ALPINE SATELLITE DEVELOPMENT PLAN (ASDP) WATER QUALITY MONITORING 2017
ACRONYMS & ABBREVIATIONS

° C     Degrees Celsius
ADEC    Alaska Department of Environmental Conservation
ASDP    Alpine Satellite Development Plan
CPAI    ConocoPhillips Alaska, Inc.
DO      Dissolved oxygen
DRO     Diesel range organics
FID     Flame ionization detector
GC      Gas chromatography
ICP     Inductively coupled plasma
MS      Mass spectrometry
µS/cm    Microsiemens per centimeter
mS/cm    Millisiemens per centimeter
mg/L    Milligrams per liter
Michael Baker Michael Baker International
NTU     Nephelometric Turbidity Units
pH      Potential of hydrogen
ppt     Parts per thousand
PSS     Practical Salinity Scale
RCRA    Resource Conservation and Recovery Act
RRO     Residual range organics
SG      Silica gel
SGS     SGS North America, Inc.
SU      Standard units
1. INTRODUCTION

The 2017 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring Report presents the results of lake monitoring conducted in August 2017 and September 2017 for ConocoPhillips Alaska, Inc. (CPAI). Annual monitoring of three lakes, lakes L9323, L9324, and M9313, is required by North Slope Borough Ordinance Serial No. 75-6-46, Stipulation IV.2.4.3(h) (NSB 2004). Lakes L9323, L9324, and M9313 have been monitored annually since 2007. An overview of the three study lakes relative to Alpine facilities is presented in Figure 1.1.

During the winter of 1998/1999, CPAI initiated construction of the Alpine Facility, CD1 and CD2, in the Colville River Delta. Alpine operations expanded with the implementation of the ASDP during the 2004/2005 winter season. Construction included placement of gravel facilities for two satellite drill sites, CD3 and CD4. The CD3 development included an airstrip and pad/airstrip access road, apron, and taxiway adjacent to the south side of Lake M9313. The CD4 development included a gravel pad, access road connected to the CD2 access road, and pipeline parallel to the access road connecting to the existing Alpine Pipeline. The CD4 pad is located between Lake L9323 to the north and Lake L9324 to the south. Alpine operations expanded again with the construction of CD5, which included a gravel pad, access road connected to the CD4 access road, and pipeline parallel to the access road connecting to the existing Alpine Pipeline.

Michael Baker International (Michael Baker) field team members conducted in-situ field sampling of the three lakes for turbidity, temperature, conductivity/specific conductance, dissolved oxygen (DO), salinity, and pH. Water samples were collected at each lake for laboratory analyses of dissolved hydrocarbons: diesel range organics (DRO), residual range organics (RRO), and Resource Conservation and Recovery Act (RCRA) metals.
2. METHODS

Field investigations were conducted at lakes L9323, L9324, and M9313 on August 23, 2017 and at Lake M9313 again on September 11, 2017. Soloy Helicopters, LLC provided helicopter access to Lake M9313. An Alpine Environmental pickup truck was used to access lakes L9323 and L9324.

In-situ water quality data measurements and laboratory sample collections were performed at all three lakes by a two-person team on August 23, 2017. Laboratory sample collections were performed again at Lake M9313 by a two-person team on September 11, 2017. The team used inflatable kayaks with an attached support raft for transporting the sampling equipment (Photo 2.1 and Photo 2.2). In-situ water quality instruments were provided by TTT Environmental. Laboratory analyses and sample collection bottles were provided by SGS North America, Inc. (SGS).

Prior to sampling, aerial reconnaissance was conducted to identify possible inflow and outflow sources, and to determine if lakes were hydraulically connected to other nearby surface water sources. It was also confirmed that each lake was well-mixed and lacked definable strata prior to analytic sample collection. Field sampling methods were based on U.S. Geological Survey (USGS 2006), Ward and Harr (1990), and U.S. Army Corps of Engineers (USACE 1987) methods.

Safety precautions were followed, as outlined in the North Slope Water Resources 2017 Health, Safety, and Environmental Plan (Michael Baker 2017a) and the 2017 Summer Hydrology Monitoring – Job Safety Analysis (Michael Baker 2017b). Michael Baker employees worked in groups of two while working on the lakes, and a third person performed wildlife scans from the bank during sampling at Lake M9313. At lakes L9323 and L9324, Michael Baker employees checked in with Alpine security before and after sampling. Personnel were equipped with dry suits and U.S. Coast Guard-approved Type III personal flotation devices during sampling.

Photo 2.1: Equipment used to collect water quality data and samples; August 23, 2017

Photo 2.2: Preparing for sampling at Lake M9313; August 23, 2017
2.1 IN-SITU WATER QUALITY

SAMPLING LOCATIONS

Previous in-situ water quality monitoring of North Slope lakes indicate hydraulically isolated lakes are well-mixed during open water conditions. The likelihood of homogeneous conditions, which are verified at each lake with in-situ measurements, supports the use of single point sampling. For this project, it is assumed data collected at specific locations are representative of conditions throughout the well-mixed water body and thus, water samples collected at a single location are representative of the lake.

Selection of the appropriate location for samples was based on maximum lake depth and relative proximity to gravel facilities. The bathymetry of each lake was used to identify the deepest part of the water body, and a single representative sampling location was selected. The locations of the deepest part of lakes L9323, L9324, and M9313 were confirmed in 2010 using a hand-held sonar depth finder (Michael Baker 2010).

Sampling locations were identified in the field using a handheld global positioning system Garmin Oregon 650t referenced to the World Geodetic System of 1984 coordinate system. The sampling locations for lakes L9323 and L9324 are shown in Figure 2.1. Figure 2.2 shows the sampling location for Lake M9313.
FIGURE: 2.1

Lakes L9323 & L9324
ASDP Water Quality Sampling Locations

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Legend
- Water Quality Sampling Point
- Pipeline
- Road
- Sample Lake
- Facility

[Map showing water quality sampling points, pipelines, roads, and sample lakes]
IN-SITU MEASUREMENTS

In-situ water quality was measured at 1- and 2-foot intervals throughout the water column. A list of water quality parameters collected is presented in Table 2.1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Depth</td>
<td>ft feet</td>
</tr>
<tr>
<td>Turbidity</td>
<td>NTU Nephelometric Turbidity Units</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C degrees Celsius</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/cm microsiemens per centimeter</td>
</tr>
<tr>
<td>Specific Conductance</td>
<td>µS/cm microsiemens per centimeter</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>mg/L milligrams per liter</td>
</tr>
<tr>
<td>Salinity</td>
<td>ppt parts per thousand</td>
</tr>
<tr>
<td>pH</td>
<td>SU standard units</td>
</tr>
</tbody>
</table>

Turbidity refers to the cloudiness of a fluid caused by suspended solids that tend to be invisible to the naked eye. As particles in a fluid will scatter light focused on them, turbidity can be measured by the quantity of reflected light for a given amount of particulates. A Nephelometer is equipped with a detector next to the light beam and is used to measure turbidity. When using a calibrated Nephelometer, the units of turbidity are Nephelometric Turbidity Units (NTU).

Conductivity is a measurement of the water’s ability to carry an electrical current. Dissolved salts (ions) are conductors of electrical current, and conductivity is proportional to the ion concentration (salinity) in an aqueous solution. The salinity is calculated using the in-situ conductivity and temperature, and the conversions defined by the Practical Salinity Scale (PSS) of 1978 (YSI 2012). The PSS is derived for standard seawater with a known ion composition; therefore, using the PSS for freshwater with unknown ion composition provides an estimate of the salinity.

Specific conductance is a metric commonly used to report the concentration of salts in freshwater. Conductivity measurements are temperature dependent. Specific conductance is calculated from in-situ conductivity and temperature using a site-specific temperature correction coefficient. The correction coefficient is determined for a site by relating the conductivity of a sample at the in-situ temperature and the conductivity of the same sample at 25 degrees Celsius (°C). Michael Baker completed this analysis for the Colville River in 2005 resulting in a correction coefficient of 0.0196 (Michael Baker 2006). The recharge of lakes from the Colville River flood waters during spring break-up justifies using the same correction coefficient for the lake measurements.

A. INSTRUMENT CALIBRATION

A YSI 650 MDS handheld unit with YSI 6920 V2 Sonde sensor was calibrated by TTT Environmental according to the manufacturer's specifications. The morning of sampling, the YSI 6920 V2 meter was calibrated for conductivity and pH and checked for DO by Michael Baker field team members as directed by the manufacturer. An optical DO sensor was used for the DO sampling. Prior to each field sampling event, the meter was thoroughly rinsed with lake water.
B. **INSTRUMENT ACCURACY**

The accuracy of the YSI 6920 V2 Sonde sensor is presented in Table 2.2 (YSI 2012).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity</td>
<td>+/- 2% of the reading or 0.3 NTU (whichever is greater)</td>
</tr>
<tr>
<td>Temperature</td>
<td>+/- 0.15°C</td>
</tr>
<tr>
<td>Conductivity</td>
<td>+/- 0.5% of reading + 0.001 mS/cm</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>+/-1% of the reading or 0.1 mg/L (whichever is greater)</td>
</tr>
<tr>
<td></td>
<td>+/-1% of the reading or 1% air saturation (whichever is greater)</td>
</tr>
<tr>
<td>Salinity</td>
<td>+/- 1.0% of reading or 0.1 ppt (whichever is greater)</td>
</tr>
<tr>
<td>pH</td>
<td>+/- 0.2 units</td>
</tr>
</tbody>
</table>

2.2 LABORATORY SAMPLE COLLECTION & ANALYSES

**SAMPLE COLLECTION**

Frequent wind and shallow depths typically prevent oxyclines (notable change in oxygen concentration with depth), haloclines (notable change in salinity with depth), and thermoclines (notable change in temperature with depth) from developing at any of the lakes during the summer. The in-situ water quality measurements confirmed water quality constituents were well-mixed within the water column at each lake; therefore, a representative single point laboratory sample at mid-depth was collected at each sampling location. In the event of significant lake stratification, multiple samples would have been collected throughout the water column and combined for laboratory analysis. Samples were collected from lakes using a 1.6” x 12” disposable polyethylene bailer (350 milliliter capacity). Nitrile gloves were worn during sample collection and changed between samples. A new bailer was used for each lake and discarded after use.

Sample bottles provided by SGS were stored in the provided cooler before, during, and after sample collection to maintain adequate storage temperature and ensure chain of custody procedures were followed. Field samples were transported to SGS within 48 hours of initial sample collection.

**LABORATORY ANALYSES**

The laboratory analyses performed for each water sample included RCRA metals, DRO, and RRO. The laboratory analyses for the samples collected on August 23, 2017 included water samples obtained from lakes L9323, L9324, M9313. The laboratory analyses for the samples collected on September 11, 2017 included water samples obtained from Lake M9313.

