2015 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring

ConocoPhillips Alaska

Michael Baker INTERNATIONAL
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October 2015

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ACRONYMS AND ABBREVIATIONS

^{0}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
µS/cm	Microsiemens per centimeter
mg/L	Milligrams per liter
Michael Baker	Michael Baker International
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.

1.0 INTRODUCTION

The 2015 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring Report presents the results of the field sampling conducted in August 2015 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 International (Michael Baker) 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 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.

The 2015 water quality monitoring program included in-situ field sampling of the three 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 0.5 1 2

Date: 10/21/2014	Project: 148369
Drawn: MEA	File: Figure 1.1
Checked: SME	Scale: 1 in = 2 miles

Legend

Road — Pipeline — Sample Lake — Facility

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2015 ASDP
Water Quality
Monitoring Sites

FIGURE: 1.1
(SHEET 1 of 1)

2.0 METHODS

On August 24, 2015, Michael Baker conducted field investigations at lakes L9323, L9324, and M9313. Pathfinder Aviation provided helicopter access to lakes L9324 and M9313. The helicopter was used for equipment drop off at Lake L9324 only. An Alpine Environmental pickup truck was used to access lakes L9323 and L9324 for sampling.

In-situ water quality data measurements and laboratory sample collections were performed by a two-person Michael Baker team. The Michael Baker 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 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 2015 Health, Safety, and Environmental Plan (Michael Baker 2015a) and the 2015 ASDP Water Quality Monitoring Job Safety Analysis (Michael Baker 2015b). Michael Baker employees worked in groups of two, and the helicopter remained on-site during the duration of the sampling process at Lake M9313. At lakes L9323 and L9324, Michael 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.

Photo 2.1: Equipment used to collect water quality data and samples; August 24, 2015

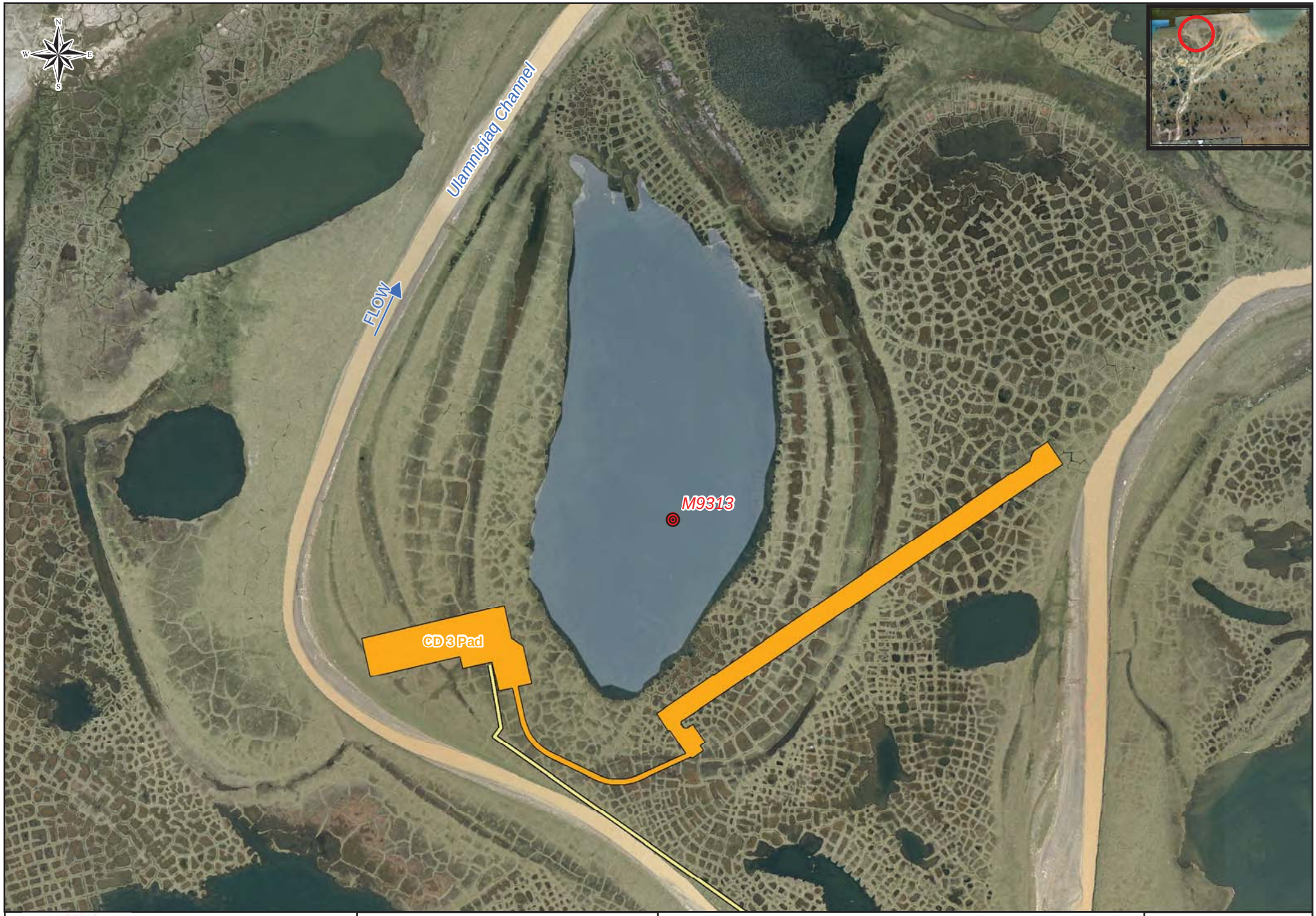
Photo 2.2: Recording in-situ water quality data; August 24, 2015

