

April 2, 2021

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Subject: Letter Report for 2020 Groundwater Sampling at ARRC Former Mammoth Trucking 1048 Whitney Road, Anchorage, Alaska 99501 Rev. 1.0
ADEC File # 2100.26.202

Mr. Grandel:

Restoration Science & Engineering, LLC (RSE) is providing the following letter report for groundwater sampling of four (4) monitoring wells located at the Alaska Railroad Corporation (ARRC) Former Mammoth Trucking Facility located at 1048 Whitney Road in Anchorage, Alaska (Figure 1, Attachment A). This site is listed under file 2100.26.202 in the Alaska Department of Environmental Conservation (ADEC) contaminated sites database.

SITE OVERVIEW

In 1990, the following underground storage tanks (USTs) were removed from the Former Mammoth Trucking Facility:

- One (1) 500-gallon gasoline UST;
- One (1) 2,000-gallon diesel UST;
- One (1) 12,000-gallon diesel UST;
- One (1) 300-gallon used oil UST; and
- One (1) 1,000-gallon used oil UST.

During UST removal, obvious impacts to the subsurface were noted. In 1994, Laidlaw Transit assumed the lease for the subject property and installed four groundwater monitoring wells. Groundwater sampling performed by EMCON Alaska, Inc. measured diesel range organics (DRO), gasoline range organics (GRO) and volatile organic compounds (VOCs), including

tetrachloroethene (PCE) and vinyl chloride above ADEC Table C Groundwater cleanup levels. These four wells were reportedly buried beneath new asphalt or destroyed between 1994 and 1997 (RSE, 2018b).

In 1997, CH2MHill began a groundwater study on an adjacent property to determine if up-gradient sources of petroleum free product hydrocarbons or solvents were migrating towards Ship Creek from north and east of Whitney Road. Free product was not detected during the CH2MHill investigation. However, PCE was detected in groundwater in 1997 and again in 1998 (RSE, 2018b).

In 1998, CH2MHill installed nine soil borings; five of which were completed as monitoring wells. In December 1998, CH2MHill collected groundwater samples from each well for DRO, residual range organics (RRO), benzene, toluene, ethylbenzene and total xylenes (collectively referred to as BTEX), as well as specific VOCs. The event measured DRO, benzene and PCE were detected above ADEC Table C cleanup levels (RSE, 2018b).

Numerous groundwater investigation efforts have occurred since the late 1990s, along with additional corrective actions to remediate the site. This report, submitted in October 2016, reported five of the six wells exceeded ADEC Table C cleanup levels standards for DRO and multiple VOCs. Historically, the depth to groundwater has been reported between 4 feet and 9 feet below ground surface (bgs), with a southerly groundwater gradient (RSE, 2018b).

In September of 2017, RSE conducted field efforts including a groundwater sampling event and a groundwater elevation survey of all six (6) wells. Monitoring wells MW-7, CHMWE5 and CHMWE2 exceeded the ADEC Table C cleanup levels for DRO. CHMWE5, EMCONMW4, and CHMWE2 exceeded ADEC Table C cleanup levels for RRO. MW-7 exceeded the ADEC Table C cleanup levels for naphthalene. Monitoring wells MW-7, MW-6, CHMWE5, and CHMWE2 results for vinyl chloride exceeded the ADEC Table C cleanup levels. Groundwater was found to flow south towards Ship Creek during this field event (RSE, 2018b).

Based on a review of the ADEC contaminated sites database, Table A on the next page illustrates the historic highest target analyte concentrations from any one monitoring well located at the Former Mammoth Trucking Facility.

Table A. Historic Highest Concentrations for Contaminants of Potential Concern

COPCs	Historic Highest Concentration (mg/L)	Reference	ADEC Table C Cleanup Level (mg/L)
DRO	26.6	CH2MHill, 1999	1.5
RRO	11.9	CH2MHill, 1999	1.1
GRO	3.1	EMCON, 1994	2.2
Benzene	0.01	RSE, 2012	0.005
Vinyl chloride	0.0258	Clarus, 2010	0.002
PCE	0.044	CH2MHill, 1999	0.005
TCE	0.03	CH2MHill, 1999	0.005

OBJECTIVES

This field event provides additional groundwater monitoring data for the wells located at the Former Mammoth Trucking site to support observed trends of natural attenuation and determine whether additional monitoring or other actions may be required. Only four of the six monitoring wells were sampled, MW-6, MW-7, CHMWE1 and CHMWE2, due to the diminished condition of wells EMCONMW4 and CHMWE5. Additionally, a groundwater elevation survey was performed of the four wells to determine the groundwater gradient.

CONTAMINANTS OF POTENTIAL CONCERN

Based upon the results of previous investigations, RSE identified the following contaminants of potential concern (COPCs):

Table B. Contaminants of Potential Concern

COPC	Matrix	COPC Abbreviation	ADEC-Approved Lab Method	ADEC Table C Groundwater Cleanup
Gasoline Range Organics	Water	GRO	AK 101	2.2 mg/L
Diesel Range Organics	Water	DRO	AK 102	1.5 mg/L
Residual Range Organics	Water	RRO	AK 103	1.1 mg/L
Volatile Organic Compounds	Water	VOCs	EPA 8260	Varies

FIELD EVENTS – GROUNDWATER SAMPLING

Once the RSE QEP mobilized to the subject property on October 6, 2020, RSE collected groundwater samples from monitoring wells MW-6, MW-7, CHMWE1 and CHMWE2 and two wells EMCONMW4 and CHMWE5 were not sampled. RSE examined the condition of each well and documented the condition of each well. Monitoring well EMCONMW4 was observed to be in a depression filled with water and as a result was not sampled. The monument for EMCONMW4 was observed to missing all the bolts that secure the well monument casing cover.

Monitoring well CHMWE5 was found to be in disrepair as the monument was damaged and the space between the housing and the polyvinyl chloride (PVC) piping was packed with soil. The well plug was in place, but the seal did not appear to be effective in keeping sediment out of the well. The well was not sampled and RSE placed a new monument cover on the casing for CHMWE5 and re-secured the well cap to eliminate intrusion of dirt and debris.

Monitoring well MW-6 was found in good condition. Monitoring well CHMWE1 was missing all the bolts for the casing cover but the well plug remained intact. The monument and housing for monitoring well MW-7 appeared slightly frost jacked above the ground surface. Monitoring well CHMWE2 was found without a monument cover, but the well plug was intact.

RSE measured the depth to the bottom of each well, and the depth to groundwater. Following these observations, RSE then purged three (3) well volumes from each well using a submersible pump. Water quality parameters were monitored using a YSI 556 for stabilization when readings collected 3-5 minutes apart were within the following:

- pH \pm 0.1
- Temperature \pm 3% (minimum of \pm 0.2C)
- Conductivity \pm 3%
- Specific Conductance \pm 10 mv
- Dissolved Oxygen \pm 10%

Tabulated field parameters for the 2020 groundwater sampling event can be found in Table 1 of Attachment B.

Monitoring well sampling was informed by EPA Low Flow (minimal draw down) Groundwater Sampling Procedures (EPA/540/S-95/504, April 1996). RSE re-measured the depth to groundwater following purging and prior to sampling using a water level indicator.

One (1) sample was collected from each of the four wells sampled for GRO, DRO, RRO and VOCs. A duplicate sample, MW-X of CHMWE2, was submitted to the laboratory for quality control purposes. Polyaromatic hydrocarbons by select ion monitoring (PAH SIM) analyses were not required during these field efforts by the ADEC project manager who approved the 2020 ARRC Mammoth Trucking Work Plan. The water samples were each collected using new, dedicated tubing. The water level indicator and any other equipment that is not disposable or dedicated was decontaminated with Alconox and distilled water.

As water samples were collected, care was taken to minimize volatile loss by excessive turbulence or air mixing. Field personnel avoided spilling or over-diluting acid sample preservatives. Water

samples were placed directly into method-specific containers and stored in a clean, chilled sample cooler. The cooler was transported under chain-of-custody to ADEC-approved laboratory, SGS North America Inc. located in Anchorage, Alaska.

The submersible pump was decontaminated using Alconox and distilled water between sampling at each well. RSE sampled from the historically least-contaminated well to the most-contaminated well so as to minimize potential cross-contamination between sample sites.

GROUNDWATER ELEVATION SURVEY

RSE conducted the groundwater elevation survey for MW-6, MW-7, CHMWE1 and CHMWE2 using a Leica Rugby 620 and a Leica Rod Eye 160. RSE performed the survey two (2) times to ensure accuracy. The two (2) sets were within 0.02 feet of each other, indicating that the data gathered is sufficiently accurate. RSE also surveyed monitoring wells RSE-1, RSE-2, RSE-3 and RSE-4 from the west adjacent ARRC Arctic Cooperage site (ADEC File No. 100.38.042).

RSE reduced the groundwater elevation data and then uploaded it into Surfer, a gradient modeling software program. RSE used Surfer to create a groundwater gradient figure using this data and overlaid it onto the site map (Figure 2 in Attachment A). Groundwater was found to flow south towards Ship Creek during 2018 and 2019 field efforts. The groundwater gradient was observed to flow south during the 2020 field event, towards Ship Creek.

RESULTS

RSE collected one (1) groundwater sample from monitoring wells MW-7, CHMWE1, MW-6 and two groundwater samples from monitoring well CHMWE2, which included a blind duplicate MW-X. All five (5) groundwater samples were analyzed for DRO, RRO, GRO and VOCs. Tabulated groundwater sample results are provided in Tables 2-4 of Attachment B.

GRO results for all samples were non-detect or below ADEC Table C Groundwater cleanup level (GCLs). DRO results for groundwater samples MW-6, MW-7, CHMWE1, CHMWE-2 and its blind duplicate MW-X ranged from 1.30 mg/L to 5.15 mg/L. The GCL for DRO is 1.5 mg/L. RRO results for groundwater samples MW-6, MW-7, CHMWE-2 and its blind duplicate MW-X ranged from 1.22 mg/L to 6.01 mg/L, above the GCL of 1.1 mg/L. All other GRO and RRO results were non-detect or below GCLs.

PCE results for groundwater sample CHMWE1 were 47 ug/L, and above the GCL of 41 ug/L. TCE results for groundwater samples CHMWE2 and its blind duplicate MW-X were 4.39 ug/L and 3.44 ug/L, respectively, above the GCL of 2.8 ug/L. Vinyl chloride results for groundwater samples MW-6, MW-7, CHMWE2 and its blind duplicate MW-X range from 0.483 ug/L to 18.7 ug/L, above

the GCL of 0.19 ug/L. All other VOC results were non-detect or below their GCLs.

