Alpine Satellite Development Plan (ASDP) Water Quality Monitoring 2014

ConocoPhillips Alaska

Michael Baker INTERNATIONAL

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October 2014
142425-MBJ-RPT-001

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ACRONYMS AND ABBREVIATIONS

µS/cm	Microsiemens per centimeter
°C	Degrees Celsius
°F	Degrees Fahrenheit
ADEC	Alaska Department of Environmental Conservation
ASDP	Alpine Satellite Development Plan
Baker	Michael Baker Jr., Inc.
CPAI	ConocoPhillips Alaska, Inc.
DO	Dissolved oxygen
DRO	Diesel range organics
FID	Flame ionization detector
ft	Feet
GC	Gas chromatography
ICP	Inductively coupled plasma
mg/L	Milligrams per liter
NSB	North Slope Borough
NTU	Nephelometric turbidity units
ppt	Parts per thousand
PSS	Practical Salinity Scale
RCRA	Resource Conservation and Recovery Act
RRO	Residual range organics
SGS	SGS North America, Inc.
USGS	U.S. Geological Survey

1.0 INTRODUCTION

The Alpine Satellite Development Plan (ASDP) 2014 Water Quality Monitoring Report presents the results of the field sampling conducted in August 2014 for ConocoPhillips Alaska, Inc. (CPAI). Annual monitoring of 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 by Michael Baker Jr., Inc. (Baker) since 2007. In 2013, Lake MB0301 was added to the annual water quality monitoring program. An overview of the four 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 new satellite drill sites, CD3 and CD4. The CD3 pad development included an airstrip and pad/airstrip access road, apron, and taxiway. The CD4 pad development included an access road running parallel to the existing Alpine Pipeline, connecting to the CD2 access road. Lake M9313 is near CD3, and lakes L9323 and L9324 are located north and south of CD4, respectively. In December 2011, CPAI was granted a permit allowing construction of a gravel road, bridge, and pipeline crossing over the Nigliq channel of the Colville River for the development of a satellite field five miles west of Alpine. Lake MB0301 is located approximately southeast of the CD5 pad.

The 2014 water quality monitoring program included in-situ field sampling of the four lakes for temperature, dissolved oxygen (DO), salinity, conductivity/specific conductance, and turbidity. Additional water samples were collected at the lakes for laboratory analysis of dissolved hydrocarbons: diesel range organics (DRO), residual range organics (RRO), and Resource Conservation and Recovery Act (RCRA) metals.

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Miles
0 0.75 1.5

Date: 09/26/2014	Project: 142425
Drawn: MEA	File: Figure 1.1
Checked: SME	Scale: 1 in = 2 miles

Legend

Road
Pipelines
Facility
Sample Lakes

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2014 OVERVIEW
ASDP WATER QUALITY MONITORING AREA

FIGURE: 1.1
(SHEET 1 of 1)

2.0 METHODS

On August 16, 2014, Baker conducted field investigations at lakes L9323, L9324, M9313, and MB0301. Pathfinder Aviation provided helicopter access to lakes L9324, M9313, and MB0301. An Alpine Environmental pickup truck was used to access Lake L9323.

In-situ water quality data measurements and laboratory sample collections were performed by a two-person Baker team. The Baker team used an inflatable kayak 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).

Photo 2.1: Inflatable kayaks used to collect water samples; August 16, 2014

Photo 2.2: Setting up equipment for water sampling; August 16, 2014

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 stratums 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 methods (USACE 1987).

Safety precautions were followed, as outlined in the North Slope Water Resources 2014 Health, Safety, and Environmental Plan (Baker 2014a) and the 2014 ASDP Water Quality Monitoring Job Safety Analysis (Baker 2014b). Baker employees worked in groups of two, and the helicopter remained on-site during the duration of the sampling process at L9324, M9313, and MB0301. At Lake L9323, Baker employees checked in with Alpine security before and after sampling. Personnel were equipped with U.S. Coast Guard-approved Type III anti-exposure work suits with integrated floatation during sampling.

2.1 Sample Lake Locations

Previous in-situ monitoring of North Slope lakes indicates 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 stations 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 (Baker 2010). The deepest part in Lake MB0301 was determined from lake bathymetry collected in July 2004.

Sample locations were identified and confirmed using a handheld global positioning system Garmin Rino 520HCx referenced to the North American [horizontal] Datum of 1983. The sample location for lakes L9323 and L9324 are shown in Figure 2.1. Figure 2.2 shows the sample locations for Lake M9313 and the sample location for Lake MB0301 is shown in Figure 2.3.

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Feet
0 1,000 2,000

Date: 09/26/2014	Project: 142425
Drawn: MEA	File: Figure 2.1
Checked: SME	Scale: 1 in = 2000 feet

Legend

Water Quality Sampling Point
Road
Pipelines
Facility
Sample Lakes

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Lake L9323 & L9324
ASDP Water Quality
Sampling Locations

FIGURE: 2.1
(SHEET 1 of 1)

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Feet
0 500 1,000

Date: 09/26/2014	Project: 142425
Drawn: MEA	File: Figure 2.2
Checked: SME	Scale: 1 in = 1000 feet