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 (Michael Baker 2010).

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 location for Lake M9313.



ConocoPhillips Alaska

Feet
0 500 1,000

Date: 09/01/2015	Project: 148369
Drawn: MEA	File: Figure 2.2
Checked: SME	Scale: 1 in = 1000 feet

Legend

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

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Lake M9313
ASDP Water Quality
Sampling Location

FIGURE: 2.2

(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 2.1.

Table 2.1: 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°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.

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).

2.2.1 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 by Michael 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

2.3.1 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 3.2). 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. 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 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.

2.3.2 Laboratory Analysis

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

2.3.3 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.

2.3.4 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.

2.3.5 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 2015 RESULTS

3.1 FIELD CONDITIONS - AUGUST 24, 2015

The average temperature during sampling on August 24, 2015 was 46 degrees Fahrenheit. The weather throughout the day was overcast with light winds (10 mph).

3.1.1 LAKE L9323

Located near CD4 and the Nigliq Channel, Lake L9323 is moderately sized with grassy banks and some vegetation on the periphery (Photo 3.1). Lake L9323 was hydraulically isolated at the time of sampling (Photo 3.2). No odor or film was observed while sampling the lake.

Photo 3.1: Lake L9323, looking southeast; August 24, 2015

Photo 3.2: Lake L9323, looking northeast; August 24, 2015

3.1.2 LAKE L9324

Located near CD4 and the Nigliq Channel, Lake L9324 is moderately sized with grassy banks and willows (Photo 3.3). Some large bluffs surround the lake. Lake L9324 was hydraulically isolated at the time of sampling (Photo 3.4). No odor or film was observed while sampling the lake.

Photo 3.3: Lake L9324, looking northwest; August 24, 2015

Photo 3.4: Lake L9324, looking southeast; August 24, 2015

3.1.3 LAKE M9313

Lake M9313, located near CD3 and the Ulamnigiaq Channel, is large with low grassy banks (Photo 3.5). At the time of sampling, Lake M9313 was connected to some areas of water ponded in adjacent polygons (Photo 3.6), but flow was not observed between water bodies. No odor or film was observed while sampling the lake.

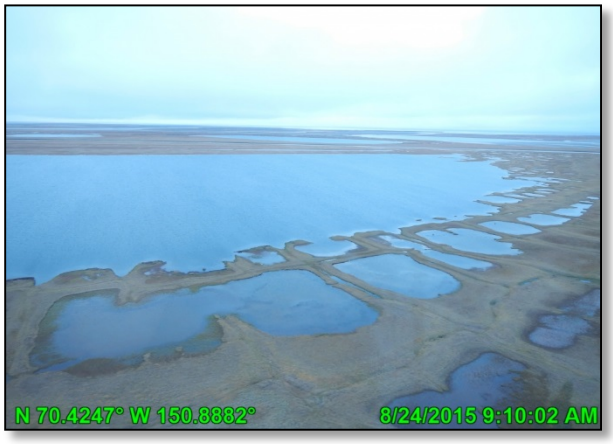

Photo 3.5: Lake M9313, looking northwest; August 24, 2015

Photo 3.6: Lake M9313, looking southeast; August 24, 2015

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. The in-situ water quality results from the August 24, 2015 sampling event are tabulated in Table 3.1.