INVESTIGATIVE DERIVED WASTE

Consumables such as tubing and gloves were placed into a trash receptacle for disposal. Non-consumables such as water level indicator and submersible pump were decontaminated using Alconox and water between sampling at each well. Tubing for water samples was dedicated to each well and disposed of following use. RSE filtered all purge and decontamination water through a granular activated carbon (GAC) filter and discharged the water on a vegetated, upland area where the water could not leave the site.

QUALITY ASSURANCE AND QUALITY CONTROL

RSE collected each sample in general accordance with applicable ADEC regulation and guidance documents. A single blind duplicate (MW-X of CHMWE2) was submitted with the laboratory samples for quality control purposes. RSE submitted one (1) trip blank with the cooler containing volatile samples. RSE has completed the ADEC Laboratory Review checklist (Attachment E). The SGS laboratory report 1205492 can be found as Attachment D. The pH data shown in Table 1 of Attachment B appears off-scale, likely due to a sensor failure. RSE had to replace the pH sensor in their YSI after these sampling efforts, because a pH above 10 at this site is unlikely.

CONCLUSION

Results from the 2020 sampling event yielded DRO and RRO exceedances above GCLs in monitoring wells MW-6, MW-7 and CHMWE2; PCE exceedances in monitoring well CHMWE1 above GCLs; TCE exceedances above GCLs in monitoring well CHMWE2; and vinyl chloride results above GCLs in monitoring wells MW-6, MW-7 and CHMWE2. The 2020 groundwater elevation survey indicates that the groundwater at the subject property flows south/southeast.

RSE observed that all the wells at the ARRC Mammoth Trucking site were in need of some level of maintenance or repair. Monitoring wells EMCONMW4 and CHMWE5 were not sampled during the 2020 sampling event. Monitoring well EMCONMW4 was observed to be in a depression ponded with water. The monument for EMCONMW4 was observed to be missing all the bolts that secure the monument casing cover. Monitoring well CHMWE5 was found to be in disrepair as the monument was damaged and the space between the housing and the polyvinyl chloride (PVC) piping was packed with sediment. The well plug was in place, but the seal did not appear to be effective in keeping sediment out of the well. RSE placed a new monument cover on the casing for CHMWE5 and re-secured the well cap to eliminate intrusion of sediment and debris. Monitoring well MW-6 was found in good condition, however this area is routinely submerged under ponded water as a result of the facility stormwater pollution prevention plan (SWPPP) measures. Monitoring well CHMWE1 was missing all the bolts for the casing cover but remained

intact. The monument and housing for monitoring well MW-7 appeared slightly frost jacked above the ground surface. Monitoring well CHMWE2 was found without a monument cover, but the well plug was intact. The damaged or compromised wells likely provide surface contributions for DRO and RRO, as reflected in the data trends.

Decreasing and stable trends have generally been observed in the COPCs at this site, with some anomalies, as shown in Table C:

Table C. COPC Trends in Groundwater Concentrations

Well	DRO Trend	RRO Trend	TCE Trend	PCE Trend	Vinyl Chloride Trend
CHMWE1	Stable	Stable	Stable	Stable	Stable
CHMWE2	Increasing	Increasing	Decreasing	Stable	Decreasing
CHMWE5 ¹	Increasing	Increasing	Stable	Stable	Decreasing
EMCONMW-4 ¹	Stable	Increasing	Stable	Stable	Stable
MW-6	Increasing	Increasing²	Stable	Stable	Decreasing
MW-7	Stable	Increasing²	Stable	Stable	Stable

Bold font indicates that the 2020 sample results exceeded the GCL; non-bolded font indicates that the 2020 sample results were below the GCL.

¹Trend reported in this table used historic data (2019 and earlier), as this well was not sampled in 2020.

²Trend was historically stable and below cleanup levels until 2020.

Table C, above, provides an overview of trends and status relative to cleanup levels of the wells at this site. Overall, the groundwater monitoring at the Mammoth Trucking site has shown decreasing or stable values of most analytes except for DRO and RRO constituents. In some cases, surface water intrusion due to damage of monitoring wells from heavy vehicular traffic has resulted in stormwater or melt water entering the wells and likely elevated the DRO and RRO results. This can be observed by obvious increases in DRO and RRO in CHMWE2, CHMWE5 and possibly MW-6 and MW-7.

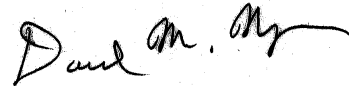
Over the years of monitoring for PCE, starting in 1998, the PCE trend has been relatively stable. Degradation products for PCE are comprised of TCE, vinyl chloride and traces of cis-1-2-dichloroethene and provide an indication that reduction of PCE may be occurring. Observations of certain analytes that appear to be increasing (DRO and RRO) and may be related to surface water intrusion due to well damage.

RSE suggests that the wells at Mammoth Trucking be repaired or abandoned, as needed. Once the wells are in good condition, RSE proposes that additional monitoring be conducted at a reduced frequency.

Please contact Lisa Koeneman at 907-884-4532, if you have any questions or comments. It is our pleasure to work with the ADEC on this project. This report was prepared an ADEC qualified environmental professional (QEP) in accordance with 18 AAC 75/78.



Lisa Koeneman, QEP



David Nyman, PE

RESTORATION SCIENCE & ENGINEERING, LLC

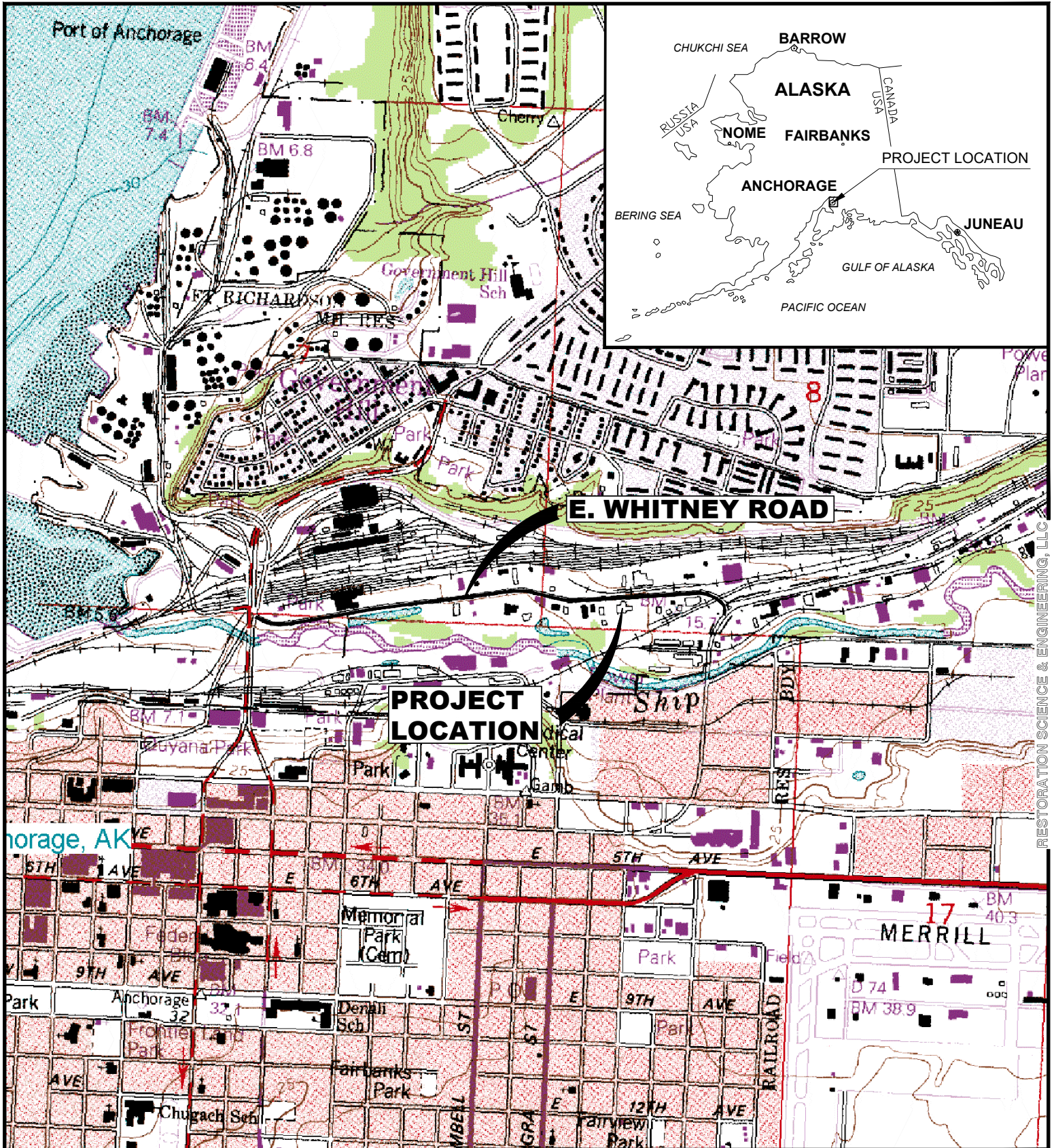
ATTACHMENTS:

- Attachment A – Figures
- Attachment B – Tabulated Laboratory Results
- Attachment C – Select Site Photographs
- Attachment D – SGS Laboratory Report 1205492
- Attachment E – ADEC Laboratory Data Review Checklist

REFERENCES:


- Fairbanks Environmental Services (FES). 2016. 2016 Groundwater Monitoring Report, Rev 1. Former Mammoth Trucking Site Anchorage, Alaska ADEC Hazard – 23887/File ID – 2100.26.202. September 8, 2016
- Restoration Science & Engineering, LLC (RSE). 2018a. Work Plan for Groundwater Sampling at ARRC Former Mammoth Trucking 1048 Whitney Road, Anchorage, Alaska ADEC File # 2100.26.202 Rev 1.0. August 20, 2018.
- Restoration Science & Engineering, LLC (RSE). 2018b. Letter Report for Groundwater Sampling at ARRC Former Mammoth Trucking 1048 Whitney Road, Anchorage, Alaska ADEC File # 2100.26.202 Rev 1.0. January 10, 2018.

Attachment A:
Figures



RESTORATION SCIENCE & ENGINEERING, LLC



ARRC 2020 MAMMOTH TRUCKING GROUNDWATER SAMPLING 1048 E. WHITNEY ROAD	
VICINITY MAP	
ANCHORAGE, ALASKA	
JOB NO: 20-2217	DRAWN: MSB
DATE: 12.8.2020	CHECKED: LG
 RESTORATION Science & Engineering, LLC 911 West 8th Avenue, Suite 100 Anchorage, Alaska 99501 PH.(907) 278-1023 FAX (907) 277-5718	
FIGURE 1	

E. WHITNEY ROAD

CHMWE1
TETRACHLOROETHENE - 47 ug/L

CHMWE2
DRO - 5.15 mg/L
RRO - 6.01 mg/L
TRICHLOROETHENE - 4.39 ug/L
VINYL CHLORIDE - 1.31 ug/L

EXISTING BUILDING

NOTES:

SAMPLES WERE ANALYSED FOR GRO, DRO, RRO, AND VOCs. ONLY EXCEEDANCES ARE SHOWN.