Legend

- Water Quality Sampling Point
- Pipelines
- Facility
- Sample Lake

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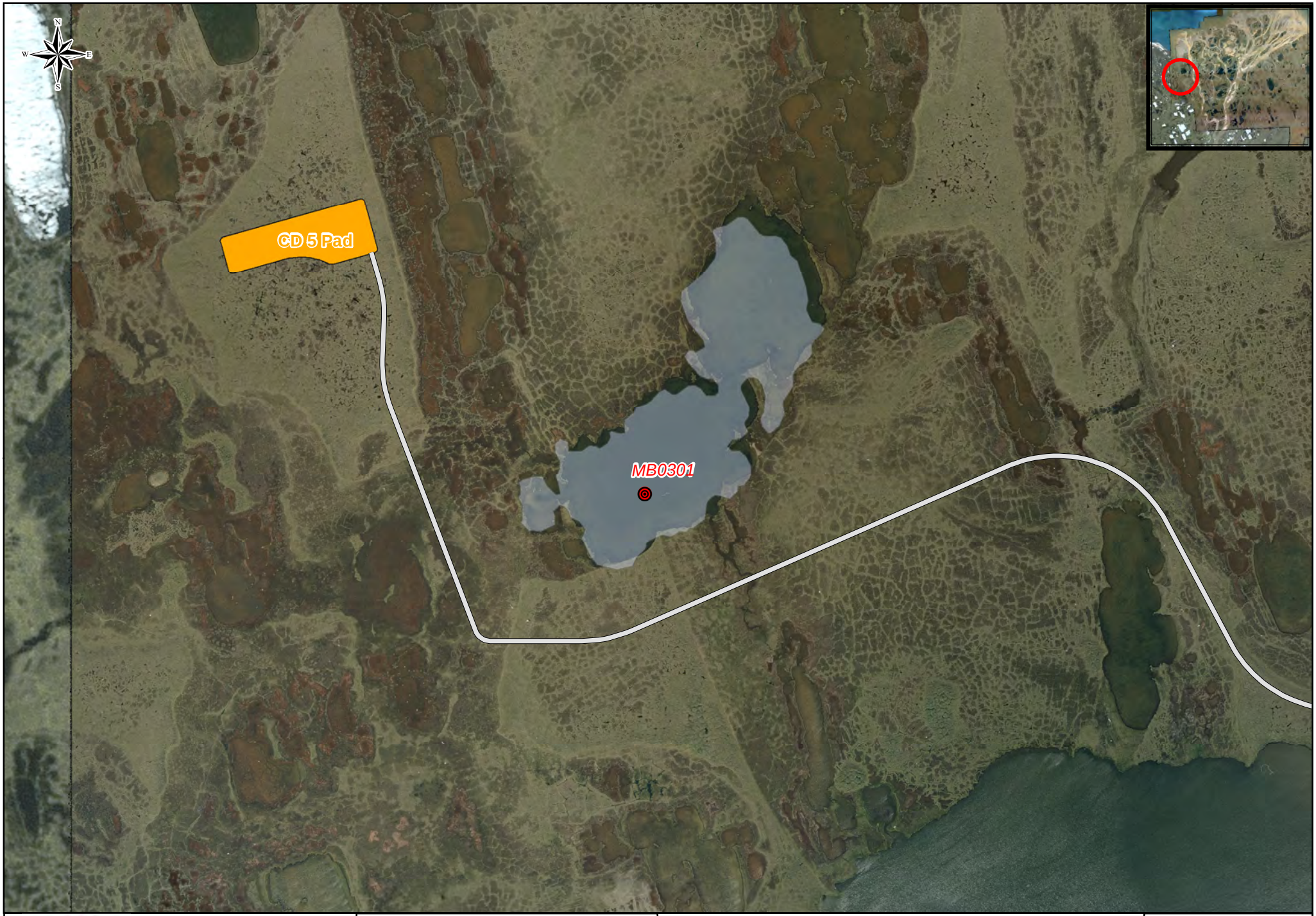
Lake M9313
ASDP Water Quality Sampling Location

FIGURE: 2.2

(SHEET 1 of 1)



ConocoPhillips Alaska

Feet
0 500 1,000

Date:	09/26/2014
Drawn:	MEA
Checked:	SME
Project:	142425
File:	Figure 2.3
Scale:	1 in = 1000 feet

Legend

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

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Lake MB0301
ASDP Water Quality Sampling Location

FIGURE: 2.3

(SHEET 1 of 1)

2.2 In-Situ Water Quality Parameters

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

Table 1: In-Situ Water Quality Parameters

Parameter	Units	Notes
Temperature	°C	degrees Celsius
Dissolved Oxygen	mg/L	milligrams per liter
Salinity	ppt	parts per thousand
Conductivity	µS/cm	microsiemens per centimeter
Specific Conductance	µS/cm	microsiemens per centimeter
Turbidity	NTU	Nephelometric Turbidity Units

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, temperature and pressure measurements, and the conversions defined by the Practical Salinity Scale (PSS) of 1978 (YSI 2007). 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^{o} C. Baker completed this analysis for the Colville River in 2005 resulting in a correction coefficient of 0.0196 (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.

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 NTU.

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 YSI 690 V2 meter was calibrated for conductivity and pH by Baker personnel the morning of sampling. In addition, a calibration check of the DO sensor was performed using tap water 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.

2.3 Laboratory Sample Collection and Analysis

Sample Collection

In-situ sampling was performed to confirm the water quality constituents were well-mixed within the water column at each sample location prior to laboratory sample collection. No oxyclines (notable change in oxygen concentration with depth) or thermoclines (notable change in temperature with depth) were apparent at any of lakes (Table 2). Therefore, a representative single point sample at mid-depth was collected at each 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. Bailers were discarded after use.

Sample bottles provided by SGS were stored in the provided cooler before, during, and after sample collection to maintain adequate storage temperatures and ensure chain of custody procedures were followed. Field samples were transported to SGS within 70 hours of initial sample collection. The procedures for transport and transfer are described in the SGS analysis report in Appendix A.

Laboratory Analysis

The laboratory analyses performed for each water sample obtained from lakes L9323, L9324, M9313 and MB0301 included DRO, RRO, and RCRA metals.

Diesel Range Organics (AK 102)

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.

Residual Range Organics (AK 103)

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.

RCRA Metals (SW6020)

The RCRA metals laboratory analysis method SW6020, developed by the U.S. Environmental Protection Agency Office of Solid Waste, employs inductively coupled plasma (ICP) - mass spectrometry 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.