Table 3.1: In-Situ Water Quality Results

Michael Baker INTERNATIONAL

CPAI 2015 ASDP Water Quality Monitoring
In-Situ Water Quality

Sample Date: August 24, 2015

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)
L9323 N70.2961° W150.9883° 17:00	19.0	0.7	2	6.50	63	99	12.77	103.9	0.05
			4	6.50	63	99	12.74	103.5	0.05
			6	6.50	63	99	12.73	103.6	0.05
			8	6.49	63	99	12.73	103.5	0.05
			10	6.48	63	99	12.71	103.4	0.05
			12	6.47	63	99	12.69	103.2	0.05
			14	6.48	63	99	12.69	103.2	0.05
			16	6.50	63	99	12.67	103.2	0.05
			18	6.49	63	99	12.68	103.2	0.05
L9324 N70.2902° W150.9832° 15:30	8.0	1.6	2	6.36	89	140	13.19	107.0	0.07
			4	6.36	89	140	13.21	106.6	0.07
			6	6.35	89	140	13.22	107.2	0.07
			8	6.36	89	140	13.24	107.4	0.07
			-	-	-	-	-	-	-
M9313 N70.4219° W150.9000° 11:00	21.0	-0.2	2	5.35	434	706	12.88	102.0	0.34
			4	5.35	434	706	12.89	102.0	0.34
			6	5.35	434	706	12.86	101.8	0.34
			8	5.34	434	706	12.82	101.7	0.34
			10	5.35	434	706	12.85	101.7	0.34
			12	5.34	434	706	12.84	101.7	0.34
			14	5.35	434	706	12.84	101.5	0.34
			16	5.35	434	706	12.83	101.7	0.34
			18	5.34	434	706	12.80	101.4	0.34
			20	5.33	434	706	12.82	101.5	0.34

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 manufacturer, 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.

3.2.1 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 which are usually observed in lakes near the coast (ADF&G 2008). The average specific conductance was 99 µS/cm in Lake L9323 and 140 µS/cm in Lake L9324. Average specific conductance in Lake M9313, located nearest to the coast, was 706 µS/cm.

3.2.2 Dissolved Oxygen and Water Temperature

The concentrations of DO were considered homogenous throughout the water column at all sample locations. In 2015, the average DO was measured at 12.71 mg/L in Lake L9323, 13.22 mg/L in Lake L9324, and 12.84 mg/L in Lake M9313. Compared to average DO values in 2014, the 2015 average DO value was slightly higher in all three lakes.

A 100% saturation level is based on standard temperature and pressure conditions. The average percent-saturation at Lake L9323 was 103.4%, Lake L9324 was 107.1%, and Lake M9313 was 101.7%. The percent-saturation levels fall within the typical 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 6.5°C in Lake L9323 to a minimum of 5.3°C in Lake M9313. The temperature in all three lakes remained consistent with depth.

3.2.3 Salinity

Salinity remained consistent with depth in all three lakes. The greatest concentration was measured in Lake M9313 at 0.34 ppt, likely due to its coastal proximity. Lakes L9323 and L9324 had concentrations of 0.05 ppt and 0.07 ppt, respectively.

3.2.4 Turbidity

Average turbidity for Lake M9313 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 this lake can be interpreted as being close to 0.0 NTU. Average turbidity in lakes L9323 and L9324 was 0.7 NTU and 1.6 NTU, respectively.

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, and M9313. 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 0.211 mg/L in lake M9313. Barium is not uncommon in arctic waters at concentrations similar to those measured at the three lakes (Guay and Falkner 1998). Analytical results and the laboratory report are presented in Table 3.2 and Appendix A, respectively.

