPS |
| 2457 | 52.835269 | 173.186266 | 5.54 | AOI1BTM | DATE:07-05-2016 TIME:20:11:37 | RTK GPS |
| 2458 | 52.835294 | 173.186221 | 5.97 | AOI1BTM | DATE:07-05-2016 TIME:20:11:52 | RTK GPS |
| 2459 | 52.835300 | 173.186210 | 7.68 | AOI1BTM | DATE:07-05-2016 TIME:20:12:05 | RTK GPS |
| 2460 | 52.835304 | 173.186200 | 8.18 | AOI1BTM | DATE:07-05-2016 TIME:20:12:17 | RTK GPS |
| 2461 | 52.835312 | 173.186182 | 9.59 | AOI1BTM | DATE:07-05-2016 TIME:20:12:31 | RTK GPS |
| 2462 | 52.835330 | 173.186149 | 10.59 | AOI1BTM | DATE:07-05-2016 TIME:20:12:45 | RTK GPS |
| 2463 | 52.835264 | 173.186089 | 11.04 | AOI1BTM | DATE:07-05-2016 TIME:20:13:06 | RTK GPS |
| 2464 | 52.835255 | 173.186096 | 8.58 | AOI1BTM | DATE:07-05-2016 TIME:20:13:26 | RTK GPS |
| 2465 | 52.835229 | 173.186150 | 6.18 | AOI1BTM | DATE:07-05-2016 TIME:20:13:46 | RTK GPS |
| 2466 | 52.835179 | 173.186254 | 4.85 | AOI1BTM | DATE:07-05-2016 TIME:20:14:06 | RTK GPS |
| 2467 | 52.835123 | 173.186355 | 5.08 | AOI1BTM | DATE:07-05-2016 TIME:20:14:25 | RTK GPS |
| 2468 | 52.835103 | 173.186393 | 4.65 | AOI1BTM | DATE:07-05-2016 TIME:20:14:40 | RTK GPS |
| 2469 | 52.835076 | 173.186484 | 3.85 | AOI1BTM | DATE:07-05-2016 TIME:20:15:06 | RTK GPS |
| 2470 | 52.835035 | 173.186561 | 4.04 | AOI1BTM | DATE:07-05-2016 TIME:20:15:21 | RTK GPS |
| 2471 | 52.835007 | 173.186493 | 8.80 | AOI1BTM | DATE:07-05-2016 TIME:20:15:52 | RTK GPS |
| 2472 | 52.835059 | 173.186392 | 7.16 | AOI1BTM | DATE:07-05-2016 TIME:20:16:10 | RTK GPS |
| 2473 | 52.835093 | 173.186324 | 5.22 | AOI1BTM | DATE:07-05-2016 TIME:20:16:28 | RTK GPS |
| 2474 | 52.835154 | 173.186231 | 4.62 | AOI1BTM | DATE:07-05-2016 TIME:20:16:46 | RTK GPS |
| 2475 | 52.835202 | 173.186148 | 6.07 | AOI1BTM | DATE:07-05-2016 TIME:20:17:05 | RTK GPS |
| 2476 | 52.835225 | 173.186099 | 7.58 | AOI1BTM | DATE:07-05-2016 TIME:20:17:21 | RTK GPS |
| 2477 | 52.835180 | 173.186053 | 6.98 | AOI1BTM | DATE:07-05-2016 TIME:20:17:46 | RTK GPS |
| 2478 | 52.835136 | 173.186124 | 5.14 | AOI1BTM | DATE:07-05-2016 TIME:20:18:03 | RTK GPS |
| 2479 | 52.835095 | 173.186100 | 5.27 | AOI1BTM | DATE:07-05-2016 TIME:20:18:20 | RTK GPS |
| 2480 | 52.835046 | 173.186179 | 4.71 | AOI1BTM | DATE:07-05-2016 TIME:20:18:39 | RTK GPS |
| 2481 | 52.835084 | 173.186238 | 4.40 | AOI1BTM | DATE:07-05-2016 TIME:20:18:57 | RTK GPS |
| 2482 | 52.835041 | 173.186267 | 6.72 | AOI1BTM | DATE:07-05-2016 TIME:20:19:28 | RTK GPS |
| 2483 | 52.834971 | 173.186348 | 7.38 | AOI1BTM | DATE:07-05-2016 TIME:20:19:48 | RTK GPS |
| 2484 | 52.834931 | 173.186219 | 7.20 | AOI1BTM | DATE:07-05-2016 TIME:20:20:11 | RTK GPS |
| 2485 | 52.834988 | 173.186124 | 7.86 | AOI1BTM | DATE:07-05-2016 TIME:20:20:31 | RTK GPS |
| 2486 | 52.835040 | 173.186017 | 6.86 | AOI1BTM | DATE:07-05-2016 TIME:20:20:50 | RTK GPS |
| 2487 | 52.835087 | 173.185910 | 8.93 | AOI1BTM | DATE:07-05-2016 TIME:20:21:10 | RTK GPS |
| 2488 | 52.835012 | 173.185847 | 9.49 | AOI1BTM | DATE:07-05-2016 TIME:20:21:33 | RTK GPS |
| 2489 | 52.834997 | 173.185877 | 6.25 | AOI1BTM | DATE:07-05-2016 TIME:20:21:49 | RTK GPS |
| 2490 | 52.834981 | 173.185912 | 7.99 | AOI1BTM | DATE:07-05-2016 TIME:20:22:13 | RTK GPS |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

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| 2491 | 52.834952 | 173.185960 | 8.85 | AOI1BTM | DATE:07-05-2016 TIME:20:22:30 | RTK GPS |
| 2492 | 52.834988 | 173.185872 | 5.96 | FL16 | DATE:07-05-2016 TIME:20:24:07 | RTK GPS |
| 2493 | 52.834998 | 173.186009 | 6.24 | FL5 | DATE:07-05-2016 TIME:20:24:42 | RTK GPS |
| 2494 | 52.835102 | 173.185964 | 7.76 | FL7 | DATE:07-05-2016 TIME:20:25:36 | RTK GPS |
| 2495 | 52.835022 | 173.186113 | 6.81 | FL9 | DATE:07-05-2016 TIME:20:26:37 | RTK GPS |
| 2496 | 52.834956 | 173.186261 | 5.91 | FL2 | DATE:07-05-2016 TIME:20:27:18 | RTK GPS |
| 2497 | 52.835032 | 173.186479 | 6.76 | FL1 | DATE:07-05-2016 TIME:20:28:05 | RTK GPS |
| 2498 | 52.835032 | 173.186349 | 6.58 | FL3 | DATE:07-05-2016 TIME:20:28:39 | RTK GPS |
| 2499 | 52.836975 | 173.187221 | 28.10 | CHKOUT | DATE:07-05-2016 TIME:20:53:35 | RTK GPS |
| 2500 | 52.834009 | 173.184947 | 10.90 | CHKIN | DATE:07-06-2016 TIME:10:43:58 | RTK GPS |
| 2501 | 52.835170 | 173.186128 | 4.88 | FL10 | DATE:07-06-2016 TIME:10:52:47 | RTK GPS |
| 2502 | 52.835237 | 173.186203 | 5.02 | FL11 | DATE:07-06-2016 TIME:10:54:11 | RTK GPS |
| 2503 | 52.835178 | 173.186324 | 4.26 | FL12 | DATE:07-06-2016 TIME:10:54:43 | RTK GPS |
| 2504 | 52.835140 | 173.186461 | 3.83 | FL9 | DATE:07-06-2016 TIME:10:55:34 | RTK GPS |
| 2505 | 52.835085 | 173.186541 | 2.79 | FL27 | DATE:07-06-2016 TIME:10:56:46 | RTK GPS |
| 2506 | 52.835082 | 173.186623 | 3.08 | FL25 | DATE:07-06-2016 TIME:10:58:36 | RTK GPS |
| 2507 | 52.835155 | 173.186628 | 3.68 | FL22 | DATE:07-06-2016 TIME:11:02:07 | RTK GPS |
| 2508 | 52.835230 | 173.186526 | 3.66 | FL2 | DATE:07-06-2016 TIME:11:03:58 | RTK GPS |
| 2509 | 52.835226 | 173.186400 | 4.33 | FL13 | DATE:07-06-2016 TIME:11:05:03 | RTK GPS |
| 2510 | 52.835289 | 173.186360 | 4.45 | FL14 | DATE:07-06-2016 TIME:11:07:19 | RTK GPS |
| 2511 | 52.835373 | 173.186404 | 5.10 | FL15 | DATE:07-06-2016 TIME:11:08:01 | RTK GPS |
| 2512 | 52.835290 | 173.186548 | 3.98 | FL29 | DATE:07-06-2016 TIME:11:11:31 | RTK GPS |
| 2513 | 52.835413 | 173.186511 | 4.62 | FL16 | DATE:07-06-2016 TIME:11:12:52 | RTK GPS |
| 2514 | 52.835359 | 173.186606 | 4.12 | FL17 | DATE:07-06-2016 TIME:11:13:50 | RTK GPS |
| 2515 | 52.835317 | 173.186650 | 4.14 | FL18 | DATE:07-06-2016 TIME:11:14:19 | RTK GPS |
| 2516 | 52.835264 | 173.186703 | 4.55 | FL20 | DATE:07-06-2016 TIME:11:15:31 | RTK GPS |
| 2517 | 52.835219 | 173.186669 | 4.16 | FL21 | DATE:07-06-2016 TIME:11:16:25 | RTK GPS |
| 2518 | 52.835155 | 173.186745 | 3.46 | FL24 | DATE:07-06-2016 TIME:11:17:31 | RTK GPS |
| 2519 | 52.835194 | 173.186790 | 4.14 | FL23 | DATE:07-06-2016 TIME:11:18:18 | RTK GPS |
| 2520 | 52.835239 | 173.186044 | 9.83 | FL8 | DATE:07-06-2016 TIME:11:25:49 | RTK GPS |
| 2521 | 52.834988 | 173.185871 | 6.01 | FL6 | DATE:07-06-2016 TIME:11:27:18 | RTK GPS |
| 2522 | 52.835034 | 173.186552 | 4.74 | SW1 | DATE:07-06-2016 TIME:11:35:56 | RTK GPS |
| 2523 | 52.835062 | 173.186655 | 5.20 | SW2 | DATE:07-06-2016 TIME:11:37:39 | RTK GPS |
| 2524 | 52.835114 | 173.186752 | 5.53 | SW3 | DATE:07-06-2016 TIME:11:38:08 | RTK GPS |
| 2525 | 52.835212 | 173.186810 | 5.13 | SW4 | DATE:07-06-2016 TIME:11:38:44 | RTK GPS |
| 2526 | 52.835271 | 173.186748 | 6.17 | SW5 | DATE:07-06-2016 TIME:11:39:12 | RTK GPS |
| 2527 | 52.835314 | 173.186741 | 6.69 | SW6 | DATE:07-06-2016 TIME:11:39:42 | RTK GPS |
| 2528 | 52.835359 | 173.186687 | 5.40 | SW7 | DATE:07-06-2016 TIME:11:40:09 | RTK GPS |
| 2529 | 52.835390 | 173.186614 | 5.17 | SW8 | DATE:07-06-2016 TIME:11:41:28 | RTK GPS |
| 2530 | 52.835408 | 173.186546 | 5.26 | SW13 | DATE:07-06-2016 TIME:13:39:50 | RTK GPS |
| 2531 | 52.835416 | 173.186478 | 6.77 | SW9 | DATE:07-06-2016 TIME:13:40:42 | RTK GPS |
| 2532 | 52.835393 | 173.186420 | 6.36 | SW10 | DATE:07-06-2016 TIME:13:41:37 | RTK GPS |
| 2533 | 52.835362 | 173.186340 | 6.36 | SW11 | DATE:07-06-2016 TIME:13:42:13 | RTK GPS |
| 2534 | 52.835326 | 173.186257 | 6.38 | SW14 | DATE:07-06-2016 TIME:13:43:25 | RTK GPS |
| 2535 | 52.835258 | 173.186102 | 8.97 | SW15 | DATE:07-06-2016 TIME:13:45:11 | RTK GPS |
| 2536 | 52.835060 | 173.186135 | 4.91 | SW16 | DATE:07-06-2016 TIME:13:49:07 | RTK GPS |
| 2537 | 52.835062 | 173.186209 | 5.02 | SW17 | DATE:07-06-2016 TIME:13:58:23 | RTK GPS |

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| 2538 | 52.835088 | 173.186270 | 5.01 | SW18 | DATE:07-06-2016 TIME:14:02:26 | RTK GPS |
| 2539 | 52.835135 | 173.186808 | 10.47 | METAL-DEBRIS-PILE | DATE:07-06-2016 TIME:14:36:46 | RTK GPS |
| 2540 | 52.835176 | 173.186892 | 10.57 | METAL-DEBRIS-PILE | DATE:07-06-2016 TIME:14:37:06 | RTK GPS |
| 2541 | 52.835204 | 173.186852 | 7.72 | METAL-DEBRIS-PILE | DATE:07-06-2016 TIME:14:37:26 | RTK GPS |
| 2542 | 52.835164 | 173.186754 | 4.23 | METAL-DEBRIS-PILE | DATE:07-06-2016 TIME:14:37:47 | RTK GPS |
| 2543 | 52.833410 | 173.183944 | 12.07 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:53:05 | RTK GPS |
| 2544 | 52.833382 | 173.184011 | 11.27 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:53:19 | RTK GPS |
| 2545 | 52.833238 | 173.183836 | 11.38 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:53:47 | RTK GPS |
| 2546 | 52.833122 | 173.183673 | 11.37 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:54:15 | RTK GPS |
| 2547 | 52.833005 | 173.183530 | 11.31 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:54:41 | RTK GPS |
| 2548 | 52.832847 | 173.183385 | 11.63 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:55:09 | RTK GPS |
| 2549 | 52.832679 | 173.183276 | 11.42 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:55:38 | RTK GPS |
| 2550 | 52.832435 | 173.183166 | 10.59 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:56:12 | RTK GPS |
| 2551 | 52.832454 | 173.183069 | 11.09 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:56:33 | RTK GPS |
| 2552 | 52.832669 | 173.183169 | 11.25 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:57:28 | RTK GPS |
| 2553 | 52.832868 | 173.183288 | 12.23 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:58:03 | RTK GPS |
| 2554 | 52.833020 | 173.183423 | 12.02 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:58:39 | RTK GPS |
| 2555 | 52.833163 | 173.183596 | 11.64 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:59:09 | RTK GPS |
| 2556 | 52.833277 | 173.183759 | 11.97 | BAG02-7-6-16 | DATE:07-06-2016 TIME:14:59:43 | RTK GPS |
| 2557 | 52.842065 | 173.176066 | 161.55 | BORROW-AREA | DATE:07-06-2016 TIME:15:37:08 | RTK GPS |
| 2558 | 52.842056 | 173.175936 | 160.41 | BORROW-AREA | DATE:07-06-2016 TIME:15:37:26 | RTK GPS |
| 2559 | 52.842000 | 173.175793 | 160.43 | BORROW-AREA | DATE:07-06-2016 TIME:15:37:48 | RTK GPS |
| 2560 | 52.841945 | 173.175719 | 160.54 | BORROW-AREA | DATE:07-06-2016 TIME:15:38:26 | RTK GPS |
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| 7256 | 52.836238 | 173.188088 | 11.53 | CONEX | DATE:07-09-2016 TIME:09:36:15 | RTK GPS |
| 7257 | 52.835824 | 173.188627 | 10.93 | CONEX | DATE:07-09-2016 TIME:09:37:42 | RTK GPS |
| 7258 | 52.835777 | 173.188674 | 10.85 | CONEX | DATE:07-09-2016 TIME:09:38:10 | RTK GPS |
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| 7260 | 52.835955 | 173.189257 | 8.72 | CONEX | DATE:07-09-2016 TIME:09:39:37 | RTK GPS |
| 7261 | 52.836501 | 173.188001 | 11.59 | BLDG | DATE:07-09-2016 TIME:09:42:40 | RTK GPS |
| 7262 | 52.836565 | 173.188261 | 11.71 | BLDG | DATE:07-09-2016 TIME:09:43:27 | RTK GPS |
| 7263 | 52.836056 | 173.188606 | 11.41 | BLDG | DATE:07-09-2016 TIME:09:44:47 | RTK GPS |
| 7264 | 52.835991 | 173.188348 | 11.34 | BLDG | DATE:07-09-2016 TIME:09:45:26 | RTK GPS |
| 2703 | 52.834568 | 173.185598 | 3.72 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:13:47 | RTK GPS |
| 2704 | 52.834648 | 173.185519 | 2.65 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:14:15 | RTK GPS |
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| 2706 | 52.834671 | 173.185485 | 2.84 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:15:15 | RTK GPS |
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| 7169 | 52.835490 | 173.186528 | 10.85 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:14:02 | RTK GPS |
| 7170 | 52.835446 | 173.186629 | 9.15 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:14:25 | RTK GPS |

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| 7175 | 52.835203 | 173.186835 | 7.15 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:16:18 | RTK GPS |
| 7176 | 52.835179 | 173.186842 | 10.61 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:16:43 | RTK GPS |
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| 2562 | 52.841823 | 173.175612 | 159.20 | BORROW-AREA | DATE:07-06-2016 TIME:15:39:12 | RTK GPS |
| 2563 | 52.841790 | 173.175528 | 158.46 | BORROW-AREA | DATE:07-06-2016 TIME:15:39:34 | RTK GPS |
| 2564 | 52.841777 | 173.175480 | 159.97 | BORROW-AREA | DATE:07-06-2016 TIME:15:40:01 | RTK GPS |
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| 2566 | 52.841769 | 173.175190 | 161.17 | BORROW-AREA | DATE:07-06-2016 TIME:15:40:48 | RTK GPS |
| 2567 | 52.841826 | 173.175061 | 163.89 | BORROW-AREA | DATE:07-06-2016 TIME:15:41:11 | RTK GPS |
| 2568 | 52.841907 | 173.174976 | 167.69 | BORROW-AREA | DATE:07-06-2016 TIME:15:41:42 | RTK GPS |
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| 2570 | 52.842119 | 173.175015 | 170.53 | BORROW-AREA | DATE:07-06-2016 TIME:15:42:35 | RTK GPS |
| 2571 | 52.842163 | 173.175148 | 163.61 | BORROW-AREA | DATE:07-06-2016 TIME:15:42:59 | RTK GPS |
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| 2573 | 52.842217 | 173.175505 | 163.90 | BORROW-AREA | DATE:07-06-2016 TIME:15:43:48 | RTK GPS |
| 2574 | 52.842182 | 173.175661 | 163.25 | BORROW-AREA | DATE:07-06-2016 TIME:15:44:11 | RTK GPS |
| 2575 | 52.842133 | 173.175736 | 161.27 | BORROW-AREA | DATE:07-06-2016 TIME:15:45:05 | RTK GPS |
| 2576 | 52.842105 | 173.175917 | 160.96 | BORROW-AREA | DATE:07-06-2016 TIME:15:45:46 | RTK GPS |
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| 2581 | 52.841829 | 173.175412 | 159.74 | BORROW | DATE:07-06-2016 TIME:15:52:02 | RTK GPS |
| 2582 | 52.841833 | 173.175341 | 159.63 | BORROW | DATE:07-06-2016 TIME:15:52:20 | RTK GPS |
| 2583 | 52.841813 | 173.175298 | 159.43 | BORROW | DATE:07-06-2016 TIME:15:52:36 | RTK GPS |
| 2584 | 52.841813 | 173.175239 | 159.35 | BORROW | DATE:07-06-2016 TIME:15:52:52 | RTK GPS |
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| 2588 | 52.841996 | 173.175151 | 164.60 | BORROW | DATE:07-06-2016 TIME:15:54:10 | RTK GPS |
| 2589 | 52.842016 | 173.175237 | 164.41 | BORROW | DATE:07-06-2016 TIME:15:54:27 | RTK GPS |
| 2590 | 52.841998 | 173.175343 | 161.84 | BORROW | DATE:07-06-2016 TIME:15:54:51 | RTK GPS |
| 2591 | 52.841965 | 173.175382 | 161.44 | BORROW | DATE:07-06-2016 TIME:15:55:11 | RTK GPS |
| 2592 | 52.841959 | 173.175408 | 161.02 | BORROW | DATE:07-06-2016 TIME:15:55:24 | RTK GPS |
| 2593 | 52.841929 | 173.175424 | 160.88 | BORROW | DATE:07-06-2016 TIME:15:55:40 | RTK GPS |
| 2594 | 52.841856 | 173.175385 | 153.33 | BORROW | DATE:07-06-2016 TIME:15:58:18 | RTK GPS |
| 2595 | 52.841857 | 173.175332 | 152.63 | BORROW | DATE:07-06-2016 TIME:15:58:37 | RTK GPS |
| 2596 | 52.841841 | 173.175270 | 152.03 | BORROW | DATE:07-06-2016 TIME:15:58:54 | RTK GPS |
| 2597 | 52.841878 | 173.175258 | 152.52 | BORROW | DATE:07-06-2016 TIME:15:59:11 | RTK GPS |
| 2598 | 52.841928 | 173.175275 | 152.94 | BORROW | DATE:07-06-2016 TIME:15:59:30 | RTK GPS |
| 2599 | 52.841945 | 173.175343 | 152.69 | BORROW | DATE:07-06-2016 TIME:15:59:46 | RTK GPS |
| 2600 | 52.841886 | 173.175397 | 153.24 | BORROW | DATE:07-06-2016 TIME:16:00:12 | RTK GPS |
| 2601 | 52.841880 | 173.175366 | 152.43 | BORROW | DATE:07-06-2016 TIME:16:01:31 | RTK GPS |

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| 2604 | 52.841933 | 173.175343 | 152.24 | BORROW | DATE:07-06-2016 TIME:16:02:25 | RTK GPS |
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| 2606 | 52.841895 | 173.175340 | 155.39 | BORROW | DATE:07-06-2016 TIME:16:03:27 | RTK GPS |
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| 2609 | 52.834818 | 173.186244 | 10.39 | AOI1 | DATE:07-06-2016 TIME:16:15:09 | RTK GPS |
| 2610 | 52.834866 | 173.186282 | 10.49 | AOI1 | DATE:07-06-2016 TIME:16:15:27 | RTK GPS |
| 2611 | 52.834845 | 173.186135 | 9.04 | AOI1 | DATE:07-06-2016 TIME:16:15:49 | RTK GPS |
| 2685 | 52.834781 | 173.185782 | 3.91 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:05:23 | RTK GPS |
| 2686 | 52.834856 | 173.185659 | 4.42 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:05:45 | RTK GPS |
| 2687 | 52.834891 | 173.185605 | 4.81 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:05:59 | RTK GPS |
| 2688 | 52.834860 | 173.185540 | 4.51 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:06:15 | RTK GPS |
| 2689 | 52.834788 | 173.185572 | 4.54 | BPTOE-7-7-16 | DATE:07-07-2016 TIME:10:06:37 | RTK GPS |
| 2690 | 52.834872 | 173.185629 | 4.36 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:08:36 | RTK GPS |
| 2691 | 52.834806 | 173.185724 | 4.39 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:08:57 | RTK GPS |
| 2692 | 52.834729 | 173.185795 | 3.58 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:09:20 | RTK GPS |
| 2693 | 52.834686 | 173.185786 | 5.03 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:10:03 | RTK GPS |
| 2694 | 52.834721 | 173.185742 | 4.80 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:10:37 | RTK GPS |
| 2695 | 52.834745 | 173.185730 | 5.42 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:10:55 | RTK GPS |
| 2696 | 52.834779 | 173.185637 | 5.22 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:11:14 | RTK GPS |
| 2697 | 52.834844 | 173.185618 | 4.83 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:11:35 | RTK GPS |
| 2698 | 52.834823 | 173.185569 | 4.45 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:11:57 | RTK GPS |
| 2699 | 52.834754 | 173.185608 | 2.54 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:12:20 | RTK GPS |
| 2700 | 52.834712 | 173.185647 | 2.67 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:12:51 | RTK GPS |
| 2701 | 52.834686 | 173.185660 | 5.19 | BPFLOOR-7-7-16 | DATE:07-07-2016 TIME:10:13:12 | RTK GPS |
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| 7179 | 52.835071 | 173.186714 | 10.13 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:17:44 | RTK GPS |
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| 7181 | 52.834986 | 173.186464 | 9.69 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:18:34 | RTK GPS |
| 7182 | 52.834948 | 173.186397 | 8.75 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:18:56 | RTK GPS |
| 7183 | 52.834929 | 173.186388 | 8.75 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:19:12 | RTK GPS |
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| 7186 | 52.834889 | 173.186225 | 9.60 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:21:04 | RTK GPS |
| 7187 | 52.834931 | 173.185920 | 9.84 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:21:52 | RTK GPS |
| 7188 | 52.834967 | 173.185844 | 10.30 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:22:08 | RTK GPS |
| 7189 | 52.835060 | 173.185786 | 10.07 | TOP-7-8-16 | DATE:07-08-2016 TIME:17:22:32 | RTK GPS |
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| 7242 | 52.834290 | 173.184615 | 15.63 | CON-AREA-7-8-16 | DATE:07-08-2016 TIME:18:01:13 | RTK GPS |
| 7243 | 52.834198 | 173.184780 | 14.45 | CON-AREA-7-8-16 | DATE:07-08-2016 TIME:18:01:53 | RTK GPS |
| 7244 | 52.834150 | 173.184704 | 14.53 | CON-AREA-7-8-16 | DATE:07-08-2016 TIME:18:02:30 | RTK GPS |
| 7245 | 52.834405 | 173.184240 | 15.15 | CON-AREA-7-8-16 | DATE:07-08-2016 TIME:18:04:32 | RTK GPS |
| 7246 | 52.834447 | 173.184319 | 15.36 | CON-AREA-7-8-16 | DATE:07-08-2016 TIME:18:04:51 | RTK GPS |
| 7247 | 52.834098 | 173.184033 | 15.17 | DEMO-PAD-7-8-16 | DATE:07-08-2016 TIME:18:07:21 | RTK GPS |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

