2106.26.004
ADEC File No.

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Environmental
Resources
Management

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ERM

11 July 2016

Mr. Robert Weimer
Alaska Department of Environmental Conservation
Contaminated Sites Program
555 Cordova Street, Anchorage, AK 99501
Via e-mail: robert_weimer@alaska.gov

Subject: Circle S Quarterly Drinking Water Summary Report, Chugiak, Alaska, BSUM Claim 105081 ADEC File Number 2106.26.004

Dear Mr. Weimer:

ERM Alaska, Inc. (ERM) performed 12 drinking water well sampling events on a monthly basis from 29 April 2015 to 21 April 2016 in the vicinity of the former Circle S Grocery site located at 22189 Birchwood Loop Road, Chugiak, Alaska (Figure 1, Attachment 1). The quarterly data reports were sent to Ms. Pomposa Porterfield, the property owner of 22179 Birchwood Loop and the associated drinking water well, and the Alaska Department of Environmental Conservation (ADEC).

This work was performed in response to a request by the Alaska Department of Environmental Conservation (ADEC) (ADEC 2015b) for monthly drinking water well sampling at 22179 Birchwood Loop, and to collect more information on the drinking water at the community well, located at 22208 Birchwood Loop.

SITE SUMMARY

In June 1995, two underground storage tanks (USTs), a 10,000-gallon gasoline UST and a 5,000-gallon diesel UST, were removed from the site. Fuel-contaminated soil was encountered during the UST removal effort. Laboratory analysis of soil samples collected from the bottom of the excavation indicated that remaining soil was impacted above applicable ADEC cleanup levels for petroleum hydrocarbons. The final excavation was approximately 15 feet deep and a fuel resistant liner was placed in the excavation prior to the installation of a new dual compartment UST and clean backfill.

Two soil boreholes were advanced to approximately 70 feet below ground surface (bgs) during an August 1999 site investigation. Laboratory results of soil samples collected from the boreholes indicated that benzene and gasoline range organics (GRO) concentrations exceeded ADEC soil cleanup levels. Although no groundwater was encountered in the boreholes, groundwater monitoring wells were installed. The

monitoring wells were checked in September 1999 and no groundwater was detected in the wells.

In August 2012, the dual compartment UST was removed. The excavation conducted to remove the UST did not extend past the liner placed in 1995 when the tank was installed. Laboratory results for soil samples collected from the excavation bottom indicated that benzene and diesel range organics (DRO) exceeded ADEC cleanup levels. Soil removed from the excavation was stockpiled and sampled. Review of results for the soil stockpile samples indicated that this soil was not impacted above ADEC cleanup levels. The closure report did not state what material was used to backfill the excavation.

In June 2013, ADEC sent a letter to Ms. Porterfield (ADEC, 2013b) in that outlined State of Alaska regulations concerning contaminated sites and her responsibilities as a landowner. The letter requested that a work plan be developed to define the nature and extent of the contamination, and that the plan be submitted to ADEC.

ERM performed a limited site investigation in January 2014 and found petroleum hydrocarbon concentrations in excess of ADEC soil cleanup levels in samples between 14 feet bgs and 82 feet bgs within the former UST footprint. Of particular concern was the benzene detection that exceeded the ADEC soil cleanup level in the sample collected at 82 feet bgs, as this represented a potentially complete exposure pathway to current receptors via ingestion of groundwater. ERM did not encounter groundwater in any of the three boreholes installed in January 2014.

In October 2014, ADEC sent a letter to Ms. Porterfield (ADEC 2014) requesting that the closest drinking water well to the site be sampled for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using United States Environmental Protection Agency (USEPA) Method 524.2, and that the depth-to-water be measured in that well. More information on the closest residential drinking water wells (*e.g.*, location, copies of well logs, depth to water, etc.) to the site were also requested (ADEC 2014).

In November 2014, ERM performed limited drinking water sampling at Ms. Porterfield's residence located at 22179 Birchwood Loop, and found trace levels of benzene and ethylbenzene contamination. In April 2015, following the receipt of the results from this sampling event, ADEC sent a letter to Ms. Porterfield (ADEC, 2015b) requesting that the closest drinking water well to the site be tested monthly for BTEX using USEPA 524.2 for a period of 1 year, starting in April 2015. ADEC also requested that the nearest community well, located at 22208 Birchwood Loop, be sampled for BTEX in April 2015.

In October 2015, ERM installed three groundwater monitoring wells at the site to depths of approximately 120 feet, to further characterize potential impacts to the drinking water aquifer. This work is addressed in a separate report.

PROJECT OBJECTIVE

The primary objective of this field effort was to assess the water quality in the closest drinking water well to the former Circle S Grocery site to fully evaluate potential exposure pathways to current and future receptors.

REGULATORY FRAMEWORK

The regulatory framework for this project was developed using the following regulations and guidance documents:

- 18 Alaska Administrative Code (AAC) 80, Drinking Water (ADEC 2012)
- 18 AAC 78, Underground Storage Tanks (ADEC 2013)
- 18 AAC 75, Oil and Other Hazardous Substances Pollution Control (ADEC 2015a)
- Title 40 of the Code of Federal Regulations (CFR), Protection of the Environment, Chapter 141 (USEPA 2014)
- ADEC Draft Field Sampling Guidance (ADEC 2010a)
- ADEC Policy Guidance on Developing Conceptual Site Models (ADEC 2010b)

Analytical results for drinking water samples collected as part of this field effort were compared to maximum contaminant levels (MCLs) set forth in 40 CFR 141.61 (USEPA 2014), as adopted by reference in 18 AAC 80.010(a)(10)(A) (ADEC 2012).

FIELD ACTIVITIES

The field effort was performed by one ERM engineer/scientist, who meets the definition of "qualified person" as per 18 AAC 75.990(100). The work was performed in accordance with the ADEC-approved project work plan (ERM 2015). Field work at the former Circle S Grocery site consisted of the following work elements:

- Collection of drinking water samples on a monthly basis during the period of 29 April 2015 to 21 April 2016, from Ms. Porterfield's well located at 22179 Birchwood Loop Road, and analyzed the samples for BTEX using USEPA Method 524.2.
- Collection of a single drinking water sample in April 2015 from the community well located at 22208 Birchwood Loop, and analyze the sample for BTEX using USEPA Method 524.2. .

Pre-Field Activities

Following ADEC approval of the work plan (ERM 2015), ERM contacted the property owners (Ms. Porterfield and the Birchwood Community Church) of the drinking water wells to request permission to sample their drinking water wells. Sample kits were obtained from the project laboratory (SGS North America, Inc. [SGS] of Anchorage,

Alaska) and ERM notified the ADEC project manager, Mr. Robert Weimer, prior to conducting the field effort.

Well Sampling

Drinking water sample collection followed procedures outlined in ADEC's Draft Field Sampling Guidance (ADEC 2010a) that has since been finalized and those found on the following ADEC Drinking Water Program's website: http://dec.alaska.gov/eh/docs/dw/brochures/VOC%204.pdf.