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

Table 3.2: Laboratory Analytical Results

Parameter	ADEC Cleanup Level[1] (mg/L)	Lake L9323 (mg/L)	Lake L9323[2] (mg/L)	Lake L9324 (mg/L)	Lake M9313 (mg/L)
Arsenic	0.01	ND[3]	ND	ND	ND
Barium	2.0	0.0431	0.0446	0.0777	0.211
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 (ADEC 2009).
2. Duplicate sample
3. ND indicates analyte is not detected above the laboratory detection limit.

Source: SGS Laboratory Analysis Report 1154857

4.0 REFERENCES

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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: **1154857**

Client Project: **2015 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 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

Print Date: 10/01/2015 3:00:01PM

Case Narrative

SGS Client: **Michael Baker Jr., Inc.**
SGS Project: **1154857**
Project Name/Site: **2015 ASDP Water Quality**
Project Contact: **Sara Eklund**

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.

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

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. 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, indenmification 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, 8021B, 8082A, 8260B, 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
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
M9313	1154857001	08/24/2015	08/27/2015	Water (Surface, Eff., Ground)
L9324	1154857002	08/24/2015	08/27/2015	Water (Surface, Eff., Ground)
L9323	1154857003	08/24/2015	08/27/2015	Water (Surface, Eff., Ground)
L9323 DUP	1154857004	08/24/2015	08/27/2015	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

Detectable Results Summary

Client Sample ID: **M9313**
Lab Sample ID: 1154857001
Metals by ICP/MS

Parameter	Result	Units
Barium	211	ug/L

Client Sample ID: **L9324**
Lab Sample ID: 1154857002
Metals by ICP/MS

Parameter	Result	Units
Barium	77.7	ug/L

Client Sample ID: **L9323**
Lab Sample ID: 1154857003
Metals by ICP/MS

Parameter	Result	Units
Barium	43.1	ug/L

Client Sample ID: **L9323 DUP**
Lab Sample ID: 1154857004
Metals by ICP/MS

Parameter	Result	Units
Barium	44.6	ug/L

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Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857001
Lab Project ID: 1154857

Collection Date: 08/24/15 11:00
Received Date: 08/27/15 08:46
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		08/31/15 17:31
Barium	211		3.00	0.940	ug/L	5		08/31/15 17:31
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:31
Chromium	4.00	U	4.00	1.20	ug/L	5		08/31/15 17:31
Lead	1.00	U	1.00	0.310	ug/L	5		08/31/15 17:31
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/31/15 17:31
Selenium	20.0	U	20.0	6.20	ug/L	5		08/31/15 17:31
Silver	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:31

Batch Information

Analytical Batch: MMS9070
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 08/31/15 17:31
Container ID: 1154857001-C

Prep Batch: MXX29048
Prep Method: SW3010A
Prep Date/Time: 08/31/15 08:39
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857001
Lab Project ID: 1154857

Collection Date: 08/24/15 11:00
Received Date: 08/27/15 08:46
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		09/15/15 02:10
Surrogates								
5a Androstane (surr)	81.1		50-150		%	1		09/15/15 02:10

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:10
Container ID: 1154857001-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
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		09/15/15 02:10
Surrogates								
n-Triacontane-d62 (surr)	91.1		50-150		%	1		09/15/15 02:10

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:10
Container ID: 1154857001-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

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Results of **M9313**

Client Sample ID: **M9313**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857001
Lab Project ID: 1154857

Collection Date: 08/24/15 11:00
Received Date: 08/27/15 08:46
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		09/14/15 18:14
Surrogates								
5a Androstane (surr)	76.1		50-150		%	1		09/14/15 18:14

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:10
Container ID: 1154857001-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
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		09/14/15 18:14
Surrogates								
n-Triacontane-d62 (surr)	86.6		50-150		%	1		09/14/15 18:14

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:10
Container ID: 1154857001-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 2 mL

Print Date: 10/01/2015 3:00:15PM

Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857002
Lab Project ID: 1154857

Collection Date: 08/24/15 15:30
Received Date: 08/27/15 08:46
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		08/31/15 17:41
Barium	77.7		3.00	0.940	ug/L	5		08/31/15 17:41
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:41
Chromium	4.00	U	4.00	1.20	ug/L	5		08/31/15 17:41
Lead	1.00	U	1.00	0.310	ug/L	5		08/31/15 17:41
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/31/15 17:41
Selenium	20.0	U	20.0	6.20	ug/L	5		08/31/15 17:41
Silver	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:41