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| 7250 | 52.834173 | 173.183904 | 15.56 | DEMO-PAD-7-8-16 | DATE:07-08-2016 TIME:18:10:01 | RTK GPS |
| 7253 | 52.835953 | 173.188201 | 10.19 | CONEX | DATE:07-09-2016 TIME:09:34:13 | RTK GPS |
| 7254 | 52.835976 | 173.188286 | 10.49 | CONEX | DATE:07-09-2016 TIME:09:34:56 | RTK GPS |
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| 2 | 52.834964 | 173.186200 | 12.89 | AOI#1_FS115 | 7/4/2016 01:46:14pm | GeoXH 6000 |
| 3 | 52.835003 | 173.186162 | 13.01 | AOI#1_FS116 | 7/4/2016 01:46:40pm | GeoXH 6000 |
| 4 | 52.835022 | 173.186111 | 13.50 | AOI#1_FS117 | 7/4/2016 01:47:15pm | GeoXH 6000 |
| 5 | 52.835051 | 173.186074 | 12.10 | AOI#1_FS118 | 7/4/2016 01:47:51pm | GeoXH 6000 |
| 6 | 52.835079 | 173.186021 | 12.59 | AOI#1_FS119 | 7/4/2016 01:48:15pm | GeoXH 6000 |
| 7 | 52.835101 | 173.185964 | 14.39 | AOI#1_FS120 | 7/4/2016 01:48:40pm | GeoXH 6000 |
| 8 | 52.835090 | 173.185898 | 14.60 | AOI#1_FS121 | 7/4/2016 01:49:05pm | GeoXH 6000 |
| 9 | 52.835059 | 173.185935 | 13.88 | AOI#1_FS122 | 7/4/2016 01:49:27pm | GeoXH 6000 |
| 10 | 52.835028 | 173.185968 | 11.98 | AOI#1_FS123 | 7/4/2016 01:49:58pm | GeoXH 6000 |
| 11 | 52.834998 | 173.186009 | 12.23 | AOI#1_FS124 | 7/4/2016 01:50:22pm | GeoXH 6000 |
| 12 | 52.834974 | 173.185952 | 12.61 | AOI#1_FS125 | 7/4/2016 01:50:46pm | GeoXH 6000 |
| 13 | 52.835007 | 173.185917 | 12.03 | AOI#1_FS126 | 7/4/2016 01:51:09pm | GeoXH 6000 |
| 14 | 52.835031 | 173.185879 | 13.49 | AOI#1_FS127 | 7/4/2016 01:51:34pm | GeoXH 6000 |
| 15 | 52.835047 | 173.185830 | 14.09 | AOI#1_FS128 | 7/4/2016 01:52:00pm | GeoXH 6000 |
| 16 | 52.835003 | 173.185838 | 14.45 | AOI#1_FS129 | 7/4/2016 01:52:28pm | GeoXH 6000 |
| 17 | 52.834988 | 173.185872 | 11.41 | AOI#1_FS130 | 7/4/2016 01:52:53pm | GeoXH 6000 |
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| 19 | 52.834517 | 173.185541 | 14.24 | AOI#1_BPSW_FS01 | 7/4/2016 02:29:23pm | GeoXH 6000 |
| 20 | 52.834546 | 173.185476 | 14.00 | AOI#1_BPSW_FS02 | 7/4/2016 02:30:03pm | GeoXH 6000 |
| 21 | 52.834612 | 173.185436 | 13.12 | AOI#1_BPSW_FS03 | 7/4/2016 02:30:34pm | GeoXH 6000 |
| 22 | 52.834664 | 173.185449 | 13.34 | AOI#1_BPSW_FS04 | 7/4/2016 02:31:02pm | GeoXH 6000 |
| 23 | 52.834819 | 173.185564 | 13.23 | AOI#1_BPSW_FS05 | 7/4/2016 02:32:16pm | GeoXH 6000 |
| 24 | 52.834867 | 173.185565 | 13.91 | AOI#1_BPSW_FS06 | 7/4/2016 02:33:12pm | GeoXH 6000 |
| 25 | 52.834900 | 173.185616 | 14.57 | AOI#1_BPSW_FS07 | 7/4/2016 02:33:50pm | GeoXH 6000 |
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| 29 | 52.834957 | 173.186262 | 9.54 | LAB_FL02 | 7/5/2016 07:28:58pm | GeoXH 6000 |
| 30 | 52.835020 | 173.186106 | 9.16 | LAB_FL04 | 7/5/2016 07:31:36pm | GeoXH 6000 |
| 31 | 52.834997 | 173.186004 | 8.83 | LAB_FL05 | 7/5/2016 07:32:01pm | GeoXH 6000 |
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| 34 | 52.835237 | 173.186037 | 12.50 | LAB_FL08 | 7/5/2016 07:35:04pm | GeoXH 6000 |
| 35 | 52.835171 | 173.186128 | 5.73 | LAB_FL010 | 7/5/2016 07:35:41pm | GeoXH 6000 |
| 36 | 52.835238 | 173.186202 | 6.08 | LAB_FL011 | 7/5/2016 07:36:06pm | GeoXH 6000 |
| 37 | 52.835179 | 173.186323 | 5.49 | LAB_FL012 | 7/5/2016 07:36:33pm | GeoXH 6000 |
| 38 | 52.835225 | 173.186399 | 7.61 | LAB_FL013 | 7/5/2016 07:37:09pm | GeoXH 6000 |
| 39 | 52.835290 | 173.186358 | 6.34 | LAB_FL014 | 7/5/2016 07:37:40pm | GeoXH 6000 |
| 40 | 52.835374 | 173.186403 | 7.11 | LAB_FL015 | 7/5/2016 07:38:11pm | GeoXH 6000 |
| 41 | 52.835413 | 173.186511 | 6.82 | LAB_FL016 | 7/5/2016 07:38:38pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 42 | 52.835360 | 173.186606 | 6.32 | LAB_FL017 | 7/5/2016 07:39:04pm | GeoXH 6000 |
| 43 | 52.835319 | 173.186650 | 6.30 | LAB_FL018 | 7/5/2016 07:39:27pm | GeoXH 6000 |
| 44 | 52.835265 | 173.186704 | 6.83 | LAB_FL020 | 7/5/2016 07:39:54pm | GeoXH 6000 |
| 45 | 52.835220 | 173.186669 | 6.81 | LAB_FL021 | 7/5/2016 07:40:18pm | GeoXH 6000 |
| 46 | 52.835157 | 173.186629 | 6.56 | LAB_FL022 | 7/5/2016 07:41:01pm | GeoXH 6000 |
| 47 | 52.835196 | 173.186791 | 7.28 | LAB_FL023 | 7/5/2016 07:41:30pm | GeoXH 6000 |
| 48 | 52.835158 | 173.186745 | 6.80 | LAB_FL024 | 7/5/2016 07:41:48pm | GeoXH 6000 |
| 49 | 52.835085 | 173.186625 | 6.84 | LAB_FL025 | 7/5/2016 07:42:13pm | GeoXH 6000 |
| 50 | 52.835088 | 173.186544 | 7.48 | LAB_FL027 | 7/5/2016 07:43:20pm | GeoXH 6000 |
| 51 | 52.835139 | 173.186457 | 10.71 | LAB_FL09 | 7/6/2016 02:04:11pm | GeoXH 6000 |
| 52 | 52.835230 | 173.186522 | 10.42 | LAB_FL028 | 7/6/2016 02:04:44pm | GeoXH 6000 |
| 53 | 52.835289 | 173.186545 | 10.53 | LAB_FL029 | 7/6/2016 02:05:10pm | GeoXH 6000 |
| 54 | 52.835034 | 173.186550 | 10.48 | LAB_SW01 | 7/6/2016 02:05:58pm | GeoXH 6000 |
| 55 | 52.835062 | 173.186651 | 10.80 | LAB_SW02 | 7/6/2016 02:06:20pm | GeoXH 6000 |
| 56 | 52.835114 | 173.186748 | 11.56 | LAB_SW03 | 7/6/2016 02:06:43pm | GeoXH 6000 |
| 57 | 52.835212 | 173.186806 | 11.33 | LAB_SW04 | 7/6/2016 02:07:11pm | GeoXH 6000 |
| 58 | 52.835270 | 173.186743 | 11.76 | LAB_SW05 | 7/6/2016 02:07:35pm | GeoXH 6000 |
| 59 | 52.835312 | 173.186737 | 12.12 | LAB_SW06 | 7/6/2016 02:07:59pm | GeoXH 6000 |
| 60 | 52.835358 | 173.186683 | 11.19 | LAB_SW07 | 7/6/2016 02:08:34pm | GeoXH 6000 |
| 61 | 52.835388 | 173.186609 | 10.72 | LAB_SW08 | 7/6/2016 02:08:55pm | GeoXH 6000 |
| 62 | 52.835408 | 173.186542 | 11.25 | LAB_SW13 | 7/6/2016 02:09:15pm | GeoXH 6000 |
| 63 | 52.835415 | 173.186475 | 12.65 | LAB_SW09 | 7/6/2016 02:09:37pm | GeoXH 6000 |
| 64 | 52.835391 | 173.186420 | 11.93 | LAB_SW10 | 7/6/2016 02:10:00pm | GeoXH 6000 |
| 65 | 52.835361 | 173.186336 | 11.84 | LAB_SW11 | 7/6/2016 02:10:24pm | GeoXH 6000 |
| 66 | 52.835325 | 173.186265 | 11.87 | LAB_SW14 | 7/6/2016 02:10:47pm | GeoXH 6000 |
| 67 | 52.835257 | 173.186098 | 14.27 | LAB_SW15 | 7/6/2016 02:11:27pm | GeoXH 6000 |
| 68 | 52.835059 | 173.186133 | 10.39 | LAB_SW16 | 7/6/2016 02:12:02pm | GeoXH 6000 |
| 69 | 52.835061 | 173.186206 | 10.28 | LAB_SW17 | 7/6/2016 02:12:24pm | GeoXH 6000 |
| 70 | 52.835087 | 173.186266 | 10.19 | LAB_SW18 | 7/6/2016 02:12:48pm | GeoXH 6000 |
| 72 | 52.834531 | 173.185545 | 7.10 | AOI#1_LABBPFL_01 | 7/7/2016 08:58:17am | GeoXH 6000 |
| 73 | 52.834557 | 173.185463 | 7.57 | AOI#1_LABBPFL_03 | 7/7/2016 08:59:12am | GeoXH 6000 |
| 74 | 52.834577 | 173.185492 | 7.47 | AOI#1_LABBPFL_04 | 7/7/2016 08:59:41am | GeoXH 6000 |
| 75 | 52.834611 | 173.185489 | 7.98 | AOI#1_LABBPFL_05 | 7/7/2016 09:00:16am | GeoXH 6000 |
| 76 | 52.834632 | 173.185544 | 8.16 | AOI#1_LABBPFL_08 | 7/7/2016 09:00:42am | GeoXH 6000 |
| 77 | 52.834607 | 173.185574 | 7.39 | AOI#1_LABBPFL_07 | 7/7/2016 09:01:05am | GeoXH 6000 |
| 78 | 52.834566 | 173.185613 | 7.10 | AOI#1_LABBPFL_06 | 7/7/2016 09:01:33am | GeoXH 6000 |
| 79 | 52.834592 | 173.185666 | 7.46 | AOI#1_LABBPFL_11 | 7/7/2016 09:01:56am | GeoXH 6000 |
| 80 | 52.834625 | 173.185626 | 7.46 | AOI#1_LABBPFL_10 | 7/7/2016 09:02:26am | GeoXH 6000 |
| 81 | 52.834653 | 173.185593 | 7.89 | AOI#1_LABBPFL_09 | 7/7/2016 09:02:59am | GeoXH 6000 |
| 82 | 52.834683 | 173.185641 | 7.55 | AOI#1_LABBPFL_13 | 7/7/2016 09:04:38am | GeoXH 6000 |
| 83 | 52.834655 | 173.185682 | 6.69 | AOI#1_LABBPFL_12 | 7/7/2016 09:05:06am | GeoXH 6000 |
| 84 | 52.834649 | 173.185798 | 5.81 | AOI#1_LABBPFL_17 | 7/7/2016 09:05:30am | GeoXH 6000 |
| 85 | 52.834689 | 173.185743 | 6.50 | AOI#1_LABBPFL_16 | 7/7/2016 09:05:54am | GeoXH 6000 |
| 86 | 52.834714 | 173.185720 | 6.59 | AOI#1_LABBPFL_15 | 7/7/2016 09:07:21am | GeoXH 6000 |
| 87 | 52.834731 | 173.185783 | 5.87 | AOI#1_LABBPFL_18 | 7/7/2016 09:07:45am | GeoXH 6000 |
| 88 | 52.834775 | 173.185763 | 6.58 | AOI#1_LABBPFL_19 | 7/7/2016 09:08:09am | GeoXH 6000 |
| 89 | 52.834781 | 173.185668 | 6.79 | AOI#1_LABBPFL_20 | 7/7/2016 09:08:35am | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 90 | 52.834845 | 173.185628 | 6.84 | AOI#1_LABBPFL_21 | 7/7/2016 09:09:02am | GeoXH 6000 |
| 91 | 52.834879 | 173.185611 | 6.87 | AOI#1_LABBPFL_22 | 7/7/2016 09:09:25am | GeoXH 6000 |
| 92 | 52.834863 | 173.185555 | 6.72 | AOI#1_LABBPFL_24 | 7/7/2016 09:09:49am | GeoXH 6000 |
| 93 | 52.834822 | 173.185555 | 6.52 | AOI#1_LABBPFL_25 | 7/7/2016 09:10:14am | GeoXH 6000 |
| 94 | 52.834732 | 173.185527 | 6.36 | AOI#1_LABBPFL_26 | 7/7/2016 09:10:44am | GeoXH 6000 |
| 95 | 52.834777 | 173.185567 | 5.99 | AOI#1_LABBPSW_01 | 7/7/2016 09:15:47am | GeoXH 6000 |
| 96 | 52.834834 | 173.185530 | 6.62 | AOI#1_LABBPSW_02 | 7/7/2016 09:16:19am | GeoXH 6000 |
| 97 | 52.834888 | 173.185581 | 7.17 | AOI#1_LABBPSW_03 | 7/7/2016 09:16:46am | GeoXH 6000 |
| 98 | 52.834861 | 173.185660 | 7.25 | AOI#1_LABBPSW_04 | 7/7/2016 09:17:11am | GeoXH 6000 |
| 99 | 52.834827 | 173.185717 | 6.88 | AOI#1_LABBPSW_05 | 7/7/2016 09:17:36am | GeoXH 6000 |
| 100 | 52.834648 | 173.185815 | 5.04 | AOI#1_LABBPSW_06 | 7/7/2016 09:18:14am | GeoXH 6000 |
| 101 | 52.834513 | 173.185541 | 6.95 | AOI#1_LABBPSW_07 | 7/7/2016 09:18:54am | GeoXH 6000 |
| 102 | 52.834543 | 173.185476 | 6.89 | AOI#1_LABBPSW_09 | 7/7/2016 09:19:18am | GeoXH 6000 |
| 103 | 52.836631 | 173.190967 | 9.25 | AOI#1_LEAD_RESAMPLE_FL01 | 7/7/2016 09:26:55am | GeoXH 6000 |
| 104 | 52.836644 | 173.190952 | 9.14 | AOI#1_LEAD_RESAMPLE_FL02 | 7/7/2016 09:27:27am | GeoXH 6000 |
| 105 | 52.836653 | 173.190986 | 9.11 | AOI#1_LEAD_RESAMPLE_FL03 | 7/7/2016 09:27:45am | GeoXH 6000 |
| 106 | 52.836635 | 173.191005 | 8.67 | AOI#1_LEAD_RESAMPLE_FL04 | 7/7/2016 09:28:02am | GeoXH 6000 |
| 107 | 52.836645 | 173.191035 | 8.40 | AOI#1_LEAD_RESAMPLE_FL05 | 7/7/2016 09:28:26am | GeoXH 6000 |
| 108 | 52.836665 | 173.191026 | 9.04 | AOI#1_LEAD_RESAMPLE_FL06 | 7/7/2016 09:28:48am | GeoXH 6000 |
| 109 | 52.836662 | 173.191067 | 8.78 | AOI#1_LEAD_RESAMPLE_FL07 | 7/7/2016 09:29:06am | GeoXH 6000 |
| 110 | 52.836644 | 173.191076 | 7.94 | AOI#1_LEAD_RESAMPLE_FL08 | 7/7/2016 09:29:23am | GeoXH 6000 |
| 111 | 52.836627 | 173.190965 | 9.33 | AOI#1_LEAD_RESAMPLE_SW01 | 7/7/2016 09:29:45am | GeoXH 6000 |
| 112 | 52.836640 | 173.190940 | 9.51 | AOI#1_LEAD_RESAMPLE_SW02 | 7/7/2016 09:30:09am | GeoXH 6000 |
| 113 | 52.836657 | 173.190972 | 9.19 | AOI#1_LEAD_RESAMPLE_SW03 | 7/7/2016 09:30:31am | GeoXH 6000 |
| 114 | 52.836671 | 173.191023 | 9.15 | AOI#1_LEAD_RESAMPLE_SW04 | 7/7/2016 09:30:50am | GeoXH 6000 |
| 115 | 52.836668 | 173.191082 | 9.09 | AOI#1_LEAD_RESAMPLE_SW05 | 7/7/2016 09:31:16am | GeoXH 6000 |
| 116 | 52.836645 | 173.191102 | 8.65 | AOI#1_LEAD_RESAMPLE_SW06 | 7/7/2016 09:31:34am | GeoXH 6000 |
| 117 | 52.836636 | 173.191053 | 8.59 | AOI#1_LEAD_RESAMPLE_SW07 | 7/7/2016 09:32:06am | GeoXH 6000 |
| 118 | 52.836628 | 173.190999 | 8.74 | AOI#1_LEAD_RESAMPLE_SW08 | 7/7/2016 09:32:27am | GeoXH 6000 |
| 5 | 52.835239 | 173.186893 | 9.81 | AOI#1_FS01 | 6/27/2016 06:04:58pm | GeoXH 6000 |
| 6 | 52.835263 | 173.186862 | 9.50 | AOI#1_FS02 | 6/27/2016 06:05:26pm | GeoXH 6000 |
| 7 | 52.835276 | 173.186840 | 9.50 | AOI#1_FS03 | 6/27/2016 06:05:46pm | GeoXH 6000 |
| 8 | 52.835261 | 173.186825 | 9.70 | AOI#1_FS04 | 6/27/2016 06:06:08pm | GeoXH 6000 |
| 9 | 52.835243 | 173.186852 | 9.60 | AOI#1_FS05 | 6/27/2016 06:06:31pm | GeoXH 6000 |
| 10 | 52.835226 | 173.186852 | 9.68 | AOI#1_FS06 | 6/27/2016 06:06:51pm | GeoXH 6000 |
| 11 | 52.835233 | 173.186828 | 9.65 | AOI#1_FS07 | 6/27/2016 06:07:12pm | GeoXH 6000 |
| 12 | 52.835208 | 173.186819 | 9.76 | AOI#1_FS08 | 6/27/2016 06:07:40pm | GeoXH 6000 |
| 13 | 52.835253 | 173.186792 | 9.62 | AOI#1_FS09 | 6/27/2016 06:08:07pm | GeoXH 6000 |
| 14 | 52.835219 | 173.186796 | 8.34 | AOI#1_FS10 | 6/27/2016 06:08:40pm | GeoXH 6000 |
| 15 | 52.835198 | 173.186785 | 9.41 | AOI#1_FS11 | 6/27/2016 06:09:03pm | GeoXH 6000 |
| 16 | 52.835186 | 173.186766 | 8.92 | AOI#1_FS12 | 6/27/2016 06:09:31pm | GeoXH 6000 |
| 17 | 52.835213 | 173.186768 | 7.50 | AOI#1_FS13 | 6/27/2016 06:09:54pm | GeoXH 6000 |
| 18 | 52.835239 | 173.186755 | 8.86 | AOI#1_FS14 | 6/27/2016 06:10:21pm | GeoXH 6000 |
| 19 | 52.835202 | 173.186729 | 6.84 | AOI#1_FS15 | 6/27/2016 06:10:49pm | GeoXH 6000 |
| 20 | 52.835222 | 173.186715 | 7.09 | AOI#1_FS16 | 6/27/2016 06:11:11pm | GeoXH 6000 |
| 21 | 52.835255 | 173.186720 | 7.60 | AOI#1_FS18 | 6/27/2016 06:11:33pm | GeoXH 6000 |
| 22 | 52.835247 | 173.186690 | 7.03 | AOI#1_FS19 | 6/27/2016 06:11:54pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 23 | 52.835237 | 173.186664 | 7.24 | AOI#1_FS20 | 6/27/2016 06:12:17pm | GeoXH 6000 |
| 24 | 52.835203 | 173.186686 | 5.56 | AOI#1_FS21 | 6/27/2016 06:12:47pm | GeoXH 6000 |
| 25 | 52.835190 | 173.186719 | 5.28 | AOI#1_FS22 | 6/27/2016 06:13:10pm | GeoXH 6000 |
| 26 | 52.835200 | 173.186632 | 5.67 | AOI#1_FS23 | 6/27/2016 06:13:38pm | GeoXH 6000 |
| 27 | 52.835220 | 173.186629 | 5.80 | AOI#1_FS24 | 6/27/2016 06:14:01pm | GeoXH 6000 |
| 28 | 52.835141 | 173.186667 | 5.50 | AOI#1_FS25 | 6/27/2016 06:14:38pm | GeoXH 6000 |
| 29 | 52.835155 | 173.186653 | 5.39 | AOI#1_FS26 | 6/27/2016 06:15:00pm | GeoXH 6000 |
| 30 | 52.835176 | 173.186624 | 6.02 | AOI#1_FS27 | 6/27/2016 06:15:23pm | GeoXH 6000 |
| 31 | 52.835200 | 173.186592 | 6.41 | AOI#1_FS28 | 6/27/2016 06:15:52pm | GeoXH 6000 |
| 32 | 52.835216 | 173.186557 | 6.56 | AOI#1_FS29 | 6/27/2016 06:16:14pm | GeoXH 6000 |
| 33 | 52.835233 | 173.186598 | 6.60 | AOI#1_FS30 | 6/27/2016 06:16:37pm | GeoXH 6000 |
| 34 | 52.835254 | 173.186556 | 6.56 | AOI#1_FS31 | 6/27/2016 06:17:01pm | GeoXH 6000 |
| 35 | 52.835271 | 173.186526 | 6.72 | AOI#1_FS32 | 6/27/2016 06:17:24pm | GeoXH 6000 |
| 36 | 52.835300 | 173.186471 | 6.85 | AOI#1_FS33 | 6/27/2016 06:17:48pm | GeoXH 6000 |
| 37 | 52.835349 | 173.186482 | 7.21 | AOI#1_FS34 | 6/27/2016 06:18:13pm | GeoXH 6000 |
| 38 | 52.835375 | 173.186421 | 7.80 | AOI#1_FS35 | 6/27/2016 06:18:38pm | GeoXH 6000 |
| 39 | 52.835354 | 173.186388 | 7.89 | AOI#1_FS36 | 6/27/2016 06:19:00pm | GeoXH 6000 |
| 40 | 52.835328 | 173.186345 | 7.40 | AOI#1_FS37 | 6/27/2016 06:19:23pm | GeoXH 6000 |
| 41 | 52.835298 | 173.186393 | 7.27 | AOI#1_FS38 | 6/27/2016 06:19:46pm | GeoXH 6000 |
| 42 | 52.835272 | 173.186434 | 6.98 | AOI#1_FS39 | 6/27/2016 06:20:10pm | GeoXH 6000 |
| 43 | 52.835241 | 173.186470 | 6.75 | AOI#1_FS40 | 6/27/2016 06:20:33pm | GeoXH 6000 |
| 44 | 52.835254 | 173.186502 | 7.01 | AOI#1_FS41 | 6/27/2016 06:21:45pm | GeoXH 6000 |
| 45 | 52.835234 | 173.186524 | 6.60 | AOI#1_FS42 | 6/27/2016 06:22:12pm | GeoXH 6000 |
| 46 | 52.835217 | 173.186514 | 6.63 | AOI#1_FS43 | 6/27/2016 06:22:34pm | GeoXH 6000 |
| 47 | 52.835185 | 173.186550 | 6.47 | AOI#1_FS44 | 6/27/2016 06:23:11pm | GeoXH 6000 |
| 48 | 52.835165 | 173.186597 | 6.39 | AOI#1_FS45 | 6/27/2016 06:23:35pm | GeoXH 6000 |
| 49 | 52.835138 | 173.186632 | 6.20 | AOI#1_FS46 | 6/27/2016 06:23:54pm | GeoXH 6000 |
| 50 | 52.835127 | 173.186588 | 7.17 | AOI#1_TP01 | 6/27/2016 06:24:21pm | GeoXH 6000 |
| 51 | 52.835225 | 173.186730 | 8.06 | AOI#1_TP02 | 6/27/2016 06:25:02pm | GeoXH 6000 |
| 52 | 52.835153 | 173.186349 | 6.94 | AOI#1_TP03 | 6/27/2016 06:25:43pm | GeoXH 6000 |
| 53 | 52.835327 | 173.186443 | 6.90 | AOI#1_TP04 | 6/27/2016 06:26:27pm | GeoXH 6000 |
| 54 | 52.835167 | 173.186511 | 7.20 | AOI#1_FS47 | 6/27/2016 07:08:15pm | GeoXH 6000 |
| 55 | 52.835187 | 173.186480 | 6.94 | AOI#1_FS48 | 6/27/2016 07:08:50pm | GeoXH 6000 |
| 56 | 52.835212 | 173.186438 | 6.98 | AOI#1_FS49 | 6/27/2016 07:09:13pm | GeoXH 6000 |
| 57 | 52.835237 | 173.186398 | 6.97 | AOI#1_FS50 | 6/27/2016 07:09:36pm | GeoXH 6000 |
| 58 | 52.835270 | 173.186354 | 7.47 | AOI#1_FS51 | 6/27/2016 07:10:00pm | GeoXH 6000 |
| 59 | 52.835296 | 173.186325 | 7.60 | AOI#1_FS52 | 6/27/2016 07:10:23pm | GeoXH 6000 |
| 60 | 52.835232 | 173.186323 | 7.41 | AOI#1_FS53 | 6/27/2016 07:10:49pm | GeoXH 6000 |
| 61 | 52.835216 | 173.186353 | 7.26 | AOI#1_FS54 | 6/27/2016 07:11:11pm | GeoXH 6000 |
| 62 | 52.835192 | 173.186392 | 7.60 | AOI#1_FS55 | 6/27/2016 07:11:34pm | GeoXH 6000 |
| 63 | 52.835165 | 173.186427 | 7.48 | AOI#1_FS56 | 6/27/2016 07:11:57pm | GeoXH 6000 |
| 64 | 52.835141 | 173.186469 | 7.71 | AOI#1_FS57 | 6/27/2016 07:12:20pm | GeoXH 6000 |
| 65 | 52.835162 | 173.186353 | 7.97 | AOI#1_FS58 | 6/27/2016 07:12:46pm | GeoXH 6000 |
| 66 | 52.835180 | 173.186314 | 8.08 | AOI#1_FS59 | 6/27/2016 07:13:09pm | GeoXH 6000 |
| 67 | 52.835131 | 173.186331 | 7.98 | AOI#1_FS60 | 6/27/2016 07:13:33pm | GeoXH 6000 |
| 68 | 52.835130 | 173.186522 | 6.54 | AOI#1_FS66 | 6/28/2016 10:54:05am | GeoXH 6000 |
| 69 | 52.835088 | 173.186527 | 4.33 | AOI#1_FS65 | 6/28/2016 10:55:04am | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 70 | 52.835089 | 173.186496 | 4.10 | AOI#1_FS64 | 6/28/2016 10:55:37am | GeoXH 6000 |
| 71 | 52.835127 | 173.186370 | 5.22 | AOI#1_FS61 | 6/28/2016 10:56:18am | GeoXH 6000 |
| 72 | 52.835142 | 173.186211 | 5.20 | AOI#1_FS62 | 6/28/2016 10:57:03am | GeoXH 6000 |
| 73 | 52.835176 | 173.186236 | 5.14 | AOI#1_FS63 | 6/28/2016 10:57:26am | GeoXH 6000 |
| 74 | 52.834534 | 173.185548 | 9.57 | AOI#1_BP_FS01 | 6/28/2016 02:31:44pm | GeoXH 6000 |
| 75 | 52.834561 | 173.185464 | 10.14 | AOI#1_BP_FS02 | 6/28/2016 02:32:10pm | GeoXH 6000 |
| 76 | 52.834581 | 173.185494 | 9.47 | AOI#1_BP_FS03 | 6/28/2016 02:32:33pm | GeoXH 6000 |
| 77 | 52.834615 | 173.185490 | 9.93 | AOI#1_BP_FS04 | 6/28/2016 02:33:01pm | GeoXH 6000 |
| 78 | 52.834635 | 173.185546 | 10.01 | AOI#1_BP_FS05 | 6/28/2016 02:33:28pm | GeoXH 6000 |
| 79 | 52.834609 | 173.185576 | 9.14 | AOI#1_BP_FS06 | 6/28/2016 02:33:51pm | GeoXH 6000 |
| 80 | 52.834570 | 173.185616 | 9.16 | AOI#1_BP_FS07 | 6/28/2016 02:34:16pm | GeoXH 6000 |
| 81 | 52.834656 | 173.185596 | 10.45 | AOI#1_BP_FS08 | 6/28/2016 02:34:47pm | GeoXH 6000 |
| 82 | 52.834628 | 173.185627 | 9.69 | AOI#1_BP_FS09 | 6/28/2016 02:35:10pm | GeoXH 6000 |
| 83 | 52.834595 | 173.185670 | 9.17 | AOI#1_BP_FS10 | 6/28/2016 02:35:37pm | GeoXH 6000 |
| 84 | 52.834685 | 173.185644 | 9.94 | AOI#1_BP_FS11 | 6/28/2016 02:36:09pm | GeoXH 6000 |
| 85 | 52.834657 | 173.185683 | 9.17 | AOI#1_BP_FS12 | 6/28/2016 02:36:33pm | GeoXH 6000 |
| 86 | 52.834633 | 173.185727 | 9.00 | AOI#1_BP_FS13 | 6/28/2016 02:36:57pm | GeoXH 6000 |
| 87 | 52.834647 | 173.185785 | 7.82 | AOI#1_BP_FS14 | 6/28/2016 02:37:22pm | GeoXH 6000 |
| 88 | 52.834669 | 173.185780 | 8.30 | AOI#1_BP_FS15 | 6/28/2016 02:37:45pm | GeoXH 6000 |
| 89 | 52.834682 | 173.185728 | 8.19 | AOI#1_BP_FS16 | 6/28/2016 02:38:08pm | GeoXH 6000 |
| 90 | 52.834715 | 173.185722 | 8.41 | AOI#1_BP_FS17 | 6/28/2016 02:39:24pm | GeoXH 6000 |
| 91 | 52.835352 | 173.186318 | 6.20 | AOI#1_SWFS01 | 6/28/2016 07:13:29pm | GeoXH 6000 |
| 92 | 52.835371 | 173.186361 | 6.67 | AOI#1_SWFS02 | 6/28/2016 07:14:17pm | GeoXH 6000 |
| 93 | 52.835384 | 173.186428 | 6.40 | AOI#1_SWFS03 | 6/28/2016 07:14:44pm | GeoXH 6000 |
| 94 | 52.835364 | 173.186473 | 6.66 | AOI#1_SWFS04 | 6/28/2016 07:15:09pm | GeoXH 6000 |
| 95 | 52.835344 | 173.186522 | 5.79 | AOI#1_SWFS05 | 6/28/2016 07:15:33pm | GeoXH 6000 |
| 96 | 52.835310 | 173.186514 | 5.56 | AOI#1_SWFS06 | 6/28/2016 07:15:57pm | GeoXH 6000 |
| 97 | 52.835280 | 173.186537 | 5.69 | AOI#1_SWFS07 | 6/28/2016 07:16:22pm | GeoXH 6000 |
| 556 | 52.840549 | 173.193062 | 18.82 | AOI#4_DU7_FS16 | 6/22/2016 06:55:50pm | GeoXH 6000 |
| 557 | 52.840508 | 173.193022 | 19.26 | AOI#4_DU7_FS17 | 6/22/2016 06:56:14pm | GeoXH 6000 |
| 558 | 52.840495 | 173.192938 | 18.07 | AOI#4_DU7_FS19 | 6/22/2016 06:56:38pm | GeoXH 6000 |
| 559 | 52.840474 | 173.192993 | 18.97 | AOI#4_DU7_FS18 | 6/22/2016 06:57:13pm | GeoXH 6000 |
| 560 | 52.840508 | 173.192781 | 19.05 | AOI#4_DU7_FS25 | 6/22/2016 06:58:06pm | GeoXH 6000 |
| 561 | 52.840519 | 173.192858 | 18.94 | AOI#4_DU7_FS24 | 6/22/2016 06:58:27pm | GeoXH 6000 |
| 562 | 52.840513 | 173.192884 | 18.61 | AOI#4_DU7_FS23 | 6/22/2016 06:58:45pm | GeoXH 6000 |
| 563 | 52.840525 | 173.192964 | 18.32 | AOI#4_DU7_FS20 | 6/22/2016 06:59:07pm | GeoXH 6000 |
| 564 | 52.840560 | 173.192994 | 18.49 | AOI#4_DU7_FS21 | 6/22/2016 06:59:34pm | GeoXH 6000 |
| 565 | 52.840544 | 173.192910 | 18.97 | AOI#4_DU7_FS22 | 6/22/2016 06:59:54pm | GeoXH 6000 |
| 566 | 52.840548 | 173.192882 | 19.27 | AOI#4_DU7_FS29 | 6/22/2016 07:00:14pm | GeoXH 6000 |
| 567 | 52.840566 | 173.192828 | 19.59 | AOI#4_DU7_FS28 | 6/22/2016 07:00:34pm | GeoXH 6000 |
| 568 | 52.840586 | 173.192774 | 19.52 | AOI#4_DU7_FS27 | 6/22/2016 07:00:57pm | GeoXH 6000 |
| 569 | 52.840539 | 173.192807 | 20.15 | AOI#4_DU7_FS26 | 6/22/2016 07:02:13pm | GeoXH 6000 |
| 570 | 52.840586 | 173.192774 | 19.97 | AOI#4_DU7_FS27 | 6/22/2016 07:02:38pm | GeoXH 6000 |
| 571 | 52.840594 | 173.192855 | 19.52 | AOI#4_DU7_FS31 | 6/22/2016 07:03:02pm | GeoXH 6000 |
| 572 | 52.840609 | 173.192799 | 19.95 | AOI#4_DU7_FS30 | 6/22/2016 07:03:36pm | GeoXH 6000 |
| 573 | 52.840656 | 173.192780 | 20.76 | AOI#4_DU7_FS34 | 6/22/2016 07:03:54pm | GeoXH 6000 |
| 574 | 52.840638 | 173.192831 | 20.63 | AOI#4_DU7_FS33 | 6/22/2016 07:04:14pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 575 | 52.840626 | 173.192877 | 20.60 | AOI#4_DU7_FS32 | 6/22/2016 07:04:33pm | GeoXH 6000 |
| 576 | 52.840665 | 173.192905 | 20.89 | AOI#4_DU7_FS48 | 6/22/2016 07:04:57pm | GeoXH 6000 |
| 577 | 52.840672 | 173.192874 | 21.20 | AOI#4_DU7_FS51 | 6/22/2016 07:05:20pm | GeoXH 6000 |
| 578 | 52.840686 | 173.192821 | 21.20 | AOI#4_DU7_FS50 | 6/22/2016 07:06:50pm | GeoXH 6000 |
| 579 | 52.840738 | 173.192797 | 21.66 | AOI#4_DU7_FS35 | 6/22/2016 07:07:14pm | GeoXH 6000 |
| 98 | 52.835259 | 173.186601 | 6.19 | AOI#1_SWFS08 | 6/28/2016 07:16:49pm | GeoXH 6000 |
| 99 | 52.835250 | 173.186652 | 6.20 | AOI#1_SWFS09 | 6/28/2016 07:17:12pm | GeoXH 6000 |
| 100 | 52.835260 | 173.186705 | 8.45 | AOI#1_SWFS10 | 6/28/2016 07:17:37pm | GeoXH 6000 |
| 101 | 52.835234 | 173.186764 | 7.88 | AOI#1_SWFS11 | 6/28/2016 07:18:56pm | GeoXH 6000 |
| 102 | 52.835206 | 173.186788 | 8.93 | AOI#1_SWFS12 | 6/28/2016 07:19:22pm | GeoXH 6000 |
| 103 | 52.835171 | 173.186745 | 6.63 | AOI#1_SWFS13 | 6/28/2016 07:19:49pm | GeoXH 6000 |
| 104 | 52.835146 | 173.186692 | 6.79 | AOI#1_SWFS14 | 6/28/2016 07:20:14pm | GeoXH 6000 |
| 105 | 52.835121 | 173.186630 | 6.91 | AOI#1_SWFS15 | 6/28/2016 07:20:37pm | GeoXH 6000 |
| 106 | 52.835093 | 173.186569 | 5.22 | AOI#1_SWFS16 | 6/28/2016 07:21:08pm | GeoXH 6000 |
| 107 | 52.835090 | 173.186480 | 4.93 | AOI#1_SWFS17 | 6/28/2016 07:21:33pm | GeoXH 6000 |
| 108 | 52.835401 | 173.186299 | 14.61 | AOI#1_FS67 | 7/1/2016 05:15:34pm | GeoXH 6000 |
| 109 | 52.835388 | 173.186241 | 15.35 | AOI#1_FS68 | 7/1/2016 05:16:04pm | GeoXH 6000 |
| 110 | 52.835347 | 173.186200 | 13.72 | AOI#1_FS69 | 7/1/2016 05:16:29pm | GeoXH 6000 |
| 111 | 52.835309 | 173.186156 | 12.22 | AOI#1_FS70 | 7/1/2016 05:16:59pm | GeoXH 6000 |
| 112 | 52.835274 | 173.186120 | 12.95 | AOI#1_FS71 | 7/1/2016 05:17:35pm | GeoXH 6000 |
| 113 | 52.835240 | 173.186045 | 12.80 | AOI#1_FS72 | 7/1/2016 05:18:10pm | GeoXH 6000 |
| 114 | 52.835210 | 173.186020 | 12.80 | AOI#1_FS74 | 7/1/2016 05:18:43pm | GeoXH 6000 |
| 115 | 52.835171 | 173.185992 | 12.15 | AOI#1_FS75 | 7/1/2016 05:19:09pm | GeoXH 6000 |
| 116 | 52.835149 | 173.186026 | 10.97 | AOI#1_FS76 | 7/1/2016 05:19:59pm | GeoXH 6000 |
| 117 | 52.835189 | 173.186065 | 10.54 | AOI#1_FS77 | 7/1/2016 05:20:33pm | GeoXH 6000 |
| 118 | 52.835222 | 173.186100 | 10.64 | AOI#1_FS78 | 7/1/2016 05:21:05pm | GeoXH 6000 |
| 119 | 52.835255 | 173.186164 | 9.60 | AOI#1_FS79 | 7/1/2016 05:21:46pm | GeoXH 6000 |
| 120 | 52.835290 | 173.186209 | 9.18 | AOI#1_FS80 | 7/1/2016 05:22:17pm | GeoXH 6000 |
| 121 | 52.835326 | 173.186236 | 10.85 | AOI#1_FS81 | 7/1/2016 05:22:44pm | GeoXH 6000 |
| 122 | 52.835354 | 173.186295 | 10.38 | AOI#1_FS82 | 7/1/2016 05:23:08pm | GeoXH 6000 |
| 123 | 52.835303 | 173.186278 | 8.51 | AOI#1_FS83 | 7/1/2016 05:23:32pm | GeoXH 6000 |
| 124 | 52.835275 | 173.186244 | 7.05 | AOI#1_FS84 | 7/1/2016 05:23:55pm | GeoXH 6000 |
| 125 | 52.835237 | 173.186200 | 8.88 | AOI#1_FS85 | 7/1/2016 05:24:20pm | GeoXH 6000 |
| 126 | 52.835207 | 173.186156 | 9.11 | AOI#1_FS86 | 7/1/2016 05:24:43pm | GeoXH 6000 |
| 127 | 52.835170 | 173.186125 | 8.55 | AOI#1_FS87 | 7/1/2016 05:25:07pm | GeoXH 6000 |
| 128 | 52.835124 | 173.186063 | 7.86 | AOI#1_FS88 | 7/1/2016 05:25:33pm | GeoXH 6000 |
| 129 | 52.835086 | 173.186084 | 10.10 | AOI#1_FS89 | 7/1/2016 05:25:57pm | GeoXH 6000 |
| 130 | 52.835052 | 173.186120 | 10.80 | AOI#1_FS90 | 7/1/2016 05:26:21pm | GeoXH 6000 |
| 131 | 52.835179 | 173.186817 | 6.98 | AOI#1_90 | 7/1/2016 06:00:35pm | GeoXH 6000 |
| 132 | 52.835153 | 173.186767 | 6.35 | AOI#1_91 | 7/1/2016 06:00:59pm | GeoXH 6000 |
| 133 | 52.835131 | 173.186720 | 6.26 | AOI#1_92 | 7/1/2016 06:01:22pm | GeoXH 6000 |
| 134 | 52.835104 | 173.186675 | 6.03 | AOI#1_93 | 7/1/2016 06:01:47pm | GeoXH 6000 |
| 135 | 52.835081 | 173.186621 | 6.12 | AOI#1_94 | 7/1/2016 06:02:10pm | GeoXH 6000 |
| 136 | 52.835057 | 173.186567 | 5.59 | AOI#1_95 | 7/1/2016 06:02:34pm | GeoXH 6000 |
| 137 | 52.835085 | 173.186538 | 5.39 | AOI#1_96 | 7/1/2016 06:02:57pm | GeoXH 6000 |
| 138 | 52.835032 | 173.186589 | 6.95 | AOI#1_SWFS18 | 7/1/2016 06:03:28pm | GeoXH 6000 |
| 139 | 52.835062 | 173.186649 | 6.49 | AOI#1_SWFS19 | 7/1/2016 06:04:00pm | GeoXH 6000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 140 | 52.835092 | 173.186702 | 6.61 | AOI#1_SWFS20 | 7/1/2016 06:04:23pm | GeoXH 6000 |
| 141 | 52.835114 | 173.186745 | 6.34 | AOI#1_SWFS21 | 7/1/2016 06:04:47pm | GeoXH 6000 |
| 142 | 52.835135 | 173.186790 | 6.87 | AOI#1_SWFS22 | 7/1/2016 06:05:11pm | GeoXH 6000 |
| 143 | 52.835178 | 173.186842 | 6.64 | AOI#1_SWFS23 | 7/1/2016 06:05:36pm | GeoXH 6000 |
| 144 | 52.835061 | 173.186135 | 10.33 | AOI#1_SWFS25 | 7/3/2016 04:21:44pm | GeoXH 6000 |
| 145 | 52.835043 | 173.186182 | 10.67 | AOI#1_SWFS26 | 7/3/2016 04:22:08pm | GeoXH 6000 |
| 146 | 52.835064 | 173.186210 | 10.66 | AOI#1_SWFS27 | 7/3/2016 04:22:40pm | GeoXH 6000 |
| 147 | 52.835086 | 173.186238 | 9.66 | AOI#1_SWFS28 | 7/3/2016 04:23:03pm | GeoXH 6000 |
| 148 | 52.835089 | 173.186269 | 10.43 | AOI#1_SWFS29 | 7/3/2016 04:23:32pm | GeoXH 6000 |
| 149 | 52.835087 | 173.186313 | 10.55 | AOI#1_SWFS30 | 7/3/2016 04:23:57pm | GeoXH 6000 |
| 150 | 52.835093 | 173.186355 | 10.98 | AOI#1_SWFS31 | 7/3/2016 04:24:20pm | GeoXH 6000 |
| 151 | 52.835097 | 173.186402 | 10.19 | AOI#1_SWFS32 | 7/3/2016 04:24:43pm | GeoXH 6000 |
| 152 | 52.835078 | 173.186448 | 9.85 | AOI#1_SWFS33 | 7/3/2016 04:25:07pm | GeoXH 6000 |
| 153 | 52.835069 | 173.186489 | 10.00 | AOI#1_SWFS34 | 7/3/2016 04:25:31pm | GeoXH 6000 |
| 154 | 52.835049 | 173.186524 | 9.69 | AOI#1_SWFS35 | 7/3/2016 04:26:00pm | GeoXH 6000 |
| 155 | 52.835035 | 173.186552 | 9.21 | AOI#1_SWFS36 | 7/3/2016 04:26:23pm | GeoXH 6000 |
| 156 | 52.835214 | 173.186809 | 10.34 | AOI#1_SWFS37 | 7/3/2016 04:27:03pm | GeoXH 6000 |
| 157 | 52.835249 | 173.186780 | 10.77 | AOI#1_SWFS38 | 7/3/2016 04:27:29pm | GeoXH 6000 |
| 158 | 52.835271 | 173.186747 | 10.72 | AOI#1_SWFS39 | 7/3/2016 04:27:53pm | GeoXH 6000 |
| 159 | 52.835296 | 173.186710 | 11.24 | AOI#1_SWFS40 | 7/3/2016 04:28:18pm | GeoXH 6000 |
| 160 | 52.835321 | 173.186668 | 10.89 | AOI#1_SWFS41 | 7/3/2016 04:28:45pm | GeoXH 6000 |
| 161 | 52.835013 | 173.186201 | 10.10 | AOI#1_FS97 | 7/3/2016 06:25:51pm | GeoXH 6000 |
| 162 | 52.835041 | 173.186241 | 9.54 | AOI#1_FS98 | 7/3/2016 06:26:32pm | GeoXH 6000 |
| 163 | 52.835075 | 173.186254 | 9.26 | AOI#1_FS99 | 7/3/2016 06:27:04pm | GeoXH 6000 |
| 164 | 52.835070 | 173.186306 | 9.12 | AOI#1_FS100 | 7/3/2016 06:27:28pm | GeoXH 6000 |
| 165 | 52.835072 | 173.186377 | 9.63 | AOI#1_FS101 | 7/3/2016 06:27:53pm | GeoXH 6000 |
| 166 | 52.835052 | 173.186428 | 9.27 | AOI#1_FS102 | 7/3/2016 06:28:16pm | GeoXH 6000 |
| 167 | 52.835029 | 173.186477 | 10.03 | AOI#1_FS103 | 7/3/2016 06:28:41pm | GeoXH 6000 |
| 168 | 52.835005 | 173.186516 | 11.20 | AOI#1_FS104 | 7/3/2016 06:29:05pm | GeoXH 6000 |
| 169 | 52.835003 | 173.186441 | 10.22 | AOI#1_FS105 | 7/3/2016 06:29:30pm | GeoXH 6000 |
| 170 | 52.835014 | 173.186394 | 9.98 | AOI#1_FS106 | 7/3/2016 06:29:53pm | GeoXH 6000 |
| 171 | 52.835028 | 173.186347 | 9.73 | AOI#1_FS107 | 7/3/2016 06:30:15pm | GeoXH 6000 |
| 172 | 52.835030 | 173.186294 | 10.01 | AOI#1_FS108 | 7/3/2016 06:30:39pm | GeoXH 6000 |
| 173 | 52.834991 | 173.186323 | 9.84 | AOI#1_FS109 | 7/3/2016 06:31:03pm | GeoXH 6000 |
| 174 | 52.834941 | 173.186370 | 10.13 | AOI#1_FS110 | 7/3/2016 06:31:29pm | GeoXH 6000 |
| 175 | 52.834935 | 173.186307 | 10.14 | AOI#1_FS111 | 7/3/2016 06:31:54pm | GeoXH 6000 |
| 176 | 52.834951 | 173.186259 | 9.13 | AOI#1_FS112 | 7/3/2016 06:32:22pm | GeoXH 6000 |
| 177 | 52.834988 | 173.186244 | 9.42 | AOI#1_FS113 | 7/3/2016 06:32:49pm | GeoXH 6000 |
| 178 | 52.836666 | 173.191021 | 13.12 | AOI#1PBFS01FL | 6/26/2016 02:19:35pm | GeoXH 6000 |
| 179 | 52.836652 | 173.191030 | 13.17 | AOI#1PBFS02FL | 6/26/2016 02:20:04pm | GeoXH 6000 |
| 180 | 52.836634 | 173.190967 | 13.22 | AOI#1PBFS03FL | 6/26/2016 02:20:33pm | GeoXH 6000 |
| 181 | 52.836652 | 173.190953 | 13.49 | AOI#1PBFS04FL | 6/26/2016 02:20:58pm | GeoXH 6000 |
| 182 | 52.836653 | 173.191004 | 13.00 | AOI#1PBFS05FL | 6/26/2016 02:21:23pm | GeoXH 6000 |
| 183 | 52.836670 | 173.191066 | 13.39 | AOI#1PBFS06FL | 6/26/2016 02:22:31pm | GeoXH 6000 |
| 184 | 52.836649 | 173.190982 | 12.88 | AOI#1PBFS07FL | 6/26/2016 02:23:09pm | GeoXH 6000 |
| 185 | 52.836661 | 173.191026 | 12.91 | AOI#1PBFS08SW | 6/26/2016 02:23:31pm | GeoXH 6000 |
| 186 | 52.836646 | 173.191012 | 12.84 | AOI#1PBFS09SW | 6/26/2016 02:23:51pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

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|---|---|---|---|---|---|---|
| 187 | 52.836637 | 173.190985 | 12.89 | AOI#1PBFS10SW | 6/26/2016 02:24:12pm | GeoXH 6000 |
| 188 | 52.836641 | 173.190958 | 12.83 | AOI#1PBFS11SW | 6/26/2016 02:24:32pm | GeoXH 6000 |
| 189 | 52.836655 | 173.190969 | 13.03 | AOI#1PBFS12SW | 6/26/2016 02:24:48pm | GeoXH 6000 |
| 190 | 52.836663 | 173.190998 | 12.99 | AOI#1PBFS13SW | 6/26/2016 02:25:05pm | GeoXH 6000 |
| 191 | 52.834694 | 173.185818 | 11.31 | AOI#1_USACE CHARACT_SAMP#2 | 6/20/2016 09:14:27am | GeoXH 6000 |
| 192 | 52.835220 | 173.186791 | 11.33 | AOI#1_USACE CHARACT_SAMP#1 | 6/20/2016 09:23:51am | GeoXH 6000 |
| 193 | 52.836651 | 173.190907 | 13.43 | AOI#1_PB01 | 6/29/2016 03:13:34pm | GeoXH 6000 |
| 194 | 52.836621 | 173.190943 | 13.47 | AOI#1_PB02 | 6/29/2016 03:14:02pm | GeoXH 6000 |
| 195 | 52.836647 | 173.190969 | 11.70 | AOI#1_PB03 | 6/29/2016 03:14:31pm | GeoXH 6000 |
| 196 | 52.836658 | 173.191017 | 11.60 | AOI#1_PB04 | 6/29/2016 03:14:59pm | GeoXH 6000 |
| 197 | 52.836679 | 173.191040 | 12.09 | AOI#1_PB05 | 6/29/2016 03:15:23pm | GeoXH 6000 |
| 198 | 52.836670 | 173.191066 | 12.09 | AOI#1_PB06 | 6/29/2016 03:15:46pm | GeoXH 6000 |
| 199 | 52.836645 | 173.191067 | 12.40 | AOI#1_PB07 | 6/29/2016 03:16:12pm | GeoXH 6000 |
| 200 | 52.840473 | 173.192769 | 25.56 | EXCAVATION_BOUND_1 | 6/14/2016 03:41:57pm | GeoXH 6000 |
| 201 | 52.840506 | 173.192732 | 24.73 | EXCAVATION_BOUND_2 | 6/14/2016 03:42:37pm | GeoXH 6000 |
| 202 | 52.840541 | 173.192762 | 24.39 | EXCAVATION_BOUND_3 | 6/14/2016 03:43:23pm | GeoXH 6000 |
| 203 | 52.840566 | 173.192743 | 24.19 | EXCAVATION_BOUND_4 | 6/14/2016 03:43:55pm | GeoXH 6000 |
| 204 | 52.840625 | 173.192764 | 23.78 | EXCAVATION_BOUND_5 | 6/14/2016 03:44:22pm | GeoXH 6000 |
| 205 | 52.840639 | 173.192752 | 23.74 | EXCAVATION_BOUND_6 | 6/14/2016 03:44:50pm | GeoXH 6000 |
| 206 | 52.840691 | 173.192744 | 24.30 | EXCAVATION_BOUND_7 | 6/14/2016 03:45:16pm | GeoXH 6000 |
| 207 | 52.840689 | 173.192794 | 23.50 | EXCAVATION_BOUND_8 | 6/14/2016 03:45:36pm | GeoXH 6000 |
| 208 | 52.840704 | 173.192813 | 23.44 | EXCAVATION_BOUND_9 | 6/14/2016 03:45:59pm | GeoXH 6000 |
| 209 | 52.840719 | 173.192705 | 23.72 | EXCAVATION_BOUND_10 | 6/14/2016 03:46:24pm | GeoXH 6000 |
| 210 | 52.840766 | 173.192743 | 23.65 | EXCAVATION_BOUND_11 | 6/14/2016 03:46:55pm | GeoXH 6000 |
| 211 | 52.840785 | 173.192796 | 23.39 | EXCAVATION_BOUND_12 | 6/14/2016 03:47:18pm | GeoXH 6000 |
| 212 | 52.840771 | 173.192862 | 22.60 | EXCAVATION_BOUND_13 | 6/14/2016 03:47:43pm | GeoXH 6000 |
| 213 | 52.840783 | 173.192901 | 20.84 | EXCAVATION_BOUND_14 | 6/14/2016 03:48:02pm | GeoXH 6000 |
| 214 | 52.840822 | 173.192881 | 20.96 | EXCAVATION_BOUND_15 | 6/14/2016 03:48:24pm | GeoXH 6000 |
| 215 | 52.840857 | 173.192907 | 21.25 | EXCAVATION_BOUND_16 | 6/14/2016 03:48:52pm | GeoXH 6000 |
| 216 | 52.840900 | 173.193023 | 20.85 | EXCAVATION_BOUND_17 | 6/14/2016 03:49:28pm | GeoXH 6000 |
| 217 | 52.840795 | 173.193047 | 21.53 | EXCAVATION_BOUND_18 | 6/14/2016 03:50:07pm | GeoXH 6000 |
| 218 | 52.840750 | 173.193034 | 21.04 | EXCAVATION_BOUND_19 | 6/14/2016 03:50:33pm | GeoXH 6000 |
| 219 | 52.840643 | 173.193092 | 22.49 | EXCAVATION_BOUND_20 | 6/14/2016 03:51:04pm | GeoXH 6000 |
| 220 | 52.840629 | 173.193075 | 22.35 | EXCAVATION_BOUND_21 | 6/14/2016 03:51:25pm | GeoXH 6000 |
| 221 | 52.840564 | 173.193132 | 23.24 | EXCAVATION_BOUND_22 | 6/14/2016 03:51:57pm | GeoXH 6000 |
| 222 | 52.840557 | 173.193110 | 22.78 | EXCAVATION_BOUND_23 | 6/14/2016 03:52:23pm | GeoXH 6000 |
| 223 | 52.840607 | 173.193050 | 21.98 | EXCAVATION_BOUND_24 | 6/14/2016 03:52:51pm | GeoXH 6000 |
| 224 | 52.840571 | 173.192927 | 22.53 | EXCAVATION_BOUND_25 | 6/14/2016 03:53:19pm | GeoXH 6000 |
| 225 | 52.840577 | 173.192929 | 21.33 | DIESEL IMPACT SOIL_1 | 6/14/2016 03:53:46pm | GeoXH 6000 |
| 226 | 52.840597 | 173.192995 | 21.23 | DIESEL IMPACT SOIL_2 | 6/14/2016 03:54:18pm | GeoXH 6000 |
| 227 | 52.840628 | 173.192979 | 21.01 | DIESEL IMPACT SOIL_3 | 6/14/2016 03:54:40pm | GeoXH 6000 |
| 228 | 52.840641 | 173.192925 | 20.94 | DIESEL IMPACT SOIL_4 | 6/14/2016 03:55:06pm | GeoXH 6000 |
| 229 | 52.840596 | 173.192893 | 21.48 | DIESEL IMPACT SOIL_5 | 6/14/2016 03:55:28pm | GeoXH 6000 |
| 230 | 52.840782 | 173.192877 | 17.37 | TRENCH_A_1 | 6/14/2016 03:56:29pm | GeoXH 6000 |
| 231 | 52.840862 | 173.192803 | 18.35 | TRENCH_A_2 | 6/14/2016 03:57:21pm | GeoXH 6000 |
| 232 | 52.840933 | 173.192742 | 16.86 | TRENCH_A_3 | 6/14/2016 03:57:50pm | GeoXH 6000 |
| 233 | 52.840999 | 173.192684 | 17.10 | TRENCH_A_4 | 6/14/2016 03:58:21pm | GeoXH 6000 |