A. **SW6020 (RCRA METALS)**

The RCRA metals laboratory analysis method SW6020, developed by the U.S. Environmental Protection Agency Office of Solid Waste, employs inductively coupled plasma– mass spectrometry (ICP-MS) to determine trace elements, including metals in solution (EPA 2006). Elements tested include: arsenic, barium, cadmium, chromium, lead, selenium, and silver. This method measures ions produced by a radio frequency ICP. High temperatures are used to produce ions, which are
then entrained in a plasma gas and extracted. The ions are separated on the basis of their mass-to-charge ratio with a mass spectrometer.

B. AK 102 (Diesel Range Organics)
The AK 102 method for DRO, developed by the Alaska Department of Environmental Conservation (ADEC), is based on a solvent extraction, gas chromatography (GC) procedure for the detection of semi-volatile petroleum products such as diesels. Other non-petroleum compounds of similar characteristics may be detected with this method. Samples spiked with a surrogate (o-Terphenyl) are extracted with methylene chloride. The GC is temperature programmed to facilitate separation of organic compounds detected by a flame ionization detector (FID). Quantification is based on FID response compared to a diesel calibration standard.

C. AK 103 (Residual Range Organics)
The AK 103 method for RRO, developed by ADEC, was originally designed to measure lubricating or motor oils and other heavy petroleum products in soils. The Underground Storage Tanks Procedures (ADEC 2009) identifies the method as adequate for determining such compounds in solution. The method is an extension of ADEC AK 102, employing solvent extractions and GC to identify heavier RRO. Quantification is based on FID response compared to a residuals calibration standard.

D. Silica Gel Cleanup for DRO & RRO
Laboratory samples containing organic plant material are especially susceptible to background biogenic interference and may result in false positive results for DRO or RRO defined petroleum hydrocarbon ranges (ADEC 2006). The silica gel (SG) procedure is recommended by the ADEC in Technical Memorandum 06-001, Biogenic Interference and Silica Gel Cleanup (ADEC 2006) to evaluate the presence and degree of biogenic interference. This procedure is used to preferentially remove biogenic compounds from a sample leaving the non-biodegraded petroleum hydrocarbon compounds. The remaining sample, presumably free of biogenic interference, is then tested for DRO and RRO according to AK 102 and AK 103, respectively.

The laboratory analytical methods for each sampling event are presented in Table 2.3.

<table>
<thead>
<tr>
<th>Analytical Method</th>
<th>Method Description</th>
<th>August 23, 2017</th>
<th>September 11, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lake L9323</td>
<td>Lake L9324</td>
</tr>
<tr>
<td>SW6020A</td>
<td>RCRA Metals by ICP-MS</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>AK 102 &amp; AK 103</td>
<td>DRO &amp; RRO Low Volume Water</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>AK 102 &amp; AK 103</td>
<td>DRO &amp; RRO Water</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>AK 102 &amp; AK 103</td>
<td>DRO &amp; RRO Silica Gel</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
3. RESULTS

3.1 IN-SITU WATER QUALITY – AUGUST 23, 2017

SAMPLING LOCATIONS

A. LAKE L9323

Located east of the Nigliq Channel, Lake L9323 is moderately sized with grassy banks and some taller vegetation on the periphery. Lake L9323 was hydraulically isolated at the time of sampling. No odor or film was observed while sampling the lake.

Photo 3.1: Lake L9323, looking south toward Nigliq Channel and CD4 pad; August 23, 2017

Photo 3.2: Lake L9323, looking west toward Nigliq Channel and CD5 road; August 23, 2017

Photo 3.3: Lake L9323, looking southeast toward culvert battery CD4-29 to CD4-33; August 23, 2017

Photo 3.4: Lake L9323, looking northeast toward culvert battery CD4-20A to CD4-23D; August 23, 2017
B. **LAKE L9324**

Located east of the Nigliq Channel, Lake L9324 is moderately sized with grassy banks and willows. Some large bluffs surround the lake. At the time of sampling, Lake L9324 was hydraulically connected to the South Paleo Lake and Sakoonang Channel. No odor or film was observed while sampling the lake.
C. **LAKE M9313**
Located east of the Ulamnigiaq Channel, Lake M9313 is large with low grassy banks. At the time of sampling on August 23 and September 11, Lake M9313 was connected to some areas of ponded water in adjacent polygons, but flow was not observed between water bodies. No odor or film was observed while sampling the lake.

![Photo 3.9: Lake M9313, looking northeast; August 23, 2017](image1)

![Photo 3.10: Lake L9324, looking northwest toward M0019; August 23, 2017](image2)

![Photo 3.11: Lake M9313, looking southwest toward CD3 pad; August 23, 2017](image3)

![Photo 3.12: Lake M9313, looking south toward CD3 runway; August 23, 2017](image4)
IN-SITU MEASUREMENTS

In-situ measurements were collected throughout the water column at the deepest part of each lake. Based on the relative homogeneity of results in all locations, the study lakes were determined to be well-mixed at the time of sampling. The in-situ water quality results are tabulated in Table 3.1.

<table>
<thead>
<tr>
<th>Lake, Location &amp; Time</th>
<th>Total Depth (ft)</th>
<th>Turbidity (NTU)</th>
<th>Depth (ft)</th>
<th>Temp (°C)</th>
<th>Conductivity (µS/cm)</th>
<th>Specific Conductance (µS/cm)</th>
<th>DO (mg/L)</th>
<th>DO (% Saturation)</th>
<th>Salinity (ppt)</th>
<th>pH</th>
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<td>L9323 N70.2960° W150.9886° 13:52</td>
<td>11.5</td>
<td>0.7</td>
<td>3</td>
<td>8.4</td>
<td>87</td>
<td>129</td>
<td>11.20</td>
<td>93.5</td>
<td>0.06</td>
<td>7.9</td>
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<td></td>
<td></td>
<td></td>
<td>5</td>
<td>8.4</td>
<td>87</td>
<td>129</td>
<td>11.11</td>
<td>93.6</td>
<td>0.06</td>
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<td>8.4</td>
<td>87</td>
<td>129</td>
<td>11.03</td>
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<td>8.4</td>
<td>87</td>
<td>129</td>
<td>10.97</td>
<td>95.3</td>
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<tr>
<td>L9324 N70.2901° W150.9828° 15:18</td>
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<td>8.3</td>
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<td>8.4</td>
<td>75</td>
<td>111</td>
<td>11.44</td>
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<td>8.4</td>
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<td>8.4</td>
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<td></td>
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<td></td>
<td>5</td>
<td>8.4</td>
<td>75</td>
<td>111</td>
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<td>100.5</td>
<td>0.05</td>
<td>9.4</td>
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<tr>
<td>M9313 N70.4217° W150.9001° 9:42</td>
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<td>7.7</td>
<td>459</td>
<td>694</td>
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</tr>
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<td>459</td>
<td>694</td>
<td>10.89</td>
<td>91.5</td>
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<td>6</td>
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<td>12</td>
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<td>694</td>
<td>10.94</td>
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<td>8.0</td>
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<td>18</td>
<td>7.7</td>
<td>459</td>
<td>694</td>
<td>10.96</td>
<td>92.1</td>
<td>0.33</td>
<td>8.0</td>
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<td>20</td>
<td>7.7</td>
<td>459</td>
<td>694</td>
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<td>22</td>
<td>7.7</td>
<td>459</td>
<td>694</td>
<td>10.96</td>
<td>92.1</td>
<td>0.33</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Notes:
1. Sample depth is measured from the water surface.
2. Turbidity, temperature, conductivity, dissolved oxygen, salinity, and pH were measured using a YSI 650-6920V2 meter.
3. Turbidity is presented as an average of the sampled values in the water column.
4. Specific conductance (referenced to 25°C) was obtained using a conversion coefficient of 0.0196 based on empirical data (Michael Baker 2006).

Average turbidity for lakes L9323, L9324, and M9313 was 0.7 NTU, 8.3 NTU, and 0.6 NTU, respectively. The higher NTU value for Lake L9324 has been observed in previous years of sampling and is likely the result of the hydraulic connection to the South Paleo Lake and Sakoonang Channel during sampling.

Temperatures in all lakes ranged from a maximum of 8.4°C in Lake L9324 to a minimum of 7.7°C in Lake M9313. The temperature in all three lakes remained consistent with depth. Specific conductance was homogenous throughout the water column at all sample locations, but was notably different between lakes. Measured specific conductance values exceeding 500 µS/cm are indicative of saline environments which are usually observed in lakes near the coast (ADF&G 2008). The average specific conductance was 129 µS/cm in Lake L9323 and 111 µS/cm in Lake L9324. Average specific conductance in Lake M9313, located nearest to the coast, was 694 µS/cm.
Concentrations of DO were considered homogenous throughout the water column at all sample locations. The average DO was 11.06 mg/L in Lake L9323, 11.57 mg/L in Lake L9324, and 10.92 mg/L in Lake M9313. A 100% saturation level is based on standard temperature and pressure conditions. The average percent-saturation at Lake L9323 was 94.2%, Lake L9324 was 98.7%, and Lake M9313 was 91.8%.

Salinity remained consistent with depth at all sampling locations. The greatest concentration was measured in Lake M9313 at 0.33 ppt, likely due to its coastal proximity. Lake L9323 and Lake L9324 had concentrations of 0.06 ppt and 0.05 ppt, respectively.

Average pH was 7.9 in Lake L9323, 9.4 in Lake L9324, and 8.0 in Lake M9313 and remained consistent with depth at all sampling locations.

3.2 LABORATORY ANALYSES

With the exception of barium, analytical results from both sampling events show that targeted metals were not detected above the laboratory detection limit. Barium was detected in all lakes at concentrations below the ADEC cleanup level of 2.0 mg/L. The greatest measured concentration of barium was 0.219 mg/L in Lake M9313 from the August 23, 2017 sampling event. Barium is not uncommon in arctic waters at concentrations similar to those measured at the three lakes (Guay and Falkner 1998).

Lakes L9323, L9324, and M9313 were sampled on August 23, 2017 and analyzed using standard methods. The laboratory results indicated DRO and RRO were not detected above the laboratory detection limits in samples collected from lakes L9323 and L9324. At Lake M9313, the laboratory results indicated RRO was detected above the laboratory detection limit in the primary sample, RRO was detected above the ADEC cleanup level limit of 1.1 mg/L in the duplicate sample, and DRO was detected above the laboratory detection limit in the duplicate sample. The DRO and RRO laboratory results from Lake M9313 may have been false positives due to the presence of biogenics, or naturally occurring organic materials. Biogenics are present in many soils in Alaska, especially tundra peat. Biogenic interference complicates petroleum range organic analysis for DRO (AK 102) and RRO (AK 103) methods (ADEC 2006). RRO has historically been detected in Lake M9313 above the laboratory detection limit and above the ADEC cleanup level limit likely due to the presence of biogenics (Michael Baker 2011 and 2012).

Lake M9313 was resampled again on September 11, 2017 and analyzed using standard sampling methods and the silica gel cleanup method which is an established analytical procedure used to separate analytes from interfering compounds (ADEC 2006). The laboratory results from the September 11, 2017 sampling event indicated DRO and RRO were not detected above the laboratory detection limits.