The drinking water samples collected from Ms. Porterfield's residence were collected from the faucet closest to the pressure tank (located in the kitchen of the residence). The drinking water samples from the community well, located at 22208 Birchwood Loop, were collected from the faucet located in the church kitchen, per instructions of the church maintenance operator (Richard). The screen, hoses, aerators, and any other treatment devices were removed from the faucets prior to sample collection. ERM ran the tap at one-half to three quarters flow for approximately 10 minutes to allow for water to be purged from the pressure tank. Once the water was purged from the pressure tank, the flow was reduced to a trickle in order to minimize aeration of the water, and the sample was collected in accordance with the procedures specified in the project work plan (ERM 2015).

One duplicate sample was collected for quality control (QC) purposes during each sampling event. All samples were placed into a chilled cooler immediately. A chain-of-custody form was completed and accompanied the samples to the project laboratory.

Investigation-Derived Waste Handling

Investigation-derived waste for this project consisted of personal protective equipment (*i.e.*, sampling gloves). Waste was placed in a garbage bag, taped shut, and disposed of in an on-site trash receptacle.

RESULTS

The following subsections discuss the findings of the monthly drinking water sampling field efforts.

Analytical Results

A summary of the analytical data for drinking water samples collected is provided in Table 1 (Attachment 2) and the associated laboratory reports are included in Attachment 3. The results of the drinking water samples were compared to the MCLs for organic contaminants specified in 40 CFR Part 141.61 (USEPA 2014), adopted by reference in 18 AAC 80 (ADEC 2012).

Benzene was detected in samples collected from Ms. Porterfield's well in 11 of the 12 sampling events. Benzene concentrations were recorded above the MCL during the following four sampling events: January, February, March, and April of 2016. The groundwater cleanup level listed in 18 AAC 75 Table C was exceeded for benzene only

in the January 2016 sample. Benzene was not detected only in the sample collected in June 2015.

Toluene was detected in samples collected from Ms. Porterfield's well in 2 of the 12 sampling events. Toluene concentrations were recorded above the MCL only during the January 2016 sampling event. Toluene levels did not exceed the ADEC groundwater cleanup level in any samples.

Ethylbenzene was detected in samples collected from Ms. Porterfield's well in 10 of the 12 sampling events. Ethylbenzene concentrations were recorded above the MCL during the four sampling events: January, February, March, and April of 2016. The highest concentration recorded was in January 2016 samples. Ethylbenzene levels did not exceed the groundwater cleanup level listed in 18 AAC 75 Table C in any samples.

Xylenes (total) were detected in samples collected from Ms. Porterfield's well in 11 of the 12 sampling events. Xylenes (total) concentrations were recorded above the MCL during the four sampling events: January, February, March, and April of 2016. The highest concentration recorded was in January 2016 samples. Xylenes (total) levels did not exceed the groundwater cleanup level listed in 18 AAC 75 Table C in any samples.

BTEX was not detected in the community well sample collected in April 2015.

DATA QUALITY REVIEW

Laboratory quality assurance (QA)/QC data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated during the April, May and June 2015 water sampling events at the former Circle S Grocery site.

Samples were collected, reported, and shipped in general accordance with the work plan. Sample analysis was performed by an ADEC-certified laboratory for applicable analytical methods.

All data were reviewed in accordance with USEPA National Functional Guidelines for Organic Methods (USEPA 2008), analytical methodology and ADEC regulatory guidance documents (ADEC 2009; 2010c). This data review focused on the following QC parameters and impact on data quality objectives (DQOs):

- Usability;
- Sample handling and chain-of-custody documentation;
- Holding time compliance;
- Field QC (trip blanks, field duplicates);
- Laboratory QC (method blanks, laboratory control samples [LCS] and LCS duplicates) surrogates;
- Method reporting limits; and

- Completeness.

Samples were delivered to SGS in Anchorage, Alaska. The water samples were analyzed for BTEX by USEPA Method E524.2. Sample results were reported in SGS work orders 1151703, 1152339 and 1153101.

The data quality was determined as acceptable. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but DQOs were not affected. No results were rejected. Data quality meets DQOs established for this project. All data are suitable for their intended use. The details of this review and qualification of the data are summarized in Attachment 4.

CONCEPTUAL SITE MODEL

The conceptual site model (CSM) for the site was modified by ERM using the results of the April, May and June 2015 site investigations (ERM 2015) and ADEC's *Policy Guidance on Developing Conceptual Site Models* (ADEC 2010b). The CSM conservatively assumes that there are completed exposure pathways between remaining contamination identified in site soils and future site receptors through incidental soil ingestion and inhalation of outdoor air. The results from the sampling events demonstrate that the human exposure pathway to groundwater is complete; however, the low concentrations measured in the groundwater samples do not pose a significant risk to human health. The CSM human health scoping form and graphical form are included in Attachment 5.

CONCLUSIONS AND RECOMMENDATIONS

Analytical results from 12 monthly sampling events (April 2015-April 2016) show detections of benzene, toluene, ethylbenzene, and total xylenes in the drinking water at Ms. Porterfield's residence located at 22179 Birchwood Loop. Concentrations appeared spike around the time of the January 2016 sampling event and decrease with each subsequent sampling event until the final event of April 2016.

Mr. Porterfield indicated in February 2016 that her residence had increased their water usage beginning in July 2015, with larger volume of laundry required daily. The increased demand for groundwater may have depressed the water level of the aquifer around the drinking water well, creating a cone of depression and drawing contaminants towards the well.

No analytes were detected in the neighboring well at 22208 Birchwood.

Due to the consistent presence of BTEX constituents and the spike seen during the seen during the January sampling event, ERM recommended in February 2016 that Ms. Porterfield obtain drinking water from an off-site source (*e.g.*, drinking water vendor, etc.) until a new drinking water well can be installed.

ERM proposes that a new Class C drinking water well be installed to replace the existing well servicing both Ms. Porterfield's and the Circle S Grocery Site to mitigate the risk of

benzene exposure. A proposal to install the new well is anticipated to be completed by August 2016 with an installation date in the fall of 2016.

Sincerely,

Joe Casey
Project Manager

Paul Douglass
Partner-in-Charge

cc:

Ms. Pomposa Porterfield, property owner
Mr. Daryl Gottilla, Berkley Specialty Underwriting Managers

Attachments:

1. Figures
2. Tables
3. Laboratory Analytical Reports
4. Quality Assurance Report and ADEC Checklists
5. Conceptual Site Model

REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2009. Environmental Laboratory Data and Quality Assurance Requirements, Technical Memo-06-2002. March.

ADEC. 2010a. Draft Field Sampling Guidance. May.

ADEC. 2010b. Policy Guidance on Developing Conceptual Site Models. October.

ADEC. 2010c. Laboratory Data Review Checklist. January.

ADEC 2012. 18 Alaska Administrative Code (AAC) 80 Drinking Water. As amended on 20 August.

ADEC. 2013a. 18 AAC 78 Underground Storage Tanks. As revised 19 July 2013.

ADEC. 2013b. Letter from Mr. Robert Weimer to Ms. Pomposa Porterfield Regarding Circle S Grocery, Hazard ID No. 24797. 20 June.

ADEC. 2014. Letter from Mr. Robert Weimer to Ms. Pomposa Porterfield Regarding Circle S Grocery, Hazard ID No. 24797. 2 October.

ADEC. 2015a. 18 AAC 75 Oil and Other Hazardous Substances Pollution Control. As revised 17 June.