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Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 234 | 52.841001 | 173.192699 | 17.16 | TRENCH_A_5 | 6/14/2016 03:58:41pm | GeoXH 6000 |
| 235 | 52.840919 | 173.192779 | 16.87 | TRENCH_A_6 | 6/14/2016 03:59:16pm | GeoXH 6000 |
| 236 | 52.840865 | 173.192838 | 18.09 | TRENCH_A_7 | 6/14/2016 03:59:48pm | GeoXH 6000 |
| 237 | 52.840789 | 173.192892 | 17.01 | TRENCH_A_8 | 6/14/2016 04:00:24pm | GeoXH 6000 |
| 238 | 52.839991 | 173.193192 | 21.79 | GREY_SOIL_AOI4_1 | 6/12/2016 11:19:58am | GeoXH 6000 |
| 239 | 52.839981 | 173.193171 | 21.74 | GREY_SOIL_AOI4_2 | 6/12/2016 11:20:32am | GeoXH 6000 |
| 240 | 52.839979 | 173.193140 | 21.61 | GREY_SOIL_AOI4_3 | 6/12/2016 11:20:53am | GeoXH 6000 |
| 241 | 52.839995 | 173.193113 | 21.38 | GREY_SOIL_AOI4_4 | 6/12/2016 11:21:15am | GeoXH 6000 |
| 242 | 52.840016 | 173.193111 | 21.44 | GREY_SOIL_AOI4_5 | 6/12/2016 11:21:38am | GeoXH 6000 |
| 243 | 52.840047 | 173.193121 | 21.28 | GREY_SOIL_AOI4_6 | 6/12/2016 11:21:58am | GeoXH 6000 |
| 244 | 52.840081 | 173.193116 | 21.03 | GREY_SOIL_AOI4_7 | 6/12/2016 11:22:24am | GeoXH 6000 |
| 245 | 52.840079 | 173.193137 | 21.32 | GREY_SOIL_AOI4_8 | 6/12/2016 11:22:51am | GeoXH 6000 |
| 246 | 52.840066 | 173.193148 | 21.47 | GREY_SOIL_AOI4_9 | 6/12/2016 11:23:32am | GeoXH 6000 |
| 247 | 52.840047 | 173.193174 | 21.19 | GREY_SOIL_AOI4_10 | 6/12/2016 11:24:03am | GeoXH 6000 |
| 248 | 52.840022 | 173.193178 | 21.38 | GREY_SOIL_AOI4_11 | 6/12/2016 11:24:29am | GeoXH 6000 |
| 249 | 52.839981 | 173.193200 | 21.22 | GREY_SOIL_AOI4_12 | 6/12/2016 11:25:05am | GeoXH 6000 |
| 250 | 52.839977 | 173.193146 | 21.11 | GREY_SOIL_AOI4_13 | 6/12/2016 11:25:46am | GeoXH 6000 |
| 251 | 52.840169 | 173.193006 | 20.88 | AOI#4_DU1_FS_SW_01 | 6/12/2016 07:04:58pm | GeoXH 6000 |
| 252 | 52.840182 | 173.193042 | 21.07 | AOI#4_DU1_FS_SW_02 | 6/12/2016 07:05:26pm | GeoXH 6000 |
| 253 | 52.840181 | 173.193083 | 20.92 | AOI#4_DU1_FS_SW_03 | 6/12/2016 07:05:53pm | GeoXH 6000 |
| 254 | 52.840158 | 173.193087 | 20.52 | AOI#4_DU1_FS_SW_04 | 6/12/2016 07:06:22pm | GeoXH 6000 |
| 255 | 52.840137 | 173.193103 | 20.18 | AOI#4_DU1_FS_SW_05 | 6/12/2016 07:06:52pm | GeoXH 6000 |
| 256 | 52.840114 | 173.193122 | 20.56 | AOI#4_DU1_FS_SW_06 | 6/12/2016 07:07:19pm | GeoXH 6000 |
| 257 | 52.840094 | 173.193136 | 18.97 | AOI#4_DU1_FS_SW_07 | 6/12/2016 07:08:05pm | GeoXH 6000 |
| 258 | 52.840072 | 173.193164 | 19.29 | AOI#4_DU1_FS_SW_08 | 6/12/2016 07:08:41pm | GeoXH 6000 |
| 259 | 52.840052 | 173.193195 | 19.45 | AOI#4_DU1_FS_SW_09 | 6/12/2016 07:09:12pm | GeoXH 6000 |
| 260 | 52.840030 | 173.193210 | 19.35 | AOI#4_DU1_FS_SW_10 | 6/12/2016 07:09:45pm | GeoXH 6000 |
| 261 | 52.840005 | 173.193217 | 19.08 | AOI#4_DU1_FS_SW_11 | 6/12/2016 07:10:23pm | GeoXH 6000 |
| 262 | 52.839944 | 173.193101 | 19.08 | AOI#4_DU1_FS_SW_12 | 6/12/2016 07:11:05pm | GeoXH 6000 |
| 263 | 52.839951 | 173.193047 | 18.92 | AOI#4_DU1_FS_SW_13 | 6/12/2016 07:11:37pm | GeoXH 6000 |
| 264 | 52.839968 | 173.193039 | 18.88 | AOI#4_DU1_FS_SW_14 | 6/12/2016 07:12:19pm | GeoXH 6000 |
| 265 | 52.839995 | 173.193056 | 18.65 | AOI#4_DU1_FS_SW_15 | 6/12/2016 07:12:54pm | GeoXH 6000 |
| 266 | 52.840020 | 173.193059 | 18.84 | AOI#4_DU1_FS_SW_16 | 6/12/2016 07:13:24pm | GeoXH 6000 |
| 267 | 52.840042 | 173.193038 | 18.58 | AOI#4_DU1_FS_SW_17 | 6/12/2016 07:13:53pm | GeoXH 6000 |
| 268 | 52.840065 | 173.193022 | 18.17 | AOI#4_DU1_FS_SW_18 | 6/12/2016 07:14:28pm | GeoXH 6000 |
| 269 | 52.840124 | 173.193047 | 18.20 | AOI#4_DU1_FS_SW_19 | 6/12/2016 07:15:01pm | GeoXH 6000 |
| 270 | 52.840149 | 173.193017 | 17.78 | AOI#4_DU1_FS_SW_20 | 6/12/2016 07:15:31pm | GeoXH 6000 |
| 271 | 52.839979 | 173.193182 | 22.68 | AOI#4_DU_FS_41 | 6/16/2016 09:10:09am | GeoXH 6000 |
| 272 | 52.839974 | 173.193156 | 22.26 | AOI#4_DU_FS_42 | 6/16/2016 09:10:46am | GeoXH 6000 |
| 273 | 52.839967 | 173.193133 | 22.41 | AOI#4_DU_FS_43 | 6/16/2016 09:11:06am | GeoXH 6000 |
| 274 | 52.839961 | 173.193112 | 22.36 | AOI#4_DU_FS_44 | 6/16/2016 09:11:28am | GeoXH 6000 |
| 275 | 52.839956 | 173.193092 | 22.19 | AOI#4_DU_FS_44 | 6/16/2016 09:11:50am | GeoXH 6000 |
| 276 | 52.839949 | 173.193070 | 22.11 | AOI#4_DU_FS_45 | 6/16/2016 09:12:13am | GeoXH 6000 |
| 277 | 52.840040 | 173.193171 | 19.56 | AOI#4_DU1_FS_23 | 6/17/2016 07:22:51pm | GeoXH 6000 |
| 278 | 52.840169 | 173.193058 | 20.16 | AOI#4_DU1_FS_01 | 6/17/2016 07:25:18pm | GeoXH 6000 |
| 279 | 52.840166 | 173.193038 | 19.99 | AOI#4_DU1_FS_02 | 6/17/2016 07:25:42pm | GeoXH 6000 |
| 280 | 52.840157 | 173.193013 | 20.19 | AOI#4_DU1_FS_03 | 6/17/2016 07:26:22pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
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| 281 | 52.840152 | 173.193063 | 19.88 | AOI#4_DU1_FS_04 | 6/17/2016 07:26:46pm | GeoXH 6000 |
| 282 | 52.840148 | 173.193047 | 20.02 | AOI#4_DU1_FS_05 | 6/17/2016 07:27:12pm | GeoXH 6000 |
| 283 | 52.840145 | 173.193028 | 20.24 | AOI#4_DU1_FS_06 | 6/17/2016 07:27:45pm | GeoXH 6000 |
| 284 | 52.840138 | 173.193074 | 19.75 | AOI#4_DU1_FS_07 | 6/17/2016 07:28:08pm | GeoXH 6000 |
| 285 | 52.840136 | 173.193052 | 20.20 | AOI#4_DU1_FS_08 | 6/17/2016 07:28:28pm | GeoXH 6000 |
| 286 | 52.840124 | 173.193086 | 19.73 | AOI#4_DU1_FS_09 | 6/17/2016 07:29:15pm | GeoXH 6000 |
| 287 | 52.840119 | 173.193066 | 19.85 | AOI#4_DU1_FS_10 | 6/17/2016 07:29:36pm | GeoXH 6000 |
| 288 | 52.840110 | 173.193099 | 19.53 | AOI#4_DU1_FS_11 | 6/17/2016 07:30:02pm | GeoXH 6000 |
| 289 | 52.840107 | 173.193073 | 19.80 | AOI#4_DU1_FS_12 | 6/17/2016 07:30:23pm | GeoXH 6000 |
| 290 | 52.840097 | 173.193102 | 19.41 | AOI#4_DU1_FS_13 | 6/17/2016 07:30:46pm | GeoXH 6000 |
| 291 | 52.840093 | 173.193076 | 19.48 | AOI#4_DU1_FS_14 | 6/17/2016 07:31:07pm | GeoXH 6000 |
| 292 | 52.840085 | 173.193111 | 19.28 | AOI#4_DU1_FS_15 | 6/17/2016 07:31:32pm | GeoXH 6000 |
| 293 | 52.840078 | 173.193082 | 19.46 | AOI#4_DU1_FS_16 | 6/17/2016 07:32:16pm | GeoXH 6000 |
| 294 | 52.840075 | 173.193056 | 19.36 | AOI#4_DU1_FS_17 | 6/17/2016 07:32:43pm | GeoXH 6000 |
| 295 | 52.840067 | 173.193027 | 19.44 | AOI#4_DU1_FS_18 | 6/17/2016 07:33:11pm | GeoXH 6000 |
| 296 | 52.840069 | 173.193119 | 19.05 | AOI#4_DU1_FS_19 | 6/17/2016 07:33:41pm | GeoXH 6000 |
| 297 | 52.840065 | 173.193093 | 19.26 | AOI#4_DU1_FS_20 | 6/17/2016 07:34:12pm | GeoXH 6000 |
| 298 | 52.840061 | 173.193067 | 19.24 | AOI#4_DU1_FS_21 | 6/17/2016 07:34:39pm | GeoXH 6000 |
| 299 | 52.840053 | 173.193040 | 19.00 | AOI#4_DU1_FS_22 | 6/17/2016 07:35:04pm | GeoXH 6000 |
| 300 | 52.840054 | 173.193127 | 18.93 | AOI#4_DU1_FS_23 | 6/17/2016 07:35:44pm | GeoXH 6000 |
| 301 | 52.840049 | 173.193101 | 19.04 | AOI#4_DU1_FS_24 | 6/17/2016 07:36:29pm | GeoXH 6000 |
| 302 | 52.840046 | 173.193076 | 19.15 | AOI#4_DU1_FS_25 | 6/17/2016 07:36:52pm | GeoXH 6000 |
| 303 | 52.840039 | 173.193052 | 19.21 | AOI#4_DU1_FS_26 | 6/17/2016 07:37:26pm | GeoXH 6000 |
| 304 | 52.840044 | 173.193164 | 18.17 | AOI#4_DU1_FS_27 | 6/17/2016 07:37:54pm | GeoXH 6000 |
| 305 | 52.840036 | 173.193108 | 18.95 | AOI#4_DU1_FS_28 | 6/17/2016 07:38:20pm | GeoXH 6000 |
| 306 | 52.840032 | 173.193090 | 19.25 | AOI#4_DU1_FS_29 | 6/17/2016 07:38:41pm | GeoXH 6000 |
| 307 | 52.840025 | 173.193067 | 19.25 | AOI#4_DU1_FS_30 | 6/17/2016 07:39:02pm | GeoXH 6000 |
| 308 | 52.840028 | 173.193173 | 17.92 | AOI#4_DU1_FS_31 | 6/17/2016 07:39:28pm | GeoXH 6000 |
| 309 | 52.840024 | 173.193144 | 18.56 | AOI#4_DU1_FS_32 | 6/17/2016 07:41:58pm | GeoXH 6000 |
| 310 | 52.840020 | 173.193119 | 18.67 | AOI#4_DU1_FS_33 | 6/17/2016 07:42:43pm | GeoXH 6000 |
| 311 | 52.840016 | 173.193098 | 18.73 | AOI#4_DU1_FS_34 | 6/17/2016 07:43:14pm | GeoXH 6000 |
| 312 | 52.840010 | 173.193079 | 18.53 | AOI#4_DU1_FS_35 | 6/17/2016 07:44:03pm | GeoXH 6000 |
| 313 | 52.840015 | 173.193177 | 18.22 | AOI#4_DU1_FS_36 | 6/17/2016 07:45:11pm | GeoXH 6000 |
| 314 | 52.840011 | 173.193149 | 18.71 | AOI#4_DU1_FS_37 | 6/17/2016 07:46:02pm | GeoXH 6000 |
| 315 | 52.840006 | 173.193124 | 18.88 | AOI#4_DU1_FS_38 | 6/17/2016 07:46:27pm | GeoXH 6000 |
| 316 | 52.840001 | 173.193099 | 18.88 | AOI#4_DU1_FS_39 | 6/17/2016 07:47:00pm | GeoXH 6000 |
| 317 | 52.839995 | 173.193072 | 18.98 | AOI#4_DU1_FS_40 | 6/17/2016 07:47:52pm | GeoXH 6000 |
| 318 | 52.840000 | 173.193189 | 18.84 | AOI#4_DU1_FS_41 | 6/17/2016 07:48:27pm | GeoXH 6000 |
| 319 | 52.839992 | 173.193160 | 18.86 | AOI#4_DU1_FS_42 | 6/17/2016 07:48:49pm | GeoXH 6000 |
| 320 | 52.839989 | 173.193132 | 18.92 | AOI#4_DU1_FS_43 | 6/17/2016 07:49:05pm | GeoXH 6000 |
| 321 | 52.839986 | 173.193105 | 19.26 | AOI#4_DU1_FS_44 | 6/17/2016 07:49:20pm | GeoXH 6000 |
| 322 | 52.839979 | 173.193071 | 19.07 | AOI#4_DU1_FS_45 | 6/17/2016 07:49:37pm | GeoXH 6000 |
| 323 | 52.839973 | 173.193193 | 19.64 | AOI#4_DU1_FS_46 | 6/17/2016 07:50:02pm | GeoXH 6000 |
| 324 | 52.839967 | 173.193167 | 19.77 | AOI#4_DU1_FS_47 | 6/17/2016 07:50:17pm | GeoXH 6000 |
| 325 | 52.839963 | 173.193138 | 19.59 | AOI#4_DU1_FS_48 | 6/17/2016 07:50:32pm | GeoXH 6000 |
| 326 | 52.839962 | 173.193111 | 19.68 | AOI#4_DU1_FS_49 | 6/17/2016 07:50:48pm | GeoXH 6000 |
| 327 | 52.839959 | 173.193081 | 19.60 | AOI#4_DU1_FS_50 | 6/17/2016 07:51:05pm | GeoXH 6000 |

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|---|---|---|---|---|---|---|
| 328 | 52.840037 | 173.193194 | 22.20 | 16AT04TARG03SS | 6/18/2016 02:37:38pm | GeoXH 6000 |
| 329 | 52.840099 | 173.193123 | 22.43 | 16AT04TARG01SS | 6/18/2016 02:38:25pm | GeoXH 6000 |
| 330 | 52.840099 | 173.193124 | 22.14 | 16AT04TARG02SS | 6/18/2016 02:38:51pm | GeoXH 6000 |
| 332 | 52.840562 | 173.192805 | 22.50 | AOI#4_DU2_SW01 | 6/17/2016 03:08:39pm | GeoXH 6000 |
| 333 | 52.840636 | 173.192909 | 20.77 | AOI#4_DU2_SW02 | 6/17/2016 03:09:34pm | GeoXH 6000 |
| 334 | 52.840656 | 173.192919 | 19.96 | AOI#4_DU2_SW03 | 6/17/2016 03:10:01pm | GeoXH 6000 |
| 335 | 52.840675 | 173.192930 | 19.69 | AOI#4_DU2_SW04 | 6/17/2016 03:10:27pm | GeoXH 6000 |
| 336 | 52.840702 | 173.192941 | 17.83 | AOI#4_DU2_SW05 | 6/17/2016 03:10:55pm | GeoXH 6000 |
| 337 | 52.840742 | 173.192964 | 18.88 | AOI#4_DU2_SW06 | 6/17/2016 03:11:31pm | GeoXH 6000 |
| 338 | 52.840754 | 173.192997 | 18.87 | AOI#4_DU2_SW07 | 6/17/2016 03:12:01pm | GeoXH 6000 |
| 339 | 52.840757 | 173.193042 | 19.23 | AOI#4_DU2_SW08 | 6/17/2016 03:12:27pm | GeoXH 6000 |
| 340 | 52.840752 | 173.193063 | 20.34 | AOI#4_DU2_SW09 | 6/17/2016 03:12:49pm | GeoXH 6000 |
| 341 | 52.840711 | 173.193133 | 18.84 | AOI#4_DU2_SW10 | 6/17/2016 03:13:15pm | GeoXH 6000 |
| 342 | 52.840693 | 173.193089 | 19.74 | AOI#4_DU2_SW11 | 6/17/2016 03:13:41pm | GeoXH 6000 |
| 343 | 52.840681 | 173.193037 | 18.81 | AOI#4_DU2_SW12 | 6/17/2016 03:14:06pm | GeoXH 6000 |
| 344 | 52.840647 | 173.193039 | 17.68 | AOI#4_DU2_SW13 | 6/17/2016 03:14:33pm | GeoXH 6000 |
| 345 | 52.840628 | 173.193064 | 17.66 | AOI#4_DU2_SW14 | 6/17/2016 03:14:56pm | GeoXH 6000 |
| 346 | 52.840610 | 173.193084 | 16.96 | AOI#4_DU2_SW15 | 6/17/2016 03:15:20pm | GeoXH 6000 |
| 347 | 52.840588 | 173.193113 | 17.75 | AOI#4_DU2_SW16 | 6/17/2016 03:15:46pm | GeoXH 6000 |
| 348 | 52.840574 | 173.193085 | 17.58 | AOI#4_DU2_SW17 | 6/17/2016 03:16:11pm | GeoXH 6000 |
| 349 | 52.840593 | 173.193072 | 16.79 | AOI#4_DU2_SW18 | 6/17/2016 03:16:34pm | GeoXH 6000 |
| 350 | 52.840612 | 173.193054 | 16.14 | AOI#4_DU2_SW19 | 6/17/2016 03:16:56pm | GeoXH 6000 |
| 351 | 52.840626 | 173.193031 | 16.69 | AOI#4_DU2_SW20 | 6/17/2016 03:17:20pm | GeoXH 6000 |
| 352 | 52.840622 | 173.193015 | 16.36 | AOI#4_DU2_SW21 | 6/17/2016 03:17:45pm | GeoXH 6000 |
| 353 | 52.840596 | 173.193017 | 16.81 | AOI#4_DU2_SW22 | 6/17/2016 03:18:09pm | GeoXH 6000 |
| 355 | 52.840708 | 173.193096 | 18.68 | AOI#4_DU2_FS_01 | 6/17/2016 04:10:52pm | GeoXH 6000 |
| 356 | 52.840721 | 173.193087 | 18.50 | AOI#4_DU2_FS_02 | 6/17/2016 04:11:23pm | GeoXH 6000 |
| 357 | 52.840735 | 173.193075 | 18.35 | AOI#4_DU2_FS_04 | 6/17/2016 04:11:45pm | GeoXH 6000 |
| 358 | 52.840748 | 173.193064 | 19.27 | AOI#4_DU2_FS_04 | 6/17/2016 04:12:06pm | GeoXH 6000 |
| 359 | 52.840718 | 173.193074 | 18.51 | AOI#4_DU2_FS_05 | 6/17/2016 04:12:29pm | GeoXH 6000 |
| 360 | 52.840715 | 173.193066 | 17.71 | AOI#4_DU2_FS_06 | 6/17/2016 04:12:52pm | GeoXH 6000 |
| 361 | 52.840726 | 173.193054 | 17.07 | AOI#4_DU2_FS_07 | 6/17/2016 04:13:13pm | GeoXH 6000 |
| 362 | 52.840739 | 173.193042 | 17.06 | AOI#4_DU2_FS_08 | 6/17/2016 04:13:46pm | GeoXH 6000 |
| 363 | 52.840751 | 173.193026 | 17.43 | AOI#4_DU2_FS_09 | 6/17/2016 04:14:06pm | GeoXH 6000 |
| 364 | 52.840696 | 173.193055 | 17.56 | AOI#4_DU2_FS_10 | 6/17/2016 04:14:39pm | GeoXH 6000 |
| 365 | 52.840709 | 173.193041 | 17.12 | AOI#4_DU2_FS_11 | 6/17/2016 04:15:06pm | GeoXH 6000 |
| 366 | 52.840721 | 173.193031 | 16.84 | AOI#4_DU2_FS_12 | 6/17/2016 04:15:27pm | GeoXH 6000 |
| 367 | 52.840732 | 173.193025 | 17.11 | AOI#4_DU2_FS_13 | 6/17/2016 04:15:49pm | GeoXH 6000 |
| 368 | 52.840744 | 173.193011 | 17.14 | AOI#4_DU2_FS_14 | 6/17/2016 04:16:15pm | GeoXH 6000 |
| 369 | 52.840691 | 173.193030 | 17.23 | AOI#4_DU2_FS_15 | 6/17/2016 04:16:41pm | GeoXH 6000 |
| 370 | 52.840702 | 173.193020 | 16.84 | AOI#4_DU2_FS_16 | 6/17/2016 04:17:04pm | GeoXH 6000 |
| 371 | 52.840713 | 173.193014 | 16.56 | AOI#4_DU2_FS_17 | 6/17/2016 04:17:26pm | GeoXH 6000 |
| 372 | 52.840724 | 173.193001 | 16.52 | AOI#4_DU2_FS_18 | 6/17/2016 04:17:53pm | GeoXH 6000 |
| 373 | 52.840734 | 173.192988 | 16.72 | AOI#4_DU2_FS_19 | 6/17/2016 04:18:18pm | GeoXH 6000 |
| 374 | 52.840679 | 173.193012 | 16.99 | AOI#4_DU2_FS_20 | 6/17/2016 04:18:45pm | GeoXH 6000 |
| 375 | 52.840694 | 173.192999 | 16.88 | AOI#4_DU2_FS_21 | 6/17/2016 04:19:10pm | GeoXH 6000 |
| 376 | 52.840706 | 173.192989 | 17.14 | AOI#4_DU2_FS_22 | 6/17/2016 04:19:32pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
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| 378 | 52.840724 | 173.192970 | 17.34 | AOI#4_DU2_FS_24 | 6/17/2016 04:20:14pm | GeoXH 6000 |
| 379 | 52.840635 | 173.193032 | 16.00 | AOI#4_DU2_FS_25 | 6/17/2016 04:20:47pm | GeoXH 6000 |
| 380 | 52.840646 | 173.193017 | 15.78 | AOI#4_DU2_FS_26 | 6/17/2016 04:21:09pm | GeoXH 6000 |
| 381 | 52.840660 | 173.193004 | 15.86 | AOI#4_DU2_FS_27 | 6/17/2016 04:21:34pm | GeoXH 6000 |
| 382 | 52.840674 | 173.192991 | 15.88 | AOI#4_DU2_FS_28 | 6/17/2016 04:21:57pm | GeoXH 6000 |
| 383 | 52.840683 | 173.192980 | 15.67 | AOI#4_DU2_FS_29 | 6/17/2016 04:22:19pm | GeoXH 6000 |
| 384 | 52.840690 | 173.192967 | 15.91 | AOI#4_DU2_FS_30 | 6/17/2016 04:22:40pm | GeoXH 6000 |
| 385 | 52.840697 | 173.192962 | 16.08 | AOI#4_DU2_FS_31 | 6/17/2016 04:23:12pm | GeoXH 6000 |
| 386 | 52.840707 | 173.192953 | 15.80 | AOI#4_DU2_FS_32 | 6/17/2016 04:23:35pm | GeoXH 6000 |
| 552 | 52.840457 | 173.192902 | 19.04 | AOI#4_DU7_FS12 | 6/22/2016 06:54:13pm | GeoXH 6000 |
| 553 | 52.840439 | 173.192967 | 19.15 | AOI#4_DU7_FS13 | 6/22/2016 06:54:38pm | GeoXH 6000 |
| 554 | 52.840457 | 173.193044 | 19.45 | AOI#4_DU7_FS14 | 6/22/2016 06:55:01pm | GeoXH 6000 |
| 555 | 52.840528 | 173.193096 | 19.04 | AOI#4_DU7_FS15 | 6/22/2016 06:55:26pm | GeoXH 6000 |
| 580 | 52.840718 | 173.192853 | 21.21 | AOI#4_DU7_FS49 | 6/22/2016 07:07:40pm | GeoXH 6000 |
| 581 | 52.840704 | 173.192901 | 20.70 | AOI#4_DU7_FS47 | 6/22/2016 07:08:01pm | GeoXH 6000 |
| 582 | 52.840767 | 173.192823 | 22.02 | AOI#4_DU7_FS36 | 6/22/2016 07:08:28pm | GeoXH 6000 |
| 583 | 52.840751 | 173.192889 | 19.47 | AOI#4_DU7_FS37 | 6/22/2016 07:08:47pm | GeoXH 6000 |
| 387 | 52.840632 | 173.193007 | 16.38 | AOI#4_DU2_FS_33 | 6/17/2016 04:24:11pm | GeoXH 6000 |
| 388 | 52.840642 | 173.192996 | 16.70 | AOI#4_DU2_FS_34 | 6/17/2016 04:24:38pm | GeoXH 6000 |
| 389 | 52.840653 | 173.192986 | 16.78 | AOI#4_DU2_FS_35 | 6/17/2016 04:24:59pm | GeoXH 6000 |
| 390 | 52.840664 | 173.192972 | 16.75 | AOI#4_DU2_FS_36 | 6/17/2016 04:25:24pm | GeoXH 6000 |
| 391 | 52.840673 | 173.192961 | 16.55 | AOI#4_DU2_FS_37 | 6/17/2016 04:25:46pm | GeoXH 6000 |
| 392 | 52.840679 | 173.192948 | 16.39 | AOI#4_DU2_FS_38 | 6/17/2016 04:26:18pm | GeoXH 6000 |
| 393 | 52.840605 | 173.192996 | 16.70 | AOI#4_DU2_FS_39 | 6/17/2016 04:26:59pm | GeoXH 6000 |
| 394 | 52.840618 | 173.192988 | 16.59 | AOI#4_DU2_FS_40 | 6/17/2016 04:27:23pm | GeoXH 6000 |
| 395 | 52.840631 | 173.192977 | 17.48 | AOI#4_DU2_FS_41 | 6/17/2016 04:27:52pm | GeoXH 6000 |
| 396 | 52.840650 | 173.192959 | 17.33 | AOI#4_DU2_FS_42 | 6/17/2016 04:28:18pm | GeoXH 6000 |
| 397 | 52.840661 | 173.192947 | 17.46 | AOI#4_DU2_FS_43 | 6/17/2016 04:28:42pm | GeoXH 6000 |
| 398 | 52.840671 | 173.192933 | 17.49 | AOI#4_DU2_FS_44 | 6/17/2016 04:29:02pm | GeoXH 6000 |
| 399 | 52.840596 | 173.192975 | 18.23 | AOI#4_DU2_FS_45 | 6/17/2016 04:29:31pm | GeoXH 6000 |
| 400 | 52.840611 | 173.192964 | 17.89 | AOI#4_DU2_FS_46 | 6/17/2016 04:29:59pm | GeoXH 6000 |
| 401 | 52.840624 | 173.192956 | 18.12 | AOI#4_DU2_FS_47 | 6/17/2016 04:30:18pm | GeoXH 6000 |
| 402 | 52.840634 | 173.192946 | 17.81 | AOI#4_DU2_FS_48 | 6/17/2016 04:30:45pm | GeoXH 6000 |
| 403 | 52.840645 | 173.192932 | 17.22 | AOI#4_DU2_FS_49 | 6/17/2016 04:31:12pm | GeoXH 6000 |
| 404 | 52.840587 | 173.192961 | 17.91 | AOI#4_DU2_FS_50 | 6/17/2016 04:31:39pm | GeoXH 6000 |
| 405 | 52.840597 | 173.192950 | 17.71 | AOI#4_DU2_FS_51 | 6/17/2016 04:32:06pm | GeoXH 6000 |
| 406 | 52.840609 | 173.192941 | 17.98 | AOI#4_DU2_FS_52 | 6/17/2016 04:32:24pm | GeoXH 6000 |
| 407 | 52.840620 | 173.192931 | 17.96 | AOI#4_DU2_FS_53 | 6/17/2016 04:32:46pm | GeoXH 6000 |
| 408 | 52.840632 | 173.192921 | 17.78 | AOI#4_DU2_FS_54 | 6/17/2016 04:33:08pm | GeoXH 6000 |
| 409 | 52.840588 | 173.192938 | 17.79 | AOI#4_DU2_FS_55 | 6/17/2016 04:33:35pm | GeoXH 6000 |
| 410 | 52.840598 | 173.192926 | 17.61 | AOI#4_DU2_FS_56 | 6/17/2016 04:34:02pm | GeoXH 6000 |
| 411 | 52.840610 | 173.192916 | 17.54 | AOI#4_DU2_FS_57 | 6/17/2016 04:34:30pm | GeoXH 6000 |
| 412 | 52.840587 | 173.192916 | 18.68 | AOI#4_DU2_FS_58 | 6/17/2016 04:35:55pm | GeoXH 6000 |
| 413 | 52.840602 | 173.192904 | 18.44 | AOI#4_DU2_FS_59 | 6/17/2016 04:36:15pm | GeoXH 6000 |
| 414 | 52.840740 | 173.193095 | 17.15 | AOI#4_DU2_FS_60 | 6/17/2016 04:37:00pm | GeoXH 6000 |
| 415 | 52.840727 | 173.193103 | 17.09 | AOI#4_DU2_FS_61 | 6/17/2016 04:37:21pm | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 416 | 52.840711 | 173.193113 | 17.03 | AOI#4_DU2_FS_62 | 6/17/2016 04:37:40pm | GeoXH 6000 |
| 417 | 52.840625 | 173.193050 | 15.74 | AOI#4_DU2_FS_63 | 6/17/2016 04:38:12pm | GeoXH 6000 |
| 418 | 52.840612 | 173.193064 | 15.71 | AOI#4_DU2_FS_64 | 6/17/2016 04:38:29pm | GeoXH 6000 |
| 419 | 52.840599 | 173.193079 | 16.24 | AOI#4_DU2_FS_65 | 6/17/2016 04:38:47pm | GeoXH 6000 |
| 420 | 52.840585 | 173.193090 | 16.37 | AOI#4_DU2_FS_66 | 6/17/2016 04:39:03pm | GeoXH 6000 |
| 421 | 52.840571 | 173.193097 | 17.13 | AOI#4_DU2_FS_67 | 6/17/2016 04:39:24pm | GeoXH 6000 |
| 422 | 52.841047 | 173.192915 | 15.94 | AOI#4_DU3_FS6 | 6/24/2016 06:29:28pm | GeoXH 6000 |
| 423 | 52.840995 | 173.192953 | 15.58 | AOI#4_DU3_FS5 | 6/24/2016 06:29:51pm | GeoXH 6000 |
| 424 | 52.840952 | 173.192988 | 14.95 | AOI#4_DU3_FS4 | 6/24/2016 06:30:18pm | GeoXH 6000 |
| 425 | 52.840897 | 173.193024 | 14.76 | AOI#4_DU3_FS3 | 6/24/2016 06:30:49pm | GeoXH 6000 |
| 426 | 52.840847 | 173.193061 | 14.10 | AOI#4_DU3_FS2 | 6/24/2016 06:31:16pm | GeoXH 6000 |
| 427 | 52.840738 | 173.193139 | 14.24 | AOI#4_DU3_FS1 | 6/24/2016 06:32:55pm | GeoXH 6000 |
| 431 | 52.840517 | 173.192086 | 19.08 | AOI#4_DU5_FS1 | 6/20/2016 07:26:23pm | GeoXH 6000 |
| 432 | 52.840508 | 173.192070 | 19.01 | AOI#4_DU5_FS2 | 6/20/2016 07:26:39pm | GeoXH 6000 |
| 433 | 52.840497 | 173.192066 | 18.96 | AOI#4_DU5_FS3 | 6/20/2016 07:26:57pm | GeoXH 6000 |
| 434 | 52.840497 | 173.192050 | 18.47 | AOI#4_DU5_FS4 | 6/20/2016 07:27:19pm | GeoXH 6000 |
| 435 | 52.840511 | 173.192048 | 18.20 | AOI#4_DU5_FS5 | 6/20/2016 07:27:40pm | GeoXH 6000 |
| 436 | 52.840522 | 173.192049 | 18.68 | AOI#4_DU5_FS6 | 6/20/2016 07:28:02pm | GeoXH 6000 |
| 437 | 52.840527 | 173.192037 | 18.49 | AOI#4_DU5_FS7 | 6/20/2016 07:28:29pm | GeoXH 6000 |
| 438 | 52.840513 | 173.192026 | 17.61 | AOI#4_DU5_FS8 | 6/20/2016 07:28:50pm | GeoXH 6000 |
| 439 | 52.840502 | 173.192029 | 17.78 | AOI#4_DU5_FS9 | 6/20/2016 07:29:06pm | GeoXH 6000 |
| 440 | 52.840489 | 173.192029 | 17.93 | AOI#4_DU5_FS10 | 6/20/2016 07:29:23pm | GeoXH 6000 |
| 441 | 52.840476 | 173.192006 | 17.94 | AOI#4_DU5_FS11 | 6/20/2016 07:29:43pm | GeoXH 6000 |
| 442 | 52.840492 | 173.192010 | 17.74 | AOI#4_DU5_FS12 | 6/20/2016 07:30:02pm | GeoXH 6000 |
| 443 | 52.840506 | 173.192010 | 17.66 | AOI#4_DU5_FS13 | 6/20/2016 07:30:21pm | GeoXH 6000 |
| 444 | 52.840519 | 173.192006 | 17.74 | AOI#4_DU5_FS14 | 6/20/2016 07:30:37pm | GeoXH 6000 |
| 445 | 52.840531 | 173.192015 | 18.58 | AOI#4_DU5_FS15 | 6/20/2016 07:30:51pm | GeoXH 6000 |
| 446 | 52.840531 | 173.191986 | 17.91 | AOI#4_DU5_FS16 | 6/20/2016 07:31:08pm | GeoXH 6000 |
| 447 | 52.840519 | 173.191982 | 17.76 | AOI#4_DU5_FS17 | 6/20/2016 07:31:25pm | GeoXH 6000 |
| 448 | 52.840508 | 173.191982 | 17.60 | AOI#4_DU5_FS18 | 6/20/2016 07:31:42pm | GeoXH 6000 |
| 449 | 52.840492 | 173.191984 | 17.38 | AOI#4_DU5_FS19 | 6/20/2016 07:32:00pm | GeoXH 6000 |
| 450 | 52.840479 | 173.191987 | 17.26 | AOI#4_DU5_FS20 | 6/20/2016 07:32:18pm | GeoXH 6000 |
| 451 | 52.840470 | 173.191964 | 16.71 | AOI#4_DU5_FS21 | 6/20/2016 07:32:36pm | GeoXH 6000 |
| 452 | 52.840482 | 173.191960 | 16.40 | AOI#4_DU5_FS22 | 6/20/2016 07:32:57pm | GeoXH 6000 |
| 453 | 52.840492 | 173.191961 | 16.77 | AOI#4_DU5_FS23 | 6/20/2016 07:33:17pm | GeoXH 6000 |
| 454 | 52.840503 | 173.191960 | 16.98 | AOI#4_DU5_FS24 | 6/20/2016 07:33:33pm | GeoXH 6000 |
| 455 | 52.840515 | 173.191959 | 17.19 | AOI#4_DU5_FS25 | 6/20/2016 07:33:51pm | GeoXH 6000 |
| 456 | 52.840525 | 173.191960 | 17.35 | AOI#4_DU5_FS26 | 6/20/2016 07:34:07pm | GeoXH 6000 |
| 457 | 52.840527 | 173.191933 | 16.96 | AOI#4_DU5_FS27 | 6/20/2016 07:34:28pm | GeoXH 6000 |
| 458 | 52.840515 | 173.191931 | 17.04 | AOI#4_DU5_FS28 | 6/20/2016 07:34:49pm | GeoXH 6000 |
| 459 | 52.840510 | 173.191926 | 18.83 | AOI#4_DU5_FS29 | 6/21/2016 10:26:25am | GeoXH 6000 |
| 460 | 52.840499 | 173.191931 | 19.08 | AOI#4_DU5_FS30 | 6/21/2016 10:26:48am | GeoXH 6000 |
| 461 | 52.840483 | 173.191930 | 18.50 | AOI#4_DU5_FS31 | 6/21/2016 10:27:10am | GeoXH 6000 |
| 462 | 52.840473 | 173.191929 | 18.48 | AOI#4_DU5_FS32 | 6/21/2016 10:27:33am | GeoXH 6000 |
| 463 | 52.840458 | 173.191914 | 17.56 | AOI#4_DU5_FS33 | 6/21/2016 10:27:52am | GeoXH 6000 |
| 464 | 52.840471 | 173.191912 | 17.90 | AOI#4_DU5_FS34 | 6/21/2016 10:28:09am | GeoXH 6000 |
| 465 | 52.840482 | 173.191909 | 17.89 | AOI#4_DU5_FS35 | 6/21/2016 10:28:31am | GeoXH 6000 |

Survey Data Table
Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 466 | 52.840493 | 173.191907 | 18.31 | AOI#4_DU5_FS36 | 6/21/2016 10:28:49am | GeoXH 6000 |
| 467 | 52.840505 | 173.191906 | 18.65 | AOI#4_DU5_FS37 | 6/21/2016 10:29:09am | GeoXH 6000 |
| 468 | 52.840514 | 173.191905 | 18.44 | AOI#4_DU5_FS38 | 6/21/2016 10:29:33am | GeoXH 6000 |
| 469 | 52.840523 | 173.191909 | 18.55 | AOI#4_DU5_FS39 | 6/21/2016 10:29:55am | GeoXH 6000 |
| 470 | 52.840532 | 173.191906 | 18.44 | AOI#4_DU5_FS40 | 6/21/2016 10:30:14am | GeoXH 6000 |
| 471 | 52.840527 | 173.191889 | 18.53 | AOI#4_DU5_FS41 | 6/21/2016 10:32:28am | GeoXH 6000 |
| 472 | 52.840516 | 173.191888 | 18.58 | AOI#4_DU5_FS42 | 6/21/2016 10:32:49am | GeoXH 6000 |
| 473 | 52.840504 | 173.191884 | 18.57 | AOI#4_DU5_FS43 | 6/21/2016 10:33:07am | GeoXH 6000 |
| 474 | 52.840494 | 173.191885 | 18.22 | AOI#4_DU5_FS44 | 6/21/2016 10:33:27am | GeoXH 6000 |
| 475 | 52.840482 | 173.191886 | 17.70 | AOI#4_DU5_FS45 | 6/21/2016 10:33:44am | GeoXH 6000 |
| 476 | 52.840469 | 173.191890 | 17.88 | AOI#4_DU5_FS46 | 6/21/2016 10:34:06am | GeoXH 6000 |
| 477 | 52.840456 | 173.191893 | 17.67 | AOI#4_DU5_FS47 | 6/21/2016 10:34:25am | GeoXH 6000 |
| 478 | 52.840443 | 173.191900 | 18.37 | AOI#4_DU5_FS48 | 6/21/2016 10:34:44am | GeoXH 6000 |
| 479 | 52.840442 | 173.191886 | 18.23 | AOI#4_DU5_FS49 | 6/21/2016 10:35:01am | GeoXH 6000 |
| 480 | 52.840453 | 173.191873 | 18.02 | AOI#4_DU5_FS50 | 6/21/2016 10:35:23am | GeoXH 6000 |
| 481 | 52.840466 | 173.191867 | 18.04 | AOI#4_DU5_FS51 | 6/21/2016 10:35:46am | GeoXH 6000 |
| 482 | 52.840480 | 173.191864 | 18.20 | AOI#4_DU5_FS52 | 6/21/2016 10:36:06am | GeoXH 6000 |
| 483 | 52.840492 | 173.191866 | 17.78 | AOI#4_DU5_FS53 | 6/21/2016 10:36:26am | GeoXH 6000 |
| 484 | 52.840502 | 173.191863 | 18.02 | AOI#4_DU5_FS54 | 6/21/2016 10:36:46am | GeoXH 6000 |
| 486 | 52.840357 | 173.192767 | 20.31 | AOI4_DU6_FS01 | 6/21/2016 04:15:30pm | GeoXH 6000 |
| 487 | 52.840330 | 173.192699 | 18.74 | AOI4_DU6_FS02 | 6/21/2016 04:16:11pm | GeoXH 6000 |
| 488 | 52.840347 | 173.192706 | 18.45 | AOI4_DU6_FS03 | 6/21/2016 04:16:36pm | GeoXH 6000 |
| 489 | 52.840343 | 173.192684 | 18.38 | AOI4_DU6_FS04 | 6/21/2016 04:17:01pm | GeoXH 6000 |
| 490 | 52.840350 | 173.192658 | 18.22 | AOI4_DU6_FS05 | 6/21/2016 04:17:22pm | GeoXH 6000 |
| 491 | 52.840354 | 173.192679 | 17.92 | AOI4_DU6_FS06 | 6/21/2016 04:17:45pm | GeoXH 6000 |
| 492 | 52.840357 | 173.192697 | 18.08 | AOI4_DU6_FS07 | 6/21/2016 04:18:10pm | GeoXH 6000 |
| 493 | 52.840371 | 173.192685 | 18.10 | AOI4_DU6_FS08 | 6/21/2016 04:18:39pm | GeoXH 6000 |
| 494 | 52.840367 | 173.192663 | 18.00 | AOI4_DU6_FS09 | 6/21/2016 04:18:59pm | GeoXH 6000 |
| 495 | 52.840378 | 173.192656 | 17.92 | AOI4_DU6_FS10 | 6/21/2016 04:19:19pm | GeoXH 6000 |
| 496 | 52.840381 | 173.192678 | 17.87 | AOI4_DU6_FS11 | 6/21/2016 04:19:38pm | GeoXH 6000 |
| 497 | 52.840397 | 173.192669 | 17.93 | AOI4_DU6_FS12 | 6/21/2016 04:19:58pm | GeoXH 6000 |
| 498 | 52.840393 | 173.192649 | 17.94 | AOI4_DU6_FS13 | 6/21/2016 04:20:19pm | GeoXH 6000 |
| 499 | 52.840404 | 173.192641 | 18.28 | AOI4_DU6_FS14 | 6/21/2016 04:20:39pm | GeoXH 6000 |
| 500 | 52.840409 | 173.192659 | 18.00 | AOI4_DU6_FS15 | 6/21/2016 04:20:59pm | GeoXH 6000 |
| 501 | 52.840421 | 173.192649 | 17.95 | AOI4_DU6_FS16 | 6/21/2016 04:21:22pm | GeoXH 6000 |
| 502 | 52.840416 | 173.192630 | 18.09 | AOI4_DU6_FS17 | 6/21/2016 04:21:41pm | GeoXH 6000 |
| 503 | 52.840429 | 173.192618 | 17.78 | AOI4_DU6_FS18 | 6/21/2016 04:22:07pm | GeoXH 6000 |
| 504 | 52.840432 | 173.192641 | 17.73 | AOI4_DU6_FS19 | 6/21/2016 04:22:30pm | GeoXH 6000 |
| 505 | 52.840446 | 173.192632 | 17.46 | AOI4_DU6_FS20 | 6/21/2016 04:22:51pm | GeoXH 6000 |
| 506 | 52.840439 | 173.192608 | 18.06 | AOI4_DU6_FS21 | 6/21/2016 04:23:15pm | GeoXH 6000 |
| 507 | 52.840456 | 173.192602 | 18.06 | AOI4_DU6_FS22 | 6/21/2016 04:23:35pm | GeoXH 6000 |
| 508 | 52.840459 | 173.192624 | 18.26 | AOI4_DU6_FS23 | 6/21/2016 04:23:54pm | GeoXH 6000 |
| 509 | 52.840474 | 173.192613 | 18.42 | AOI4_DU6_FS24 | 6/21/2016 04:24:09pm | GeoXH 6000 |
| 510 | 52.840466 | 173.192591 | 18.27 | AOI4_DU6_FS25 | 6/21/2016 04:24:30pm | GeoXH 6000 |
| 511 | 52.840480 | 173.192580 | 18.11 | AOI4_DU6_FS26 | 6/21/2016 04:24:51pm | GeoXH 6000 |
| 512 | 52.840486 | 173.192604 | 18.02 | AOI4_DU6_FS27 | 6/21/2016 04:25:13pm | GeoXH 6000 |
| 513 | 52.840493 | 173.192569 | 18.29 | AOI4_DU6_FS28 | 6/21/2016 04:27:10pm | GeoXH 6000 |

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Attu Island Environmental Clean Up 2016 (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 514 | 52.840499 | 173.192592 | 18.24 | AOI4_DU6_FS29 | 6/21/2016 04:27:30pm | GeoXH 6000 |
| 515 | 52.840509 | 173.192576 | 18.09 | AOI4_DU6_FS30 | 6/21/2016 04:27:50pm | GeoXH 6000 |
| 516 | 52.840505 | 173.192561 | 18.07 | AOI4_DU6_FS31 | 6/21/2016 04:28:12pm | GeoXH 6000 |
| 517 | 52.840516 | 173.192551 | 18.24 | AOI4_DU6_FS32 | 6/21/2016 04:28:41pm | GeoXH 6000 |
| 518 | 52.840519 | 173.192567 | 18.26 | AOI4_DU6_FS33 | 6/21/2016 04:29:02pm | GeoXH 6000 |
| 519 | 52.840528 | 173.192540 | 18.40 | AOI4_DU6_FS34 | 6/21/2016 04:29:20pm | GeoXH 6000 |
| 520 | 52.840533 | 173.192557 | 18.21 | AOI4_DU6_FS35 | 6/21/2016 04:29:37pm | GeoXH 6000 |
| 521 | 52.840545 | 173.192552 | 18.17 | AOI4_DU6_FS36 | 6/21/2016 04:29:58pm | GeoXH 6000 |
| 522 | 52.840541 | 173.192533 | 18.16 | AOI4_DU6_FS37 | 6/21/2016 04:30:14pm | GeoXH 6000 |
| 523 | 52.840555 | 173.192524 | 18.16 | AOI4_DU6_FS38 | 6/21/2016 04:30:32pm | GeoXH 6000 |
| 524 | 52.840559 | 173.192542 | 18.08 | AOI4_DU6_FS39 | 6/21/2016 04:30:52pm | GeoXH 6000 |
| 525 | 52.840573 | 173.192535 | 18.02 | AOI4_DU6_FS40 | 6/21/2016 04:31:09pm | GeoXH 6000 |
| 526 | 52.840566 | 173.192518 | 18.07 | AOI4_DU6_FS41 | 6/21/2016 04:31:33pm | GeoXH 6000 |
| 527 | 52.840580 | 173.192508 | 17.79 | AOI4_DU6_FS42 | 6/21/2016 04:31:49pm | GeoXH 6000 |
| 528 | 52.840584 | 173.192525 | 17.65 | AOI4_DU6_FS43 | 6/21/2016 04:32:07pm | GeoXH 6000 |
| 529 | 52.840593 | 173.192520 | 17.72 | AOI4_DU6_FS44 | 6/21/2016 04:32:21pm | GeoXH 6000 |
| 530 | 52.840590 | 173.192501 | 17.85 | AOI4_DU6_FS45 | 6/21/2016 04:32:45pm | GeoXH 6000 |
| 531 | 52.840603 | 173.192488 | 17.77 | AOI4_DU6_FS46 | 6/21/2016 04:33:00pm | GeoXH 6000 |
| 532 | 52.840608 | 173.192506 | 17.69 | AOI4_DU6_FS47 | 6/21/2016 04:33:19pm | GeoXH 6000 |
| 533 | 52.840620 | 173.192494 | 17.40 | AOI4_DU6_FS48 | 6/21/2016 04:33:37pm | GeoXH 6000 |
| 534 | 52.840615 | 173.192477 | 17.51 | AOI4_DU6_FS49 | 6/21/2016 04:33:55pm | GeoXH 6000 |
| 535 | 52.840627 | 173.192467 | 17.51 | AOI4_DU6_FS50 | 6/21/2016 04:34:13pm | GeoXH 6000 |
| 536 | 52.840631 | 173.192485 | 17.70 | AOI4_DU6_FS51 | 6/21/2016 04:34:36pm | GeoXH 6000 |
| 537 | 52.840644 | 173.192478 | 17.50 | AOI4_DU6_FS52 | 6/21/2016 04:34:54pm | GeoXH 6000 |
| 538 | 52.840640 | 173.192456 | 17.52 | AOI4_DU6_FS53 | 6/21/2016 04:35:15pm | GeoXH 6000 |
| 539 | 52.840652 | 173.192450 | 17.37 | AOI4_DU6_FS54 | 6/21/2016 04:35:33pm | GeoXH 6000 |
| 540 | 52.840655 | 173.192469 | 17.30 | AOI4_DU6_FS55 | 6/21/2016 04:35:51pm | GeoXH 6000 |
| 541 | 52.840669 | 173.192459 | 17.45 | AOI4_DU6_FS56 | 6/21/2016 04:36:10pm | GeoXH 6000 |
| 542 | 52.840667 | 173.192445 | 17.26 | AOI4_DU6_FS57 | 6/21/2016 04:36:33pm | GeoXH 6000 |
| 544 | 52.840243 | 173.192880 | 21.04 | AOI#4_DU7_FS3 | 6/22/2016 06:50:59pm | GeoXH 6000 |
| 545 | 52.840268 | 173.192930 | 20.79 | AOI#4_DU7_FS2 | 6/22/2016 06:51:13pm | GeoXH 6000 |
| 546 | 52.840291 | 173.192971 | 20.64 | AOI#4_DU7_FS1 | 6/22/2016 06:51:48pm | GeoXH 6000 |
| 547 | 52.840344 | 173.192989 | 19.60 | AOI#4_DU7_FS7 | 6/22/2016 06:52:10pm | GeoXH 6000 |
| 548 | 52.840347 | 173.192903 | 19.90 | AOI#4_DU7_FS10 | 6/22/2016 06:52:39pm | GeoXH 6000 |
| 549 | 52.840368 | 173.192942 | 19.47 | AOI#4_DU7_FS9 | 6/22/2016 06:53:00pm | GeoXH 6000 |
| 550 | 52.840385 | 173.192980 | 19.15 | AOI#4_DU7_FS8 | 6/22/2016 06:53:23pm | GeoXH 6000 |
| 551 | 52.840406 | 173.192930 | 19.76 | AOI#4_DU7_FS11 | 6/22/2016 06:53:48pm | GeoXH 6000 |
| 584 | 52.840740 | 173.192939 | 19.91 | AOI#4_DU7_FS38 | 6/22/2016 07:09:06pm | GeoXH 6000 |
| 585 | 52.840760 | 173.192968 | 19.06 | AOI#4_DU7_FS40 | 6/22/2016 07:16:28pm | GeoXH 6000 |
| 586 | 52.840780 | 173.192926 | 18.49 | AOI#4_DU7_FS39 | 6/22/2016 07:16:55pm | GeoXH 6000 |
| 587 | 52.840812 | 173.192960 | 18.31 | AOI#4_DU7_FS42 | 6/22/2016 07:17:20pm | GeoXH 6000 |
| 588 | 52.840790 | 173.193002 | 19.04 | AOI#4_DU7_FS41 | 6/22/2016 07:17:38pm | GeoXH 6000 |
| 589 | 52.840768 | 173.193026 | 19.18 | AOI#4_DU7_FS46 | 6/22/2016 07:17:54pm | GeoXH 6000 |
| 590 | 52.840824 | 173.193035 | 18.60 | AOI#4_DU7_FS44 | 6/22/2016 07:18:23pm | GeoXH 6000 |
| 591 | 52.840868 | 173.193019 | 18.52 | AOI#4_DU7_FS45 | 6/22/2016 07:18:47pm | GeoXH 6000 |

Notes:

1. Survey Method and Equipment 1: RTK GPS, Topcon GR3 base and Topcon GR3 rover. (Column: "Survey Type" identifies method for each record.)