3.0 2014 RESULTS

3.1 FIELD CONDITIONS - AUGUST 16, 2014

On August 16 during sampling at Lakes L9323 and MB0301, the temperature was 50 degrees Fahrenheit (°F). The weather was clear with light winds. Later that day, during sampling at Lakes L9324 and M9313, the temperature was 45 °F. The weather was overcast with moderate winds.

LAKE L9323

Located near CD4 and the Nigliq Channel, Lake L9323 is moderately sized with grassy banks and some vegetation on the periphery. Lake L9323 was hydraulically isolated at the time of sampling. No odor or film was observed while sampling the lake.

LAKE L9324

Located near CD4 and the Nigliq Channel, Lake L9324 is moderately sized with grassy banks and willows (Photo 3.1). Some large bluffs surround the lake. At the time of sampling, Lake L9324 appeared to be connected to the Sakoonang Channel; however, no flow could be verified between the two water bodies. No odor or film was observed while sampling the lake.

Photo 3.1: Lake L9324, looking northwest; August 16, 2014

LAKE M9313

Lake M9313, located near CD3 and the Ulamnigiaq Channel, is large with low grassy banks (Photo 3.2). At the time of sampling, Lake M9313 was connected to some areas of water ponded in adjacent polygons (Photo 3.3), but flow was not observable between water bodies. No odor or film was observed while sampling the lake.

Photo 3.2: Lake M9313, looking northeast; August 16, 2014

Photo 3.3: Water ponded in adjacent polygons at Lake M9313; August 16, 2014

LAKE MB0301

Located near the CD5 pad, Lake MB0301 is a moderately sized lake, with grassy banks. During sampling, Lake MB0301 was hydraulically connected to Lake L9308/Oil Lake via the small stream to the south (Photo 3.4) and was connected to the extensive wetlands to the northeast.

Photo 3.4: Lake MB0301, looking northeast; August 16, 2014

3.2 IN-SITU RESULTS

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. Samples for laboratory analysis were collected from the middle of the water column. The in-situ water quality results from the August 16, 2014 sampling event are tabulated in Table 2.

Table 2: In-Situ Water Quality Results

CPAI 2014 ASDP Water Quality Monitoring
In-Situ Water Quality

Michael Baker INTERNATIONAL
Sample Date: August 16, 2014

Lake Location Time	Total Depth (ft)	Turbidity (NTU)	Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (Percent Saturation)	Salinity (ppt)	pH
L9323 N70.2960° W150.9886° 20:49	19.0	-1.6	2	7.08	52	80	12.25	101.0	0.04	6.96
			4	7.08	52	80	12.28	101.3	0.04	6.90
			6	7.09	52	80	12.29	101.4	0.04	6.88
			8	7.09	52	80	12.29	101.5	0.04	6.86
			10	7.09	52	80	12.28	101.4	0.04	6.85
			12	7.09	52	80	12.24	101.1	0.04	6.83
			14	7.09	52	80	12.25	101.2	0.04	6.81
			16	7.09	52	80	12.24	101.1	0.04	6.81
			18	7.09	52	80	12.24	101.1	0.04	6.79
L9324 N70.2902° W150.9831° 13:21	7.3	7.1	2	6.27	42	66	12.42	100.4	0.03	5.95
			4	6.22	42	66	12.42	100.3	0.03	6.26
			6	6.14	42	67	12.41	100.1	0.03	6.32
			-	-	-	-	-	-	-	-
			-	-	-	-	-	-	-	-
M9313 N70.4219° W150.9000° 17:40	18.0	-1.4	2	5.79	442	709	12.43	99.6	0.34	7.22
			4	5.80	442	709	12.52	100.3	0.34	7.25
			6	5.80	442	709	12.55	100.5	0.34	7.26
			8	5.79	442	709	12.55	100.5	0.34	7.27
			10	5.80	442	709	12.52	100.4	0.34	7.27
			12	5.80	442	709	12.54	100.5	0.34	7.27
			14	5.81	442	708	12.53	100.4	0.34	7.27
			16	5.81	442	708	12.53	100.4	0.34	7.27
			18	5.81	442	708	12.52	100.3	0.34	7.28
MB0301 N70.3080° W151.2014° 16:39	7.0	-0.8	2	6.48	141	221	12.24	99.7	0.10	7.04
			4	6.46	141	221	12.29	100.0	0.10	7.12
			6	6.45	140	220	12.27	99.8	0.10	7.15
			-	-	-	-	-	-	-	-
			-	-	-	-	-	-	-	-

Notes:
(1) Sample depth is measured from the water surface.
(2) Turbidity, temperature, conductivity, dissolved oxygen, and salinity were measured using a YSI 650-6920V2 meter.
(3) Turbidity is presented as an average of the sampled values in the water column.
(4) Negative turbidity is typically traced to minute contamination of the zero calibration standard. According to the meter manufacture, a used instrument can contaminate a zero standard to almost 1.0 NTU.
(5) Specific conductance (referenced to 25°C) was obtained using a conversion coefficient of 0.0196 based on empirical data.

Specific Conductance

Specific conductance was considered homogenous throughout the water column at all sample locations, but was notably different between lakes. Measured values exceeding 500 µS/cm are indicative of saline environments (ADF&G, 2008) which are usually observed in lakes near the coast. The average specific conductance in Lake M9313, located nearest to the coast, was 709 µS/cm. Average specific conductance was 80 µS/cm in Lake L9323, 66 µS/cm in Lake L9324, and 221 µS/cm in Lake MB0301.

Dissolved Oxygen and Water Temperature

The concentrations of DO were considered homogenous throughout the water column at all sample locations. In 2014, the average DO was measured at 12.26 mg/L in Lake L9323, 12.42 mg/L in Lake

L9324, 12.52 mg/L in Lake M9313, and 12.27 mg/L in Lake MB0301. Compared to average DO values in 2013, the 2014 average DO value was slightly higher in all four lakes.