ADEC. 2015b. Letter from Mr. Robert Weimer to Ms. Pomposa Porterfield Regarding Circle S Grocery, Hazard ID No. 24797. 7 April.

ERM Alaska, Inc. (ERM). 2014. Circle S Grocery Site Investigation Report, Chugiak, Alaska, ADEC File No. 2106.26.004, ADEC Hazard ID 24797. May.

ERM. 2015. Work Plan - Drinking Water Well Sampling, Chugiak, Alaska, Berkley Specialty Underwriting Managers Claim No. 105081, ADEC File No. 2106.26.004, ADEC Hazard ID 24797. 24 April.

United States Environmental Protection Agency (USEPA). 2008. Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review. June. (EPA 540-R-08-01).

USEPA. 2014. Title 40, Code of Federal Regulations, Protection of Environment. As revised 1 July.

ATTACHMENT 1

Figures

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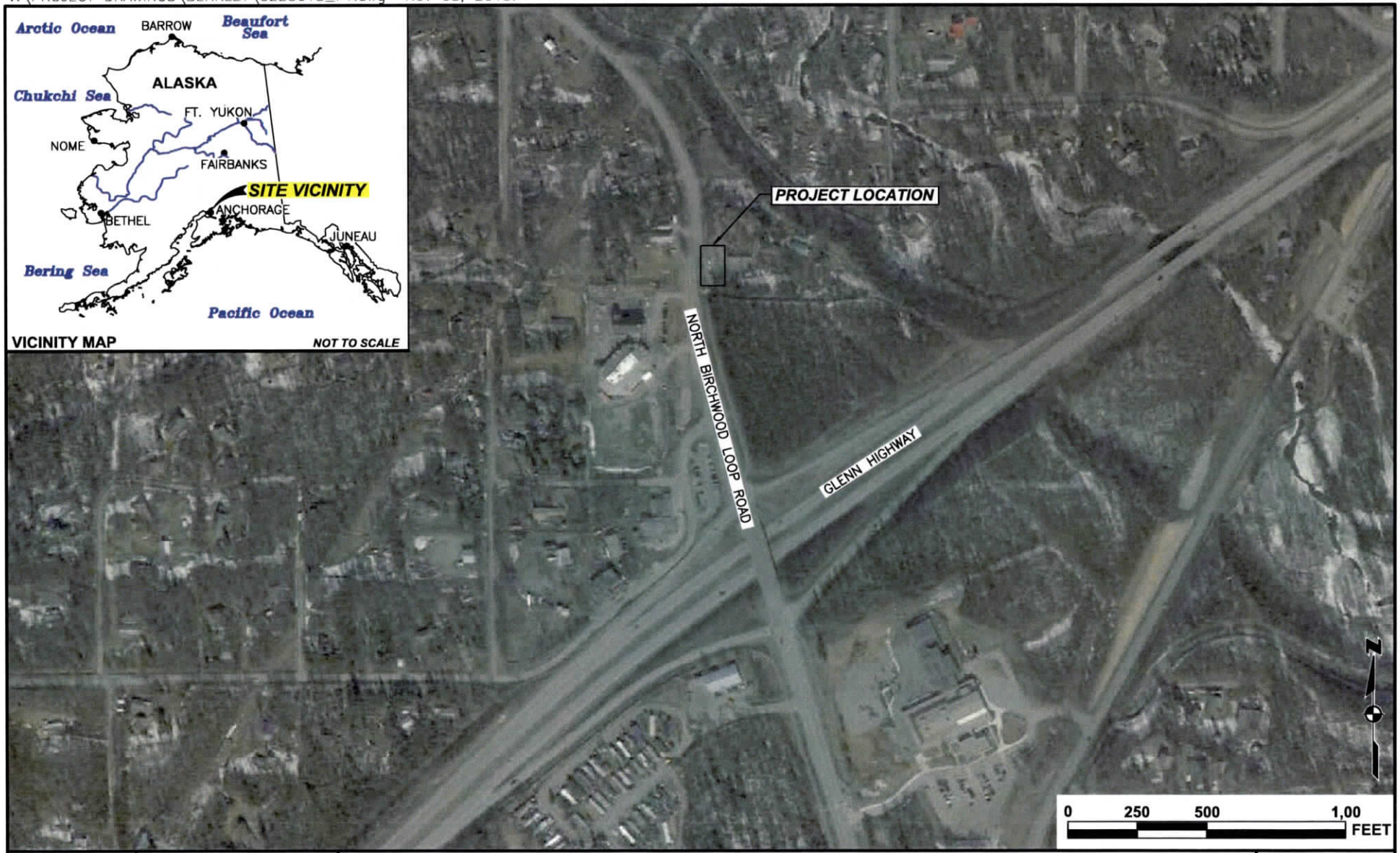
V:\PROJECT DRAWINGS\BERKLEY\0223618_F1.dwg Nov 08, 2013.



ERM

DATE: NOV. 2013
CHKD: C.O.
DRAWN: D.R.F.
PROJ. No.: 0223618

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SITE LOCATION MAP
22189 BIRCHWOOD LOOP ROAD

CIRCLE S GROCERY SITE INVESTIGATION
BERKLEY SPECIALTY UNDERWRITING MANAGERS
Chugiak, Alaska

FIGURE
1

SOURCE: GOOGLE EARTH PRO 2010

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ATTACHMENT 2

Tables

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TABLE 1: DRINKING WATER SAMPLE ANALYTICAL RESULTS
DRINKING WATER WELL SAMPLING
APRIL 2015 - APRIL 2016
FORMER CIRCLE S GROCERY SITE, CHUGIAK, ALASKA