2. Survey Method and Equipment 2: Post-Processed GPS, Trimble GeoXH 6000. (Column: "Survey Type" identifies method for each record.)

3. Spatial Reference: Horizontal Datum, GCS WGS 1984 latitude/longitude in decimal degrees. Vertical Datum, NAVD88 in feet.

4. Summary:

| Requirements | | |
|---|---|---|
| Feature Type | Minimum Horizontal Quality | Minimum Vertical Quality |
| Confirmation Sample | 3.3 feet / 1 meter | 0.5 foot / 0.15 meter |
| Field Screening Location | 3.3 feet / 1 meter | No elevation data required |

| RTK GPS | | |
|---|---|---|
| Feature Type | Maximum Horizontal Quality | Maximum Vertical Quality |
| Survey Point/Confirmation Sample | 0.06 feet | 0.04 feet |

| Trimble GeoXH 6000 | | |
|---|---|---|
| Feature Type | Maximum Horizontal Quality | Maximum Vertical Quality |
| Field Screening Location | 2.6 feet | 4.6 feet |

# APPENDIX I

Chemical Data Quality Report

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| °C | degrees Celsius |
| ADEC | Alaska Department of Environmental Conservation |
| Bristol | Bristol Environmental Remediation Services, LLC |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| CCV | continuing calibration verification |
| COC | chain of custody |
| DL | detection limit |
| DQO | data quality objective |
| DRO | diesel-range organics |
| EPA | U.S. Environmental Protection Agency |
| GRO | gasoline-range organics |
| ISM | Incremental Sampling Methodology |
| LCS | laboratory control sample |
| LCSD | laboratory control sample duplicate |
| LOD | limit of detection |
| LOQ | limit of quantitation |
| MB | method blank |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| ND | non-detect |
| PAH | polynuclear aromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| QAPP | Quality Assurance Project Plan |
| QC | quality control |

## ACRONYMS AND ABBREVIATIONS (continued)

| | |
|---|---|
| RPD | relative percent difference |
| RRO | residual-range organics |
| RSD | relative standard deviation |
| SDG | sample delivery group |
| SIM | selective ion mode |
| SVOC | semivolatile organic compound |
| SW-846 | EPA publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* |
| TCLP | toxicity characteristic leaching procedure |
| USACE | US Army Corps of Engineers |
| VOC | volatile organic compound |

# 1.0 DATA VERIFICATION

Bristol Environmental Remediation Services, LLC (Bristol), composed this data verification report in accordance with the US Army Corps of Engineers (USACE), Alaska District requirements. All laboratory results relate to remedial actions executed at Attu Island, Alaska. Bristol performed this work under USACE Contract Nos. W911KB-14-D-0006, Task Order 0008.

Bristol verified sample data collected from Sites AOI#1, and AOI#4. The verification process evaluates data completeness, correctness, consistency, and compliance with method procedures and quality control (QC) requirements; it also identifies anomalous data. The reported project sample values and any method laboratory control samples extracted or prepared with the project samples were reviewed. Data verification considers potentially influential conditions and procedures:

- Sample receipt conditions
  - Sample preservation
  - Cooler temperatures upon receipt
  - Chain-of-custody (CoC) condition/correspondence to submitted sample set
  - Presence/absence of custody seals
- Extraction and analytical procedures
  - Holding times
  - Method blanks (MBs)
  - Laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs)
  - Matrix spike (MS) and matrix spike duplicate (MSD),
  - Duplicate/replicate samples
  - Surrogate recoveries

- Sampling procedures
  - Field blanks
  - Trip blanks
  - Field duplicate/replicate samples
  - Multi Incremental samples
- Correspondence to method criteria and project data quality objectives (DQOs)

This Report does not include internal standards, calibrations, instrument tunes, summaries identifying any analytical irregularities (and the subsequent corrective action taken by the laboratories), or anything not listed above. Laboratory report case narratives were examined and any documented calibration or other QC outliers were included when appropriate.

Data validation requirements are specified in the *Source and Incidental Contaminant Removal Action Work Plan, Section 7.0 Quality Assurance Project Plan (QAPP),* dated April, 2016. Unless otherwise stated, data fell within control limits. If control limits were not specified in the QAPP, in-house laboratory control limits were used for review. In some instances, quality control information beyond QAPP specifications, were reported (e.g., additional surrogates). This information was also used for data review unless specifically noted.

Data verification satisfied standards established in the – *Quality Assurance Project Plan* (QAPP), Revision 1 (April, 2016); the Department of Defense *Quality Systems Manual*, Version 5.0 (July 2013); and the Alaska Department of Environmental Conservation (ADEC) Technical Memorandum: Environmental Laboratory and Quality Assurance Requirements (Updated March 2009); State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program, Draft Guidance on Multi-Incremental Soil Sampling, March 2009.

The data verifier assessed precision and accuracy by comparing surrogate, MS/MSD, and LCS/LCSD recoveries and relative percent differences (RPDs) to the QAPP-specified control limits. The frequency of QC samples was compared to the frequency specified in the QAPP. The MS/MSDs performed on non-project samples are not applicable, and were not evaluated.

The reviewed data sets include sample data collected for the Attu Island Removal Action, June through July 2016. SGS North America Inc., Anchorage, Alaska analyzed the data. An onsite screening mobile laboratory also analyzed soil samples for diesel range organics (DRO) and residual range organics (RRO) onsite at Attu Island.

SGS used several methods for sample analysis:

- U.S. Environmental Protection Agency (EPA) methods 5030B/8260B for benzene, toluene, ethylbenzene, and xylenes (BTEX), as defined in US publication Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)
- Volatile organic compounds (VOCs) by SW-846 Methods 5035/8260B
- Gasoline range organics (GRO) by ADEC method AK101
- DRO and RRO by ADEC method AK102/103
- Polynuclear aromatic hydrocarbons (PAHs) by SW-846 method 3510C (or 3520C)/8270C (waters), 3550B/8270C (soils) or SW-846 method 3580A/8270C in selective ion mode (SIM)
- Polychlorinated biphenyls (PCBs) by SW-846 method 3510C/8082 (waters) and either 3550B or 3550C/8082 or 8082A (soils)
- Metals by SW-846 methods 3005A/6020 (waters) or 3050B/6020 (soils)
- Mercury by SW-846 methods 7470A (waters) or 7471A (soils)
- Toxicity characteristic leaking procedure (TCLP) metals by SW-846 methods 1311/3010A/6010B/7470A
- Incremental sample preparation (soil) in conjunction with the preparation and analytical methods listed above for PAHs, and DRO/RRO

Analytical results tables are presented in Appendix E of the RA Report. The tables include sample identification, which reference the year (16 for 2016), the project (AT) for Attu,

the area of interest (e.g., 01 for AOI #1), the site (e.g. POL for POL Burn Pit), the matrix (e.g., SS for subsurface soil) and the sample location (referred to in Appendix E as location ID) as well as the laboratory ID along with the sample collection date. The location ID indicates the specific site at Attu, as well as a specific location within the sites.

Data qualifiers assigned during the data review are included on the analytical results tables in Appendix E. The following data qualifiers may be used to identify data points when data verification determines that results should be qualified because of a potential bias in the result, or a deviation from method or QAPP QC procedures.

## 1.1 DATA QUALIFIERS

- B – Analyte result is considered a high estimated value due to contamination present in the method blank, instrument blank, or trip blank. Results less than 10 times the reported method blank concentration will be B flagged to indicate bias.
- J – Positive result is less than the limit of quantitation (LOQ) and is considered an estimate.
- ND (LOD) – Analyte result is less than the detection limit (DL). The non-detected result (ND) has the limit of detection (LOD) in parentheses.
- QH, QL, QN – Analyte result is considered an estimated value biased (high [H], low [L], uncertain [N]) due to a laboratory quality control failure (Q) such as LCS/LCSD, MS/MSD or surrogate recoveries outside of acceptance limits. Field duplicates that do not meet RPD limits but meet other acceptance criteria are also flagged QN.
- H-Sample extracted or analyzed outside of holding time. Results have potential low bias.

Data verification was performed for samples collected from each area of interest (AOI):

### *AOI #1*

- Lead–acid Batteries: Nine primary soil samples, one MS/MSD pair, and one field duplicate
- TAR Area: Forty-four primary soil samples, four field duplicates, and four MS/MSD pairs
- Burn Pit/Drum Excavation: Thirty-two primary soil samples, four field duplicates, and two MS/MSD pairs
- Investigation-derived Waste samples

### *AOI #4*

- DU1: Two primary soil samples, one incremental sampling methodology (ISM) soil sample, one field duplicate and a MS/MSD pair
- DU2: One triplicate ISM soil sample, ten primary soil samples, one MS/MSD pair, and one field duplicate
- DU3: One ISM soil sample
- DU4: One ISM soil sample
- DU5: One ISM soil sample
- DU6: One ISM soil sample
- DU7: One ISM soil sample
- Equipment blank: one soil equipment blank, one duplicate and one MS/MSD pair
- Investigation-derived Waste samples

Field sample identification, corresponding laboratory identification, and analytical results are presented in the analytical results tables in Appendix E of the RA Report.

The sample summary sheet which lists all project samples and their respective analyses is presented as Attachment 1. The ADEC Laboratory Data Review Checklists are presented in Attachment 2. Laboratory certifications are included in Attachment 3.

Table 1-1 lists all laboratory work orders along with identifying the matrix and sites at Attu Island where the samples were collected.

## Table 1-1 Laboratory Work Orders

| Laboratory Work Order | Matrix | Site(s) |
|---|---|---|
| 1163041 | Water | Dewatering pre-treatment, AOI#1, AOI#4 |
| 1163241 | Water/Soil | Dewatering post treatment, DU1, DU3, Lead-acid batteries |
| 1163432 | Soil | DU2, TAR Area, Burn Pit/Drum Excavation, Investigation-derived Waste |
| 1163609 | Soil | DU4, DU5, DU6, DU7, AOI#1 Investigation-derived Waste |
| 1163637 | Water/Soil | AOI#1 Investigation-derived Waste, AOI#4 Investigation-derived Waste |
| 1163844 | Water | Rinsate blanks |
| 1163916 | Soil | Burn Pit/Drum Excavation, Tar area |
| 1163917 | Soil | Burn Pit/Drum Excavation, Tar area |
| 1163919 | Soil | Lead-acid Batteries |
| 1163920 | Soil | Burn Pit/Drum Excavation, Tar area |
| 1163921 | Soil | Tar area |
| 1163922 | Soil | Tar area |
| 1163952 | Soil | Pb Stock Pile |

Notes:
AOI = area of interest
DU = decision unit

# 2.0 DATA VERIFICATION RESULTS

## 2.1 SAMPLE RECEIPT CONDITIONS

Sample coolers were shipped from Attu Island by a charter flight with Security Aviation to Adak. Once in Adak the sample coolers were transferred to Alaska Airlines Goldstreak by Bristol field personnel and sent to Anchorage. Once in Anchorage the coolers were picked up by a Bristol staff member who then dropped the cooler off at the laboratory. Custody seals remained intact from Attu Island until receipt by the laboratory. Most samples arrived at the lab at 4 (±2) Celsius (°C) and in good condition. Exceptions are noted here:

1163041: The case narrative noted that the PAH water samples for 1163041001 (16AT01POLG01WA), 1163041002 (16AT01POLG02WA), 1163041003 (16AT01POLG03WA), and 1163041004 (16AT01POLG04WA) were received with insufficient time for extraction within hold time. The method required hold time to extraction is seven days for a PAH water sample. These samples were extracted one day past the seven-day hold time. PAH results for these samples were flagged with an "H" qualifier in the associated data table and may be considered biased low.

1163241: The sample receipt form notes that two unpreserved bottles were received for sample 1163241012 and -13. The sample summary log in the report lists these two samples as waters with a "NA" for the Client Sample ID. The chain of custody (COC) has no evidence that these samples were submitted for analysis. When the laboratory was contacted they explained that the samples were accidently added to the sample delivery group (SDG) and once added it was not possible to take them out of the report.

Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) were ISM samples, collected in gallon Ziploc bags, that were listed on the COC as ISM samples and should have been ISM sampled at the laboratory. There is no indication in

the report that the samples were dried, sieved, and sub-sampled according to the ADEC ISM procedure. When the lab was contacted about the procedural mistake, they confirmed that the samples were not prepped by the ISM procedures via email on 17 November 2016. Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) are considered to be composite samples from a rather large and unknown decision unit since the ISM preparation was not conducted on them. Results for these samples were flagged with a "QN" since the exact location of the sample is unknown. Outside of the omission of samples 1163241-12 and -13 in the report, and the flagging of samples 3241-4 and -5 all other samples data quality met criteria in regards to sample receipt, login, preservation, and containers.

**1163432:** No discrepancies were documented with the receipt of the SDG. During data review it was noted that sample 1163432004(16ATO4TARG04SS) and 1163432005(16ATO4TARG05SS) were labeled as multi-incremental samples on the COC when they should have been listed as grab samples. Data quality met all criteria in regards to sample receipt, login, preservation, and containers so no data flags were applied.

**1163609:** Sample receipt form in the laboratory report documented that there were six containers for samples 1163609-1 (16AT04TARM06SS) thru 6 (16AT04TARM09SS). The COC only lists one container was received at the laboratory. The laboratory explained that only one bulk sample was received and then ISM subsampled at a later date and transferred to six separate containers labeled –A thru –F which is what was documented on the sample receipt form on page 1102.

The COC only had one sample container listed for sample 1163609007 (16AT01TARG03SS). The sample receipt form in the laboratory report has the correct amount of containers listed at two. One methanol preserved jar and one unpreserved jar. No data flags were assigned for the sample container discrepancy.

**1163844:** There was a note on the e-sample receipt form that there was limited volume for the analyses listed in the COC. One bottle was received for each analysis. Typically, two bottles are received for each analysis.

Additionally, there was a note that no custody seals were present on the cooler when it was delivered to the laboratory. The samples were in the presence of Bristol personnel at all times thus the lack of the custody seals had no effect on the data quality. No flags were applied to the data tables.

**1163916:** One cooler labeled 071416-2 was received on 14 July 2016, at a temperature of 4.5°C. The 2nd page of the COC documented a different thermometer # that was used to take the cooler temperature. Page two lists thermometer # 200 instead of thermometer # 242, which was used to document the temperature on page one of the COC and is also listed on the e-sample receipt form. Both temperatures were recorded at the same temperature of 4.5° C. It also appears that SDG 1163917 was included in the same cooler at the time of delivery as the cooler labels are identical in each SDG. No additional data flags were added to the data tables.

**1163917:** Cooler 071416-2 was received on 14 July 2016, at a temperature of 4.5°C. SDG 11663916 was also contained in the same sample cooler as it has the same cooler ID, 071416-2, listed on the COC. Sample 1163917009 (16A01POLG08SS) was listed on the COC twice. One note was made on the e-sample receipt form under the header, "Do samples match COC." A second note appears on the COC on 25 July 2016 by VLP that explains the last line on the COC is carryover from page 1. No additional data flags were added to the data tables for the discrepancies described above.

**1163919:** One cooler labeled 071416-3 was received on 14 July 2016 at a temperature of 3.3 °C. It also appears that SDG 1163920 was included in the same cooler at the time of delivery as both SGDs have the same cooler ID. No data flags were added to the data table.

**1163920:** Cooler 071416-3 was received on 14 July 2016 at a temperature of 3.3°C. The cooler also contained 10 samples in SDG 1163919 for total lead. The COC has a second temperature of 4.5°C listed below the field for the temperature blank. This temperature is believed to be associated with another cooler dropped off at the same time that was labeled 071416-2 since the "2)" preceded the temperature on the COC. This cooler is believed to have SDGs 1163916 and 1163917 in it. No data flags were added to the data table.

**1163921:** Cooler 071416-1 was received on 14 July 2016, at a temperature of 3.5°C. SDG 11663922 was also contained in the same sample cooler as it has the same cooler ID, 071416-1, listed on the COC.

**1163922:** Cooler 071416-1 was received on 14 July 2016, at a temperature of 3.5°C. SDG 11663921 was also contained in the same sample cooler as it has the same cooler ID, 071416-1, listed on the COC.

Sample 1163922015(16A01TARG35SS) had two jars listed on the COC. One of the jars was noted to have an incorrect label and or lid that did not match the COC. Initial note on the sample receipt form indicated that the second jar was logged in per the information on the COC. A second note on 14 July 2016, by VLP explains that the second jar was set aside as "extra volume" if needed. The Sample Containers and Preservatives page of the report (page 331) only lists an "A" container for sample 39222-15. According to the laboratory results sample preparatory XXX35804 was conducted on the jar labeled "A," which did not have a discrepancy associated with it. The re-extract batch XXX35917 does not have a container ID field filled out in the report on page 29. The data reviewer contacted the laboratory PM who confirmed via email (14 July 2016) that the "A" container was rescheduled in the laboratory computer data base for re-exaction. No data flags were added to the data table for this discrepancy.

**1163952:** One cooler labeled 071516-1 was received on 14 July 2016, at a temperature of 3.6°C. Data quality for this SDG met all criteria in regards to sample receipt, login, preservation, and containers.

## 2.2 BTEX ANALYSES

SGS analyzed samples for BTEX by SW-846 method 8260B. QAPP specified QC for an analytical batch of up to 20 samples requires an MB, LCS, and MS/MSD pair. A MB, LCS, and project MS/MSD pair were analyzed with each batch and met all quality control criteria, except where noted below:

**1163241:** Benzene and toluene were detected above the DL but below the LOQ in the 8260 method blank 1334101(VXX29058). Sample results were also below the LOQ for these analytes in the associated samples. Samples associated with this MB are 1163241001(16AT04POLG05WA) and 1163241002(16AT04POLG06WA). These samples were flagged with a "B" qualifier in the data table for benzene and toluene. The trip blank was ND for both of these analytes. 8260B MB 1334101 surrogate recovery for 1,2-dichloroethane recovery was high and did not meet laboratory QC goals. The target analytes related to the high surrogate recoveries were "ND," therefore no additional data qualifiers were added to the data table.

**1163432:** Opening continuing calibration verification (CCV) (1335142) recoveries for several analytes are high and did not meet laboratory QC goals. All associated BTEX samples, 1163432-18 (16AT04TARG01IDWSS), and -19 (16AT04TARG02IDWSS); reported analytes were not detected above the LOD in the analytical batch. Results are not affected.

## 2.3 VOC ANALYSES

SGS analyzed samples for VOCs by SW-846 method 8260B. QAPP specified QC for an analytical batch of up to 20 samples includes an MB, LCS, and MS/MSD pair. An MB, LCS,

and project MS/MSD were analyzed and within control limits with each batch with exceptions noted below.

**1163432:** Sample 16AT01TARG01SS (1163432-16) and 16AT01POLG02SS (1163432-17) were originally analyzed within hold but over calibration range for several analytes. Samples were re-run outside of hold and the results confirmed the initial in hold results. The laboratory reported the initial over range in hold results. Analytes that exceeded the calibration range include p & m xylene, n-propylbenzene 1,2,4-trimethylbenzene, and naphthalene for samples -16 and -17. Isopropylbenzene, 1,3,5-trimethylbenzene, sec-butylbenzene, 4-isopropyltoluene, and n-butylbeneze were also over calibration range for sample -17. All of these results including total xylenes have been flagged with a "QN" in the associated data table.

Sample 1163432-17 (16AT01POLG02SS) surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals due to sample matrix interference. Sample was re-run at a 10x dilution, outside of hold time, and it is unknown if the surrogate met laboratory QC goals as the results were not included in the laboratory's report. Detected results for ethylbenzene, isopropylbenzene, and m & p xylenes are all associated with this surrogate and may be biased high. Results were flagged with a "QH" qualifier for ethylbenzene in the associated data table. Results for isopropylbenzene and m & p xylene were not flagged as the reported results are outside calibration range and have already been flagged with a "QN" flag in the data table.

Opening CCV (1335109) recovery for chloroethane was high and did not meet laboratory QC goals for batch VMS15941. Closing CCV (1135110) recovery for this analyte was also high. The associated samples were "ND" for this analyte thus no data flags were applied.

Opening CCV (1335109) recovery for 2-butanone was low and did not meet laboratory QC goals for batch VMS15941. The closing CCV (1335110) recovery for this analyte did meet laboratory goals. The associated samples were unable to be re-run within hold time for this analyte. The associated samples 1163432-16 (16AT01TARG01SS), 1163432-17 (16AT01POLG02SS), 1163432-20 (TB061916-1), and 1163432-21 (16ATCAMPG01IDW) were flagged "QL" for this analyte in the data table.

Opening CCV (1335142) recoveries for several analytes are high and did not meet laboratory QC goals. All associated samples, 1163432-18, -19, and -21, reported analytes were not detected above the LOD in the analytical batch. Results are not affected.

MS/MSD (1335106/1335107) recoveries for batch VMS15941 did not meet percent recovery and or percent RPD goals for several analytes. The LCS met QC percent recovery goals for this analytical batch. There was no LCSD run with the batch. The parent sample was not associated with this SDG therefore no data flags were applied.

**1163241:** Benzene and toluene were detected above the DL but below the LOQ in MB 1334101(VXX29058) for 8260B. Sample results were also below the LOQ for these analytes in the associated samples. Samples associated with this MB are 1163241001 (16AT04POLG05WA) and 1163241002 (16AT04POLG06WA). Associated samples were flagged with a "B" qualifier in the data table for benzene and toluene. The trip blank was ND for both of these analytes. 8260B MB for 1,2-dichloroethane-D4 surrogate recovery (120%) in the MB were above the QC criteria. This surrogate was within criteria for all associated samples; therefore no flags were applied.

**1163609:** 1335855 CCV recoveries for carbon disulfide, vinyl chloride, dichlorodifluoromethane, chloroethane, 1,1-dichloroethene, and trichlofluoromethane are high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected.

1335856 CVC recovery for dichlorodifluoromethane is high and does not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected.

1335816 LCS percent recoveries for carbon disulfide, vinyl chloride, dichlorodifluoromethane, and trichlofluoromethane are high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected.

1163609007 (16AT01TARG03SS) and MS/MSD (1335817/1335818) recoveries for 1,2,3-trichloropropane, 2-chlorotoluene, MIBK, carbon disulfide, dichlorodifluoromethane and vinyl chloride are high and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. Results are not affected.

1163609007 (16AT01TARG03SS) MS (1335817) recovery for trichlorofluoromethane is high and does not meet laboratory QC goals. Results in the associated parent sample were ND for this analyte. Results are not affected by this high QC bias.

1163609007 (16AT01TARG03SS) MS/MSD (1335817/1335818) recoveries for 1,1,1,2-tetrachloroethane, 1,2-dibromoethane, 1,3-dichloropropane, bromoform, chlorobenzene, dibromochloromethane, styrene, tetrachloroethene, and trans-1,3-dichloropropene are low and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. LOD results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a “QL” in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD recoveries for ethylbenzene, isopropylbenzene, naphthalene, n-propyl benzene, o-xylenes, p&m xylenes, sec-butylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and total

xylenes are low and do not meet laboratory QC goals. Results in the associated parent sample were detected for these analytes. Results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (16AT01TARG03SS) MS/MSD (1335817/1335818) RPD recoveries for 2-hexanone and trichlorofluoromethane are high and do not meet laboratory precision QC goals of less than 20 percent. Results in the associated parent sample were flagged with a "QN" in the data table.

**1163920:** This SDG report was revised on 11/14/2016 to remove five 8260 analytes reported as detections for sample 1163920003(16AT01POLG33SS) and two 8260 analytes from sample 1163920011(16AT01POLG50SS). The results that were changed/deleted were 1,1,2-Trichloroethane, 1,2,3-Trichloropropane, 2-Chlorotoluene, n-Butylbenzene, and tert-Butylbenzene for sample 1163920-3 (16AT01POLG33SS) and 1,1,2-Trichloroethane and 2-Chlorotoluene for sample 3920-11 (16AT01TARG50SS). The report was changed after the data reviewer commented to the laboratory that the results in the report were not consistent with sample chromatograms for these two samples. Please refer to the revised report for all submissions and results.

CCV 1338212, in analytical batch VMS 15988, recoveries for naphthalene and 1,2,3-trichlorobenzene are low and do not meet laboratory QC goals. The following samples are affected 1163920001, -02, -05, -08, -09, -10, -12, and -15 (16AT01POLG31SS, 16AT01POLG32SS, 16AT01POLG35SS, 16AT01TARG44SS, 16AT01POLG37SS, 16AT01POLG38SS, 16AT01TARG49SS, and 16AT01POLG25SS). These samples were re-analyzed after the method hold times to confirm the initial results. Sample 1163920004 (16AT01POLG34SS) was in the same analytical batch but a re-run within hold time at 100x dilution was reported for these two analytes. The

rest of the affected samples are flagged with a "QL" for these two analytes in the associated data table.

CCV 1339167, in analytical batch VMS 15999, recovery for carbon disulfide is high and does not meet laboratory QC goals. This analyte was not detected in the associated samples. Results are not affected.

CCV 1338409, in analytical batch VMS 15989, recoveries for 2,2-dichloropropane and hexachlorobutadiene are high and do not meet laboratory QC goals. These analytes were not detected in the associated samples. Results are not affected.

CCV 1338409, in analytical batch VMS 15989, surrogate recoveries for toluene-d8 and 4-bromofluorobenzene are high and do not meet laboratory QC goals. The results associated with these surrogates met laboratory QC goals except hexachlorbutadiene. No associated samples were detected for this analyte and the surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

MB 1338004, in prep batch VXX29161, recovery for tetrachloroethene is above the LOQ at 0.0165 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

MB 1338004, in preparatory batch VXX29161, recovery for vinyl chloride is above the LOD at 0.00650 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

MB 1338015, in prep batch VXX29162, recovery for tetrachloroethene is above the LOQ at 0.0135 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

LCS 1338005, in preparatory batch VXX 29161, surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals. The percent recovery results associated with this surrogate met laboratory QC goals. The surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

MS/MSD 1338316/1338317 recoveries for 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-butanone, 2-chlorotoluene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-butylbenzene, n-propylbenzene, p & m xylenes, and total xylenes are high and do not meet laboratory QC goals. LCS met laboratory QC goals for these analytes. Detected results in the parent sample 116392014 (16AT01POLG21SS) are flagged with a "QH" in the associated data table. These include 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-propylbenzene, p & m xylenes, and total xylenes.

MS/MSD 1338006/1338007 RPD for chloroethane was noted in the case narrative as being high at 20.2% and not meeting laboratory QC goals of <20%. When using EPA rounding rules and two significant figures this result is rounded to 20% which meets method goals of less than or equal to 20%. No data qualification was added to the parent sample result for this analyte as results are not affected.

1163920012(16AT01TARG49SS) field surrogate recovery for 4-bromofluorobenzene is high and does not meet laboratory QC goals. Sample was also run at a dilution of 10x but not reported. The case narrative suggested that the surrogate result was high due to matrix interference but the internal standards met method QC goals for the sample and no manual integration was performed on the surrogate. Detected results, 1,3,5-trimethylbenzene and 4-isopropyltoluene, were qualified with a "QH" flag in the data table.

Samples 1163920-3, -4, and -11 (16AT01POLG33SS, 16AT01POLG34SS, and 16AT01TARG50SS) were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table. Specifically, Sample 1163920003(16AT01POLG33SS) did not meet PALs for 1,2,3-trichloropropane, 1,2-dibromomethane, chloroethane, chloroform, hexachlorobutadiene, and trichloroethene due to a sample dilution of 100x. Sample 1163920004(16AT01POLG34SS) did not meet PAL for 1,2,3-Trichloropropane due to a sample dilution of 10x.

## 2.4 GRO ANALYSES

SGS tested for GRO by ADEC method AK101. Required QC for an analytical batch of up to 20 samples includes an MB, LCS/LCSD, and MS/MSD pair. An MB, LCS/LCSD pair and project MS/MSD pair were performed with each QC batch.

Holding times, surrogate recoveries, MBs, LCS/LCSD recoveries and RPDs, and MS/MSD recoveries and RPDs were reviewed and met QAPP criteria, except as noted below.

**1163432:** Percent recoveries for the field surrogate 4-bromofluorobenzene (4-BFB) were high and did not meet method QC goals in several samples of the SDG. Samples were not re-run do to evidence of matrix interference and or sample dilutions. Affected samples are 1163432-16, -17, -18, and -19 (16AT01TARG01SS, 16AT01POLG02SS, 16AT04TARG01IDWSS, and 16AT04TARG02IDWSS) which were flagged with a "QH" flag in the data tables. AK 101- GRO was detected in the MB at a concentration of 0.805 mg/kg, which is less than LOD (1/2 of the LOQ); therefore, no flags applied.

**1163920:** The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163920003, -4, -11, -12, and -14 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01TARG50SS, 16AT01TARG49SS, and 16AT01POLG21SS).

The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries exceeded QC goals. The GRO result for sample 1163920-14 (16AT01POLG21SS) was flagged "QH" for high surrogate recovery as this sample did not require a dilution. Samples 1163920-3, -4, -11, and -12 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01TARG50SS, and 16AT01TARG49SS) required a dilution in order to bring the target analyte within calibration range. Reported results for these samples were at least 100x above the standard GRO LOQ so no data qualifiers were added to these results.

The AK101 1163920001(16AT01POLG31SS) MS percent recovery for GRO is high and does not meet laboratory QC goals. The MSD met percent recovery goals, but the MS/MSD did not meet RPD goals of <20%. The LCS/LCSD (1341091/1341092) in batch VXX29244 met both percent recovery and RPD control limits for these analytes. The detected results for GRO were flagged "QN" in the parent sample 1163920-1 (16AT01POLG31SS) in the data table.

1163921: The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163921003(16AT01TARG06SS), and -4 (16AT01TARG07SS). The case narrative noted matrix interference as the reason the surrogate recoveries exceeded QC goals. The samples were not re-analyzed to confirm the matrix effect. The GRO result for samples 1163921-3 and -4 (16AT01POLG33SS, 16AT01POLG34SS) were flagged "QH" for high surrogate recovery in the data table.

## 2.5 SVOC ANALYSES

SGS analyzed semivolatile organic compound (SVOC) samples by method SW-846 8270C. Required QC for an analytical batch of up to 20 samples includes an MB, LCS, and MS/MSD pair. An MB, and LCS and MS/MSD pairs were performed with each QC batch.

MBs, surrogate recoveries, and LCS, MS/MSD recoveries and RPDs were reviewed and met QAPP criteria except where noted below.

**1163432:** Sample 1163432016, -17, and -21 (16AT01TARG01SS, 16AT01POLG02SS, and 16ATCAMPG01IDW) were all run at a dilution (20x) due to a matrix interference. The associated LOQs are elevated for these samples and several PALs are not met due to this dilution. Results above the PAL have been bolded in the data table.

Extractable surrogate nitrobenzene-d5 recovery for sample 1163432016 (16AT01TARG01SS) is low and does not meet laboratories QC goals possibly due to a 20x sample dilution and or matrix interference. The other five extractable surrogates met laboratory QC goals. Results were not re-analyzed or re-extracted to confirm initial low surrogate results. Results associated with this surrogate were qualified with a "QL" flag in the associated data table. Low surrogate recoveries for nitrobenzene-d5 affect the following analytes: nitrobenzene, isophorone, 2-nitrophenol, 2,4-dimethylphenol, benzoic acid, bis (2-chloroethoxy) methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, naphthalene, 2,6-dichlorophenol, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, 2-methylnaphthalene, and 1-methylnaphthalene.

**1163241:** 8270 PAH SIM surrogate recovery for 2-fluorbiphenyl in sample 3241-4 (16AT04TARM01SS) was high. 8260B MB 1334101 surrogate recovery for 1,2-dichloroethane recovery was high and did not meet laboratory QC goals. Associated samples were ND for all target analytes related to the high surrogate recoveries. No effect on data usability.

**1163609:** Sample 1163609007 (16AT01TARG03SS) has elevated LOQs due to sample dilution caused by the matrix of the sample. The sample had several detections above the PALs for 8260. The sample was a characterization sample so the elevated LODs did not significantly impact the decision making on the project.

Sample 1163609007 (16AT01TARG03SS) was diluted to a point, (20x), where the extractable surrogate recoveries are low and do not meet laboratory QC goals. The

sample was not flagged in the associated data table since the low surrogate recoveries were a result of the 20x dilution that was due to the complex matrix of the sample. The low 8270 surrogate recoveries on sample 1163609007(16AT01TARG03SS) did not impact project making decisions for this project. Again as noted above, the sample exceeded several 8260 PALs so the elevated detection limits and low surrogate recoveries of the 8270 data was not critical to decision making.

1334314/1334315 LCS/LCSD(XXX35709) percent RPD recoveries for aniline do not meet laboratory QC goals of less than 20 percent. Results for this analyte in the associated samples, 1163609007, are flagged with a "QN" qualifier in the associated data table.

**1163920:** Samples 1163920-2, -3, -4, -8, -14, -15, and -16 (16AT01POLG32SS, 16AT01POLG33SS, 16AT01POLG34SS, 16AT01TARG44SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table. All n-nitrosodimethylamine "ND" results for all samples were greater than the ADEC PALs. Samples 1163920-2, -3, -4, -8, -14, -15, and -16 (16AT01POLG32SS, 16AT01POLG33SS, 16AT01POLG34SS, 16AT01TARG44SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) did not meet PALs for n-Nitrosodi-n-propylamine, Dibenzo(a,h)anthracene, and Benzo(a)pyrene due to sample dilutions. 1163920-3, -4, -14, -15, and -16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) did not meet PALs for bis-(2-Chloroethyl) ether, 3,3'-Dichlorobenzidine, Benzo(a)anthracene, and 2,6-Dinitrotoluene, also due to sample dilutions. 1163920-3, -4, -14, and -16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) did not meet PALs for 2,4-Dinitrotoluene due to dilutions.

Samples 1163920003, -4, -14, and-16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, and 16AT01POLG09SS) all had analytes that were detected above the project action levels so the elevated limits had no effect on these samples. 1163920001, -2, -5, -8, -9, -10, -11, -12, -13, -15, and -20 (16AT01POLG32SS, 16AT01POLG35SS, 16AT01TARG44SS, 16AT01POLG37SS, 16AT01POLG38SS, 16AT01TARG50SS, 16AT01TARG49SS, 16AT01POLG29SS, 16AT01POLG25SS, and 16AT01POLG28SS) all had some results in the 8270 and or 8260 analyte list that did not meet PALs. Although it is unlikely that the results that did not achieve detection levels would actually be present in the samples, one cannot conclude from these results that the bolded ND analytes in the data table may be present at lower levels than have been achieved in this SDG.

Samples 1163920-3 and -15 (16AT01POLG33SS, 16AT01POLG25SS) surrogate recoveries for terphenyl-d14 are high and do not meet laboratory QC goals. Results associated with this surrogate were not detected above the detection limit in the samples therefore results are not affected and no data qualification was added to the table.

1163920006/7 (16AT01POLG35SS) BMS/BMSD percent recoveries for hexachlorocyclopentadiene and 4-nitroaniline are low and do not meet laboratory QC goals. The LCS meets QC goals for these analytes. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased low and are flagged with a “QL” qualifier in the associated data table.

1163920006/7 (16AT01POLG35SS), BMS/BMSD RPDs for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, bis(2-chloroethyl) ether, hexachlorobutadiene, hexachloroethane, and n-nitrosodimethylamine do not meet laboratory QC goals. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased and are flagged with a “QN” qualifier in the associated data table.

1163921: LCS 1337227 in batch XXX35807 recovery for 4-nitroaniline is low and does not meet laboratory QC goals. BMS/BMSD 1163921011/12 met recoveries goals for this analyte. No LCSD was prepped for this batch. Results for this analyte in the associated data table were flagged with a "QL" except sample 1163921010(16AT01TARG13SS), which is the parent sample of the BMS/BMSD.

Samples 1163921002, -3, -4 and -6 (16AT01TARG05SS, 16AT01TARG06SS, 16AT01TARG07SS, and 16AT01TARG09SS) were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table.

## 2.6 PCB ANALYSES

SGS analyzed samples for PCBs by method SW-846 8082. Required QC for an analytical batch of up to 20 samples includes an MB, LCS, and MS/MSD pair. The following items were reviewed and met QAPP criteria: holding times, MBs, and LCS recoveries. A MB, LCS, and project MS/MSD pair were performed with each QC batch and met acceptance criteria with noted exceptions:

1163920: Closing CCV recoveries for PCB Aroclor-1260 and 1254 (1343466/1343467) in batch XGC9417 were low and did not meet laboratory QC goals. Per DOD QSM the CCV must be re-run twice with passing results to validate the run. These CCV re-runs met QC goals on both runs for both analytes. Results are not affected.

## 2.7 PAH ANALYSES

SGS analyzed samples by SW-846 method 8270C SIM for PAHs. Required QC for an analytical batch of up to 20 samples includes an MB, LCS, and MS/MSD pair. A MB, LCS, and project MS/MSD pair were performed with each QC batch and met criteria with some exceptions:

1163041: The case narrative noted that the PAH water samples for 1163041001 (16AT01POLG01WA), 1163041002 (16AT01POLG02WA),

1163041003 (16AT01POLG03WA), and 1163041004 (16AT01POLG04WA) were received with insufficient time for extraction within hold time. The method required hold time to extraction is seven days for a PAH water sample. These samples were extracted one day past the seven-day hold time. PAH results for these samples were flagged with an "H" qualifier in the associated data table and may be considered biased low.

**1163241:** The report for this SDG was revised once to include 1-methyl naphthalene and 2-methyl naphthalene that was omitted in the first report for PAH SIM water samples 1163241001 (16AT04POLG05WA) and 1163241002 (16AT04POLG06WA). 8270 PAH SIM surrogate recovery for 2-fluorbiphenyl in sample 1163241-4 (16AT04TARM01SS) was high and did not meet laboratory QC goals. Results associated with this surrogate were all "ND" so the results are not affected.

**1163432:** Sample 1163432014 (16AT04TARG14SS) was observed to be mostly vegetation and it was difficult to achieve the necessary sample mass needed for the sample extraction due to the nature of the matrix. LODs may be slightly elevated for ND analytes. All reported results met PALs for this sample. Sample was requested for BMS/BMSD on the COC.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) percent recoveries are low and do not meet laboratory QC goals for 1, and 2-methylnaphthalene. LCS met QC recovery goals for these analytes. Low results may be partially attributed to matrix (noted as mostly vegetation in the case narrative). Results in the parent sample were flagged "QL" in the data table.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) percent recoveries are high and do not meet laboratory QC goals for benzo[b]fluoranthene. LCS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

Sample 1163432-14BMSD (1163432023 16AT04TARG14SS) percent recovery is high and does not meet laboratory QC goals for phenanthrene. LCS and BMS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) percent RPD is high and does not meet laboratory QC goals for fluoranthene. No LCSD was run with this preparatory batch to compare RPD recoveries in a clean matrix. Results in the parent sample were flagged "QN" in the data table.

Sample 1163432012 (16AT04TARG12SS) was diluted (5x) due to the color of the sample extract. The associated target analytes have elevated PQLs due to this dilution. Reported results meet all associated PALs for this analysis.

PAH SIM surrogate terphenyl-d14 and 2-fluorobiphenyl recoveries for samples 1163432018, and -19 (16AT04TARG01IDWSS, 16AT04TARG02IDWSS) are high and do not meet laboratory QC goals. Samples were diluted due to non-target analytes in the sample extracts. Results were not re-analyzed to confirm initial high surrogate results. Sample -018 was run at a 10x dilution and sample -019 was run at a 20x dilution. Reported results meet all associated PALs for this analysis and no detected result is above the PAL. Results above the DL have been flagged with the "QH" qualifier in the associated data table.

**1163609:** 1163609006 BMSD(16AT04TARM09SS) percent recovery for 1-methylnaphthalene is high and does not meet laboratory QC goals. Results for this analyte in the parent sample are ND. Results are not affected.