A 100% saturation level is based on standard temperature and pressure conditions. The average percent-saturation at Lake L9323 was 101.2%, Lake L9324 was 100.3%, Lake M9313 was 100.3%, and Lake MB0301 was 99.8%. The percent-saturation levels fall within the normal range for these lakes.

There were no significant oxyclines or thermoclines at any of the sampling sites. Generally, oxygen saturation was consistent throughout the water column in all lakes.

Temperatures in all lakes ranged from a maximum of 7.1°C in Lake L9323 to a minimum of 5.8°C in Lake M9313. The temperature in four all lakes remained consistent with depth.

SALINITY

Salinity remained consistent with depth at all lakes. The greatest concentration was measured in Lake M9313 at 0.34 ppt likely because of its coastal proximity. Lakes L9323, L9324, and MB0301 had concentrations of 0.04 ppt, 0.03 ppt, and 0.1 ppt, respectively.

TURBIDITY

Average turbidity for lakes L9323, M9313, and MB0301 was below 0.0 NTU. According to the meter manufacturer, a used instrument can contaminate a zero standard to almost 1.0 NTU. In addition, negative bias can result from interference because of absorbing particles, particle size, sample cell variations, particle density, and particle settling (Sadar, 2004). As a result, the negative turbidity measurements for these lakes can be interpreted as being close to 0.0 NTU. Average turbidity in Lake L9324 was 7.1 NTU.

3.3 LABORATORY RESULTS

With the exception of barium, analytical results show that targeted compounds and metals were not detected above the laboratory detection limit in lakes L9323, L9324, M9313, and MB0301. 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 0.204 mg/L in Lake M9313. Barium is not uncommon in arctic waters at concentrations similar to those measured at the four lakes (Guay and Falkner 1998). Analytical results and the laboratory report are presented in Table 3 and Appendix A, respectively.

DRO and RRO were not detected above the laboratory detection limits in samples collected from lakes L9323, L9324, M9313, and MB0301.

Table 3: Laboratory Analytical Results

Parameter	ADEC Cleanup Level[1] (mg/L)	Lake L9323 (mg/L)	Lake L9324 (mg/L)	Lake M9313 (mg/L)	Lake MB0301 (mg/L)
Arsenic	0.01	ND[2]	ND	ND	ND
Barium	2.0	0.0394	0.0505	0.204	0.147
Cadmium	0.005	ND	ND	ND	ND
Chromium	0.1	ND	ND	ND	ND
Lead	0.015	ND	ND	ND	ND
Mercury	0.002	ND	ND	ND	ND
Selenium	0.05	ND	ND	ND	ND
Silver	0.1	ND	ND	ND	ND
DRO	1.5	ND	ND	ND	ND
RRO	1.1	ND	ND	ND	ND

1. ADEC Water Quality Standards 18 AAC 75.345 Table C Groundwater Cleanup Waters (2009).
2. ND indicates analyte is not detected above the laboratory detection limit.

Source: SGS Laboratory Analysis Report 114897

4.0 REFERENCES

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Ward, J.R. and C.A. Harr eds. 1990. Methods for Collection and Processing Surface-Water and Bed-Material Samples for Physical and Chemical Analyses. Open-File Report 90-147.

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Appendix A Laboratory Analytical Results

Laboratory Report of Analysis

To: Michael Baker Jr., Inc.
165 South Union Blvd, Suite 200
Denver, CO 80228
(720)479-3165

Report Number: **1143897**

Client Project: **ASDP Water Quality**

Dear Sara Eklund,

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 five 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

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

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Case Narrative

SGS Client: **Michael Baker Jr., Inc.**
SGS Project: **1143897**
Project Name/Site: **ASDP Water Quality**
Project Contact: **Sara Eklund**

Refer to sample receipt form for information on sample condition.

LCS for HBN 1626068 [XXX/31787 (1228866) LCS

AK102 - LCS recovery for 5a-androstane (surrogate) does not meet QC criteria (biased high); however the sample surrogates are within criteria.

LCSD for HBN 1626068 [XXX/3178 (1228867) LCSD

AK102/103 - LCSD recoveries for 5a-androstane and n triacontane (surrogates) do not meet QC criteria (biased high); however the sample surrogates are within criteria.

14DL-01SW(1143870001MS) (1228105) MS

6020A - Metals - MS/MSD recoveries for multiple analytes were outside of acceptance criteria. Post digestion spike was successful.

14DL-01SW(1143870001MSD) (1228106) MSD

6020A - Metals - MS/MSD recoveries for multiple analytes were outside of acceptance criteria. 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.

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Laboratory Qualifiers

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
L9323	1143897001	08/16/2014	08/19/2014	Water (Surface, Eff., Ground)
L9324	1143897002	08/16/2014	08/19/2014	Water (Surface, Eff., Ground)
MB0301	1143897003	08/16/2014	08/19/2014	Water (Surface, Eff., Ground)
M9313	1143897004	08/16/2014	08/19/2014	Water (Surface, Eff., Ground)

Method	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

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Detectable Results Summary

Client Sample ID: **L9323**
Lab Sample ID: 1143897001
Metals by ICP/MS

Parameter	Result	Units
Barium	39.4	ug/L

Client Sample ID: **L9324**
Lab Sample ID: 1143897002
Metals by ICP/MS

Parameter	Result	Units
Barium	50.5	ug/L

Client Sample ID: **MB0301**
Lab Sample ID: 1143897003
Metals by ICP/MS

Parameter	Result	Units
Barium	147	ug/L

Client Sample ID: **M9313**
Lab Sample ID: 1143897004
Metals by ICP/MS

Parameter	Result	Units
Barium	204	ug/L

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Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897001
Lab Project ID: 1143897

Collection Date: 08/16/14 20:49
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.00	U	5.00	1.50	ug/L	5		08/21/14 17:39
Barium	39.4		3.00	0.940	ug/L	5		08/21/14 17:39
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:39
Chromium	4.00	U	4.00	1.20	ug/L	5		08/21/14 17:39
Lead	1.00	U	1.00	0.310	ug/L	5		08/21/14 17:39
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/21/14 17:39
Selenium	20.0	U	20.0	6.20	ug/L	5		08/21/14 17:39
Silver	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:39