Sample Location	Sample Date	Sample ID	QA/QC Sample (Y/N)?	Analytical Results (µg/L[1])			
				Benzene (EPA 8021B)	Toluene (EPA 8021B)	Ethylbenzene (EPA 8021B)	Total Xylenes (EPA 8021B)
ADEC Groundwater Cleanup Level (µg/L)				5.0	1000	700	10000
22179 Birchwood	4/29/2015	15-CSG-01-WG	N	0.29 J	0.25 U	0.48 J	0.72 J
22179 Birchwood	4/29/2015	15-CSG-02-WG	Y	0.30 J	0.25 U	0.47 J	0.62 J
22208 Birchwood	4/29/2015	15-CSG-03-WG	N	0.25 U	0.25 U	0.25 U	0.25 U
NA	4/29/2015	15-TB-01	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	5/26/2015	15-CSG-04-WG	N	0.22 J	0.25 U	0.47 J	0.58 J
22179 Birchwood	5/26/2015	15-CSG-05-WG	Y	0.23 J	0.25 U	0.47 J	0.59 J
NA	5/26/2015	15-TB-02	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	6/23/2015	15-CSG-06-WG	N	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	6/23/2015	15-CSG-07-WG	Y	0.25 U	0.25 U	0.21 J	0.19 J
NA	6/23/2015	15-TB-03	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	7/27/2015	15-CSG-08-WG	N	0.30 J	0.25 U	0.46 J	0.45 J
22179 Birchwood	7/27/2015	15-CSG-09-WG	Y	0.30 J	0.25 J	0.46 J	0.45 J
NA	7/27/2015	15-TB-04	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	8/25/2015	15-CSG-10-WG	N	0.24 J	0.25 U	0.29 J	0.26 J
22179 Birchwood	8/25/2015	15-CSG-11-WG	Y	0.30 J	0.25 U	0.35 J	0.30 J
NA	8/25/2015	15-TB-05	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	9/30/2015	15-CSG-12-WG	N	0.17 J	0.25 U	0.25 U	0.25 U
22179 Birchwood	9/30/2015	15-CSG-13-WG	Y	0.16 J	0.25 U	0.25 U	0.16 J
NA	9/30/2015	15-TB-06	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	11/18/2015	15-CSG-14-WG	N	0.20 J	0.25 U	0.25 U	0.25 U
22179 Birchwood	11/18/2015	15-CSG-15-WG	Y	0.21 J	0.25 U	0.25 U	0.25 U
NA	11/19/2015	15-CSG-01-TB-1/TB-07	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	12/7/2015	15-CSG-16-WG	N	0.29 J	0.25 U	0.21 J	0.19 J
22179 Birchwood	12/7/2015	15-CSG-17-WG	Y	0.27 J	0.25 U	0.25 U	0.25 U
NA	12/7/2015	TRIP BLANK	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	1/26/2016	15-CSG-18-WG	N	**19.30**	0.98	18.30	77.30
22179 Birchwood	1/26/2016	15-CSG-19-WG	Y	**19.40**	0.90	18.70	79.20
NA	1/26/2016	TRIP BLANK	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	2/23/2016	16-CSG-23-WG	N	3.01	0.25 U	5.03	15.20
22179 Birchwood	2/23/2016	16-CSG-24-WG	Y	2.90	0.25 U	4.94	15.20
NA	2/23/2016	TRIP BLANK	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	3/18/2016	16-CSG-25-WG	N	1.48	0.25 U	2.74	4.79
22179 Birchwood	3/18/2016	16-CSG-26-WG	Y	1.39	0.25 U	2.61	4.46
NA	3/18/2016	16-CSG-TB	Y	0.25 U	0.25 U	0.25 U	0.25 U
22179 Birchwood	4/21/2016	16-CSG-27-WG	N	0.42 J	0.25 U	0.61	0.69
22179 Birchwood	4/21/2016	16-CSG-28-WG	Y	0.50	0.25 U	0.70	0.81
NA	4/21/2016	16-CSG-TB	Y	0.25 U	0.25 U	0.25 U	0.25 U

Notes

[1]: Groundwater cleanup levels were taken from Title 18 of the Alaska Administrative Code (AAC), Chapter 75, as amended June 17, 2015 (ADEC 2015).

J = Analyte detected above the MDL and below the MCL

U = Analytical result is not detected above the MDL

µg/L = Micrograms per liter = parts per billion (ppb).

19.30 The indicated concentration exceeds the 18 AAC 75 Table C Groundwater Cleanup Level.

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ATTACHMENT 3

Laboratory Analytical Reports

(Provided Electronically - CD)

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ATTACHMENT 4

Quality Assurance Review and ADEC Checklists

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1. QUALITY ASSURANCE REVIEW

Laboratory quality assurance/quality control (QA/QC) data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated from sampling on 29 April, 26 May and 23 June 2015 at two locations in the vicinity of the former Circle S Grocery site located at 22189 Birchwood Loop Road, Chugiak, Alaska.

A completeness check and data review was performed by ERM Alaska, Inc. and completed by an ERM Project Chemist. The data and usability review was performed using the United States EPA National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008) as a reference for qualification. The Alaska Department of Environmental Conservation (ADEC) laboratory data checklists were completed for this project (ADEC 2010).

All data were reviewed in accordance with United States EPA National Functional Guidelines for Organic Methods (EPA 2008) and ADEC regulatory guidance documents (ADEC 2009; 2012). This data review focuses on criteria for QA/QC parameters and their effect on the quality of data and usability.

All results are considered usable for project objectives. Some results are considered estimated due to quality control criteria not being met. The completeness for this project is 100%. The details of this review and qualification of the data are summarized in the following sections.

1.1. Sample Handling and Chain of Custody

Samples were collected, reported, and shipped in general accordance with the sampling plan requirements. Sample analysis was performed by Alaska Department of Environmental Conservation (ADEC) certified laboratories for applicable analytical methods.

Drinking water samples were analyzed for the following:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX), EPA Method 524.2.

Samples were delivered to SGS North America, Inc. (SGS) in Anchorage, Alaska. Results were reported in 3 sample delivery groups (SDG) 1151703, 1152339, and 1153101.

All sample coolers were shipped with custody seals intact. Chain of Custody (COC) forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data. All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range, with a few exceptions.

Several temperature blanks were reported as above the recommended temperature range of 4 $\pm$ 2°C. No data required qualification.

1.2. Holding Time Compliance

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

1.3. Field QA/QC

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site heterogeneity and laboratory analyses. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. During this sampling event, trip blanks, and field duplicates were submitted for analysis.

1.3.1. Trip Blanks

A trip blank was prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field event, and transported with the collected samples back to the laboratory for analysis.

A trip blank was placed in the cooler with associated matrix specific volatile organics samples (GRO/BTEX). Three trip blanks were submitted for analysis and analytes detected in the trip blank were not detected (U) above the limit of detection (LOD) for all analytes.

1.3.2. Field Duplicates

There were 4 primary samples, with three field duplicates submitted for analysis. When analytes were present in concentrations below the LOD in one or both samples, no valid comparison could be made. The primary sample and duplicate relative percent differences (RPDs) met ADEC applicable control limits of <30% between water samples. Overall, there was adequate comparability of field duplicate results to meet project data quality objectives with previously noted exceptions.

1.4. Laboratory QA/QC

1.4.1. Laboratory Blanks

Laboratory/ Method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (ND) in any laboratory blanks.

1.4.2. Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and

recoveries are calculated. Acceptable recovery criteria vary with each analytical method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes.

1.4.3. Matrix Spikes

Extra volumes of primary field samples were collected and submitted to the laboratory for matrix spike/matrix spike duplicate (MS/MSD) analyses. Matrix spikes have a known quantity of target analytes are added (spiked) to field samples. Spike recoveries are calculated and are used to evaluate both site conditions and laboratory quality control. MS/MSD percent recoveries (%R) and relative percent differences (RPDs) were within limits.

1.4.4. Surrogates

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD, MS/MSD and other QA/QC samples.

1.4.5. Detection Limits (Sensitivity)

Detection limits (DLs) met or were below established criteria specified for all analyses in the project sampling plan and detection limits were also below the ADEC established cleanup levels.

1.5. Precision and Accuracy

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with "true values" established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs, MS/MSDs and field duplicate pairs for this project, with exceptions noted in above sections. Field duplicates and MS/MSD samples were collected in accordance with sampling plan specifications. Field duplicate RPDs met applicable control limits, with exceptions noted in above sections. Recoveries and RPDs for all LCS/LSCD and MS/MSD samples were within required limits, with exceptions noted in above sections.

1.5.1. Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\%\ \text{completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications. No sample results were rejected. Completeness for this project is 100%.

