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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 16, 2022

Mr. Peter Campbell
Alaska Department of Environmental Conservation
43335 Kalifornsky Beach Road, Suite 11
Soldotna, AK 99669

RE: ADDITIONAL RELEASE INVESTIGATION ACTIVITIES WORK PLAN, KASILOF RIVERVIEW LODGE, 57400 STERLING HIGHWAY, KASILOF, ALASKA; ADEC FILE NO. 2319.26.002

Dear Mr. Campbell:

We are pleased to submit herein our work plan to conduct additional release investigation activities at the Kasilof Riverview Lodge located at 57400 Sterling Highway in Kasilof, Alaska. A vicinity map is included as Figure 1 and a site plan is included as Figure 2.

BACKGROUND

In 1993 and 1994 an on-site 6,000-gallon gasoline underground storage tank (UST) failed tightness tests. The tank was subsequently closed. In 1998, to evaluate the extent of contamination associated with the closed tank, three borings were advanced at the site by Gilfilian Engineering & Environmental Testing, Inc. (GE^2T). Samples collected from each of the borings contained concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX), and gasoline range organics (GRO) at concentrations exceeding the Alaska Department of Environmental Conservation (ADEC) cleanup levels, applicable at that time.

Tank upgrades were conducted at the site in 1999. At this time, soil was excavated from around the tanks and test pits were advanced. Based on soil samples collected during this effort, GE^2T concluded that the extent of contamination was not fully delineated.

In 2003, A.C.E. Engineering advanced three borings (SB1, SB2, and SB3), completed as groundwater monitoring wells (MW1, MW2, and MW3), at the site. Monitoring Wells MW1, MW2, and MW3 were advanced southeast, northeast, and west of the Kasilof Riverview Lodge, respectively, as shown on Figure 2. Groundwater was encountered at approximately 24 to 27 feet below ground surface (bgs) during drilling, and groundwater flow direction was to the east. A soil sample collected from Boring SB1 contained 0.0889 milligrams per kilogram (mg/kg) benzene, which exceeds the current ADEC cleanup level of 0.022 mg/kg. A groundwater sample collected from Well MW1 contained 0.00626

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milligrams per liter (mg/L) benzene, which exceeds the current ADEC Table C cleanup level of 0.0046 mg/L. A.C.E. Engineering collected additional groundwater samples from the wells in 2005 and 2016. A groundwater sample collected from Well MW1 in 2016 contained 0.0536 mg/L benzene, which exceeds the applicable ADEC cleanup level.

In 2018 and 2019, EHX Alaska collected groundwater samples from the site wells. The samples did not contain detected concentrations of the tested analytes.

In 2019 Shannon & Wilson removed one approximately 2,000-gallon diesel underground storage tank (UST), five fuel dispensers, and piping from the site. In addition, two approximately 6,000-gallon and one 3,000-gallon gasoline USTs were closed in-place. GRO, diesel range organics (DRO), volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs) were detected at concentrations exceeding the ADEC cleanup levels in soil.

In 2021, Shannon & Wilson installed Monitoring Well MW4 approximately 75 feet from the Kasilof River, southwest of the former gasoline USTs. Wells MW1, MW2, MW3 were also sampled in 2021. Contaminant concentrations exceeding the most stringent ADEC cleanup levels were not detected in the soil and groundwater samples collected during the release investigation activities.

In a letter dated August 5, 2021, Mr. Peter Campbell of the ADEC requested additional release investigation and/or cleanup activities. The purpose of this project is to further delineate the plume by installing an additional monitoring well between the former gasoline USTs and the Kasilof River. Results from the additional release investigation activities will be used to develop a future cleanup plan for the site, if appropriate.

PROJECT ACTIVITIES

The project will consist of advancing one soil boring, installing one groundwater monitoring well, collecting soil, groundwater, and drinking water samples, disposing of investigation-derived waste (IDW), and reporting. Discovery Drilling, Inc. (Discovery) will provide the equipment and personnel to advance the boring and install the well. Soil and groundwater samples will be submitted to SGS North America Inc. (SGS) for laboratory analysis. US Ecology will dispose/treat the IDW generated during the project, if necessary.

Task 1- Soil Boring and Sampling

At least three days prior to advancing the boring, the local utilities will be contacted to mark buried utilities within the project area and identify potential conflicts such that the proposed boring location can be adjusted, if necessary.

One soil boring, designated Boring B5, will be advanced by Discovery using a track mounted drill rig and direct push method. The boring will be advanced to the south of the fuel dispenser canopy in the approximate location shown on Figure 2. The boring will be advanced until groundwater is encountered, which is assumed to be approximately 25 to 28 feet bgs.

Soil samples will be recovered on a continuous basis using 5-foot sampling sleeves until groundwater is encountered. Immediately following retrieval and opening of the sampling sleeves, the analytical samples and field screening samples will be collected. The analytical sample jars for volatile analyses will be collected first, followed by the non-volatile analytical sample jars, and finally the field screening sample. At least two field screening samples will be collected from each sample interval assuming at least 80 percent recovery within the sampling sleeves. Each soil sample will be visually described and "screened" for VOCs using a photoionization detector (PID) and ADEC-approved headspace screening techniques. The field screening samples will be collected in re-sealable plastic bags, warmed to at least 40 degrees Fahrenheit, and tested within 60 minutes of collection. To screen, the sample will be agitated for about 15 seconds, the seal of the bag will be opened slightly, the instrument probe will be inserted into the air space above the soil, and the bag held closed around the probe. The maximum ionization response as the PID draws vapor from the sample bag will be recorded. The PID will be calibrated with 100 parts per million (ppm) isobutylene in air standard gas.

The soil samples tested for volatile constituents will be collected using methanol preservation. In accordance with the method, at least 25 grams of soil will be quickly placed into a laboratory supplied 4-ounce jar that had been pre-weighed. Afterward, 25 milliliters of reagent grade methanol will be added to submerge the soil. The methanol extracts the hydrocarbons from the soil at the time of sampling, thereby reducing the possible loss of volatile constituents prior to sample analysis. The sample jars for non-volatile analyses will be collected after the volatile analysis jars. All samples will be transferred to the appropriate laboratory supplied jars using decontaminated stainless-steel spoons, and transferred to the laboratory in coolers with ice packs using chain-of-custody procedures.

One analytical soil sample will be collected from the boring and submitted for analysis. The sample will be collected from the interval just above the soil/water interface or from the sample interval with the highest photoionization detector (PID) measurement. The analytical sample will be analyzed for GRO by Alaska Method (AK) 101, DRO by AK 102, VOCs by Environmental Protection Agency (EPA) Method 8260D, and PAHs by EPA Method 8270D SIM. For quality control purposes, one duplicate sample and one trip blank will be submitted for analysis.

Task 2 – Monitoring Well Installation and Development

The soil boring will be completed as Monitoring Well MW5. The well will be constructed of 2-inch nominal inside diameter 40 polyvinyl chloride (PVC) pipe with threaded connections. The lower portion of the well will consist of an approximately 10-foot section of 0.010-inch slotted well screen. The screen will extend approximately 5-feet below the soil/groundwater interface. A continuous sand pack will be used to backfill around the well screen to 1 to 2 feet above the screened section. Hydrated bentonite chips will be used to backfill the borehole from the top of the sand pack to approximately 2 feet bgs to create a seal. A flush mount casing will be used around the monitoring well and finished with gravel or asphalt to match the surrounding grade.

The monitoring well will be developed approximately 12 hours following well installation, using a surge block and submersible pump (3 to 5-minute cycles of each). Water quality parameters, including pH, temperature, turbidity, and conductivity will be collected to evaluate the effectiveness of the development process. Development will be considered complete when the following stabilization criteria are met over three successive readings: pH is within 0.1 unit, temperature is within 3 percent (minimum 0.2 degree Celsius), conductivity is within three percent, and turbidity is within 10 percent or three consecutive readings of less than 10 Nephelometric Turbidity Units (NTU). If the stabilization criteria are not met once 25-gallons of water are removed or 3 hours of effort per well is expended, development will be considered complete. The monitoring well will not be sampled if free product is encountered.

Task 3 – Monitoring Well Sampling

The newly installed well will be allowed to recharge to 80 percent of the original water volume before sample collection. If more than 24 hours passes to allow for recharge, the well will be purged before sampling. Water samples will be obtained from the screened portion of the well using a submersible pump with dedicated disposable tubing. Analytical

samples will be collected by transferring water directly from the pump tubing into the laboratory supplied containers. The sample jars will be filled in decreasing order of volatility.

In addition to the newly installed monitoring well, pre-existing Wells MW1, MW2, MW3, MW4 will be sampled. Groundwater samples will be collected using a low-flow sampling method. The submersible pump will be placed within 2 feet of the surface of the groundwater column. The pump rate will be adjusted with a goal of limiting the sustained water drawdown to a maximum of 0.3 foot. During the purging process, field personnel will monitor water quality parameters and purge volume. Purging will be considered complete when at least one well volume is removed, and water quality parameters stabilize. Water quality parameters will be considered stabilized when three consecutive measurements collected 3 to 5 minutes apart indicate that at least four of the five parameters are within the following tolerance ranges: pH is within 0.1 unit, temperature is within 3 percent, conductivity is within 3 percent, , and turbidity is within 10 percent or is less than 10 NTU.

If the drawdown does not stabilize at the lowest usable pumping rate of the submersible pump or if the water quality parameters do not stabilize within one hour of purging, stabilization of water quality parameters will not be required. The well will be sampled after at least 1 well volume has been removed and the well has recovered to at least 80 percent of the pre-purge volume.

The samples will be analyzed for GRO by AK 101, DRO by AK 102, VOCs by EPA Method 8260D, and PAHs by EPA Method 8270D SIM. For quality control purposes, one duplicate sample and one trip blank will be submitted for analysis.

Task 4 – Drinking Water Well Sampling

The Kasilof Riverview Lodge drinking water well will be sampled from the spigot or faucet closest to the well. The well system will be purged for at least 15 minutes prior to sampling to remove water from the system piping and to obtain a representative sample of formation groundwater. The sample will be analyzed for GRO by AK 101, DRO by AK 102, VOCs by EPA Method 8260D, and PAHs by EPA Method 8270D SIM.

Task 5 – Investigation-Derived Waste

IDW will consist of development/purge water and soil cuttings. Water generated during monitoring well development and sampling will be containerized in 55-gallon drums,

labeled, and stored onsite pending analytical results. The drill cuttings from the borehole will be containerized in a labeled 55-gallon drum and stored on site pending analytical results. If the groundwater and/or soil samples contain concentrations greater than the applicable ADEC cleanup levels, prior approval will be obtained from ADEC to transport and treat the water and/or drill cuttings. If contaminant concentrations do not exceed the applicable ADEC cleanup levels, the water and/or soil will be discharged and/or landspread on an unpaved portion of the property, following ADEC approval.

For cost planning purposes, we assume the drill cuttings and development/purge water will require off-site disposal and treatment by US Ecology. IDW disposal receipts will be included in the summary report, if applicable.

Task 6 – Reporting

A report will be prepared summarizing our field activities and analytical results. The report will include a description of field procedures, a scaled site plan showing soil boring/monitoring well locations, field notes, photographs taken during field activities, soil boring and monitoring well logs, ADEC Laboratory Data Review Checklists (LDRCs), and tabulated field screening and laboratory analytical results. The report will include recommendations for further assessment and/or cleanup, if warranted.

CHEMICAL QUALITY CONTROL PROCEDURES

Quality Control Samples

Chemical data quality for this project will be assessed by comparing quality control sample results to pre-established numerical data quality objectives (DQOs).

Field Samples

A trip blank sample, prepared by the project laboratory, will accompany each sample cooler containing samples for volatile analysis. The trip blank sample will remain in the cooler during the entire sampling process. Evaluation of the analytical results of the trip blank sample will determine if volatile contaminants have been introduced to the samples from an external source or from cross-contamination during sample transport and analyses.

Laboratory Samples

Laboratory quality control samples include method blanks, laboratory control samples/laboratory control sample duplicates (LCS/LCSD), matrix spikes/matrix spike

duplicates (MS/MSD), and surrogates. The MS/MSD samples will be selected by the laboratory and separate project samples specifically for MS/MSD analysis will not be collected. LCS/LCSD, MS/MSD, surrogate quality assurance data, and qualifiers not meeting laboratory's DQOs will be noted in the laboratory reports.

Measurement Quality Objectives for Chemical Data

Data quality for this project will be assessed using internal laboratory procedures and field quality control data, in general accordance with the EPA's National Functional Guidelines for Inorganic Data Review and National Functional Guidelines for Organic Data Review. The quantitative Measurement Quality Objectives (MQOs) for this project will be used to assess precision and accuracy.

Precision

Precision is the mutual agreement of discrete measurements of the same property, under similar conditions. For the purposes of this program, precision will be expressed as the relative percent difference (RPD) between primary and duplicate quality control samples, including the MS/MSD and LCS/LCSD results.

The RPD will be calculated by dividing the absolute difference between the values by their mean and multiplying by 100:

$$RPD = \frac{(|X_1 - X_2|)}{\frac{(X_1 + X_2)}{2}} \times 100$$

Where X_1 and X_2 are the primary and duplicate values, respectively.

Accuracy

Accuracy is the degree of agreement of a measured value with the true or expected value of the measured quantity. The accuracy of control sample measurements is generally expressed as a percent recovery (%R).

For surrogates and samples without a background level of the analyte in the sample matrix, such as reference materials and LCS, the percent recovery is calculated from:

$$\%R = \frac{X}{T} \times 100$$

Where X is the measured concentration and T is the true or expected concentration.

The percent recovery for measurements in which a known amount of analyte is added to an environmental sample (such as MS/MSD) is calculated from:

$$\%R = \frac{X - B}{T} \times 100$$

Where B is the background concentration of the spiked analyte in environmental sample and X and T are as defined above.

Accuracy will be determined for surrogate, MS/MSD, and LCS/LCSD spike recoveries and results will be included in the laboratory report. The data from each analytical batch will be compared to the laboratory control limits that are provided in each laboratory report, and the method-specified control limits for certain analytes (e.g. DRO).

Sensitivity

Sensitivity is the ability of the laboratory methods to detect the analyte in the samples. Because the method detection limit is not generally practicable for environmental samples, sensitivity is evaluated using the laboratory limit of quantitation. The limit of quantitation (LOQ) values are effective reporting limits and are based on the method detection limits adjusted for dilutions, matrix inference, and other sample-specific considerations. Note that concentrations less than the LOQ are reported as estimates and concentrations not detected at the maximum detection limit are reported as non-detect at the level of detection.

Blank Samples

Trip blank and method blank samples will be analyzed to check for possible contributions to the analytical results from cross-contamination between samples, or from sample-contamination from an outside source. If an analyte is reported in a method blank, all samples in the corresponding preparatory batch will be evaluated for that analyte. If an analyte is reported in a trip blank, all samples in the corresponding cooler will be evaluated for the detected analyte and, if necessary, qualified, as outlined below.

Concentration in blank (y)	Concentration in corresponding project sample (z)	Action
DL < y < 2x LOQ	z = Not detected	No qualification
	z < LOQ	Flag "B" and report as nondetect at the LOQ
	LOQ ≤ z < 5y	Flag "B" and report as nondetect at the detected result (z)
	5y ≤ z < 10y	Flag "B" and report at the detected result (z)
	10y ≤ z	No qualification
y ≥ 2x LOQ	z = Not Detected	No qualification
	z = Detect	Reject

DL = detection limit, LOQ = limit of quantitation

Comparability/Representativeness

For the purpose of obtaining quality data, the sampling program design facilitates collection of sample data representative of environmental conditions at the project site. Comparability will be maintained by consistency in sampling conditions, selection of sampling equipment and procedures, sample preservation methods, analytical methods, trip blank analysis, and data reporting units.

Data Assessment

For each chain-of-custody, the project lab will provide a Level II data deliverables package. The data will be reviewed and compared to the project's numerical MQOs. Any MQOs not met, through our evaluation, will be identified in the report and the effects, if any, on the usability of the data will be described.

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SCHEDULE

The field activities will be conducted over three days during the Fall of 2022 and our final report will be submitted to Kasilof Riverview Lodge within four weeks following receipt of analytical results.

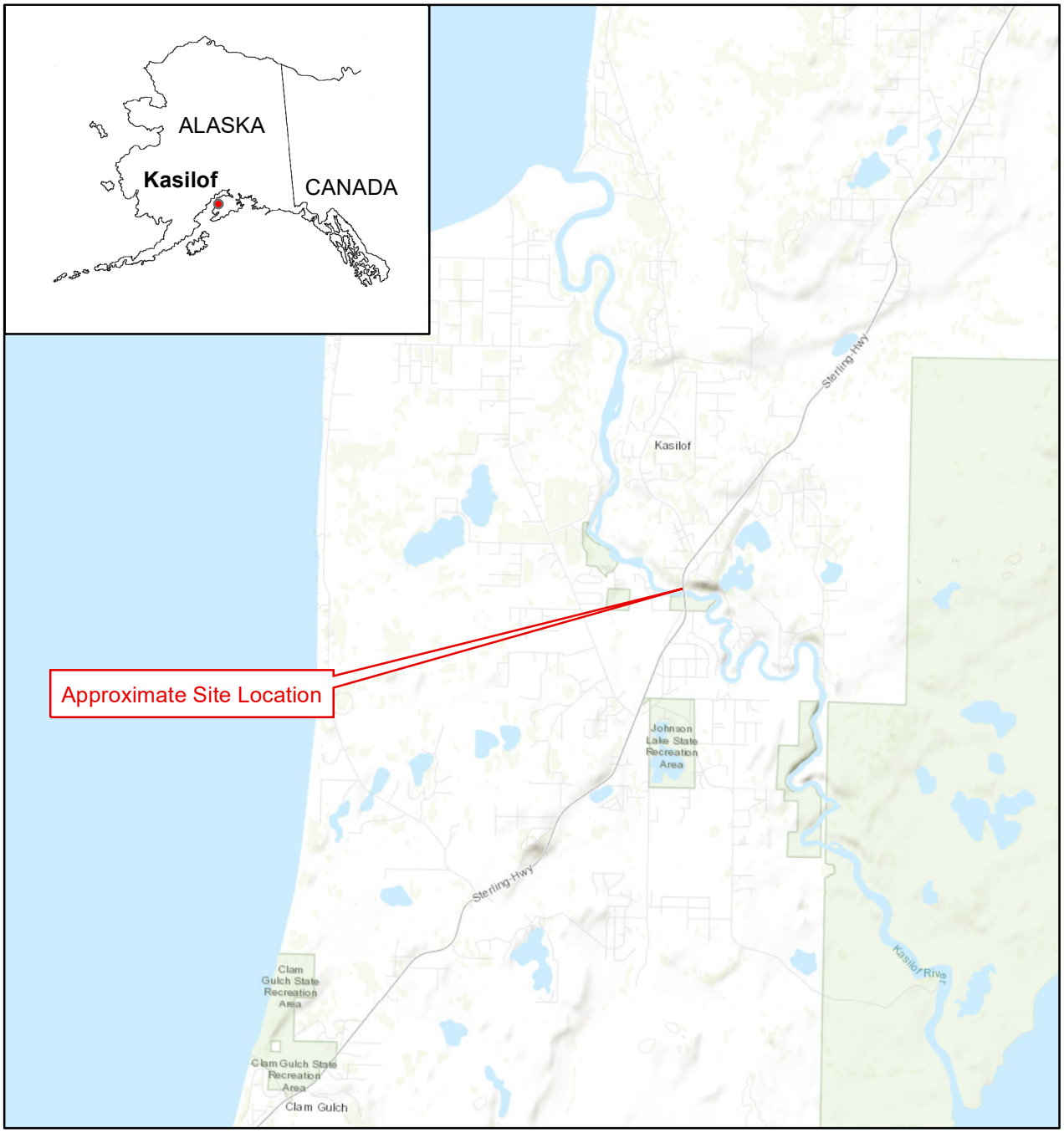
If you have any questions or comments, please contact the undersigned at (907) 561-2120.

Sincerely,

SHANNON & WILSON

Alec Rizzo
Environmental Staff

Enc. Figures 1 and 2



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Miles

Kasilof Riverview Lodge
Kasilof, Alaska

VICINITY MAP

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FIG. 1

Legend

B5/MW5 — Appoximate Location of Proposed Boring/Monitoring Well B5/MW5

Monitoring Well

0 150 300
Feet

N

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Kasilof Riverview Lodge
Kasilof, Alaska

SITE PLAN

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FIG. 2