1163609006 BMSD(16AT04TARM09SS) percent recovery for anthracene is high and does not meet laboratory QC goals. 1163609005/6 BMS/BMSD(16AT04TARM09SS) recoveries for this same analyte do not meet laboratory QC RPD goals of less than

20 percent. Results for this analyte in the parent sample 1163609004 (16AT04TARM09SS) are flagged with a "QN" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for fluorene are high and do not meet laboratory QC goals. Results for this analyte in the parent sample 1163609004 (16AT04TARM09SS) are ND. Results are not affected.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for dibenzo[a,h]anthracene, fluoranthene, and phenanthrene are low and do not meet laboratory QC goals. Detected results for this analyte in the parent sample, 1163609004, have been flagged with a "QL" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample are flagged with a "QN" qualifier in the associated data table.

**1163844:** 1163844002 (16AT04TARG16WA) BMS/BMSD RPDs for several analytes are high and do not meet laboratory QC goals. Results for acenaphthene, acenaphtheylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-c,d] pyrene, and phenanthrene are flagged with a "QN" in the associated data table in the parent sample 1163844001(16AT04TARG16WA). Both the primary sample and duplicate sample in this SDG were the two equipment blanks for the project. No results were above the LOQ in either equipment blank for PAH or DRO/RRO. All equipment blanks are useable for project making decisions without additional qualification.

## 2.8 DRO/RRO ANALYSES

SGS analyzed samples for DRO/RRO following ADEC methods AK102/103. Required QC for a batch of up to 20 samples includes an MB, LCS /LCSD, and MS/MSD pair. A MB, LCS/LCSD, and project MS/MSD pair were performed with each QC batch and met acceptance criteria, with some exceptions:

**1163432:** Sample 1163432014 (16AT04TARG14SS) was observed to be mostly vegetation and it was difficult to achieve the necessary sample mass needed for the sample extraction due to the nature of the matrix. LODs may be slightly elevated for ND analytes. Sample was requested for BMS/BMSD on the COC.

The high concentration of target analytes required sample dilution for the following samples: 1163432-16, -17, -18, and -19 (16AT01TARG01SS, 16AT01POLG02SS, 16AT04TARG01IDWSS, and 16AT04TARG02IDWSS). This dilution was necessary for the samples to be analyzed within instrument calibration range. Due to this dilution, the extraction surrogate percent recoveries were diluted to a point where they do not provide useful information. The associated samples were not flagged in the associated data tables.

Sample 1163432-14BMS (1163432022/16AT04TARG14SS) is low for percent recovery for RRO and does not meet laboratory QC goals. LCS/LCSD and BMSD meet QC recovery goals for this analyte. Low results are attributed to non-sample homogeneity, matrix (noted as mostly vegetation), and the sample target analyte concentration was four times the BMS spike concentration. Results were not flagged in the associated parent sample.

**1163609:** 1163609006 (16AT04TARM09SS) BMSD percent recovery for DRO and RRO are high and do not meet laboratory QC goals. The BMS meets laboratory QC goals for DRO and RRO. The LCS and LCSD also meet laboratory goals for both analytes. The case narrative suggested that the sample may be non-homogeneous, although this

sample had been ISM sampled and sieved prior to extraction. Detected results in the parent sample were flagged with a "QH" qualifier in the data table.

**1163844:** All method blanks in the SDG were below the LOQ. However, the method blank for the RRO, 1338308 was reported at 0.211 mg/L and J flagged. This result is below half the LOQ but greater than the DL. Results reported above the DL in the associated samples were flagged with a "B" qualifier in the data table. Samples 1163844001(16AT04TARG16WA) and 1163844004(16AT04TARG17WA) were flagged with a "B" qualifier in the data tables for their RRO results.

**1163916:** The AK102/DRO surrogate 5a-androstane recoveries are high and do not meet laboratory QC goals for samples 1163916009(16AT01POLG20SS), 1163916010(16AT01TARG08SS), and 1163916011(16AT01POLG22SS). These samples were analyzed at a 4x dilution. The reported result in these samples is ten times above the LOQ for DRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table.

The AK103/RRO surrogate n-triacontane recoveries are high and do not meet laboratory QC goals for samples 1163916007(16AT01POLG18SS), 1163916009(16AT01POLG20SS), 1163916011(16AT01POLG22SS), and 1163916013(16AT01POLG24SS). These samples were analyzed at a 4x dilution. The reported result in these samples is eight to ten times above the LOQ for RRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table.

**1163920:** The AK102 surrogate 5a-androstane was low and did not meet percent recovery laboratory QC goals in samples 1163920014, and -15 (16AT01POLG21SS and 16AT01POLG25SS). The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the DRO LOQ so no data qualifiers were added to these results.

The AK103 surrogate n-triacontane was low and did not meet percent recovery laboratory QC goals in samples 1163920003, -14, -15, and -16 (16AT01POLG33SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS). The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the RRO LOQ so no data qualifiers were added to these results.

**1163921:** The AK102 surrogate 5a-androstane was low and did not meet percent recovery laboratory QC goals in samples 1163921002(16AT01TARG05SS), -3(16AT01TARG06SS), and -4(16AT01TARG07SS). The case narrative noted 40x dilutions as the reason the surrogate recoveries did not meet QC goals. Reported results for these samples were five times above the DRO LOQs and two times below PALs so no data qualifiers were added to these results.

**1163922:** The AK102/103 DRO/RRO extractable surrogate recoveries in preparatory batch XXX35804 are low and do not meet laboratory QC goals in all samples and quality control samples except 1163922022(16AT01TARG22SS). The entire batch minus sample -22 was re-extracted past the fourteen-day method hold time in preparatory batch XXX35917. The re-extracted sample results confirmed the initial in hold results. Both data sets were included in the laboratory report. The initial low surrogate, in hold results are in the data table with a “QL” flag. There was no formal documented Corrective Action Report (CAR) concerning the low extractable

surrogates for preparatory batch XXX35804. The laboratory PM responded via email that a meeting was conducted but no formal written document was completed. All samples with low surrogates were re-extracted in XXX35917 and included in the laboratory report without an "H" flag qualifier.

The AK103 RRO percent recovery for sample 1163922009 BMSD (16AT01TARG29SS) is high and does not meet laboratory QC goals. MS meets QC goals as does the LCS and LSCD. Results for the parent sample, 1163922007 (16AT01TARG29SS), are flagged with a "QN" in the associated data table.

The AK102 DRO surrogate percent recovery for sample 1163922005 (16AT01TARG04SS) is low and does not meet laboratory QC goals in the re-extraction batch XXX35917. The sample was diluted at a twenty times dilution which potentially could have diluted out the surrogate. The initial low surrogate, in hold results are in the data table with a "QL" flag.

## 2.9 METALS ANALYSES

SGS analyzed water and soil samples by SW-846 method 6020. Water samples were analyzed for total metals. IDW soil samples were analyzed for total Pb by 6020 and TCLP RCRA 8 metals by EPA Method 6020. Required QC for a batch of up to 20 samples includes an MB, LCS, and MS/MSD pair. An MB, LCS, and project MS/MSD were analyzed per batch and met acceptance criteria, except as noted below. In addition, laboratory duplicates were reported.

1163241: It was documented in the case narrative that TCLP RCRA8 metals were added to the analysis list per client request. MS/MSD recoveries for 6020A TCLP lead were high and did not meet laboratory QC goals. A post digestion spike was run and did meet laboratory QC goals upon reanalysis. MS/MSD RPD recoveries for 6020A TCLP Hg are high (28%) and do not meet the targeted laboratory QC goals of 20%. Parent sample 1163241011(16AT01IDWG01SS) result for lead is ten times greater than

the spike value that was added to the MS/MSD sample. A post digestion spike was run on both the MS and MSD with recoveries that met laboratory QC goals. For these reasons, lead results are considered usable for the project purposes without additional qualification. Sample results for mercury are ND therefore the additional qualification of a "QN" flag is being added to the parent sample result for the RPD value that is over the 20% laboratory QC goal. Data is considered useable for project purposes with respect to accuracy and precision requirements with the noted additional data qualification.

**1163432:** The LOQs for samples 1163432-16 (16AT01TARG01SS), 1163432-17 (16AT01POLG02SS), and 1163432-21 (16ATCAMPG01IDW) are elevated due to a matrix interference. Samples were run at a 50x dilution and all results met PAL goals.

Sample 1333325 MSD percent recoveries are high and do not meet laboratory QC goals for barium and chromium. LCS met QC recovery goals for these analytes. This sample was not part of the SDG; therefore, no data qualifiers were added to the data table and there is no effect on the sample results.

Sample 1333325 MSD percent recovery is low and does not met laboratory QC goals for lead. LCS met QC recovery goal for this analyte. This sample was not part of the SDG; therefore, no data qualifiers were added to the data table and there is no effect on the sample results.

The calibration blank 1335208 detected chromium at a concentration greater than the LOD but less than the LOQ at 0.747 J mg/Kg. Chromium results in the associated samples 1163432016, -17, and -21 (16AT01TARG01SS, 16AT01POLG02SS, and 16ATCAMPG01IDW) results were ten times above this CB level. Results are not affected for the associated samples.

**1163919:** 1163919005 BMSD (16AT01BATG01SS) percent recovery for lead is high and does not meet laboratory QC goals. The LCS and BMS met laboratory QC goals as did the post digestion spike. Reported results for lead may be biased high in the parent sample 1163919003 (16AT01BATG01SS). Results in the associated data table have been flagged with a "QH."

**1163921:** BMS/BMSD 1163921011/12 (16AT01TARG13SS) recoveries for chromium are high and do not meet laboratory QC goals. The post digestion spike did meet laboratory QC goals. Results for this analyte in the parent sample 1163921010(16AT01TARG13SS) may be biased high and were flagged with the "QH" qualifier in the associated data table.

**1163952:** TCLP leachate blank 1338180 had chromium detected above the LOQ at 0.210 mg/L. Project samples with detections of chromium within ten times of the LOQ that were associated with this leachate blank were flagged with a "B" qualifier in the data table. Project sample 1163952002 (16AT01BATSPG02IDW) had a detection of chromium at 0.145 mg/L J. This result was flagged with a "B" qualifier in the E2 Solid Matrix IDW data table.

1339360 MS (1163952003), parent sample ID 16AT01BATSPG01IDW, percent recovery for total lead was high and did not meet laboratory QC goals. 1339361 MSD (1163952003), parent sample ID 16AT01BATSPG01IDW, percent recovery for total lead was low and did not meet laboratory QC goals. The MS/MSD percent RPD exceeded the laboratory's less than 20 percent goal for precision. The case narrative suggested that the parent sample, 16AT01BATSPG01IDW may be non-homogenous. Results in the parent sample, 1163952001 (16AT01BATSPG01IDW), were flagged with a "QN" in the associated E2 Solid Matrix IDW data table.

1339363 DUP (1163952003), parent sample ID 16AT01BATSPG01IDW, RPD for total lead was greater than the laboratory's goal of 20%. The case narrative suggested that

the parent sample, 16AT01BATSPG01IDW may be non-homogenous. Results in the parent sample were flagged with a "QN" in the associated E2 Solid Matrix IDW data table.

## 2.10 PERCENT MOISTURE

SGS analyzed samples for percent moisture using the standard method 2540G in order to report results on a dry-weight basis. All samples met laboratory QC goals for this method.

## 2.11 FIELD QA/QC

Field QC samples included field duplicate pairs, MS/MSD pairs, and trip blanks. Field QC samples were analyzed in the same manner and in the same extraction and analytical batches as primary field samples. Field duplicate samples were submitted "blind" to the laboratory with similar sample IDs as primary field samples, so the laboratory could not identify which samples were duplicates.

### 2.11.1 Field Sample Duplicates and Replicates

The comparison of field sample duplicate results provides for the evaluation of precision as measured by relative percent difference (RPD) for the overall sample collection and analytical process. The precision between the field duplicate samples may be influenced by the unequal distribution of target analyte concentrations within a matrix. The RPD assessment criteria (as specified in the QAPP) were used to evaluate the field duplicates: ≤30% RPD for water matrices and ≤50% RPD for soils. This variability is assessed by evaluating the calculated RPDs between the field duplicate sample results. If target analytes were detected in one sample greater than the LOQ and not detected in the duplicate, both detected and non-detected results were flagged QN to indicate imprecision. Data which was J flagged and detected between the LOQ and the DL had the RPD calculated but analytical results were not flagged for out of control RPDs.

For ISM samples, one primary and two field replicate samples were collected; therefore, the calculation is percent relative standard deviation (RSD), not RPD. The RSD assessment criterion was <30% RSD using the same reporting criteria cited in the last paragraph. One set of replicates were collected at the same minimum 10% frequency or greater per matrix and analyte suite per area of concern.

### *Field Duplicate Frequencies*

Field sample duplicate pairs are specified in the QAPP at a minimum rate of 10% per matrix and analytical suite. Seventeen sets of field duplicate soil samples were collected and analyzed during the sampling event for all SDGs. There were 101 samples submitted for this project, 17 field duplicates met the rate of 10 percent to measure the precision of the sampling processes.

### *Field Duplicate RPDs*

Table 2-1 lists the calculated RPDs between the field duplicate and parent sample results for target analytes that were outside of the 50% RPD for soil and 30% RPD for water samples. RPDs out of precision control and detected above the LOQ in both the parent and field duplicate sample were flagged QN. Analytes with one or both results below the LOQ had the RPDs calculated but neither result was flagged due to the inherent imprecision of the multiple methods below the LOQ.

Table 2-2 lists the percent RSD and 95% UCLs calculated between the primary sample and two replicate samples for all target analytes. RSDs that were greater than the 30% RSD are bolded. No calculated UCLs exceeded the ADEC cleanup level for DRO/RRO or PAH SIM analysis.

## Table 2-1 Field Sample Duplicate Pair Results

| Parent Sample ID/ Laboratory Sample ID | Field duplicate Sample ID/ Laboratory Sample ID | Compound | Units | Parent Field Sample Result | Field duplicate Result | RPD (%) |
|---|---|---|---|---|---|---|
| 16AT04TARG01SS<br>1163241006 | 16AT04TARG02SS<br>1163241007 | Benzo(a)anthracene<br>Chrysene<br>Fluoranthene<br>Phenanthrene<br>Pyrene | mg/kg | 0.00438<br>0.00663<br>0.00489<br>0.00207<br>0.00513 | 0.00755 0.012<br>0.00822<br>0.00602<br>0.00898 | **53.14 53.14**<br>**50.80 97.65**<br>**54.57** |
| 16AT04TARG04SS<br>1163432004 | 16AT04TARG15SS<br>1163432015 | Benzo(a)anthracene<br>Benzo(a)pyrene<br>Fluoranthene Phenanthrene<br>Pyrene | mg/kg | ND<br>ND<br>ND<br>ND<br>ND | 0.006870<br>0.006940<br>0.011700<br>0.014700<br>0.016600 | **NC**<br>**NC**<br>**NC**<br>**NC**<br>**NC** |
| 16AT01POLG37SS<br>1163920009 | 16AT01POLG38SS<br>1163920010 | Lead<br>PCB-1254<br>(Aroclor 1254) | mg/kg | 2.96<br>0.135 | 5.2<br>0.0597 | **77.35** |
| 16AT01POLG28SS<br>1163920020 | 16AT01POLG29SS<br>1163920013 | Chromium | mg/kg | 2.96 | 5.2 | **54.90** |

Notes:

**BOLD** = Exceeds acceptance criteria except 14NCMOCSP04 and 14NCSP05, which exceed cleanup levels.

µg/L = micrograms per liter
DRO = diesel range organics
field dup = field duplicate
ID = identifier
LOQ = limit of quantitation
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
RPD = relative percent difference
RRO = residual range organics

## Table 2-2 Field Sample Triplicate Results

| Sample IDs (lab IDs) | Target Analytes | Units | ADEC Cleanup Level | Parent Result | First Replicate Result | Second Replicate Result | RSD (%) | 95% Upper confidence Limit |
|---|---|---|---|---|---|---|---|---|
| 16AT04TARM03SS (1163432001) 16AT04TARM04SS (1163432002) 16AT04TARM05SS (1163432003) | 1-Methylnaphthalene | mg/kg | 230 | 0.0425 | 0.0188 | 0.00141 | **98.7** | 0.05567 |
| | 2-Methylnaphthalene | | 230 | 0.0158 | 0.00936 | 0.00148 | **80.8** | 0.02097 |
| | Acenaphthene | | 2300 | 0.0138 | 0.00974 | 0.00148 | **75.3** | 0.01892 |
| | Acenaphthylene | | 2300 | 0.00192 | .00152 | 0.00148 | 14.8 | 0.00205 |
| | Anthracene | | 16800 | 0.0259 | 0.0279 | 0.018 | 21.9 | .03276 |
| | Benzo(a)anthracene | | 4 | 0.00133 | 0.00149 | 0.00161 | 9.5 | 0.00171 |
| | Benzo(a)pyrene | | 0.4 | 0.00184 | 0.00225 | 0.002 | 10.2 | 0.00238 |
| | Benzo(b)fluoranthene | | 4 | 0.00192 | 0.00368 | 0.00148 | **49.3** | 0.00432 |
| | Benzo(g,h,i)perylene | | 1100 | 0.00163 | 0.00157 | 0.00143 | 6.7 | 0.00172 |
| | Benzo(k)fluoranthene | | 40 | 0.00192 | 0.00171 | 0.00148 | 12.9 | 0.00207 |
| | Chrysene | | 400 | 0.00724 | 0.0072 | 0.00679 | 3.5 | 0.00750 |
| | Dibenzo(a,h)anthracene | | 0.4 | 0.00192 | 0.00152 | 0.00148 | 14.8 | 0.00205 |

## Table 2-2 Field Sample Triplicate Results

| Sample IDs (lab IDs) | Target Analytes | Units | ADEC Cleanup Level | Parent Result | First Replicate Result | Second Replicate Result | RSD (%) | 95% Upper confidence Limit |
|---|---|---|---|---|---|---|---|---|
| 16AT04TARM03SS (1163432001)<br>16AT04TARM04SS (1163432002)<br>16AT04TARM05SS (1163432003) | Fluoranthene | | 1500 | 0.00359 | 0.00433 | 0.00298 | 18.6 | 0.00477 |
| | Fluorene | | 1900 | 0.0824 | 0.0617 | 0.0125 | **68.8** | 0.11273 |
| | Indeno(1,2,3-cd)pyrene | | 4 | 0.00192 | 0.00101 | 0.00148 | **31.0** | 0.00224 |
| | Naphthalene | | 21 | 0.00261 | 0.00173 | 0.00148 | **30.6** | 0.00294 |
| | Phenanthrene | | 16800 | 0.122 | 0.0938 | 0.0278 | **59.5** | 0.16270 |
| 16AT04TARM03SS (1163432001)<br>16AT04TARM04SS (1163432002)<br>16AT04TARM05SS (1163432003) | Pyrene | mg/kg | 1100 | 0.00736 | 0.00824 | 0.00676 | 10.0 | 0.00871 |
| | Diesel Range Organics | | 8250 | 117 | 134 | 107 | 11.4 | 142.3 |
| | Residual Range Organics | | 8300 | 223 | 288 | 175 | 24.8 | 324.3 |
| | Total Solids | | na | 89.6 | 87.6 | 91 | 1.9 | 92.3 |

Notes:

**BOLD** = Exceeds acceptance criteria

% = percent

ID = identifier

mg/kg = milligrams per kilogram

RSD = relative standard deviation

The field duplicate RPDs and field triplicate RSDs were within control limits with the exceptions shown in bold on Tables 2-1 and 2-2. A total of 26 out of 1,564 duplicate results (1.6%) did not meet RPD criteria. The out of control results for the parent, duplicate and triplicate sample results were QN qualified to indicate estimated results with an unknown bias. In addition, if one of the pair had a detection above the LOQ and one or more results were less than the LOQ, the RPD and RSD were calculated but not flagged for results outside of RPD or RSD acceptance limits, as there is a lower degree of analytical accuracy at concentrations less than the LOQ. No duplicate or replicate results were flagged if one or both results were reported at less than the LOQ. All other results were also usable for project decisions to demonstrate that none of the precision biased sample results were greater than or anywhere near site-specific cleanup levels. Many of the affected result concentrations were within one order of magnitude of the LOQ. The overall field duplicate imprecision was 1.6%, well below the 10% data quality objective for usable results.

The 95% UCL statistical calculation was calculated for each decision unit utilizing the 95% UCL equation. This calculation is demonstrated on Table E10 in Appendix E. Data quality objectives (DQOs) are specific goals developed to ensure that a sufficient quality and quantity of data are collected to make appropriate decisions. The DRO method cleanup level was 8,250 mg/kg to achieve final site closure. The RRO method cleanup level was 8,300 mg/kg to achieve final site closure. The resulting 95% UCL for DRO is 142.3 mg/kg and for RRO is 324.3 mg/kg. The cleanup level to achieve final site closure has been met based on 95% UCL. All analytes for the MI sample have met cleanup level to achieve final site closure.

### 2.11.2 Trip Blanks

Water trip blanks were prepared at the laboratory and contained hydrochloric acid preservative with distilled deionized water. Soil trip blanks preserved in methanol with

BFB surrogate were transported with samples to be analyzed for GRO and volatile organic compounds. Trip blanks were submitted with project samples to assess the potential for cross-contamination introduced by laboratory-provided sample containers, storage during field operations, field sample shipment and storage, and analysis at the laboratory. Trip blanks were free of target analytes with exceptions noted below:

**1163432:** The trip blank had two detections above the LOQ for 1,2,4-trimethylbenzene and p & m xylene at 0.0618 mg/Kg and 0.0691 mg/Kg respectively. The sample also had six results that were above the DL but below the LOQ for 1,3,5-trimethylbenzene, 4-isopropyl toluene, benzene, n-propyl benzene, and total xylenes. Trip blank was "ND" for GRO. None of the sample results exceeded the threshold for hazard determination. All associated samples in the SDG had detected sample results that were ten times above the trip blank reported concentration. No data flags were applied to the results in the data table. Data is useable for project decision-making purposes without additional data qualifications in respect to the trip blank.

**1163920:** There were three trip blanks in this SDG: TB070516-3, TB070516-4, and TB070516-5, TB070516-3 is associated with 1163920011(16AT01TARG50SS), 1163920012(16AT01TARG49SS), and 1163920016(16AT01POLG09SS). TB070516-4 is associated with 1163920013(16AT01POLG29SS), 1163920014(16AT01POLG21SS), 1163920015(16AT01POLG25SS), and 1163920020(16AT01POLG28SS). TB070516-5 is associated with 1163920001(16AT01POLG31SS), 1163920002(16AT01POLG32SS), 1163920003(16AT01POLG33SS), 1163920004(16AT01POLG34SS), 1163920005(16AT01POLG35SS), 1163920008(16AT01TARG44SS), 1163920009(16AT01POLG37SS), and 1163920010(16AT01POLG38SS). All samples were in cooler 071416-2, and all three trip blanks results were "ND" for the 8260 analytes and the AK101 GRO.

**1163921:** There were two trip blanks in this SDG: TB070516-1, and TB070516-2. TB070516-1 is associated with 1163921002(16AT01TARG05SS), 1163921003(16AT01TARG06SS), 1163921004(16AT01TARG07SS), 1163921005(16AT01TARG21SS), 1163921006(16AT01TARG09SS), 1163921007(16AT01TARG32SS), 1163921009(16AT01TARG12SS), 1163921010(16AT01TARG13SS), 1163921013(16AT01TARG14SS), 1163921014(16AT01TARG15SS), 1163921015(16AT01TARG16SS), 1163921016(16AT01TARG17SS), 1163921017(16AT01TARG18SS), 1163921018(16AT01TARG19SS), and 1163921019(16AT01TARG20SS). TB070516-2 is associated with 1163921001(16AT01TARG27SS), and 163921008(16AT01TARG06SS). Both trip blank results were "ND" for the 8260 analytes and the AK101 GRO analysis. All results were usable for project making decisions with respect to trip blanks.

## 3.0 SENSITIVITY AND QUANTITATION LIMITS

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses that represent different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory-fortified blanks at the LOQ/ LOD studies, and the lowest calibration standards at or below the LOQ. In order to meet the needs of the data users, the project data must meet the measurement performance criteria for sensitivity and project LOQs. Analytical factors, such as dilutions or high percent soil moisture, may elevate the reporting limits for all target constituents. Other factors, such as low initial soil weights may also elevate limits.

Overall sensitivity and reporting for the project met quantitation reporting limits with minor exceptions.

**1163432:** Sample 1163432014 (16AT04TARG14SS) was observed to be mostly vegetation and it was difficult to achieve the necessary sample mass needed for the sample extraction due to the nature of the matrix. LODs may be slightly elevated for ND analytes. Sample was requested for BMS/BMSD on the COC. Sample 1163432012 (16AT04TARG12SS) was diluted (5x) due to the color of the sample extract for the PAH SIM analysis. The associated target analytes have elevated PQLs due to this dilution. Reported results meet all associated PALs for this analysis. Sample 1163432016, -17, and -21 (16AT01TARG01SS, 16AT01POLG02SS, and 16ATCAMPG01IDW) were run at a dilution (20x) due to a matrix interference for 8270D. The associated LOQs are elevated for these samples and several PALs are not met due to this dilution. Detections above the PAL have been bolded in the data tables. Non-detections with LODs above the PAL have been highlighted in the data tables. The LOQs for samples 1163432016, -17, and -21 (16AT01TARG01SS, 16AT01POLG02SS, and 16ATCAMPG01IDW) for 6020 metals analysis are elevated

due to a matrix interference. Samples were run at a 50x dilution and all results met PAL goals.

**1163609:** Sample 1163609007 (16AT01TARG03SS) has elevated LOQs for the 8270 analysis due to sample dilution caused by the matrix of the sample. This sample was diluted to a point, (20x), where the extractable surrogate recoveries are low and do not meet laboratory QC goals. Detections above the PAL have been bolded in the data tables. Non-detections with LODs above the PAL have been highlighted in the data tables. MS/MSD 1335817/1335818 volatile 8260 recoveries for 1,1,1,2-tetrachloroethane, 1,2-dibromoethane, 1,3-dichloropropane, bromoform, chlorobenzene, dibromochloromethane, styrene, tetrachloroethene, and trans-1,3-dichloropropene are low and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. LOD results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes. The sample was a characterization sample so the elevated LODs did not significantly impact the decision making on the project.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for dibenzo[a,h]anthracene, fluoranthene, and phenanthrene are low and do not meet laboratory QC goals. Detected results for this analyte in the parent sample, 1163609004, have been flagged with a "QL" qualifier in the associated data table. Even with this low bias the PALs were met by more than 10 times.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample are flagged with

a "QN" qualifier in the associated data table. As stated above, even with this noted low bias PALs were achieved by at least ten times, so there is no significant effect on the data from a sensitivity aspect.

**1163920:** Sample 1163920003(16AT01POLG33SS) did not meet PALs for 1,2,3-trichloropropane, 1,2-dibromomethane, chloroethane, chloroform, hexachlorobutadiene, and trichloroethene due to a sample dilution of 100x. Sample 1163920004(16AT01POLG34SS) did not meet PAL for 1,2,3-Trichloropropane due to a sample dilution of 10x. All other samples in the SDG met PALs for the 8260 analysis. Detections above the PAL have been bolded in the data tables. Non-detections with LODs above the PAL have been highlighted in the data tables. All n-nitrosodimethylamine "ND" results for all samples were greater than the ADEC PALs. Samples 1163920-2, -3, -4, -8, -14, -15, and -16 (16AT01POLG32SS, 16AT01POLG33SS, 16AT01POLG34SS, 16AT01TARG44SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) did not meet PALs for n-Nitrosodi-n-propylamine, Dibenzo(a,h)anthracene, and Benzo(a)pyrene due to sample dilutions. 1163920-3, -4, -14, -15, and -16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, 16AT01POLG25SS, and 16AT01POLG09SS) did not meet PALs for bis-(2-Chloroethyl) ether, 3,3'-Dichlorobenzidine, Benzo(a)anthracene, and 2,6-Dinitrotoluene, also due to sample dilutions. 1163920-3, -4, -14, and -16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, and 16AT01POLG09SS) did not meet PALs for 2,4-Dinitrotoluene due to dilutions. All of these 8270 results were highlighted in the data table to highlight the deficiencies. Samples 1163920003, -4, -14, and -16 (16AT01POLG33SS, 16AT01POLG34SS, 16AT01POLG21SS, and 16AT01POLG09SS) all had analytes that were detected above the project action levels so the elevated limits had no effect on these samples. 1163920001, -2, -5, -8, -9, -10, -11, -12, -13, -15, and -20 (16AT01POLG32SS, 16AT01POLG35SS, 16AT01TARG44SS,

16AT01POLG37SS, 16AT01POLG38SS, 16AT01TARG50SS, 16AT01TARG49SS, 16AT01POLG29SS, 16AT01POLG25SS, and 16AT01POLG28SS ) all had some results in the 8270 and or 8260 analyte list that did not meet PALs. Although it is unlikely that the results that did not achieve detection levels would actually be present in the samples, one cannot conclude from these results that the highlighted ND analytes in the data table may be present at lower levels than have been achieved in this SDG.

**1163921:** All 8270 n-nitrosodimethylamine "ND" results for all samples were greater than the ADEC PALs. Samples 1163921002, -3, -4 and -6 (16AT01TARG05SS, 16AT01TARG06SS, 16AT01TARG07SS, and 16AT01TARG09SS) did not meet PALs for several analytes due to sample dilutions. Detections above the PAL have been bolded in the data tables. Non-detections with LODs above the PAL have been highlighted in the data tables.

## 3.1 SENSITIVITY SUMMARY

The overall project sensitivity was met with few exceptions. The majority of analyses met reporting limits. Several SVOC compounds and two VOC soil samples collected at AOI # 1 represented the only instance where reporting limits did not meet sensitivity requirements. All of these deficiencies are associated with non-detect results for analytes that are not typically found at POL sites. The samples that had some non-detect results above the PAL were largely due to a sample dilution from either a matrix effect or a DRO/RRO target analyte in the sample at a high concentration. The two exceptions were the 8270 analytes n-Nitrosodimethylamine and n-Nitrosodiphenylamine, which failed to meet PALs in the majority of samples. Outside of the sensitivity issues for the non-detect results there was no instance of where any one of the VOC or SVOC analytes that did not achieve PALs was positively identified in any project sample.

## 4.0 SUMMARY

This CDQR evaluates analytical data generated June through the beginning of July 2016, during the Attu Island RA. This assessment evaluated whether program objectives and data quality goals were met. The assessment reviewed sample receipt conditions, extraction and analytical procedures, sampling procedures, and correspondence to method criteria and project DQOs.

The overall data quality and completeness was met for the project.

Two samples in SDG 1163241 that were collected using field ISM techniques (1163241004 [16AT04TARM01SS] and 1163241005 [16AT04TARM02SS]) did not have ISM preparation performed due to laboratory oversight. Subsequently, these samples cannot be treated as true ISM samples and are instead considered to be traditional composites.

Overall, the project met its data quality objectives. No results were rejected based on data review and all data was complete and reportable. Some results are estimates due to minor QC issues during analyses. Some non-detect results had LODs above PALs; these were generally for analytes that would not be associated with POL contamination. With the possible exception of the two composite samples discussed in the preceding paragraph, all samples collected for analysis had reportable results that were usable for project purposes.

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**ATTACHMENT 1**

Sample Summary Report

**2016 Attu Removal Action Sample Summary**

| Location ID | Sample Depth (feet bgs) | Sample ID | Date/Time Collected | Analytical Methods | Matrix | Container Type Volume | QC | Laboratory | SDG # / Work order | Field Preservation | Cooler Name | Sampler Initials | Turnaround Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pb FL01 | 2.0 | 16AT01BATG01SS | 7/6/2016 12:05 | 6020 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb FL04 | 2.0 | 16AT01BATG02SS | 7/6/2016 12:10 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb FL05 | 2.0 | 16AT01BATG03SS | 7/6/2016 12:15 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb FL08 | 2.0 | 16AT01BATG04SS | 7/6/2016 12:20 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb FL09 | 2.0 | 16AT01BATG10SS | 7/6/2016 12:55 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb SW01 | 1.0 | 16AT01BATG05SS | 7/6/2016 12:30 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb SW02 | 1.0 | 16AT01BATG06SS | 7/6/2016 12:35 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb SW02 | 1.0 | 16AT01BATG07SS | 7/6/2016 12:40 | 6020 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01BATG06SS | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb SW03 | 1.0 | 16AT01BATG08SS | 7/6/2016 12:45 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| Pb SW05 | 1.0 | 16AT01BATG09SS | 7/6/2016 12:50 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163919 | Ice | 071416-3 | RB | Standard |
| TAR SW01 | 5.4 | 16AT01TARG04SS | 7/6/2016 10:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR SW02 | 3.6 | 16AT01TARG05SS | 7/6/2016 10:45 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW03 | 4.7 | 16AT01TARG06SS | 7/6/2016 10:50 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW04 | 3.3 | 16AT01TARG07SS | 7/6/2016 11:00 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW05 | 2.8 | 16AT01TARG08SS | 7/6/2016 11:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| TAR SW06 | 2.3 | 16AT01TARG09SS | 7/6/2016 11:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW07 | 3.5 | 16AT01TARG10SS | 7/6/2016 11:35 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR SW08 | 4.4 | 16AT01TARG11SS | 7/6/2016 11:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR SW09 | 4.5 | 16AT01TARG12SS | 7/6/2016 11:50 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR SW10 | 5.4 | 16AT01TARG13SS | 7/6/2016 12:00 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW11 | 5.7 | 16AT01TARG14SS | 7/6/2016 12:15 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW11 | 5.7 | 16AT01TARG15SS | 7/6/2016 12:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01TARG14SS | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW13 | 4.9 | 16AT01TARG16SS | 7/6/2016 12:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR SW14 | 5.5 | 16AT01TARG17SS | 7/6/2016 13:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR SW15 | 2.8 | 16AT01TARG18SS | 7/6/2016 13:35 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR SW16 | 4.9 | 16AT01TARG19SS | 7/6/2016 13:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR SW17 | 4.7 | 16AT01TARG20SS | 7/6/2016 13:50 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| Trip Blank | --- | TB070516-1 | 7/5/2016 8:00 | 8260, AK 101 | Soil | Soil jar 4 oz amber | Trip blank | SGS | 1163921 | MeOH | 071416-1 | RB | Standard |
| Trip Blank | --- | TB070516-2 | 7/5/2016 8:00 | 8260, AK 101 | Soil | Soil jar 4 oz amber | Trip blank | SGS | 1163921 | MeOH | 071416-1 | RB | Standard |
| TAR SW18 | 4.9 | 16AT01TARG21SS | 7/6/2016 13:55 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR FL01 | 2.2 | 16AT01TARG22SS | 7/5/2016 15:30 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL02 | 2.3 | 16AT01TARG23SS | 7/5/2016 15:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 171416-1 | RB | Standard |
| TAR FL03 | 2.8 | 16AT01TARG24SS | 7/5/2016 15:55 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 171416-1 | RB | Standard |
| TAR FL04 | 2.8 | 16AT01TARG25SS | 7/5/2016 16:05 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 171416-1 | RB | Standard |
| TAR FL05 | 3.3 | 16AT01TARG26SS | 7/5/2016 16:10 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 171416-1 | RB | Standard |
| TAR FL06 | 4.7 | 16AT01TARG27SS | 7/5/2016 16:20 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH, Ice | 071416-1 | RB | Standard |
| TAR FL07 | 2.4 | 16AT01TARG28SS | 7/5/2016 16:25 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL08 | 2.0 | 16AT01TARG29SS | 7/5/2016 16:35 | AK 102 & 103 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL09 | 6.4 | 16AT01TARG30SS | 7/6/2016 10:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL10 | 5.0 | 16AT01TARG31SS | 7/5/2016 16:50 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL11 | 5.5 | 16AT01TARG32SS | 7/5/2016 16:55 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | Ice | 071416-1 | RB | Standard |
| TAR FL12 | 6.0 | 16AT01TARG33SS | 7/5/2016 17:05 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163921 | MeOH | 071416-1 | RB | Standard |
| TAR FL13 | 5.8 | 16AT01TARG34SS | 7/5/2016 17:10 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL14 | 6.2 | 16AT01TARG35SS | 7/5/2016 17:25 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL15 | 6.6 | 16AT01TARG36SS | 7/5/2016 17:30 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL16 | 6.2 | 16AT01TARG37SS | 7/5/2016 18:00 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL17 | 5.2 | 16AT01TARG38SS | 7/5/2016 18:10 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL18 | 5.2 | 16AT01TARG39SS | 7/5/2016 18:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL18 | 5.2 | 16AT01TARG40SS | 7/5/2016 18:25 | AK 102 & 103 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01TARG39SS | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL20 | 4.8 | 16AT01TARG41SS | 7/5/2016 18:30 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163922 | Ice | 071416-1 | RB | Standard |
| TAR FL21 | 5.4 | 16AT01TARG42SS | 7/5/2016 18:35 | AK 102 & 103 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| TAR FL22 | 5.7 | 16AT01TARG43SS | 7/5/2016 18:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| TAR FL23 | 4.3 | 16AT01TARG44SS | 7/5/2016 18:50 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| TAR FL24 | 5.4 | 16AT01TARG45SS | 7/5/2016 19:00 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| TAR FL25 | 7.0 | 16AT01TARG46SS | 7/5/2016 19:05 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| TAR FL25 | 7.0 | 16AT01TARG47SS | 7/5/2016 19:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01TARG46SS | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| TAR FL27 | 6.5 | 16AT01TARG48SS | 7/5/2016 19:20 | AK 102 & 103 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| TAR FL28 | 6.4 | 16AT01TARG49SS | 7/6/2016 10:25 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| TAR FL28 | 6.4 | 16AT01TARG50SS | 7/6/2016 10:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01TARG49SS | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| TAR FL30 | 6.1 | 16AT01TARG51SS | 7/6/2016 10:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL01 | 2.0 | 16AT01POLG03SS | 7/6/2016 14:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL01 | 2.0 | 16AT01POLG04SS | 7/6/2016 14:50 | AK 102 & 103 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01POLG03SS | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL03 | 2.0 | 16AT01POLG05SS | 7/6/2016 16:00 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL04 | 1.5 | 16AT01POLG06SS | 7/6/2016 16:10 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL05 | 1.3 | 16AT01POLG07SS | 7/6/2016 16:20 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL06 | 2.1 | 16AT01POLG08SS | 7/6/2016 16:25 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL07 | 2.0 | 16AT01POLG09SS | 7/6/2016 16:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP FL08 | 1.3 | 16AT01POLG10SS | 7/6/2016 16:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL09 | 1.6 | 16AT01POLG11SS | 7/6/2016 16:44 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL10 | 1.8 | 16AT01POLG12SS | 7/6/2016 16:52 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP FL11 | 1.9 | 16AT01POLG13SS | 7/6/2016 17:02 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL12 | 1.9 | 16AT01POLG14SS | 7/6/2016 17:10 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL13 | 1.2 | 16AT01POLG15SS | 7/6/2016 17:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL13 | 1.2 | 16AT01POLG16SS | 7/6/2016 17:20 | AK 102 & 103 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01POLG15SS | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL15 | 1.2 | 16AT01POLG17SS | 7/6/2016 17:30 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL16 | 1.7 | 16AT01POLG18SS | 7/6/2016 17:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL17 | 1.4 | 16AT01POLG19SS | 7/6/2016 17:50 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL18 | 3.3 | 16AT01POLG20SS | 7/6/2016 17:55 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL19 | 4.4 | 16AT01POLG21SS | 7/6/2016 18:00 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP FL20 | 2.3 | 16AT01POLG22SS | 7/6/2016 18:15 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL21 | 4.3 | 16AT01POLG23SS | 7/6/2016 18:20 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL22 | 4.0 | 16AT01POLG24SS | 7/6/2016 18:25 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL23 | 8.6 | 16AT01POLG25SS | 7/6/2016 18:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP FL24 | 4.9 | 16AT01POLG26SS | 7/6/2016 18:35 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |

**2016 Attu Removal Action Sample Summary**

| Location ID | Sample Depth (feet bgs) | Sample ID | Date/Time Collected | Analytical Methods | Matrix | Container Type Volume | QC | Laboratory | SDG # / Work order | Field Preservation | Cooler Name | Sampler Initials | Turnaround Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BP FL25 | 2.9 | 16AT01POLG27SS | 7/6/2016 18:40 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP FL26 | 0.8 | 16AT01POLG28SS | 7/6/2016 18:45 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-2 | RB | Standard |
| BP FL26 | 0.8 | 16AT01POLG29SS | 7/6/2016 18:50 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01POLG28SS | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW01 | 0.7 | 16AT01POLG30SS | 7/6/2016 19:00 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163916 | Ice | 071416-2 | RB | Standard |
| BP SW02 | 3.6 | 16AT01POLG31SS | 7/6/2016 19:10 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW03 | 4.4 | 16AT01POLG32SS | 7/6/2016 19:15 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW04 | 4.5 | 16AT01POLG33SS | 7/6/2016 19:20 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW05 | 4.9 | 16AT01POLG34SS | 7/6/2016 19:30 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW06 | 1.9 | 16AT01POLG35SS | 7/6/2016 19:35 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| Trip Blank | --- | TB070516-3 | 7/5/2016 8:00 | 8260, AK 101 | Soil | Soil jar 4 oz amber | Trip blank | SGS | 1163920 | MeOH | 071416-3 | RB | Standard |
| Trip Blank | --- | TB070516-4 | 7/5/2016 8:00 | 8260, AK 101 | Soil | Soil jar 4 oz amber | Trip Blank | SGS | 1163920 | MeOH | 071416-3 | RB | Standard |
| Trip Blank | --- | TB070516-5 | 7/5/2016 8:00 | 8260, AK 101 | Soil | Soil jar 4 oz amber | Trip Blank | SGS | 1163920 | MeOH | 071416-3 | RB | Standard |
| BP SW07 | 1.2 | 16AT01POLG36SS | 7/6/2016 19:45 | AK 102 & 103 | Soil | Soil jar 4 oz amber | -- | SGS | 1163917 | Ice | 071416-2 | RB | Standard |
| BP SW08 | 1.3 | 16AT01POLG37SS | 7/6/2016 19:50 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | -- | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| BP SW08 | 1.3 | 16AT01POLG38SS | 7/6/2016 19:55 | AK 101, 102 & 103, 8260, 8270, 8082 | Soil | Soil jar 4 oz amber | Duplicate of 16AT01POLG37SS | SGS | 1163920 | MeOH, Ice | 071416-3 | RB | Standard |
| DU1 MI1 | 1.0 | 16AT04TARM01SS | 6/16/2016 14:45 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| DU1 SW7 | 1.7 | 16AT04TARG01SS | 6/18/2016 14:20 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| DU1 SW7 | 1.7 | 16AT04TARG02SS | 6/18/2016 14:30 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | Duplicate of 16AT04TARG01SS | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| DU1 SW9 | 1.1 | 16AT04TARG03SS | 6/18/2016 14:25 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| DU2 MI1 | 4.0 | 16AT04TARM03SS | 6/20/2016 15:25 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 MI1 | 4.0 | 16AT04TARM04SS | 6/20/2016 16:15 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | Duplicate of 16AT04TARM03SS | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 MI1 | 4.0 | 16AT04TARM05SS | 6/20/2016 18:30 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | Triplicate of 16AT04TARM03SS | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW01 | 1.0 | 16AT04TARG04SS | 6/22/2016 9:40 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW02 | 1.1 | 16AT04TARG05SS | 6/22/2016 9:45 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW03 | 1.7 | 16AT04TARG06SS | 6/22/2016 9:50 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW04 | 2.4 | 16AT04TARG07SS | 6/22/2016 9:55 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW05 | 2.8 | 16AT04TARG08SS | 6/22/2016 10:00 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW06 | 3.3 | 16AT04TARG09SS | 6/22/2016 10:05 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW07 | 2.6 | 16AT04TARG10SS | 6/22/2016 10:10 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW08 | 1.0 | 16AT04TARG11SS | 6/22/2016 10:15 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW09 | 1.7 | 16AT04TARG12SS | 6/22/2016 10:20 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW10 | 2.3 | 16AT04TARG13SS | 6/22/2016 10:25 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW11 | 2.4 | 16AT04TARG14SS | 6/22/2016 10:30 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU2 SW01 | 1.0 | 16AT04TARG15SS | 6/22/2016 10:35 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | Duplicate of 16AT04TARG04SS | SGS | 1163432 | Ice | 062316-1 | RB | Standard |
| DU3 MI1 | 3.0 | 16AT04TARM02SS | 6/17/2016 17:45 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| DU4 MI1 | 2.0 | 16AT04TARM08SS | 6/23/2016 17:00 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163609 | Ice | 062616-1 | RB | Standard |
| DU5 MI1 | 2.0 | 16AT04TARM07SS | 6/26/2016 16:15 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163609 | Ice | 062616-1 | RB | Standard |
| DU6 MI 1 | 2.0 | 16AT04TARM06SS | 6/23/2016 15:15 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | -- | SGS | 1163609 | Ice | 062616-1 | RB | Standard |
| DU7 MI1 | 2.0 | 16AT04TARM09SS | 6/25/2016 11:30 | AK 102 & 103, 8270-SIM | Soil | Soil jar 4 oz amber | MS/MSD | SGS | 1163609 | Ice | 062616-1 | RB | Standard |
| Equipment Blank | --- | 16AT04TARG16WA | 7/7/2016 12:30 | AK 102 & 103, 8270-SIM | Water | Amber bottle | MS/MSD | SGS | 1163844 | HCl, Ice | 071216-1 | RB | Standard |
| Equipment Blank | --- | 16AT04TARG17WA | 7/7/2016 13:00 | AK 102 & 103, 8270-SIM | Water | Amber bottle | Duplicate of 16AT04TARG16WA | SGS | 1163844 | HCl, Ice | 071216-1 | RB | Standard |
| Trip Blank | --- | TB060916-1 | 6/19/2016 9:00 | AK 101, 8260 | Soil | Soil jar 4 oz amber | Trip Blank | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Standard |
| Pre-AOI #1 | --- | 16AT01POLG01WA | 6/5/2016 10:00 | 8260, 8270-SIM | Water | Amber bottle, VOA | | SGS | 1163041 | HCl, Ice | 060916-1 | RB | Standard |
| Pre-AOI #1 | --- | 16AT01POLG02WA | 6/5/2016 10:10 | 8260, 8270-SIM | Water | Amber bottle, VOA | Duplicate of 16AT01POLG01WA | SGS | 1163041 | HCl, Ice | 060916-1 | RB | Standard |
| Trip Blank | --- | TB06516-1 | 6/5/2016 9:00 | 8260 | Water | VOA | Trip Blank | SGS | 1163041 | HCL, Ice | 060916-1 | RB | Standard |
| Trip Blank | --- | TB062516-1 | 6/25/2016 12:00 | 8260 | Soil | Soil jar 4 oz amber | Trip Blank | SGS | 1163609 | MeOH, Ice | 062816-1 | RB | Standard |
| Post AOI#1 | --- | 16AT01POLG07WA | 7/3/2016 12:00 | 8270-SIM, 8260 | Water | Amber bottle, VOA | | SGS | 1163637 | HCl, Ice | 0070316-1 | RB | Rush |
| Post AOI#1 | --- | 16AT01POLG08WA | 7/3/2016 12:15 | 8270-SIM, 8260 | Water | Amber bottle, VOA | Duplicate of 16AT01POLG07WA | SGS | 1163637 | HCl, Ice | 0070316-1 | RB | Rush |
| Trip Blank | --- | TB070316-2 | 7/13/2016 9:00 | 8260 | Water | VOA | Trip Blank | SGS | 1163637 | HCl, Ice | 0070316-1 | RB | Rush |
| Pre-AOI #4 | --- | 16AT04ASTG03WA | 6/5/2016 1015 | 8260, 8270-SIM | Water | Amber bottle, VOAs | | SGS | 1163041 | HCl, Ice | 060916-1 | RB | Standard |
| Pre-AOI #4 | --- | 16AT04ASTG04WA | 6/5/2016 10:25 | 8260, 8270-SIM | Water | Amber bottle, VOA | Duplicate of 16AT04ASTG03WA | SGS | 1163041 | HCl, Ice | 060916-1 | RB | Standard |
| Post-AOI #4 | --- | 16AT04POLG05WA | 6/19/2016 10:00 | 8260, 8270-SIM | Water | Amber bottle, VOA | | SGS | 1163241 | HCl, Ice | 060916-1 | RB | Standard |
| Post-AOI #4 | --- | 16AT04POLG06WA | 6/19/2016 10:10 | 8260, 8270-SIM | Water | Amber bottle, VOA | Duplicate of 16AT04ASTG05WA | SGS | 1163241 | HCl, Ice | 060916-1 | RB | Standard |
| Trip Blank | --- | TB061916-1 | 6/19/2016 9:00 | 8260 | Water | VOA | Trip Blank | SGS | 1163241 | HCl, Ice | 160916-1 | RB | Standard |
| AOI#1 Tar Area | --- | 16AT01TARG01SS | 6/19/2016 16:50 | DRO, RRO, SVOCs, VOCs, GRO, PCBs, RCRA8 | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Standard |
| AOI#1 Drums | --- | 16AT01POLG02SS | 6/19/2016 20:00 | DRO, RRO, SVOCs, VOCs, GRO, PCBs, RCRA8 | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Standard |
| AOI#1 sub-tar | --- | 16AT01TARG03SS | 6/25/2016 14:00 | VOCs, SVOCs, RCRA8 | Soil | Soil jar 4 oz amber | -- | SGS | 1163609 | MeOH, Ice | 062616-1 | RB | Standard |
| Pb Battery IDW | --- | 16AT01IDWG01SS | 6/18/2016 18:45 | 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163241 | Ice | 061916-1 | RB | Standard |
| AOI#4 IDW 1 | --- | 16AT04TARG01IDWSS | 6/23/2016 11:00 | DRO, RRO, PAHs, GRO, BTEX | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Standard |
| AOI#4 IDW 2 | --- | 16AT04TARG02IDWSS | 6/23/2016 11:15 | DRO, RRO, PAHs, GRO, BTEX | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Standard |
| AOI#4 IDW Water | --- | 16AT04IDWG01IDW | 7/3/2016 11:00 | 8260 (BTEX), 1020 | Water | Amber bottle, VOA | -- | SGS | 1163637 | HCl, Ice | 070316-1 | RB | Rush |
| AOI#4 IDW Sludge | --- | 16AT04IDWG02IDW | 7/3/2016 11:30 | 8260 (BTEX), 1020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163637 | MeOH, Ice | 070316-1 | RB | Rush |
| Camp Ash | --- | 16ATCAMPG01IDW | 6/23/2016 13:30 | VOCs, SVOCs, RCRA8 | Soil | Soil jar 4 oz amber | -- | SGS | 1163432 | MeOH, Ice | 062316-1 | RB | Rush |
| Lead Stockpile | --- | 16AT01BATSPG01IDW | 7/13/2016 14:00 | RCRA8, TCLP, 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163952 | Ice | 071516-1 | EB | Standard |
| Lead Stockpile | --- | 16AT01BATSPG02IDW | 7/13/2016 14:15 | RCRA8, TCLP, 6020 | Soil | Soil jar 4 oz amber | -- | SGS | 1163952 | Ice | 071516-1 | EB | Standard |

**Notes:**

AK = Alaska test method
bgs = below the ground surface
HCL = Hydrochloric acid
ID = identification
MeOH = Methanol
MS/MSD = Matrix spike/matrix spike duplicate
oz = Ounce
QC = quality control
RB = Bristol Sampler Robert Beckman
EB = Bristol Sampler Eric Barnhill
SIM = Selective Ion Monitoring
VOA = volatile organic analysis

**ATTACHMENT 2**

ADEC Laboratory Data Review Checklists

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 8/3/16

CS Report Name: Attu Island Removal Action Report Date: 7/25/16

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163241

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No subcontract laboratory was needed for this SDG.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the COC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      One water sample and a duplicate was requested for 8260 BTEX and PAHs by 8270 SIM along with a water trip bank. Additionally, two soil ISM samples, two grab samples, one field duplicate and a MS/MSD pair were requested for PAHs and DRO/RROs. The SDG also included one soil grab sample for total lead. Bristol requested via email to add TCLP RCRA 8 metals to this final grab sample, 1163241011(16AT01IDWG01SS). Request was documented by the lab in the case narrative.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler labeled 061916-1 was received at a temperature of 2.2° C on 6/20/2016.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

All sample preservatives were acceptable for the requested analysis.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

All 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.?
x□Yes □ No □NA (Please explain.) Comments:

The sample receipt form notes that two unpreserved bottles were received for sample 1163241012 and -13. The sample summary log in the report lists these two samples as waters with a "NA" for the Client Sample ID. The COC has no evidence that these samples were submitted for analysis. When the lab was contacted they explained that the samples were accidently added to the SDG and once added it wasn't possible to take them out of the report.

Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) were MI samples, collected in gallon zip lock bags, that were listed on the COC as MI samples and should have been MI sampled at the laboratory. There is no indication in the report that the samples were dried, sieved, and sub-sampled according to the ADEC MI sampling procedure. When the lab was contacted about the procedural mistake, they confirmed that the samples were not prepped by the MI sampling procedures via email on 11/17/2016.

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

Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) are considered to be composite samples from a rather large and unknown decision unit since the ISM prep was not conducted on them. Results for these samples were flagged with a "QN" since the exact location of the sample is unknown. Outside of the omission of samples 1163241-12 and -13 in the report, and the flagging of samples 3241-4 and -5 all other samples data quality met criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

Report was revised once to include 1-methyl naphthalene and 2-methyl naphthalene that was omitted in the first report for PAH SIM water samples.

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

QC limits that did not meet laboratory goals were highlighted in case narrative.

c. Were all corrective actions documented?
□Yes x□ No □NA (Please explain.) Comments:

It was documented in the case narrative that TCLP RCRA8 metals were added to the analysis list per client request.
It was also documented in the narrative that a revised report was issued on 8/03/2016 to include 1-methylnaphthalene and 2-methylnapthalene.
It was not documented that two samples were added to the SDG, 1163241-12 and -13, by mistake and later listed as NA in the sample summary.

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

Sample results were usable for project purposes with some qualifications for out of control QC.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
□Yes x□ No □NA (Please explain.) Comments:

TCLP RCRA metals added by client via email and documented in case narrative.

Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) were MI samples, collected in gallon zip lock bags, that were listed on the COC as MI samples and should have been MI sampled at the laboratory. There is no indication in the report that the samples were dried, sieved, and sub-sampled according to the ADEC MI sampling procedure. When the lab was contacted about the procedural mistake, they confirmed that the samples were not prepped by the MI sampling procedures via email on 11/17/2016.

b. All applicable holding times met?
x□Yes □ No □NA (Please explain.) Comments:

Yes, hold times for all requested analysis meet laboratory method goals.

c. All soils reported on a dry weight basis?
x□Yes □ No □NA (Please explain.) Comments:

All soil samples are dry weight corrected.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
x□Yes □ No □NA (Please explain.) Comments:

PQLs meet applicable project goals.

e. Data quality or usability affected?

Comments:

| |
|---|
| Samples 1163241004(16AT04TARM01SS) and 1163241005(16AT04TARM02SS) are considered to be composite samples from a rather large and unknown decision unit since the ISM prep was not conducted on them. Results for these samples were flagged with a "QN" since the exact location of the sample is unknown. All additional sample results were useable for project purposes with qualification on several associated QC results. |

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, MB and LB frequencies were met for all methods. |

ii. All method blank results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Benzene and toluene were detected above the DL but below the LOQ in MB 1334101(VXX29058) for 8260B. Sample results were also below the LOQ for these analytes in the associated samples. |

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

| |
|---|
| Samples associated with this MB are 1163241001(16AT04POLG05WA) and 1163241002(16AT04POLG06WA). |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the associated samples were flagged with a "B" qualifier in the data table for benzene and toluene. The trip blank was ND for both of these analytes. |

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

Comments:

| |
|---|
| Sample results were usable for project purposes with respect to method and leachate blanks. |

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)

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| AK series methods have an LCS/LCSD and the SW-846 methods have at a minimum of LCS. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the 6020A analysis has a LCS, and a MS/MSD per batch. |

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
□Yes x□ No □NA (Please explain.) Comments:

LCS/LCSD met all laboratory QC goals for all methods. MS/MSD recoveries for 6020A TCLP lead were high and did not meet laboratory QC goals. A post digestion spike was run and did meet laboratory QC goals upon reanalysis.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
□Yes x□ No □NA (Please explain.) Comments:

MS/MSD RPD recoveries for 6020A TCLP Hg are high (28%) and do not meet the targeted laboratory QC goals of 20%.

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

Lab sample ID 1163241-11 (16AT01IDWG01SS) for 6020A TCLP

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Sample 1163241011(16AT01IDWG01SS) result for lead is ten times greater than the spike value that was added to the MS/MSD sample. A post digestion spike was run on both the MS and MSD with recoveries that met laboratory QC goals. For these reasons, lead results are considered usable for the project purposes without additional qualification. Sample results for mercury are ND therefore the additional qualification of a "QN" flag is being added to the sample result for the RPD value that is over the 20% laboratory QC goal.

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

Data is useable for project purposes with respect to accuracy and precision requirements with the noted additional data qualification.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

All organic sample have appropriate surrogates for the required analysis.

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| 8270 PAH SIM surrogate recovery for 2-fluorbiphenyl in sample 3241-4 (16AT04TARM01SS) was high. 8260B MB 1334101 surrogate recovery for 1,2-dichloroethane recovery was high and did not meet laboratory QC goals. |

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| Associated samples were ND for all target analytes related to the high surrogate recoveries. |

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

Comments:

| |
|---|
| Noted above. No effect on data usability. |

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

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, one water trip blank was reported for the 8260 BTEX analysis. |

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)

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all samples arrived in one cooler, ID 061916-1, which included the trip blank 1163241003(TB061916-1). |

iii. All results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All BTEX results were ND. |

iv. If above PQL, what samples are affected?

| |
|---|
| NA |

Comments:

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

Comments:

| All volatile sample results were useable for project purposes. |
|---|

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

| One soil field duplicate, 1163241007(16AT04TARG01SS), of sample 1163241006(16AT04TARG02SS) was submitted in this SDG along with 2 primary samples for DRO/RRO and PAH SIM analysis. One duplicate water sample, 1163241002(16AT04POLG05WA), of sample 1163241001(16AT04POLG05WA), was submitted for BTEX and PAH SIM. |
|---|

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all field dups were unknown to the lab. |
|---|

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

□Yes x□ No □NA (Please explain.) Comments:

| The water duplicate sample met all precision goals. The soil duplicate met precision goals for eleven target analytes and was over the 50 % RPD goal for the following analytes: Benzo(a)anthracene, Chrysene, Fluoranthene, Phenanthrene, and Pyrene. These analytes were flagged with the "QN" qualifier in the associated data table. |
|---|

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

Comments:

| Data was still usable for project decision making purposes as all of the flagged analytes were considerably below the PALs. |
|---|

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

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

| |
|---|
| No equipment blank was run with this SDG. The equipment blanks were run the on 07/07/16. |

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA |

ii. If above PQL, what samples are affected?

Comments:

| |
|---|
| NA |

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

Comments:

| |
|---|
| NA |

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

a. Defined and appropriate?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| ACOE data qualifiers utilized. |

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 9/22/16

CS Report Name: Attu Island Removal Action Report Date: 7/6/16

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163041

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was switched one time prior to arrival at the lab on 6/27/16. All transfers were documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      No revisions were made to the CoC upon submittal at the lab.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler was received on 6/27/16 at a temperature of 4.1 ° C.

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

x□Yes □ No □NA (Please explain.) Comments:

Containers and preservatives provided for the requested analysis meet all requirements.

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

x□Yes □ No □NA (Please explain.) Comments:

All samples were documented that they were received in good condition with appropriate preservation.

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 x□NA (Please explain.) Comments:

No discrepancies were documented with the receipt of the SDG. During data review it was noted that sample 1163432004(16ATO4TARG04SS) and 1163432005(16ATO4TARG05SS) were labeled as multi-incremental samples on the COC when they should have been listed as grab samples.

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

Comments:

No. Data quality met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative

a. Present and understandable?

x□Yes □ No □NA (Please explain.) Comments:

Yes, the case narrative documents challenges encountered by the lab on a sample by sample basis.

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

x□Yes □ No □NA (Please explain.) Comments:

**8260B**

Sample 16AT01TARG01SS (1163432-16) and 16AT01POLG02SS (1163432-17) were originally analyzed within hold but over calibration range for several analytes. Samples were rerun outside of hold and the results confirmed the initial in hold results. The lab reported the initial over range in hold results. Analytes that exceeded the calibration range include p & m xylene, n-propylbenzene 1,2,4-trimethylbenzene, and naphthalene for samples -16 and -17. Isopropylbenzene, 1,3,5-trimethylbenzene, sec-butylbenzene, 4-isopropyltoluene, n-butylbeneze were also over calibration range for sample -17. All of these results including total xylenes, have been flagged with a "QN" in the associated data table.

Sample 16AT01POLG02SS (3432-17) surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals due to sample matrix interference. Sample was re-run at a 10x dilution, outside of hold time, and it is unknown if the surrogate met laboratory QC goals as the results were not included in the lab's report. Detected results for ethylbenzene, isopropylbenzene, and m & p xylenes are all associated with this surrogate and may be biased high. Results were flagged with a "QH" qualifier for ethylbenzene in the associated data table. Results for isopropylbenzene and m & p xylene were not flagged as the reported results are outside calibration range and have already been flagged with a "QN" flag in the data table.

Opening CCV (1335109) recovery for chloroethane was high and did not meet laboratory QC goals for batch VMS15941. Closing CCV (1135110) recovery for this analyte was also high. The associated samples were "ND" for this analyte thus no data flags were applied.

**8260Cont.**

Opening CCV (1335109) recovery for 2-butanone was low and did not meet laboratory QC goals for batch VMS15941. The closing CCV (1335110) recovery for this analyte did meet laboratory goals. The associated samples were unable to be rerun within hold time for this analyte. The associated samples 1163432-16, -17, -20, and -21 were flagged "QL" for this analyte in the data table.

Opening CCV (1335142) recoveries for several analytes are high and did not meet laboratory QC goals. All associated samples, 1163432-18, -19, and -21, reported analytes were not detected above the LOD in the analytical batch. Results are not affected.

MS/MSD (1335106/1335107) recoveries for batch VMS15941 did not meet % recovery and or % RPD goals for several analytes. The LCS met QC % recovery goals for this analytical batch. There was no LCSD run with the batch. The parent sample was not associated with this SDG therefore no data flags were applied.

**AK101**

Percent recoveries for field surrogate 4-bromofluorobenzene (4-BFB) are high and do not meet method QC goals. Samples were not re-run do to evidence of matrix interference and or sample dilutions. Affected samples are 1163432-16, 17, 18, and 19 which were flagged with a "QH" flag in the data tables.

**AK102/103**

Sample 1163432014 was observed to be mostly vegetation and it was difficult to achieve the necessary sample mass needed for the sample extraction due to the nature of the matrix. LODs may be slightly elevated for ND analytes. Sample was requested for BMS/BMSD on the COC.

The high concentration of target analytes required sample dilution for the following samples: 1163432-16, 17, 18, and 19. This dilution was necessary for the samples to be analyzed within instrument calibration range. Due to this dilution, the extraction surrogate % recoveries were diluted to a point where they do not provide useful information. The associated samples were not flagged in the associated data tables.

Sample 1163432-14BMS (1163432022/ 16AT04TARG14SS) is low for % recovery for RRO and does not meet laboratory QC goals. LCS/LCSD and BMSD meet QC recovery goals for this analyte. Low results are attributed to non-sample homogeneity, matrix (noted as mostly vegetation), and the sample target analyte concentration was four times the BMS spike concentration. Results were not flagged in the associated parent sample.

**8270 PAH SIM**

Sample 1163432014 was observed to be mostly vegetation and it was difficult to achieve the necessary sample mass needed for the sample extraction due to the nature of the matrix. LODs may be slightly elevated for ND analytes. All reported results met PALs for this sample. Sample was requested for BMS/BMSD on the COC.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % recoveries are low and do not met laboratory QC goals for 1, and 2-methylnaphthalene. LCS met QC recovery goals for these analytes. Low results may be partially attributed to matrix (noted as mostly vegetation in the case narrative). Results in the parent sample were flagged "QL" in the data table.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % recoveries are high and do not met laboratory QC goals for benzo[b]fluoranthene. LCS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

**8270 PAH SIM cont.**

Sample 1163432-14BMSD (1163432023 16AT04TARG14SS) % recovery is high and does not met laboratory QC goals for phenanthrene. LCS and BMS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % RPD is high and does not met laboratory QC goals for fluoranthene. No LCSD was run with this prep batch to compare RPD recoveries in a clean matrix. Results in the parent sample were flagged "QN" in the data table.

Sample 1163432012 (16AT04TARG12SS) was diluted (5X) due to the color of the sample extract. The associated target analytes have elevated PQLs due to this dilution. Reported results meet all associated PALs for this analysis.

PAH SIM surrogate terphenyl-d14 and 2-fluorobiphenyl recoveries for samples 1163432018, and -19 are high and do not meet laboratory QC goals. Samples were diluted due to non-target analytes in the sample extracts. Results were not re-analyzed to confirm initial high surrogate results. Sample -018 was run at a 10x dilution and sample -019 was run at a 20x dilution. Reported results meet all associated PALs for this analysis and no detected result is above the PAL. Results above the DL have been flagged with the "QH" qualifier in the associated data table.

**8270D**

Sample 1163432016, -17, and -21 were all run at a dilution (20x) due to a matrix interference. The associated LOQs are elevated for these samples and several PALs are not met due to this dilution. Results above the PAL have been bolded in the data table.

Extractable surrogate nitrobenzene-d5 recovery for sample 1163432016 is low and does not meet laboratories QC goals possibly due to a 20x sample dilution and or matrix interference. The other five extractable surrogates met laboratory QC goals. Results were not re-analyzed or re-extracted to confirm initial low surrogate results. Results associated with this surrogate were qualified with a "QL" flag in the associated data table.

**6020A**

The LOQs for samples 16AT01TARG01SS (1163432-16), 16AT01POLG02SS (1163432-17) and 16ATCAMPG01IDW (1163432-21) are elevated due to a matrix interference. Samples were run at a 50X dilution and all results met PAL goals.

Sample 1333325 MSD % recoveries are high and do not met laboratory QC goals for barium and chromium. LCS met QC recovery goals for these analytes. This sample was not part of the SDG therefore no data qualifiers were added to the data table and there is no affect on the sample results.

Sample 1333325 MSD % recovery is low and does not met laboratory QC goals for lead. LCS met QC recovery goal for this analyte. This sample was not part of the SDG therefore no data qualifiers were added to the data table and there is no affect on the sample results.

The calibration blank 1335208 detected chromium at a concentration greater than the LOD but less than the LOQ at 0.747 J mg/Kg. Chromium results in the associated samples 1163432016, -17, and -21 results were ten times above this CB level. Results are not affected for the associated samples.

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.)

Comments:

There were no corrective actions associated with this SDG.

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

Data is useable for project decision making purposes with the above noted data qualifications.

Comments:

5. Samples Results

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, all analyses were reported as requested.

b. All applicable holding times met?

□Yes x□ No □NA (Please explain.) Comments:

**8260B**

Sample results for samples 1163432-16, and -17 were reanalyzed past the 14 method specified hold times due to several analytes that exceeded the linear calibration range. The lab reported the initial results as the out of hold results confirmed the initial over range results.

All other methods in the SDG met method holding times.

c. All soils reported on a dry weight basis?

x□Yes □ No □NA (Please explain.) Comments:

Yes, all samples were dry weight corrected.

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

□Yes x□ No □NA (Please explain.) Comments:

Reported LOQ for samples 1163432-16, -17, and -21 do not meet PALs for several analytes in the 8270 target list due to sample dilution.

e. Data quality or usability affected?

Comments:

Data is useable for project decision making purposes with the appropriate data qualifications.

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, SDG meets all MB method frequencies.

ii. All method blank results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

Chromium was detected in the calibration blank (CB-1335208) in batch MXX29922 above the LOD but below the LOQ at 0.747 J mg/Kg. All associated sample results are ten times above the CB concentration therefore results are not affected.

iii. If above PQL, what samples are affected?

Comments:

| No results are affected by method blank contamination. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No data flags are required in this SDG. |
|---|

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

Comments:

| Data is useable for project purposes in respect to method blanks. |
|---|

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)

x□Yes □ No □NA (Please explain.) Comments:

| AK series methods have an LCS/LCSD and the SW-846 methods have at a minimum of LCS. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the 6020A analysis has a LCS and a duplicate reported per batch. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

**8260**
MS/MSD (1335106/1335107) recoveries for batch VMS15941 did not meet % recovery goals for several analytes. The LCS met QC % recovery goals for this analytical batch. There was no LCSD run with the batch. The parent sample was not associated with this SDG therefore no data flags were applied.

**AK102/103**
Sample 1163432-14BMS (1163432022/ 16AT04TARG14SS) is low for % recovery for RRO and does not meet laboratory QC goals. LCS/LCSD and BMSD meet QC recovery goals for this analyte. Low results are attributed to non-sample homogeneity, matrix (noted as mostly vegetation), and the sample target analyte concentration was four times the BMS spike concentration. Results were not flagged in the associated parent sample.

**8270 PAH SIM**
Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % recoveries are low and do not met laboratory QC goals for 1, and 2-methylnaphthalene. LCS met QC recovery goals for these analytes. Low results may be partially attributed to matrix (noted as mostly vegetation). Results in the parent sample were flagged "QL" in the data table.

Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % recoveries are high and do not met laboratory QC goals for benzo[b]fluoranthene. LCS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

Sample 1163432-14BMSD (1163432023 16AT04TARG14SS) % recovery is high and does not met laboratory QC goals for phenanthrene. LCS and BMS met QC recovery goals for this analyte. ND results in the parent sample were flagged "QH" in the data table.

**6020A**
Sample 1333325 MSD % recoveries are high and do not met laboratory QC goals for barium and chromium. LCS met QC recovery goals for these analytes. This sample was not part of the SDG therefore no data qualifiers were added to the data table and there is no affect on the sample results.

Sample 1333325 MSD % recovery is low and does not met laboratory QC goals for lead. LCS met QC recovery goal for this analyte. This sample was not part of the SDG therefore no data qualifiers were added to the data table and there is no affect on the sample results.

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

**8260**
MS/MSD (1335106/1335107) recoveries for batch VMS15941 did not meet % RPD goals for several analytes. The LCS met QC % recovery goals for this analytical batch. There was no LCSD run with the batch. The parent sample was not associated with this SDG therefore no data flags were applied.

**8270 PAH SIM**
Sample 1163432-14BMS/BMSD (1163432022/1163432023 16AT04TARG14SS) % RPD is high and does not met laboratory QC goals for fluoranthene. No LCSD was run with this prep batch to compare RPD recoveries in a clean matrix. Results in the parent sample were flagged "QN" in the data table.

□Yes x□ No □NA (Please explain.) Comments:

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

Comments:

**8260**

No samples affected. MS/MSD (1335106/1335107) % recoveries and RPDs were not associated with a parent sample in this SDG**.**

**AK102/103**

No samples affected. Sample 1163432-14BMS (1163432022/ 16AT04TARG14SS) low % recovery for RRO are attributed to non-sample homogeneity, matrix (noted as mostly vegetation), and the sample target analyte concentration being four times the BMS spike concentration.

**8270 PAH SIM**

Sample 1163432-14 (16AT04TARG14SS) BMS/BMSD low % recoveries for 1, and 2-methylnaphthalene affect the parent sample to be flagged "QL" in the data table.

Sample 1163432-14(16AT04TARG14SS) BMS/BMSD high % recoveries for benzo[b]fluoranthene affect the ND results in the parent sample to be flagged with a"QH" in the data table.

Sample 1163432-14(16AT04TARG14SS) BMSD high % recovery for phenanthrene affect the ND results in the parent sample to be flagged with a "QH" in the data table.

Sample 1163432-14 (16AT04TARG14SS) BMS/BMSD % RPD for fluoranthene affect the ND results in the parent sample to be flagged with a "QN" in the data table

**6020A**

No samples affected. Sample 1333325 MSD % recoveries being high and low were not associated with a parent sample in this SDG**.**

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, all data flags in the data table are ACOE compliant.

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

Comments:

Data is useable for project decision making purposes with some data qualifications noted above.

c. Surrogates – Organics Only

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, all organic analyses have appropriate surrogates reported with the results.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
□Yes x□ No □NA (Please explain.) Comments:

**8260**
Sample 16AT01POLG02SS (1163432-17) surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals. Detected results for ethylbenzene, isopropyl benzene, and m & p xylenes are all associated with this surrogate and may be biased high. Results were flagged with a "QH" qualifier for ethylbenzene in the associated data table. Results for isopropyl benzene and m & p xylene were not flagged as the reported results are outside calibration range and have already been flagged with a "QN" flag in the data table.

**AK101**
Percent recoveries for field surrogate 4-bromofluorobenzene (4-BFB) are high and do not meet method QC goals. Samples were not re-run do to evidence of matrix interference and or sample dilutions. Affected samples are 1163432-16, 17, 18, and 19 which were flagged with a "QH" flag in the data tables.

**AK102/103**
The high concentration of target analytes required sample dilution for the following samples: 1163432-16, 17, 18, and 19. The extraction surrogate % recoveries were diluted to a point where they do not provide useful information. The associated samples were not flagged in the associated data tables.

**8270 PAH SIM**
PAH SIM surrogate terphenyl-d14 and 2-fluorobiphenyl recoveries for samples 1163432018, and -19 are high. Samples were diluted due to non-target analytes in the sample extracts. Results were not re-analyzed to confirm initial high surrogate results. Sample -018 was run at a 10x dilution and sample -019 was run at a 20x dilution. Reported results meet all associated PALs for this analysis and no detected result is above the PAL. Results above the DL have been flagged with the "QH" qualifier in the associated data table.

**8270**
Extractable surrogate nitrobenzene-d5 recovery for sample 1163432016 is low and does not meet laboratories QC goals possibly due to a 20x sample dilution and or matrix interference. The other five extractable surrogates met laboratory QC goals. Results were not re-analyzed or re-extracted to confirm initial low surrogate results. Results associated with this surrogate were qualified with a "QL" flag in the associated data table.

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

x□Yes □ No □NA (Please explain.) Comments:

**8260**
Sample 16AT01POLG02SS (1163432-17) high toluene-d8 surrogate recovery is associated with detected results for ethylbenzene, isopropyl benzene, and m & p xylenes which are flagged with a "QH" or "QN" in the data table.

**AK101**
High field surrogate 4-bromofluorobenzene (4-BFB) recoveries affected samples are 1163432-16, 17, 18, and 19 which were flagged with a "QH" flag in the data tables.

**AK102/103**
Samples 1163432-16, 17, 18, and 19 were not affected due to the high concentration of target analytes in the samples. No data flags were applied to the results.

**8270 PAH SIM**
Samples 1163432018, and -19 were affected by the high surrogate recoveries. Results above the DL have been flagged with the "QH" qualifier in the associated data table.

**8270**
Sample 1163432016 low surrogate recoveries for nitrobenzene-d5 affect the following analytes: nitrobenzene, isophorone, 2-nitrophenol, 2,4-dimethylphenol, benzoic acid, bis (2-chloroethoxy) methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, naphthalene, 2,6-dichlorophenol, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, 2-methylnaphthalene, and 1-methylnaphthalene. These analytes were flagged with a "QL" qualifier in the associated data table.

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

Data is useable for project decision making purposes with the data qualifications noted above in sections 6 c ii and iii.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
x□Yes □ No □NA (Please explain.) Comments:

Yes, one trip blank was reported for the GRO and 8260 analyses.

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)
x□Yes □ No □NA (Please explain.) Comments:

Yes, all samples arrived in one cooler, ID 062316-1, which included the trip blank 1163432020(TB061916-1).

iii. All results less than PQL?

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| The trip blank had two detections above the LOQ for 1,2,4-trimethylbenzene and p & m xylene at 0.0618 mg/Kg and 0.0691 mg/Kg respectively. The sample also had six results that were above the DL but below the LOQ for 1,3,5-trimethylbenzene, 4-isopropyl toluene, benzene, n-propyl benzene, and total xylenes. Trip blank was "ND" for GRO. |

iv. If above PQL, what samples are affected?

Comments:

| |
|---|
| All associated samples in the SDG had detected sample results that were ten times above the trip blank reported concentration. No data flags were applied to the results in the data table. |

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

Comments:

| |
|---|
| Data is useable for project decision making purposes without additional data qualifications in respect to the trip blank. |

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| One set of field duplicates was submitted with 15 primary soil samples for DRO/RRO and 8270 PAH SIM analysis. |

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the field dup was unknown to the lab. |

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| DRO/RRO met precision all requirements. All PAH results were "ND" in the primary sample while the duplicate sample had estimated values (J) reported for 1-Methylnaphthalene, Acenaphthylene, Anthracene, Benzo(g,h,i)perylene, Chrysene, Fluorene, and Indeno(1,2,3-cd)pyrene. The sample also had detection above the LOQ for Benzo(a)anthracene, Benzo(a)pyrene, Fluoranthene, Phenanthrene, and Pyrene. All other PAH analytes were ND in the duplicate. All of these analytes that were listed do not meet the RPD precision goal of less than 50%. |

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

Comments:

| |
|---|
| PAH SIM results for samples 1163432004 (16AT04TARG04SS) and 1163432015 (16AT04TARG15SS) were flagged with a "QN" qualifier for the following analytes: Benzo(a)anthracene, Benzo(a)pyrene, Fluoranthene, Phenanthrene, and Pyrene. |

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| No equipment blank was included with this SDG. |

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA |

ii. If above PQL, what samples are affected?

Comments:

| |
|---|
| NA |

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

Comments:

| |
|---|
| NA |

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

a. Defined and appropriate?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| ACOE data flagging convention used throughout the checklist. |

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/14/2016

CS Report Name: Attu Island Removal Action Report Date: 08/23/2016

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163609

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the COC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Four primary ISM samples and a BMS/BMSD were requested for DRO/RRO and PAH SIM by 8270. One grab sample was requested for VOCs by 8260, SVOCs by 8270, and RCRA8 metals by 6020A. Additionally, one trip blank for VOCs by 8260 was also requested on the COC.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler labeled 062616-1 was received on 7/1/16 at a temperature of 2.1 ° C.

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Four ISM samples were received with no preservative for DRO/RRO and PAH, one trip blank was received in methanol, and one grab sample was received with one methanol preserved sample for VOAs and one unpreserved sample for 8270 and RCRA8 metals. |

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Sample receipt form documented that all 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.?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Sample receipt form in the lab report documented that there were six containers for samples 1163609-1 thru 6. The COC only lists one container was received at the lab. The lab explained that only one bulk sample was received at the lab and then ISM subsampled at a later date and transferred to six separate containers labeled –A thru –F which is what was documented on the sample receipt form on page 1102.<br><br>The COC only had one sample container listed for sample 1163609007 (16AT01TARG03SS). The sample receipt form in the lab report has the correct amount of containers listed at two. One methanol preserved jar and one unpreserved jar. |

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

| |
|---|
| Data quality met all criteria in regards to sample receipt, login, preservation, and containers. |

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the case narrative documents challenges encountered by the lab on a sample by sample basis. |

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| **8260**<br>1335855 CCV recoveries for carbon disulfide, vinyl chloride, dichlorodifluoromethane, chloroethane, 1,1-dichloroethene, and trichlofluoromethane are high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected.<br><br>1335856 CVC recovery for dichlorodifluoromethane is high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected. |

| |
|---|
| **8260 cont.**<br>1335816 LCS percent recoveries for carbon disulfide, vinyl chloride, dichlorodifluoromethane, and trichlofluoromethane are high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected. |

1163609007 (1335817/1335818) MS/MSD recoveries for 1,2,3-trichloropropane, 2-chlorotoluene, MIBK, carbon disulfide, dichlorodifluoromethane and vinyl chloride are high and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. Results are not affected.

1163609007 (1335817) MS recovery for trichlorofluoromethane is high and does not meet laboratory QC goals. Results in the associated parent sample were ND for this analyte. Results are not affected by this high QC bias.

1163609007 (1335817/1335818) MS/MSD recoveries for 1,1,1,2-tetrachloroethane, 1,2-dibromoethane, 1,3-dichloropropane, bromoform, chlorobenzene, dibromochloromethane, styrene, tetrachloroethene and trans-1,3-dichloropropene are low and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. LOD results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD recoveries for ethylbenzene, isopropylbenzene, naphthalene, n-propyl benzene, o-xylenes, p&m xylenes, sec-butylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and total xylenes are low and do not meet laboratory QC goals. Results in the associated parent sample were detected for these analytes. Results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD RPD recoveries for 2-hexanone and trichlorofluoromethane are high and do not meet laboratory precision QC goals of less than 20 percent. Results in the associated parent sample were flagged with a "QN" in the data table.

**AK102/103**

1163609006 (16AT04TARM09SS) BMSD percent recovery for DRO and RRO are high and do not meet laboratory QC goals. The BMS meets laboratory QC goals for DRO and RRO. The LCS and LCSD also meet laboratory goals for both analytes. The case narrative suggested that the sample may be non-homogeneous, although this sample had been ISM sampled and sieved prior to extraction. Detected results in the parent sample were flagged with a "QH" qualifier in the data table.

**8270 PAH SIM**

1163609006 BMSD(16AT04TARM09SS) percent recovery for 1-methylnaphthalene is high and does not meet laboratory QC goals. Results for this analyte in the parent sample are ND. Results are not affected.

1163609006 BMSD(16AT04TARM09SS) percent recovery for anthracene is high and does not meet laboratory QC goals. 1163609005/6 BMS/BMSD(16AT04TARM09SS) recoveries for this same analyte do not meet laboratory QC RPD goals of less than 20 percent. Results for this analyte in the parent sample are flagged with a "QN" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for fluorene are high and do not meet laboratory QC goals. Results for this analyte in the parent sample are ND. Results are not affected.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for dibenzo[a,h]anthracene, fluoranthene, and phenanthrene are low and do not meet laboratory QC goals. Detected results for this analyte in the parent sample, 1163609004, have been flagged with a "QL" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not

meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample are flagged with a "QN" qualifier in the associated data table.

**8270**

Sample 1163609007 (16AT01TARG03SS) has elevated LOQs due to sample dilution caused by the matrix of the sample.

Sample 1163609007 (16AT01TARG03SS) was diluted to a point, (20X), where the extractable surrogate recoveries are low and do not meet laboratory QC goals.

1334314/1334315 LCS/LCSD(XXX35709) percent RPD recoveries for aniline do not meet laboratory QC goals of less than 20 percent. Results for this analyte in the associated samples, 1163609007, are flagged with a "QN" qualifier in the associated data table.

c. Were all corrective actions documented?
□Yes x□ No □NA (Please explain.) Comments:

No corrective actions were associated with this SDG.

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

Sample results were usable for project purposes with some qualifications for out of control QC.

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
   x□Yes □ No □NA (Please explain.) Comments:

Four primary ISM samples and a BMS/BMSD were requested for DRO/RRO and PAH SIM by 8270. One grab sample was requested for VOCs by 8260, SVOCs by 8270, and RCRA8 metals by 6020A. Additionally, one trip blank for VOCs by 8260 was also requested on the COC.

   b. All applicable holding times met?
   x□Yes □ No □NA (Please explain.) Comments:

All sample hold times were achieved in the SDG.

   c. All soils reported on a dry weight basis?
   x□Yes □ No □NA (Please explain.) Comments:

All results were reported on a dry weight basis.

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
   □Yes x□ No □NA (Please explain.) Comments:

Sample 1163609007(16AT01TARG03SS) LODs were above the PALs for several 8270 analytes. The sample had several detections above the PALs for 8260. The sample was a characterization sample so the elevated LODs did not significantly impact the decision making on the project.

e. Data quality or usability affected?

Comments:

| Sample results were usable for project purposes with some qualifications for out of control QC. |
|---|

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB frequencies were met for all methods. |
|---|

ii. All method blank results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all MB met laboratory QC goals. |
|---|

iii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

Comments:

| Data quality met all criteria in regards to method blanks. |
|---|

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)

x□Yes □ No □NA (Please explain.) Comments:

| AK series methods have LCS/LCSD and SW-846 have at a minimum of LCS. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the 6020A analysis has a LCS and a duplicate reported per batch. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

**8260**

1335816 LCS percent recoveries for carbon disulfide, vinyl chloride, dichlorodifluoromethane, and trichlofluoromethane are high and do not meet laboratory QC goals. Results in the associated samples were ND for these analytes. Results are not affected.

1163609007 (1335817/1335818) MS/MSD recoveries for 1,2,3-trichloropropane, 2-chlorotoluene, MIBK, carbon disulfide, dichlorodifluoromethane and vinyl chloride are high and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. Results are not affected.

1163609007 (1335817) MS recovery for trichlorofluoromethane is high and does not meet laboratory QC goals. Results in the associated parent sample were ND for this analyte. Results are not affected by this high QC bias.

1163609007 (1335817/1335818) MS/MSD recoveries for 1,1,1,2-tetrachloroethane, 1,2-dibromoethane, 1,3-dichloropropane, bromoform, chlorobenzene, dibromochloromethane, styrene, tetrachloroethene and trans-1,3-dichloropropene are low and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. LOD results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD recoveries for ethylbenzene, isopropylbenzene, naphthalene, n-propyl benzene, o-xylenes, p&m xylenes, sec-butylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and total xylenes are low and do not meet laboratory QC goals. Results in the associated parent sample were detected for these analytes. Results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

**AK102/103**

1163609006 (16AT04TARM09SS) BMSD percent recovery for DRO and RRO are high and do not meet laboratory QC goals. The BMS meets laboratory QC goals for DRO and RRO. The LCS and LCSD also meet laboratory goals for both analytes. The case narrative suggested that the sample may be non-homogeneous, although this sample had been ISM sampled and sieved prior to extraction. Detected results in the parent sample were flagged with a "QH" qualifier in the data table.

**8270 PAH SIM**

1163609006 BMSD(16AT04TARM09SS) percent recovery for 1-methylnaphthalene is high and does not meet laboratory QC goals. Results for this analyte in the parent sample are ND. Results are not affected.

1163609006 BMSD(16AT04TARM09SS) percent recovery for anthracene is high and does not meet laboratory QC goals. 1163609005/6 BMS/BMSD(16AT04TARM09SS) recoveries for this same analyte do not meet laboratory QC RPD goals of less than 20 percent. Results for this analyte in the parent sample are flagged with a "QN" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for fluorene are high and do not meet laboratory QC goals. Results for this analyte in the parent sample are ND. Results are not affected.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for dibenzo[a,h]anthracene, fluoranthene, and phenanthrene are low and do not meet laboratory QC goals. Detected results for this analyte in the parent sample, 1163609004, have been flagged with a "QL" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample are flagged with a "QN" qualifier in the associated data table.

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

□Yes x□ No □NA (Please explain.) Comments:

**8260**

1163609007 (1335817/1335818) MS/MSD RPD recoveries for 2-hexanone and trichlorofluoromethane are high and do not meet laboratory precision QC goals of less than 20 percent. Results in the associated parent sample were flagged with a "QN" in the data table.

**8270 PAH SIM**

1163609006 BMSD(16AT04TARM09SS) percent recovery for anthracene is high and does not meet laboratory QC goals. 1163609005/6 BMS/BMSD(16AT04TARM09SS) recoveries for this same analyte do not meet laboratory QC RPD goals of less than 20 percent. Results for this analyte in the parent sample are flagged with a "QN" qualifier in the associated data table.

**8270 PAH SIM cont.**

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample are flagged with a "QN" qualifier in the associated data table.

**8270**

1334314/1334315 LCS/LCSD(XXX35709) percent RPD recoveries for aniline do not meet laboratory QC goals of less than 20 percent. Results for this analyte in the associated samples, 1163609007, are flagged with a "QN" qualifier in the associated data table.