1.5.2. Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the sampling plan and verified in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

1.5.3. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

1.6. Data Summary

In general, the overall quality of the data was acceptable. The data quality was determined as acceptable. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. The EPA National Functional Guidelines (EPA 2008) were used to evaluate the acceptability of the data.

Data quality meets established DQO established for this project. All data are suitable for their intended use.

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2. REFERENCES

ADEC. 2009. *Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements.* March 2009.

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EPA. 2010. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 540-R-010-011). January.

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Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Jul 20, 2015
CS Report Name:	Circle S Grocery, Quarterly Drinking Water Well Sampling Report Chugiak, Alaska	Report Date:	July 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1153101
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

No samples were transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 6.5°C. No data was qualified due to temperature.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and with zero headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the laboratory sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability in not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil analyses.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs are within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs are within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

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

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results are less than PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Primary 15-CSG-06-WG with duplicate 15-CSG-07-WG

ii. Submitted blind to lab?

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

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Decontamination or equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

Decontamination or equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the SGS laboratory data package.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Jul 20, 2015
CS Report Name:	Circle S Grocery, Quarterly Drinking Water Well Sampling Report Chugiak, Alaska	Report Date:	July 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1152339
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

No samples were transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 10.9°C. No data was qualified due to temperature.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and with zero headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the laboratory sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability in not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil analyses.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs are within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs are within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results are less than PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-04-WG with duplicate 15-CSG-05-WG

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Decontamination or equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

Decontamination or equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the SGS laboratory data package.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Jul 20, 2015
CS Report Name:	Circle S Grocery, Quarterly Drinking Water Well Sampling Report Chugiak, Alaska	Report Date:	July 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1151703
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

No samples were transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 8.5°C. No data was qualified due to temperature.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and with zero headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the laboratory sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability in not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil analyses.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs are within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs are within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results are less than PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-01-WG with duplicate 15-CSG-02-WG

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Decontamination or equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination or equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the SGS laboratory data package.

[redacted]

A1. DATA VALIDATION REPORT SUMMARY

Laboratory quality assurance/quality control (QA/QC) data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated during the July through August drinking water monitoring for the community well located at 22208 Birchwood Loop, the former site of Circle S Grocery, in Chugiak, Alaska.

Samples were collected, reported and shipped in general accordance with ADEC regulatory and guidance documents and an ADEC approved work plan (ERM 2015). Sample analysis was performed by an Alaska Department of Environmental Conservation (ADEC) certified laboratory for applicable analytical methods.

Samples were analyzed for the following:

- Volatile organic compounds (specifically, BTEX - benzene; ethylbenzene; toluene; m&p-xylene, and o-xylene), EPA Method 524.2.

Collected samples were submitted to SGS Environmental, Inc. located in Anchorage, Alaska for analysis.

In July 2015, sample results were reported in sample delivery group (SDG) 1153946.

In August 2015, sample results were reported in SDG 1154780.

In September 2015, sample results were reported in SDG 1155766.

The data validation and usability review was performed using the *National Functional Guidelines for Organic Data Review* (USEPA 2008), and ADEC regulatory guidance documents (ADEC, 2009; 2012) as references for qualification.

Data review was performed by an Environmental Resources Management (ERM) Project Chemist. An Alaska Department of Environmental Conservation (ADEC) laboratory data checklist (ADEC, 2010) was completed for this project.

Most results are considered usable for project objectives. The details of this review and qualification of the data are summarized in the following sections.

A1.1. Sample Handling and Chain of Custody

All sample coolers were shipped with custody seals intact. Chain of custody (CoC) forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data. All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range of 4 degrees Celsius (°C) +/- 2°C.

A1.2. Holding Time Compliance

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

A1.3. Field QA/QC

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site heterogeneity and laboratory analyses. During this sampling event, a trip blank, and a field duplicate were submitted for analysis.

A1.3.1. Trip Blank

During each sampling event, a trip blank was prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field events, and transported with the collected samples back to the laboratory for analysis. The trip blank was placed in the cooler with associated matrix-specific VOC samples. No target analytes were detected in the trip blank, with one exception.

SDG 1155766: Methylene chloride was present in the trip blank at 0.000510 mg/L. Assoicated sample results were 15-CSG-12-WG and 15-CSG-13-WG. All associated methylene chloride results were not detected a the limit of detection (LOD). Data did not require qualification.

A1.3.2. Field Duplicate

Out of a total of 3 primary samples, there were 3 field duplicate samples submitted. The frequency of field duplicate sample collection met the 10 percent (%) frequency requirements specified in the work plan.

Relative percent differences (RPDs) were calculated between the primary and duplicate samples, and met the ADEC recommended limits of <30% in water samples. When analytes were present in concentrations below the detection limit (DL), or not detected at the limit of detection (LOD), in one or both samples, no valid comparison could be made.

July 2015, 1153946: One primary, 15-CSG-08-WG, with one duplicate, 15-CSG-09-WG, were collected. The primary sample and duplicate RPDs met applicable control limits.

August 2015, 1154780: One primary, 15-CSG-10-WG, with one duplicate, 15-CSG-11-WG, were collected. The primary sample and duplicate relative percent differences (RPD) met applicable control limits.

September 2015, 1155766: One primary, 15-CSG-12-WG, with one duplicate, 15-CSG-13-WG, were collected. The primary sample and duplicate relative percent differences (RPD) met applicable control limits.

Overall, there was adequate comparability of field duplicate results to meet project data quality objectives.

A1.4. Laboratory QA/QC

A1.4.1. Laboratory Blanks

Laboratory method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (ND) in the laboratory blanks.

A1.4.2. Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples before extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes, with the following exceptions.

1155766: The LCS percent recovery (%R) was outside of the quality control criteria in the following analytes: 1,1-dichloroethene; 1,2-dibromo-3-chloropropane; carbon tetrachloride; dichlorodifluoromethane; trichlorofluoromethane. The LCSD %R was outide of the quality control limits in the following analytes: 1,1,1-Trichloroethane; 1,1-dichloroethene; 2,2- dichloropropane; carbon tetrachloride; dichlorodifluoromethane; trichlorofluoromethane. All samples within this SDG are potentially impacted; however, all sample results were not detected at the LOD. Therefore, no qualifications were required.

A1.4.3. Surrogates

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD and other QA/QC samples.

A1.4.4. Detection Limits (Sensitivity)

Detection Limits (DL) provided adequate sensitivity needed to meet project objectives. All not detected results were reported as not detected (U) at the limit of detection (LOD), which is half of the limit of quantitation (LOQ).

A1.5. Precision and Accuracy

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with "true values" established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs and field duplicate pairs for this project. Field

duplicates samples were collected in accordance with work plan specifications. Field duplicate RPDs met applicable control limits. Recoveries and RPDs for all LCS/LSCD samples were within required limits, with any exceptions noted in previous sections.

A1.5.1. Data Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-rejected flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications. No results were qualified as unusable (i.e., flagged as rejected with an "R"). Data completeness for this project is 100%.

A1.5.2. Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the work plan and verified in the field to accurately account for site variations and sample matrices. The data quality objective (DQO) for representativeness was met.

A1.5.3. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

A1.6. Data Quality Summary

In general, the overall quality of the data was acceptable. The USEPA National Functional Guidelines (USEPA 2008) were used to evaluate the acceptability of the data. The data quality was individually determined as acceptable or estimated. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. Estimated results, flagged with "J," are considered inaccurate due to a bias created by QC acceptance criteria which were not met. No results were rejected.