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 08/21/14 17:39
Container ID: 1143897001-A

Prep Batch: MXX27992
Prep Method: SW3010A
Prep Date/Time: 08/20/14 09:30
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/05/2014 1:34:11PM

Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897001
Lab Project ID: 1143897

Collection Date: 08/16/14 20:49
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.25	U	1.25	0.375	mg/L	1		08/25/14 15:19
Surrogates								
5a Androstane	119		50-150		%	1		08/25/14 15:19

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 15:19
Container ID: 1143897001-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.04	U	1.04	0.313	mg/L	1		08/25/14 15:19
Surrogates								
n-Triacontane-d62	118		50-150		%	1		08/25/14 15:19

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 15:19
Container ID: 1143897001-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

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Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897001
Lab Project ID: 1143897

Collection Date: 08/16/14 20:49
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
DRO Silica Gel	1.25	U	1.25	0.375	mg/L	1		08/25/14 19:47
Surrogates								
5a Androstane	118		50-150		%	1		08/25/14 19:47

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 15:19
Container ID: 1143897001-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.04	U	1.04	0.313	mg/L	1		08/25/14 19:47
Surrogates								
n-Triacontane-d62	118		50-150		%	1		08/25/14 19:47

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 15:19
Container ID: 1143897001-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

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Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897002
Lab Project ID: 1143897

Collection Date: 08/16/14 13:21
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.00	U	5.00	1.50	ug/L	5		08/21/14 17:42
Barium	50.5		3.00	0.940	ug/L	5		08/21/14 17:42
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:42
Chromium	4.00	U	4.00	1.20	ug/L	5		08/21/14 17:42
Lead	1.00	U	1.00	0.310	ug/L	5		08/21/14 17:42
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/21/14 17:42
Selenium	20.0	U	20.0	6.20	ug/L	5		08/21/14 17:42
Silver	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:42

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 08/21/14 17:42
Container ID: 1143897002-A

Prep Batch: MXX27992
Prep Method: SW3010A
Prep Date/Time: 08/20/14 09:30
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/05/2014 1:34:11PM

Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897002
Lab Project ID: 1143897

Collection Date: 08/16/14 13:21
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.28	U	1.28	0.383	mg/L	1		08/25/14 15:40
Surrogates								
5a Androstane	119		50-150		%	1		08/25/14 15:40

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 15:40
Container ID: 1143897002-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.06	U	1.06	0.319	mg/L	1		08/25/14 15:40
Surrogates								
n-Triacontane-d62	118		50-150		%	1		08/25/14 15:40

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 15:40
Container ID: 1143897002-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

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Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897002
Lab Project ID: 1143897

Collection Date: 08/16/14 13:21
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
DRO Silica Gel	1.28	U	1.28	0.383	mg/L	1		08/25/14 20:08
Surrogates								
5a Androstane	114		50-150		%	1		08/25/14 20:08

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 15:40
Container ID: 1143897002-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.06	U	1.06	0.319	mg/L	1		08/25/14 20:08
Surrogates								
n-Triacontane-d62	114		50-150		%	1		08/25/14 20:08

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 15:40
Container ID: 1143897002-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

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Results of **MB0301**

Client Sample ID: **MB0301**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897003
Lab Project ID: 1143897

Collection Date: 08/16/14 16:39
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.00	U	5.00	1.50	ug/L	5		08/21/14 17:44
Barium	147		3.00	0.940	ug/L	5		08/21/14 17:44
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:44
Chromium	4.00	U	4.00	1.20	ug/L	5		08/21/14 17:44
Lead	1.00	U	1.00	0.310	ug/L	5		08/21/14 17:44
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/21/14 17:44
Selenium	20.0	U	20.0	6.20	ug/L	5		08/21/14 17:44
Silver	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:44

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 08/21/14 17:44
Container ID: 1143897003-A

Prep Batch: MXX27992
Prep Method: SW3010A
Prep Date/Time: 08/20/14 09:30
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/05/2014 1:34:11PM

Results of **MB0301**

Client Sample ID: **MB0301**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897003
Lab Project ID: 1143897

Collection Date: 08/16/14 16:39
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.28	U	1.28	0.385	mg/L	1		08/25/14 16:00
Surrogates								
5a Androstane	116		50-150		%	1		08/25/14 16:00

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 16:00
Container ID: 1143897003-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 935 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.07	U	1.07	0.321	mg/L	1		08/25/14 16:00
Surrogates								
n-Triacontane-d62	116		50-150		%	1		08/25/14 16:00

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 16:00
Container ID: 1143897003-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 935 mL
Prep Extract Vol: 2 mL

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Results of **MB0301**

Client Sample ID: **MB0301**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897003
Lab Project ID: 1143897

Collection Date: 08/16/14 16:39
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
DRO Silica Gel	1.28	U	1.28	0.385	mg/L	1		08/25/14 20:28
Surrogates								
5a Androstane	112		50-150		%	1		08/25/14 20:28

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 16:00
Container ID: 1143897003-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 935 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.07	U	1.07	0.321	mg/L	1		08/25/14 20:28
Surrogates								
n-Triacontane-d62	109		50-150		%	1		08/25/14 20:28

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 16:00
Container ID: 1143897003-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 935 mL
Prep Extract Vol: 2 mL

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Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897004
Lab Project ID: 1143897

Collection Date: 08/16/14 17:40
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.00	U	5.00	1.50	ug/L	5		08/21/14 17:47
Barium	204		3.00	0.940	ug/L	5		08/21/14 17:47
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:47
Chromium	4.00	U	4.00	1.20	ug/L	5		08/21/14 17:47
Lead	1.00	U	1.00	0.310	ug/L	5		08/21/14 17:47
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/21/14 17:47
Selenium	20.0	U	20.0	6.20	ug/L	5		08/21/14 17:47
Silver	2.00	U	2.00	0.620	ug/L	5		08/21/14 17:47