Batch Information

Analytical Batch: MMS9070
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 08/31/15 17:41
Container ID: 1154857002-C

Prep Batch: MXX29048
Prep Method: SW3010A
Prep Date/Time: 08/31/15 08:39
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857002
Lab Project ID: 1154857

Collection Date: 08/24/15 15:30
Received Date: 08/27/15 08:46
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	1.27	U	1.27	0.381	mg/L	1		09/15/15 02:31
Surrogates								
5a Androstane (surr)	81		50-150		%	1		09/15/15 02:31

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:31
Container ID: 1154857002-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 945 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	0.317	mg/L	1		09/15/15 02:31
Surrogates								
n-Triacontane-d62 (surr)	86.5		50-150		%	1		09/15/15 02:31

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:31
Container ID: 1154857002-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 945 mL
Prep Extract Vol: 2 mL

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Results of **L9324**

Client Sample ID: **L9324**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857002
Lab Project ID: 1154857

Collection Date: 08/24/15 15:30
Received Date: 08/27/15 08:46
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	1.27	U	1.27	0.381	mg/L	1		09/14/15 18:35
Surrogates								
5a Androstane (surr)	82.5		50-150		%	1		09/14/15 18:35

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:31
Container ID: 1154857002-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 945 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	0.317	mg/L	1		09/14/15 18:35
Surrogates								
n-Triacontane-d62 (surr)	89.2		50-150		%	1		09/14/15 18:35

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:31
Container ID: 1154857002-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 945 mL
Prep Extract Vol: 2 mL

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Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857003
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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		08/31/15 17:43
Barium	43.1		3.00	0.940	ug/L	5		08/31/15 17:43
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:43
Chromium	4.00	U	4.00	1.20	ug/L	5		08/31/15 17:43
Lead	1.00	U	1.00	0.310	ug/L	5		08/31/15 17:43
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/31/15 17:43
Selenium	20.0	U	20.0	6.20	ug/L	5		08/31/15 17:43
Silver	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:43

Batch Information

Analytical Batch: MMS9070
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 08/31/15 17:43
Container ID: 1154857003-C

Prep Batch: MXX29048
Prep Method: SW3010A
Prep Date/Time: 08/31/15 08:39
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 10/01/2015 3:00:15PM

Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857003
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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	1.26	U	1.26	0.377	mg/L	1		09/15/15 02:51
Surrogates								
5a Androstane (surr)	84.9		50-150		%	1		09/15/15 02:51

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:51
Container ID: 1154857003-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 955 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.05	U	1.05	0.314	mg/L	1		09/15/15 02:51
Surrogates								
n-Triacontane-d62 (surr)	89.9		50-150		%	1		09/15/15 02:51

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:51
Container ID: 1154857003-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 955 mL
Prep Extract Vol: 2 mL

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Results of **L9323**

Client Sample ID: **L9323**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857003
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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	1.26	U	1.26	0.377	mg/L	1		09/14/15 18:56
Surrogates								
5a Androstane (surr)	77.4		50-150		%	1		09/14/15 18:56

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 02:51
Container ID: 1154857003-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 955 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.05	U	1.05	0.314	mg/L	1		09/14/15 18:56
Surrogates								
n-Triacontane-d62 (surr)	82.8		50-150		%	1		09/14/15 18:56

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 02:51
Container ID: 1154857003-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 955 mL
Prep Extract Vol: 2 mL

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Results of **L9323 DUP**

Client Sample ID: **L9323 DUP**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857004
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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		08/31/15 17:45
Barium	44.6		3.00	0.940	ug/L	5		08/31/15 17:45
Cadmium	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:45
Chromium	4.00	U	4.00	1.20	ug/L	5		08/31/15 17:45
Lead	1.00	U	1.00	0.310	ug/L	5		08/31/15 17:45
Mercury	0.200	U	0.200	0.0620	ug/L	5		08/31/15 17:45
Selenium	20.0	U	20.0	6.20	ug/L	5		08/31/15 17:45
Silver	2.00	U	2.00	0.620	ug/L	5		08/31/15 17:45

Batch Information

Analytical Batch: MMS9070
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 08/31/15 17:45
Container ID: 1154857004-C