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A2. REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2009. Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements. March.

ADEC. 2010. Laboratory Data Review Checklist. January.

ADEC. 2012. Technical Memorandum: Guidelines for Data Reporting, Data Reduction, and Treatment of Non-detect Values. June.

ERM. 2015. Work Plan - Drinking Water Well Sampling, Chugiak, Alaska, BSUM Claim No. 105081, ADEC File No. 2106.26.004, ADEC Hazard ID 24797. 24 April.

USEPA. 2008. Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review. June. (EPA 540-R-08-01).

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Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Nov 9, 2015
CS Report Name:	Quarterly Drinking Water Well Sampling Report July - September 2015 Chugiak, Alaska; BSUM Claim 105081	Report Date:	November 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1153946
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

NA. Samples were not transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived at 5.9°C.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and free of headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability are not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All the results were reported as not detected at the limit of detection (LOD).

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All the results were reported as not detected at the limit of detection (LOD).

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability was not affected with respect to the LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

Trip blank not indicated on the COC; however Trip Blank results are included within the data package.

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results were not detected at the LOD.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-08-WG with duplicate 15-CSG-09-WG.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Nov 9, 2015
CS Report Name:	Quarterly Drinking Water Well Sampling Report July - September 2015 Chugiak, Alaska; BSUM Claim 105081	Report Date:	November 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1154780
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

NA. Samples were not transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived at 4.5°C.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and free of headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability are not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All the results were reported as not detected at the limit of detection (LOD).

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All the results were reported as not detected at the limit of detection (LOD).

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability was not affected with respect to the LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results were not detected at the LOD.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-10-WG with duplicate 15-CSG-11-WG.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Nov 9, 2015
CS Report Name:	Quarterly Drinking Water Well Sampling Report July - September 2015 Chugiak, Alaska; BSUM Claim 105081	Report Date:	November 2015
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1155766
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

NA. Samples were not transferred or subcontracted to another network laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived at 1.6°C.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition, unbroken and free of headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt documentation.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability are not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All the results were reported as not detected at the limit of detection (LOD).

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All the results were reported as not detected at the limit of detection (LOD).

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

○ Yes ◉ No ○ NA (Please explain) Comments:

LCS: 1,1-dichloroethene; 1,2-dibromo-3-chloropropane; carbon tetrachloride; dichlorodifluoromethane; trichlorofluoromethane.
LCSD: 1,1,1-Trichloroethane; 1,1-dichloroethene; 2,2- dichloropropane; carbon tetrachloride; dichlorodifluoromethane; trichlorofluoromethane.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

All samples within the data package are potentially impacted.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Data quality and usability was not affected with respect to the LCS/LCSD results. All associated results were not detected within the associated samples. Data did not require qualification.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

○ Yes ◉ No ○ NA (Please explain.) Comments:

Methylene chloride (0.000510 mg/L)

iv. If above PQL, what samples are affected?

Comments:

15-CSG-12-WG and 15-CSG-13-WG

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results. All associated results were not detected at the limit of detection (LOD). No data required qualification.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-12-WG with duplicate 15-CSG-13-WG.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

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1. QUALITY ASSURANCE REVIEW

Laboratory quality assurance/quality control (QA/QC) data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated from drinking well water sampling in November 2015, December 2015 and January 2016 at 22179 Birchwood Loop Road, Chugiak, Alaska.

A completeness check and data review was performed by ERM Alaska, Inc. and completed by an ERM Project Chemist. The data and usability review was performed using the United States EPA National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008) as a reference for qualification. The Alaska Department of Environmental Conservation (ADEC) laboratory data checklists were completed for this project (ADEC 2010).

All data were reviewed in accordance with United States EPA National Functional Guidelines for Organic Methods (EPA 2008) and ADEC regulatory guidance documents (ADEC 2009; 2010; 2012). This data review focuses on criteria for QA/QC parameters and their effect on the quality of data and usability.

All results are considered usable for project objectives. Some results are considered estimated due to quality control criteria not being met. The completeness for this project is 100%. The details of this review and qualification of the data are summarized in the following sections.

1.1. Sample Handling and Chain of Custody

Samples were collected, reported, and shipped in general accordance with the sampling plan requirements. Sample analysis was performed by Alaska Department of Environmental Conservation (ADEC) certified laboratories for applicable analytical methods.

Drinking water samples were analyzed for Benzene, toluene, ethylbenzene, and xylenes (BTEX), EPA Method 524.2.

Samples were delivered to SGS North America, Inc. (SGS) in Anchorage, Alaska. Results were reported in 3 sample delivery groups (SDG).

November 2015 results were reported in SDG 1156817.
December 2015 results were reported in SDG 1157036.
January 2016 results were reported in SDG 1160332.

All sample coolers were shipped with custody seals intact. Chain of Custody (COC) forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data. All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range.

1.2. Holding Time Compliance

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

1.3. Field QA/QC

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site heterogeneity and laboratory analyses. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. During this sampling event, a trip blank and a field duplicate were submitted for analysis.

1.3.1. Trip Blanks

A trip blank was prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field event, and transported with the collected samples back to the laboratory for analysis.

A trip blank was placed in the cooler with associated matrix specific volatile organics samples (BTEX). The trip blanks were submitted for analysis and analytes detected in the trip blank were not detected (U) above the limit of detection (LOD) for all analytes.

1.3.2. Field Duplicates

There were 3 primary samples and 3 field duplicates submitted for analysis.

- November 2105: primary sample 15-CSG-14-WG with duplicate 15-CSG-15-WG.
- December 2015: primary sample 15-CSG-16-WG with duplicate 15-CSG-17-GW.
- January 2016: primary sample 15-CSG-18-WG with duplicate 15-CSG-19-GW.

When analytes were present in concentrations below the LOD in one or both samples, no valid comparison could be made. The primary sample and duplicate relative percent differences (RPDs) met ADEC applicable control limits of <30% between water samples. Overall, there was adequate comparability of field duplicate results to meet project data quality objectives with previously noted exceptions.

1.4. Laboratory QA/QC

1.4.1. Laboratory Blanks

Laboratory/ Method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (ND) in any laboratory blanks.

1.4.2. Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes.

1.4.3. Surrogates

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD and other QA/QC samples.

1.4.4. Detection Limits (Sensitivity)

Detection limits (DLs) met or were below established criteria specified for all analyses in the project sampling plan and detection limits were also below the ADEC established cleanup levels.

1.5. Precision and Accuracy

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with "true values" established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs and field duplicate pairs for this project. Field duplicates samples were collected in accordance with sampling plan specifications. Field duplicate RPDs met applicable control limits. Recoveries and RPDs for all LCS/LSCD samples were within required limits.

1.5.1. Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications. No sample results were rejected. Completeness for this project is 100%.

1.5.2. *Representativeness*

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the sampling plan and verified in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

1.5.3. *Comparability*

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

1.6. Data Summary

In general, the overall quality of the data was acceptable. The data quality was determined as acceptable. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. The EPA National Functional Guidelines (EPA 2008) were used to evaluate the acceptability of the data.

