SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

April 25, 2022

Mr. Nick Waldo
Alaska Department of Environmental Conservation
410 Willoughby Avenue
Juneau, Alaska 99811-1800

RE: WORK PLAN FOR REMEDIATION ACTIVITIES, SHISHMAREF NATIVE STORE, SHISHMAREF, ALASKA; ADEC FILE NO. 530.38.006

Dear Mr. Waldo:

On behalf of our client, the Native Village of Shishmaref, we are pleased to submit our work plan to conduct remediation activities at the Shishmaref Native Store in Shishmaref, Alaska.

SITE DESCRIPTON

The site is located in the village of Shishmaref on the north side of Sarichef Island. A fuel dispenser was located at the south side of the site, west of the Shishmaref Native Store. An asphalt road bisecting the site is present north of the former fuel dispenser. The remainder of the site lies to the north of the road where a former marine header and a currently unused warehouse building are located. At the northwest end of the site, a rocky revetment leads down to the Chukchi Sea. A vicinity map and a site plan are included as Figures 1 and 2, respectively.

BACKGROUND

In May 2014, the City of Shishmaref reported to the Alaska Department of Environmental Conservation (ADEC) and U.S. Coast Guard (USCG) that a sheen was present along the shoreline north of the Shishmaref Native Store. The USCG undertook spill response activities, including placing absorbent boom along the beach, in June 2014. After the sheen was reported again in December 2014, the USCG conducted additional spill response and cleanup activities. At this time the USCG located a potential source area at the marine header north of the Shishmaref Native Store. Analytical samples collected from seawater by the USCG identified gasoline and diesel. In 2015, the fuel lines at the marine header were hydrostatically tested and confirmed that the gasoline line was leaking. In 2016, the marine header piping extending from the former marine header to the tank farm was repaired and passed a hydrostatic inspection.

5430 Fairbanks Street ■ Suite 3 ■ Anchorage, Alaska 99518-1263 ■ 907 561-2120 ■ Fax 206 695-6777
■ www.shannonwilson.com ■

In 2016, surface soil screening samples were collected in the vicinity of the marine header piping. Based on field screening samples and visual and olfactory observations, surface soil contamination remained near the former marine header and the former fuel dispenser. One test pit was advanced to approximately 7 feet below ground surface (bgs) approximately 20 feet southwest of the marine header. Field screening samples collected from the test pit showed that contamination extended to the bottom of the test pit. Permafrost was encountered at the base of the test pit and the contamination appeared to spread horizontally at this depth.

In 2018, Shannon & Wilson advanced a total of seven test pits (TP1 through TP7), collected surface and subsurface soil samples, and conducted indoor air quality building surveys. A total of 15 analytical soil samples were collected from the test pits and surface soil locations. Soil samples exceeding the ADEC Method Two Arctic Zone cleanup levels were documented at the locations of the former marine header (Test Pits TP3 and TP6) and the former dispenser (Test Pit TP7). Soil samples collected from Test Pits TP3, TP6, and TP7 contained concentrations of 1,2,4-trimethylbenzene (maximum of 168 milligrams per kilogram [mg/kg]) and xylenes (maximum of 576 mg/kg) exceeding the ADEC cleanup levels of 43 mg/kg and 57 mg/kg, respectively. Soil samples collected from Test Pits TP3 and TP7 also contained concentrations of 1,3,5-trimethylbenzene (maximum of 61.1 mg/kg) exceeding the ADEC cleanup level of 37 mg/kg. A soil sample collected from Test Pit TP6 also contained a concentration of gasoline range organics (GRO) (1,820 mg/kg) exceeding the ADEC cleanup level of 1,400 mg/kg. The horizontal and vertical extent of soil contamination was not fully defined at either location. Based on Indoor Air Quality Building Surveys conducted for the warehouse and Shishmaref Native Store, Shannon & Wilson concluded that the indoor air exposure pathway was potentially complete at both structures due to their proximity (less than 30 feet) to petroleum impacted soils.

In 2019, Shannon & Wilson conducted building surveys, advanced eleven hand borings (HB1 through HB11), and collected field screening and analytical soil samples. Xylenes were detected in Hand Boring HB3 at a maximum concentration of 59 mg/kg, exceeding the ADEC cleanup level of 57 mg/kg. No other exceedances were detected. Based on data from 2018 and 2019, the horizontal extent of contamination was delineated at the former marine header and fuel dispenser, however, the vertical extent of contamination is not fully delineated at locations of Test Pit TP6, Hand Boring HB3, and Test Pit TP7. In addition, impacted soil is likely present along the west wall of the cellar of the warehouse adjacent to the former marine header and beneath the roadway, north of Test Pit TP7.

PROJECT ACTIVITIES

The project will consist of installing temporary injection wells for in-situ chemical oxidation (ISCO), conducting two rounds of ISCO injections, advancing soil borings for post-injection performance monitoring, and reporting. Shannon & Wilson will provide a Qualified Environmental Professional (QEP), as defined by 18 Alaska Administrative Code (AAC) 75.33, to conduct and document the field work. SGS North America Inc. (SGS), an ADEC-approved analytical laboratory with National Environmental Laboratory Accreditation Program (NELAP) certification, of Anchorage, Alaska will conduct the analytical testing of the project samples. A subcontractor, to be selected, will assist in the installation and application of the ISCO product. In addition, The Native Village of Shishmaref will be contracted to assist in acquiring locally hired personnel to support the project. Regenesis will provide the design support for the ISCO injections and will provide RegenOx®, the ISCO injection product.