SAMPLE WHEN A DUPLICATE WAS COLLECTED - THE HIGHEST OF THE TWO VALUES IS SHOWN

94.5

EMCONMW-4
(NOT SAMPLED)

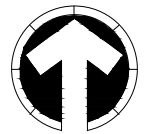
FORMER MAMMOTH TRUCKING FACILITY
1048 E. WHITNEY ROAD

92

MW-7
DRO - 1.56 mg/L
RRO - 1.22 mg/L
VINYL CHLORIDE - 18.7 ug/L






CHMWE5
(NOT SAMPLED)

MW-6
DRO - 1.62mg/L
RRO - 3.84 mg/L
VINYL CHLORIDE - 1.28 ug/L



GRAPHIC SCALE
1"=60'

LEGEND

-  APPROXIMATE PARCEL BOUNDARY
-  EXISTING FENCE
-  EXISTING BUILDING
-  MONITORING WELL (SAMPLED 10/6/2020)
-  POWER POLE / LIGHT POLE

ARRC
MAMMOTH TRUCKING GROUNDWATER SAMPLING
1048 E. WHITNEY ROAD

GW GRADIENT & MONITORING WELL SAMPLE RESULTS (OCTOBER 2020)

ANCHORAGE, ALASKA

JOB NO: 20.2217
DATE: 3.29.2021

DRAWN: MSB
CHECKED: LK

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FIGURE 2

Attachment B:
Tabulated Laboratory Results

**TABLE 1
ALASKA RAILROAD CORPORATION
MAMMOTH TRUCKING GROUNDWATER SAMPLING
GROUNDWATER QUALITY FIELD PARAMETERS**

GROUNDWATER QUALITY FIELD PARAMETERS										
SAMPLE ID	DATE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	TEMP (°C)	pH* (pH Units)	CONDUCTIVITY (mS/cm)	SPECIFIC CONDUCTANCE (µS/cm)	DISSOLVED OXYGEN %	DISSOLVED OXYGEN (mg/L)	OBSERVATIONS
MW-7	10/6/2020	9.3	14.76	6.83 6.84 6.86	12.68 12.63 12.63	0.885 0.854 0.850	580 557 556	13.3 11.5 10.5	1.64 1.45 1.29	TURBID, DARK GRAY, NO SHEEN OR ODOR
CHMWE1	10/6/2020	9.5	14.5	10.0 10.01 10.01	11.67 11.70 11.72	0.520 0.517 0.515	371 369 369	39.6 24.0 23.8	4.5 2.71 2.78	TURBID, BROWN, NO SHEN OR ODOR
MW-6	10/6/2020	6.39	14.35	7.96 8.24 8.40	12.20 12.23 12.14	0.288 0.287 0.288	195 196 197	20.2 12.3 10.1	2.40 1.60 1.20	TURBID, DARK GRAY, NO SHEEN OR ODOR
CHMWE5	10/6/2020	8.4	11.18	NOT SAMPLED - NEEDS REPAIR						
EMCONMW4	NOT SAMPLED - NEEDS REPAIR - UNDERWATER AT TIME OF SAMPLING									
CHMWE2	10/6/2020	7.22	10.2	10.45 10.47 10.47	10.77 10.30 10.30	1.178 1.184 1.180	850 847 850	31.0 32.5 32.5	3.48 3.50 3.49	TURBID, DARK GRAY, NO SHEEN OR ODOR

NOTES:

1) Water quality measurements performed using a YSI Model 556 Water Quality Meter.

2) Purging of well was done with a submersible pump.

3) "mS/cm" means "millisiemens per centimeter"; "µS/cm" means "micro Siemens per centimeter"; "ppt" means "parts per thousand"; "mV" means "millivolts"; "mg/L" means "milligram per liter"; "gal" means "gallon"; "°C" means "degrees Celsius".

*pH probe appears to be failing - data is obviously off scale.

**TABLE 2
ALASKA RAILROAD CORPORATION
MAMMOTH TRUCKING GROUNDWATER SAMPLING
HYDROCARBONS CONCENTRATIONS IN GROUNDWATER**

HYDROCARBON CONCENTRATIONS IN GROUNDWATER					
SAMPLE ID	DATE	GASOLINE RANGE ORGANICS (mg/L)	DIESEL RANGE ORGANICS (mg/L)	RESIDUAL RANGE ORGANICS (mg/L)	SGS WORK ORDER
MW-7	10/6/2020	0.242	1.56	1.22	1205492
CHMWE1	10/6/2020	0.0500 U	0.301 J	0.269 J	
MW-6	10/6/2020	0.0864 J	1.62	3.84	
CHMWE2	10/6/2020	0.0500 U	4.49	4.85	
MW-X	10/6/2020	0.0418 J	5.15	6.01	
ADEC GROUNDWATER TABLE C CLEANUP LEVELS (mg/L)		2.2	1.5	1.1	

NOTES:

- 1) Gasoline Range Organics (GRO) samples analyzed by AK Method 101;
- 1) Diesel Range Organics (DRO) samples analyzed by AK Method 102;
- Residual Range Organics (RRO) samples analyzed by AK Method 103;
- 2) "mg/L" means "milligrams per liter".
- 3) **Bold** font indicates the analyte was detected above the detection limit (DL).
- 4) *Italicized* font with a U-flag indicates the analyte was not detected at the DL; the value presented is the limit of detection.
- 5) J flag indicates the result is an estimated value.
- 6) Yellow highlighting indicates the analyte was detected above the ADEC Table C Groundwater Cleanup Level.
- 7) MW-X is a blind duplicate of CHMWE2.

TABLE 3
ALASKA RAILROAD CORPORATION
MAMMOTH TRUCKING GROUNDWATER SAMPLING
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER

VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER						
SAMPLE ID	MW-7	CHMWE1	MW-6	CHMWE2	MW-6	ADEC TABLE C
DATE	10/6/2020	10/6/2020	10/6/2020	10/6/2020	10/6/2020	GROUNDWATER
SGS WORK ORDER	1205492	1205492	1205492	1205492	1205492	CLEANUP LEVELS
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/L)
1,1,1,2-Tetrachloroethane	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	5.7
1,1,1-Trichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	8,000
1,1,2,2-Tetrachloroethane	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.76
1,1,2-Trichloroethane	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.41
1,1-Dichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	28
1,1-Dichloroethene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	280
1,1-Dichloropropene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
1,2,3-Trichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	7.0
1,2,3-Trichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.0075
1,2,4-Trichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	4.0
1,2,4-Trimethylbenzene	0.500 U	0.500 U	0.484 J	0.500 U	0.500 U	56
1,2-Dibromo-3-chloropropane	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	--
1,2-Dibromoethane	0.0375 U	0.0375 U	0.0375 U	0.0375 U	5.00 U	0.075
1,2-Dichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.0375 U	300
1,2-Dichloroethane	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U	1.7
1,2-Dichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	8.2
1,3,5-Trimethylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	60
1,3-Dichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	300
1,3-Dichloropropane	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	4.4
1,4-Dichlorobenzene	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	4.8
2,2-Dichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
2-Butanone (MEK)	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5,600
2-Chlorotoluene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
2-Hexanone	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	38
4-Chlorotoluene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
4-Isopropyltoluene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
4-Methyl-2-pentanone (MIBK)	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	6,300
Benzene	1.09	0.200 U	0.57	0.481	0.44	4.6
Bromobenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	62
Bromochloromethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
Bromodichloromethane	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	1.3
Bromoform	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	33
Bromomethane	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	7.5
Carbon disulfide	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	810
Carbon tetrachloride	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	4.6
Chlorobenzene	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	78
Chloroethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--
Chloroform	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	2.2
Chloromethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	190
cis-1,2-Dichloroethene	0.393 J	0.500 U	0.500 U	2.51	2.15	36
cis-1,3-Dichloropropene	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	--
Dibromochloromethane	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	8.7
Dibromomethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	8.3
Dichlorodifluoromethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	200
Ethylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	15
Freon-113	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	55000
Hexachlorobutadiene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.4
Isopropylbenzene (Cumene)	1.35	0.500 U	0.500 U	0.500 U	0.500 U	450
Methylene chloride	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	110
Methyl-t-butyl ether	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	140
Naphthalene	0.493 J	0.500 U	0.413 J	0.500 U	0.500 U	1.7
n-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1,000
n-Propylbenzene	0.461 J	0.500 U	0.500 U	0.500 U	0.500 U	660
o-Xylene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	See Total Xylenes
P & M -Xylene	1.07 J	1.00 U	1.00 U	1.00 U	1.00 U	See Total Xylenes
sec-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	2,000
Styrene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1,200
tert-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	690
Tetrachloroethene	0.500 U	47	0.500 U	0.441 J	0.500 U	41
Toluene	0.500 U	0.500 U	25.6	0.500 U	0.500 U	1,100
trans-1,2-Dichloroethene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	360
trans-1,3-Dichloropropene	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	4.7
Trichloroethene	0.500 U	1.24	0.500 U	4.39	3.44	2.8
Trichlorofluoromethane	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5,200
Vinyl acetate	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	410
Vinyl chloride	18.7	0.0750 U	0.483	1.31	1.28	0.19
Xylenes (total)	1.07 J	1.50 U	1.50 U	1.50 U	1.50 U	190

NOTES:

- 1) Volatile organic compounds (VOC) analyses by Method EPA SW8260C.
- 2) "ug/L" means "micrograms per liter".
- 3) **Bold** font indicates the analyte was detected above the laboratory Detection Limit (DL).
- 4) *Italicized* font with a U-qualifier indicates the analyte was not detected above the DL; the value presented is the limit of detection.
- 5) J flag indicates the result is an estimated value.
- 6) Light blue highlighting indicates that the DL is elevated above the cleanup level.
- 7) Yellow highlighting indicates the analyte was detected above the ADEC Table C Groundwater Cleanup Level.
- 8) MW-X is a blind duplicate of CHMWE2.