Data quality meets established DQO established for this project. All data are suitable for their intended use.

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2. REFERENCES

ADEC. 2009. *Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements.* March 2009.

ADEC. 2010. Laboratory Data Review Checklist. January.

ADEC. 2012. *Technical Memorandum: Guidelines for Data Reporting, Data Reduction, and Treatment of Non-detect Values.* June.

EPA. 2008. *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 540-R-08-01). June.

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Feb 12, 2016
CS Report Name:	Quarterly Drinking Water Well Sampling Report November 2015 - January 2016	Report Date:	February 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1156817
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred or subcontracted to another laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples were received at 5.6°C.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition with zero headspace. Two GRO/BTEX sample vials contained limited volume.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Two GRO/BTEX sample vials contained limited volume. Enough sample volume was present in the remaining sample vials.

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

Comments:

Data quality and usability is not affected with respect to the reported laboratory sample reciept information.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability is not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data package.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability are not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were less than PQL.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses within this data package.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPD were within limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPD were within limits.

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

Data quality and usability is not affected

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All results were below PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-14-WG with duplicate 15-CSG-15-WG; and primary with duplicate 15-CSG-01-WG-FD.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Feb 12, 2016
CS Report Name:	Quarterly Drinking Water Well Sampling Report November 2015 - January 2016	Report Date:	February 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1157036
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred or subcontracted to another laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples were received at 5.6°C.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition with zero headspace. Two GRO/BTEX sample vials contained limited volume.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Two GRO/BTEX sample vials contained limited volume. Enough sample volume was present in the remaining sample vials.

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

Comments:

Data quality and usability is not affected with respect to the reported laboratory sample reciept information.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability is not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data package.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability are not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were less than PQL.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses within this data package.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPD were within limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPD were within limits.

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

Data quality and usability is not affected

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All results were below PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Primary 15-CSG-16-WG with duplicate 15-CSG-17-WG.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability is not affected with respect to the field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Melissa Pike		
Title:	Project Chemist	Date:	Feb 12, 2016
CS Report Name:	Quarterly Drinking Water Well Sampling Report November 2015 - January 2016	Report Date:	February 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1160332
ADEC File Number:	2106.26.004	ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred or subcontracted to another laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 0.8°C. No data required qualification due to temperature.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition with zero headspace.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no receiving discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the reported laboratory sample reciept information.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability is not effected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There are no soil samples within this data package.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality and usability are not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were less than PQL.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses within this data package.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There are no failed surrogate recoveries.

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

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

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

iv. If above PQL, what samples are affected?

Comments:

NA. All results were below PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Primary 15-CSG-18-WG with duplicate 15-CSG-19-WG.

ii. Submitted blind to lab?

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

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes (•) No ( ) NA (Please explain) Comments:

Data quality and usability is not affected with respect to the field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

Comments:

NA. Decontamination and equipment blanks were not required as all sampling equipment was disposable.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Defined within the laboratory qualifier section of the laboratory report.

[redacted]

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1. QUALITY ASSURANCE REVIEW

Laboratory quality assurance/quality control (QA/QC) data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated from drinking well water sampling in February, March and April 2016 at 22179 Birchwood Loop Road, Chugiak, Alaska.

A completeness check and data review was performed by ERM Alaska, Inc. and completed by an ERM Project Chemist. The data and usability review was performed using the United States EPA National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008) and ADEC regulatory guidance documents (ADEC 2009; 2010; 2012) as a reference for qualification. The Alaska Department of Environmental Conservation (ADEC) laboratory data checklists were completed for this project (ADEC 2010).

All results are considered usable for project objectives. Some results are considered estimated due to quality control criteria not being met. The completeness for this project is 100%. The details of this review and qualification of the data are summarized in the following sections.

1.1. Sample Handling and Chain of Custody

Samples were collected, reported, and shipped in general accordance with the sampling plan requirements. Sample analysis was performed by Alaska Department of Environmental Conservation (ADEC) certified laboratories for applicable analytical methods.

Drinking water samples were analyzed for volatile organic compounds benzene, toluene, ethylbenzene, and xylenes (BTEX), EPA Method 524.2.

Samples were delivered to SGS North America, Inc. (SGS) in Anchorage, Alaska. Results were reported in three sample delivery groups (SDG).

February2016 results were reported in SDG 1160809.
March 2016 results were reported in SDG1161241.
April 2016 results were reported in SDG 1161870.

All sample coolers were shipped with custody seals intact. Chain of Custody (COC) forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data. All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range.

1.2. Holding Time Compliance

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

1.3. Field QA/QC

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site heterogeneity and laboratory analyses. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. During this sampling event, a trip blank and a field duplicate were submitted for analysis.

1.3.1. Trip Blanks

A trip blank was prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field event, and transported with the collected samples back to the laboratory for analysis.

A trip blank was placed in the cooler with associated matrix specific volatile organics samples (BTEX). The trip blanks were submitted for analysis and the target analytes (BTEX) were not detected in the trip blank above the limit of detection (LOD. In the trip blank associated with samples collected in March, chloromethane was detected above the detection limit (DL). The associated result for chloromethane in sample 16-CSG-26-GW was reported as estimated (J-B) and may be biased high due to contamination.

1.3.2. Field Duplicates

There were 3 primary samples and 3 field duplicates submitted for analysis.

- February 2016: primary sample 16-CSG-23-WG with duplicate 16-CSG-24-WG.
- March 2016: primary sample 16-CSG-25-WG with duplicate 16-CSG-26-GW.
- April2016: primary sample 16-CSG-27-WG with duplicate 16-CSG-28-GW.

When analytes were present in concentrations below the LOD in one or both samples, no valid comparison could be made. The primary sample and duplicate relative percent differences (RPD) met ADEC applicable control limits of <30% between water samples for all target compounds (BTEX). In the field duplicates collected in March, there was a high RPD for chloromethane results. The results for chloromethane in samples 16-CSG-25-WG and 16-CSG-26-GW were flagged J-D as estimated with a higher imprecision.Overall, there was adequate comparability of field duplicate results to meet project data quality objectives with previously noted exceptions.

1.4. Laboratory QA/QC

1.4.1. Laboratory Blanks

Laboratory/ Method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (ND) in any laboratory blanks.

1.4.2. Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes.

1.4.3. Surrogates

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD and other QA/QC samples.

1.5. Detection Limits (Sensitivity)

Detection limits (DLs) met or were below established criteria specified for all analyses in the project sampling plan and detection limits were also below the ADEC established cleanup levels.

1.6. Precision and Accuracy

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with "true values" established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs and field duplicate pairs for this project. Field duplicates samples were collected in accordance with sampling plan specifications. Field duplicate RPDs met applicable control limits for target compounds (BTEX). Recoveries and RPDs for all LCS/LSCD samples were within required limits.

1.7. Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{}$$

number of possible results

All requested analyses were performed in accordance with Work Plan specifications. No sample results were rejected. Completeness for this project is 100%.

1.8. Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the sampling plan and verified in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

1.9. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

1.10. Data Summary

In general, the overall quality of the data was acceptable.. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. The EPA National Functional Guidelines (EPA 2008) were used to evaluate the acceptability of the data.