Task 1- In Situ Chemical Oxidation of Soil

Soil at the site will be remediated through the process of ISCO via the injection of RegenOx. RegenOx is a chemical oxidant delivered as a fluid to the subsurface which will assist with the remediation of petroleum hydrocarbon contamination at this site.

At least ten days prior to ground disturbing activity on site, the Native Village of Shishmaref and the local utilities will be contacted to mark buried utilities within the project area and identify potential conflicts such that the proposed locations can be adjusted, if necessary.

A series of 30 temporary wells (Figure 2) will be installed in order to provide injection pathways for the RegenOx fluid, which will be pumped into the subsurface soil. These 30 wells cover the areal extent of soil impacts as delineated in previous investigations, with the exception of inaccessible areas underneath the road and warehouse building. The injection wells will consist of stainless steel hand driven well points with screen slot size of 0.02 inch or greater. Wells will be installed to the depth of refusal, or permafrost, which is expected to be located at seven feet bgs. Wells will be installed with four foot screens, which will allow ISCO injection throughout the range of the impacted soil horizon.

The wells will be installed in a grid with a spacing of approximately 10 feet. Well locations may be adjusted in the field to avoid obstacles and utilities. Based on results of the characterization activities, the wells will be installed over the approximately 3,000 square feet area in which contaminants are present in soil above ADEC Method Two Arctic Zone

cleanup levels. The horizontal position of the sample locations will also be recorded using swing tie measurements to site features.

A total of two injection events are proposed to degrade site contaminants and provide for control of contaminant rebound. Timing of the initial injection event in 2022 is anticipated to be in July or August to allow for installation of injection wells at a time close to maximum seasonal ground thaw. The second event will be conducted in 2023, approximately one year following the 2022 injection activities. Injection of RegenOx will start at the north end of the site and proceed south to avoid mobilization of contaminants towards the ocean. The revetment will be monitored for seepage of fluids during the injection events. If observed, the injection activities will be temporarily halted.

Each injection event will consist of the injection of approximately to 1,250 lbs of RegenOx material dissolved into 2,300 gallons of water, spread across the 30 injection wells. The RegenOx Part A and B material will be mixed with water to a 5% solution in separate storage tanks on site. The RegenOx fluid will be pumped into the injection wells with a positive displacement or diaphragm pump, capable of high pumping rates under relatively low pressures. Detailed instructions on the RegenOx injection procedure are provided as Attachment 1. Safety Data Sheets for the RegenOx compounds are provided as Attachment 2.

Prior to the initial injection event, a hydraulic test of a representative well point will be conducted to determine aquifer volume limitations and appropriate pumping rates and pressures. Testing will be performed by injection of water at 1.3 times the volume of the planned RegenOx Part A solution. Pumping rates and pressures will be controlled to prevent upwelling of water to the surface or compromising the bentonite seal of the injection well. This information will be used to guide the injection of Regenox throughout the project.

The temporary wells will be left in place until results of post-injection testing indicates that soil at the site has been remediated.

Task 2- Post-Injection Soil Borings

In 2023, soil borings PI1 through PI7 will be advanced at the site via hand auger to assess the effectiveness of the ISCO injections (Figure 3) and to attempt to provide vertical delineation of contamination. Soil borings will be advanced at least 30 days after the last ISCO injection event to allow time for all remaining remediation reactions to cease. Boring PI3 will be placed near the former location of Test Pit TP6, Boring PI5 will be placed near the former

location of Test Pit TP7, and Boring PI7 will be placed near the former location of HB3 to compare results to historical data. Borings PI3 and PI5 will be placed outside of the boundaries of the former test pits to ensure that the boring is representative of the native soil strata. The remaining borings will document soil contaminant concentrations throughout the impacted area. Borings will be advanced to refusal at permafrost or as deep as is feasible with hand tools.

At least ten days prior to advancing the hand borings, the Native Village of Shishmaref and the local utilities will be contacted to mark buried utilities within the project area and identify potential conflicts such that the proposed hand boring locations can be adjusted, if necessary.

Field screening samples will be obtained from the hand borings at a rate of one sample per one-foot interval. The samples collected from the hand borings will be screened for organic vapors using a photoionization detector (PID) calibrated with 100 parts per million (ppm) isobutylene standard gas. The PID will be used to sample the volatile vapors released from the soil using an ADEC-approved headspace sampling method. Headspace samples will be collected in re-sealable plastic bags by filling them with freshly exposed soil to between one-third to one-half of capacity and then sealing the top. Headspace samples will be warmed to at least 40° F and allowed to develop for at least 10 minutes prior to field headspace screening. Field PID readings will be obtained within 60 minutes of the sample collection. The PID display will be observed, and the maximum reading will be recorded for each sample.