TABLE 5
ALASKA RAILROAD CORPORATION
MAMMOTH TRUCKING GROUNDWATER SAMPLING
HISTORIC CONCENTRATIONS IN GROUNDWATER

HISTORIC CONCENTRATIONS IN GROUNDWATER							
SAMPLE ID	DATE	DIESEL RANGE ORGANICS (mg/L)	RESIDUAL RANGE ORGANICS mg/L	GASOLINE RANGE ORGANICS (mg/L)	TETRACHLOROETHENE (PCE) (mg/L)	TRICHLOROETHENE (TCE) (mg/L)	Vinyl Chloride (mg/L)
CHMW1							
CHMW1	12/1998	0.2	2	--	--	--	--
CHMW1	8/1999	0.25	1.1	--	0.044	0.0024	<i>ND</i>
CHMW1	10/2010	<i>ND</i>	<i>ND</i>	--	0.0307	0.00141	<i>ND</i>
CHMW1	9/2012	<i>ND</i>	0.116 J	--	0.0405	0.00122	<i>ND</i>
CHMW1	10/2015	0.332 J	0.2118 J	--	0.0521 J	0.00142	<i>ND</i>
CHMW1	6/2016	<i>ND</i>	<i>ND</i>	--	0.0496	0.00135	<i>ND</i>
CHMW1	9/5/2017	<i>0.278 U</i>	<i>0.232 U</i>	0.0325 J	0.0422	0.00109	<i>0.0000750 U</i>
CHMW1	5/30/2019	<i>0.300 U</i>	0.347 J	<i>0.0500 U</i>	0.0394	<i>0.000500 U</i>	<i>0.0000750 U</i>
CHMW1	10/6/2020	0.301 J	0.269 J	<i>0.500 U</i>	0.047	0.00124	<i>0.000750 U</i>
CHMW2							
CHMW2	12/1998	4.87	<i>ND</i>	--	--	--	--
CHMW2	8/1999	26.6	11.9	--	<i>ND</i>	0.0016	0.001
CHMW2	10/2010	5.72	2.39	--	<i>ND</i>	0.00949	0.00395
CHMW2	9/2012	4.5	1.24	--	0.00062	0.00963	0.00677
CHMW2	10/2015	2.45	0.832	--	<i>ND</i>	0.00579	0.00467
CHMW2	6/2016	7.18	4.49	--	<i>ND</i>	0.00917	0.00231
CHMW2	9/5/2017	5.7	3.59	0.0347 J	<i>0.000500 U</i>	0.00416	0.00185
CHMW2	5/30/2019	2.94	1.72	0.0658 J	0.00107	0.00694	0.00125
CHMW2	10/6/2020	5.15	6.01	0.418 J	0.00441 J	0.00439	0.00131
CHMW5							
CHMW5	12/1998	1.49	1.0	--	--	--	--
CHMW5	8/1999	3.08	6.6	--	<i>ND</i>	<i>ND</i>	0.0064
CHMW5	10/2010	0.588	<i>ND</i>	--	<i>ND</i>	<i>ND</i>	0.0179
CHMW5	9/2012	1.11	0.445 J	--	<i>ND</i>	<i>ND</i>	0.00258
CHMW5	10/2015	0.521 J	0.333 J	--	<i>ND</i>	<i>ND</i>	0.00585
CHMW5	6/2016	0.539 J	0.644	--	<i>ND</i>	<i>ND</i>	0.0224
CHMW5	9/5/2017	2.36	7.27	0.0397 J	<i>0.000500 U</i>	<i>0.000500 U</i>	0.0172
CHMW5	5/30/2019	3.06 J	11.4	<i>0.0500 U</i>	<i>0.000500 U</i>	<i>0.000500 U</i>	0.00863
CHMW5	10/6/2020	NOT SAMPLED - NEEDS REPAIR					
EMCONMW-4							
EMCONMW-4	10/2015	0.276 J	<i>ND</i>	--	<i>ND</i>	<i>ND</i>	<i>ND</i>
EMCONMW-4	6/2016	1.36	1.11	--	<i>ND</i>	<i>ND</i>	<i>ND</i>
EMCONMW-4	9/5/2017	0.689	1.27	<i>0.0500 U</i>	<i>0.000500 U</i>	<i>0.000500 U</i>	<i>0.000750 U</i>
EMCONMW4	5/30/2019	1.06	2.2	<i>0.0500 U</i>	<i>0.000500 U</i>	<i>0.000500 U</i>	<i>0.000750 U</i>
EMCONMW4	10/6/2020	NOT SAMPLED - NEEDS REPAIR					
MW-6							
MW-6	10/2015	1.3	0.637	--	<i>ND</i>	<i>ND</i>	0.0076
MW-6	6/2016	0.823	0.491 J	--	<i>ND</i>	<i>ND</i>	0.0177
MW-6	9/5/2017	0.613	0.445 J	0.0502 J	<i>0.000500 U</i>	<i>0.000500 U</i>	0.00730
MW-6	5/30/2019	1.22	1.03	0.0726 J	<i>0.000500 U</i>	<i>0.000500 U</i>	0.00954
MW-6	10/6/2020	1.62	3.84	0.0864 J	<i>0.00500 U</i>	<i>0.00500 U</i>	0.00048
MW-7							
MW-7	10/2015	1.42	0.447 J	--	<i>ND</i>	<i>ND</i>	<i>ND</i>
MW-7	6/2016	0.369 J	0.285 J	--	<i>ND</i>	<i>ND</i>	0.00167
MW-7	9/5/2017	1.6	0.763	0.629	<i>0.000500 U</i>	<i>0.000500 U</i>	0.00400
MW-7	5/30/2019	1.31	0.554	0.345	<i>0.000500 U</i>	<i>0.000500 U</i>	0.0159
MW-7	10/6/2020	1.56	1.22	0.242	<i>0.00500 U</i>	<i>0.00500 U</i>	0.0187
ADEC GROUNDWATER CLEANUP LEVELS TABLE C		1.5	1.1	2.2	0.041	0.0028	0.00019

NOTES:

- 1) Diesel Range Organics (DRO) samples analyzed by AK Method 102; Residual Range Organics (RRO) samples analyzed by AK Method 103 Volatile organic compounds (VOC) analyses by Method EPA 8260D
- 2) "mg/L" means "milligrams per liter"; "ug/L" means "micrograms per liter".
- 3) **Bold** font indicates the analyte was detected above the Laboratory Limit of Detection (LOD).
- 4) *Italicized* font with a U-flag indicates the analyte was not detected at the LOD; the value presented is the LOD
- 5) J flag indicates the result is an estimated value
- 6) Yellow highlighting indicates the analyte was detected above the ADEC Groundwater Cleanup Level

Attachment C:
Select Site Photographs





Sampling at MW-6



Groundwater from monitoring well MW-7



Monitoring well EMCONMW-4; not sampled



Monitoring well CHMWE1



Monitoring well CHMWE5; not sampled



Monitoring well CHMWE2

**Attachment D:
SGS North America Laboratory Report**





Laboratory Report of Analysis

To: Restoration Science & Eng
911 West 8th Ave Suite 100
Anchorage, AK 99501
(907)278-1023

Report Number: **1205492**

Client Project: **20-2217 ARRC Mammoth Tracking**

Dear Lisa Koeneman,

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 Chuck 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.

Chuck Homestead
Project Manager
Charles.Homestead@sgs.com

Date

Case Narrative

SGS Client: **Restoration Science & Eng**
SGS Project: **1205492**
Project Name/Site: **20-2217 ARRC Mammoth Tracking**
Project Contact: **Lisa Koeneman**

Refer to sample receipt form for information on sample condition.

LCSD for HBN 1812956 [VXX/3652 (1587407) LCSD

AK101 - LCSD recovery for GRO does not meet QC criteria. This analyte was not reported above the LOQ in the associated samples.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 10/15/2020 4:41:49PM

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
CHMWE1	1205492001	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)
CHMWE2	1205492002	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)
MW-6	1205492003	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)
MW-7	1205492004	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)
MW-X	1205492005	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)
Trip Blank	1205492006	10/06/2020	10/06/2020	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK102	DRO/RRO Low Volume Water
AK103	DRO/RRO Low Volume Water
AK101	Gasoline Range Organics (W)
SW8260D	Volatile Organic Compounds (W) FULL

Print Date: 10/15/2020 4:41:53PM

Detectable Results Summary

Client Sample ID: **CHMWE1**

Lab Sample ID: 1205492001

Semivolatile Organic Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.301J	mg/L
Residual Range Organics	0.269J	mg/L
Tetrachloroethene	47.0	ug/L
Trichloroethene	1.24	ug/L

Client Sample ID: **CHMWE2**

Lab Sample ID: 1205492002

Semivolatile Organic Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	4.49	mg/L
Residual Range Organics	4.85	mg/L
Benzene	0.481	ug/L
cis-1,2-Dichloroethene	2.51	ug/L
Tetrachloroethene	0.441J	ug/L
Trichloroethene	4.39	ug/L
Vinyl chloride	1.31	ug/L

Client Sample ID: **MW-6**

Lab Sample ID: 1205492003

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	1.62	mg/L
Residual Range Organics	3.84	mg/L
Gasoline Range Organics	0.0864J	mg/L
1,2,4-Trimethylbenzene	0.484J	ug/L
Benzene	0.570	ug/L
Naphthalene	0.413J	ug/L
Toluene	25.6	ug/L
Vinyl chloride	0.483	ug/L

Client Sample ID: **MW-7**

Lab Sample ID: 1205492004

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	1.56	mg/L
Residual Range Organics	1.22	mg/L
Gasoline Range Organics	0.242	mg/L
Benzene	1.09	ug/L
cis-1,2-Dichloroethene	0.393J	ug/L
Isopropylbenzene (Cumene)	1.35	ug/L
Naphthalene	0.493J	ug/L
n-Propylbenzene	0.461J	ug/L
P & M -Xylene	1.07J	ug/L
Vinyl chloride	18.7	ug/L
Xylenes (total)	1.07J	ug/L

Detectable Results Summary

Client Sample ID: **MW-X**
 Lab Sample ID: 1205492005

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	5.15	mg/L
Residual Range Organics	6.01	mg/L
Gasoline Range Organics	0.0418J	mg/L
Benzene	0.440	ug/L
cis-1,2-Dichloroethene	2.15	ug/L
Trichloroethene	3.44	ug/L
Vinyl chloride	1.28	ug/L



Results of **CHMWE1**

Client Sample ID: **CHMWE1**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492001
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.301 J	0.600	0.180	mg/L	1		10/14/20 18:36

Surrogates

5a Androstane (surr)	95.8	50-150		%	1		10/14/20 18:36
----------------------	------	--------	--	---	---	--	----------------

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 10/14/20 18:36
Container ID: 1205492001-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	0.269 J	0.500	0.150	mg/L	1		10/14/20 18:36

Surrogates

n-Triacontane-d62 (surr)	96.7	50-150		%	1		10/14/20 18:36
--------------------------	------	--------	--	---	---	--	----------------

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 10/14/20 18:36
Container ID: 1205492001-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Results of CHMWE1

Client Sample ID: **CHMWE1**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492001
 Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		10/09/20 03:04
Surrogates							
4-Bromofluorobenzene (surr)	88.1	50-150		%	1		10/09/20 03:04