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

Comments:

**8260**

1163609007 (1335817/1335818) MS/MSD recoveries for 1,1,1,2-tetrachloroethane, 1,2-dibromoethane, 1,3-dichloropropane, bromoform, chlorobenzene, dibromochloromethane, styrene, tetrachloroethene and trans-1,3-dichloropropene are low and do not meet laboratory QC goals. Results in the associated parent sample were ND for these analytes. LOD results in the parent sample 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD recoveries for ethylbenzene, isopropylbenzene, naphthalene, n-propyl benzene, o-xylenes, p&m xylenes, sec-butylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and total xylenes are low and do not meet laboratory QC goals. Results in the associated parent sample were detected for these analytes. Results in the parent sample, 1163609007 (16AT01TARG03SS) have been flagged with a "QL" in the associated data table to notate a potential low bias in the sample for these analytes.

1163609007 (1335817/1335818) MS/MSD RPD recoveries for 2-hexanone and trichlorofluoromethane are high and do not meet laboratory precision QC goals of less than 20 percent. Results in the associated parent sample, 1163609007(16AT01TARG03SS) were flagged with a "QN" in the data table.

**AK102/103**

1163609006 (16AT04TARM09SS) BMSD percent recovery for DRO and RRO are high and do not meet laboratory QC goals. The BMS meets laboratory QC goals for DRO and RRO. The LCS and LCSD also meet laboratory goals for both analytes. The case narrative suggested that the sample may be non-homogeneous, although this sample had been ISM sampled and sieved prior to extraction. Detected results in the parent sample, 1163609004(16AT04TARM09SS) were flagged with a "QH" qualifier in the data table.

**8270 PAH SIM**

1163609006 BMSD(16AT04TARM09SS) percent recovery for anthracene is high and does not meet laboratory QC goals. 1163609005/6 BMS/BMSD(16AT04TARM09SS) recoveries for this same analyte do not meet laboratory QC RPD goals of less than 20 percent. Results for this analyte in the parent sample, 1163609004(16AT04TARM09SS), are flagged with a "QN" qualifier in the associated data table.

**8270 PAH SIM cont.**

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for dibenzo[a,h]anthracene, fluoranthene, and phenanthrene are low and do not meet laboratory QC goals. Detected results for this analyte in the parent sample, 1163609004(16AT04TARM09SS), have been flagged with a "QL" qualifier in the associated data table.

1163609005/6 BMS/BMSD(16AT04TARM09SS) percent recoveries for benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-c,d] pyrene, and pyrene are low and do not meet laboratory QC goals. Recoveries for the same analytes also do not meet laboratory QC RPD goals of less than 20 percent. Results for these analytes in the parent sample, 1163609004(16AT04TARM09SS), are flagged with a "QN" qualifier in the associated data table.

**8270**
1334314/1334315 LCS/LCSD(XXX35709) percent RPD recoveries for aniline do not meet laboratory QC goals of less than 20 percent. Results for this analyte in the associated samples, 1163609007(16AT01TARG03SS), are flagged with a "QN" qualifier in the associated data table.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all flags in the data table are ACOE compliant and additional comments are provided in section 6.b.v.

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

Data is useable for project decision making purposes with some data qualifications noted above.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all organic analyses have appropriate surrogates reported with the results.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
□Yes x□ No □NA (Please explain.) Comments:

**8270**
Sample 1163609007 (16AT01TARG03SS) was diluted to a point, (20X), where the extractable surrogate recoveries are low and do not meet laboratory QC goals.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
iv.
□Yes x□ No □NA (Please explain.) Comments:

**8270**
Sample 1163609007 (16AT01TARG03SS) was not flagged in the associated data table since the low surrogate recoveries were a result of the 20X dilution that was due to the complex matrix of the sample

v. Data quality or usability affected? (Use the comment box to explain.)
Comments:

The low 8270 surrogate recoveries on sample 1163609007(16AT01TARG03SS) did not impact project making decisions for this project. The sample exceeded several 8260 PALs so the elevated detection limits and low surrogate recoveries of the 8270 data was not critical to decision making.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
x□Yes □ No □NA (Please explain.) Comments:

| Yes, one soil trip blank was reported for the 8260 analysis. |
|---|

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)
x□Yes □ No □NA (Please explain.) Comments:

| Yes, all samples arrived in one cooler, ID 062616-1, which included the trip blank 1163609008(TB062516-1). |
|---|

iii. All results less than PQL?
x□Yes □ No □NA (Please explain.) Comments:

| All results in the trip blank were below the LOD. |
|---|

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

| NA, all results for the trip blank were ND. |
|---|

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

| Data is useable for project decision making purposes with respect to the trip blank. |
|---|

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
□Yes x□ No □NA (Please explain.) Comments:

| There was no field duplicate in this SDG. |
|---|

ii. Submitted blind to lab?
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

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

Where $R_1$ = Sample Concentration
$R_2$ = Field Duplicate Concentration

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No equipment blanks were run until 7/7/16. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

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

| NA |
|---|

a. Defined and appropriate?

x□Yes □ No □NA (Please explain.) Comments:

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/17/2016

CS Report Name: Attu Island Removal Action Report Date: 09/02/2016

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163844

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the COC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, one water, one duplicate and one MS/MSD pair, was requested for DRO/RRO and PAH by 8270 SIM.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      Cooler 071216-1 was received on 7/12/16 at a temperature of 3.8 ° C.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

Yes, the DRO/RRO samples were preserved with HCL to a pH < 2 and the PAH samples were received unpreserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

All samples were received in good condition. No documentation of broken or leaking sample jars was associated with this SDG.

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.?
x□Yes □ No □NA (Please explain.) Comments:

There was a note on the e-sample receipt form that there was limited volume for the analyses listed in the COC. One bottle was received for each analysis. Typically, two bottles are received for each analyses.

Additionally, there was a note that no custody seals were present on the cooler when it was delivered to the laboratory. The samples were in the presence of Bristol personnel at all times thus the lack of the custody seals had no effect on the data quality.

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

Data quality met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative
a. Present and understandable?
x □Yes □ No □NA (Please explain.) Comments:

Yes, case narrative outlined one quality control outlier in the associated SDG.

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

**8270 PAH SIM**
1163844002/1163844003(16AT04TARG16WA) BMS/BMSD RPDs for several analytes are high and do not meet laboratory QC goals. Results for acenaphthene, acenaphtheylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-c,d] pyrene, and phenanthrene are flagged with a "QN" in the associated data table in the parent sample 1163844001(16AT04TARG16WA).

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.) Comments:

No corrective actions were necessary in this SDG.

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

Comments:

| |
|---|
| All results were usable for project making decisions with respect to the case narrative. |

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
      x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, sample results were identical to the requested analyses listed in the COC. |

   b. All applicable holding times met?
      x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all method holding times were achieved by the laboratory. |

   c. All soils reported on a dry weight basis?
      □Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| All of the samples in the SDG were waters. No dry weight correction was required. |

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
      x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All results meet PALs. |

   e. Data quality or usability affected?

Comments:

| |
|---|
| All results in the SDG were usable for project making decisions. |

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
      □Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, method blank frequencies were met for all methods. |

      ii. All method blank results less than PQL?
      x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all method blanks were below the LOQ. However, the method blank for the RRO was reported at 0.211 mg/L and J flagged. This result is below ½ the LOQ but greater than the DL. Results reported above the DL in the associated samples were flagged with a "B" qualifier in the data table. |

iii. If above PQL, what samples are affected?

Comments:

| |
|---|
| Samples 1163844001(16AT04TARG16WA) and 1163844004(16AT04TARG17WA) were flagged with a "B" qualifier in the data tables. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, RRO samples in the SDG were flagged with a "B" qualifier. |

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

Comments:

| |
|---|
| All results in the SDG were usable for project making decisions. |

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)

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, LCS/LCSD frequencies were met for all methods. |

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

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA, there were no inorganic analyses requested in this SDG. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all % recoveries were achieved by the laboratory in this SDG. |

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| **8270PAH SIM**<br>1163844002/1163844003(16AT04TARG16WA) BMS/BMSD RPDs for several analytes are high and do not meet laboratory QC goals. Results for acenaphthene, acenaphtheylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-c,d] pyrene, and phenanthrene are flagged with a "QN" in the associated data table in the parent sample 1163844001(16AT04TARG16WA). |

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

Comments:

| Parent sample of the BMS/BMSD 1163844001(16AT04TARG16WA). |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Results for acenaphthene, acenaphtheylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-c,d] pyrene, and phenanthrene are flagged with a "QN" in the associated data table for the parent sample, 1163844001(16AT04TARG16WA). |
|---|

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

Comments:

| Sample results were usable for project purposes with some qualifications for out of control QC. |
|---|

c. Surrogates – Organics Only

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, surrogate frequencies were met for all samples. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all surrogates in the SDG met DQOs. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| NA, all surrogates met laboratory QC goals. |
|---|

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

Comments:

| All results in the SDG were usable for project making decisions with respect to surrogate recoveries. |
|---|

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

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

□Yes □ No x□NA (Please explain.) Comments:

| No trip blank was reported with this SDG as no volatile samples were included in the cooler. |
|---|

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 x□NA (Please explain.) Comments:

| NA, no trip blanks was needed. |
|---|

iii. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iv. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

| One field duplicate, 1163844004(16AT04TARG17WA), was a duplicate of sample 1163844001(16AT04TARG16WA). |
|---|

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all field dups were unknown to the lab. |
|---|

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

□Yes x□ No □NA (Please explain.) Comments:

| 1-methylnapthalene was detected in the primary sample above the DL but below the LOQ and reported with a "J" value. The same analyte was not detected in the duplicate sample. All other analytes meet precision goals of less than 30 % RPDs. |
|---|

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

Comments:

| |
|---|
| All results in the SDG were usable for project making decisions with respect to field duplicate precision. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Both the primary sample and duplicate sample were the two equipment blanks for the project. |

i. All results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all results are below the laboratory LOQs. |

ii. If above PQL, what samples are affected?

Comments:

| |
|---|
| No results were above the LOQ in either equipment blank for PAH or DRO/RRO. |

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

Comments:

| |
|---|
| All equipment blanks are useable for project making decisions without additional qualification. |

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

a. Defined and appropriate?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| ACOE data flagging convention used in the associated data tables. |

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 10/28/16

CS Report Name: Attu Island Removal Action Report Date: 07/29/2016

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163916

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, 16 primary soil samples, one field duplicate, and one BMS/BMSD were requested for DRO/RRO analysis on the COC.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler labeled 071416-2 was received on 7/14/16 at a temperature of 4.5 ° C. The 2nd page of the COC has a different thermometer # of 200 instead of 242 on it. Both temperatures are the same at 4.5° C. It also appears that SDG 1163917 was included in the same cooler at the time of delivery.

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Samples were received in 4 oz. amber jars with no preservative which is the correct container and preservative for the requested analysis. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All samples were documented that they were received in good condition with no preservation. |

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 x□ No □NA (Please explain.) Comments:

| |
|---|
| No discrepancies were documented with the receipt of the SDG. |

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

Comments:

| |
|---|
| Data quality met all criteria in regards to sample receipt, login, preservation, and containers. |

4. Case Narrative

a. Present and understandable?

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the case narrative adequately outlined the quality control outliers in the associated SDG. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| **AK102/103**<br>The AK102/DRO surrogate 5a-androstane recoveries are high and do not meet laboratory QC goals for samples 1163916009(16AT01POLG20SS), 1163916010(16AT01TARG08SS) and 1163916011(16AT01POLG22SS). These samples were analyzed at a 4x dilution. The reported result in these samples is ten times above the LOQ for DRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table.<br><br>The AK103/RRO surrogate n-triacontane recoveries are high and do not meet laboratory QC goals for samples 1163916007(16AT01POLG18SS), 1163916009(16AT01POLG20SS), 1163916011(16AT01POLG22SS), and 1163916013(16AT01POLG24SS). These samples were analyzed at a 4x dilution. The reported result in these samples is eight to ten times above the LOQ for RRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table. |

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.) Comments:

| No corrective actions were necessary in this SDG. |
|---|

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

| All results were usable for project making decisions. |
|---|

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
   x□Yes □ No □NA (Please explain.) Comments:

| Yes, sample results were identical to the requested analyses listed in the COC. |
|---|

   b. All applicable holding times met?
   x□Yes □ No □NA (Please explain.) Comments:

| Yes, all method holding times were achieved by the laboratory. |
|---|

   c. All soils reported on a dry weight basis?
   x□Yes □ No □NA (Please explain.) Comments:

| Yes, all results are dry weight corrected. |
|---|

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
   x□Yes □ No □NA (Please explain.) Comments:

| Yes, laboratory LOQs meet all PALs for the SDG. |
|---|

   e. Data quality or usability affected?
   Comments:

| All results were usable for project making decisions. |
|---|

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB frequencies were met for all methods. |
|---|

      ii. All method blank results less than PQL?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, MBs were “ND” for both DRO and RRO. |
|---|

iii. If above PQL, what samples are affected?

Comments:

| No detections above the LOD for the associated MBs. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No detections above the LOD for the associated MBs. |
|---|

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

Comments:

| All results were usable for project making decisions. |
|---|

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)

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS/LCSD frequencies were met for all methods. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No inorganic analyses requested in the SDG. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all LCS/LCSD and BMS/BMSD met method recovery goals for AK102/103. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all LCS/LCSD and BMS/BMSD met method precision goals for AK102/103. |
|---|

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

Comments:

| NA |
|---|

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

| All results were usable for project making decisions. |
|---|

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

| Yes, surrogate frequencies were met for all samples. |
|---|

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
□Yes x□ No □NA (Please explain.) Comments:

| The AK102/DRO surrogate 5a-androstane recoveries are high and do not meet laboratory QC goals for samples 1163916009(16AT01POLG20SS), 1163916010(16AT01TARG08SS) and 1163916011(16AT01POLG22SS).<br><br>The AK103/RRO surrogate n-triacontane recoveries are high and do not meet laboratory QC goals for samples 1163916007(16AT01POLG18SS), 1163916009(16AT01POLG20SS), 1163916011(16AT01POLG22SS), and 1163916013(16AT01POLG24SS). |
|---|

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
□Yes x□ No □NA (Please explain.) Comments:

| **AK102**<br>These samples (1163916-9, -10, and -11) were analyzed at a 4x dilution. The reported result in these samples is ten times above the LOQ for DRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table.<br><br>**AK103**<br>These samples (1163916-7, -9, -11, and -13) were analyzed at a 4x dilution. The reported result in these samples is eight to ten times above the LOQ for RRO. The case narrative suggested that the surrogate result was high due to matrix interference. The samples were not re-analyzed to confirm the initial results. Because of the sample dilutions, high concentration of target analytes, and suggested matrix interference no data qualification was placed on the results in the data table. |
|---|

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

| All results were usable for project making decisions. |
|---|

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
□Yes □ No x□NA (Please explain.) Comments:

| NA. No volatiles were requested in this SDG. |
|---|

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iii. All results less than PQL?
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

| NA |
|---|

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

| NA |
|---|

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
x□Yes □ No □NA (Please explain.) Comments:

| There was one field duplicate submitted for 16 primary samples. |
|---|

ii. Submitted blind to lab?
x□Yes □ No □NA (Please explain.) Comments:

| Yes, the lab was unaware of the field duplicate sample. |
|---|

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

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

Where $R_1$ = Sample Concentration
$R_2$ = Field Duplicate Concentration

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the RPD for DRO was 34% and the RPD for RRO was 42%. |
|---|

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

Comments:

| Yes, all data is usable in respect to field duplicate precision results. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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

a. Defined and appropriate?

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

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/07/2016

CS Report Name: Attu Island Removal Action Report Date: 09/07/2016

Consultant Firm: USACE Alaska District (COE)/ Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163917

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, 13 primary soil samples, two field duplicates, and one BMS/BMSD were requested for DRO/RRO analysis on the COC.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      Cooler 071416-2 was received on 7/14/16 at a temperature of 4.5 ° C. SDG 11663916 was also contained in the same sample cooler as it has the same cooler ID, 071416-2, listed on the COC.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

All sample preservatives met method requirements. DRO/RRO soils were received unpreserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

All samples were received in good condition. No documentation of broken or leaking sample jars was associated with this SDG.

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.?
x□Yes □ No □NA (Please explain.) Comments:

Sample 1163917009 (16A01POLG08SS) was listed on the COC twice. One note was made on the e-sample receipt form under the header, "Do samples match COC". A second note appears on the COC on 7/25/16 by VLP that explains the last line on the COC is carryover from page 1.

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

No, all samples met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

Yes, there is a page for the case narrative.

b. Discrepancies, errors or QC failures identified by the lab?
□Yes x□ No □NA (Please explain.) Comments:

No lab errors or QC failures were noted in the case narrative.

c. Were all corrective actions documented?
□Yes x□ No □NA (Please explain.) Comments:

There were no corrective actions needed for the SDG.

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

Results are useable for project making decision without any data qualification.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
x□Yes □ No □NA (Please explain.) Comments:

Yes, sample results were identical to the requested analyses listed in the COC.

b. All applicable holding times met?
x□Yes □ No □NA (Please explain.) Comments:

All samples were extracted within the 14-day method hold time.

c. All soils reported on a dry weight basis?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all results are dry weight corrected.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
x□Yes □ No □NA (Please explain.) Comments:

Yes, laboratory LOQs meet all PALs for the SDG.

e. Data quality or usability affected?
Comments:

All results were usable for project making decisions.

6. QC Samples
a. Method Blank
i. One method blank reported per matrix, analysis and 20 samples?
x□Yes □ No □NA (Please explain.) Comments:

Yes, MB frequencies were met for the AK102/103 method.

ii. All method blank results less than PQL?
x□Yes □ No □NA (Please explain.) Comments:

Yes, the one method blank achieved all laboratory QC goals in this SDG.

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

NA

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
□Yes □ No x□NA (Please explain.) Comments:

NA

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

NA

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)

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS/LCSD frequencies were met for the AK102/103 method. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No inorganic analysis was requested on the COC for this SDG. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS/LCSD and BMS/BMSD percent recoveries were met for the AK102/103 method. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Precision (RPD) goals were meet for all LCS/LCSDs and BMS/BMSDs in the SDG. |
|---|

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

Comments:

| NA |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No data flags were applied. |
|---|

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

Comments:

| NA |
|---|

c. Surrogates – Organics Only

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, surrogate frequencies were met for all samples. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, surrogate percent recoveries goals were met for all samples and QC in the SDG. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No data flags were needed as all surrogate met percent recovery goals. |
|---|

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

Comments:

| All results were usable for project making decisions with respect to QC samples and surrogate recoveries. |
|---|

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

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

□Yes □ No x□NA (Please explain.) Comments:

| No volatile analyses were requested in this SDG so no trip blank was needed. |
|---|

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 x□NA (Please explain.) Comments:

| NA |
|---|

iii. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iv. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Two field duplicates were submitted in this SDG along with thirteen primary samples. 1163917008 (16AT01TARG47SS) is a field dup of sample 1163917007(16AT01TARG46SS). 1163917014 (16AT01POLG04SS) is a field dup of sample 1163917013(16AT01POLG03SS). |

ii. Submitted blind to lab?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all field dups were unknown to the lab. |

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

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

Where $R_1$ = Sample Concentration
$R_2$ = Field Duplicate Concentration

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the RPD for DRO was 8% and the RPD for RRO was 7% for samples 3917-13 and 3917-14. The RPD for DRO was 17% and the RPD for RRO was 21% for samples 3917-7 and 3917-8. |

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

Comments:

| |
|---|
| Yes, all data is usable in respect to field duplicate precision results. |

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA |

ii. If above PQL, what samples are affected?

Comments:

| |
|---|
| NA |

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

Comments:

| NA |
|---|

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      x□Yes □ No □NA (Please explain.) Comments:

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/08/2016

CS Report Name: Attu Island Removal Action Report Date: 08/16/16

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163919

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, 9 primary soil samples, one field duplicate, and one BMS/BMSD were requested for total lead by 6020 on the COC.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler labeled 071416-3 was received on 7/14/16 at a temperature of 3.3 ° C. It also appears that SDG 1163920 was included in the same cooler at the time of delivery.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Samples were received in jars with no preservative which is the correct preservative for the requested analysis. |

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All samples were documented that they were received in good condition with no preservation. |

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 x□ No □NA (Please explain.) Comments:

| |
|---|
| No discrepancies were documented with the receipt of the SDG. |

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

| |
|---|
| No. Data quality met all criteria in regards to sample receipt, login, preservation, and containers. |

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the case narrative adequately outlined the quality control outliers in the associated SDG. |

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| **6020**<br>1163919005 BMSD (16AT01BATG01SS) percent recovery for lead is high and does not meet laboratory QC goals. The LCS and BMS meet laboratory QC goals as did the post digestion spike. Reported results for lead may be biased high in the parent sample 1163919003 (16AT01BATG01SS). Results in the associated data table have been flagged with a "QH". |

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| No corrective actions were necessary in this SDG. |

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

| |
|---|
| All results were usable for project making decisions. |

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, sample results were identical to the requested analyses listed in the COC. |
|---|

   b. All applicable holding times met?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, all method holding times were achieved by the laboratory. |
|---|

   c. All soils reported on a dry weight basis?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, all results are dry weight corrected. |
|---|

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, all reported laboratory LOQs were all below the 400 mg/Kg PAL for the SDG. |
|---|

   e. Data quality or usability affected?
      Comments:

| All results were usable for project making decisions with respect to PQLs, dry weights, hold times, and analyses. |
|---|

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB frequencies were met for the 6020 lead method. |
|---|

      ii. All method blank results less than PQL?
      x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB was “ND” for total lead. |
|---|

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

| No detection above the LOD for the associated MB. |
|---|

      iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
      □Yes □ No x□NA (Please explain.) Comments:

| No detection above the LOD for the associated MB. |
|---|

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

Comments:

| All results were usable for project making decisions. |
|---|

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 x□NA (Please explain.) Comments:

| No organic analysis was requested. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS and BMS/BMSD frequencies were met for the 6020 method. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| 1163919005 BMSD (16AT01BATG01SS) percent recovery for lead is high and does not meet laboratory QC goals. The LCS and BMS meet laboratory QC goals as did the post digestion spike. Reported results for lead may be biased high in the parent sample 1163919003 (16AT01BATG01SS). Results in the associated data table have been flagged with a "QH". |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| BMS/BMSD RPD recoveries met laboratory QC goals. |
|---|

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

Comments:

| Reported results for lead may be biased high in the parent sample 1163919003 (16AT01BATG01SS). Results in the associated data table have been flagged with a "QH". |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Results in the associated data table have been flagged with a "QH". |
|---|

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

| All results were usable for project making decisions. |
|---|

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
□Yes □ No x□NA (Please explain.) Comments:

| No organic analyses requested in the SDG. |
|---|

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

| NA |
|---|

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
□Yes □ No x□NA (Please explain.) Comments:

| NA. No volatiles were requested in this SDG. |
|---|

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iii. All results less than PQL?
□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

iv. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

| There was one field duplicate submitted for 9 primary samples. |
|---|

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the lab was unaware of the field duplicate sample. |
|---|

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the RPD for total lead was 17%. |
|---|

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

Comments:

| Yes, all data is usable in respect to field duplicate precision results. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      x□Yes □ No □NA (Please explain.) Comments:

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 10/31/16

CS Report Name: Attu Island Removal Action Report Date: 08/10/16

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163920

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, twelve primary samples, three field duplicates, one BMS/BMSD, and three trip blanks were requested for AK101, AK102/103, 8082, 8260B, 8270D, and RCRA8 metals. The trip blanks were only requested for AK101 and 8260B analysis.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      Cooler 071416-3 was received on 7/14/16 at a temperature of 3.3 ° C. The cooler also contained 10 samples in SDG 1163919 for total Pb.

      The COC also has a second temperature at 4.5° C which is associated with another cooler dropped off at the same time that was labeled 071416-2. This had SDGs 1163916 and 1163917.

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

x□Yes □ No □NA (Please explain.) Comments:

All sample preservatives met method requirements. Volatiles soils were received in methanol and SVOCs, DRO/RRO, RCRA8 metals, and PCBs were received unpreserved.

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

□Yes x□ No □NA (Please explain.) Comments:

All samples were received in good condition. No documentation of broken or leaking sample jars was associated with this SDG.

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.?

x□Yes □ No □NA (Please explain.) Comments:

The COC has a second temperature of 4.5° C listed below the field for the temp blank. This temperature is believed to be associated with another cooler dropped off at the same time that was labeled 071416-2 since the 2nd preceded the temperature on the COC. This cooler is believed to have SDGs 1163916 and 1163917 in it.

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

Comments:

Both sample temperatures on the COC met temperature range goals. Data quality met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative

a. Present and understandable?

x□Yes □ No □NA (Please explain.) Comments:

Yes, case narrative outlined several quality control outliers in the associated SDG.

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

x□Yes □ No □NA (Please explain.) Comments:

**AK101**

The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163920003, -4, -11, -12, and -14. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries exceeded QC goals. The GRO result for sample 1163920-14 was flagged "QH" for high surrogate recovery as this sample did not require a dilution. Samples 1163920-3, -4, -11, and -12 required a dilution in order to bring the target analyte within calibration range. Reported results for these samples were at least 100 X above the standard GRO LOQ so no data qualifiers were added to these results.

**AK101 cont.**

The AK101 1163920001(16AT01POLG31SS) MS % recovery for GRO is high and does not meet laboratory QC goals. The MSD met % recovery goals, but the MS/MSD did not meet RPD goals of < 20%. The LCS/LCSD (1341091/1341092) in batch VXX29244 met both % recovery and RPD control limits for these analytes. The detected results for GRO were flagged "QN" in the parent sample 1163920-1 in the data table.

**AK102/103**

The AK102 surrogate 5a-androstane was low and did not meet % recovery laboratory QC goals in samples 1163920014, and -15. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the DRO LOQ so no data qualifiers were added to these results.

The AK103 surrogate n-triacontane was low and did not meet % recovery laboratory QC goals in samples 1163920003, -14, -15, and -16. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the RRO LOQ so no data qualifiers were added to these results.

**8260**

CCV 1338212, in analytical batch VMS 15988, recoveries for naphthalene and 1,2,3-trichlorobenzene are low and do not meet laboratory QC goals. The following samples are affected 1163920001, -02, -05, -08, -09, -10, -12, and -15. These samples were re-analyzed after the method hold times to confirm the initial results. Sample 1163920004 was in the same analytical batch but a rerun within hold time at 100 X dilution was reported for these two analytes. The rest of the affected samples are flagged with a "QL" for these two analytes in the associated data table.

CCV 1339167, in analytical batch VMS 15999, recovery for carbon disulfide is high and does not meet laboratory QC goals. This analyte was not detected in the associated samples. Results are not affected.

CCV 1338409, in analytical batch VMS 15989, recoveries for 2,2-dichloropropane and hexachlorobutadiene are high and do not meet laboratory QC goals. These analytes were not detected in the associated samples. Results are not affected.

CCV 1338409, in analytical batch VMS 15989, surrogate recoveries for toluene-d8 and 4-bromofluorobenzene are high and do not meet laboratory QC goals. The results associated with these surrogates met laboratory QC goals except hexachlorbutadiene. No associated samples were detected for this analyte and the surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

MB 1338004, in prep batch VXX29161, recovery for tetrachloroethene is above the LOQ at 0.0165 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

**8260 cont.**

MB 1338004, in prep batch VXX29161, recovery for vinyl chloride is above the LOD at 0.00650 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

MB 1338015, in prep batch VXX29162, recovery for tetrachloroethene is above the LOQ at 0.0135 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

LCS 1338005, in prep batch VXX 29161, surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals. The % recovery results associated with this surrogate met laboratory QC goals. The surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

MS/MSD 1338316/1338317 recoveries for 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-butanone, 2-chlorotoluene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-butylbenzene, n-propylbenzene, p & m xylenes, and total xylenes are high and do not meet laboratory QC goals. LCS met laboratory QC goals for these analytes. Detected results in the parent sample (116392014) are flagged with a "QH" in the associated data table. These include 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-propylbenzene, p & m xylenes, and total xylenes.

MS/MSD 1338006/1338007 RPD for chloroethane was noted in the case narrative as being high at 20.2% and not meeting laboratory QC goals of < 20%. When using EPA rounding rules and two significant figures this result is rounded to 20% which meets method goals of less than or equal to 20%. No data qualification was added to the parent sample result for this analyte as results are not affected.

1163920012(16AT01TARG49SS) field surrogate recovery for 4-bromofluorobenzene is high and does not meet laboratory QC goals. Sample was also run at a dilution of 10x but not reported. The case narrative suggested that the surrogate result was high due to matrix interference but the internal standards met method QC goals for the sample and no manual integration was performed on the surrogate. Detected results, 1,3,5-trimethylbenzene and 4-isopropyltoluene, were qualified with a "QH" flag in the data table.

Samples 1163920-3, -4, and -11 were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table.

**8270**

Samples 1163920-2, -3, -4, -8, -14, -15, and -16 were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table.

Samples 1163920-3 and -15 surrogate recoveries for terphenyl-d14 are high and not meet laboratory QC goals. Results associated with this surrogate were not detected above the detection limit in the samples therefore results are not affected and no data qualification was added to the table.

1163920006/7 BMS/BMSD percent recoveries for hexachlorocyclopentadiene and 4-nitroaniline are low and do not meet laboratory QC goals. The LCS meets QC goals for these analytes. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased low and are flagged with a "QL" qualifier in the associated data table.

1163920006/7 BMS/BMSD RPDs for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, bis(2-chloroethyl) ether, hexachlorobutadiene, hexachloroethane, and n-nitrosodimethylamine do not meet laboratory QC goals. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased and are flagged with a "QN" qualifier in the associated data table.

**8082**

Closing CCV recoveries for PCB Aroclor-1260 and 1254 (1343466/1343467) in batch XGC9417 were low and did not meet laboratory QC goals. Per DOD QSM the CCV must be re-run twice with passing results to validate the run. These CCV re-runs met QC goals on both runs for both analytes. Results are not affected.

c. Were all corrective actions documented?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Sample report was revised on 11/14/2016 to remove five 8260 analytes reported as detections for sample 1163920003(16AT01POLG33SS) and two 8260 analytes from sample 1163920011(16AT01POLG50SS). The results that were deleted were 1,1,2-Trichloroethane, 1,2,3-Trichloropropane, 2-Chlorotoluene, n-Butylbenzene, and tert-Butylbenzene for sample 3920-3 and 1,1,2-Trichloroethane and 2-hexanone for sample 3920-11. |

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

| |
|---|
| Sample results were usable for project purposes with some qualifications for out of control QC. |

5. Samples Results

a. Correct analyses performed/reported as requested on COC?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, sample results were identical to the requested analyses listed on the COC. |

b. All applicable holding times met?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All reported results in the data table meet applicable method hold times. Samples 1163920001, -02, -05, -08, -09, -10, -12, and -15 were all re-run past hold to confirm the in-hold results with QC that was outside of laboratory goals. |

c. All soils reported on a dry weight basis?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all samples were reported on a dry weight basis. |

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| **8260**<br>Sample 1163920003(16AT01POLG33SS) did not meet PALs for 1,2,3-trichloropropane, 1,2-dibromomethane, chloroethane, chloroform, hexachlorobutadiene, and trichloroethene due to a sample dilution of 100x. Sample 1163920004(16AT01POLG34SS) did not meet PAL for 1,2,3-Trichloropropane due to a sample dilution of 10x. All other samples met PALs for this analysis. Samples results that are above PALs are bolded in the data table.<br><br>**8270**<br>All n-nitrosodimethylamine "ND" results for all samples were greater than the ADEC PALs. Samples 1163920-2, -3, -4, -8, -14, -15, and -16 did not meet PALs for n-Nitrosodi-n-propylamine, Dibenzo(a,h)anthracene, and Benzo(a)pyrene due to sample dilutions. 1163920-3, -4, -14, -15, and -16 did not meet PALs for bis-(2-Chloroethyl) ether, 3,3'-Dichlorobenzidine, Benzo(a)anthracene, and 2,6-Dinitrotoluene, also due to sample dilutions. 1163920-3, -4, -14, and -16 did not meet PALs for 2,4-Dinitrotoluene due to dilutions. |

e. Data quality or usability affected?

Comments:

Samples 1163920003, -4, -14, and -16 all had analytes that were detected above the project action levels so the elevated limits had no affect on these samples. 1163920001, -2, -5, -8, -9, -10, -11, -12, -13, -15, and -20 all had some results in the 8270 and or 8260 analyte list that did not meet PALs. Although it is unlikely that the results that did not achieve detection levels would actually be present in the samples, one cannot conclude from these results that the bolded ND analytes in the data table may be present at lower levels than have been achieved in this SDG.

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, MB frequencies were met for all methods.

ii. All method blank results less than PQL?

□Yes x□ No □NA (Please explain.) Comments:

MB 1338004, in prep batch VXX29161, recovery for tetrachloroethene is above the LOQ at 0.0165 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

MB 1338004, in prep batch VXX29161, recovery for vinyl chloride is above the LOD at 0.00650 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

MB 1338015, in prep batch VXX29162, recovery for tetrachloroethene is above the LOQ at 0.0135 mg/Kg. This analyte was not detected above the DL in the associated samples. Results are not affected and no flags were applied to the data table for this analyte.

iii. If above PQL, what samples are affected?

Comments:

No samples are affected since none of the analytes that were detected in the MB were detected in the associated samples.

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

□Yes □ No x□NA (Please explain.) Comments:

No samples are affected.

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

Comments:

All results were usable for project making decisions with respect to method blanks.

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)

x□Yes □ No □NA (Please explain.) Comments:

Yes, LCS/LCSD frequencies were met for all organic methods.

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, LCS frequencies were met for all inorganic methods.

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

□Yes x□ No □NA (Please explain.) Comments:

**AK101**

The AK101 1163920001(16AT01POLG31SS) MS % recovery for GRO is high and does not meet laboratory QC goals. The MSD met % recovery goals. The LCS/LCSD (1341091/1341092) in batch VXX29244 met % recovery control limits for these analytes.

**8260**

MS/MSD 1338316/1338317 recoveries for 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-butanone, 2-chlorotoluene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-butylbenzene, n-propylbenzene, p & m xylenes, and total xylenes are high and do not meet laboratory QC goals. LCS met laboratory QC goals for these analytes.

**8270**

1163920006/7 BMS/BMSD percent recoveries for hexachlorocyclopentadiene and 4-nitroaniline are low and do not meet laboratory QC goals. The LCS meets QC goals for these analytes.

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

**AK101**

The AK101 1163920001(16AT01POLG31SS) MS/MSD did not meet RPD goals of < 20%. The LCS/LCSD (1341091/1341092) in batch VXX29244 met both % recovery and RPD control limits for these analytes. The detected results for GRO were flagged "QN" in the parent sample 1163920-1 in the data table.

**8270**

1163920006/7 BMS/BMSD RPDs for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, bis(2-chloroethyl) ether, hexachlorobutadiene, hexachloroethane, and n-nitrosodimethylamine do not meet laboratory QC goals. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased and are flagged with a "QN" qualifier in the associated data table.

□Yes x□ No □NA (Please explain.) Comments:

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

**AK101**
The 1163920001MS/MSD did not meet RPD goals of < 20%. The LCS/LCSD (1341091/1341092) in batch VXX29244 met both % recovery and RPD control limits for these analytes. The detected results for GRO were flagged "QN" in the parent sample 1163920-1 in the data table.

**8260**
MS/MSD 1338316/1338317 recoveries are high and do not meet laboratory QC goals. Detected results in the parent sample (116392014) are flagged with a "QH" in the associated data table. These include 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 4-isopropyltoluene, benzene, ethylbenzene, naphthalene, n-propylbenzene, p & m xylenes, and total xylenes.

**8270**
1163920006/7 BMS/BMSD percent recoveries for hexachlorocyclopentadiene and 4-nitroaniline are low and do not meet laboratory QC goals. Results in the parent sample, 116392005 (16AT01POLG35SS), may be biased low and are flagged with a "QL" qualifier in the associated data table.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Yes, noted above in section 6.b.v.

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

Sample results were usable for project purposes with some qualifications for out of control QC.

c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

Yes, surrogate frequencies were met for all samples.

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

**AK101**
The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163920003, -4, -11, -12, and -14. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries exceeded QC goals. The GRO result for sample 1155871-14 was flagged "QH" for high surrogate recovery as this sample did not require a dilution. Samples 1163920-3, -4, -11, and -12 required a dilution in order to bring the target analyte within calibration range. Reported results for these samples were at least 100 X above the standard GRO LOQ so no data qualifiers were added to these results.

**AK102/103**

The AK102 surrogate 5a-androstane was low and did not meet percent recovery laboratory QC goals in samples 1163920014, and -15. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the DRO LOQ so no data qualifiers were added to these results.

The AK103 surrogate n-triacontane was low and did not meet percent recovery laboratory QC goals in samples 1163920003, -14, -15, and -16. The case narrative noted matrix interference and dilutions as the reasons the surrogate recoveries did not meet QC goals. Reported results for these samples were ten times above the RRO LOQ so no data qualifiers were added to these results.

**8260**

CCV 1338409, in analytical batch VMS 15989, surrogate recoveries for toluene-d8 and 4-bromofluorobenzene are high and do not meet laboratory QC goals. The results associated with these surrogates met laboratory QC goals except hexachlorbutadiene. No associated samples were detected for this analyte and the surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

LCS 1338005, in prep batch VXX 29161, surrogate recovery for toluene-d8 is high and does not meet laboratory QC goals. The % recovery results associated with this surrogate met laboratory QC goals. The surrogate results in the associated samples met all laboratory QC goals. Results are not affected.

1163920012(16AT01TARG49SS) field surrogate recovery for 4-bromofluorobenzene is high and does not meet laboratory QC goals. Sample was also run at a dilution of 10x but not reported. The case narrative suggested that the surrogate result was high due to matrix interference but the internal standards met method QC goals for the sample and no manual integration was performed on the surrogate. Detected results, 1,3,5-trimethylbenzene and 4-isopropyltoluene, were qualified with a "QH" flag in the data table.

**8270**

Samples 1163920-3 and -15 surrogate recoveries for terphenyl-d14 are high and not meet laboratory QC goals. Results associated with this surrogate were not detected above the detection limit in the samples therefore results are not affected and no data qualification was added to the table.

□Yes x□ No □NA (Please explain.) Comments:

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, noted above in section 6.c.ii.

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

Comments:

Sample results were usable for project purposes with some qualifications for out of control QC.

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

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

□Yes x□ No □NA (Please explain.) Comments:

There were three trip blanks in this SDG: TB070516-3, TB070516-4, and TB070516-5.

**TB070516-3** is associated with 1163920011(16AT01TARG50SS), 1163920012(16AT01TARG49SS), and 1163920016(16AT01POLG09SS).

**TB070516-4** is associated with 1163920013(16AT01POLG29SS), 1163920014(16AT01POLG21SS), 1163920015(16AT01POLG25SS), and 1163920020(16AT01POLG28SS).

**TB070516-5** is associated with 1163920001(16AT01POLG31SS), 1163920002(16AT01POLG32SS), 1163920003(16AT01POLG33SS), 1163920004(16AT01POLG34SS), 1163920005(16AT01POLG35SS), 1163920008(16AT01TARG44SS), 1163920009(16AT01POLG37SS), and 1163920010(16AT01POLG38SS).

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)

x□Yes □ No □NA (Please explain.) Comments:

Yes, all samples were in cooler 071416-2

iii. All results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

Yes, all three trip blanks results were "ND" for the 8260 analytes and the AK101 GRO.

iv. If above PQL, what samples are affected?

Comments:

NA as nothing was detected in any of the three trip blanks.

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

Comments:

All results were usable for project making decisions with respect to trip blanks

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

Field duplicates exceeded the frequency goals as three samples were submitted in this SDG that are field duplicates.

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all field dups were unknown to the lab. |
|---|

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

□Yes x□ No □NA (Please explain.) Comments:

| Field dup 1163920010 (16AT01POLG38SS) met precision goals for ten analytes and exceeded the 50 % limit for lead and PCB 1254. There were also three analytes in the 8270 list that were reported below the LOQ as a "J" in the Primary sample and were "ND" in the duplicate. These analytes were Benzo(b)fluoranthene, Benzo(g,h,i)perylene, and Phenanthrene. All of these analytes that did not meet the precision goal of 50% were flagged with a "QN" in the associated data table except for analytes with one or both results below the LOQ had the RPDs calculated but neither result was flagged. There is a lower degree of analytical accuracy at concentrations less than the LOQ.<br><br>Field dup 1163920011 (16AT01TARG50SS) met precision goals for eight detected analytes. There was one analyte, 1,3,5-trimethylbenzene, in the 8260 list that was reported below the LOQ as a "J" in the Primary sample and was "ND" in the duplicate. 4-isopropyltoluene was reported above the LOQ in the primary sample and was "ND" in the duplicate. Both of these analytes were flagged with a "QH" qualifier in the primary sample for a high field surrogate recovery of BFB so no additional qualification was applied to either the primary or the duplicate sample for these analytes. Naphthalene was reported below the LOQ as a "J" in the duplicate but was "ND" in the primary sample with a "QL" qualifier due to a low CCV. No additional qualification was applied to either the primary or duplicate result for naphthalene. |
|---|

| **RPD Comments cont.**<br>Field dup 1163920013 (16AT01POLG29SS) met precision goals for seven detected analytes. Chromium had RPD result of 55 %. Trans-1,3-Dichloropropene and 1,1,2-Trichloroethane were reported as detections in the duplicate sample but the laboratory chromatogram in the level IV data report does not support these results. These analytes were "ND" in the primary sample thus no additional qualification was added to the data table. GRO was detected as a "J" value in the primary sample and was "ND" in the sample duplicate. Analytes with one or both results below the LOQ had the RPDs calculated but neither result was flagged due to there is a lower degree of analytical accuracy at concentrations less than the LOQ. |
|---|

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

Comments:

| Field duplicate data was usable for project decision making purposes as all of the flagged analytes were considerably below the PALs. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA |

ii. If above PQL, what samples are affected?

Comments:

| |
|---|
| NA |

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

Comments:

| |
|---|
| NA |

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

a. Defined and appropriate?

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

| |
|---|
| ACOE data flagging convention used in the associated data tables. |

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/4/16

CS Report Name: Attu Island Removal Action Report Date: 08/19/2016

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163921

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage Alaska

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      □x Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, sixteen primary samples, one field duplicate, one BMS/BMSD, and two trip blanks were requested for AK101, AK102/103, 8082, 8260B, 8270D, and RCRA8 metals. The trip blanks were only requested for AK101 and 8260B.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      □x Yes □ No □NA (Please explain.) Comments:

      Cooler 071416-1 was received on 7/14/16 at a temperature of 3.5 ° C. SDG 11663922 was also contained in the same sample cooler as it has the same cooler ID, 071416-1, listed on the COC.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

All sample preservatives met method requirements. Volatiles soils were received in methanol and SVOCs, DRO/RRO, RCRA8 metals, and PCBs were received unpreserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

All samples were received in good condition. No documentation of broken or leaking sample jars was associated with this SDG.

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 x□ No □NA (Please explain.) Comments:

No discrepancies were associated with this SDG in relation to the sample receipt documentation.

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

Data quality met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

Yes, case narrative outlined several quality control outliers in the associated SDG.

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

**AK101**
The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163921003(16AT01TARG06SS), and -4(16AT01TARG07SS). The case narrative noted matrix interference as the reason the surrogate recoveries exceeded QC goals. The samples were not re-analyzed to confirm the matrix effect. The GRO result for samples 1163921-3 and -4 were flagged "QH" for high surrogate recovery in the data table.

**AK102**
The AK102 surrogate 5a-androstane was low and did not meet percent recovery laboratory QC goals in samples 1163921002(16AT01TARG05SS), -3(16AT01TARG06SS), and -4(16AT01TARG07SS). The case narrative noted 40 X dilutions as the reason the surrogate recoveries did not meet QC goals. Reported results for these samples were five times above the DRO LOQs and two times below PALs so no data qualifiers were added to these results.