One analytical soil sample will be selected from each hand boring at the depth of the highest PID reading. An additional analytical sample may be collected from the deepest interval in each boring. The soil samples will be analyzed for GRO by Alaska (AK) Method 101 and VOCs by Environmental Protection Agency (EPA) Method 8260D. For quality control purposes, one duplicate sample and one trip blank will be submitted for analysis.

Following sampling, the hand borings will be backfilled with the removed material.

Task 3- Reporting

After laboratory results are available, Shannon & Wilson will prepare a report that will summarize our field activities. The report will include a description of field procedures, a scaled site plan showing the locations of the soil borings and injection wells, field notes, photographs taken during field activities, ADEC Laboratory Data Review Checklists

(LDRCs), and tabulated field screening and laboratory analytical results. The report will provide recommendations for future site activities, if warranted.

SCHEDULE

Installation of the temporary injection wells and the first ISCO injection is tentatively scheduled for late summer of 2022, pending ADEC approval of the work plan. The second injection event is planned for late summer of 2023. The post-injection soil borings will take place in 2023 at least 30 days following the final injection event. Analytical laboratory results are typically available within two weeks of submittal of samples. The report will be provided to the Native Village of Shishmaref within four weeks following receipt of analytical sample results. Following review, a draft report will be submitted to the ADEC. Following ADEC review, a final report will be prepared.

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

Sincerely,

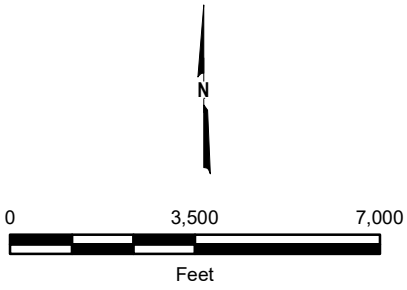
SHANNON & WILSON

Digitally signed by Alex Geilich
Date: 2022.04.25 15:59:41 -08'00'

Alex Geilich
Senior Environmental Scientist

Enc.

Figure 1 – Vicinity Map
Figure 2 – Site Plan
Figure 3 – Proposed Injection and Boring Locations
Attachment 1 – RegenOx Installation Instructions
Attachment 2 – RegenOx Safety Data Sheets
Attachment 3 – ADEC Comments/Responses



Shishmaref Native Store
Shishmaref, Alaska

VICINITY MAP

April 2022

103407-003

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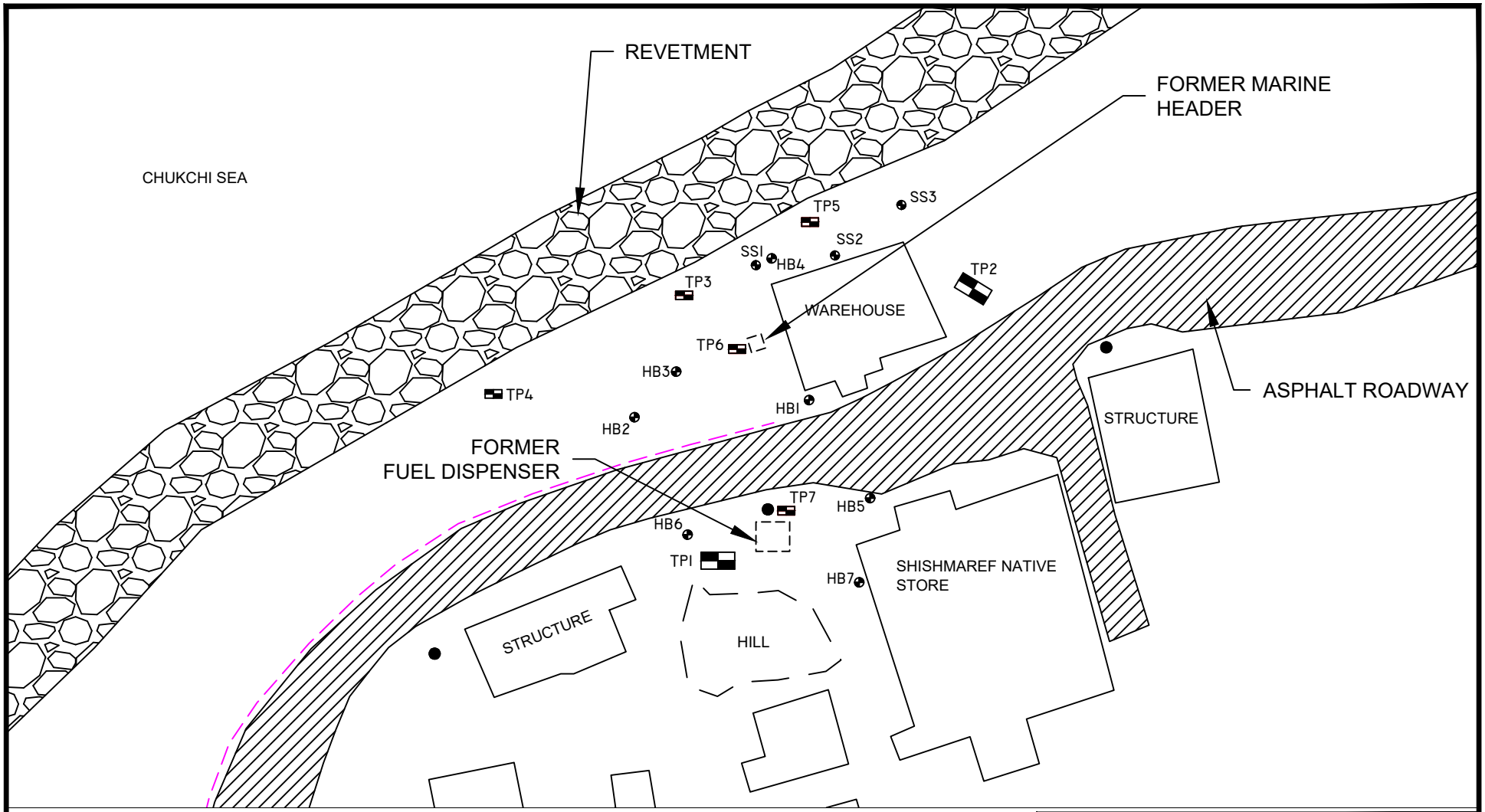
FIG. 1