Batch Information

Analytical Batch: VFC15389
 Analytical Method: AK101
 Analyst: E.L
 Analytical Date/Time: 10/09/20 03:04
 Container ID: 1205492001-C

Prep Batch: VXX36503
 Prep Method: SW5030B
 Prep Date/Time: 10/08/20 06:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of CHMWE1

Client Sample ID: **CHMWE1**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492001
 Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
1,1,1-Trichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,1,2,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
1,1,2-Trichloroethane	0.200 U	0.400	0.120	ug/L	1		10/07/20 19:43
1,1-Dichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,1-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,1-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2,3-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2,3-Trichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2,4-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2,4-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2-Dibromo-3-chloropropane	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
1,2-Dibromoethane	0.0375 U	0.0750	0.0180	ug/L	1		10/07/20 19:43
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,2-Dichloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
1,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,3,5-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
1,3-Dichloropropane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
2,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
2-Butanone (MEK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
2-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
2-Hexanone	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
4-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
4-Isopropyltoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
4-Methyl-2-pentanone (MIBK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Benzene	0.200 U	0.400	0.120	ug/L	1		10/07/20 19:43
Bromobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Bromochloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Bromodichloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
Bromoform	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Bromomethane	2.50 U	5.00	2.00	ug/L	1		10/07/20 19:43
Carbon disulfide	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Carbon tetrachloride	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
Chloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43

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Results of **CHMWE1**

Client Sample ID: **CHMWE1**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492001
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Chloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
cis-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
cis-1,3-Dichloropropene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
Dibromochloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:43
Dibromomethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Dichlorodifluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Freon-113	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Hexachlorobutadiene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Isopropylbenzene (Cumene)	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Methylene chloride	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Methyl-t-butyl ether	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Naphthalene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
n-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
n-Propylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/07/20 19:43
sec-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Styrene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
tert-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Tetrachloroethene	47.0	1.00	0.310	ug/L	1		10/07/20 19:43
Toluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
trans-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
trans-1,3-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Trichloroethene	1.24	1.00	0.310	ug/L	1		10/07/20 19:43
Trichlorofluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:43
Vinyl acetate	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:43
Vinyl chloride	0.0750 U	0.150	0.0500	ug/L	1		10/07/20 19:43
Xylenes (total)	1.50 U	3.00	1.00	ug/L	1		10/07/20 19:43
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	81-118		%	1		10/07/20 19:43
4-Bromofluorobenzene (surr)	99	85-114		%	1		10/07/20 19:43
Toluene-d8 (surr)	98.8	89-112		%	1		10/07/20 19:43

Results of **CHMWE1**

Client Sample ID: **CHMWE1**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492001
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/07/20 19:43
Container ID: 1205492001-F

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of **CHMWE2**

Client Sample ID: **CHMWE2**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492002
Lab Project ID: 1205492

Collection Date: 10/06/20 12:15
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	4.49	0.577	0.173	mg/L	1		10/14/20 18:45
Surrogates							
5a Androstane (surr)	92.9	50-150		%	1		10/14/20 18:45

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 10/14/20 18:45
Container ID: 1205492002-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	4.85	0.481	0.144	mg/L	1		10/14/20 18:45
Surrogates							
n-Triacontane-d62 (surr)	93.5	50-150		%	1		10/14/20 18:45

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 10/14/20 18:45
Container ID: 1205492002-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of CHMWE2

Client Sample ID: **CHMWE2**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492002
 Lab Project ID: 1205492

Collection Date: 10/06/20 12:15
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		10/09/20 01:16
Surrogates							
4-Bromofluorobenzene (surr)	103	50-150		%	1		10/09/20 01:16

Batch Information

Analytical Batch: VFC15389
 Analytical Method: AK101
 Analyst: E.L
 Analytical Date/Time: 10/09/20 01:16
 Container ID: 1205492002-C

Prep Batch: VXX36503
 Prep Method: SW5030B
 Prep Date/Time: 10/08/20 06:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of **CHMWE2**

Client Sample ID: **CHMWE2**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492002
Lab Project ID: 1205492

Collection Date: 10/06/20 12:15
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
1,1,1-Trichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,1,2,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
1,1,2-Trichloroethane	0.200 U	0.400	0.120	ug/L	1		10/07/20 19:58
1,1-Dichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,1-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,1-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2,3-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2,3-Trichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2,4-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2,4-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2-Dibromo-3-chloropropane	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
1,2-Dibromoethane	0.0375 U	0.0750	0.0180	ug/L	1		10/07/20 19:58
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,2-Dichloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
1,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,3,5-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
1,3-Dichloropropane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
2,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
2-Butanone (MEK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
2-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
2-Hexanone	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
4-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
4-Isopropyltoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
4-Methyl-2-pentanone (MIBK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Benzene	0.481	0.400	0.120	ug/L	1		10/07/20 19:58
Bromobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Bromochloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Bromodichloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
Bromoform	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Bromomethane	2.50 U	5.00	2.00	ug/L	1		10/07/20 19:58
Carbon disulfide	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Carbon tetrachloride	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
Chloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58

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J flagging is activated



Results of CHMWE2

Client Sample ID: **CHMWE2**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492002
 Lab Project ID: 1205492

Collection Date: 10/06/20 12:15
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Chloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
cis-1,2-Dichloroethene	2.51	1.00	0.310	ug/L	1		10/07/20 19:58
cis-1,3-Dichloropropene	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
Dibromochloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 19:58
Dibromomethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Dichlorodifluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Freon-113	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Hexachlorobutadiene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Isopropylbenzene (Cumene)	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Methylene chloride	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Methyl-t-butyl ether	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Naphthalene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
n-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
n-Propylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/07/20 19:58
sec-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Styrene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
tert-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Tetrachloroethene	0.441 J	1.00	0.310	ug/L	1		10/07/20 19:58
Toluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
trans-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
trans-1,3-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Trichloroethene	4.39	1.00	0.310	ug/L	1		10/07/20 19:58
Trichlorofluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 19:58
Vinyl acetate	5.00 U	10.0	3.10	ug/L	1		10/07/20 19:58
Vinyl chloride	1.31	0.150	0.0500	ug/L	1		10/07/20 19:58
Xylenes (total)	1.50 U	3.00	1.00	ug/L	1		10/07/20 19:58
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	81-118		%	1		10/07/20 19:58
4-Bromofluorobenzene (surr)	99.8	85-114		%	1		10/07/20 19:58
Toluene-d8 (surr)	98.1	89-112		%	1		10/07/20 19:58

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Results of CHMWE2

Client Sample ID: **CHMWE2**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492002
Lab Project ID: 1205492

Collection Date: 10/06/20 12:15
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/07/20 19:58
Container ID: 1205492002-F

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of MW-6

Client Sample ID: MW-6
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492003
Lab Project ID: 1205492

Collection Date: 10/06/20 10:30
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Diesel Range Organics and Surrogates (5a Androstane).

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 10/14/20 18:55
Container ID: 1205492003-A
Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Residual Range Organics and Surrogates (n-Triacontane-d62).

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 10/14/20 18:55
Container ID: 1205492003-A
Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL

Results of MW-6

Client Sample ID: **MW-6**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492003
 Lab Project ID: 1205492

Collection Date: 10/06/20 10:30
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0864 J	0.100	0.0310	mg/L	1		10/12/20 12:17
Surrogates							
4-Bromofluorobenzene (surr)	82.9	50-150		%	1		10/12/20 12:17

Batch Information

Analytical Batch: VFC15393
 Analytical Method: AK101
 Analyst: E.L
 Analytical Date/Time: 10/12/20 12:17
 Container ID: 1205492003-C

Prep Batch: VXX36527
 Prep Method: SW5030B
 Prep Date/Time: 10/12/20 06:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of MW-6

Client Sample ID: MW-6
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492003
Lab Project ID: 1205492

Collection Date: 10/06/20 10:30
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

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J flagging is activated



Results of MW-6

Client Sample ID: **MW-6**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492003
 Lab Project ID: 1205492

Collection Date: 10/06/20 10:30
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Chloromethane	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
cis-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
cis-1,3-Dichloropropene	0.250 U	0.500	0.150	ug/L	1		10/08/20 01:21
Dibromochloromethane	0.250 U	0.500	0.150	ug/L	1		10/08/20 01:21
Dibromomethane	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Dichlorodifluoromethane	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Freon-113	5.00 U	10.0	3.10	ug/L	1		10/08/20 01:21
Hexachlorobutadiene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Isopropylbenzene (Cumene)	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Methylene chloride	5.00 U	10.0	3.10	ug/L	1		10/08/20 01:21
Methyl-t-butyl ether	5.00 U	10.0	3.10	ug/L	1		10/08/20 01:21
Naphthalene	0.413 J	1.00	0.310	ug/L	1		10/08/20 20:41
n-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
n-Propylbenzene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		10/08/20 01:21
sec-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Styrene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
tert-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Tetrachloroethene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Toluene	25.6	1.00	0.310	ug/L	1		10/08/20 01:21
trans-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
trans-1,3-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Trichloroethene	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Trichlorofluoromethane	0.500 U	1.00	0.310	ug/L	1		10/08/20 01:21
Vinyl acetate	5.00 U	10.0	3.10	ug/L	1		10/08/20 01:21
Vinyl chloride	0.483	0.150	0.0500	ug/L	1		10/08/20 01:21
Xylenes (total)	1.50 U	3.00	1.00	ug/L	1		10/08/20 01:21
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	81-118		%	1		10/08/20 01:21
4-Bromofluorobenzene (surr)	97.8	85-114		%	1		10/08/20 01:21
Toluene-d8 (surr)	98.7	89-112		%	1		10/08/20 01:21

Results of MW-6

Client Sample ID: **MW-6**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492003
Lab Project ID: 1205492

Collection Date: 10/06/20 10:30
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/08/20 01:21
Container ID: 1205492003-F

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS20393
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/08/20 20:41
Container ID: 1205492003-G

Prep Batch: VXX36505
Prep Method: SW5030B
Prep Date/Time: 10/08/20 15:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of MW-7

Client Sample ID: MW-7
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492004
Lab Project ID: 1205492

Collection Date: 10/06/20 11:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Diesel Range Organics and Surrogates (5a Androstane).

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 10/14/20 19:05
Container ID: 1205492004-A
Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Residual Range Organics and Surrogates (n-Triacontane-d62).

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 10/14/20 19:05
Container ID: 1205492004-A
Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Results of MW-7

Client Sample ID: **MW-7**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492004
 Lab Project ID: 1205492

Collection Date: 10/06/20 11:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.242	0.100	0.0310	mg/L	1		10/12/20 12:35
Surrogates							
4-Bromofluorobenzene (surr)	101	50-150		%	1		10/12/20 12:35

Batch Information

Analytical Batch: VFC15393
 Analytical Method: AK101
 Analyst: E.L
 Analytical Date/Time: 10/12/20 12:35
 Container ID: 1205492004-C

Prep Batch: VXX36527
 Prep Method: SW5030B
 Prep Date/Time: 10/12/20 06:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of MW-7

Client Sample ID: MW-7
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492004
Lab Project ID: 1205492

Collection Date: 10/06/20 11:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.