Prep Batch: MXX29048
Prep Method: SW3010A
Prep Date/Time: 08/31/15 08:39
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Results of **L9323 DUP**

Client Sample ID: **L9323 DUP**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857004
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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	1.24	U	1.24	0.371	mg/L	1		09/15/15 03:12
Surrogates								
5a Androstane (surr)	76.2		50-150		%	1		09/15/15 03:12

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 03:12
Container ID: 1154857004-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 970 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	1.03	U	1.03	0.309	mg/L	1		09/15/15 03:12
Surrogates								
n-Triacontane-d62 (surr)	90.9		50-150		%	1		09/15/15 03:12

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 03:12
Container ID: 1154857004-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 970 mL
Prep Extract Vol: 2 mL

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Results of **L9323 DUP**

Client Sample ID: **L9323 DUP**
Client Project ID: **2015 ASDP Water Quality**
Lab Sample ID: 1154857004
Lab Project ID: 1154857

Collection Date: 08/24/15 17:00
Received Date: 08/27/15 08:46
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	1.24	U	1.24	0.371	mg/L	1		09/14/15 19:16
Surrogates								
5a Androstane (surr)	67.6		50-150		%	1		09/14/15 19:16

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 09/15/15 03:12
Container ID: 1154857004-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 970 mL
Prep Extract Vol: 2 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
RRO Silica Gel	1.03	U	1.03	0.309	mg/L	1		09/14/15 19:16
Surrogates								
n-Triacontane-d62 (surr)	82.8		50-150		%	1		09/14/15 19:16

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 09/15/15 03:12
Container ID: 1154857004-A

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 09/04/15 09:22
Prep Initial Wt./Vol.: 970 mL
Prep Extract Vol: 2 mL

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Method Blank

Blank ID: MB for HBN 1718868 [MXX/29048]
Blank Lab ID: 1287412

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1154857001, 1154857002, 1154857003, 1154857004

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: MMS9070
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: EAB
Analytical Date/Time: 8/31/2015 4:44:52PM

Prep Batch: MXX29048
Prep Method: SW3010A
Prep Date/Time: 8/31/2015 8:39:25AM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1154857 [MXX29048]
Blank Spike Lab ID: 1287413
Date Analyzed: 08/31/2015 16:47

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

Results by **SW6020A**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	1000	1020	102	(84-116)
Barium	1000	993	99	(86-114)
Cadmium	100	101	101	(87-115)
Chromium	400	406	101	(85-116)
Lead	1000	1060	106	(88-115)
Mercury	10	10.5	105	(70-124)
Selenium	1000	1020	102	(80-120)
Silver	100	104	104	(85-116)

Batch Information

Analytical Batch: **MMS9070**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Sciex ICP-MS P3**
Analyst: **EAB**

Prep Batch: **MXX29048**
Prep Method: **SW3010A**
Prep Date/Time: **08/31/2015 08:39**
Spike Init Wt./Vol.: 1000 ug/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1287425
MS Sample ID: 1287414 MS
MSD Sample ID: 1287415 MSD

Analysis Date: 08/31/2015 16:49
Analysis Date: 08/31/2015 16:51
Analysis Date: 08/31/2015 16:54
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

Results by **SW6020A**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	2.50U	1000	1030	103	1000	1020	102	84-116	1.08	(< 20)
Barium	16.5	1000	991	97	1000	984	97	86-114	0.74	(< 20)
Cadmium	1.00U	100	100	100	100	99.8	100	87-115	0.40	(< 20)
Chromium	2.00U	400	402	100	400	398	100	85-116	0.81	(< 20)
Lead	0.500U	1000	1060	106	1000	1040	104	88-115	1.97	(< 20)
Mercury	0.100U	10.0	10.1	101	10.0	10.3	103	70-124	1.52	(< 20)
Selenium	10.0U	1000	1030	103	1000	1010	101	80-120	1.12	(< 20)
Silver	1.00U	100	102	102	100	101	101	85-116	0.47	(< 20)

Batch Information

Analytical Batch: MMS9070
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: EAB
Analytical Date/Time: 8/31/2015 4:51:57PM

Prep Batch: MXX29048
Prep Method: 3010 H20 Digest for Metals ICP-MS
Prep Date/Time: 8/31/2015 8:39:25AM
Prep Initial Wt./Vol.: 25.00mL
Prep Extract Vol: 25.00mL