Laboratory analytical results for both sampling events are presented in Table 3.2. The August 23, 2017 laboratory analytical results are provided in Appendix A.1 and the September 11, 2017 laboratory analytical results are provided in Appendix A.2.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>ADEC Cleanup Level¹ (mg/L)</th>
<th>August 23, 2017²</th>
<th>September 11, 2017³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lake L9323 (mg/L)</td>
<td>Lake L9324 (mg/L)</td>
<td>Lake M9313 (mg/L)</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.01</td>
<td>ND⁴</td>
<td>ND</td>
</tr>
<tr>
<td>Barium</td>
<td>2.0</td>
<td>0.0503</td>
<td>0.0629</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.005</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.1</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Lead</td>
<td>0.015</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.002</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.05</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Silver</td>
<td>0.1</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>DRO (low volume water)</td>
<td>1.5</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>RRO (low volume water)</td>
<td>1.1</td>
<td>ND</td>
<td>0.598</td>
</tr>
<tr>
<td>DRO (water)</td>
<td>1.5</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>RRO (water)</td>
<td>1.1</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>DRO (silica gel)</td>
<td>1.5</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>RRO (silica gel)</td>
<td>1.1</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Notes:
1. ADEC Water Quality Standards 18 AAC 75.345 Table C Groundwater Cleanup Waters (ADEC 2009)
2. Sample results from SGS Laboratory Analysis Report 1176024
3. Sample results from SGS Laboratory Analysis Report 1176481
4. ND indicates analyte was not detected above the laboratory detection limit
4. REFERENCES


Alaska Department of Fish and Game (ADF&G). 2008. Fish Habitat Permit FH04-111-0135 Amendment #1.


North Slope Borough (NSB). 2004 North Slope Borough Ordinance Serial No. 75-6-46


Appendix A

LABORATORY ANALYTICAL RESULTS

A.1 LABORATORY REPORT 1176024 – AUGUST 23, 2017 SAMPLING EVENT
To: Michael Baker International

(949)246-2953

Report Number: 1176024
Client Project: ASDP WQ 161682

Dear Jen Gillenwater,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Forest Taylor
Project Manager
Forest.Taylor@sgs.com
Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.
Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

* The analyte has exceeded allowable regulatory or control limits.
! Surrogate out of control limits.
B Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB Closing Continuing Calibration Verification
CL Control Limit
DF Analytical Dilution Factor
DL Detection Limit (i.e., maximum method detection limit)
E The analyte result is above the calibrated range.
GT Greater Than
IB Instrument Blank
ICV Initial Calibration Verification
J The quantitation is an estimation.
LCS(D) Laboratory Control Spike (Duplicate)
LLOC/LLIQC Low Level Quantitation Check
LOD Limit of Detection (i.e., 1/2 of the LOQ)
LOQ Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT Less Than
MB Method Blank
MS(D) Matrix Spike (Duplicate)
ND Indicates the analyte is not detected.
RPD Relative Percent Difference
U Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.
### Sample Summary

<table>
<thead>
<tr>
<th>Client Sample ID</th>
<th>Lab Sample ID</th>
<th>Collected</th>
<th>Received</th>
<th>Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>M9313</td>
<td>1176024001</td>
<td>08/23/2017</td>
<td>08/24/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
<tr>
<td>M9313 Dup</td>
<td>1176024002</td>
<td>08/23/2017</td>
<td>08/24/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
<tr>
<td>L9323</td>
<td>1176024003</td>
<td>08/23/2017</td>
<td>08/24/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
<tr>
<td>L9324</td>
<td>1176024004</td>
<td>08/23/2017</td>
<td>08/24/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method</th>
<th>Method Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK102</td>
<td>DRO/RRO Low Volume Water</td>
</tr>
<tr>
<td>AK103</td>
<td>DRO/RRO Low Volume Water</td>
</tr>
<tr>
<td>SW6020A</td>
<td>Metals by ICP-MS</td>
</tr>
</tbody>
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## Detectable Results Summary

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<th>Lab Sample ID:</th>
<th>1176024001</th>
<th>Parameter</th>
<th>Result</th>
<th>Units</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Barium</td>
<td>219</td>
<td>ug/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Residual Range Organics</td>
<td>0.598</td>
<td>mg/L</td>
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</table>

<table>
<thead>
<tr>
<th>Client Sample ID:</th>
<th>M9313 Dup</th>
<th>Lab Sample ID:</th>
<th>1176024002</th>
<th>Parameter</th>
<th>Result</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Barium</td>
<td>217</td>
<td>ug/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diesel Range Organics</td>
<td>0.624</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Residual Range Organics</td>
<td>1.35</td>
<td>mg/L</td>
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</table>

<table>
<thead>
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<th>Client Sample ID:</th>
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<th>Lab Sample ID:</th>
<th>1176024003</th>
<th>Parameter</th>
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<td>Barium</td>
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<th>Result</th>
<th>Units</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Barium</td>
<td>62.9</td>
<td>ug/L</td>
</tr>
</tbody>
</table>
### Results of M9313

**Client Sample ID:** M9313  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176024001  
**Lab Project ID:** 1176024

**Collection Date:** 08/23/17 10:05  
**Received Date:** 08/24/17 15:24  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**

**Location:**

### Results by Metals by ICP/MS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable</th>
<th>Date Analyzed</th>
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<tbody>
<tr>
<td>Arsenic</td>
<td>5.00 U</td>
<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barium</td>
<td>219</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
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<td>1.30</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>1.00 U</td>
<td>1.00</td>
<td>0.310</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>0.200 U</td>
<td>0.200</td>
<td>0.0620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>20.0 U</td>
<td>20.0</td>
<td>6.20</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Batch Information

- **Analytical Batch:** MMS9924  
- **Analytical Method:** SW6020A  
- **Analyst:** VDL  
- **Analytical Date/Time:** 09/05/17 20:19

- **Prep Batch:** MXX30993  
- **Prep Method:** SW3010A  
- **Prep Date/Time:** 08/30/17 09:00  
- **Prep Initial Wt./Vol.:** 25 mL  
- **Prep Extract Vol:** 25 mL
Results of M9313

Client Sample ID: M9313
Client Project ID: ASDP WQ 161682
Lab Sample ID: 1176024001
Lab Project ID: 1176024

Collection Date: 08/23/17 10:05
Received Date: 08/24/17 15:24
Matrix: Water (Surface, Eff., Ground)

Location:

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<tr>
<th>Parameter</th>
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<th>LOQ/CL</th>
<th>DL</th>
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<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Range Organics</td>
<td>0.600 U</td>
<td>0.600</td>
<td>0.180</td>
<td>mg/L</td>
<td>1</td>
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<td>08/31/17 12:02</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sa Androstane (surr)</td>
<td>75.5</td>
<td>50-150</td>
<td>%</td>
<td></td>
<td>1</td>
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Batch Information

Prep Batch: XXX38284
Prep Method: SW3520C
Prep Date/Time: 08/28/17 08:55
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Analytical Batch: XFC13740
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 08/31/17 12:02
Container ID: 1176024001-A

Residual Range Organics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
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<th>Allowable Limits</th>
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</thead>
<tbody>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>93.2</td>
<td>50-150</td>
<td>%</td>
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Batch Information

Prep Batch: XXX38284
Prep Method: SW3520C
Prep Date/Time: 08/28/17 08:55
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Analytical Batch: XFC13740
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 08/31/17 12:02
Container ID: 1176024001-A
Results of M9313 Dup

Client Sample ID: M9313 Dup
Client Project ID: ASDP WQ 161682
Lab Sample ID: 1176024002
Lab Project ID: 1176024

Collection Date: 08/23/17 10:10
Received Date: 08/24/17 15:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Metals by ICP/MS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>5.00 U</td>
<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
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<td>Barium</td>
<td>217</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
<td>5</td>
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<tr>
<td>Cadmium</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
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<td>09/05/17 20:24</td>
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<tr>
<td>Chromium</td>
<td>4.00 U</td>
<td>4.00</td>
<td>1.30</td>
<td>ug/L</td>
<td>5</td>
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<td>09/05/17 20:24</td>
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<tr>
<td>Lead</td>
<td>1.00 U</td>
<td>1.00</td>
<td>0.310</td>
<td>ug/L</td>
<td>5</td>
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<td>09/05/17 20:24</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.200 U</td>
<td>0.200</td>
<td>0.0620</td>
<td>ug/L</td>
<td>5</td>
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<tr>
<td>Selenium</td>
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<tr>
<td>Silver</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
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Batch Information

Analytical Batch: MMS9924
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 09/05/17 20:24
Container ID: 1176024002-C

Prep Batch: MXX30993
Prep Method: SW3010A
Prep Date/Time: 08/30/17 09:00
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/06/2017 4:03:14PM
Results of M9313 Dup

Client Sample ID: M9313 Dup
Client Project ID: ASDP WQ 161682
Lab Sample ID: 1176024002
Lab Project ID: 1176024

Collection Date: 08/23/17 10:10
Received Date: 08/24/17 15:24
Matrix: Water (Surface, Eff., Ground)

Solids (%):
Location:

Results by Semivolatile Organic Fuels

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<th>DL</th>
<th>Units</th>
<th>DF</th>
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<tbody>
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<td>mg/L</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>5a Androstane (surr)</td>
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<td>%</td>
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Batch Information

Analytical Batch: XFC13740
Analytical Method: AK102
Analyst: JMG
Analytical Date/Time: 08/31/17 12:12
Container ID: 1176024002-A

Prep Batch: XXX38284
Prep Method: SW3520C
Prep Date/Time: 08/28/17 08:55
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Residual Range Organics

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<th>DL</th>
<th>Units</th>
<th>DF</th>
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<tbody>
<tr>
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Surrogates

<table>
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<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a Androstane (surr)</td>
<td>78.2</td>
<td>50-150</td>
<td>%</td>
<td>1</td>
<td></td>
<td>08/31/17 12:12</td>
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Batch Information

Analytical Batch: XFC13740
Analytical Method: AK103
Analyst: JMG
Analytical Date/Time: 08/31/17 12:12
Container ID: 1176024002-A

Prep Batch: XXX38284
Prep Method: SW3520C
Prep Date/Time: 08/28/17 08:55
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Print Date: 09/06/2017 4:03:14PM
### Results of L9323

**Client Sample ID:** L9323  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176024003  
**Lab Project ID:** 1176024  
**Collection Date:** 08/23/17 14:00  
**Received Date:** 08/24/17 15:24  
**Matrix:** Water (Surface, Eff., Ground)  

### Results by Metals by ICP/MS

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<thead>
<tr>
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<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
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<th>Date Analyzed</th>
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<td>Arsenic</td>
<td>5.00</td>
<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
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</tr>
<tr>
<td>Barium</td>
<td>50.3</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>2.00</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
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<td>4.00</td>
<td>1.30</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
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</tr>
<tr>
<td>Lead</td>
<td>1.00</td>
<td>1.00</td>
<td>0.310</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
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<td>0.200</td>
<td>0.0620</td>
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<td>5</td>
<td>09/05/17 20:28</td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
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<td>20.0</td>
<td>6.20</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
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<tr>
<td>Silver</td>
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<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td>09/05/17 20:28</td>
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### Batch Information