Results of MW-7

Client Sample ID: **MW-7**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492004
 Lab Project ID: 1205492

Collection Date: 10/06/20 11:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Chloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
cis-1,2-Dichloroethene	0.393 J	1.00	0.310	ug/L	1		10/07/20 20:13
cis-1,3-Dichloropropene	0.250 U	0.500	0.150	ug/L	1		10/07/20 20:13
Dibromochloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 20:13
Dibromomethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Dichlorodifluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Freon-113	5.00 U	10.0	3.10	ug/L	1		10/07/20 20:13
Hexachlorobutadiene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Isopropylbenzene (Cumene)	1.35	1.00	0.310	ug/L	1		10/07/20 20:13
Methylene chloride	5.00 U	10.0	3.10	ug/L	1		10/07/20 20:13
Methyl-t-butyl ether	5.00 U	10.0	3.10	ug/L	1		10/07/20 20:13
Naphthalene	0.493 J	1.00	0.310	ug/L	1		10/07/20 20:13
n-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
n-Propylbenzene	0.461 J	1.00	0.310	ug/L	1		10/07/20 20:13
o-Xylene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
P & M -Xylene	1.07 J	2.00	0.620	ug/L	1		10/07/20 20:13
sec-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Styrene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
tert-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Tetrachloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Toluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
trans-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
trans-1,3-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Trichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Trichlorofluoromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 20:13
Vinyl acetate	5.00 U	10.0	3.10	ug/L	1		10/07/20 20:13
Vinyl chloride	18.7	0.150	0.0500	ug/L	1		10/07/20 20:13
Xylenes (total)	1.07 J	3.00	1.00	ug/L	1		10/07/20 20:13
Surrogates							
1,2-Dichloroethane-D4 (surr)	103	81-118		%	1		10/07/20 20:13
4-Bromofluorobenzene (surr)	99.6	85-114		%	1		10/07/20 20:13
Toluene-d8 (surr)	98.2	89-112		%	1		10/07/20 20:13

Results of MW-7

Client Sample ID: **MW-7**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492004
Lab Project ID: 1205492

Collection Date: 10/06/20 11:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/07/20 20:13
Container ID: 1205492004-F

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of MW-X

Client Sample ID: MW-X
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492005
Lab Project ID: 1205492

Collection Date: 10/06/20 13:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Diesel Range Organics, 5.15, 0.600, 0.180, mg/L, 1, 10/14/20 19:15

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane (surr), 93.9, 50-150, %, 1, 10/14/20 19:15

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 10/14/20 19:15
Container ID: 1205492005-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 6.01, 0.500, 0.150, mg/L, 1, 10/14/20 19:15

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62 (surr), 94, 50-150, %, 1, 10/14/20 19:15

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 10/14/20 19:15
Container ID: 1205492005-A

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/20 16:17
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Results of MW-X

Client Sample ID: **MW-X**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492005
 Lab Project ID: 1205492

Collection Date: 10/06/20 13:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0418 J	0.100	0.0310	mg/L	1		10/12/20 12:53
Surrogates							
4-Bromofluorobenzene (surr)	88.1	50-150		%	1		10/12/20 12:53

Batch Information

Analytical Batch: VFC15393
 Analytical Method: AK101
 Analyst: E.L
 Analytical Date/Time: 10/12/20 12:53
 Container ID: 1205492005-C

Prep Batch: VXX36527
 Prep Method: SW5030B
 Prep Date/Time: 10/12/20 06:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of MW-X

Client Sample ID: MW-X
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492005
Lab Project ID: 1205492

Collection Date: 10/06/20 13:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 10/15/2020 4:41:57PM

J flagging is activated



Results of MW-X

Client Sample ID: MW-X
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492005
Lab Project ID: 1205492

Collection Date: 10/06/20 13:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Results of MW-X

Client Sample ID: **MW-X**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492005
Lab Project ID: 1205492

Collection Date: 10/06/20 13:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/07/20 20:27
Container ID: 1205492005-F

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492006
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		10/12/20 13:56
Surrogates							
4-Bromofluorobenzene (surr)	67.4	50-150		%	1		10/12/20 13:56

Batch Information

Analytical Batch: VFC15394
Analytical Method: AK101
Analyst: ALJ
Analytical Date/Time: 10/12/20 13:56
Container ID: 1205492006-E

Prep Batch: VXX36526
Prep Method: SW5030B
Prep Date/Time: 10/12/20 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **20-2217 ARRC Mammoth Tracking**
 Lab Sample ID: 1205492006
 Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
 Received Date: 10/06/20 14:23
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,1,1,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
1,1,1-Trichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,1,2,2-Tetrachloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
1,1,2-Trichloroethane	0.200 U	0.400	0.120	ug/L	1		10/07/20 17:46
1,1-Dichloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,1-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,1-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2,3-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2,3-Trichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2,4-Trichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2,4-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2-Dibromo-3-chloropropane	5.00 U	10.0	3.10	ug/L	1		10/07/20 17:46
1,2-Dibromoethane	0.0375 U	0.0750	0.0180	ug/L	1		10/07/20 17:46
1,2-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,2-Dichloroethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
1,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,3,5-Trimethylbenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,3-Dichlorobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
1,3-Dichloropropane	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
1,4-Dichlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
2,2-Dichloropropane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
2-Butanone (MEK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 17:46
2-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
2-Hexanone	5.00 U	10.0	3.10	ug/L	1		10/07/20 17:46
4-Chlorotoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
4-Isopropyltoluene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
4-Methyl-2-pentanone (MIBK)	5.00 U	10.0	3.10	ug/L	1		10/07/20 17:46
Benzene	0.200 U	0.400	0.120	ug/L	1		10/07/20 17:46
Bromobenzene	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
Bromochloromethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
Bromodichloromethane	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
Bromoform	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
Bromomethane	2.50 U	5.00	2.00	ug/L	1		10/07/20 17:46
Carbon disulfide	5.00 U	10.0	3.10	ug/L	1		10/07/20 17:46
Carbon tetrachloride	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46
Chlorobenzene	0.250 U	0.500	0.150	ug/L	1		10/07/20 17:46
Chloroethane	0.500 U	1.00	0.310	ug/L	1		10/07/20 17:46

Print Date: 10/15/2020 4:41:57PM

J flagging is activated



Results of Trip Blank

Client Sample ID: Trip Blank
Client Project ID: 20-2217 ARRC Mammoth Tracking
Lab Sample ID: 1205492006
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **20-2217 ARRC Mammoth Tracking**
Lab Sample ID: 1205492006
Lab Project ID: 1205492

Collection Date: 10/06/20 10:00
Received Date: 10/06/20 14:23
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Analyst: NRB
Analytical Date/Time: 10/07/20 17:46
Container ID: 1205492006-A

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/07/20 15:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1812767 [VXX/36499]
 Blank Lab ID: 1586490

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.150	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	2.50U	5.00	2.00	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Print Date: 10/15/2020 4:42:00PM

Method Blank

Blank ID: MB for HBN 1812767 [VXX/36499]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1586490

QC for Samples:

1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	5.00U	10.0	3.10	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	105	81-118		%
4-Bromofluorobenzene (surr)	100	85-114		%
Toluene-d8 (surr)	98.6	89-112		%

Method Blank

Blank ID: MB for HBN 1812767 [VXX/36499]
Blank Lab ID: 1586490

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
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Batch Information

Analytical Batch: VMS20392
Analytical Method: SW8260D
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 10/7/2020 5:17:00PM

Prep Batch: VXX36499
Prep Method: SW5030B
Prep Date/Time: 10/7/2020 3:00:00PM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/15/2020 4:42:00PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36499]
 Blank Spike Lab ID: 1586491
 Date Analyzed: 10/07/2020 16:00

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36499]
 Spike Duplicate Lab ID: 1586492
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	30	28.1	94	30	27.8	93	(78-124)	0.91	(< 20)
1,1,1-Trichloroethane	30	27.6	92	30	26.8	89	(74-131)	3.00	(< 20)
1,1,2,2-Tetrachloroethane	30	27.9	93	30	28.4	95	(71-121)	1.70	(< 20)
1,1,2-Trichloroethane	30	28.5	95	30	28.6	95	(80-119)	0.42	(< 20)
1,1-Dichloroethane	30	28.7	96	30	28.0	93	(77-125)	2.30	(< 20)
1,1-Dichloroethene	30	28.5	95	30	27.6	92	(71-131)	3.30	(< 20)
1,1-Dichloropropene	30	28.7	96	30	27.8	93	(79-125)	3.30	(< 20)
1,2,3-Trichlorobenzene	30	31.5	105	30	33.2	111	(69-129)	5.50	(< 20)
1,2,3-Trichloropropane	30	27.3	91	30	27.6	92	(73-122)	0.91	(< 20)
1,2,4-Trichlorobenzene	30	32.1	107	30	33.0	110	(69-130)	2.70	(< 20)
1,2,4-Trimethylbenzene	30	28.8	96	30	28.4	95	(79-124)	1.40	(< 20)
1,2-Dibromo-3-chloropropane	30	26.2	87	30	26.8	90	(62-128)	2.30	(< 20)
1,2-Dibromoethane	30	28.3	94	30	28.7	96	(77-121)	1.30	(< 20)
1,2-Dichlorobenzene	30	29.3	98	30	29.0	97	(80-119)	0.95	(< 20)
1,2-Dichloroethane	30	27.7	93	30	27.8	93	(73-128)	0.29	(< 20)
1,2-Dichloropropane	30	29.1	97	30	28.6	96	(78-122)	1.50	(< 20)
1,3,5-Trimethylbenzene	30	28.6	95	30	28.1	94	(75-124)	1.90	(< 20)
1,3-Dichlorobenzene	30	29.7	99	30	29.3	98	(80-119)	1.20	(< 20)
1,3-Dichloropropane	30	28.9	96	30	29.0	97	(80-119)	0.27	(< 20)
1,4-Dichlorobenzene	30	30.0	100	30	29.7	99	(79-118)	0.97	(< 20)
2,2-Dichloropropane	30	27.6	92	30	26.8	89	(60-139)	2.80	(< 20)
2-Butanone (MEK)	90	79.6	88	90	83.3	93	(56-143)	4.60	(< 20)
2-Chlorotoluene	30	28.9	96	30	28.2	94	(79-122)	2.50	(< 20)
2-Hexanone	90	79.0	88	90	81.6	91	(57-139)	3.30	(< 20)
4-Chlorotoluene	30	29.1	97	30	28.3	94	(78-122)	2.80	(< 20)
4-Isopropyltoluene	30	29.4	98	30	29.4	98	(77-127)	0.07	(< 20)
4-Methyl-2-pentanone (MIBK)	90	81.2	90	90	82.5	92	(67-130)	1.60	(< 20)
Benzene	30	27.8	93	30	27.6	92	(79-120)	0.55	(< 20)
Bromobenzene	30	29.1	97	30	28.5	95	(80-120)	2.00	(< 20)
Bromochloromethane	30	27.5	92	30	27.4	91	(78-123)	0.47	(< 20)
Bromodichloromethane	30	28.8	96	30	28.7	96	(79-125)	0.61	(< 20)
Bromoform	30	27.4	91	30	27.2	91	(66-130)	1.00	(< 20)
Bromomethane	30	28.6	95	30	28.8	96	(53-141)	0.84	(< 20)
Carbon disulfide	45	44.7	99	45	42.3	94	(64-133)	5.40	(< 20)