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 08/21/14 17:47
Container ID: 1143897004-A

Prep Batch: MXX27992
Prep Method: SW3010A
Prep Date/Time: 08/20/14 09:30
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/05/2014 1:34:11PM

Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897004
Lab Project ID: 1143897

Collection Date: 08/16/14 17:40
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.28	U	1.28	0.383	mg/L	1		08/25/14 16:21
Surrogates								
5a Androstane	121		50-150		%	1		08/25/14 16:21

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 16:21
Container ID: 1143897004-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.06	U	1.06	0.319	mg/L	1		08/25/14 16:21
Surrogates								
n-Triacontane-d62	121		50-150		%	1		08/25/14 16:21

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 16:21
Container ID: 1143897004-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Print Date: 09/05/2014 1:34:11PM

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Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **ASDP Water Quality**
Lab Sample ID: 1143897004
Lab Project ID: 1143897

Collection Date: 08/16/14 17:40
Received Date: 08/19/14 08:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
DRO Silica Gel	1.28	U	1.28	0.383	mg/L	1		08/25/14 20:50
Surrogates								
5a Androstane	119		50-150		%	1		08/25/14 20:50

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 08/25/14 16:21
Container ID: 1143897004-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.06	U	1.06	0.319	mg/L	1		08/25/14 20:50
Surrogates								
n-Triacontane-d62	123		50-150		%	1		08/25/14 20:50

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Analyst: EAB
Analytical Date/Time: 08/25/14 16:21
Container ID: 1143897004-C

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 08/22/14 11:55
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 2 mL

Print Date: 09/05/2014 1:34:11PM

Method Blank

Blank ID: MB for HBN 1625876 [MXX/27992]
Blank Lab ID: 1228103

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1143897001, 1143897002, 1143897003, 1143897004

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	2.50U	5.00	1.50	ug/L
Barium	1.50U	3.00	0.940	ug/L
Cadmium	1.00U	2.00	0.620	ug/L
Chromium	2.00U	4.00	1.20	ug/L
Lead	0.500U	1.00	0.310	ug/L
Mercury	0.100U	0.200	0.0620	ug/L
Selenium	10.0U	20.0	6.20	ug/L
Silver	1.00U	2.00	0.620	ug/L

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: ACF
Analytical Date/Time: 8/21/2014 4:59:32PM

Prep Batch: MXX27992
Prep Method: SW3010A
Prep Date/Time: 8/20/2014 9:30:44AM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1143897 [MXX27992]
Blank Spike Lab ID: 1228104
Date Analyzed: 08/21/2014 17:01

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **SW6020A**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	1000	959	96	(80-120)
Barium	1000	937	94	(80-120)
Cadmium	100	99.3	99	(80-120)
Chromium	400	384	96	(80-120)
Lead	1000	1030	103	(80-120)
Mercury	10	9.17	92	(80-120)
Selenium	1000	951	95	(80-120)
Silver	100	97.1	97	(80-120)

Batch Information

Analytical Batch: **MMS8648**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Sciex ICP-MS P3**
Analyst: **ACF**

Prep Batch: **MXX27992**
Prep Method: **SW3010A**
Prep Date/Time: **08/20/2014 09:30**
Spike Init Wt./Vol.: 1000 ug/L Extract Vol: 25 mL
Dup Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1228135
MS Sample ID: 1228105 MS
MSD Sample ID: 1228106 MSD

Analysis Date: 08/21/2014 17:04
Analysis Date: 08/21/2014 17:06
Analysis Date: 08/21/2014 17:08
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **SW6020A**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	10.4	1000	1040	103	1000	1030	102	80-120	1.09	(< 15)
Barium	249	1000	1260	101	1000	1220	97	80-120	3.38	(< 15)
Cadmium	1.00U	100	103	103	100	99.9	100	80-120	2.77	(< 15)
Chromium	2.64J	400	402	100	400	395	98	80-120	1.90	(< 15)
Lead	0.370J	1000	1010	101	1000	994	99	80-120	1.16	(< 15)
Mercury	0.135J	10.0	10.5	104	10.0	9.59	95	80-120	9.07	(< 15)
Selenium	27.8	1000	1080	105	1000	1060	104	80-120	1.09	(< 15)
Silver	1.00U	100	96.7	97	100	93.8	94	80-120	3.02	(< 15)

Batch Information

Analytical Batch: MMS8648
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: ACF
Analytical Date/Time: 8/21/2014 5:06:37PM

Prep Batch: MXX27992
Prep Method: 3010 H20 Digest for Metals ICP-MS
Prep Date/Time: 8/20/2014 9:30:44AM
Prep Initial Wt./Vol.: 25.00mL
Prep Extract Vol: 25.00mL

Print Date: 09/05/2014 1:34:25PM

Method Blank

Blank ID: MB for HBN 1626067 [XXX/31786]
Blank Lab ID: 1228860

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1143897001, 1143897002, 1143897003, 1143897004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
DRO Silica Gel	0.600U	1.20	0.360	mg/L
Surrogates				
5a Androstane	115	70-125		%

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: EAB
Analytical Date/Time: 8/25/2014 5:23:00PM

Prep Batch: XXX31786
Prep Method: SW3520C
Prep Date/Time: 8/22/2014 11:55:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1143897 [XXX31786]
Blank Spike Lab ID: 1228861
Date Analyzed: 08/25/2014 17:43

Spike Duplicate ID: LCSD for HBN 1143897 [XXX31786]
Spike Duplicate Lab ID: 1228862
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
DRO Silica Gel	10	9.54	95	10	9.84	98	(70-125)	3.10	(< 20)
Surrogates									
5a Androstane	0.2		118	0.2		120	(70-125)	2.30	