Print Date: 10/01/2015 3:00:41PM

Method Blank

Blank ID: MB for HBN 1719250 [XXX/34044]
Blank Lab ID: 1288490

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1154857001, 1154857002, 1154857003, 1154857004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
DRO Silica Gel	0.418J	1.20	0.360	mg/L
Surrogates				
5a Androstane (surr)	75.7	70-125		%

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 9/14/2015 12:24:00PM

Prep Batch: XXX34044
Prep Method: SW3520C
Prep Date/Time: 9/4/2015 9:22:18AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1154857 [XXX34044]
Blank Spike Lab ID: 1288491
Date Analyzed: 09/14/2015 12:45

Spike Duplicate ID: LCSD for HBN 1154857 [XXX34044]
Spike Duplicate Lab ID: 1288492
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

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	9.16	92	10	8.83	88	(70-125)	3.80	(< 20)
Surrogates									
5a Androstane (surr)	0.2	85	85	0.2	85.8	86	(70-125)	0.95	

Batch Information

Analytical Batch: **XFC12086**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34044**
Prep Method: **SW3520C**
Prep Date/Time: **09/04/2015 09:22**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

Print Date: 10/01/2015 3:00:43PM

Method Blank

Blank ID: MB for HBN 1719250 [XXX/34044]
Blank Lab ID: 1288490

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1154857001, 1154857002, 1154857003, 1154857004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
RRO Silica Gel	0.500U	1.00	0.300	mg/L
Surrogates				
n-Triacontane-d62 (surr)	84.1	70-125		%

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 9/14/2015 12:24:00PM

Prep Batch: XXX34044
Prep Method: SW3520C
Prep Date/Time: 9/4/2015 9:22:18AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1154857 [XXX34044]
Blank Spike Lab ID: 1288491
Date Analyzed: 09/14/2015 12:45

Spike Duplicate ID: LCSD for HBN 1154857 [XXX34044]
Spike Duplicate Lab ID: 1288492
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

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	9.02	90	10	8.91	89	(70-125)	1.30	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.2	86.5	87	0.2	87.2	87	(70-125)	0.79	

Batch Information

Analytical Batch: **XFC12086**
Analytical Method: **AK103**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34044**
Prep Method: **SW3520C**
Prep Date/Time: **09/04/2015 09:22**
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 1719251 [XXX/34045]
Blank Lab ID: 1288493

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1154857001, 1154857002, 1154857003, 1154857004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.600U	1.20	0.360	mg/L
Surrogates				
5a Androstane (surr)	82.6	60-120		%

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 9/14/2015 8:18:00PM

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 9/4/2015 9:22:42AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1154857 [XXX34045]
Blank Spike Lab ID: 1288494
Date Analyzed: 09/14/2015 20:39

Spike Duplicate ID: LCSD for HBN 1154857 [XXX34045]
Spike Duplicate Lab ID: 1288495
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

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	9.36	94	10	9.50	95	(75-125)	1.40	(< 20)
Surrogates									
5a Androstane (surr)	0.2	92	92	0.2	91.3	91	(60-120)	0.79	

Batch Information

Analytical Batch: **XFC12086**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34045**
Prep Method: **SW3520C**
Prep Date/Time: **09/04/2015 09:22**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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Method Blank

Blank ID: MB for HBN 1719251 [XXX/34045]
Blank Lab ID: 1288493

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1154857001, 1154857002, 1154857003, 1154857004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.500U	1.00	0.300	mg/L
Surrogates				
n-Triacontane-d62 (surr)	91	60-120		%

Batch Information

Analytical Batch: XFC12086
Analytical Method: AK103
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 9/14/2015 8:18:00PM

Prep Batch: XXX34045
Prep Method: SW3520C
Prep Date/Time: 9/4/2015 9:22:42AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 2 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1154857 [XXX34045]
Blank Spike Lab ID: 1288494
Date Analyzed: 09/14/2015 20:39

Spike Duplicate ID: LCSD for HBN 1154857 [XXX34045]
Spike Duplicate Lab ID: 1288495
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1154857001, 1154857002, 1154857003, 1154857004

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	9.13	91	10	9.02	90	(60-120)	1.10	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.2	94.7	95	0.2	95.3	95	(60-120)	0.61	