Print Date: 10/15/2020 4:42:03PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36499]
 Blank Spike Lab ID: 1586491
 Date Analyzed: 10/07/2020 16:00

Spike Duplicate ID: LCSD for HBN 1205492
 [VXX36499]
 Spike Duplicate Lab ID: 1586492
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Carbon tetrachloride	30	27.1	90	30	26.3	88	(72-136)	3.20	(< 20)
Chlorobenzene	30	29.1	97	30	28.3	94	(82-118)	2.80	(< 20)
Chloroethane	30	29.4	98	30	28.4	95	(60-138)	3.30	(< 20)
Chloroform	30	26.9	90	30	26.4	88	(79-124)	2.00	(< 20)
Chloromethane	30	28.5	95	30	27.1	91	(50-139)	5.00	(< 20)
cis-1,2-Dichloroethene	30	28.5	95	30	28.0	93	(78-123)	1.90	(< 20)
cis-1,3-Dichloropropene	30	28.5	95	30	28.2	94	(75-124)	0.76	(< 20)
Dibromochloromethane	30	28.2	94	30	28.1	94	(74-126)	0.38	(< 20)
Dibromomethane	30	28.8	96	30	28.9	96	(79-123)	0.21	(< 20)
Dichlorodifluoromethane	30	28.1	94	30	27.0	90	(32-152)	4.00	(< 20)
Ethylbenzene	30	28.6	95	30	27.8	93	(79-121)	2.60	(< 20)
Freon-113	45	42.6	95	45	41.3	92	(70-136)	3.10	(< 20)
Hexachlorobutadiene	30	29.9	100	30	29.7	99	(66-134)	0.51	(< 20)
Isopropylbenzene (Cumene)	30	28.8	96	30	28.0	93	(72-131)	3.00	(< 20)
Methylene chloride	30	29.9	100	30	29.5	99	(74-124)	1.20	(< 20)
Methyl-t-butyl ether	45	41.0	91	45	41.5	92	(71-124)	1.10	(< 20)
Naphthalene	30	30.2	101	30	30.8	103	(61-128)	2.00	(< 20)
n-Butylbenzene	30	31.2	104	30	31.8	106	(75-128)	1.70	(< 20)
n-Propylbenzene	30	29.6	99	30	28.7	96	(76-126)	2.80	(< 20)
o-Xylene	30	28.8	96	30	28.1	94	(78-122)	2.60	(< 20)
P & M -Xylene	60	57.6	96	60	55.7	93	(80-121)	3.30	(< 20)
sec-Butylbenzene	30	29.4	98	30	29.2	97	(77-126)	0.86	(< 20)
Styrene	30	28.8	96	30	28.1	94	(78-123)	2.20	(< 20)
tert-Butylbenzene	30	28.7	96	30	28.1	94	(78-124)	1.80	(< 20)
Tetrachloroethene	30	28.8	96	30	28.2	94	(74-129)	2.20	(< 20)
Toluene	30	28.1	94	30	27.6	92	(80-121)	1.90	(< 20)
trans-1,2-Dichloroethene	30	28.5	95	30	27.7	92	(75-124)	3.00	(< 20)
trans-1,3-Dichloropropene	30	28.5	95	30	28.6	95	(73-127)	0.43	(< 20)
Trichloroethene	30	29.1	97	30	28.2	94	(79-123)	3.10	(< 20)
Trichlorofluoromethane	30	29.1	97	30	28.1	94	(65-141)	3.50	(< 20)
Vinyl acetate	30	28.7	96	30	29.1	97	(54-146)	1.20	(< 20)
Vinyl chloride	30	30.0	100	30	28.6	95	(58-137)	4.70	(< 20)
Xylenes (total)	90	86.4	96	90	83.8	93	(79-121)	3.10	(< 20)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36499]
 Blank Spike Lab ID: 1586491
 Date Analyzed: 10/07/2020 16:00

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36499]
 Spike Duplicate Lab ID: 1586492
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002, 1205492003, 1205492004, 1205492005, 1205492006

Results by SW8260D

Parameter	Spike	Blank Spike (%)		Spike	Spike Duplicate (%)		CL	RPD (%)	RPD CL
		Result	Rec (%)		Result	Rec (%)			
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	99.9	100	30	101	101	(81-118)	0.71	
4-Bromofluorobenzene (surr)	30	100	100	30	99.1	99	(85-114)	0.95	
Toluene-d8 (surr)	30	99.5	100	30	99.9	100	(89-112)	0.34	

Batch Information

Analytical Batch: **VMS20392**
 Analytical Method: **SW8260D**
 Instrument: **Agilent 7890-75MS**
 Analyst: **NRB**

Prep Batch: **VXX36499**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/07/2020 15:00**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 10/15/2020 4:42:03PM

Method Blank

Blank ID: MB for HBN 1812808 [VXX/36503]

Blank Lab ID: 1586642

QC for Samples:

1205492001, 1205492002

Matrix: Water (Surface, Eff., Ground)

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	66.6	50-150		%

Batch Information

Analytical Batch: VFC15389
 Analytical Method: AK101
 Instrument: Agilent 7890 PID/FID
 Analyst: E.L
 Analytical Date/Time: 10/8/2020 9:40:00AM

Prep Batch: VXX36503
 Prep Method: SW5030B
 Prep Date/Time: 10/8/2020 6:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Print Date: 10/15/2020 4:42:05PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36503]
 Blank Spike Lab ID: 1586646
 Date Analyzed: 10/08/2020 10:34

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36503]
 Spike Duplicate Lab ID: 1586645
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002

Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	1.02	102	1.00	1.08	108	(60-120)	5.50	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	0.0500	81	81	0.0500	118	118	(50-150)	36.80	
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Batch Information

Analytical Batch: **VFC15389**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890 PID/FID**
 Analyst: **E.L**

Prep Batch: **VXX36503**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/08/2020 06:00**
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1812812 [VXX/36505]
 Blank Lab ID: 1586676

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1205492003

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	106	81-118		%
4-Bromofluorobenzene (surr)	99.6	85-114		%
Toluene-d8 (surr)	98.5	89-112		%

Batch Information

Analytical Batch: VMS20393
 Analytical Method: SW8260D
 Instrument: Agilent 7890-75MS
 Analyst: NRB
 Analytical Date/Time: 10/8/2020 3:59:00PM

Prep Batch: VXX36505
 Prep Method: SW5030B
 Prep Date/Time: 10/8/2020 3:30:00PM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Print Date: 10/15/2020 4:42:10PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36505]
 Blank Spike Lab ID: 1586677
 Date Analyzed: 10/08/2020 16:13

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36505]
 Spike Duplicate Lab ID: 1586678
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492003

Results by SW8260D

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trimethylbenzene	30	28.9	96	30	29.4	98	(79-124)	1.70	(< 20)
Naphthalene	30	29.8	99	30	32.5	108	(61-128)	8.60	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	101	101	30	101	101	(81-118)	0.20	
4-Bromofluorobenzene (surr)	30	99.9	100	30	99.8	100	(85-114)	0.16	
Toluene-d8 (surr)	30	98.7	99	30	99.4	99	(89-112)	0.68	

Batch Information

Analytical Batch: **VMS20393**
 Analytical Method: **SW8260D**
 Instrument: **Agilent 7890-75MS**
 Analyst: **NRB**

Prep Batch: **VXX36505**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/08/2020 15:30**
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1812956 [VXX/36526]

Blank Lab ID: 1587403

QC for Samples:

1205492006

Matrix: Water (Surface, Eff., Ground)

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	80.7	50-150		%

Batch Information

Analytical Batch: VFC15394

Analytical Method: AK101

Instrument: Agilent 7890 PID/FID

Analyst: ALJ

Analytical Date/Time: 10/12/2020 10:08:00AM

Prep Batch: VXX36526

Prep Method: SW5030B

Prep Date/Time: 10/12/2020 6:00:00AM

Prep Initial Wt./Vol.: 5 mL

Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36526]
 Blank Spike Lab ID: 1587406
 Date Analyzed: 10/12/2020 11:01

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36526]
 Spike Duplicate Lab ID: 1587407
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492006

Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	1.20	120	1.00	1.30	130	* (60-120)	8.60	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	0.0500	103	103	0.0500	100	100	(50-150)	2.90	
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Batch Information

Analytical Batch: **VFC15394**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890 PID/FID**
 Analyst: **ALJ**

Prep Batch: **VXX36526**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/12/2020 06:00**
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1812958 [VXX/36527]
 Blank Lab ID: 1587416

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1205492003, 1205492004, 1205492005

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0321J	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	91.4	50-150		%

Batch Information

Analytical Batch: VFC15393
 Analytical Method: AK101
 Instrument: Agilent 7890A PID/FID
 Analyst: E.L
 Analytical Date/Time: 10/12/2020 10:10:00AM

Prep Batch: VXX36527
 Prep Method: SW5030B
 Prep Date/Time: 10/12/2020 6:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [VXX36527]
 Blank Spike Lab ID: 1587414
 Date Analyzed: 10/12/2020 11:04

Spike Duplicate ID: LCSD for HBN 1205492 [VXX36527]
 Spike Duplicate Lab ID: 1587415
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492003, 1205492004, 1205492005

Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	1.03	103	1.00	1.04	104	(60-120)	0.32	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	0.0500	103	103	0.0500	98.4	98	(50-150)	4.30	
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Batch Information

Analytical Batch: **VFC15393**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **E.L**

Prep Batch: **VXX36527**
 Prep Method: **SW5030B**
 Prep Date/Time: **10/12/2020 06:00**
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1812963 [XXX/44054]
 Blank Lab ID: 1587445

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1205492001, 1205492002, 1205492003, 1205492004, 1205492005

Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.300U	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	99.9	60-120		%

Batch Information

Analytical Batch: XFC15772
 Analytical Method: AK102
 Instrument: Agilent 7890B F
 Analyst: CDM
 Analytical Date/Time: 10/14/2020 6:06:00PM

Prep Batch: XXX44054
 Prep Method: SW3520C
 Prep Date/Time: 10/13/2020 4:17:07PM
 Prep Initial Wt./Vol.: 250 mL
 Prep Extract Vol: 1 mL

Print Date: 10/15/2020 4:42:26PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [XXX44054]
 Blank Spike Lab ID: 1587446
 Date Analyzed: 10/14/2020 18:16

Spike Duplicate ID: LCSD for HBN 1205492
 [XXX44054]
 Spike Duplicate Lab ID: 1587447
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002, 1205492003, 1205492004, 1205492005

Results by AK102

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	20	20.8	104	20	20.7	103	(75-125)	0.50	(< 20)

Surrogates

5a Androstane (surr)	0.4	108	108	0.4	107	107	(60-120)	1.20	
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Batch Information

Analytical Batch: **XFC15772**
 Analytical Method: **AK102**
 Instrument: **Agilent 7890B F**
 Analyst: **CDM**

Prep Batch: **XXX44054**
 Prep Method: **SW3520C**
 Prep Date/Time: **10/13/2020 16:17**
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 10/15/2020 4:42:28PM

Method Blank

Blank ID: MB for HBN 1812963 [XXX/44054]
Blank Lab ID: 1587445

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1205492001, 1205492002, 1205492003, 1205492004, 1205492005

Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	0.250U	0.500	0.150	mg/L
Surrogates				
n-Triacontane-d62 (surr)	98.5	60-120		%

Batch Information

Analytical Batch: XFC15772
Analytical Method: AK103
Instrument: Agilent 7890B F
Analyst: CDM
Analytical Date/Time: 10/14/2020 6:06:00PM

Prep Batch: XXX44054
Prep Method: SW3520C
Prep Date/Time: 10/13/2020 4:17:07PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Print Date: 10/15/2020 4:42:31PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1205492 [XXX44054]
 Blank Spike Lab ID: 1587446
 Date Analyzed: 10/14/2020 18:16

Spike Duplicate ID: LCSD for HBN 1205492 [XXX44054]
 Spike Duplicate Lab ID: 1587447
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1205492001, 1205492002, 1205492003, 1205492004, 1205492005

Results by AK103

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Residual Range Organics	20	20.8	104	20	20.9	104	(60-120)	0.32	(< 20)

Surrogates

n-Triacontane-d62 (surr)	0.4	106	106	0.4	103	103	(60-120)	2.90	
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Batch Information

Analytical Batch: **XFC15772**
 Analytical Method: **AK103**
 Instrument: **Agilent 7890B F**
 Analyst: **CDM**

Prep Batch: **XXX44054**
 Prep Method: **SW3520C**
 Prep Date/Time: **10/13/2020 16:17**
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL



e-Sample Receipt Form

SGS Workorder #:

1205492



1 2 0 5 4 9 2

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		
Were Custody Seals intact? Note # & location	N/A	absent
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
<input type="checkbox"/> N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 3.4 °C Therm. ID: D52
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		
Note: Refer to form F-083 "Sample Guide" for specific holding times.		
Were samples received within holding time?	Yes	
Do samples match COC** (i.e., sample IDs, dates/times collected)?	Yes	
Note: If times differ <1hr, record details & login per COC. *Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals))	Yes	
Were proper containers (type/mass/volume/preservative***) used?	Yes	<input type="checkbox"/> N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	Yes	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1205492001-A	HCL to pH < 2	OK			
1205492001-B	HCL to pH < 2	OK			
1205492001-C	HCL to pH < 2	OK			
1205492001-D	HCL to pH < 2	OK			
1205492001-E	HCL to pH < 2	OK			
1205492001-F	HCL to pH < 2	OK			
1205492001-G	HCL to pH < 2	OK			
1205492001-H	HCL to pH < 2	OK			
1205492002-A	HCL to pH < 2	OK			
1205492002-B	HCL to pH < 2	OK			
1205492002-C	HCL to pH < 2	OK			
1205492002-D	HCL to pH < 2	OK			
1205492002-E	HCL to pH < 2	OK			
1205492002-F	HCL to pH < 2	OK			
1205492002-G	HCL to pH < 2	OK			
1205492002-H	HCL to pH < 2	OK			
1205492003-A	HCL to pH < 2	OK			
1205492003-B	HCL to pH < 2	OK			
1205492003-C	HCL to pH < 2	OK			
1205492003-D	HCL to pH < 2	OK			
1205492003-E	HCL to pH < 2	OK			
1205492003-F	HCL to pH < 2	OK			
1205492003-G	HCL to pH < 2	OK			
1205492003-H	HCL to pH < 2	OK			
1205492004-A	HCL to pH < 2	OK			
1205492004-B	HCL to pH < 2	OK			
1205492004-C	HCL to pH < 2	OK			
1205492004-D	HCL to pH < 2	OK			
1205492004-E	HCL to pH < 2	OK			
1205492004-F	HCL to pH < 2	OK			
1205492004-G	HCL to pH < 2	OK			
1205492004-H	HCL to pH < 2	OK			
1205492005-A	HCL to pH < 2	OK			
1205492005-B	HCL to pH < 2	OK			
1205492005-C	HCL to pH < 2	OK			
1205492005-D	HCL to pH < 2	OK			
1205492005-E	HCL to pH < 2	OK			
1205492005-F	HCL to pH < 2	OK			
1205492005-G	HCL to pH < 2	OK			
1205492005-H	HCL to pH < 2	OK			
1205492006-A	HCL to pH < 2	OK			
1205492006-B	HCL to pH < 2	OK			
1205492006-C	HCL to pH < 2	OK			
1205492006-D	HCL to pH < 2	OK			
1205492006-E	HCL to pH < 2	OK			
1205492006-F	HCL 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 that an inappropriate container was submitted.

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

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

DM - The container was received damaged.

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

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.

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.

QN - Insufficient sample quantity provided.

**Attachment E:
ADEC Laboratory Data Quality Review Checklist**

Laboratory Data Review Checklist

Completed By:

Lisa Koeneman

Title:

Qualified Environmental Professional

Date:

12/7/2020

Consultant Firm:

Restoration Science & Engineering, LLC

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1205492

Laboratory Report Date:

10/15/2020

CS Site Name:

ARRC Mammoth Alaska

ADEC File Number:

2100.26.202

Hazard Identification Number:

23887

1205492

Laboratory Report Date:

10/15/2020

CS Site Name:

ARRC Mammoth Alaska

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

1. Laboratory

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

Yes No N/A Comments:

SGS completed all analyses for the submitted samples.

b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

Yes No N/A Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

The completed, signed and dated COC is part of the lab report.

b. Correct analyses requested?

Yes No N/A Comments:

The correct analyses were requested.

3. Laboratory Sample Receipt Documentation

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

Yes No N/A Comments:

The cooler was delivered within the acceptable temperature range.

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

Yes No N/A Comments:

All sample preservations were acceptable.

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

Yes No N/A Comments:

All samples were delivered in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes No N/A Comments:

No discrepancies were reported.

e. Data quality or usability affected?

Comments:

The Sample Receipt Form does not indicate that the data quality and usability are affected.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

The Case Narrative is present and understandable.

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

Yes No N/A Comments:

One QC failure was reported.

c. Were all corrective actions documented?

Yes No N/A Comments:

No corrective actions were taken.

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

Comments:

The Case Narrative does not indicate that the data quality and usability are affected.

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5. Samples Results

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

Yes No N/A Comments:

The requested analyses were performed.

b. All applicable holding times met?

Yes No N/A Comments:

All samples were submitted and extracted within the applicable holding times.

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

The samples in this report are water samples.

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

Yes No N/A Comments:

Several non-target analyte LOQs are above their associated cleanup levels.

e. Data quality or usability affected?

The non-target analytes with LOQs above the ADEC cleanup levels are generally found to be non-detect. Additionally, these are not COPCs. Therefore, the data quality and usability are not affected. (The non-target analytes with LOQs above the ADEC cleanup levels are highlighted light blue in the data tables.)

6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

One Method Blank is reported per analysis for the 5 water samples.

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

Yes No N/A Comments:

All Method Blank results are less than their LOQs.

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

Comments:

No samples are affected.

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

Yes No N/A Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

The Method Blank results do not indicate that the data quality and usability are affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No N/A Comments:

One LCS and LCSD are reported per analysis for the 5 water samples.

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

Yes No N/A Comments:

No metals or inorganics were analyzed.

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

Yes No N/A Comments:

The %R for the GRO LCSD for the Trip Blank is above the lab limits.

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

Yes No N/A Comments:

All Method Blank RPDs are within lab limits.

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

Comments:

No samples are affected.

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

Yes No N/A Comments:

No samples are affected.

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

Comments:

The LCS and LCSD results do not indicate that the data quality and usability are affected.

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

Note: Leave blank if not required for project

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Comments:

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

Yes No N/A Comments:

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

Comments:

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

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

Yes No N/A Comments:

Surrogate recoveries are reported for the organic analyses.

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

Yes No N/A Comments:

All surrogate %Rs are within lab limits.

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

Yes No N/A Comments:

No surrogate recoveries failed.

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iv. Data quality or usability affected?

Comments:

The surrogate results do not indicate that the data quality and usability are affected.

e. Trip Blanks

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

Yes No N/A Comments:

One Trip Blank was submitted in the cooler with the volatile samples for the 5 water samples.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?
(If not, a comment explaining why must be entered below)

Yes No N/A Comments:

The cooler is clearly indicated on the COC.

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

Yes No N/A Comments:

All Trip Blank results are less than their LOQs.

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

Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

The Trip Blank results do not indicate that the data quality and usability are affected.

f. Field Duplicate

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

Yes No N/A Comments:

MW-X was submitted as a blind duplicate of CHMWE2

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ii. Submitted blind to lab?

Yes No N/A Comments:

MW-X was submitted to the lab for quality control purposes.

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

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

Where R₁ = Sample Concentration
R₂ = Field Duplicate Concentration

Yes No N/A Comments:

RPDs for the target analytes in the blind and parent sample are within lab limits.

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

Comments:

The Field Blank results do not indicate that the data quality and usability are affected.

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

Yes No N/A Comments:

No Decontamination or Equipment Blank was submitted.

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

Yes No N/A Comments:

No Decontamination or Equipment Blank was submitted.

ii.

No Decontamination or Equipment Blank was submitted.

iii.

RSE uses new dedicated equipment when possible for collecting each sample. Non-dedicated equipment is decontaminated in between uses. No Decontamination or Equipment Blank was submitted.

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CS Site Name:

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7.

a. Defined and appropriate?

Yes No N/A

Comments:

No other data flags were defined or reported by the lab.