**Analytical Batch:** MMS9924  
**Analytical Method:** SW6020A  
**Analyst:** VDL  
**Analytical Date/Time:** 09/05/17 20:28  
**Container ID:** 1176024003-C  

**Prep Batch:** MXX30993  
**Prep Method:** SW3010A  
**Prep Date/Time:** 08/30/17 09:00  
**Prep Initial Wt./Vol.:** 25 mL  
**Prep Extract Vol:** 25 mL
### Results of L9323

**Client Sample ID:** L9323  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176024003  
**Lab Project ID:** 1176024

**Collection Date:** 08/23/17 14:00  
**Received Date:** 08/24/17 15:24  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**

### Results by Semivolatilic Organic Fuels

#### Diesel Range Organics
- **Result:** 0.600 mg/L  
- **LOQ/CL:** 0.600  
- **DL:** 0.180  
- **Units:** mg/L  
- **DF:** 1  
- **Allowable Limits:**
- **Qual:** D  
- **Date Analyzed:** 08/31/17 12:22

#### Surrogates
- **5a Androstane (surr):**  
  - **Result:** 76.2  
  - **LOQ/CL:** 50-150  
  - **Units:** %  
  - **DF:** 1  
  - **Allowable Limits:**
  - **Qual:** D  
  - **Date Analyzed:** 08/31/17 12:22

### Batch Information

**Prep Batch:** XXX38284  
**Prep Method:** SW3520C  
**Prep Date/Time:** 08/28/17 08:55  
**Prep Initial Wt./Vol.:** 250 mL  
**Prep Extract Vol.:** 1 mL

**Analytical Batch:** XFC13740  
**Analytical Method:** AK102  
**Analytical Date/Time:** 08/31/17 12:22  
**Container ID:** 1176024003-A

**Prep Batch:** XXX38284  
**Prep Method:** SW3520C  
**Prep Date/Time:** 08/28/17 08:55  
**Prep Initial Wt./Vol.:** 250 mL  
**Prep Extract Vol.:** 1 mL

**Analytical Batch:** XFC13740  
**Analytical Method:** AK103  
**Analytical Date/Time:** 08/31/17 12:22  
**Container ID:** 1176024003-A

**Prep Batch:** XXX38284  
**Prep Method:** SW3520C  
**Prep Date/Time:** 08/28/17 08:55  
**Prep Initial Wt./Vol.:** 250 mL  
**Prep Extract Vol.:** 1 mL

**Analytical Batch:** XFC13740  
**Analytical Method:** AK103  
**Analytical Date/Time:** 08/31/17 12:22  
**Container ID:** 1176024003-A

### Residual Range Organics
- **Result:** 0.500 mg/L  
- **LOQ/CL:** 0.500  
- **DL:** 0.150  
- **Units:** mg/L  
- **DF:** 1  
- **Allowable Limits:**
- **Qual:** D  
- **Date Analyzed:** 08/31/17 12:22

#### Surrogates
- **n-Triacontane-d62 (surr):**  
  - **Result:** 91.2  
  - **LOQ/CL:** 50-150  
  - **Units:** %  
  - **DF:** 1  
  - **Allowable Limits:**
  - **Qual:** D  
  - **Date Analyzed:** 08/31/17 12:22

### Batch Information

**Prep Batch:** XXX38284  
**Prep Method:** SW3520C  
**Prep Date/Time:** 08/28/17 08:55  
**Prep Initial Wt./Vol.:** 250 mL  
**Prep Extract Vol.:** 1 mL

**Analytical Batch:** XFC13740  
**Analytical Method:** AK103  
**Analytical Date/Time:** 08/31/17 12:22  
**Container ID:** 1176024003-A

**Prep Batch:** XXX38284  
**Prep Method:** SW3520C  
**Prep Date/Time:** 08/28/17 08:55  
**Prep Initial Wt./Vol.:** 250 mL  
**Prep Extract Vol.:** 1 mL

**Analytical Batch:** XFC13740  
**Analytical Method:** AK103  
**Analytical Date/Time:** 08/31/17 12:22  
**Container ID:** 1176024003-A

Print Date: 09/06/2017 4:03:14PM

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Page 11 of 23
**Results of L9324**

Client Sample ID: **L9324**  
Client Project ID: **ASDP WQ 161682**  
Lab Sample ID: 1176024004  
Lab Project ID: 1176024

**Collection Date:** 08/23/17 15:30  
**Received Date:** 08/24/17 15:24  
**Matrix:** Water (Surface, Eff., Ground)

**Solids (%):**
**Location:**

---

**Results by Metals by ICP/MS**

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<tr>
<th>Parameter</th>
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<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
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<tbody>
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<td>Barium</td>
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<tr>
<td>Cadmium</td>
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<td>2.00</td>
<td>0.620</td>
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<td>5</td>
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<tr>
<td>Chromium</td>
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<td>4.00</td>
<td>1.30</td>
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<td>09/05/17 20:42</td>
</tr>
<tr>
<td>Lead</td>
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<tr>
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<td>0.0620</td>
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<td>09/05/17 20:42</td>
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<tr>
<td>Selenium</td>
<td>20.0 U</td>
<td>20.0</td>
<td>6.20</td>
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<td>09/05/17 20:42</td>
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<tr>
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<td>0.620</td>
<td>ug/L</td>
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<td></td>
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**Batch Information**

Analytical Batch: MMS9924  
Analytical Method: SW6020A  
Analyst: VDL  
Analytical Date/Time: 09/05/17 20:42  
Container ID: 1176024004-C

Prep Batch: MXX30993  
Prep Method: SW3010A  
Prep Date/Time: 08/30/17 09:00  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

---

Print Date: 09/06/2017 4:03:14PM

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Page 12 of 23
## Results of L9324

**Client Sample ID:** L9324  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176024004  
**Lab Project ID:** 1176024  
**Collection Date:** 08/23/17 15:30  
**Received Date:** 08/24/17 15:24  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**  
**Location:**

### Results by Semivolatile Organic Fuels

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<th>DL</th>
<th>Units</th>
<th>DF</th>
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<th>Date Analyzed</th>
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<td>Diesel Range Organics</td>
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<td>0.600</td>
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<td>mg/L</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Surrogates</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Androstane (surr)</td>
<td></td>
<td>68.4</td>
<td>50-150</td>
<td>%</td>
<td>1</td>
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### Batch Information

- **Analytical Batch:** XFC13740
- **Analytical Method:** AK102
- **Analyst:** JMG
- **Analytical Date/Time:** 08/31/17 12:33
- **Container ID:** 1176024004-A

- **Prep Batch:** XXX38284
- **Prep Method:** SW3520C
- **Prep Date/Time:** 08/28/17 08:55
- **Prep Initial Wt./Vol.:** 250 mL
- **Prep Extract Vol.:** 1 mL

### Results of L9324

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<th>DL</th>
<th>Units</th>
<th>DF</th>
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<th>Date Analyzed</th>
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<td>0.150</td>
<td>mg/L</td>
<td>1</td>
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<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Triacontane-d62 (surr)</td>
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<td>85.5</td>
<td>50-150</td>
<td>%</td>
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<td>08/31/17 12:33</td>
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### Batch Information

- **Analytical Batch:** XFC13740
- **Analytical Method:** AK103
- **Analyst:** JMG
- **Analytical Date/Time:** 08/31/17 12:33
- **Container ID:** 1176024004-A

- **Prep Batch:** XXX38284
- **Prep Method:** SW3520C
- **Prep Date/Time:** 08/28/17 08:55
- **Prep Initial Wt./Vol.:** 250 mL
- **Prep Extract Vol.:** 1 mL
### Results by SW6020A

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<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
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<tr>
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<td>2.50U</td>
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<td>Barium</td>
<td>1.50U</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1.00U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
</tr>
<tr>
<td>Chromium</td>
<td>2.00U</td>
<td>4.00</td>
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<tr>
<td>Lead</td>
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<tr>
<td>Mercury</td>
<td>0.100U</td>
<td>0.200</td>
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<tr>
<td>Selenium</td>
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<td>ug/L</td>
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<tr>
<td>Silver</td>
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<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
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### Batch Information

- **Analytical Batch**: MMS9924
- **Analytical Method**: SW6020A
- **Instrument**: Perkin Elmer NexIon P5
- **Analyst**: VDL
- **Analytical Date/Time**: 9/5/2017 6:53:48PM

- **Prep Batch**: MXX30993
- **Prep Method**: SW3010A
- **Prep Date/Time**: 8/30/2017 9:00:57AM
- **Prep Initial Wt./Vol.**: 25 mL
- **Prep Extract Vol**: 25 mL

- **Analytical Batch**: MMS9925
- **Analytical Method**: SW6020A
- **Instrument**: Perkin Elmer NexIon P5
- **Analyst**: VDL
- **Analytical Date/Time**: 9/6/2017 12:49:45PM

- **Prep Batch**: MXX30993
- **Prep Method**: SW3010A
- **Prep Date/Time**: 8/30/2017 9:00:57AM
- **Prep Initial Wt./Vol.**: 25 mL
- **Prep Extract Vol**: 25 mL
## Blank Spike Summary

Blank Spike ID: LCS for HBN 1176024 [MXX30993]  
Blank Spike Lab ID: 1409036  
Date Analyzed: 09/05/2017 18:58  
Matrix: Water (Surface, Eff., Ground)  
QC for Samples: 1176024001, 1176024002, 1176024003, 1176024004

### Results by SW6020A

| Parameter  | Spike (ug/L) | Result (ug/L) | Rec (%) | CL  
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</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>1000</td>
<td>1060</td>
<td>106</td>
<td>(84-116)</td>
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<tr>
<td>Barium</td>
<td>1000</td>
<td>1010</td>
<td>101</td>
<td>(86-114)</td>
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<td>Cadmium</td>
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<tr>
<td>Lead</td>
<td>1000</td>
<td>1070</td>
<td>107</td>
<td>(88-115)</td>
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<td>Mercury</td>
<td>10</td>
<td>10.3</td>
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<td>(70-124)</td>
</tr>
<tr>
<td>Selenium</td>
<td>1000</td>
<td>1070</td>
<td>107</td>
<td>(80-120)</td>
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<tr>
<td>Silver</td>
<td>100</td>
<td>108</td>
<td>108</td>
<td>(85-116)</td>
</tr>
</tbody>
</table>

## Batch Information

Analytical Batch: MMS9924  
Analytical Method: SW6020A  
Instrument: Perkin Elmer NexIon P5  
Analyzer: VDL  
Prep Batch: MXX30993  
Prep Method: SW3010A  
Prep Date/Time: 08/30/2017 09:00  
Spike Init Wt./Vol.: 1000 ug/L  
Extract Vol.: 25 mL  
Dupe Init Wt./Vol.: Extract Vol:
# Matrix Spike Summary

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<th>Analysis Date: 09/05/2017 19:02</th>
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<tbody>
<tr>
<td>MS Sample ID: 1409038 MS</td>
<td>Analysis Date: 09/05/2017 19:07</td>
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<td>MSD Sample ID: 1409039 MSD</td>
<td>Analysis Date: 09/05/2017 19:11</td>
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<tr>
<td>QC for Samples: 1176024001, 1176024002, 1176024003, 1176024004</td>
<td></td>
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<tr>
<td>Matrix: Water (Surface, Eff., Ground)</td>
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</tr>
</tbody>
</table>

## Results by SW6020A

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
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<tbody>
<tr>
<td>Arsenic</td>
<td>12.2</td>
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<td>85-116</td>
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## Batch Information

- **Analytical Batch:** MMS9924
- **Analytical Method:** SW6020A
- **Instrument:** Perkin Elmer NexIon P5
- **Analyst:** VDL
- **Analytical Date/Time:** 9/5/2017 7:07:20PM

- **Prep Batch:** MXX30993
- **Prep Method:** 3010 H20 Digest for Metals ICP-MS
- **Prep Date/Time:** 8/30/2017 9:00:57AM
- **Prep Initial Wt./Vol.:** 25.00mL
- **Prep Extract Vol:** 25.00mL

Print Date: 09/06/2017 4:03:20PM

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Method Blank

Blank Lab ID: 1408492
QC for Samples:
1176024001, 1176024002, 1176024003, 1176024004

Results by AK102

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Range Organics</td>
<td>0.300U</td>
<td>0.600</td>
<td>0.180</td>
<td>mg/L</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Androstane (surr)</td>
<td>76.2</td>
<td>60-120</td>
<td></td>
<td>%</td>
</tr>
</tbody>
</table>

Batch Information

- Analytical Batch: XFC13740
- Analytical Method: AK102
- Instrument: Agilent 7890B F
- Analyst: JMG
- Analytical Date/Time: 8/31/2017 10:59:00AM

- Prep Batch: XXX38284
- Prep Method: SW3520C
- Prep Date/Time: 8/28/2017 8:55:33AM
- Prep Initial Wt./Vol.: 250 mL
- Prep Extract Vol: 1 mL
**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1176024 [XXX38284]
Blank Spike Lab ID: 1408493
Date Analyzed: 08/31/2017 11:10

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1176024001, 1176024002, 1176024003, 1176024004

---

**Results by AK102**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Blank Spike (mg/L)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Range Organics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>18.7</td>
<td>94</td>
<td>20</td>
<td>18.5</td>
<td>92</td>
<td>(75-125)</td>
<td>1.30</td>
<td>( &lt; 20 )</td>
<td></td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Androstane (surr)</td>
<td>0.4</td>
<td>101</td>
<td>101</td>
<td>0.4</td>
<td>101</td>
<td>101</td>
<td>(60-120)</td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Batch Information**

Analytical Batch: XFC13740
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: JMG

Prep Batch: XXX38284
Prep Method: SW3520C
Prep Date/Time: 08/28/2017 08:55
Spike Init Wt./Vol.: 20 mg/L
Extract Vol.: 1 mL
Dupe Init Wt./Vol.: 20 mg/L
Extract Vol.: 1 mL
### Method Blank

**Blank ID:** MB for HBN 1767040 [XXX/38284]  
**Matrix:** Water (Surface, Eff., Ground)  
**Blank Lab ID:** 1408492  
**QC for Samples:**  
1176024001, 1176024002, 1176024003, 1176024004

### Results by AK103

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Range Organics</td>
<td>0.178J</td>
<td>0.500</td>
<td>0.150</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

**Surrogates**

- n-Triacontane-d62 (surr)  
  
| 95.1 | 60-120 | % |

### Batch Information

- **Analytical Batch:** XFC13740  
- **Analytical Method:** AK103  
- **Instrument:** Agilent 7890B F  
- **Analyst:** JMG  
- **Analytical Date/Time:** 8/31/2017 10:59:00AM  
- **Prep Batch:** XXX38284  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 8/28/2017 8:55:33AM  
- **Prep Initial Wt./Vol.:** 250 mL  
- **Prep Extract Vol:** 1 mL
### Blank Spike Summary

Blank Spike ID: LCS for HBN 1176024 [XXX38284]  
Blank Spike Lab ID: 1408493  
Date Analyzed: 08/31/2017 11:10  
QC for Samples: 1176024001, 1176024002, 1176024003, 1176024004  

Spike Duplicate ID: LCSD for HBN 1176024 [XXX38284]  
Spike Duplicate Lab ID: 1408494  
Matrix: Water (Surface, Eff., Ground)  

### Results by AK103

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Range Organics</td>
<td>20</td>
<td>20.0</td>
<td>100</td>
<td>20</td>
<td>19.4</td>
<td>97</td>
<td>(60-120)</td>
<td>2.90</td>
<td>(&lt; 20)</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>0.4</td>
<td>96.2</td>
<td>96</td>
<td>0.4</td>
<td>96.8</td>
<td>97</td>
<td>(60-120)</td>
<td>0.63</td>
<td></td>
</tr>
</tbody>
</table>

### Batch Information

- **Analytical Batch:** XFC13740  
- **Analytical Method:** AK103  
- **Instrument:** Agilent 7890B F  
- **Analyst:** JMG  
- **Prep Batch:** XXX38284  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 08/28/2017 08:55  
- **Spike Init Wt./Vol.:** 20 mg/L  
- **Extract Vol.:** 1 mL  
- **Dupe Init Wt./Vol.:** 20 mg/L  
- **Extract Vol.:** 1 mL
### Section 1

**CLIENT:** Michael Baker Int'l  
**CONTACT:** Jen Gillen Water  
**PHONE NO:** 949-246-2953  
**PROJECT NAME:** ASDP WQ  
**PERMIT:** 161687  
**RECEIVED FOR:** Michael Baker Int'l  
**REPORTS TO:** Jen Gillen Water  
**E-MAIL:** Jen.GillenWater@MBakerIntl.com  
**INVOICE TO:** Michael Baker Int'l  
**QUOTE #:** 3341722  
**P.O. #:** 8

### Section 2

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Date/Time</th>
<th>Matrix/Matrix Code</th>
<th>Remarks/LOC ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A-C M9313</td>
<td>8/23/17 10:05</td>
<td>WATER 3</td>
<td>G &lt; C &lt; C &lt; C</td>
</tr>
<tr>
<td>1A-C M9313 DCIP</td>
<td>8/23/17 10:10</td>
<td>WATER 3</td>
<td>G &lt; C &lt; C &lt; C</td>
</tr>
<tr>
<td>2A-C L9323</td>
<td>8/23/17 11:00</td>
<td>WATER 3</td>
<td>G &lt; C &lt; C &lt; C</td>
</tr>
<tr>
<td>3A-C L9324</td>
<td>8/23/17 15:30</td>
<td>WATER 3</td>
<td>G &lt; C &lt; C &lt; C</td>
</tr>
</tbody>
</table>

**Section 3**

**Preservative**

**Section 4**

**DOD Project?** Yes  
**Data Deliverable Requirements:**

**Cooler ID:**

**Requested Turnaround Time and/or Special Instructions:**

**Section 5**

**Relinquished By:** Devon Rae  
**Date:** 8/24/17  
**Time:** 7:47 am

**Relinquished By:** Josh Grabel  
**Date:** 8/24/17  
**Time:** 3:31 pm

**Relinquished By:**  
**Date:**  
**Time:**

**Relinquished By:**  
**Date:**  
**Time:**

**Redacted:**

**Temp Blank °C:** 0.9 ± 0.20

**Chain of Custody Seal:**

(See attached Sample Receipt Form)

(See attached Sample Receipt Form)

http://www.sgs.com/terms-and-conditions

---

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301  
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

F083-Kit_Request_and_COC_Templates-Blank  
Revised 2013-03-24
### Review Criteria / Temperature Requirements

<table>
<thead>
<tr>
<th>Condition</th>
<th>Exemption permitted if sampler hand carries/delivers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required**

<table>
<thead>
<tr>
<th>Temperature blank compliant* (i.e., 0-6 °C after CF)?</th>
<th>6.9 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

*If >6°C, were samples collected <8 hours ago?**

<table>
<thead>
<tr>
<th>N/A</th>
<th>Proceed per client request</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If <0°C, were sample containers ice free?  

<table>
<thead>
<tr>
<th>N/A</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".

Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.

### Holding Time / Documentation / Sample Condition Requirements

<table>
<thead>
<tr>
<th>Were samples received within holding time?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were samples matched COC** (i.e., sample IDs, dates/times collected)?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Note: If times differ &lt;1hr, record details &amp; login per COC.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were analyses requested unambiguous? (i.e., method is specified for analyses with &gt;1 option for analysis)</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient volume for silica gel clean up method. Logged in for DRO/RRO only per Forest Taylor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were proper containers (type/mass/volume/preservative***) used?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Removable container permitted for metals (e.g., 200.8/6020A).</td>
<td></td>
</tr>
</tbody>
</table>

### Volatile / LL-Hg Requirements

<table>
<thead>
<tr>
<th>Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were all water VOAs vials free of headspace (i.e., bubbles ≤ 6mm)?</td>
<td>N/A</td>
</tr>
<tr>
<td>Were all soil VOAs field extracted with MeOH+BFB?</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Note to Client:** Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

**Additional notes (if applicable):**
## Sample Containers and Preservatives

<table>
<thead>
<tr>
<th>Container Id</th>
<th>Preservative</th>
<th>Container Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1176024001-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024001-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024001-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024002-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024002-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024002-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024003-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024003-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024003-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024004-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024004-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176024004-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
</tbody>
</table>

### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

**OK** - The container was received at an acceptable pH for the analysis requested.

**BU** - The container was received with headspace greater than 6mm.

**DM** - The container was received damaged.

**FR** - The container was received frozen and not usable for Bacteria or BOD analyses.

**PA** - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

**PH** - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
A.2 LABORATORY REPORT 1176481 – SEPTEMBER 11, 2017 SAMPLING EVENT
To: Michael Baker International

   (949)246-2953

Report Number: 1176481
Client Project: ASDP WQ 161682

Dear Jen Gillenwater,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

________________________________________
Forest Taylor                          Date
Project Manager
Forest.Taylor@sgs.com
Case Narrative

SGS Client: Michael Baker International
SGS Project: 1176481
Project Name/Site: ASDP WQ 161682
Project Contact: Jen Gillenwater

Refer to sample receipt form for information on sample condition.

1176547002(1412754MS) (1412755) MS
6020A - Metals MS recovery for manganese (83.2%) does not meet QC criteria. The post digestion spike was successful.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.
Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) for which SGS North America Inc. is Provisionally Certified as of 9/21/2017 & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

* The analyte has exceeded allowable regulatory or control limits.
! Surrogate out of control limits.
B Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB Continuing Calibration Verification
CCCV/CVC/CVA/CVCB Closing Continuing Calibration Verification
CL Control Limit
DF Dilution Factor
DL Detection Limit (i.e., maximum method detection limit)
E The analyte result is above the calibrated range.
GT Greater Than
IB Instrument Blank
ICV Initial Calibration Verification
J The quantitation is an estimation.
LCS(D) Laboratory Control Spike (Duplicate)
LLQC/LLIQC Low Level Quantitation Check
LOD Limit of Detection (i.e., 1/2 of the LOQ)
LOQ Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT Less Than
MB Method Blank
MS(D) Matrix Spike (Duplicate)
ND Indicates the analyte is not detected.
RPD Relative Percent Difference
U Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.
<table>
<thead>
<tr>
<th>Client Sample ID</th>
<th>Lab Sample ID</th>
<th>Collected</th>
<th>Received</th>
<th>Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>M9313</td>
<td>1176481001</td>
<td>09/11/2017</td>
<td>09/12/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
<tr>
<td>M9313 Dup</td>
<td>1176481002</td>
<td>09/11/2017</td>
<td>09/12/2017</td>
<td>Water (Surface, Eff., Ground)</td>
</tr>
</tbody>
</table>

**Method Description**

- **AK102**: Diesel/Residual Range Organics w/ Silica
- **AK103**: Diesel/Residual Range Organics w/ Silica
- **AK102**: Diesel/Residual Range Organics Water
- **AK103**: Diesel/Residual Range Organics Water
- **SW6020A**: Metals by ICP-MS
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium</td>
<td>213</td>
<td>ug/L</td>
</tr>
<tr>
<td>Barium</td>
<td>202</td>
<td>ug/L</td>
</tr>
</tbody>
</table>

Client Sample ID: M9313
Lab Sample ID: 1176481001

Metals by ICP/MS

Client Sample ID: M9313 Dup
Lab Sample ID: 1176481002

Metals by ICP/MS
**Results of M9313**

Client Sample ID: **M9313**  
Client Project ID: **ASDP WQ 161682**  
Lab Sample ID: **1176481001**  
Lab Project ID: **1176481**

**Collection Date:** 09/11/17 17:14  
**Received Date:** 09/12/17 12:14  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**

**Results by Metals by ICP/MS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>5.00 U</td>
<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Barium</td>
<td>213</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Cadmium</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Chromium</td>
<td>4.00 U</td>
<td>4.00</td>
<td>1.30</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Lead</td>
<td>1.00 U</td>
<td>1.00</td>
<td>0.310</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.200 U</td>
<td>0.200</td>
<td>0.0620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Selenium</td>
<td>20.0 U</td>
<td>20.0</td>
<td>6.20</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
</tr>
<tr>
<td>Silver</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
<td></td>
<td>09/15/17 19:03</td>
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**Batch Information**

- Analytical Batch: **MMS9937**  
- Analytical Method: **SW6020A**  
- Analyst: **ACF**  
- Analytical Date/Time: 09/15/17 19:03  
- Container ID: **1176481001-C**

- Prep Batch: **MXX31041**  
- Prep Method: **SW3010A**  
- Prep Initial Wt./Vol.: 25 mL  
- Prep Extract Vol: 25 mL  
- Prep Date/Time: 09/14/17 13:15

**Print Date:** 09/27/2017 4:55:31PM

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# Results of M9313

**Client Sample ID:** M9313  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176481001  
**Lab Project ID:** 1176481

**Collection Date:** 09/11/17 17:14  
**Received Date:** 09/12/17 12:14  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**

**Location:**

## Results by Semivolatile Organic Fuels

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<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable</th>
<th>Date Analyzed</th>
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<tbody>
<tr>
<td>Diesel Range Organics</td>
<td>1.28 U</td>
<td>1.28</td>
<td>0.383</td>
<td>mg/L</td>
<td>1</td>
<td></td>
<td>09/23/17 15:55</td>
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<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sa Androstane (surr)</td>
<td>89.6</td>
<td>50-150</td>
<td>%</td>
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<tr>
<td>Residual Range Organics</td>
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<td>1.06</td>
<td>0.319</td>
<td>mg/L</td>
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<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>92.6</td>
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## Batch Information

- **Prep Batch:** XXX38484  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 09/21/17 07:49  
- **Prep Initial Wt./Vol.:** 940 mL  
- **Prep Extract Vol.:** 2 mL

- **Analytical Batch:** XFC13827  
- **Analytical Method:** AK103  
- **Analyst:** JMG  
- **Prep Batch:** XXX38484  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 09/21/17 07:49  
- **Prep Initial Wt./Vol.:** 940 mL  
- **Prep Extract Vol.:** 2 mL

---

Print Date: 09/27/2017 4:55:31PM

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7 of 25
### Results of M9313

Client Sample ID: **M9313**  
Client Project ID: **ASDP WQ 161682**  
Lab Sample ID: **1176481001**  
Lab Project ID: **1176481**  
Collection Date: **09/11/17 17:14**  
Received Date: **09/12/17 12:14**  
Matrix: Water (Surface, Eff., Ground)  
Solids (%): Location:  

#### Results by Semivolatile Organic Fuels Department, Silica G

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<th>DL</th>
<th>Units</th>
<th>DF</th>
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<tbody>
<tr>
<td>DRO Silica Gel</td>
<td>1.28 U</td>
<td>1.28</td>
<td>0.383</td>
<td>mg/L</td>
<td>1</td>
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</tr>
<tr>
<td>5a Androstane (surr)</td>
<td>70.5</td>
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<td>%</td>
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#### Batch Information

- **Prep Batch**: XXX38485
- **Prep Method**: SW3520C-SG
- **Prep Date/Time**: 09/21/17 07:49
- **Prep Initial Wt./Vol.**: 940 mL
- **Prep Extract Vol.**: 2 mL

---

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<tr>
<td>RRO Silica Gel</td>
<td>1.06 U</td>
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<td>0.319</td>
<td>mg/L</td>
<td>1</td>
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<tr>
<td>Surrogates</td>
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<td></td>
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<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>78.5</td>
<td>50-150</td>
<td>%</td>
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#### Batch Information

- **Prep Batch**: XXX38485
- **Prep Method**: SW3520C-SG
- **Prep Date/Time**: 09/21/17 07:49
- **Prep Initial Wt./Vol.**: 940 mL
- **Prep Extract Vol.**: 2 mL
### Results of M9313 Dup

- **Client Sample ID:** M9313 Dup
- **Client Project ID:** ASDP WQ 161682
- **Lab Sample ID:** 1176481002
- **Lab Project ID:** 1176481
- **Collection Date:** 09/11/17 17:24
- **Received Date:** 09/12/17 12:14
- **Matrix:** Water (Surface, Eff., Ground)
- **Location:**

### Results by Metals by ICP/MS

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<tbody>
<tr>
<td>Arsenic</td>
<td>5.00 U</td>
<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
<td>5</td>
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<tr>
<td>Barium</td>
<td>202</td>
<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
<td>5</td>
<td></td>
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</tr>
<tr>
<td>Cadmium</td>
<td>2.00 U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
<td>5</td>
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<tr>
<td>Chromium</td>
<td>4.00 U</td>
<td>4.00</td>
<td>1.30</td>
<td>ug/L</td>
<td>5</td>
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<tr>
<td>Lead</td>
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<td>0.310</td>
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<td>Mercury</td>
<td>0.200 U</td>
<td>0.200</td>
<td>0.0620</td>
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<td>5</td>
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<tr>
<td>Selenium</td>
<td>20.0 U</td>
<td>20.0</td>
<td>6.20</td>
<td>ug/L</td>
<td>5</td>
<td></td>
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<tr>
<td>Silver</td>
<td>2.00 U</td>
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<td>0.620</td>
<td>ug/L</td>
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### Batch Information

- **Analytical Batch:** MMS9937
- **Analytical Method:** SW6020A
- **Analyst:** ACF
- **Analytical Date/Time:** 09/15/17 19:45
- **Container ID:** 1176481002-C
- **Prep Batch:** MXX31041
- **Prep Method:** SW3010A
- **Prep Date/Time:** 09/14/17 13:15
- **Prep Initial Wt./Vol.:** 25 mL
- **Prep Extract Vol:** 25 mL
### Results of M9313 Dup

**Client Sample ID:** M9313 Dup  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176481002  
**Lab Project ID:** 1176481  
**Collection Date:** 09/11/17 17:24  
**Received Date:** 09/12/17 12:14  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**  
**Location:**

## Results by Semivolatile Organic Fuels

### Diesel Range Organics

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<th>Units</th>
<th>DF</th>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel Range Organics</td>
<td>1.29 U</td>
<td>1.29</td>
<td>0.387</td>
<td>mg/L</td>
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<td>09/23/17 16:05</td>
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### Surrogates

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<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
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</thead>
<tbody>
<tr>
<td>Sa Androstane (surr)</td>
<td>93.9</td>
<td>50-150</td>
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<td>%</td>
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## Batch Information

- **Analytical Batch:** XFC13827  
- **Analytical Method:** AK102  
- **Analyst:** JMG  
- **Analytical Date/Time:** 09/23/17 16:05  
- **Container ID:** 1176481002-A  

- **Prep Batch:** XXX38484  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 09/21/17 07:49  
- **Prep Initial Wt./Vol.:** 930 mL  
- **Prep Extract Vol.:** 2 mL

### Residual Range Organics

<table>
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<tr>
<th>Parameter</th>
<th>Result Qual</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
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<tr>
<td>Residual Range Organics</td>
<td>1.08 U</td>
<td>1.08</td>
<td>0.323</td>
<td>mg/L</td>
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<td>09/23/17 16:05</td>
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### Surrogates

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<th>DL</th>
<th>Units</th>
<th>DF</th>
<th>Allowable Limits</th>
<th>Date Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>96.7</td>
<td>50-150</td>
<td></td>
<td>%</td>
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<td>09/23/17 16:05</td>
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## Batch Information

- **Analytical Batch:** XFC13827  
- **Analytical Method:** AK103  
- **Analyst:** JMG  
- **Analytical Date/Time:** 09/23/17 16:05  
- **Container ID:** 1176481002-A  

- **Prep Batch:** XXX38484  
- **Prep Method:** SW3520C  
- **Prep Date/Time:** 09/21/17 07:49  
- **Prep Initial Wt./Vol.:** 930 mL  
- **Prep Extract Vol.:** 2 mL

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Print Date: 09/27/2017 4:55:31PM  

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10 of 25
### Results of M9313 Dup

**Client Sample ID:** M9313 Dup  
**Client Project ID:** ASDP WQ 161682  
**Lab Sample ID:** 1176481002  
**Lab Project ID:** 1176481

**Collection Date:** 09/11/17 17:24  
**Received Date:** 09/12/17 12:14  
**Matrix:** Water (Surface, Eff., Ground)  
**Solids (%):**  
**Location:**

### Results by Semivolatile Organic Fuels Department, Silica G

#### Surrogates

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<tbody>
<tr>
<td>DRO Silica Gel</td>
<td></td>
<td></td>
<td>mg/L</td>
<td>1.29 U</td>
<td>1.29</td>
<td>0.387</td>
<td>09/23/17 16:37</td>
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<tr>
<td>5a Androstane (surr)</td>
<td>%</td>
<td>50-150</td>
<td></td>
<td>76.7</td>
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#### Surrogates