**8270**
LCS 1337227 in batch XXX35807 recovery for 4-nitroaniline is low and does not meet laboratory QC goals. BMS/BMSD 1163921011/12 met recoveries goals for this analyte. No LCSD was prepped for this prep batch. Results for this analyte in the associated data table were flagged with a "QL" except sample 1163921010(16AT01TARG13SS) which is the parent sample of the BMS/BMSD.

Samples 1163921002, -3, -4 and -6 were analyzed at a dilution due to matrix interference in the samples. Results have elevated LOQs for all analytes. Several "ND" results exceeded PALs. These results are bolded in the associated data table.

**6020**
BMS/BMSD 1163921011/12 recoveries for chromium are high and do not meet laboratory QC goals. The post digestion spike did meet laboratory QC goals. Results for this analyte in the parent sample 1163921010(16AT01TARG13SS) may be biased high and were flagged with the "QH" qualifier in the associated data table.

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.) Comments:

No corrective actions were necessary in this SDG.

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

All results were usable for project making decisions.

5. Samples Results
a. Correct analyses performed/reported as requested on COC?
x□Yes □ No □NA (Please explain.) Comments:

Yes, sample results were identical to the requested analyses listed in the COC.

b. All applicable holding times met?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all method holding times were achieved by the laboratory.

c. All soils reported on a dry weight basis?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all results are dry weight corrected.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
□Yes x□ No □NA (Please explain.) Comments:

**8270**
All n-nitrosodimethylamine "ND" results for all samples were greater than the ADEC PALs. Samples 1163921002, -3, -4 and -6 did not meet PALs for several analytes due to sample dilutions. Results are bolded in the associated data table.

e. Data quality or usability affected?

Comments:

| All results were usable for project making decisions. |
|---|

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB frequencies were met for all methods. |
|---|

ii. All method blank results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, MBs achieved all laboratory QC goals in this SDG. |
|---|

iii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

Comments:

| All results were usable for project making decisions with regards to the method blanks in this SDG. |
|---|

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)

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS/LCSD frequencies were met for all methods. |
|---|

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS frequencies were met for all inorganic methods. |
|---|

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
□Yes x□ No □NA (Please explain.) Comments:

**8270**
SVOC LCS 1337227 in batch XXX35807 recovery for 4-nitroaniline is low and does not meet laboratory QC goals. BMS/BMSD 1163921011/12 met recoveries goals for this analyte. No LCSD was prepped for this prep batch. Results for this analyte in the associated data table were flagged with a "QL" except sample 1163921010(16AT01TARG13SS) which is the parent sample of the BMS/BMSD.

**6020**
BMS/BMSD 1163921011/12 recoveries for chromium are high and do not meet laboratory QC goals. The post digestion spike did meet laboratory QC goals. Results for this analyte in the parent sample 1163921010(16AT01TARG13SS) may be biased high and were flagged with the "QH" qualifier in the associated data table.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
x□Yes □ No □NA (Please explain.) Comments:

Yes, all LCS/LCSD and BMS/BMSD met method precision goals for all method in the SDG.

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

**8270**
All sample results for 4-nitroaniline in the associated data table were flagged with a "QL" except sample 1163921010(16AT01TARG13SS) which is the parent sample of the BMS/BMSD.

**6020**
Results for chromium in the parent sample 1163921010(16AT01TARG13SS) may be biased high and were flagged with the "QH" qualifier in the associated data table.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Yes, noted above in section 6 b v.

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

Sample results were usable for project purposes with some qualifications for out of control QC.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

| Yes, surrogate frequencies were met for all samples. |
|---|

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
□Yes x□ No □NA (Please explain.) Comments:

| **AK101**<br>The AK101 field surrogate 4-bromofluorobenzene was high and did not meet laboratory QC goals in samples 1163921003(16AT01TARG06SS), and -4(16AT01TARG07SS). The case narrative noted matrix interference as the reason the surrogate recoveries exceeded QC goals. The samples were not re-analyzed to confirm the matrix effect. The GRO result for samples 1163921-3 and -4 were flagged "QH" for high surrogate recovery in the data table.<br>**AK102**<br>The AK102 surrogate 5a-androstane was low and did not meet percent recovery laboratory QC goals in samples 1163921002(16AT01TARG05SS), -3(16AT01TARG06SS), and -4(16AT01TARG07SS). The case narrative noted 40 X dilutions as the reason the surrogate recoveries did not meet QC goals. Reported results for these samples were five times above the DRO LOQs and two times below PALs so no data qualifiers were added to these results. |
|---|

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

| Yes, noted above in section 6 c ii. |
|---|

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

| All results were usable for project making decisions with some qualification for surrogates that did not meet QC goals. |
|---|

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)
x□Yes □ No □NA (Please explain.) Comments:

| Yes, there were two trip blanks in this SDG. Results were reported for 8260 and AK101 (GRO). |
|---|

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)
x□Yes □ No □NA (Please explain.) Comments:

There were two trip blanks in this SDG: TB070516-1, and TB070516-2.

TB070516-1 is associated with 1163921002(16AT01TARG05SS), 1163921003(16AT01TARG06SS), 1163921004(16AT01TARG07SS), 1163921005(16AT01TARG21SS), 1163921006(16AT01TARG09SS), 1163921007(16AT01TARG32SS), 1163921009(16AT01TARG12SS), 1163921010(16AT01TARG13SS), 1163921013(16AT01TARG14SS), 1163921014(16AT01TARG15SS), 1163921015(16AT01TARG16SS), 1163921016(16AT01TARG17SS), 1163921017(16AT01TARG18SS), 1163921018(16AT01TARG19SS), and 1163921019(16AT01TARG20SS).

TB070516-2 is associated with 1163921001(16AT01TARG27SS), and 1163921008(16AT01TARG06SS).

iii. All results less than PQL?
x□Yes □ No □NA (Please explain.) Comments:

Yes, both trip blanks results were "ND" for the 8260 analytes and the AK101 GRO analysis.

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

NA as nothing was detected in any of the two trip blanks.

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

All results were usable for project making decisions with respect to trip blanks.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
x□Yes □ No □NA (Please explain.) Comments:

One field duplicate, 1163921014(16AT01TARG15SS), of sample 1163921013(16AT01TARG14SS) was submitted in this SDG along with 16 primary samples.

ii. Submitted blind to lab?
x□Yes □ No □NA (Please explain.) Comments:

Yes, all field dups were unknown to the lab.

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

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

Where $R_1$ = Sample Concentration
$R_2$ = Field Duplicate Concentration

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the RPDs for the SDG were all under 50%. |
|---|

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

Comments:

| Yes, all data is usable in respect to field duplicate precision results. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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

a. Defined and appropriate?

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

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/07/2016

CS Report Name: Attu Island Removal Action Report Date: 08/09/2016

Consultant Firm: Bristol Environmental Remediation Services/USACE Alaska District (COE)

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163922

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      □x Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the CoC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Yes, 19 primary soil samples, one field duplicate, and one BMS/BMSD were requested for DRO/RRO analysis on the COC.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      Cooler 071416-1 was received on 7/14/16 at a temperature of 3.5 ° C. SDG 11663921 was also contained in the same sample cooler as it has the same cooler ID, 071416-1, listed on the COC.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All sample preservatives met method requirements. DRO/RRO soils were received unpreserved. |

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| All samples were received in good condition. No documentation of broken or leaking sample jars was associated with this SDG. |

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.?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Sample 1163922015(16A01TARG35SS) had two jars listed on the COC. One of the jars was noted to have an incorrect label and or lid that did not match the COC. Initial note on the sample receipt form indicated that the second jar was logged in per the information on the COC. A second note on 7/15/16 by VLP explains that the second jar was set aside as "extra volume" if needed. The Sample Containers and Preservatives page of the report (page 331) only lists an "A" container for sample 39222-15. |

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

| |
|---|
| No, sample 1163922015(16A01TARG35SS) second jar appears to have been set aside by the lab and not used for sample analysis. According to the lab results sample prep XXX35804 was conducted on the jar labeled "A" which did not have a discrepancy associated with it. The re-extract batch XXX35917 does not have a container ID field filled out in the report on page 29. The data reviewer contacted the laboratory PM who confirmed via email (11/7/16) that the "A" container was rescheduled in the laboratory computer data base for re-exaction. All other samples met all criteria in regards to sample receipt, login, preservation, and containers. |

4. <u>Case Narrative</u>
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, the case narrative adequately outlined the quality control outliers in the associated SDG. |

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

x□Yes □ No □NA (Please explain.) Comments:

**AK102/103**

The AK102/103 DRO/RRO extractable surrogate recoveries in preparatory batch XXX35804 are low and do not meet laboratory QC goals in all samples and quality control samples except 1163922022(16AT01TARG22SS). The entire batch minus sample -22 was re-extracted past the fourteen-day method hold time in preparatory batch XXX35917. The re-extracted sample results confirmed the initial in hold results. Both data sets were included in the laboratory report. The initial low surrogate, in hold results are in the data table with a "QL" flag.

**AK102/103 cont.**

The AK103 RRO % recovery for sample 1163922009 BMSD (16AT01TARG29SS) is high and does not meet laboratory QC goals. MS meets QC goals as does the LCS and LSCD. Results for the parent sample, 1163922007 (16AT01TARG29SS), are flagged with a "QN" in the associated data table.

The AK102 DRO surrogate % recovery for sample 1163922005 (16AT01TARG04SS) is low and does not meet laboratory QC goals in the re-extraction batch XXX35917. The sample was diluted at a twenty times dilution which potentially could have diluted out the surrogate. The initial low surrogate, in hold results are in the data table with a "QL" flag.

c. Were all corrective actions documented?

□Yes x□ No □NA (Please explain.) Comments:

There was no formal documented CAR concerning the low extractable surrogates for prep batch XXX35804 in all samples expect 1163922022. The PM responded via email that a meeting was conducted but no formal written document was completed. All samples with low surrogates were re-extracted in XXX35917 and included in the laboratory report without an "H" flag qualifier.

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

Comments:

Results are useable for project making decision with the appropriate data qualification.

5. Samples Results

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, sample results were identical to the requested analyses listed in the COC.

b. All applicable holding times met?

□Yes x□ No □NA (Please explain.) Comments:

Sample re-extracts XXX35917 were extracted past the 14-day method hold time. These results are considered potentially biased low and were only used to confirm the initial in hold results with low surrogate. Both results are included in the laboratory report.

c. All soils reported on a dry weight basis?

x□Yes □ No □NA (Please explain.) Comments:

Yes, all results are dry weight corrected.

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, laboratory LOQs meet all PALs for the SDG. |
|---|

e. Data quality or usability affected?

Comments:

| All in hold results were usable for project making decisions. |
|---|

6. QC Samples

a. Method Blank

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

x□Yes □ No □NA (Please explain.) Comments:

| Yes, MB frequencies were met for AK102/103 method. |
|---|

ii. All method blank results less than PQL?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, MBs achieved all laboratory QC goals in this SDG. |
|---|

iii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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)

x□Yes □ No □NA (Please explain.) Comments:

| Yes, LCS/LCSD frequencies were met for the AK102/103 method. |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| No inorganic analysis was requested on the COC for this SDG. |
|---|

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
□Yes x□ No □NA (Please explain.) Comments:

The AK103 RRO % recovery for sample 1163922009 BMSD (16AT01TARG29SS) is high and does not meet laboratory QC goals.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
x□Yes □ No □NA (Please explain.) Comments:

Precision (RPD) goals were meet for all LCS/LCSDs and BMS/BMSDs in the SDG.

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

Results for the parent sample, 1163922007 (16AT01TARG29SS), are flagged with a "QN" in the associated data table for the high % recovery in the BMSD. This sample already had a "QL" flag on it for the low surrogate recovery. This flag was adjusted to "QN" to represent the high % analyte recovery and low surrogate in the BMSD.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Yes, see section 6. b.5.

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

Sample results were usable for project purposes with some qualifications for out of control BMSD QC results.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
x□Yes □ No □NA (Please explain.) Comments:

Yes, surrogate frequencies were met for all samples.

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

□Yes x□ No □NA (Please explain.) Comments:

| |
|---|
| The AK102/103 DRO/RRO extractable surrogate recoveries in preparatory batch XXX35804 are low and do not meet laboratory QC goals in all samples and quality control samples except 1163922022(16AT01TARG22SS). The entire batch minus sample -22 was re-extracted past the fourteen-day method hold time in preparatory batch XXX35917. The re-extracted sample results confirmed the initial in hold results. Both data sets were included in the laboratory report. The initial low surrogate, in hold results are in the data table with a "QL" flag. |

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

x□Yes □ No □NA (Please explain.) Comments:

| |
|---|
| Yes, all sample results are flagged with a "QL" qualifier in the associated data table minus the results for sample 1163922022 which met all surrogate QC goals and parent sample 1163922007 which also had a high % recovery for RRO. This sample result was flagged with a "QN" in the data table. |

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

Comments:

| |
|---|
| All results were usable for project making decisions with some qualification for surrogates that did not meet QC goals. |

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

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

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| No volatile analyses were requested in this SDG so no trip blank was needed. |

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 x□NA (Please explain.) Comments:

| |
|---|
| NA |

iii. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| |
|---|
| NA |

iv. If above PQL, what samples are affected?

Comments:

| |
|---|
| NA |

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

Comments:

| NA |
|---|

e. Field Duplicate

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

x□Yes □ No □NA (Please explain.) Comments:

| One field duplicate, 1163922020(16AT01TARG40SS), of sample 1163921019(16AT01TARG39SS) was submitted in this SDG along with 19 primary samples. |
|---|

ii. Submitted blind to lab?

x□Yes □ No □NA (Please explain.) Comments:

| Yes, all field dups were unknown to the lab. |
|---|

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

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

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

x□Yes □ No □NA (Please explain.) Comments:

| Yes, the RPD for DRO was 11% and the RPD for RRO was 11%. |
|---|

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

Comments:

| Yes, all data is usable in respect to field duplicate precision results. |
|---|

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

□Yes x□ No □NA (Please explain.) Comments:

| No equipment blank was run with this SDG. The equipment blanks were run the following day on 07/07/16. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
   a. Defined and appropriate?
      x□Yes □ No □NA (Please explain.) Comments:

| ACOE data flagging convention used in the associated data tables. |
|---|

# Laboratory Data Review Checklist

Completed by: Troy Engstrom

Title: Project Chemist Date: 11/09/2016

CS Report Name: Attu Island Removal Action Report Date: 09/12/2016

Consultant Firm: Bristol Environmental Remediation Services

Laboratory Name: SGS North America Inc. Laboratory Report Number: 1163952

ADEC File Number: ADEC RecKey Number:

1. Laboratory
   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
      x□Yes □ No □NA (Please explain.) Comments:

      Samples were received and analyzed by SGS North America in Anchorage, Alaska.

   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 x□NA (Please explain.) Comments:

      No samples were subcontracted.

2. Chain of Custody (COC)
   a. COC information completed, signed, and dated (including released/received by)?
      x□ Yes □ No □NA (Please explain.) Comments:

      Yes, sample custody was documented with a signature and date in the appropriate box on the COC.

   b. Correct analyses requested?
      x□Yes □ No □NA (Please explain.) Comments:

      Two primary composite samples were requested for RCRA 8 TCLP analysis by 6020. The case narrative noted that total lead by 6020 was added per client request on 7/22/16 to both primary samples.

3. Laboratory Sample Receipt Documentation
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
      x□Yes □ No □NA (Please explain.) Comments:

      One cooler labeled 071516-1 was received on 7/15/16 at a temperature of 3.6 ° C.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
x□Yes □ No □NA (Please explain.) Comments:

Samples were received with no preservative which is the correct container and preservative for the requested analysis.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
x□Yes □ No □NA (Please explain.) Comments:

All samples were documented that they were received in good condition with no preservation.

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 x□ No □NA (Please explain.) Comments:

No discrepancies were documented with the receipt of the SDG.

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

Data quality met all criteria in regards to sample receipt, login, preservation, and containers.

4. Case Narrative
a. Present and understandable?
x□Yes □ No □NA (Please explain.) Comments:

Yes, the case narrative adequately outlined the quality control outliers in the associated SDG.

b. Discrepancies, errors or QC failures identified by the lab?
x□Yes □ No □NA (Please explain.) Comments:

**6020A**

TCLP leachate blank 1338180 had chromium detected above the LOQ at 0.210 mg/L. Project samples with detections of chromium within ten times of the LOQ that were associated with this leachate blank were flagged with a "B" qualifier in the data table.

1339360 MS (1163952003) percent recovery for total lead was high and did not meet laboratory QC goals. 1339361 MSD (1163952003) percent recovery for total lead was low and did not meet laboratory QC goals. The MS/MSD percent RPD exceeded the laboratory's less than 20 percent goal for precision. The case narrative suggested that the parent sample, 16AT01BATSPG01IDW may be non-homogenous. Results in the parent sample were flagged with a "QN" in the associated data table.

1339363 DUP (1163952003) RPD for total lead was greater than the laboratory's goal of 20%. The case narrative suggested that the parent sample, 16AT01BATSPG01IDW may be non-homogenous. Results in the parent sample were flagged with a "QN" in the associated data table.

c. Were all corrective actions documented?
□Yes □ No x□NA (Please explain.) Comments:

| No corrective actions were associated with this SDG. |
|---|

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

| Sample results were usable for project purposes with some qualifications for out of control QC. |
|---|

5. Samples Results
   a. Correct analyses performed/reported as requested on COC?
   x□Yes □ No □NA (Please explain.) Comments:

| Two primary samples were requested for RCRA 8 TCLP analysis by 6020. The case narrative noted that total lead by 6020 was added per client request on 7/22/16 to both primary samples. |
|---|

   b. All applicable holding times met?
   x□Yes □ No □NA (Please explain.) Comments:

| All sample hold times were achieved in the SDG. |
|---|

   c. All soils reported on a dry weight basis?
   □Yes x□ No □NA (Please explain.) Comments:

| Total lead results were reported on a dry weight basis. TCLP RCRA 8 metals results were reported in mg/L. |
|---|

   d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?
   x□Yes □ No □NA (Please explain.) Comments:

| Reporting levels for this SDG met all associated PALs for total lead and TCLP RCRA 8 metals. |
|---|

   e. Data quality or usability affected?
   Comments:

| Sample results were usable for project purposes. |
|---|

6. QC Samples
   a. Method Blank
      i. One method blank reported per matrix, analysis and 20 samples?
      x □Yes □ No □NA (Please explain.) Comments:

| Yes, MB and LB frequencies were met for all methods. |
|---|

ii. All method blank results less than PQL?
□Yes x□ No □NA (Please explain.) Comments:

TCLP leachate blank 1338180 had chromium detected above the LOQ at 0.210 mg/L. Project samples with detections of chromium within ten times of the LOQ that were associated with this leachate blank were flagged with a "B" qualifier in the data table.

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

Project sample 1163952002 (16AT01BATSPG02IDW) had a detection of chromium at 0.145 mg/L J. This result was flagged with a "B" qualifier in the data table.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
x□Yes □ No □NA (Please explain.) Comments:

Yes, sample 1163952002 was flagged with a "B" qualifier for the chromium result in the data table.

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

Sample results were usable for project purposes with some qualifications for QC that did not meet laboratory goals.

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 x□NA (Please explain.) Comments:

No organic analysis was requested on the COC.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
x□Yes □ No □NA (Please explain.) Comments:

Yes, LCS and sample duplicate frequencies were met for method EPA 6020.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
□Yes x□ No □NA (Please explain.) Comments:

1339360 MS (1163952003) percent recovery for total lead was high and did not meet laboratory QC goals. 1339361 MSD (1163952003) percent recovery for total lead was low and did not meet laboratory QC goals.

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

□Yes x□ No □NA (Please explain.) Comments:

1133960/1133961(16AT01BATSPG01IDW) MS/MSD percent RPD for total lead exceeded the laboratory's less than 20 percent goal for precision.

1339363 DUP (1163952003) RPD for total lead was greater than the laboratory's goal of 20%.

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

Comments:

Sample 1163952003(16AT01BATSPG01IDW), the parent sample of MS/MSD (1133960/1133961) and sample duplicate 1339363, was flagged with a "QN" in the associated data table for total lead.

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

x□Yes □ No □NA (Please explain.) Comments:

Yes, the sample 1163952003(16AT01BATSPG01IDW) was flagged with an unknown bias flag, "QN" for the 6020 total lead results.

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

Comments:

Sample results were usable for project purposes with some qualifications for QC that did not meet laboratory goals.

c. Surrogates – Organics Only

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

□Yes □ No x□NA (Please explain.) Comments:

There were no organic analyses requested on the COC.

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

□Yes □ No x□NA (Please explain.) Comments:

NA

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

□Yes □ No x□NA (Please explain.) Comments:

NA

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

Comments:

| NA |
|---|

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

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

□Yes □ No x□NA (Please explain.) Comments:

| There were no volatile analyses requested on the COC. |
|---|

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 x□NA (Please explain.) Comments:

| NA |
|---|

iii. All results less than PQL?

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

| NA |
|---|

iv. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

e. Field Duplicate

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

□Yes x□ No □NA (Please explain.) Comments:

| No field duplicate was collected. Samples were 2 composite samples from a single stockpile. |
|---|

ii. Submitted blind to lab?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

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

Where $R_1$ = Sample Concentration
$R_2$ = Field Duplicate Concentration

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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

□Yes □ No x□NA (Please explain.) Comments:

| Samples were from a stockpile. |
|---|

i. All results less than PQL?

□Yes □ No x□NA (Please explain.) Comments:

| NA |
|---|

ii. If above PQL, what samples are affected?

Comments:

| NA |
|---|

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

Comments:

| NA |
|---|

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

a. Defined and appropriate?

x□Yes □ No □NA (Please explain.) Comments:

| ACOE data flagging convention used in the associated data tables. |
|---|

**ATTACHMENT 3**

Laboratory Certifications

THE STATE of ALASKA
GOVERNOR BILL WALKER

**Department of Environmental Conservation**

DIVISION OF ENVIRONMENTAL HEALTH
Environmental Health Laboratory

5251 Dr. Martin Luther King Jr. Ave.
Anchorage, Alaska 99507-1293
Main: 907.375.8200
Fax: 907.929.7335
www.dec.alaska.gov

December 11, 2015

Heather Hall
SGS North America, Inc.
200 W. Potter Drive
Anchorage, AK 99518

Reference: FY2015 Contaminated Sites Approval, #UST-005

Ms. Hall:

Thank you for submitting an application to the Alaska Department of Environmental Conservation's (DEC) Laboratory Certification Program (LCP), for renewal of your Alaska Contaminated Sites (CS) Laboratory Approval.

Based on the materials reviewed to date, SGS North America, Inc., located at 200 West Potter Drive in Anchorage, AK, is granted ***Full approval*** to perform the analyses listed in the attached *State of Alaska Scope of Accreditation*, for Alaska CS projects, including UST/LUST, under the January 30, 2003 revision of 18 AAC 78. Approval Status may be upgraded or downgraded upon full review of the renewal application, supporting materials, and any additionally requested documentation.

Be aware that method detection limit (MDL) data must be retained on file for each method and instrument for which you are maintaining or seeking approval under the AK CS Program. The data may be subject to inspection at any time.

Please remember your expiration date is 12/18/2016. The required documentation must be submitted for renewal no earlier than 90 days and no later than 30 days before your date of expiration. The application, fees, and the latest revision of the quality assurance manual must be received during this window. Proficiency test (PT) results must be performed less than 90 days before expiration, and must be submitted from the vendor to the LCP before the expiration date. Please remember to include the laboratory's ID number, listed above, on ALL correspondence concerning the laboratory, and on all data transmittals.

A copy of the application may be downloaded from: http://www.state.ak.us/dec/eh/lab/cs/csapproval.htm

If you have any questions, please contact the LCP at (907)375-8200, or at the following email address: declabcert@alaska.gov.

Respectfully,

Shera Hickman
Alaska CS Lab Approval Officer

Attachments: Certificate, Scope of Approval

# THE STATE OF ALASKA

**Department of Environmental Conservation**
**Laboratory Certification Program**

*Certificate of Approval for Contaminated Sites Analysis*

## SGS North America, Inc.

**200 W. Potter Drive**
**Anchorage, AK 99518**

**UST-005**

has complied with the provisions set forth in 18 AAC 78 and is hereby recognized by The Department of Environmental Conservation as **Fully Approved** for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective **12/11/2015**, and expires **12/18/2016**.

Patryce D. McKinney
State of Alaska Certification Authority

Shera Hickman
Laboratory Approval Officer

# THE STATE OF ALASKA
## Department of Environmental Conservation
## Laboratory Approval Program

## Scope of Approval

**Expiration: 12/18/2016**

**SGS North America Inc.-Anchorage, AK** **UST-005**
**200 W. Potter Drive**
**Anchorage, AK 99518**

is approved by the State of Alaska Department of Environmental Conservation, pursuant to 18 AAC 78, to perform analysis for the parameters listed below using the analytical methods indicated. Approval for all parameters is final. Approval is for the latest version of a method unless specified otherwise in a note. EPA refers to the U.S. Environmental Protection Agency. AK refers to Alaska Methods 101, 102 and 103 for the determination of gasoline, diesel and residual range organics in soil and water. ASTM refers to the American Society for Testing and Materials.

### Contaminated Sites

| Method/Test Name | Reference | Analyte | Matrix | Status |
|---|---|---|---|---|
| 6020A | EPA | Total Arsenic | Soil | Approved |
| 6020A | EPA | Total Barium | Soil | Approved |
| 6020A | EPA | Total Cadmium | Soil | Approved |
| 6020A | EPA | Total Chromium | Soil | Approved |
| 6020A | EPA | Total Lead | Soil | Approved |
| 6020A | EPA | Total Nickel | Soil | Approved |
| 6020A | EPA | Total Vanadium | Soil | Approved |
| 6020A | EPA | Total Arsenic | Water | Approved |
| 6020A | EPA | Total Barium | Water | Approved |
| 6020A | EPA | Total Cadmium | Water | Approved |
| 6020A | EPA | Total Chromium | Water | Approved |
| 6020A | EPA | Total Lead | Water | Approved |
| 6020A | EPA | Total Nickel | Water | Approved |
| 6020A | EPA | Total Vanadium | Water | Approved |
| 8021B | EPA | BTEX | Water | Approved |
| 8021B | EPA | Total Volatile Chlorinated Solvents | Water | Approved |
| 8082A | EPA | Polychlorinated Biphenyls-PCB | Soil | Approved |
| 8082A | EPA | Polychlorinated Biphenyls-PCB | Water | Approved |
| 8260B | EPA | BTEX | Soil | Approved |

## Contaminated Sites

| Method/Test Name | Reference | Analyte | Matrix | Status |
|---|---|---|---|---|
| 8260B | EPA | Total Volatile Chlorinated Solvents | Soil | Approved |
| 8260B | EPA | BTEX | Water | Approved |
| 8260B | EPA | Total Volatile Chlorinated Solvents | Water | Approved |
| 8270D | EPA | PAH | Soil | Approved |
| 8270D | EPA | PAH | Water | Approved |
| 8270D-SV | EPA | PAH- small volume by 3520C | Water | Approved |
| AK101 | AK | Gasoline Range Organics | Soil | Approved |
| AK101 | AK | Gasoline Range Organics | Water | Approved |
| AK101/8021B | EPA | BTEX-methanol preserved | Soil | Approved |
| AK101-MS | AK | Gasoline Range Organics | Soil | Approved |
| AK101-MS | AK | Gasoline Range Organics | Water | Approved |
| AK102 | AK | Diesel Range Organics | Soil | Approved |
| AK102 | AK | Diesel Range Organics | Water | Approved |
| AK102-SV | AK | Diesel Range Organics-small volume | Water | Approved |
| AK103 | AK | Residual Range Organics | Soil | Approved |



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

SGS NORTH AMERICA INC. – ALASKA DIVISION[1]
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ENVIRONMENTAL

Valid To: December 31, 2017 Certificate Number: 2944.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2009 TNI Standard, and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.0 of the DoD Quality Systems Manual for Environmental Laboratories) accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

Inductively Coupled Plasma Mass Spectroscopy, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Ion Chromatography, Hazardous Waste Characteristics Tests, Total Organic Carbon

| **Parameter/Analyte** | **Solid & Chemical Materials** | |
|---|---|---|
| | **Aqueous** | **Solid** |
| **Metals** | | |
| Aluminum | EPA 6020A | EPA 6020A |
| Antimony | EPA 6020A | EPA 6020A |
| Arsenic | EPA 6020A | EPA 6020A |
| Barium | EPA 6020A | EPA 6020A |
| Beryllium | EPA 6020A | EPA 6020A |
| Boron | EPA 6020A | EPA 6020A |
| Cadmium | EPA 6020A | EPA 6020A |
| Calcium | EPA 6020A | EPA 6020A |
| Chromium | EPA 6020A | EPA 6020A |
| Cobalt | EPA 6020A | EPA 6020A |
| Copper | EPA 6020A | EPA 6020A |
| Iron | EPA 6020A | EPA 6020A |
| Lead | EPA 6020A | EPA 6020A |
| Magnesium | EPA 6020A | EPA 6020A |
| Manganese | EPA 6020A | EPA 6020A |
| Mercury | EPA 7470A/6020A | EPA 7471B/6020A |
| Molybdenum | EPA 6020A | EPA 6020A |
| Nickel | EPA 6020A | EPA 6020A |



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| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| Potassium | EPA 6020A | EPA 6020A |
| Selenium | EPA 6020A | EPA 6020A |
| Silver | EPA 6020A | EPA 6020A |
| Sodium | EPA 6020A | EPA 6020A |
| Thallium | EPA 6020A | EPA 6020A |
| Vanadium | EPA 6020A | EPA 6020A |
| Zinc | EPA 6020A | EPA 6020A |
| Metals digestion methods<br>toxicity characteristic leaching procedure | EPA 3010A<br>EPA 1311 | EPA 3050B<br>EPA 1311 |
| **Nutrients** | | |
| Nitrate (as N) | EPA 9056A | EPA 9056A |
| Nitrate-nitrite (as N) | EPA 9056A | EPA 9056A |
| Nitrite (as N) | EPA 9056A | EPA 9056A |
| **Demands** | | |
| Total organic carbon | EPA 9060A | EPA 9060A |
| **Wet Chemistry** | | |
| Bromide | EPA 9056A | EPA 9056A |
| Chloride | EPA 9056A | EPA 9056A |
| Fluoride | EPA 9056A | EPA 9056A |
| Sulfate | EPA 9056A | EPA 9056A |
| **Purgeable Organics (volatiles)** | | |
| Acetone | EPA 8260B | EPA 8260B |
| Benzene | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| Bromobenzene | EPA 8260B | EPA 8260B |
| Bromochloromethane | EPA 8260B | EPA 8260B |
| Bromodichloromethane | EPA 8260B | EPA 8260B |
| Bromoform | EPA 8260B | EPA 8260B |
| Bromomethane | EPA 8260B | EPA 8260B |
| 2-Butanone | EPA 8260B | EPA 8260B |
| n-Butylbenzene | EPA 8260B | EPA 8260B |
| sec-Butylbenzene | EPA 8260B | EPA 8260B |
| tert-Butylbenzene | EPA 8260B | EPA 8260B |
| Carbon disulfide | EPA 8260B | EPA 8260B |
| Carbon tetrachloride | EPA 8260B | EPA 8260B |
| Chlorobenzene | EPA 8260B | EPA 8260B |
| Chloroethane | EPA 8260B | EPA 8260B |
| Chloroform | EPA 8260B | EPA 8260B |
| Chloromethane | EPA 8260B | EPA 8260B |
| 2-Chlorotoluene | EPA 8260B | EPA 8260B |
| 4-Chlorotoluene | EPA 8260B | EPA 8260B |
| Dibromochloromethane | EPA 8260B | EPA 8260B |
| 1,2-Dibromo-3-chloropropane (DBCP) | EPA 8260B<br>EPA 8260B SIM | EPA 8260B |

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| Dibromomethane | EPA 8260B | EPA 8260B |
| 1,2-Dibromoethane (EDB) | EPA 8260B<br>EPA 8260B SIM | EPA 8260B |
| 1,2-Dichlorobenzene | EPA 8260B | EPA 8260B |
| 1,3-Dichlorobenzene | EPA 8260B | EPA 8260B |
| 1,4-Dichlorobenzene | EPA 8260B | EPA 8260B |
| Dichlorodifluoromethane | EPA 8260B | EPA 8260B |
| 1,1-Dichloroethane | EPA 8260B | EPA 8260B |
| 1,2-Dichloroethane | EPA 8260B | EPA 8260B |
| 1,1-Dichloroethene | EPA 8260B | EPA 8260B |
| cis-1,2-Dichloroethene | EPA 8260B | EPA 8260B |
| trans-1,2-Dichloroethene | EPA 8260B | EPA 8260B |
| 1,2-Dichloropropane | EPA 8260B | EPA 8260B |
| 1,3-Dichloropropane | EPA 8260B | EPA 8260B |
| 2,2-Dichloropropane | EPA 8260B | EPA 8260B |
| 1,1-Dichloropropene | EPA 8260B | EPA 8260B |
| cis-1,3-Dichloropropene | EPA 8260B | EPA 8260B |
| trans-1,3-Dichloropropene | EPA 8260B | EPA 8260B |
| Ethyl benzene | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| Freon 113 | EPA 8260B | EPA 8260B |
| 2-Hexanone | EPA 8260B | EPA 8260B |
| Hexachlorobutadiene | EPA 8260B | EPA 8260B |
| Isopropylbenzene | EPA 8260B | EPA 8260B |
| 4-Isopropyltoluene | EPA 8260B | EPA 8260B |
| Methylene chloride | EPA 8260B | EPA 8260B |
| 4-Methyl-2-pentanone | EPA 8260B | EPA 8260B |
| Methyl tert-butyl ether | EPA 8260B | EPA 8260B |
| Naphthalene | EPA 8260B | EPA 8260B |
| n-Propylbenzene | EPA 8260B | EPA 8260B |
| Styrene | EPA 8260B | EPA 8260B |
| 1,1,1,2-Tetrachloroethane | EPA 8260B | EPA 8260B |
| 1,1,2,2-Tetrachloroethane | EPA 8260B | EPA 8260B |
| Tetrachloroethene | EPA 8260B | EPA 8260B |
| Toluene | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| 1,2,3-Trichlorobenzene | EPA 8260B | EPA 8260B |
| 1,2,4-Trichlorobenzene | EPA 8260B | EPA 8260B |
| 1,1,1-Trichloroethane | EPA 8260B | EPA 8260B |
| 1,1,2-Trichloroethane | EPA 8260B | EPA 8260B |
| Trichloroethene | EPA 8260B | EPA 8260B |
| Trichlorofluoromethane | EPA 8260B | EPA 8260B |
| 1,2,3-Trichloropropane | EPA 8260B<br>EPA 8260B SIM | EPA 8260B |
| 1,2,4-Trimethylbenzene | EPA 8260B | EPA 8260B |
| 1,3,5-Trimethylbenzene | EPA 8260B | EPA 8260B |
| Vinyl acetate | EPA 8260B | EPA 8260B |
| Vinyl chloride | EPA 8260B | EPA 8260B |

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| Xylenes, total | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| 1,2-Xylene (O-Xylene) | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| 1,3-Xylene & 1,4-Xylene (M+P-Xylene) | EPA 8021B<br>EPA 8260B | EPA 8021B<br>EPA 8260B |
| Volatiles preparation methods<br>Toxicity characteristic leaching procedure<br>zero headspace extraction | EPA 3511<br>EPA 5030B<br>EPA 1311 | EPA 5035A<br>EPA 1311 |
| **Total Petroleum Hydrocarbons (TPH)** | | |
| Gasoline range organics | AK 101 (AK State Method)<br>EPA 8015C | AK 101 (AK State Method)<br>EPA 8015C |
| GRO preparation methods | EPA 5030B | EPA 5035A |
| Diesel range organics | AK 102 (AK State Method)<br>EPA 8015C | AK 102 (AK State Method)<br>EPA 8015C |
| Residual range organics | AK 103 (AK State Method)<br>EPA 8015C | AK 103 (AK State Method)<br>EPA 8015C |
| DRO/RRO preparation methods | EPA 3520C Modified | EPA 3550C |
| **Extractable Organics (semivolatiles)** | | |
| Acenaphthene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Acenaphthylene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Aniline | EPA 8270D | EPA 8270D |
| Anthracene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Azobenzene | EPA 8270D | EPA 8270D |
| Benzoic acid | EPA 8270D | EPA 8270D |
| Benzo (a) anthracene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Benzo (b) fluoranthene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Benzo (k) fluoranthene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Benzo (ghi) perylene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Benzo (a) pyrene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Benzyl alcohol | EPA 8270D | EPA 8270D |
| Bis (2-chloroethoxy) methane | EPA 8270D | EPA 8270D |
| Bis (2-chloroethyl) ether | EPA 8270D | EPA 8270D |
| Bis (2-chloroisopropyl) ether | EPA 8270D | EPA 8270D |
| Bis (2-ethylhexyl) phthalate | EPA 8270D | EPA 8270D |
| 4-bromophenylphenyl ether | EPA 8270D | EPA 8270D |
| Butyl benzyl phthalate | EPA 8270D | EPA 8270D |
| Carbazole | EPA 8270D | EPA 8270D |
| 4-Chloroaniline | EPA 8270D | EPA 8270D |

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| 4-Chloro-3-methylphenol | EPA 8270D | EPA 8270D |
| 1-Chloronaphthalene | EPA 8270D | EPA 8270D |
| 2-Chloronaphthalene | EPA 8270D | EPA 8270D |
| 2-Chlorophenol | EPA 8270D | EPA 8270D |
| 4-Chlorophenyl phenyl ether | EPA 8270D | EPA 8270D |
| Chrysene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Dibenzo (a,h) anthracene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Dibenzofuran | EPA 8270D | EPA 8270D |
| 1,2-Dichlorobenzene | EPA 8270D | EPA 8270D |
| 1,3-Dichlorobenzene | EPA 8270D | EPA 8270D |
| 1,4-Dichlorobenzene | EPA 8270D | EPA 8270D |
| 3,3'-Dichlorobenzidine | EPA 8270D | EPA 8270D |
| 2,4-Dichlorophenol | EPA 8270D | EPA 8270D |
| 2,6-Dichlorophenol | EPA 8270D | EPA 8270D |
| Diethyl phthalate | EPA 8270D | EPA 8270D |
| 2,4-Dimethylphenol | EPA 8270D | EPA 8270D |
| Dimethyl phthalate | EPA 8270D | EPA 8270D |
| di-n-Butyl phthalate | EPA 8270D | EPA 8270D |
| di-n-Octyl phthalate | EPA 8270D | EPA 8270D |
| 2,4-Dinitrophenol | EPA 8270D | EPA 8270D |
| 2,4-Dinitrotoluene | EPA 8270D | EPA 8270D |
| 2,6-Dinitrotoluene | EPA 8270D | EPA 8270D |
| Fluoranthene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Fluorene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Hexachlorobenzene | EPA 8270D | EPA 8270D |
| Hexachlorobutadiene | EPA 8270D | EPA 8270D |
| Hexachlorocyclopentadiene | EPA 8270D | EPA 8270D |
| Hexachloroethane | EPA 8270D | EPA 8270D |
| Indeno (1,2,3-cd) pyrene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Isophorone | EPA 8270D | EPA 8270D |
| 1-Methylnaphthalene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| 2-Methylnaphthalene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| 2-Methyl-4,6-dinitrophenol | EPA 8270D | EPA 8270D |
| 2-Methylphenol (As O cresol) | EPA 8270D | EPA 8270D |
| 3 & 4-Methylphenol (As P & M cresol) | EPA 8270D | EPA 8270D |
| Naphthalene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| 2-Nitroaniline | EPA 8270D | EPA 8270D |
| 3-Nitroaniline | EPA 8270D | EPA 8270D |
| 4-Nitroaniline | EPA 8270D | EPA 8270D |
| Nitrobenzene | EPA 8270D | EPA 8270D |
| 2-Nitrophenol | EPA 8270D | EPA 8270D |

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| 4-Nitrophenol | EPA 8270D | EPA 8270D |
| N-Nitrosodimethylamine | EPA 8270D | EPA 8270D |
| N-Nitrosodi-n-propylamine | EPA 8270D | EPA 8270D |
| N-Nitrosodiphenylamine | EPA 8270D | EPA 8270D |
| Pentachlorophenol | EPA 8270D | EPA 8270D |
| Phenanthrene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Phenol | EPA 8270D | EPA 8270D |
| Pyrene | EPA 8270D<br>EPA 8270D SIM | EPA 8270D<br>EPA 8270D SIM |
| Pyridine | EPA 8270D | EPA 8270D |
| 1,2,4-Trichlorobenzene | EPA 8270D | EPA 8270D |
| 2,4,5-Trichlorophenol | EPA 8270D | EPA 8270D |
| 2,4,6-Trichlorophenol | EPA 8270D | EPA 8270D |
| **Pesticides/Herbicides/PCBs** | | |
| Aldrin | EPA 8270D SIM | EPA 8270D SIM |
| alpha-BHC | EPA 8270D SIM | EPA 8270D SIM |
| alpha Chlordane | EPA 8270D SIM | EPA 8270D SIM |
| beta-BHC | EPA 8270D SIM | EPA 8270D SIM |
| delta-BHC | EPA 8270D SIM | EPA 8270D SIM |
| gamma-BHC | EPA 8270D SIM | EPA 8270D SIM |
| gamma Chlordane | EPA 8270D SIM | EPA 8270D SIM |
| Chlordane (technical) | EPA 8270D SIM | EPA 8270D SIM |
| 4,4'-DDD | EPA 8270D SIM | EPA 8270D SIM |
| 4,4'-DDE | EPA 8270D SIM | EPA 8270D SIM |
| 4,4',-DDT | EPA 8270D SIM | EPA 8270D SIM |
| Dieldrin | EPA 8270D SIM | EPA 8270D SIM |
| Endosulfan I | EPA 8270D SIM | EPA 8270D SIM |
| Endosulfan II | EPA 8270D SIM | EPA 8270D SIM |
| Endosulfan sulfate | EPA 8270D SIM | EPA 8270D SIM |
| Endrin | EPA 8270D SIM | EPA 8270D SIM |
| Endrin aldehyde | EPA 8270D SIM | EPA 8270D SIM |
| Endrin ketone | EPA 8270D SIM | EPA 8270D SIM |
| Heptachlor | EPA 8270D SIM | EPA 8270D SIM |
| Heptachlor epoxide | EPA 8270D SIM | EPA 8270D SIM |
| Methoxychlor | EPA 8270D SIM | EPA 8270D SIM |
| PCB-1016 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1221 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1232 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1242 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1248 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1254 (Aroclor) | EPA 8082A | EPA 8082A |
| PCB-1260 (Aroclor) | EPA 8082A | EPA 8082A |
| Toxaphene | EPA 8270D SIM | EPA 8270D SIM |
| Semivolatile extraction methods<br>Toxicity characteristic leaching procedure | EPA 3520C Modified<br>EPA 1311 | EPA 3665A / EPA 3550C<br>EPA 1311 |

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| **Hazardous Waste Characteristics** | | |
| Corrosivity | EPA 9040C | EPA 9045D |
| Ignitability | EPA 1020B | ---------- |

[1]In addition, this laboratory meets A2LA R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories for their Mobile Laboratory to perform the following tests:

| Parameter/Analyte | Solid & Chemical Materials | |
|---|---|---|
| | Aqueous | Solid |
| **PCBs** | | |
| PCB-1254 (Aroclor) | ---------- | EPA 3550C/8082A |
| PCB-1260 (Aroclor) | ---------- | EPA 3550C/8082A |

# Accredited Laboratory

A2LA has accredited

## SGS NORTH AMERICA INC. - ALASKA DIVISION

*Anchorage, AK*

for technical competence in the field of

### Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2003 NELAC Chapter 5 Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.0 of the DoD Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 10th day of December 2015.

President & CEO
For the Accreditation Council
Certificate Number 2944.01
Valid to December 31, 2017

*For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.*

# APPENDIX J

Responses to Comments