Batch Information

Analytical Batch: **XFC11528**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **EAB**

Prep Batch: **XXX31786**
Prep Method: **SW3520C**
Prep Date/Time: **08/22/2014 11:55**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dup Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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Method Blank

Blank ID: MB for HBN 1626067 [XXX/31786]
Blank Lab ID: 1228860

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1143897001, 1143897002, 1143897003, 1143897004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
RRO Silica Gel	0.500U	1.00	0.300	mg/L
Surrogates				
n-Triacontane-d62	116	70-125		%

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Instrument: HP 7890A FID SV E F
Analyst: EAB
Analytical Date/Time: 8/25/2014 5:23:00PM

Prep Batch: XXX31786
Prep Method: SW3520C
Prep Date/Time: 8/22/2014 11:55:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

Print Date: 09/05/2014 1:34:29PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1143897 [XXX31786]
Blank Spike Lab ID: 1228861
Date Analyzed: 08/25/2014 17:43

Spike Duplicate ID: LCSD for HBN 1143897 [XXX31786]
Spike Duplicate Lab ID: 1228862
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **AK103**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
RRO Silica Gel	10	9.85	99	10	10.5	105	(70-125)	6.30	(< 20)
Surrogates									
n-Triacontane-d62	0.2		107	0.2		114	(70-125)	7.00	

Batch Information

Analytical Batch: **XFC11528**
Analytical Method: **AK103**
Instrument: **HP 7890A FID SV E F**
Analyst: **EAB**

Prep Batch: **XXX31786**
Prep Method: **SW3520C**
Prep Date/Time: **08/22/2014 11:55**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dup Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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Method Blank

Blank ID: MB for HBN 1626068 [XXX/31787]
Blank Lab ID: 1228865

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1143897001, 1143897002, 1143897003, 1143897004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.600U	1.20	0.360	mg/L
Surrogates				
5a Androstane	117	60-120		%

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: EAB
Analytical Date/Time: 8/25/2014 12:55:00PM

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 8/22/2014 11:55:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1143897 [XXX31787]
Blank Spike Lab ID: 1228866
Date Analyzed: 08/25/2014 13:16

Spike Duplicate ID: LCSD for HBN 1143897 [XXX31787]
Spike Duplicate Lab ID: 1228867
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	10	10.1	101	10	10.9	109	(75-125)	7.40	(< 20)
Surrogates									
5a Androstane	0.2		121 *	0.2		129	* (60-120)	6.40	

Batch Information

Analytical Batch: **XFC11528**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **EAB**

Prep Batch: **XXX31787**
Prep Method: **SW3520C**
Prep Date/Time: **08/22/2014 11:55**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dup Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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Method Blank

Blank ID: MB for HBN 1626068 [XXX/31787]
Blank Lab ID: 1228865

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1143897001, 1143897002, 1143897003, 1143897004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.500U	1.00	0.300	mg/L
Surrogates				
n-Triacontane-d62	116	60-120		%

Batch Information

Analytical Batch: XFC11528
Analytical Method: AK103
Instrument: HP 7890A FID SV E F
Analyst: EAB
Analytical Date/Time: 8/25/2014 12:55:00PM

Prep Batch: XXX31787
Prep Method: SW3520C
Prep Date/Time: 8/22/2014 11:55:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

Print Date: 09/05/2014 1:34:34PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1143897 [XXX31787]
Blank Spike Lab ID: 1228866
Date Analyzed: 08/25/2014 13:16

Spike Duplicate ID: LCSD for HBN 1143897 [XXX31787]
Spike Duplicate Lab ID: 1228867
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1143897001, 1143897002, 1143897003, 1143897004

Results by **AK103**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	10	10.3	103	10	10.9	109	(60-120)	5.60	(< 20)
Surrogates									
n-Triacontane-d62	0.2		114	0.2		122	* (60-120)	6.40	

Batch Information

Analytical Batch: **XFC11528**
Analytical Method: **AK103**
Instrument: **HP 7890A FID SV E F**
Analyst: **EAB**

Prep Batch: **XXX31787**
Prep Method: **SW3520C**
Prep Date/Time: **08/22/2014 11:55**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dup Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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SGS North America Inc.
CHAIN OF CUSTODY RECORD

1143897

Locations Nationwide

ıska	Maryland
:w Jersey	New York
ɔrth Carolina	Indiana
/est Virgina	Kentucky

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: MICHAEL BAKER JR., INC

CONTACT: SARA EKLUND PHONE NO:

PROJECT NAME: ASDP WATER QUALITY PROJECT/ PWSID/ PERMIT#:

REPORTS TO: E-MAIL:

INVOICE TO: QUOTE #: P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: HCL	Preservative: HNO_3	REMARKS/ LOC ID
(1) A-E	L9323	8/16/2014	20:49	WATER	5	G	4	1	
(2) A-E	L9324	8/16/2014	13:21	WATER	5	G	4	1	
(3) A-E	MB0301	8/16/2014	16:39	WATER	5	G	4	1	
(4) A-E	M9313	8/16/2014	17:40	WATE	5	G	4	1	

Preservative: AK 102/103 + SG; RCRA METAL

Section 5

	Date	Time	
Relinquished By: (1) SARAH CASE	8/18/2014	1000hrs	Received By:
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	8/19/14	08:30	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 5.5/#241 6.0/#241 or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 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