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<th>Result</th>
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<tbody>
<tr>
<td>RRO Silica Gel</td>
<td></td>
<td></td>
<td>mg/L</td>
<td>1.08 U</td>
<td>1.08</td>
<td>0.323</td>
<td>09/23/17 16:37</td>
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<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>%</td>
<td>50-150</td>
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<td>85.6</td>
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<td>09/23/17 16:37</td>
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### Batch Information

**Prep Batch:** XXX38485  
**Prep Method:** SW3520C-SG  
**Prep Date/Time:** 09/21/17 07:49  
**Prep Initial Wt./Vol.:** 930 mL  
**Prep Extract Vol:** 2 mL

**Analytical Batch:** XFC13828  
**Analytical Method:** AK102-  
**Analyst:** JMG  
**Analytical Date/Time:** 09/23/17 16:37

**Prep Batch:** XXX38485  
**Prep Method:** SW3520C-SG  
**Prep Date/Time:** 09/21/17 07:49  
**Prep Initial Wt./Vol.:** 930 mL  
**Prep Extract Vol:** 2 mL

**Analytical Batch:** XFC13828  
**Analytical Method:** AK103-  
**Analyst:** JMG  
**Analytical Date/Time:** 09/23/17 16:37

**Prep Batch:** XXX38485  
**Prep Method:** SW3520C-SG  
**Prep Date/Time:** 09/21/17 07:49  
**Prep Initial Wt./Vol.:** 930 mL  
**Prep Extract Vol:** 2 mL

**Analytical Batch:** XFC13828  
**Analytical Method:** AK103-  
**Analyst:** JMG  
**Analytical Date/Time:** 09/23/17 16:37

**Prep Batch:** XXX38485  
**Prep Method:** SW3520C-SG  
**Prep Date/Time:** 09/21/17 07:49  
**Prep Initial Wt./Vol.:** 930 mL  
**Prep Extract Vol:** 2 mL

**Analytical Batch:** XFC13828  
**Analytical Method:** AK103-  
**Analyst:** JMG  
**Analytical Date/Time:** 09/23/17 16:37
Method Blank
Blank Lab ID: 1412752
QC for Samples:
1176481001, 1176481002

Results by SW6020A

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<th>Units</th>
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<td>5.00</td>
<td>1.50</td>
<td>ug/L</td>
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<td>3.00</td>
<td>0.940</td>
<td>ug/L</td>
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<td>Cadmium</td>
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<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
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<tr>
<td>Chromium</td>
<td>2.08J</td>
<td>4.00</td>
<td>1.30</td>
<td>ug/L</td>
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<td>Lead</td>
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<td>1.00</td>
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<td>ug/L</td>
</tr>
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<td>0.0620</td>
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<tr>
<td>Silver</td>
<td>1.00U</td>
<td>2.00</td>
<td>0.620</td>
<td>ug/L</td>
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Batch Information

Analytical Batch: MMS9937
Analytical Method: SW6020A
Instrument: Perkin Elmer NexIon P5
Analyst: ACF
Analytical Date/Time: 9/15/2017  6:27:28PM

Prep Batch: MXX31041
Prep Method: SW3010A
Prep Date/Time: 9/14/2017  1:15:28PM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/27/2017  4:55:44PM
Blank Spike Summary

Blank Spike ID: LCS for HBN 1176481 [MXX31041]
Blank Spike Lab ID: 1412753
Date Analyzed: 09/15/2017 18:32
QC for Samples: 1176481001, 1176481002

Matrix: Water (Surface, Eff., Ground)

Results by SW6020A

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<th>Parameter</th>
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<th>Result</th>
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<th>CL</th>
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<td>1000</td>
<td>993</td>
<td>99</td>
<td>( 84-116 )</td>
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<tr>
<td>Barium</td>
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<td>979</td>
<td>98</td>
<td>( 86-114 )</td>
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<tr>
<td>Cadmium</td>
<td>100</td>
<td>98.1</td>
<td>98</td>
<td>( 87-115 )</td>
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<tr>
<td>Chromium</td>
<td>400</td>
<td>399</td>
<td>100</td>
<td>( 85-116 )</td>
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<tr>
<td>Lead</td>
<td>1000</td>
<td>1020</td>
<td>102</td>
<td>( 88-115 )</td>
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<tr>
<td>Mercury</td>
<td>10</td>
<td>9.85</td>
<td>99</td>
<td>( 70-124 )</td>
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<td>Selenium</td>
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<td>97</td>
<td>( 80-120 )</td>
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<tr>
<td>Silver</td>
<td>100</td>
<td>99.8</td>
<td>100</td>
<td>( 85-116 )</td>
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Batch Information

Analytical Batch: MMS9937
Analytical Method: SW6020A
Instrument: Perkin Elmer NexIon P5
Analyst: ACF

Prep Batch: MXX31041
Prep Method: SW3010A
Prep Date/Time: 09/14/2017 13:15
Spike Init Wt./Vol.: 1000 ug/L
Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:
## Matrix Spike Summary

Original Sample ID: 1412754  
Analysis Date: 09/15/2017 18:36  
MS Sample ID: 1412755 MS  
Analysis Date: 09/15/2017 18:41  
MSD Sample ID: 1412756 MSD  
Analysis Date: 09/15/2017 18:45  
Matrix: Water (Surface, Eff., Ground)  
QC for Samples: 1176481001, 1176481002

### Results by SW6020A

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<th>Parameter</th>
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<th>Result</th>
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<tr>
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<td>2.50U</td>
<td>1000</td>
<td>978</td>
<td>98</td>
<td>1000</td>
<td>999</td>
<td>100</td>
<td>84-116</td>
<td>2.09</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Barium</td>
<td>83.2</td>
<td>1000</td>
<td>1070</td>
<td>99</td>
<td>1000</td>
<td>1060</td>
<td>98</td>
<td>86-114</td>
<td>1.08</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1.00U</td>
<td>100</td>
<td>101</td>
<td>101</td>
<td>100</td>
<td>99.5</td>
<td>100</td>
<td>87-115</td>
<td>1.42</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Chromium</td>
<td>2.89J</td>
<td>400</td>
<td>399</td>
<td>99</td>
<td>400</td>
<td>404</td>
<td>100</td>
<td>85-116</td>
<td>1.34</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Lead</td>
<td>0.500U</td>
<td>1000</td>
<td>1040</td>
<td>104</td>
<td>1000</td>
<td>1010</td>
<td>101</td>
<td>88-115</td>
<td>1.97</td>
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<tr>
<td>Mercury</td>
<td>0.100U</td>
<td>10.0</td>
<td>10.4</td>
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<td>10.0</td>
<td>10.2</td>
<td>102</td>
<td>70-124</td>
<td>1.93</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Selenium</td>
<td>10.0U</td>
<td>1000</td>
<td>966</td>
<td>97</td>
<td>1000</td>
<td>975</td>
<td>98</td>
<td>80-120</td>
<td>0.91</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Silver</td>
<td>1.00U</td>
<td>100</td>
<td>106</td>
<td>106</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>85-116</td>
<td>5.20</td>
<td>(&lt; 20 )</td>
</tr>
</tbody>
</table>

### Batch Information

Analytical Batch: MMS9937  
Prep Batch: MXX31041  
Analytical Method: SW6020A  
Prep Method: 3010 H2O Digest for Metals ICP-MS  
Instrument: Perkin Elmer NexIon P5  
Prep Date/Time: 9/14/2017 1:15:28PM  
Analyst: ACF  
Prep Initial Wt./Vol.: 25.00mL  
Analytical Date/Time: 9/15/2017 6:41:00PM  
Prep Extract Vol: 25.00mL

Print Date: 09/27/2017 4:55:48PM
### Method Blank

Blank ID: MB for HBN 1768879 [XXX/38484]
Blank Lab ID: 1414674

QC for Samples:
1176481001, 1176481002

Matrix: Water (Surface, Eff., Ground)

### Results by AK102

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Range Organics</td>
<td>0.600U</td>
<td>1.20</td>
<td>0.360</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

### Surrogates

<table>
<thead>
<tr>
<th>Surrogates</th>
<th>Result</th>
<th>LOQ/CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a Androstane (surr)</td>
<td>90.1</td>
<td>60-120</td>
</tr>
</tbody>
</table>

### Batch Information

- **Analytical Batch:** XFC13827
- **Analytical Method:** AK102
- **Instrument:** Agilent 7890B F
- **Analyst:** JMG
- **Analytical Date/Time:** 9/23/2017 3:24:00PM

Prep Batch: XXX38484
Prep Method: SW3520C
Prep Date/Time: 9/21/2017 7:49:15AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol.: 2 mL
**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1176481 [XXX38484]
Blank Spike Lab ID: 1414675
Date Analyzed: 09/23/2017 15:34

QC for Samples: 1176481001, 1176481002

**Spike Duplicate ID:** LCSD for HBN 1176481 [XXX38484]
Spike Duplicate Lab ID: 1414676
Matrix: Water (Surface, Eff., Ground)

---

**Results by AK102**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Blank Spike (mg/L)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Range Organics</td>
<td></td>
<td>10</td>
<td>9.94</td>
<td>99</td>
<td>10</td>
<td>9.89</td>
<td>99</td>
<td></td>
<td>0.48</td>
<td>(&lt; 20 )</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td>0.2</td>
<td>101</td>
<td>101</td>
<td>0.2</td>
<td>103</td>
<td>103</td>
<td>( 60-120 )</td>
<td>1.60</td>
<td></td>
</tr>
</tbody>
</table>

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**Batch Information**

Analytical Batch: XFC13827
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: JMG

Prep Batch: XXX38484
Prep Method: SW3520C
Prep Date/Time: 09/21/2017 07:49
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
**Method Blank**

Blank ID: MB for HBN 1768879 [XXX/38484]  
Blank Lab ID: 1414674  
QC for Samples:  
1176481001, 1176481002

**Matrix:** Water (Surface, Eff., Ground)

**Results by AK103**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Range Organics</td>
<td>0.500U</td>
<td>1.00</td>
<td>0.300</td>
<td>mg/L</td>
</tr>
<tr>
<td><strong>Surrogates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>92.4</td>
<td>60-120</td>
<td></td>
<td>%</td>
</tr>
</tbody>
</table>

**Batch Information**

- Analytical Batch: XFC13827  
- Analytical Method: AK103  
- Instrument: Agilent 7890B F  
- Analyst: JMG  
- Analytical Date/Time: 9/23/2017 3:24:00PM  
- Prep Batch: XXX38484  
- Prep Method: SW3520C  
- Prep Date/Time: 9/21/2017 7:49:15AM  
- Prep Initial Wt./Vol.: 1000 mL  
- Prep Extract Vol.: 2 mL

Print Date: 09/27/2017 4:55:52PM
**Blank Spike Summary**

- **Blank Spike ID:** LCS for HBN 1176481 [XXX38484]
- **Blank Spike Lab ID:** 1414675
- **Date Analyzed:** 09/23/2017 15:34
- **QC for Samples:** 1176481001, 1176481002

- **Spike Duplicate ID:** LCSD for HBN 1176481 [XXX38484]
- **Spike Duplicate Lab ID:** 1414676
- **Matrix:** Water (Surface, Eff., Ground)

**Results by AK103**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Blank Spike (mg/L)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Range Organics</td>
<td></td>
<td>10</td>
<td>9.32</td>
<td>93</td>
<td>10</td>
<td>9.26</td>
<td>93</td>
<td>(60-120)</td>
<td>0.66</td>
<td>(&lt;20)</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td>0.2</td>
<td>94.9</td>
<td>95</td>
<td>0.2</td>
<td>101</td>
<td>101</td>
<td>(60-120)</td>
<td>6.20</td>
<td></td>
</tr>
</tbody>
</table>

**Batch Information**

- **Analytical Batch:** XFC13827
- **Analytical Method:** AK103
- **Instrument:** Agilent 7890B F
- **Analyst:** JMG

- **Prep Batch:** XXX38484
- **Prep Method:** SW3520C
- **Prep Date/Time:** 09/21/2017 07:49
- **Spike Init Wt./Vol.:** 10 mg/L  
  **Extract Vol.:** 2 mL
- **Dupe Init Wt./Vol.:** 10 mg/L  
  **Extract Vol.:** 2 mL
Method Blank

Blank ID: MB for HBN 1768881 [XXX/38485]  
Blank Lab ID: 1414681

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1176481001, 1176481002

Results by AK102

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRO Silica Gel</td>
<td>0.600U</td>
<td>1.20</td>
<td>0.360</td>
<td>mg/L</td>
</tr>
<tr>
<td><strong>Surrogates</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Androstane (surr)</td>
<td>79.1</td>
<td>70-125</td>
<td>%</td>
<td></td>
</tr>
</tbody>
</table>

Batch Information

Analytical Batch: XFC13828  
Analytical Method: AK102  
Instrument: Agilent 7890B R  
Analyst: JMG  
Analytical Date/Time: 9/23/2017 3:55:00PM  
Prep Batch: XXX38485  
Prep Method: SW3520C  
Prep Date/Time: 9/21/2017 7:49:12AM  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 2 mL
**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1176481 [XXX38485]
Blank Spike Lab ID: 1414682
Date Analyzed: 09/23/2017 16:05

QC for Samples: 1176481001, 1176481002

Spike Duplicate ID: LCSD for HBN 1176481 [XXX38485]
Spike Duplicate Lab ID: 1414683
Matrix: Water (Surface, Eff., Ground)

---

**Results by AK102**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Blank Spike (mg/L)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRO Silica Gel</td>
<td></td>
<td>10</td>
<td>8.75</td>
<td>88</td>
<td>10</td>
<td>9.03</td>
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<td>3.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(&lt; 20 )</td>
<td></td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td>0.2</td>
<td>95.2</td>
<td>95</td>
<td>0.2</td>
<td>100</td>
<td>100</td>
<td></td>
<td>5.10</td>
<td></td>
</tr>
<tr>
<td>5a Androstane (surr)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

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**Batch Information**

Analytical Batch: XFC13828
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: JMG

Prep Batch: XXX38485
Prep Method: SW3520C
Prep Date/Time: 09/21/2017 07:49
Spike Init Wt./Vol.: 10 mg/L  Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L   Extract Vol: 2 mL

Print Date: 09/27/2017 4:55:58PM

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com
Blank Lab ID: 1414681

QC for Samples:
1176481001, 1176481002

Results by AK103

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
<th>LOQ/CL</th>
<th>DL</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRO Silica Gel</td>
<td>0.500U</td>
<td>1.00</td>
<td>0.300</td>
<td>mg/L</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td>70-125</td>
<td>%</td>
</tr>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>88.3</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Batch Information

Analytical Batch: XFC13828
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: JMG
Analytical Date/Time: 9/23/2017 3:55:00PM

Prep Batch: XXX38485
Prep Method: SW3520C
Prep Date/Time: 9/21/2017 7:49:12AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol.: 2 mL
**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1176481 [XXX38485]
Blank Spike Lab ID: 1414682
Date Analyzed: 09/23/2017 16:05
QC for Samples: 1176481001, 1176481002

**Spike Duplicate ID:** LCSD for HBN 1176481 [XXX38485]
Spike Duplicate Lab ID: 1414683
Matrix: Water (Surface, Eff., Ground)

**Results by AK103**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>Spike</th>
<th>Result</th>
<th>Rec (%)</th>
<th>CL</th>
<th>RPD (%)</th>
<th>RPD CL</th>
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</thead>
<tbody>
<tr>
<td>RRO Silica Gel</td>
<td>10</td>
<td>8.38</td>
<td>84</td>
<td>10</td>
<td>8.96</td>
<td>90</td>
<td>(70-125)</td>
<td>6.70</td>
<td>(&lt;20)</td>
</tr>
<tr>
<td>Surrogates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Triacontane-d62 (surr)</td>
<td>0.2</td>
<td>93.8</td>
<td>94</td>
<td>0.2</td>
<td>101</td>
<td>101</td>
<td>(70-125)</td>
<td>7.60</td>
<td></td>
</tr>
</tbody>
</table>

**Batch Information**

Analytical Batch: XFC13828
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: JMG

Prep Batch: XXX38485
Prep Method: SW3520C
Prep Date/Time: 09/21/2017 07:49
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

Print Date: 09/27/2017 4:56:01PM

SGS North America Inc. 200 West Potter Drive Anchorage, AK 95518 t 907.562.2343 f 907.561.5301 www.us.sgs.com
**SGS North America Inc.**  
**CHAIN OF CUSTODY RECORD**

**CLIENT:** Michael Baker Intl  
**CONTACT:** Jenna Gillenwater  
**PHONE NO:** 907-273-1684  
**PROJECT NAME:** ASDP WQ  
**WATERID/PERMIT #:** 161682  
**REPORTS TO:** Jenna Gillenwater  
**E-MAIL:** Jen.Gillenwater@michaelbakerintl.com  
**INVOICE TO:** Michael Baker International  
**QUOTE #:** 338422

**Section 1**  
<table>
<thead>
<tr>
<th>RESERVED for lab use</th>
<th>SAMPLE IDENTIFICATION</th>
<th>DATE mm/dd/yy</th>
<th>TIME HH:MM</th>
<th>MATRIX/MATRIX CODE</th>
<th>CONTAINERS</th>
<th>Preservative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0A-C M9313</td>
<td>9/11/17</td>
<td>17:14</td>
<td>water</td>
<td>3 G</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0A-C M9313 Dup</td>
<td>9/11/17</td>
<td>17:24</td>
<td>water</td>
<td>3 G</td>
<td></td>
</tr>
</tbody>
</table>

**Section 2**  
<table>
<thead>
<tr>
<th>Relinquished By: (1)</th>
<th>Date</th>
<th>Time</th>
<th>Received By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Guttwiller</td>
<td>9/12/17</td>
<td>6:00 AM</td>
<td></td>
</tr>
</tbody>
</table>

**Section 3**  
<table>
<thead>
<tr>
<th># CONTAINERS</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCL</td>
</tr>
<tr>
<td></td>
<td>RO</td>
</tr>
</tbody>
</table>

**Section 4**  
<table>
<thead>
<tr>
<th>DOD Project?</th>
<th>Yes</th>
<th>Data Deliverable Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cooler ID:</td>
</tr>
</tbody>
</table>

**Section 5**  
<table>
<thead>
<tr>
<th>Relinquished By: (2)</th>
<th>Date</th>
<th>Time</th>
<th>Received By:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relinquished By: (3)</th>
<th>Date</th>
<th>Time</th>
<th>Received By:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relinquished By: (4)</th>
<th>Date</th>
<th>Time</th>
<th>Received For Laboratory By:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9/12/17</td>
<td>12:14</td>
<td></td>
</tr>
</tbody>
</table>

**Temp Blank °C:** 0.1

<table>
<thead>
<tr>
<th>Chain of Custody Seal:</th>
<th>INTACT</th>
<th>BROKEN</th>
<th>ABSENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(See attached Sample Receipt Form)

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http://www.sgs.com/terms-and-conditions

F083-Kit_Request_and_COC_Templates-Blank  
Revised 2013-03-24
## Review Criteria

<table>
<thead>
<tr>
<th>Review Criteria</th>
<th>Condition (Yes, No, N/A)</th>
<th>Exceptions Noted below</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chain of Custody / Temperature Requirements</strong></td>
<td></td>
<td>Exemption permitted if sampler hand carries/delivers.</td>
</tr>
<tr>
<td>Were Custody Seals intact? Note # &amp; location</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>COC accompanied samples?</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required.

**Exception permitted if chilled & collected <8 hours ago, or for samples where chilling is not required**

<table>
<thead>
<tr>
<th>Cooler ID:</th>
<th>1</th>
<th>@</th>
<th>°C</th>
<th>Therm. ID:</th>
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</thead>
<tbody>
<tr>
<td>Coolers ID:</td>
<td>2</td>
<td>0</td>
<td>°C</td>
<td>Therm. ID:</td>
</tr>
<tr>
<td>Coolers ID:</td>
<td>3</td>
<td>0</td>
<td>°C</td>
<td>Therm. ID:</td>
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<td>Coolers ID:</td>
<td>4</td>
<td>0</td>
<td>°C</td>
<td>Therm. ID:</td>
</tr>
<tr>
<td>Coolers ID:</td>
<td>5</td>
<td>0</td>
<td>°C</td>
<td>Therm. ID:</td>
</tr>
</tbody>
</table>

**If >6°C, were samples collected <8 hours ago?**

| N/A | |

**If <0°C, were sample containers ice free?**

| No | Sample 1B for DRO/RRO was received with ice in the container. |

### Holding Time / Documentation / Sample Condition Requirements

- Were samples received within holding time?  **Yes**
- Do samples match COC** (i.e., sample IDs, dates/times collected)?  **Yes**
  - **Note:** If times differ <1hr, record details & login per COC.
- Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)  **Yes**
- *Exemption permitted for metals (e.g., 200.8/6020A).*

### Volatile / LL-Hg Requirements

- Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?  **N/A**
- *Note to Client:* Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

- Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?  **N/A**
- Were all soil VOAs field extracted with MeOH+BFB?  **N/A**

### Additional notes (if applicable):

- Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.
### Sample Containers and Preservatives

<table>
<thead>
<tr>
<th>Container Id</th>
<th>Preservative</th>
<th>Container Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1176481001-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176481001-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176481001-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176481002-A</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176481002-B</td>
<td>HCL to pH &lt; 2</td>
<td>OK</td>
</tr>
<tr>
<td>1176481002-C</td>
<td>HNO3 to pH &lt; 2</td>
<td>OK</td>
</tr>
</tbody>
</table>

**Container Condition Glossary**

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates that an inappropriate container was submitted.

**OK** - The container was received at an acceptable pH for the analysis requested.

**BU** - The container was received with headspace greater than 6mm.

**DM** - The container was received damaged.

**FR** - The container was received frozen and not usable for Bacteria or BOD analyses.

**PA** - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

**PH** - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.