LEGEND

- Guard Rail
- Light Pole
- Hand Dug Test Pit
- Excavator Dug Test Pit
- Sample Location

NOTES

All locations are approximate. Building locations interpreted from the 2004 Community Map provided the Alaska Department of Commerce, Community, and Economic Development.

0 20 40 80

APPROXIMATE SCALE IN FEET

N

Shishmaref Native Store
Shismaref, Alaska

SITE PLAN

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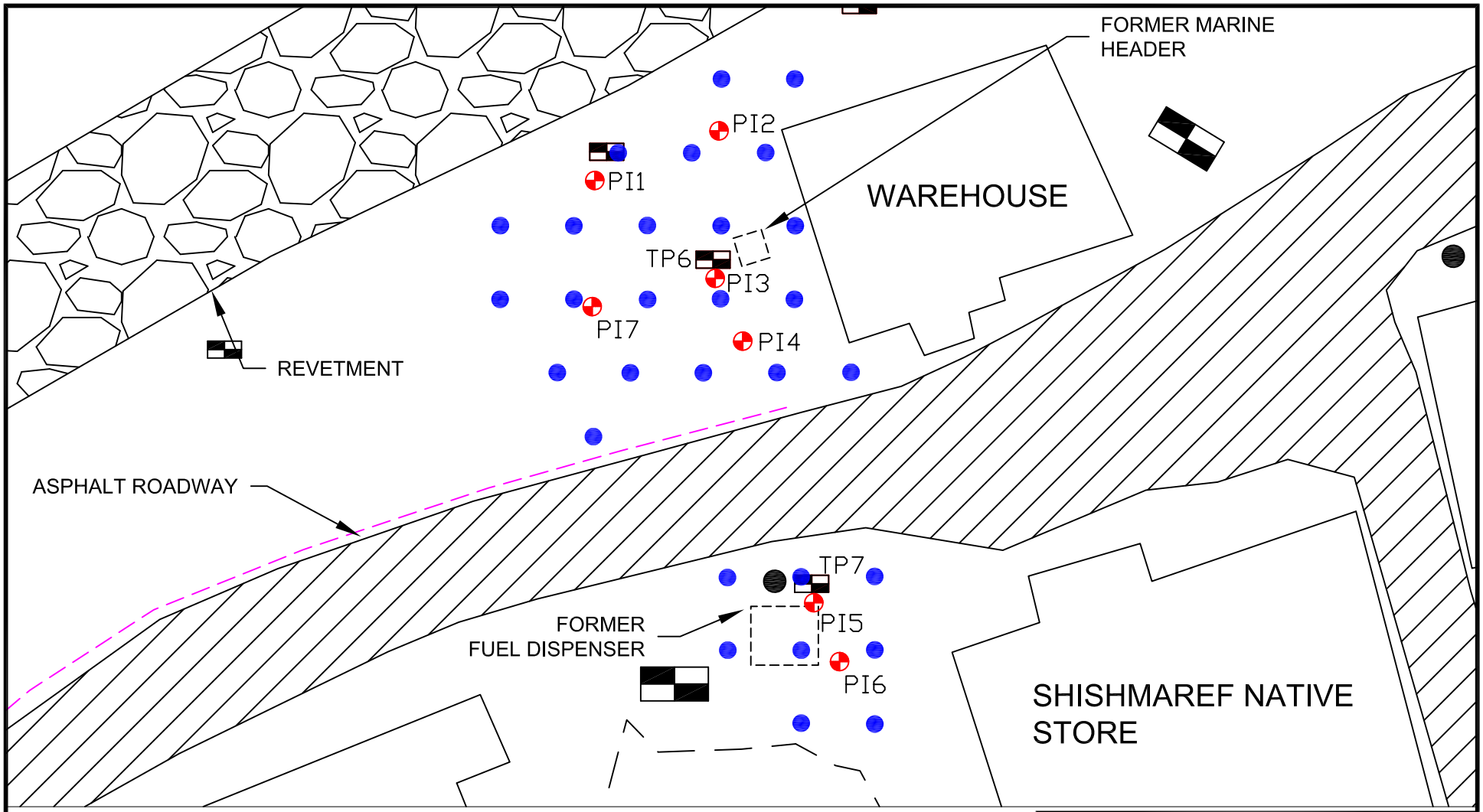
FIG. 2



LEGEND

- Guard Rail
- Light Pole
- Proposed Boring
- Proposed Injection Point
- Hand Dug Test Pit

NOTES

All locations are approximate. Building locations interpreted from the 2004 Community Map provided the Alaska Department of Commerce, Community, and Economic Development.

0 10 20 40

APPROXIMATE SCALE IN FEET

N

Shishmaref Native Store
Shismaref, Alaska

Proposed Injection and Boring Locations

April 2022 103407-003

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FIG. 3

Attachment 1

REGENOX INSTALLATION INSTRUCTIONS

RegenOx® Installation Instructions: Using Fixed Wells

On some projects, it may appropriate to apply RegenOx using fixed wells. This will allow the RegenOx to be reapplied multiple times and reduce a large mass of contaminant incrementally over time.

Application of RegenOx via a series of fixed wells can be accomplished most effectively by separate application of RegenOx Part A and Part B via multiple separate application events. Most sites require 3-4 applications to ensure contact and minimize rebound.

NOTE: for the purposes of this discussion, it is assumed that the hydraulic conductivity of this aquifer is sufficient to accept the volumes of material associated with this approach.

Well Installation

It is critical that the delivery wells associated with this application are installed across the appropriate vertical application interval. These wells should be constructed using 2 or 4- inch diameter Schedule 80 PVC and preferably with the screened section composed of wire-wound PVC with a slot size >0.2 inch. The surrounding filter pack should be composed of an appropriately sized sand/gravel that is a reasonable match to the surrounding soil type.

An adequate seal above the screen zone is critical. When possible we recommend a least a one-foot bentonite seal above the filter pack and an addition 3 feet or more or a cement-bentonite (<10%) grout to the surface.

Hydraulic Testing of Wells

A hydraulic test should be performed prior to implementation of the RegenOx application. This testing consists of the injection of clear water at a volume equivalent to 1.3x the designed injection volume of the RegenOx Part A material.

It is critical that you understand the hydraulic conductivity/volumetric limitation of the aquifer prior to installation of the RegenOx material. Each sites aquifer conductivity and capacity will directly affect the volume of RegenOx applied and the application rate.

RegenOx - Part A Estimation/Application

Using a designed application rate of 5,970 pounds of Part A material per event, a 5% solution will result in an application volume of 14,214 gallons of total fluids per event.

682 gals Part A + 13,532 gals H2O = 14,214 gals of fluid

Detailed steps for estimation of this volume are provided below. Using a five well application array results an application volume of 2,843gallons/well/event.

14,214 gals of fluid/5 wells = 2,843 gals/well/event

Hydraulic Test Volume Estimation:
The hydraulic test volume per well is estimated based on the above application rate (2,843 gallons) x (application factor of 1.3). This yields a total clear water test volume of 3,696 gallons/well.

RegenOx – Part B Application:
This method is significantly different from a direct-push application. This method requires application of a solution of the catalyst material separately and prior to application of the Part A oxidant material. As discussed previously, application of Part B is typically installed at a low concentration, spread over two events and is followed by a clear water chaser equal to 1.5-3x the wells borehole volume.

Step 1:
Mix Part B at solution that is 3-8% by weight, see Table 1 (below) for a volumetric estimation per bucket of material for each percentage solution. This range in volume is provided to allow for variations in aquifer types and specifically to adjust for each site's aquifer hydraulic conductivity and effective porosity. The aquifers hydraulic characteristics should dictate the solution percentage.

For example, Part B application in a fine grained aquifer (hydraulic conductivity of 10-5 to 10-6cm/sec) should be mixed at approximately a 7% solution by weight while a coarse grained aquifer (10-2 to 10-3cm/sec) should be mixed at approximately a 3% solution by weight.

TABLE 1.

No. of Buckets	Weight of Material (lbs.)	Desired Solution (%)	Volume of Water (gals.)
1	30	3	116
1	30	4	86
1	30	5	68
1	30	6	56
1	30	7	48
1	30	8	41

Example:
Based on application into a silty sand aquifer (10-4 cm/sec) the Part B solution should be mixed at 5%. Using the previous example, this application will require a total of 5,970 pounds of Part B applied via two events of 2,985 pounds or 100 bucket/event

2,985 lbs./30 lbs./bucket = 100 buckets

Thus, for each of the two Part B applications, the water volume necessary is calculated using the following equation:

100 buckets Part B x 68 gallons water/bucket = 6,800 gallons of water

This yields a total solution application per event estimation of:

(6,800 gals of H2O + 260 gals Part B)/5 wells = 1,412 gals Part B Solution/well/event

Step 2:
Clear Part B material from the injection well and surrounding well pack by application of a clear water chaser equivalent to the volume of 1.5-3x the borehole volume.

Example:
For a 2-inch diameter well with a 6-inch borehole diameter, a total depth of 20 feet (10 feet of blank and 10 feet of screen). A single borehole volume with an assumed sand pack void space of 30% would be the sum of the following:

Borehole Volume = (screened interval borehole volume + blank casing volume)
[(10 feet x 0.543 gals/ft) + (10 feet x 0.163 gals/ft)] = 7 gals

Using a clear water chaser application factor of 1.5-3x yields a total clear water chaser volume ranging from 11 to 21 gallons/well.

For a 4-inch diameter well with a 8.25-inch borehole diameter, a total depth of 20 feet (10 feet of blank and 10 feet of screen). A single borehole volume using an assumed sand pack void space of 30% would be the sum of the following:

Borehole Volume = (screened interval borehole volume + blank casing volume)
[(10 feet x 1.23 gals/ft) + (10 feet x 0.65)] = 19 gals

Using a clear water chaser application factor of 1.5-3x yields a total clear water chaser volume ranging from 28 to 57 gallons/well.

Step 3:
Mix Part A at a solution of between 3-5%. As discussed previously the transmissivity and reactivity of a particular aquifer as well as hydraulic testing should be factored into the application volume decision. The stability of RegenOx Part A is optimal at approximately 3%. In coarse grained aquifers it is best to apply Part A at or near a 3% solution. In fine grained aquifers it may be necessary to decrease the water content to near a 5% solution. NOTE: Do not apply a Part A that is >5% solution.

Example:
Based on application of Part A solution into a silty sand aquifer, the Part A solution should be mixed at 5%. As discussed previously this application is designed for application of 5,970 pounds of Part A per event via a 5 well application array. Using Table 1 the number of buckets of Part A is required is estimated as follows:

5,970 lbs Part A/30 lbs/bucket = 199 buckets

The volume of water necessary to create a 5% Part A solution is calculated using Table 1 and the following equation:

199 buckets Part A x 68 gallons H2O/bucket = 13,532 gallons of H_2O

This yields a total solution application per event estimation of:

(13,532 gals of H2O + 682 gals Part A)/5 wells = 2,843 gals Part A Solution/well/event

Step 4:
Clear the Part A solution from the injection well and some of the surrounding well pack by application of a clear water chaser equivalent to the volume of 1.5-3x the borehole volume.

Example:
For a 2-inch diameter well with a 6-inch borehole diameter, a total depth of 20 feet (10 feet of blank and 10 feet of screen). A single borehole volume with an assumed sand pack void space of 30% would be the sum of the following:

Borehole Volume = (screened interval borehole volume + blank casing volume)
[(10 feet x 0.543 gallons/ft) + (10 feet x 0.163)] = 7.1 gallons

Using a clear water chaser application factor of 1.5-3x yields a total clear water chaser volume ranging from 11 to 21 gallons/well.

For a 4-inch diameter well with a 8.25-inch borehole diameter, a total depth of 20 feet (10 feet of blank and 10 feet of screen). A single borehole volume using an assumed sand pack void space of 30% would be the sum of the following:

Borehole Volume = (screened interval borehole volume + blank casing volume)
[(10 feet x 1.23 gallons/ft) + (10 feet x 0.65)] = 19 gallons.

Using a clear water chaser application factor of 1.5-3x yields a total clear water chaser volume ranging from 28 to 57 gallons/well.

Repeat the above series of steps as needed. As discussed previously the first two injection events will consist of application of Part B followed by Part A and thereaftr as a series of Part A only injections.

Pump Selection (Wells)

It stands to reason that application of RegenOx via a series of wells is best accomplished using a pump that can deliver high volumes of fluids in a relatively low pressure setting. Regenesis has evaluated a number of pumps that are capable of delivery of these volumes of RegenOx in a reasonably efficient manner.

These pumps are typically the positive displacement pumps and the diaphragm pumps. The positive displacement pumps are generally a stader driven (auger) and are electrically driven via a generator while the diaphragm pump is composed of one or two diaphragms that use pneumatic pressure to drive the pump. Both of these types of pumps can provide a relatively high volume of reagent while allowing significant control of volume and pressure.

Pressure Gauge System

It is critical that application of RegenOx by preformed with proper pressure gauge set up. The gauges used should be configured to read PSI at the pump effluent and either along the delivery line or at the well head. This provides on-site personnel with adequate information on the pumps working pressure as well as the well delivery pressure. The difference in the two is the result of line loss. It is critical that application of RegenOx not exceed the burst pressure of the application well casing.

Pump Cleaning (Wells)

For best results, flush all moving parts and hoses with clean water at the end of the day, flush the injection system with a mixture of water and biodegradable cleaner such as Simple Green.

For more information contact REGENESIS at 949.366.8000.

Attachment 2

REGENOX SAFETY DATA SHEETS

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier **RegenOx® Part A**

Other means of identification None.

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Serious eye damage/eye irritation	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May intensify fire; oxidizer. Harmful if swallowed. Causes serious eye damage. Toxic to aquatic life.

Precautionary statement

Prevention Keep away from heat. Keep/Store away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/eye protection/face protection.

Response If swallowed: Call a poison center/doctor if you feel unwell. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Rinse mouth. In case of fire: Use appropriate media to extinguish.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Sodium Carbonate Peroxyhydrate	15630-89-4	≥95
Silicic Acid, Sodium Salt, Sodium Silicate	1344-09-8	<1

Composition comments	All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
Ingestion	Never give anything by mouth to a victim who is unconscious or is having convulsions. Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.
Most important symptoms/effects, acute and delayed	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off all contaminated clothing immediately. Contact with combustible material may cause fire. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water spray, fog (flooding amounts).
Unsuitable extinguishing media	Dry chemical, CO2, halon. Foam.
Specific hazards arising from the chemical	Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides and metal oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.
Specific methods	Cool containers exposed to flames with water until well after the fire is out.
General fire hazards	May intensify fire; oxidizer. Contact with combustible material may cause fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect dust using a vacuum cleaner equipped with HEPA filter. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. This product is miscible in water. Stop the flow of material, if this is without risk. Absorb in vermiculite, dry sand or earth and place into containers. Large Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Shovel the material into waste container. Minimize dust generation and accumulation. Avoid the generation of dusts during clean-up. Prevent product from entering drains. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Place all material into loosely covered plastic containers for later disposal. For waste disposal, see section 13 of the SDS. Wear appropriate protective equipment and clothing during clean-up.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling
Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Do not get this material in contact with eyes. Do not taste or swallow. When using, do not eat, drink or smoke. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities
Keep away from heat. Store in a cool, dry place out of direct sunlight. Store at temperatures not exceeding 40°C/104°F. Store in original tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS). Protect from contamination.

8. Exposure controls/personal protection

Occupational exposure limits
No exposure limits noted for ingredient(s).

Biological limit values
No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection
Unvented, tight fitting goggles should be worn in dusty areas.

Skin protection

Hand protection
Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier. Frequent change is advisable. Rubber, neoprene or PVC gloves are recommended.

Other
Wear appropriate chemical resistant clothing.

Respiratory protection
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Recommended use: Wear respirator with dust filter.

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state
Solid.

Form
Powder.

Color
White.

Odor
Odorless.

Odor threshold
Not available.

pH
10.5 (3% solution/water)

Melting point/freezing point
Not available.

Initial boiling point and boiling range
Not available.

Flash point
Not available.

Evaporation rate
Not available.

Flammability (solid, gas)
Oxidizer.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)
Not available.

Flammability limit - upper (%)
Not available.

Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	14.5 g/100g water @ 20 ºC (minimum)
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	122 °F (50 °C)
Viscosity	Not available.
Other information	
Bulk density	0.9 - 1.2 g/ml

10. Stability and reactivity

Reactivity	Greatly increases the burning rate of combustible materials.
Chemical stability	Product may be unstable at temperatures above: 50°C/122°F. Decomposes on heating.
Possibility of hazardous reactions	Reacts slowly with water.
Conditions to avoid	Moisture. Heat. Avoid temperatures exceeding the decomposition temperature. Contact with incompatible materials.
Incompatible materials	Acids. Bases. Salts of heavy metals. Reducing agents. Combustible material.
Hazardous decomposition products	Oxygen. Steam. Heat.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Causes serious eye damage.
Ingestion	Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Dusts may irritate the respiratory tract, skin and eyes. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Components	Species	Test Results
Silicic Acid, Sodium Salt, Sodium Silicate (CAS 1344-09-8)		
Acute		
Oral		
LD50	Mouse	1100 mg/kg
	Rat	1.1 g/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Causes serious eye damage.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

12. Ecological information

Ecotoxicity Toxic to aquatic life.

Components		Species	Test Results
Silicic Acid, Sodium Salt, Sodium Silicate (CAS 1344-09-8)			
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	0.28 - 0.57 mg/l, 48 hours
Fish	LC50	Western mosquitofish (Gambusia affinis)	1800 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability Decomposes in the presence of water. The product contains inorganic compounds which are not biodegradable.

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil This product is water soluble and may disperse in soil.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN3378
UN proper shipping name Sodium carbonate peroxyhydrate
Transport hazard class(es)
Class 5.1
Subsidiary risk -
Label(s) 5.1
Packing group II
Environmental hazards
Marine pollutant No
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions IB8, IP2, IP4, T3, TP33
Packaging exceptions 152
Packaging non bulk 212
Packaging bulk 240

IATA

UN number UN3378

UN proper shipping name	Sodium carbonate peroxyhydrate
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	No
ERG Code	5L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN3378
UN proper shipping name	SODIUM CARBONATE PEROXYHYDRATE
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-Q
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 26-March-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings

Health: 3
Flammability: 0
Physical hazard: 2

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier **RegenOx® Part B**

Other means of identification None.

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Causes skin irritation. Causes serious eye irritation.

Precautionary statement

Prevention Wash thoroughly after handling. Wear protective gloves. Wear eye/face protection.

Response If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Silicic Acid, Sodium Salt, Sodium Silicate	1344-09-8	25-40
SILICON DIOXIDE (AMORPHOUS SILICA GEL)	63231-67-4	<10
Ferrous sulfate	7720-78-7	2-5

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Keep victim at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Never give anything by mouth to a victim who is unconscious or is having convulsions. Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Spray mist may irritate the respiratory system. Symptoms may include coughing, difficulty breathing and shortness of breath.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: silicon oxides, metal oxides, sulfur oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in a cool, dry, well-ventilated place. Maintain storage temperatures between 50°F to 140°F (10°C to 60°C). Store away from incompatible materials (see Section 10 of the SDS). Recommended storage containers: steel or plastic. Do not use containers made of aluminum, fiberglass, copper, brass, zinc or galvanized containers.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value
SILICON DIOXIDE (AMORPHOUS SILICA GEL) (CAS 63231-67-4)	TWA	0.8 mg/m3
		20 mppcf

US. ACGIH Threshold Limit Values

Components	Type	Value
Ferrous sulfate (CAS 7720-78-7)	TWA	1 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ferrous sulfate (CAS 7720-78-7)	TWA	1 mg/m3
SILICON DIOXIDE (AMORPHOUS SILICA GEL) (CAS 63231-67-4)	TWA	6 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection To avoid contact with eyes, wear chemical goggles or shielded safety glasses.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Recommended use: Wear NIOSH approved respirator appropriate for airborne exposure at the point of use.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Green to dark blue.

Odor Odorless.

Odor threshold Not available.

pH 11 (10% solution/water)

Melting point/freezing point Not available.

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1.2 - 1.4
Solubility(ies)	
Solubility (water)	Miscible.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	< 10,000cP

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Hydrogen fluoride. Fluorine. Oxygen difluoride. Chlorine trifluoride. Strong acids. Strong bases. Oxidizers. Aluminum metal. Copper. Brass. Zinc. Galvanized metals.
Hazardous decomposition products	Thermal decomposition or combustion may produce: silicon oxides, metal oxides, sulfur oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful. Spray mists may cause respiratory tract irritation.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	Ingestion may cause irritation and malaise.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Inhalation may irritate lungs causing coughing and/or shortness of breath.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

SILICON DIOXIDE (AMORPHOUS SILICA GEL) (CAS 63231-67-4)	3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	This product is water soluble and may spread in the water system.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Ferrous sulfate (CAS 7720-78-7) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List
Ferrous sulfate (CAS 7720-78-7)

US. New Jersey Worker and Community Right-to-Know Act
Ferrous sulfate (CAS 7720-78-7)

US. Pennsylvania Worker and Community Right-to-Know Law
Ferrous sulfate (CAS 7720-78-7)

US. Rhode Island RTK
Not regulated.

US. California Proposition 65
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 02-April-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings Health: 2
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Attachment 3

ADEC Comments/Responses

Comment No.	Page/ Section	DEC Comment/Recommendation: 4/8/2022	Responsible Party (Native Village of Shishmaref) Response:
1.	Pg. 3 – Task 1	The workplan proposes hand-driving well points to refusal in the early summer. However, vertical delineation has not been established in in the area around Test Pits 6 & 7 and Hand Boring 3, and maximum seasonal ground thaw is not expected until later in the season. DEC requests clarification on how the proposed work will ensure any contamination in the active zone is addressed, and advises that site closure will not be possible until post-treatment vertical delineation is established.	Agree. Injection wells will be installed later in summer (July to August) to allow for additional ground thaw. To accommodate this schedule, changes have been made to the injection plan. One injection event will be performed each in 2022 and 2023. Post-injection borings and sampling will be performed at least 30 days after the second injection in 2023. An additional boring, PI7, will be placed near former Hand Boring 3. Borings near Hand Boring 3 and Test Pits 6 and 7 will attempt to provide vertical delineation. Samples will also be collected at the deepest interval in these borings if they are able to be advanced past the previous sample intervals. **DEC Response**: Accepted.
2.	Pg. 3 – Task 1	Please include a list of chemical additives and their potential effects on human health and the environment, as described in 18 AAC 75 (5)	Agree. Safety Data Sheets for RegenOx Part A and Part B compounds have been provided as Attachment 2. **DEC Response**: Accepted.
3.	Pg. 4 – Task 2	Please advance the post-injection borings PI3 and PI5 outside the footprint of the associated former test pits to ensure that the soil profile is representative of conditions in the area and is not the re-worked material that was used to backfill the pits.	Agree. Borings PI3 and PI5 will be advanced near the former test pits but outside of their boundaries to avoid sampling re-worked soil. **DEC Response**: Accepted.
4.	General	Please include as an appendix the qualifications of the Qualified Environmental Professional(s) who will conduct the work.	Agree. It is currently unknown which Shannon & Wilson QEP will perform the work. Once the project is staffed, qualifications of the Shannon & Wilson QEP will be provided to ADEC prior to mobilization.

Comment No.	Page/ Section	DEC Comment/Recommendation: 4/8/2022	Responsible Party (Native Village of Shishmaref) Response:
			DEC Response: Accepted with comment. Inclusion of this comment table in the final report will constitute a commitment by Shannon & Wilson to provide satisfactory QEP credentials prior to commencement of work.
-	-	End of Comments	-