Data quality meets established DQO established for this project. All data are suitable for their intended use.

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2. REFERENCES

ADEC. 2009. *Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements.* March 2009.

ADEC. 2010. Laboratory Data Review Checklist. January.

ADEC. 2012. *Technical Memorandum: Guidelines for Data Reporting, Data Reduction, and Treatment of Non-detect Values.* June.

EPA. 2008. *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 540-R-08-01). June.

Laboratory Data Review Checklist

Completed by:	Elsie King		
Title:	Project Chemist	Date:	May 10, 2016
CS Report Name:	Circle S Drinking Water Report	Report Date:	May 10, 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1161870
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred to another laboratory or subcontracted to an alternate laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received chilled, within 1 hour of sample collection.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt condition.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability was not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

There are no soil samples in this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality or usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results were less than PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

16-CSG-23-WG and 16-CSG-24-WG

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data is acceptable.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required.

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

Comments:

NA. Decontamination or equipment blanks were not required.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Within the laboratory qualifiers section of the data report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Elsie King		
Title:	Project Chemist	Date:	May 9, 2016
CS Report Name:	Circle S Drinking Water Report	Report Date:	May 9, 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1161241
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred to another laboratory or subcontracted to an alternate laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 6.1°C. No data required qualification.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition within 8 hours of collection.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt condition.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability was not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

The COC did not specify BTEX only on the COC, and all VOCs have been reported. For this project, the target compounds tare BTEX only.

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

There are no soil samples in this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality or usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

Chloromethane was detected below the PQL, but above the DL. (0.00022 J mg/L)

iv. If above PQL, what samples are affected?

Comments:

16-CSG-25-WG, 16-CSG-26-WG

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

Comments:

Chloromethane results within 5x the trip blank concentration (0.0011 mg/L) may be biased high. The result for sample 16-CSG-26-WG was reported as estimated (J-B) and may be biased high due to contamination.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

16-CSG-25-WG and 16-CSG-26-WG

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain) Comments:

RPD was 67% for chloromethane

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

◉ Yes ○ No ○ NA (Please explain) Comments:

The results for chloromethane are estimated and may be also be affected by contamination. Results for 16-CSG-25-WG and 16-CSG-26-WG were flagged J-D and have uncertain precision. However, chloromethane is not a target compound for this project.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required.

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

Comments:

NA. Decontamination or equipment blanks were not required.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Within the laboratory qualifiers section of the data report.

[redacted]

Laboratory Data Review Checklist

Completed by:	Elsie King		
Title:	Project Chemist	Date:	May 10, 2016
CS Report Name:	Circle S Drinking Water Report	Report Date:	May 10, 2016
Consultant Firm:	ERM Alaska, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1160809
ADEC File Number:		ADEC RecKey Number:	

1. Laboratory

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

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

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 (•) NA (Please explain) Comments:

Samples were not transferred to another laboratory or subcontracted to an alternate laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

( ) Yes (•) No ( ) NA (Please explain) Comments:

Samples were received at 6.5°C. No data required qualification.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Samples arrived in good condition.

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies.

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

Comments:

Data quality and usability is not affected with respect to the sample receipt condition.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no discrepancies, errors or QC failures.

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

NA. There were no corrective actions.

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

Comments:

Data quality and usability was not affected with respect to the case narrative report.

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

There are no soil samples in this data set.

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

Comments:

Data quality or usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

NA. All method blank results were below PQL.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All method blank results were below PQL.

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

Data quality and usability is not affected with respect to the reported method blank results.

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no metal or inorganic analyses.

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

NA. All %R and RPDs were within acceptable limits.

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. All %R and RPDs were within acceptable limits.

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

Data quality and usability is not affected with respect to the reported LCS/LCSD results.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. There were no failed surrogate recoveries.

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

Comments:

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

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

◉ Yes ○ No ○ NA (Please explain.) Comments:

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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results were less than PQL.

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

Comments:

Data quality and usability is not affected with respect to the reported trip blank results.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

16-CSG-23-WG and 16-CSG-24-WG

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ◉ No ○ NA (Please explain) Comments:

Data is acceptable.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA. Decontamination or equipment blanks were not required.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or equipment blanks were not required.

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

Comments:

NA. Decontamination or equipment blanks were not required.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

Within the laboratory qualifiers section of the data report.

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ATTACHMENT 5

Conceptual Site Model

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HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Circle S Grocery
ADEC File No. 2106.26.004

Completed By: Joe Casey Environmental Technician
Date Completed: 2/11/2016

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media	Transport Mechanisms	
☐ Surface Soil (0-2 ft bgs)	Direct release to surface soil	check soil
	☐ Migration to subsurface	check soil
	☐ Migration to groundwater	check groundwater
	☐ Volatilization	check air
	☐ Runoff or erosion	check surface water
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil	check soil
	✓ Migration to groundwater	check groundwater
	✓ Volatilization	check air
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Ground-water	Direct release to groundwater	check groundwater
	✓ Volatilization	check air
	☐ Flow to surface water body	check surface water
	☐ Flow to sediment	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Surface Water	Direct release to surface water	check surface water
	☐ Volatilization	check air
	☐ Sedimentation	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☐ Sediment	Direct release to sediment	check sediment
	☐ Resuspension, runoff, or erosion	check surface water
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	✓ Incidental Soil Ingestion	F	F	F	F			
	☐ Dermal Absorption of Contaminants from Soil							
	☐ Inhalation of Fugitive Dust							
☑ groundwater	✓ Ingestion of Groundwater	C	C	C	C			
	✓ Dermal Absorption of Contaminants in Groundwater	C						
	✓ Inhalation of Volatile Compounds in Tap Water	C	C	C	C			
☑ air	✓ Inhalation of Outdoor Air	I	I	I	I			
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☐ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ sediment	☐ Direct Contact with Sediment							
☐ biota	☐ Ingestion of Wild or Farmed Foods							

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Print Form

Human Health Conceptual Site Model Scoping Form

Site Name: Circle S Grocery

File Number: 2106.26.004

Completed by: Joe Casey / Environmental Technician

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☐ ASTs
- ☒ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other:

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☐ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Concentrations of DRO and benzene exceeded their applicable ADEC soil cleanup levels in one sample collected at a depth interval of 14 to 16 feet below ground surface (bgs).

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

The compounds detected in the soil samples collected at depths shallower than 15 feet bgs are not listed in Appendix B of the guidance document.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Groundwater was encountered in the 3 soil borings advanced to depths of approximately 120 feet bgs at the site in October 2015. Groundwater monitoring at the site conducted in November 2015 showed detectable levels of GRO, DRO and BTEX constituents in two of the monitoring wells. the monitoring well located closest to the on-site drinking water well showed benzene concentrations of 0.104 mg/L

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Surface water bodies are not present in close proximity to the site.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

Site contaminants are not listed in Appendix C of the guidance document.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Benzene was detected at a concentration greater than the ADEC soil cleanup level in 1 sample collected at a depth interval of 14 to 16 feet bgs. Given the depth to contaminated soil and the fact that potential exposure would come from outdoor air, any exposure to site contaminants via this pathway would be insignificant.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

The occupied building present at the site is located greater than 30 horizontal feet from the petroleum contaminated soil remaining at the site.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

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