Batch Information

Analytical Batch: **XFC12086**
Analytical Method: **AK103**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34045**
Prep Method: **SW3520C**
Prep Date/Time: **09/04/2015 09:22**
Spike Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL
Dupe Init Wt./Vol.: 10 mg/L Extract Vol: 2 mL

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ODY RECORD

SGS Environmental Services
200 West Potter Road
Anchorage, AK 99518
(907) 562-2343
www.sgs.com/alaska

SECTION 1

CLIENT: Michael Baker International

CONTACT: Garrett Yager PHONE #: 907.273.1608

PROJECT NAME: 2015 ASDP Water Quality PROJECT/ PWSID/ PERMIT #: 148369

REPORTS TO: Garrett Yager E-MAIL: garrett.yager@mbakerintl.com

INVOICE TO: Garrett Yager QUOTE #: Qt 12114A P.O. #:

INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS

Page 1 of 1

SECTION 3

SECTION 2

RESERVED FOR LAB USE	SAMPLE IDENTIFICATION	DATE MM/DD/YY	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	SAMPLE TYPE: Comp Grab MI (Multi-incremental)	PRESERVATIVE: HCl	HNO3							REMARKS/ LOC ID
							DRO/RRO w/SG Cleanup	RCRA Metal							
1 A-C	M9313	08/24/2015	11:00	Water	3	G	✓	✓							
2 A-C	L9324	08/24/2015	15:30	Water	3	G	✓	✓							
3 A-C	L9323	08/24/2015	17:00	Water	6	G	✓	✓							
4 A-C															

SECTION 5

	DATE	TIME	
RELINQUISHED BY: (1) Jen Gillenwater	08/27/2015	08:40	RECEIVED BY:
RELINQUISHED BY:(2)			RECEIVED BY:
RELINQUISHED BY:(3)			RECEIVED BY:
RELINQUISHED BY:(4)	8/27/15	0846	RECEIVED FOR LABORATORY BY:

SECTION 4 DOD Project? NO

COC ID:

Cooler ID:

DATA DELIVERABLE REQUIREMENTS:

REQUESTED TURNAROUND TIME AND/OR SPECIAL INSTRUCTIONS

TEMP BLANK °C: 1.0 1.02

ORAMBIENT

CHAIN OF CUSTODY SEALS: INTACT BROKEN ABSENT

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

F101_eCOC_Revised_2014-12-10

1154857

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	☐ ☑	☑ ☐	☐ ☐	***Exemption permitted if sampler hand carries/delivers.***
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] _____ @ 1.0 _____ w/ Therm.ID: D2 _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ 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."	☑ ☐ ☐	☐ ☑ ☑	☐ ☐ ☐	***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?*	☐	☑	☐	
	Yes	N/A	No	
Were samples received within hold time? Do samples **match COC*** (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	☑ ☑ ☑	☐ ☐ ☐	☐ ☐ ☐	***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:	☑	☐	☐	
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?	☑ ☐ ☐ ☐	☐ ☑ ☑ ☑	☐ ☐ ☐ ☐	☐ ***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)?	☑ ☐	☐ ☑	☐ ☐	
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)?	☐	☑	☐	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	☐	☑	☐	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	☐	☑	☐	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	☐	☑	☐	SRF Completed by: KPV 8/27/15 PM notified:
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	☑	☐	☐	Peer Reviewed by: VDL
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

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1154857001-A	HCL to pH < 2	OK			
1154857001-B	HCL to pH < 2	OK			
1154857001-C	HNO3 to pH < 2	OK			
1154857002-A	HCL to pH < 2	OK			
1154857002-B	HCL to pH < 2	OK			
1154857002-C	HNO3 to pH < 2	OK			
1154857003-A	HCL to pH < 2	OK			
1154857003-B	HCL to pH < 2	OK			
1154857003-C	HNO3 to pH < 2	OK			
1154857004-A	HCL to pH < 2	OK			
1154857004-B	HCL to pH < 2	OK			
1154857004-C	HNO3 to pH < 2	OK			

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.
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.

2015 Alpine Satellite Development Plan (ASDP) Water Quality Monitoring

Michael Baker INTERNATIONAL

148369-MBJ-RPT-001 | October 2015