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

SGS

1143897

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	(Yes) No N/A (Yes) No	☐ *Exemption permitted if sampler hand carries/delivers.* 1F 2a
Temperature blank compliant* (i.e., 0-6°C after CF)? *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: 1 @ 5.5 w/ Therm.ID: 241 Cooler ID: 2 @ 6.0 w/ Therm.ID: 241 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are 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."	(Yes) No Yes No (N/A) Yes No (N/A)	☐ *Exemption permitted if chilled & collected <8 hrs ago.* *Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.*
Delivery method (specify all that apply): Client (hand carried) USPS Lynden AK Air (Alert Courier) UPS FedEx RAVN C&D Delivery Carlile Pen Air Warp Speed Other: _____ → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Tracking/AB # or see attached or (N/A) (Yes) No N/A	KMW 8/19/14
→ For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
→ For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed. SRF initiated in FBKS by:		
Were samples received within hold time? Do samples **match COC*** (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	*Note: Refer to form F-083 "Sample Guide" for hold times.* *Note: If times differ <1hr, record details and login per COC.*
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	(Yes) No	
Were **proper containers** (type/mass/volume/preservative*) used? Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	(Yes) No N/A Yes No (N/A) Yes No (N/A) Yes No (N/A)	☐ *Exemption permitted for metals (e.g., 200.8/6020A).*
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	(Yes) No N/A Yes No (N/A)	
For **special handling** (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: KMW PM notified: N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: N/A
Additional notes (if applicable):		

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

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1143897001-A	HNO3 to pH < 2	OK			
1143897001-B	HCL to pH < 2	OK			
1143897001-C	HCL to pH < 2	OK			
1143897001-D	HCL to pH < 2	OK			
1143897001-E	HCL to pH < 2	OK			
1143897002-A	HNO3 to pH < 2	OK			
1143897002-B	HCL to pH < 2	OK			
1143897002-C	HCL to pH < 2	OK			
1143897002-D	HCL to pH < 2	OK			
1143897002-E	HCL to pH < 2	OK			
1143897003-A	HNO3 to pH < 2	OK			
1143897003-B	HCL to pH < 2	OK			
1143897003-C	HCL to pH < 2	OK			
1143897003-D	HCL to pH < 2	OK			
1143897003-E	HCL to pH < 2	OK			
1143897004-A	HNO3 to pH < 2	OK			
1143897004-B	HCL to pH < 2	OK			
1143897004-C	HCL to pH < 2	OK			
1143897004-D	HCL to pH < 2	OK			
1143897004-E	HCL to pH < 2	OK			

Container Condition Glossary

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

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.

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

Alert Expeditors Inc.
DBA/Petroleum Courier Service

#346486

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 5-19-11

From SARAH CASE

To SCT?

Collect ❐	Prepay ❐ Account ❐	Advance Charges ❐
Job #	PO#	

2 CUTTERS

1143897

Shipped Signature

Total Charge

Received By:

AIRPORT OF DEPARTURE SCC | 08/18/14 | 10:01 | 095850 | **808 6676964** | **Dash**

SHIPPER'S NAME, ADDRESS & PHONE

SARAH CASE

DEADHORSE AK 9072306811

SHIPPER'S ACCOUNT NUMBER

NOT NEGOTIABLE
AIR WAYBILL
(AIR CONSIGNMENT NOTE)

Ravn ALASKA

4700 Old International Airport Road
Anchorage, Alaska 99502

It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT AS LISTED IN THE COMPANIES TARIFFS. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS' LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

Received in Good Condition

Place Date

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER AS PER TARIFF RULE UNLESS SHIPPER GIVES OTHER INSTRUCTION HEREON

CONSIGNEE'S NAME, ADDRESS & PHONE

SGS NORTH AMERICA
200 W. POTTER DRIVE
ANCHORAGE AK 9075622343

CONSIGNEE'S ACCOUNT NUMBER

ISSUING CARRIER'S AGENT NAME, CITY & PHONE

ALSO NOTIFY NAME & ADDRESS

AGENT'S IATA CODE

ACCOUNT NO.

ACCOUNTING INFORMATION 6875815
Card VI 0036 Exp 0117

AIRPORT OF DEPARTURE: Deadhorse

Declared Value: $ 0.00

Insured Amount: $ 0.00

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY

COMMENTS: Dash Rate

AIRPORT OF DESTINATION: Anchorage

FOR CARRIER USE ONLY

FLIGHT/DATE: 0

FLIGHT/DATE:

No. Of Pieces Rcp	Gross Weight	kg lb	Rate Class	Commodity Item No.	Chargeable Weight	Rate/Charge	Total	Nature and Quantity of Goods
1	49	lb	F		1	$109.18	$109.18	box- water sample--DASH
1	32	lb	N		0	$0.00	$0.00	box- water sample--dash
2	81						$109.18	

1143897

PREPAID	WEIGHT CHARGE	COLLECT
$109.18		

VALUATION CHARGE: $0.00

FEDERAL EXCISE TAX: $6.82

TOTAL OTHER CHARGES DUE AGENT: $0.00

TOTAL OTHER CHARGES DUE CARRIER: $0.00

TOTAL PREPAID: $116.00

TOTAL COLLECT:

OTHER CHARGES AND DESCRIPTION

AMOUNT	DESCRIPTION

HAZMAT: No

Shipper certifies that the particulars on the face hereof are correct, agrees to the CONDITIONS AS LISTED IN THE COMPANIES TARIFFS, accepts that carrier's liability is limited as stated in the companies tariffs and accepts such value unless a higher value for carriage is declared on the face hereof subject to an additional charge and that insofar as any part of the consignment contains restricted articles, such part is described by name and is in proper condition for carriage by air according to applicable national governmental regulations, and for international shipments, the current International Air Transport Association's Restricted Articles Regulations.

Printed Name and Title

Signature

STATION NUMBERS

ANCHORAGE - (907) 243-2761
ANIAK - (907) 675-4572
BARROW - (907) 852-5300
BETHEL -(907) 543-3825
DEADHORSE - (907) 659-9222
FAIRBANKS - (907) 450-7250
GALENA -(907) 656-1875
KOTZEBUE - (907) 442-3020
NOME - (907) 443-7595
ST. MARYS - (907) 438-2247
UNALAKLEET - (907) 624-3595

Printed at 10:16:27 on 8/18/2014 at SCC-1 10.10.0.3

Consignee Copy

2014 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring