Alaska Department of Environmental Conservation

Reuse & Redevelopment Initiative

Brownfield Assessment

ENVIRONMENTAL MANAGEMENT PLAN

Big Lake Former Dump Site

Holy Cross, Alaska

Submitted to:
Department of Environmental Conservation
Brownfield Program

By:
SLR International Corp
June 2009

ENVIRONMENTAL MANAGEMENT PLAN
BIG LAKE FORMER DUMP SITE
HOLY CROSS, ALASKA

Prepared for

Alaska Department of Environmental Conservation
Contaminated Sites Program
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This document has been prepared by SLR International Corp. The material and data in this report were prepared under the supervision and direction of the undersigned.

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ACRONYMS

AAC	Alaska Administrative Code
ANCSA	Alaska Native Claims Settlement Act
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	Code of Federal Regulations
CSM	conceptual site model
cy	cubic yards
DBA	DEC Brownfield Assessment
DCCED	Alaska Department of Commerce, Community and Economic Development
DEC	Alaska Department of Environmental Conservation
Deloycheet	Deloycheet, Incorporated
DNR	Alaska Department of Natural Resources
DRO	diesel range organics
EMP	environmental management plan
EPA	U.S. Environmental Protection Agency
ETM	exposure tracking model
gpm	gallons per minute
GRO	gasoline range organics
HAZWOPER	Hazardous Waste Operations and Emergency Response
IGAP	Indian General Assistance Program
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NOAA	National Oceanic and Atmospheric Administration
PAH	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PID	photoionization detector
ppm	parts per million
RACM	regulated asbestos-containing material
RRO	residual-range organics
SLR	SLR International Corp
SPCC	spill prevention control and countermeasures

ACRONYMS (CONTINUED)

SQuiRTs	Screening Quick Reference Tables
STRP	State Tribal Response Program
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
TPH	total petroleum hydrocarbons
UST	underground storage tank
VOC	volatile organic compound
YRITWC	Yukon River Intertribal Watershed Council

EXECUTIVE SUMMARY

SLR International Corp (SLR) is pleased to submit this Environmental Management Plan (EMP) to the Alaska Department of Environmental Conservation (DEC) for two sites in Holy Cross, Alaska. The sites include Big Lake and the City Shop. Big Lake and the City Shop are located on land owned by Deloycheet Incorporated (Deloycheet). Big Lake is located on Block 26, Parcel E of U.S. Survey No. 732, and the City Shop is located on the southern half of Lot 5, Block 21, Parcel E of U.S. Survey No. 732. These properties are contiguous and are collectively referred to as the Site.

The objective of this EMP is to provide information aimed at advancing the Site through the Brownfield process to beneficially re-use the Site. The two properties have previously been used as a dump and were subsequently backfilled in part. Big Lake was reportedly longer and wider than at present with miscellaneous trash and debris dumped in it. The City Shop is used for equipment storage and routine maintenance and repairs.

No analytical samples have been collected at the Site to characterize the extent or magnitude of contamination. The water quality in Big Lake is currently unknown, but debris may pose a risk to recreational users. Although not quantified, surface soils have been impacted outside and inside the City Shop by fuel-related contaminants; stained soil was observed in several locations during the site visit.

The Site is located in an area that can be impacted by flooding of the Yukon River. Ground water at the Site is not used and the majority of the community gets their water from the community well, located approximately 0.25 miles from the Site. Routine monitoring of the community well has not had detected concentrations of volatile organic compounds and there are no suspected impacts to ground water.

Interested parties in this EMP are the Holy Cross Village Council, City of Holy Cross, Deloycheet, and the Yukon River Inter-Tribal Watershed Council (YRITWC). The interested parties would like to see Big Lake restored so it can be used for recreational activities such as swimming, fishing, and picnicking. Plans for the re-use of the City Shop include an area for the community to do automotive repairs, storage for a new fire foam trailer, and continued use for storage, maintenance, and repair of City owned equipment.

Recommended actions resulting from preparation of this EMP include debris and contaminated soil removal around the City Shop, training of shop workers in spill prevention and countermeasure procedures, and quantitation of potential chemical impacts to the waters and sediments of Big Lake.

1. INTRODUCTION

In the spring of 2008, the Holy Cross Village Council submitted an Alaska Department of Environmental Conservation (DEC) Brownfield Assessment (DBA) request form to the DEC to address contamination concerns at two properties in the community. The DBA request form is included as Appendix A. The properties include Big Lake and the Holy Cross City Shop, which are located on land owned by Deloycheet Incorporated (Deloycheet). Big Lake is located on Block 26, Parcel E of U.S. Survey No. 732, and the City Shop is located on the southern half of Lot 5, Block 21, Parcel E of U.S. Survey No. 732. The properties are contiguous and when discussed together are referred to as the Site. The DBA request form identified contamination from the former activities at the Site as a health concern precluding re-use of the land. The stated re-use objective for Big Lake is to restore it such that the lake and surrounding area can be used for recreational purposes such as swimming, ice skating, fishing, picnicking, and walking. Although not stated in the request, the re-use objective for the City Shop (based on interviews as described in Section 2.2.3 of this document) is to use the three areas inside the shop for community vehicle maintenance and repairs (northern section), city vehicle maintenance and repairs (middle section), and for storage of a new fire foam trailer (southern section).

This Environmental Management Plan (EMP) was written on behalf of DEC in response to the Holy Cross Village Council's DBA request to provide background, regulatory, and remedial option information suitable to progress the Site through the Brownfield process.

Funding for this work was provided by DEC using the State Tribal Response Program (STRP) grant program, which is sponsored by the U.S. Environmental Protection Agency (EPA). Future funding to address cleanup has not been identified for this site at this time, although the EPA Brownfield Program has national competitive cleanup grants for which this project may be eligible.

1.1 PURPOSE OF PROJECT

The purpose of this EMP is to provide background, regulatory and remedial option information appropriate for advancing the Site through the cleanup and redevelopment. The stated re-use objective for Big Lake is to restore it such that the lake and surrounding area can be used for recreational activities such as swimming, ice skating, fishing, picnicking, and walking. The re-use objective for the City Shop is to use the area inside the shop for community vehicle maintenance and repairs, city vehicle maintenance and repair, and for storage of a new fire foam trailer.

1.2 SCOPE OF SERVICES SUMMARY

SLR completed the following tasks to develop this EMP.

1.2.1 TASK 1 – STAKEHOLDER SCOPING AND PLANNING MEETING

On March 2, 2009, SLR participated in a stakeholder and planning teleconference with stakeholders in the project. Attendees included representatives from the Holy Cross Village Council, the City of Holy Cross, Deloycheet, DEC, EPA, SLR International Corp (SLR), and the Yukon River Inter-Tribal Watershed Council (YRITWC). The purpose of the meeting was to define the cleanup objectives and approach to a solution within the context of the existing environmental impacts. The meeting also identified the path through the Brownfield process to re-use the site. SLR prepared a summary record of the meeting and provided it to the stakeholders and DEC. A copy of this summary and community contact list is included in Appendix B.

1.2.2 TASK 2 – SITE VISIT

On May 13 and 14, 2009, Christina Bentz of SLR, traveled to Holy Cross to assess site conditions to better evaluate potential environmental concerns. During the site visit, SLR conducted interviews with individuals familiar with the Site to determine, to the extent possible, potential sources of contamination, historical use, and future plans for the Site. While in Holy Cross, SLR visually assessed Big Lake for trash or debris visible from shore. In addition, the City Shop property was visually assessed for staining and products stored and used at the shop. Shallow hand auger borings were also advanced outside and inside the shop to aid in determining the extent of soil staining. No analytical samples were collected during the site visit.

1.2.3 TASK 3 – SUBMIT AN OUTLINE OF THE EMP TO DEC

In March 2009, SLR submitted an outline of the proposed EMP document. The outline consolidated information from DEC, and the stakeholder meeting to gain an understanding of known site conditions and local and regional resources for managing the Site. The outline summarized the information planned for inclusion in the final draft of the EMP document. On March 31, 2009, SLR received comments from DEC on the submitted outline.

1.2.4 TASK 4 – DRAFT AND FINAL EMP PREPARATION

The development of the EMP followed outline preparation. This EMP includes a comprehensive summary based on the inventory of existing background documents, observations made during the site visit, interviews with members of the Holy Cross community, and the community meeting summary. The intent of this EMP is to supply all interested stakeholders with a guideline document suitable for progressing the Holy Cross Site through the Brownfield process to allow for the proposed re-use of the Site.

1.3 OBJECTIVES

The following objectives were used to guide the preparation of this EMP:

- Compile demographic information about the City of Holy Cross, current Site ownership information, prior and current use, and re-use objectives for the land;
- Prepare a summary of contaminant history and assessment activities performed to date; and
- Develop a general execution plan and a cost estimate for a feasible remedial alternative permitting the community's re-use objective for the sites to be met.

2. COMMUNITY OVERVIEW

2.1 COMMUNITY GENERAL INFORMATION

This section provides information about the community of Holy Cross, Alaska.

Holy Cross receives approximately 17.92 inches of precipitation annually. Holy Cross temperatures range from the negative single digits in winter to near 70 degrees during the summer months (WRCC, 2009). Holy Cross is subject to flooding of the Yukon River.

Holy Cross currently receives their supplies via air year-round and through barge service during the summer months. Transportation via boat is also used during the summer months.

Information from the Alaska Department of Commerce, Community and Economic Development (DCCED) indicated that water in Holy Cross is derived from a treated, deep well. Seventy-one households and the school are connected to a piped water and sewer system, with a plumed kitchen, although a number of residents in the community still haul water from the washeteria and use honeybuckets or outhouses (DCCED, 2009).

There are two public supply wells listed in the Well Log Tracking System (DNR, 2009). The first well, drilled in 1968, was screened from 71 feet to 77 feet below ground surface (bgs). The static water level in the well was 41.5 feet bgs. A pumping test indicated a maximum production rate of six gallons per minute (gpm) of good, clear water. The second well, drilled in 1972, was advanced to 130 feet bgs. The well was screened from 126 feet to 130 feet bgs. The static water level measured after drilling was 39 feet bgs and a pumping test indicated a maximum flow rate of 7 gpm with drawdown of 15 feet. These drill logs are provided in Appendix C. It is SLR understands that the latter well is being used by the community. This well is monitored under the Drinking Water Program of DEC's Division of Environmental Health (DEC, 2009). Appendix D shows recent (August 2008), laboratory results for the community well.

2.1.1 LOCATION

Holy Cross is located in Interior Alaska on the west bank of Ghost Creek Slough off the Yukon River (Figure 1) approximately 40 miles northwest of Aniak and 420 miles southwest of Fairbanks. The community lies at approximately 62.199440º North Latitude and -159.771390º West longitude using North American Datum 1983, (Section 5, Township 24 North, Range 57 West of the Seward Meridian). The area encompasses 31.3 square miles of land and 6.2 square miles of water (DCCED, 2009).

2.1.2 POLITICAL ORGANIZATIONAL STRUCTURE

Holy Cross is located in an unorganized borough of Alaska, in which services are primarily provided by the state government. The City of Holy Cross was incorporated as a second-class city in 1968 and has an elected city council. It also has a tribal government, with a traditional council recognized federally as the official tribal governing body (Deloycheet, 2009).

2.1.3 STAKEHOLDERS

Stakeholders for this project include the Holy Cross Village Council, City of Holy Cross, Deloycheet, DEC, EPA, and the YRITWC. A summary of the project stakeholders, and their involvement in the Brownfield process for the Site in Holy Cross, is provided below.

2.1.3.1 The Holy Cross Village Council

The Holy Cross Village Council administers the Indian General Assistance Program (IGAP) program. The IGAP provides an opportunity for tribes to build capacity and management capability to implement environmental programs administered by the Tribe.

In 2008, an IGAP Coordinator in Holy Cross filed a DBA request form on behalf of the Holy Cross Village Council.

2.1.3.2 The City of Holy Cross

The Holy Cross City Council is the governing body for administering municipal services in the City of Holy Cross, and is considered an eligible applicant for EPA Brownfield assessment and cleanup grants.

2.1.3.3 Deloycheet

Deloycheet is an Alaska Native Village Corporation that was incorporated in 1974 under Alaska Law and pursuant to the 1971 federal Alaska Native Claims Settlement Act (ANCSA). Instead of a reservation system, a system of corporate ownership of assets was developed under ANCSA to ensure long-term profitability and financial independence for Native Alaskans. Deloycheet's corporate office is located in Holy Cross, Alaska. There are a total of 475 shareholders and a nine member Board of Directors that comprise Deloycheet (Deloycheet, 2009). Deloycheet owns the land comprising the Site.

2.1.3.4 Alaska Department of Environmental Conservation

DEC administers an STRP program on behalf of the State of Alaska through a federal grant from EPA. A portion of the grant is used by DEC to fund specific projects based on a prioritization of all DBA request forms received annually from communities with Brownfield concerns. There are no documented contaminated sites at the Site.

2.1.3.5 U.S. Environmental Protection Agency

The EPA funds state and tribal Brownfield programs. The STRP plays a significant role in cleaning up Brownfields across the country and Alaska. The continued demand for Brownfield cleanup and redevelopment in communities throughout the country, coupled with increasingly limited state and tribal resources, makes access to federal funding critical. The law authorizes EPA to provide up to $50 million in grants to states and tribes to establish or enhance their response programs. Generally, these response programs address the assessment, cleanup, and redevelopment of Brownfields (EPA, 2009).

EPA's Brownfield Program empowers tribes, states, and communities by providing money and technical assistance to prevent, assess, safely clean up, and sustainably reuse Brownfields. EPA is proud of its partnership with the more than 60 tribes that are creating and enhancing Tribal Response Programs to address the clean up and re-use of contaminated property in Indian country. Through these response programs, tribes are taking an active role in combating environmental issues, while creating self-sufficient organizations for environmental protection (EPA, 2009).

2.1.3.6 The Yukon River Inter-Tribal Watershed Council

The YRITWC consists of 66 First Nations and Tribes and is dedicated to the protection and preservation of the Yukon River Watershed. The council provides Yukon First Nations and Alaska Tribes in the Yukon Watershed with technical assistance, such as facilitating the development and exchange of information, coordinating efforts between First Nations and Tribes, undertaking research, and providing training, education and awareness programs to promote the health of the watershed and its Indigenous peoples.

Since receiving Section 128(a) Tribal Response Program funding in 2005, the YRITWC Brownfield Program has partnered with 36 tribes, working with them to identify, prioritize, and assess potential Brownfields.

The YRITWC operates a backhaul program to several villages. Holy Cross is served by this barge-supported backhaul program. The YRITWC coordinates the entire process for the backhaul program. The village IGAP coordinator submits the YRITWC with a list of material requiring backhaul. The program provides all of the cost for the backhaul (funded through EPA). The removal is generally coordinated with other big projects in the village (construction, large shipment). This dramatically cuts the cost of having to contract a special carrier just for the removal. In this manner, debris can be staged for transport by the empty carrier after delivery of the goods for the other project. The YRITWC also operates an aircraft-based backhaul program using local transport and heavy freight carriers.

2.1.4 COMMUNITY DEMOGRAPHICS

Holy Cross first had contact with Europeans in the early 1840s, when Russian explorers traveled the Yukon River. A Catholic mission and school were established in the 1880s by Father Aloysius Robaut, who came to Alaska across the Chilkoot Trail. Ingalik Indians migrated to Holy Cross to be near the mission and school. A post office was opened in 1899. In 1912, the name of the town was changed to "Holy Cross," after the mission. In the 1930s

and 1940s, sternwheelers brought the mail and supplies two or three times a year. The course of the river changed during the 1930s, and by the mid-1940s, the slough on which the village is now located was formed. The mission Church and many additional buildings were torn down after the boarding school ceased operations in 1956. The City government was incorporated in 1968 (DCCED, 2009).

A federally-recognized tribe, Holy Cross Village, is located in the community. The population of the community consists of 96.5 percent Alaska Native or part Native and Holy Cross is an Ingalik Indian village (DCCED, 2009).

According to the 2000 U.S. Census data, the total population in Holy Cross was 254 people, 64 households, and 49 families residing in the city. This data also indicated that 165 people were employed with an unemployment rate of 45.6 percent of residents living below the poverty level (U.S. Bureau of the Census, 2000).

2.2 COMMUNITY INVOLVEMENT

During the 2008 DBA application period, a project team was developed, identifying community involvement in the desired cleanup of Big Lake and the City Shop. Members of the Holy Cross Village Council, the City of Holy Cross, and Deloycheet are active participants (DEC, 2008d). The contact list for the project, as identified during the project stakeholder meeting, is included as Appendix B of this plan. Within the 2008 DBA request application, the main community concern identified was that hazardous materials at the Site will affect all fish species in the area and since the community relies upon subsistence fishing there is growing concern over the safe consumption of fish. The description of the City Shop in the DBA request identifies some of the community concerns. The description stated that the City Shop contains fuels, acids and hazardous substances; has a distinctive diesel odor; and little or no plant life exists in the surrounding area (DEC, 2008d).

The restoration of Big Lake would benefit the community by preserving subsistence habitat, protecting the surrounding environment, and providing a recreational site. Cleanup of the City Shop and surrounding property would also aid in the protection of habitat and the environment as well as provide a location for community members to work on vehicles and for storage of a new fire foam trailer.

Members of the project team have committed to assisting in the planning and logistics of the needed work. As part of this involvement, residents have provided interviews for the development of this EMP. The YITWC is also committed to helping with and contributing to the different phases of the project.

2.2.1 STAKEHOLDER MEETING SUMMARY

On March 2, 2009, a stakeholder and planning teleconference was held and included attendees from the Holy Cross Village Council, Deloycheet, DEC, EPA, SLR, and the YRITWC. The purpose of the meeting was to define the cleanup objectives and approaches to a solution within the context of the existing environmental impacts. The meeting also

identified the path through the Brownfield process to re-use the Site. SLR prepared a summary record of the meeting and provided it to the stakeholders and DEC (SLR, 2009). A copy of this summary is included in Appendix B.

2.2.2 PROPOSED COMMUNITY DEVELOPMENT AND LAND USE

The re-use objective for Big Lake is to restore it such that the lake and surrounding area can be used for recreational activities such as swimming, ice skating, fishing, picnicking, and walking. The re-use objective for the City Shop is to use the three areas inside the shop for community vehicle maintenance and repairs (northern section), City vehicle maintenance and repairs (middle section), and for storage of a new fire foam trailer (southern section).

2.2.3 INTERVIEWS AND COMMUNITY INPUT

Three interviews were conducted during the site visit with individuals knowledgeable about current and historic conditions of the Site. Interviews were conducted with Evan Newman, the Holy Cross Village Council, and City of Holy Cross, and Deloycheet. These interviews are summarized below to provide the pertinent gathered information.

2.2.3.1 Evan Newman

Evan Newman, a member of both the Holy Cross Village Council and City of Holy Cross Council, has lived in Holy Cross for the majority of his life (approximately 50 years). Mr. Newman described Big Lake as being clean approximately 20 years ago. According to Mr. Newman, Big Lake was both longer and wider; was used for swimming, and contained both pike and white fish. Currently, the lake is used for canoe races, ice picking contests, and limited ice skating. Mr. Newman indicated that some stuff has been removed from Big Lake; these items include: a safe, copper pipe, bicycles, tires, car parts, soda cans, and fire hydrant housing. In addition, a sawmill was located near the lake edge and the lake was used for floating logs. A rock crusher (owned by Deloycheet) was also used for a long time. Mr. Newman would like to see Big Lake cleaned up and used for swimming and picnicking.

Regarding the City Shop, Mr. Newman indicated that the shop has been, and is currently, used for storage and equipment maintenance. Mr. Newman indicated that battery acid, glycol, engine oil, hydraulic oil, brake fluid, and batteries have all been used at the shop. To his knowledge, there has never been fuel storage or asbestos-containing materials. The transformer located on the power pole near the southwest corner of the shop was installed in 2008. Mr. Newman indicated that all utilities in the vicinity were moved aboveground approximately ten years ago. Mr. Newman also stated that the State of Alaska backhauls used vehicles and that a burn box for the landfill is anticipated on the first barge in 2009.

2.2.3.2 Holy Cross Village Council and City of Holy Cross

Several members of the Holy Cross Village Council and the City of Holy Cross Council were interviewed as part of the site visit. These individuals included: Matthew Burkett (mayor of Holy Cross), Carolyn, Burkett, Connie Edwards, Christine Edwards, Evan Newman, and Eugene Paul (Holy Cross Tribal Leader).

During the interview it was mentioned that Big Lake was historically longer and wider until part of it was filled; Big Lake, in its current state, was estimated at about half its original size. The following items have been observed in or pulled out of Big Lake: bicycles, deceased animals, refuge, and batteries. One person drowned in the lake and it is unknown whether the remains were ever recovered. Algae are observed in the summer on the east side of Big Lake. Beavers and small pike currently live in the lake. No one in this interview knew how deep the lake is or of any known drainage from it. They would like to see the lake cleaned out so that it can be used as a recreational site for swimming, picnicking, and other activities. Big Lake is currently used minimally with only canoe races taking place.

Based on the interview, the City Shop has been at its current location for approximately 25 years. Prior to use as the City Shop, the property was the former landfill site for the City of Holy Cross. Ms. Burkett indicated that she thought that when the land use changed that refuse from the Site was moved to the new landfill. No one had any knowledge about an inventory of products used at the shop being conducted. No known lead paint, asbestos, polychlorinated biphenyls (PCBs), or pesticides/herbicides were known to be used at the shop. According to this interview, a small quantity of used oil from the City Shop was burned at the landfill approximately three years ago. The proposed usage for the City Shop was described as follows:

- Section 1 (north) has already been cleaned out and is proposed for use by the community so that they have a place to work on and repair vehicles.
- Section 2 (center) is planned for use by the City for working on their equipment.
- Section 3 (south) will be cleaned out and used to store a new fire foam trailer due into Holy Cross on the first barge of the 2009.

The mayor (Mr. Burkett) indicated that they would like to see old, non-working equipment shipped out for trade-in or recycling. If possible, they would like to obtain funding for this to allow the City to buy new equipment.

Other information gathered during the interview is presented here. Upcoming construction projects include a new tank farm through the Denali Commission (this has not yet been funded), airport improvements including a new runway in 2011, and a weatherization project funded by the Tanana Chiefs Conference currently scheduled for 2012. Operational equipment available includes one dump truck, a loader, a CAT, one grader, and one tiller. One additional dump truck could be made available once repairs have been made. There are approximately two qualified equipment operators in Holy Cross who may or may not have 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. It was estimated that up to 60 people in the community may have 40-hour HAZWOPER training, although the number who have a current 8-hour refresher is unknown.

All land, including the Site, is owned by Deloycheet; however, the City of Holy Cross is trying to get all the land transferred to them.

2.2.3.3 Deloycheet

Four members of the Deloycheet Board of Directors were interviewed. These included: Jeffery Demientieff, Chairperson; Rudy A. Walker, President; Robert A. Walker, Vice President; and Sam Demientieff, Director.

Big Lake was described as being longer and wider historically with the lake extending further north to include the area where the shop is currently. The depth of the lake is unknown, but it was indicated that the lake is shallower in some areas with terraces down to deeper areas. The lake was used for swimming, ice skating, picnicking, and fishing (pike and white fish) prior to dumping. Refuge was dumped into Big Lake in the late 1960s to late 1970s. Known refuge included batteries, vehicles, a safe, and general household refuge. Prior to dumping, there was a well house near Big Lake where people from the community retrieved water, presumably from a seep. A trench was dug to try and drain the lake (time period unknown), and was unsuccessful. The trench remains, but there is no known discharge from the lake. Mr. Robert Walker indicated that during a forest fire, the lake was used as a water source and during five days of constant pumping the water levels was depressed less than a foot and recovered within one day (indicating that the lake is most likely ground water fed). Deloycheet Board Members would also like to see the lake restored to its original condition to be utilized as a recreation site.

According to Deloycheet, the history of the City Shop property (in chronological order) was used as a recreation site, a sawmill, a landfill, and then the City Shop. As a recreation site, the land contained lots of vegetation and was used for picnicking, fishing, swimming, and ice skating. In order to build the City Shop, the area was covered with gravel; the shop was constructed in the 1980s. Deloycheet was under the impression that the material generated during the landfill days was not moved prior to covering. They are concerned that refuge may still be under the property and building up methane gas. No known spills, aboveground storage tanks, underground storage tanks (USTs), asbestos, or PCBs were known to be present or used at the site. Lead paint may have been used in Holy Cross, but they were not sure if this included the shop. It was indicated that the military, which was present in Holy Cross in the 1940s and 1950s, sprayed the area with herbicides in 1956. Deloycheet Board Members support the re-use objective for the City Shop proposed by the Holy Cross Village Council and the City of Holy Cross.

Other information gathered during the interview is presented here. Water for the majority of the community is from one well located in town, which is approximately 125 feet deep. Upcoming work includes an airport project, which is currently in review and tank farm upgrades through the Denali Commission. Deloycheet indicated that 10 to 12 people had recently completed 40-hour HAZWOPER training. Mr. Rudy Walker stated that Deloycheet would make an in-kind donation (permitting assistance or securing backfill) and will do what they can to help support the Holy Cross Village Council and the City of Holy Cross with work related to the Site. They also indicated that there is no space for land spreading or soil stockpiling as most of the land in the area is within the Yukon River flood plain.

3. PROPERTY/SITE OVERVIEW

3.1 HISTORICAL OVERVIEW OF SITE PROPERTIES

This section describes the history of Big Lake and the City Shop gathered from the DBA request and interviews.

3.1.1 BIG LAKE

Big Lake is located on the south side of town and occupies approximately 4 to 5 acres of land. The land is not zoned and is owned by Deloycheet.

According to interviews with stakeholders, Big Lake was historically used as a recreational site which included swimming and fishing. Since that time the Site has been used as a sawmill, a quarry, and a landfill. The lake was reduced in size through backfilling. Backfilling occurred on the north end (the lake was stated to have extended to where the City Shop is currently located) and west side where the road was made and gravel was excavated. It is not clear if the lake was reduced in size on the south or east sides.

There is no known outflow from Big Lake and anecdotal information indicates that the lake is likely ground water fed. Fish species and beavers live in the lake, but are not consumed due to concerns over water quality. The depth of lake is unknown. The amount of debris located within the lake is not quantified. A small amount of debris was visible during the site visit and discussions with community members indicate that during the summer when the lake is clear, more debris is visible. However, the total amount and distribution of debris is unknown. In addition, other than a few known items (bicycles, animal carcasses, batteries, vehicles, and household refuge) the type of debris in the lake is undefined.

3.1.2 CITY SHOP

The City Shop is located just north of Big Lake on property also owned by Deloycheet The shop was built in the 1980s at its current location and has been used for storage and maintenance of equipment owned by the City of Holy Cross since that time. Prior to that, the location was used as a recreation site, a sawmill, and a landfill. In order to build the City Shop, the area was covered with gravel. Interviews revealed conflicting information on what happened to the refuge that had been dumped at this location and it is unclear if the refuge was transported to the new landfill or simply covered with gravel.

No known asbestos or PCBs have been used in the shop. An inventory during the site visit revealed used oil, engine oil, heavy duty coolant, hydraulic oil, hydraulic fluid, tractor hydraulic fluid, transmission fluid, heavy duty motor oil, antifreeze, gasoline, muriatic acid,

primer, paint and stain, lead-acid batteries, dissolved acetylene, compressed oxygen, and nitrogen. Areas of stained soil were observed outside and inside the shop. The majority of the stained soil was located under equipment where fluids had leaked. Other staining noted was associated with drums containing different types of fuel-related liquids.

3.2 GEOLOGIC SETTING

Holy Cross is located on the Yukon-Kuskokwim delta. The community well log was reviewed for lithological information; two well logs were found for the City of Holy Cross, based on interviews, it is presumed that the deeper of the two wells is the current source of drinking water for the community. The first well was drilled to a total of 77 feet bgs. The first 7 feet of the log are illegible. Lithology from 7 feet to 46 feet consisted of brown silt underlain by approximately 20 feet of black muck and clay. A sand and gravel unit was observed from 66 feet to 70 feet; the presence of some water was noted in this zone. From 70 feet to 77 feet green clay, gravel, and sand were observed. The static water level for this well was measured at 46.5 feet. A pumping test yielded good clear water, with a maximum production rate of 6 gpm.

The second well was drilled to a total depth of 130 feet. Frozen soils were observed from 0 foot to 4 feet bgs. Silt and sand, observed from 0 foot to 20 feet, were underlain by sand and clay to a depth of 75 feet bgs. Weathered bedrock was described starting at 87 feet. The static water level for this well was measured at 39 feet.

Holy Cross is subject to flooding. According to the U.S. Army Corp of Engineers Flood Hazard Data, the elevation of the highest flood of record, which occurred in 1971, was 7 feet aboveground surface as measured at the gage on a utility pole upstream of the AVEC fuel storage tanks (USACE, 2009).

3.2.1 PROPERTY USE

Figure 2 shows the location of the Site; the Site is located between the south end of town and the landfill. The Site is currently owned by Deloycheet and the City Shop is operated by the City of Holy Cross.

3.2.2 HISTORICAL USE

The description of historical use of the Site here was obtained from the DBA request and interviews conducted during the site visit. Prior to any dumping or development the Site was used for recreation including fishing for pike and white fish, beaver trapping, and swimming. The Site (including the City Shop property) was used as a dump for at least ten years. During this period, refuse from the entire village was dumped here.

In the 1960s, a sawmill was hauled to Holy Cross from Shageluk and operated at the site utilizing the lake for floating logs. It was reported that once the sawmill broke down, it was shoved into Big Lake. At one time there was a “rock quarry” and gravel was mined from the Site.

3.2.3 CURRENT USE

Big Lake receives minimal usage currently. Usage is limited to canoe races during the annual agricultural fair and the ice picking contest during the spring carnival. The City Shop is currently used for storage of equipment and material. At the time of the site visit, the northern section of the shop had been cleared out and the City and Village Council had plans to clean out the southern section for storage of the new fire foam trailer, and to cleanup the main portion of the shop to allow the City to use it for vehicle maintenance and repair. The floor of the City Shop is dirt.

3.3 RECORDS REVIEW

Records reviewed to prepare this EMP included files from DEC's Drinking Water program and DEC's Contaminated Sites Database.

As a Class C public water system in Alaska, the water well at Holy Cross is sampled regularly per the requirements of the Drinking Water Program in DEC's Division of Environmental Health. The Drinking Water Program maintains a database of well sampling results going back to 1995. There have never been any violations for volatile organic compound (VOC) exceedances. The most recent VOC results for the Holy Cross community well are provided in Appendix D; no compounds were detected above the method reporting limit.

The DEC Contaminated Sites Database yielded three sites in Holy Cross. Two of the sites (Holy Cross Lift Station and Alaska Department of Transportation and Public Facilities SREB – Holy Cross Airport) have been closed. The only remaining open site (Holy Cross Oil Co.) had a reported 18,833 gallon leak of unleaded gasoline on the west bank of Ghost Creek Slough; it was reportedly cleaned up.

4. ENVIRONMENTAL REVIEW AND SUMMARY OF FINDINGS

4.1 PREVIOUS WORK AND EXISTING SITE DATA

No known previous work or existing site data is available for Big Lake or the City Shop.

4.2 POTENTIAL SOURCE AREAS

The main potential source area for Big Lake is the north end of the lake that was located closest to the dump and was most likely the recipient of the majority of dumping activities. The south end of Big Lake may also be a source area as several 55-gallon barrels were observed there.

The main sources at the City Shop include: parked equipment and drums, buckets, or other containers containing oil, hydraulic fluid, or chemicals. The resulting source areas are outside beneath parked equipment and inside and outside the shop where drums, buckets, or other containers are stored. Figure 3 depicts areas of stained soil observed during the site visit.

4.3 KNOWN OR PERCEIVED DATA GAPS

No data has been collected from Big Lake or the City Shop to date.

4.4 CONCEPTUAL SITE MODEL

SLR developed a Conceptual Site Model (CSM) to qualitatively assess the risk to potential human and ecological receptors from petroleum hydrocarbons in soil at the Site. Since there is no data available, the CSM presents the likely potential exposure scenarios for current and future site receptors. The collection of analytical data from the Site would aid in determining which pathways are significant, allowing remedial actions to be focused on reducing risk to human receptors.

The CSM identified the following potentially complete exposure pathways:

- Incidental soil ingestion;
- Dermal absorption of contaminants from soil;
- Ingestion of ground water;
- Inhalation of outdoor air;
- Inhalation of indoor air;

- Ingestion of surface water;
- Direct contact with sediments; and
- Ingestion of wild foods.

A complete discussion of these pathways is provided in Appendix G.

DEC's Contaminated Sites Program developed the Exposure Tracking Model (ETM) to assist the program in prioritizing sites that have the greatest potential of a risk of exposure. The ETM is a revision to the Alaska Hazard Ranking Model, historically used to prioritize all contaminated sites. The ETM provides a preliminary evaluation using available information and data on all sites and provides a ranking of each site according to the possibility of human and ecosystem exposure to the contaminants. Prioritization for a site can change over time as new information becomes available, and as cleanup actions decrease the potential for exposure. Since the Site is not a confirmed contaminated site, no ETM has been done.

4.5 CLEANUP CRITERIA

The current DEC soil and ground water cleanup levels are contained in Title 18 of the Alaska Administrative Code (AAC) Chapter 75, Table C, *Oil and Hazardous Substances Pollution Control Regulations* (DEC, 2008b). Current DEC surface water cleanup levels are outlined in 18 AAC 70 Water Quality Standards (DEC, 2008c). Sediments do not have specified cleanup levels, but will be compared to National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs), which are screening concentrations for inorganic and organic contaminants in environmental media (Buchman, M. F., 2008)

4.5.1 SOIL CLEANUP LEVELS

The most stringent Method Two cleanup levels for the under 40-inch zone for each of the potential contaminants are listed below:

- Benzene, 0.025 milligrams per kilogram (mg/kg) (migration to ground water)
- Toluene, 6.5 mg/kg (migration to ground water)
- Ethylbenzene, 6.9 mg/kg (migration to ground water)
- Total xylenes, 63 mg/kg (migration to ground water)
- Gasoline range organics (GRO), 300 mg/kg (migration to ground water)
- Diesel range organics (DRO), 250 mg/kg (migration to ground water)
- Residual range organics (RRO), 10,000 mg/kg (ingestion)
- Lead (if gasoline is targeted), 400 mg/kg (direct contact)
- 1,2-Dibromoethane (if gasoline is targeted - lead scavenger compound), 0.00016 mg/kg (migration to ground water)

- 1,2-Dichloroethane (if gasoline is targeted - lead scavenger compound), 0.016 mg/kg (migration to ground water)
- Polynuclear aromatic hydrocarbon (PAH) compounds at varying concentrations listed in 18 AAC 75
- Metals at varying concentrations listed in 18 AAC 75

4.5.2 GROUND WATER CLEANUP LEVELS

Ground water sampling is not currently included in the recommended actions; however, if ground water is encountered during remedial activities at the City Shop, a sample should be collected. No samples are planned from the community well, which is routinely monitored and has never contained VOCs at concentrations above water quality standards.

If ground water samples are collected, they would be compared to 18 AAC 75 Table C ground water cleanup levels. These cleanup levels for potential Site contaminants are as follows:

- Benzene, 0.005 milligrams per liter (mg/L)
- Toluene, 1.0 mg/L
- Ethylbenzene, 0.7 mg/L
- Total xylenes, 10 mg/L
- GRO, 2.2 mg/L
- DRO, 1.5 mg/L
- RRO, 1.1 mg/L
- Lead (if gasoline is targeted), 0.015 mg/L
- 1,2-Dibromoethane (if gasoline is targeted - lead scavenger compound), 0.00005 mg/L
- 1,2-Dichloroethane (if gasoline is targeted - lead scavenger compound), 0.005 mg/L
- PAH compounds at varying concentrations listed in 18 AAC 75 Table C
- Metals at varying concentrations listed in 18 AAC 75 Table C

4.5.3 SURFACE WATER CLEANUP LEVELS

Any surface water analytical data collected from Big Lake should be analyzed for total aromatic hydrocarbons (TAH) using EPA Method 624, and PAHs using EPA Method 610. The sum of TAH and PAH results from these two methods yield a total aqueous hydrocarbon (TAqH) value.

The appropriate surface water criteria are:

- TAH, 10 micrograms per liter (µg/L)

- TAqH, 15 µg/L

4.5.4 SEDIMENT GUIDANCE

Sediments do not have specified cleanup levels, but will be compared to NOAA SQuiRTs, which are screening concentrations for inorganic and organic contaminants in environmental media (Buchman, M. F., 2008). Individual PAH compounds will be evaluated as well as total PAH concentrations. In addition, to PAH concentrations, it is recommended that sediment results also be evaluated with respect to soil cleanup levels for comparison purposes only.

4.5.5 OTHER REGULATED CLEANUP CRITERIA

All material to be removed off site should be inventoried prior to the handling of the waste. If regulated asbestos-containing material (RACM) or non-RACM asbestos waste is found, it must be removed prior to any necessary excavation. A certified asbestos removal contractor will be required to remove all asbestos-containing waste. Alternatively, a one-time asbestos-containing waste disposal operation may be possible through the acquisition of a DEC Solid Waste General Permit; General Permit Number SWG0301000 is issued for a one time disposal of asbestos-containing waste.

DEC Division of Environmental Health's Solid Waste Program (DEC Solid Waste Program) should also be contacted regarding the removal and disposal of lead paint and other hazardous materials. Hazardous material that does not include asbestos or scrap metal debris and does not exceed a total of 1,000 cubic yards (cy) of waste may be disposed of by obtaining DEC Solid Waste Program's General Permit Number SWG0303000. This permit may only be used for disposal of wastes in locations that are more than 100 miles from the nearest permitted landfill. Although Holy Cross' landfill is an unpermitted Class 3 landfill, the nearest permitted landfill, located in Aniak, Alaska, is less than 100 miles from Holy Cross and, therefore, this permit would not apply.

4.5.6 NON-REGULATED CLEANUP CRITERIA

For non-hazardous, non-regulated waste material, cleanup criteria do not include the acquisition of a DEC Solid Waste Permit. Material including, but not limited to, cement, rebar, crushed glass, brick, and mortar are usually not regulated.

4.6 GENERAL ENVIRONMENTAL OVERVIEW

The lack of available analytical data makes it difficult to determine the significance of each potentially complete exposure pathway identified in the CSM (Appendix G). The collection of analytical data from this Site would aid in determining which pathways pose significant risk to human receptors and allow stakeholders to select the remedial actions that will most effectively reduce the risk of exposure.

In addition, the collection of analytical data would provide the community with information that they are currently lacking, which has the potential to alleviate concerns and rumors

regarding the state of Site. Big Lake, in its current state, is not used by residents for recreation such as swimming or fishing. Potentially completed pathways, including surface water ingestion and direct contact with sediments, may or may not pose risk to recreational users. Recommended activities at Big Lake include surface water quality sampling and a bathymetric and debris survey, which would provide for a good first step in adequately identifying the magnitude and extent of impact.

It is unlikely that petroleum-stained soil observed at the City Shop would pose a significant risk to current or future site occupants. Soil staining observed at the Site appears to originate from sources such as leaks of lubricating oil from equipment and appears limited in extent. SLR did not characterize the vertical extent of the impacted soil, and soil samples were not collected for laboratory analysis. Current conditions at the City Shop do not prohibit continued usage or future light industrial re-use as intended by the community. However, recommended actions (as described in Section 5.2) would reduce environmental impacts to the property and remove impacted soils from the Site which is subject to flooding. If not removed, contaminants could be mobilized during flooding events.

5. RECOMMENDED ACTIONS

The following sections summarize actions necessary for beneficial re-use of the Site. Due to their unique characteristics, the subsequent discussion is divided by location.

5.1 BIG LAKE

The recommended actions for Big Lake include surface water and sediment sampling and a bathymetric and debris survey; these topics are discussed in detail below.

5.1.1 SURFACE WATER AND SEDIMENT SAMPLING

The first recommendation for Big Lake is to collect surface water samples from the lake to determine if DEC surface water quality criteria for the most stringent usages (water supply; water recreation; and the growth and propagation of fish, shellfish, other aquatic life, and wildlife) are met. This will determine if the water quality in Big Lake is acceptable for the proposed usage of the lake for swimming and fishing. Once the water quality of Big Lake has been characterized, further remedial actions, if necessary could be implemented. At this time, the extent of impact, if any, is unknown.

Sediment sampling is recommended to further evaluate the potentially complete pathway of direct contact with sediment. In general, fuel-related contaminants tend to float and disperse rather than sink and accumulate in sediments. However, PAHs, which have the potential to bioaccumulate and some of which are carcinogens, tend to concentrate in bottom sediments. A limited sediment sampling program is recommended to determine if sediments have been impacted as a result of previous Site activities.

The recommended analytical sampling is discussed further in Section 6 of this EMP.

5.1.2 BATHYMETRIC AND DEBRIS SURVEY

Debris located in the Big Lake may pose a risk to humans wishing to use the lake for recreation purposes such as swimming. However, before any sort of debris removal is attempted, a bathymetric and debris survey is recommended. It is recommended that the debris survey be executed via an underwater video recorder. Conducting this type of survey will allow for debris removal to occur in a planned and manageable fashion by answering the following questions:

- **How deep is the lake?** The depth of Big Lake is currently unknown, although interviews with community members indicated that the lake is terraced and shallower at the two ends than in the middle. The depth of the lake will play an important role in

determining what type of equipment will be needed to remove debris (i.e. is it accessible by heavy equipment? Will divers be required?).

- **How much debris is in the lake?** The amount of debris will help determine the type of equipment needed for removal, how much debris will need to be relocated (i.e. to the dump or shipped out of Holy Cross).
- **What type of debris is in the lake?** The type of debris will also help determine the type of equipment required for removal. In addition, this will determine if any special handling is required (i.e. disposal of such material is regulated or improper removal could cause harm to the lake or workers).

Once these questions have been answered, a comprehensive plan for debris removal could be put together.

5.2 CITY SHOP

Although not required for continued site use, or future light industrial re-use, potential environmental impacts resulting from continued activities at the City Shop would be limited with the use of administrative controls such as waste management and spill prevention programs. Debris removal and limited contaminated soil excavation and removal are recommended because they would ultimately improve the effectiveness of these programs by setting the stage for future activity (i.e., establishing a baseline for future environmental stewardship). Because the site is in active use, it is unlikely these activities would qualify for Brownfield funding.

5.2.1 DEBRIS REMOVAL

Debris located in and around the City Shop may preclude the use of the Site to the full extent and may be negatively impacting the surrounding environment. This material includes, but is not limited to, the items described below. It is recommended that "debris" be removed from the City Shop and surrounding land.

- Several **inoperable pieces of equipment** were observed around the City Shop property and indicated by the mayor. It is recommended that inoperable pieces of equipment be removed via a barge backhaul program, or flown out using the aircraft-based backhaul program for trade-in or recycling.
- Several **55-gallon barrels** were located inside and around the City Shop property. Drums, not currently used, should be confirmed empty and disposed of according to all applicable state, federal, and local regulations. If possible, the drums can be reused within the community.
- One **used oil** tank was located and was noted outside the City Shop. The tank did not have any corresponding piping and did not appear to be leaking. The tank should be purged of fuel (if necessary) and removed. If possible, the tank can be reused within the community.

- **Lead-acid batteries** were present within the City Shop. It is recommended that these batteries be removed off-site via a barge backhaul program, or flown out using the aircraft-based backhaul program.
- Drums and buckets of **used oil** were observed inside the City Shop. It is recommended that the used oil be removed via a waste oil burner. The byproducts of the waste oil burner are water and heat; the heat generated from the waste oil burner could be beneficially used to heat the City Shop. The burning of waste oil would require compliance with state, federal, and local regulations.
- During the site visit, **tires** were noted in several locations on the City Shop property. It is recommended that unusable tires be removed off-site via a barge backhaul program, or flown out using an aircraft-based backhaul program. The tires could be transported to a tire recycling company such as Alaska Tire Recycling Inc.

All activities for the removal off site of materials will be conducted according to all applicable state, federal, and local regulations. Procedures for tank decommissioning will likely follow the DEC *Underground Storage Tanks (USTs) Regulation, 18 AAC 78,* as amended in October 2006 (DEC, 2006). The best alternative for removal and recycling or disposal of the materials listed above would either be through a backhaul program or disposal in at the City dump. Scrap metal can be shipped off site for recycling without waste characterization since processed scrap metal destined for recycling is not considered solid waste if it meets the exemption criterion under 40 Code of Federal Regulation (CFR) 261.4(a)(13) for processed scrap metal.

5.2.2 CONTAMINATED SOIL EXCAVATION

Several areas of stained soil were noted on the City Shop property (Figure 3). The majority of the stained soil was indentified outside of the shop beneath equipment. All of the staining outside the shop appeared to be mostly surficial based on shallow hand auger borings. One large area of stained soil was noted inside the City Shop. This stained soil appeared to penetrate deeper than 6 inches bgs.

Although all utilities appear to be overhead, it is recommended that a utility clearance be performed prior to any subsurface activities.

Preliminary limits of excavation are based on observed soil staining, hand borings, and the assumptions described in the next paragraph. The total in-place volume of the proposed excavation area(s) is 35 cy. During removal, field screening samples should be taken to guide the lateral extent of the excavation. Further excavation beyond the preliminary limits may be deemed necessary based on the field screening. Once field screening indicates that contaminated soil has been excavated, confirmation samples should be collected from the excavation sidewall or floor. Excavation screening sampling method and frequency and proposed analytical methods, are discussed in Section 6 of this EMP.

Due to the absence of analytical data, assumptions were used to develop the estimated volume of contaminated soil. These assumptions are listed below:

- Contamination outside the shop is assumed to be surficial in nature, extending to a depth of 2 feet bgs. Contamination inside the shop is assumed to extend further than outside the shop to an assumed depth of 5 feet bgs.
- Contamination is assumed to have a limited lateral extent. The area of impacted soil was calculated by estimating the area of each stained soil location and extending it 1 foot in each of the four directions (an additional 4 square feet).
- Any contamination located in non-stained areas is not covered in these estimates.
- Contamination below the water table will not be removed.

These soil volumes are in-place estimates. Due to the swell of soils during handling, the anticipated ex situ management volume is expected to increase by 30 percent to 45.5 cy. An additional 10 percent contingency for additional excavation beyond the preliminary limits of excavation would require the management of approximately 50 cy of soil.

The removal volume was developed to remove impacted soil to the extent possible.

5.2.3 SPILL PREVENTION CONTROL AND COUNTERMEASURES

It is recommended that the City of Holy Cross implement spill prevention control and countermeasures (SPCC) as part of future work at the City Shop. Based on observations made during the site visit, the following actions are recommended:

- Placing drip pans beneath parked equipment;
- Utilizing drip pans during routine maintenance;
- Following good handling practices for transfer of fluids (funnels, sorbents, etc.);
- Placing drums and buckets containing fuel-related items inside a secondary containment;
- Putting together a spill response kit to address spills that may occur;
- Repairing leaking equipment;
- Performing regular inspections to ensure control measures are functioning; and
- Training City employees and community members who will be using the City Shop on proper SPCC protocols.

5.2.4 ADMINISTRATIVE CONTROLS

It is recommended that several administrative controls be implemented to protect workers and minimize the potential for environmental impacts. A chemical inventory should be developed to maintain a record of chemicals stored and used in the shop. As part of the chemical inventory, the City of Holy Cross should compile material safety data sheets for all chemicals. In addition, a waste management plan should be developed for properly disposing of regulated chemicals.

5.2.5 TRAINING

In order to implement SPCC and administrative controls, it is recommended that the City of Holy Cross request training for shop workers.

5.3 SOIL MANAGEMENT ALTERNATIVES

If contaminated soil excavation is conducted, proper management of the soil will be required. The following alternatives were considered for the management of contaminated soil. The results of the evaluation of the selected soil remedial actions are presented in Table 1.

- **Passive Biopile Construction** – In this option, excavated soils are mixed with clean soil, placed on a treatment area, and covered. Aeration is provided passively through perforated pipe extending into the pile. The pile is covered and a leachate collection sump is included to manage water if the cover is damaged. The pile is left until the soils meet specified cleanup levels for land spreading or beneficial re-use. This option could potentially be used in Holy Cross, although the space for biopile construction is limited.
- **Road Base Encapsulation** – This method would only apply if the use of a barrier to provide zero net infiltration is part of the design along with other requirements of 18 AAC 75.360(11)(G). This option is considered unlikely as Holy Cross does not have any paved roads nor is expected to in the foreseeable future.
- **Daily Landfill Cover** – Under this option, contaminated soils could be used for landfill cover. This option requires permission from DEC Solid Waste Program, and typically is contingent on pre-treatment of soil prior to use as landfill cover. This alternative is a common form of beneficial re-use of contaminated soil, is less expensive than many other options at remote sites, and effectively manages risks associated with contaminated soil. For Holy Cross, this method would most likely work if contaminated soil can be directly placed on the landfill without prior treatment.
- **Landfarming** – This method includes spreading the contaminated soil into a 1-foot thick layer. The soil is tilled monthly during the summer months using a roto-tiller. Tilling aerates the soils to promote aerobic degradation of contaminants in the soil. The addition of fertilizer is also used to promote biological activity. Initial landfarm characterization samples are collected to document contaminant levels at the time of placement. Characterization samples are collected on an annual basis to determine when cleanup goals are met. The DEC Solid Waste Program will specify the cleanup requirements prior to using landfarmed soils as daily landfill cover. Holy Cross has very limited area above the Yukon River flood plain for landfarming.
- **Thermal Remediation** – Thermal remediation of contaminated soil is generally expensive at remote locations both to ship in treatment equipment and for the fuel required, and is most likely not a feasible option for Holy Cross.

Table 1
Evaluation of Remedial Alternatives for Soil

Alternative	Environmental Protection	Regulatory Compliance	Effectiveness	Implement-ability	Cost	Overall Rating
No Action	Fair	Fair	Poor	Excellent	Good	Fair
Passive Biopile Construction	Good	Good	Fair	Fair	Fair	Fair
Road Base Encapsulation	Good	Good	Good	Fair; best if pavement is used in road construction. No roads in Holy Cross are paved	Fair	Fair
Daily Landfill Cover	Fair	Fair	Fair	Good	Good	Good
Landfarming	Fair	Fair	Fair	Fair; no available space outside flood plain for landfarming	Good	Fair
Thermal Remediation	Fair	Fair	Good	Fair	Poor; extremely high cost for small projects	Fair

5.4 PREFERRED REMEDIAL ALTERNATIVE FOR SOIL

The matrix for remedial option selection is presented in Table 1. The alternatives are ranked according to environmental protection, regulatory compliance, effectiveness, implementability, and cost. Remediation options with the best overall rating are compared for use at this particular Site.

Although this is not an UST site, the ex situ remedial option may involve bioremediation and the development of a corrective action plan in general compliance with the terms of 18 AAC 78.250(e)(12)(E).

The preferred alternative for contaminated soils at Holy Cross would be use as daily landfill cover. Precedence exists for using contaminated soils as landfill cover in rural communities, but it requires approval by DEC's Solid Waste Program. Although the DEC Solid Waste Program requires that contaminated soil be managed prior to use as landfill cover, Holy Cross has limited space to remediate soils. The landfill is located outside of town and placement of contaminated soils would likely not result in an unacceptable risk to human receptors.

5.5 INSTITUTIONAL CONTROLS

It is anticipated that excavation would completely remove contaminated soils from the Site and no institutional controls are anticipated. However, if removal of all contaminated soil is not possible, institutional controls would be required to protect future site workers. Development of institutional controls appropriate for this Site is presented in the DEC guidance document *Site Closure Policy and Procedures* (DEC, 2008a).

5.6 SOURCE OF BACKFILL MATERIAL

Backfill sources for the excavations described in this plan have been identified as bluff material, obtained from south of the dump. The subsurface rights are owned by Doyon Limited and the surface rights by Deloycheet. Deloycheet has indicated they could secure backfill as an in-kind donation. This material would serve as adequate backfill material for the excavations discussed in this EMP.

5.7 WATER MANAGEMENT OPTIONS

Ground water, if encountered, will not be removed from the excavations. Excavation will not proceed below the static water level if water is encountered. No excavation dewatering is proposed as part of this EMP.

5.8 EQUIPMENT AND LABOR REQUIREMENTS

The equipment and labor requirements to implement the preferred alternative could be carried out with resources available in Holy Cross. Available resources are described in the next section.

5.9 AVAILABLE RESOURCES IN HOLY CROSS

The available equipment and labor resources are described in the following sections.

5.9.1 EQUIPMENT

Equipment identified in the City of Holy Cross that is operational and available includes a dump truck, a loader, a CAT, a grader, and a tiller. One additional dump truck may be available once repairs are made.

5.9.2 LABOR

There are two qualified equipment operators in Holy Cross. It was indicated that at least 12 people have recently completed 40-hour HAZWOPER training. Several other residents have 40-hour HAZWOPER training, but would require an 8-hour refresher class prior to being eligible to work on a contaminated site.

5.9.3 RESOURCE LEVERAGING OPPORTUNITIES

There are no planned construction projects in Holy Cross for 2009. Future projects may include airport improvements, a new tank farm, and a weatherization program; each of these projects is discussed briefly below.

According to residents, the Alaska Department of Transportation has plans to make improvements to the runway in Holy Cross. The project is currently in review and may take place in 2011. An application for a new tank farm was filed with the Denali Commission; at this time the project status is suspended (Denali Commission, 2009). A project to renovate houses for energy savings and weatherization through the Tanana Chiefs Conference may occur in 2012.

The Holy Cross Village Council has indicated that lodging could be provided as an in-kind donation and they and the City have some equipment available. Deloycheet indicated that they could assist with permitting and securing backfill.

5.9.4 PERSONNEL QUALIFICATIONS

Personnel working on the field component of this project must be trained to the HAZWOPER standard per the Occupational Safety and Health Administration requirement in 29 CFR 1910.120. Equipment operators must have certification with a commercial driver's license and be able to verify their ability, training, and experience to operate equipment required for this project.

6. SAMPLING

This section discusses the appropriate analytical sampling that would be required to complete the recommended actions described in Section 5 of this EMP.

6.1 ANALYTICAL METHODS

The following analytical methods are recommended for sampling associated with the recommended actions:

6.1.1 SURFACE WATER

- BTEX by EPA Method 624
- PAHs by EPA Method 610

6.1.2 SEDIMENT

- PAHs by EPA Method 8270

6.1.3 SOIL AND GROUND WATER

- BTEX by EPA Method 8021B
- GRO by Alaska Method (AK) 101
- DRO by AK102
- RRO by AK103
- PAHs by EPA Method 8270 (at selected locations only [approximately 10 percent])
- VOCs by EPA Method 8260 (at selected locations only [approximately 10 percent])
- Lead by SW-846 7421 (target analyte only in the event evidence emerges that gasoline was stored at this facility)
- Metals by SW-6020 (at selected locations only [approximately 10 percent])

6.2 SURFACE WATER AND SEDIMENT CHARACTERIZATION

A description of recommended surface water and sediment characterization activities is provided below.

6.2.1 SURFACE WATER

It is recommended that three surface water samples be collected to assess the current water quality in Big Lake. Recommended sample locations include the south where ground water would likely be entering the lake, the center of the lake, and the north end of the lake where the majority of the dumping probably occurred. Analytical data from samples collected from surface waters will be compared to water quality criteria published in 18 AAC 70. Surface water samples, if available, will be analyzed for TAH using EPA Method 624, and PAH using EPA Method 610. The sum of TAH and PAH results from these two methods yield TAqH that can be compared to water quality criteria in 18 AAC 70.

6.2.2 SEDIMENT

It is recommended that approximately three sediment samples be collected to determine if PAH compounds are present. Two samples should be collected from the north end of the lake, where the majority of the dumping most likely occurred and one from the southern end of the lake that may be less impacted. Analytical data from samples collected from sediment will be compared to NOAA SQuiRT ecological screening values and soil cleanup levels presented in 18 AAC 75 for comparison purposes only as there is no regulatory criteria for contaminant concentrations in sediment.

6.3 SOIL AND GROUND WATER CHARACTERIZATION

A description of recommended soil and ground water characterization activities is provided below.

6.3.1 SCREENING AND SAMPLING OF EXCAVATION

Although not an UST site, excavation sampling locations and frequencies should be performed in general accordance with DEC UST Regulations (DEC, 2006). However, due to the nature of contamination at the City Shop (i.e. lots of small stained areas), the procedures may need to be modified to better suit the property.

6.3.1.1 Excavation Screening

Screening of soils during removal should be performed to try and ensure that all contaminated soil is successfully removed. The frequency of excavation screening specified in the UST Procedures Manual of one sample every 10 cy of excavated soil, would be insufficient for this project. It is recommended that screening samples be collected from each excavated area.

Excavation field screening should be conducted using headspace analysis, as well as analysis for total petroleum hydrocarbons (TPH) using EPA Method 9074. Photoionization detector (PID) heated headspace screening should be performed on all samples, consisting or placing a representative soil sample in a resealable plastic bag and warming for a sufficient time to raise the soil temperature to at least 40 degrees Fahrenheit, but preferably to 60 degrees

Fahrenheit. After warming, the sealed soil sample is agitated (shaken) for 15 to 20 seconds, after which a PID probe is inserted into the bag and the highest reading recorded.

EPA Method 9074 (PetroFLAG® turbidimetric screening method) will be used on selected samples and is expected to produce conservative DRO concentration results, which is to say concentrations are higher than those obtained from laboratory results using AK Method 102. Disadvantages of EPA Method 9074 are that the method is more susceptible to interference from biogenic material in the soil, and this method, although it produces a quantitative TPH concentration, is considered to be most suitable for qualitative analysis (EPA, 1998). If biogenic interference is suspected, clean soil of the same type from background areas should be analyzed to attempt to quantify the response attributed to biogenic material.

Samples will be collected to determine if the removal activity is meeting the required cleanup levels, and to help minimize the uncontaminated material removed. Soil samples from the excavation will be field screened by visual observation, by use of a PID, and with field testing. Soil samples with elevated PID levels or field testing concentrations, or otherwise suspected to be contaminated with petroleum, will be identified, and additional soil will be removed. PID readings of 40 parts per million (ppm) and PetroFLAG® readings of 150 ppm will be used as cutoff points during the excavation guidance.

6.3.1.2 Sampling at Limits of Excavation

After PID screening and field testing indicates contaminated soil has been removed to cleanup levels, laboratory confirmation soil samples should be collected and analyzed by the methods specified in Section 6.1.3 of this EMP. It is recommended that at least one confirmation sample should be collected per excavation from the excavation floor or sidewall. The excavation limits and sample locations should be measured and noted.

This sampling should document the location and chemical concentrations at the final limits of excavation prior to backfill. Excavation sampling should follow guidance for excavation closure sampling provided in 18 AAC 78.090(d)(B).

6.3.2 GROUND WATER SAMPLING

Ground water should only be sampled if encountered during excavation activities. In this scenario, a permanent or temporary well should be installed, developed and sampled. Ground water samples, if collected, should be analyzed for the methods specified in Section 6.1.3 of this EMP.

The community water system should not be sampled as VOCs have never been detected.

6.4 SAFETY AND SITE CONTROL

Excavation activities have objective hazards that must be addressed in the field. Barricades, and working notices, must be established in the field during all excavation work. Open holes must be barricaded off to clearly indicate the hazard. Equipment, when not in use, must be

parked in a safe area. Community meetings should be held to apprise all residents of upcoming activities and their duration.

6.5 SAMPLE HANDLING AND RECORDS MANAGEMENT

Proper sample handling and procedures should be adhered to during remediation efforts; these are described in the subsequent sections.

6.5.1 SAMPLE PACKAGING AND SHIPPING

Chain-of-custody procedures and proper sample handling and packaging methods must be used for all samples shipped to Anchorage, Fairbanks, or elsewhere, on a regional carrier. U.S. Department of Transportation requirements for hazardous material shipment must be observed when shipping any dangerous goods to or from the community of Holy Cross. The laboratory must be notified of all in-bound sample shipments at the time of shipment from the community.

6.5.2 DATA QUALITY ASSESSMENT

All data generated during the soil management must be assessed using the DEC data quality control procedures. Each data deliverable package must be reviewed and have a completed data review checklist and quality control summary (DEC, 2009).

7. WASTE STREAM MANAGEMENT

This section discusses the types of waste expected to be generated during the course of this project and the recommended method of management.

7.1 CONSTRUCTION DEBRIS AND ABANDONED MATERIALS

All material to be removed off site should be inventoried prior to the handling of the waste. If RACM or non-RACM asbestos waste is found, it must be removed prior to any necessary excavation. A certified contractor for asbestos removal should be contacted to locate and remove all asbestos-containing wasted. Alternatively, a one-time asbestos-containing waste disposal operation may be possible through the acquisition of a DEC Solid Waste General Permit. General Permit No. SWG0301000 is issued for a one time disposal of asbestos-containing waste. Asbestos-containing waste is not anticipated at this Site based on interviews.

DEC's Solid Waste Program should also be contacted regarding the removal and disposal of lead paint and other hazardous materials. Hazardous material that does not include asbestos or scrap metal debris and does not exceed a total of 1,000 cy of waste may be disposed of by obtaining DEC Solid Waste Program's General Permit No. SWG0303000. This permit may only be used for disposal of wastes in locations that are more than 100 miles from the nearest permitted landfill. Holy Cross' landfill is unpermitted.

The majority of the waste anticipated during debris removal at the City Shop consists of inoperable equipment, tires, wood, metal, and other miscellaneous items. It is expected that when possible, recycling should be used. The YRITWC backhaul program had one to two barges last year for Holy Cross. It is anticipated that this program will continue and some debris can be transported off site through this program.

7.2 LIQUID WASTES

No removal of oily wastes is anticipated as part of the recommended actions. Used oil, if managed under this plan, should be used for heat recovery in an EPA-approved burner at the shop.

Used sampling equipment may be disposed of as trash for local disposal at the landfill.

8. COST

The estimated cost of implementing the recommended actions is described below.

The total cost for the recommended actions is $136, 853. This cost is broken down into tasks, which include:

- Work plan preparation;
- Big Lake surface water and sediment assessment;
- Big Lake bathymetric and debris survey;
- City Shop excavation of contaminated soils, confirmation sampling, and transport soil to landfill;
- City Shop backfill excavations;
- City Shop SPCC Plan;
- City Shop administrative controls and training; and
- Reporting.

The cost of each individual task is presented on the cost estimate provided in Appendix H. The use of local equipment and labor will help keep costs down as well as using contaminated soil as landfill cover.

9. CONCLUSIONS

Big Lake poses unique challenges in regards to environmental assessment and cleanup. As such, this EMP focuses on the first stage of environmental remediation which is assessment. Recommended actions include surface water and sediment sampling to determine if the lake has been impacted and a bathymetric and debris survey to determine the type and magnitude of the debris and any logistical challenges associated with its removal. Once these potential impacts have been quantified a remediation plan can be implemented in a safe and cost effective manner.

Recommended actions for the City Shop property focus on remediation of contaminated soils and implementation of SPCC and administrative controls to prevent future environmental impacts resulting from usage. In order to address existing contamination at the shop would require excavation of approximately 35 cy and management of approximately 50 cy of soil once swell and contingency factors are applied. It is recommended that contaminated soil be used as landfill cover due to the limited disposal options available in Holy Cross; this would help keep costs down and should not pose unacceptable risks to the community.

The estimated cost of implementing the recommended actions is $136,853. Implementation of these actions would rely on consultant assistance and reporting to DEC.

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LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

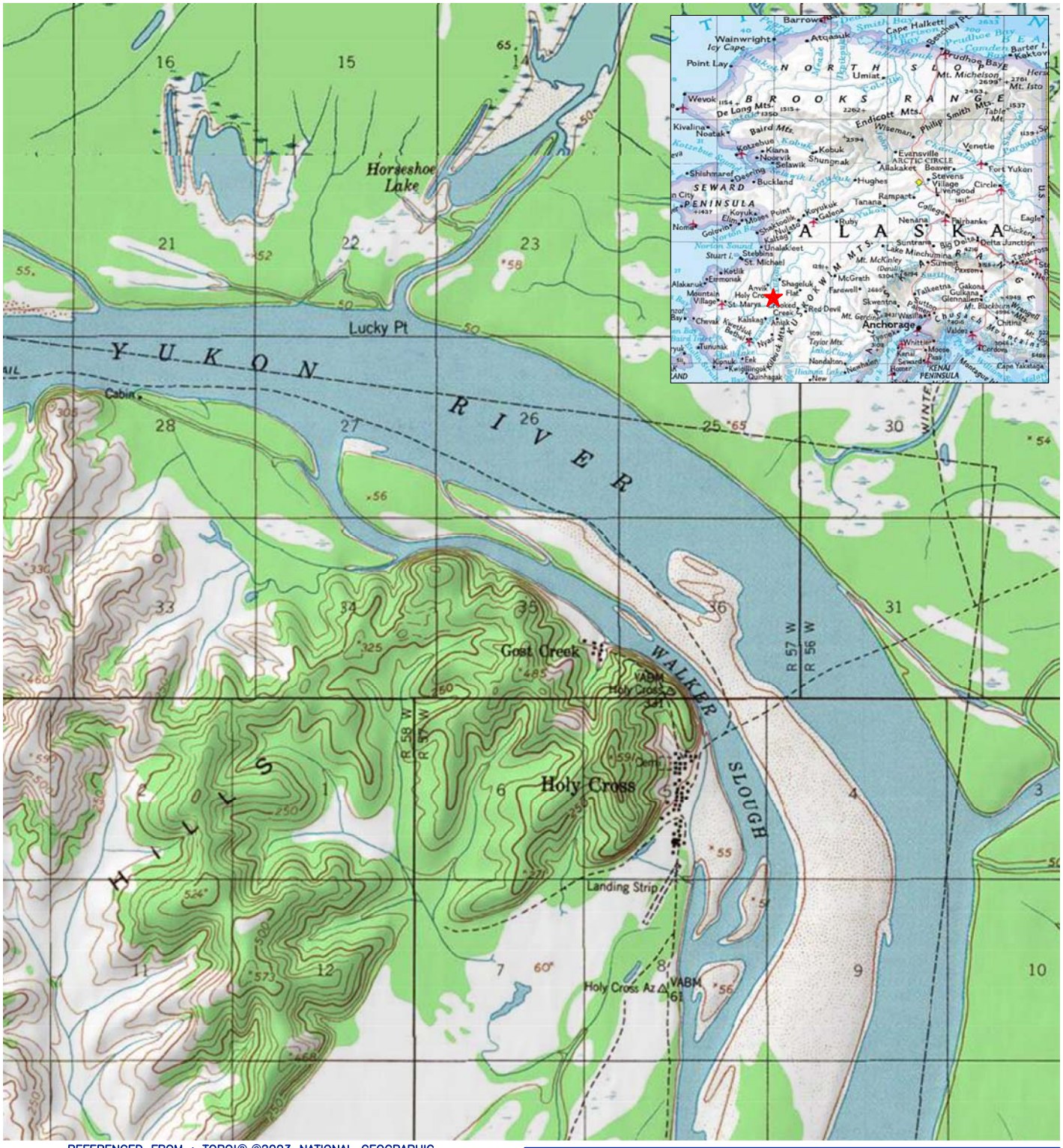
The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

Environmental conditions may exist at the site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

FIGURES



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SLR

Alaska Department of Environmental Conservation
Contaminated Sites Program
Division of Spill Prevention and Response
611 University Avenue
Fairbanks, AK 99709-3643

Report: Environmental Management Plan
Big Lake Former Dump Site
Holy Cross, Alaska

Drawing: Location Map

Date: June 1, 2009	Scale: 1"=2000'	Fig. No. 1
File Name: F1 HOLY CROSS	Project No.: 005.0065.09001	

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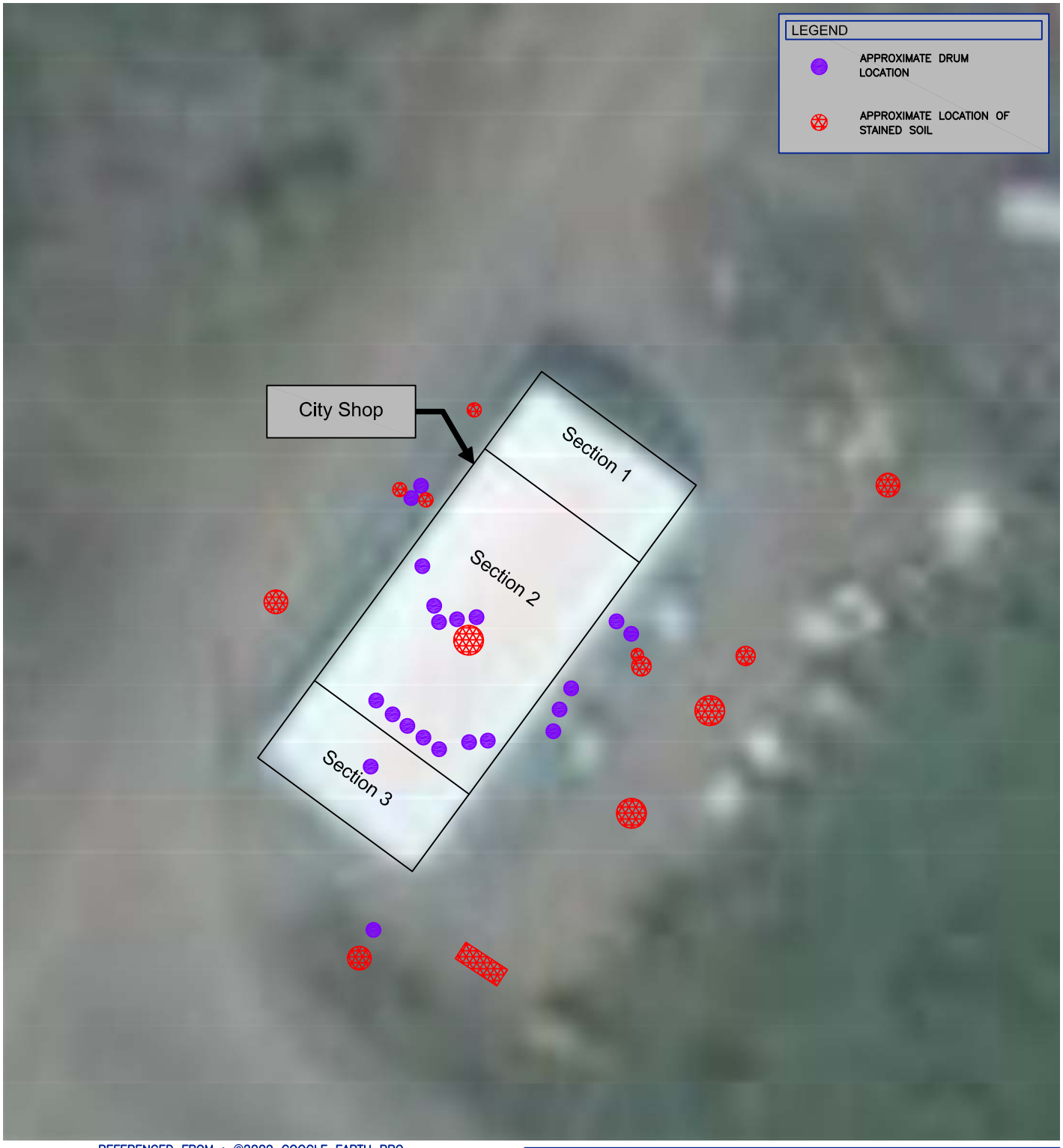
SLR

Alaska Department of Environmental Conservation
Contaminated Sites Program
Division of Spill Prevention and Response
611 University Avenue
Fairbanks, AK 99709-3643

Report: Environmental Management Plan
Big Lake Former Dump Site
Holy Cross, Alaska

Drawing: Site Plan

Date: June 1, 2009	Scale: 1"=550'	Fig. No. 2
File Name: F2 HOLY CROSS	Project No.: 005.0065.09001	



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SLR

Alaska Department of Environmental Conservation
Contaminated Sites Program
Division of Spill Prevention and Response
611 University Avenue
Fairbanks, AK 99709-3643

Report: Environmental Management Plan
Big Lake Former Dump Site
Holy Cross, Alaska

Drawing: City Shop Detail

Date: June 1, 2009	Scale: 1"=30'	Fig. No. 3
File Name: F3 HOLY CROSS	Project No.: 005.0065.09001	

APPENDIX A

2008 DEC BROWNFIELD ASSESSMENT REQUEST FORM

DEC BROWNFIELDS ASSESSMENT REQUEST FORM – 2008

Please check the appropriate box for each question at the top of this page, and then answer questions 1–5 by inserting text in the blank area under each question, using as much space as you need. The deadline for receipt of requests is April 30, 2008.

Eligibility Determination—General Questions:

Is the applicant in any way responsible for the potential contamination at the site, or related to those who may be responsible?

☐ Yes ☒ No

Is the site federally owned?

☐ Yes ☒ No

Has the site or facility received funding for remediation from the Leaking Underground Storage Tank (LUST) Trust Fund?

☐ Yes ☒ No ☐ Unknown

If you answered "yes" to any of the above questions, we recommend that you please call DEC to discuss the specifics of your eligibility determination.

To the best of your knowledge, is the *owner* of the property in question:

☐ Private ☐ City/Public ☐ State ☒ Native Corp ☐ Tribal ☐ Unknown

Known or suspected contaminant(s) (check one):

☐ Hazardous Substances ☐ Petroleum Only ☒ Hazardous Substances and Petroleum

Is this site currently listed on DEC's *contaminated sites* database?

☐ Yes ☒ No ☐ Unknown

If yes, please list the project name, if known:

---

1. Applicant/Owner

a) ***Applicant*** - Provide the name and address of the organization applying for a DBA, the name of the contact person, email, telephone, and fax numbers.

Holy Cross Village Council, Box 89, Holy Cross, Alaska 99602,contact person: Kathy W. Chase, IGAP Coordinator, Box 88, Holy Cross, Alaska 99602 kwchase2003@yahoo.com, (907) 476-7308 fax (907) 476-713

b) ***Project Team*** - Because no one person can be responsible for all aspects of a brownfield project, we request that you form a *project team* to ensure continued action beyond this DBA. Attach a letter from each team member acknowledging their support and willingness to participate. (Team members may include: city or village government representatives, tribal council representatives, environmental managers, elders or other community leaders, and other interested parties.)

Team Members: City of Holy Cross, Deloycheet, Inc.,& Holy Cross Village Council

c) ***Property Owner*** **-** The owner of the property must allow DEC access to the site. If the applicant is different from the owner, include written consent for access from the owner. (*Note: the applicant must be able to secure access for DEC and its contractors to conduct the assessment.*)

Deloycheet, Inc., letter of ownership attached.

2. Site Information

a) ***Historical Site Use*** **-** Describe, to the best of your ability, the previous known uses of the site, when the different activities occurred, and any historic or cultural significance of the property.

Identify when and how the site became or may have become contaminated, with what substance(s), and where the contamination is likely to be found.

A sawmill was once located at this site, sawmill was hauled from Shageluk, Alaska back in the early 1960's. After the sawmill broke down, it was shoved into the lake. The Big Lake site has been a dumping ground for at least 20 years. There are vehicles, motors, etc., at this site. Refuse from the entire village was dumped here. At one time there was a "rock quarry" of sorts here. Gravel was hauled from this area. Prior to the contamination of this site, people caught pike, trapped beaver, swam in the lake, used this for a recreation site. The annual Agriculture Fair that takes place is the site for the canoe race. During the Spring Carnival the ice picking contest is held here.

Contamination: petroleum fuels, oils, vehicles, engines, animal carcasses and hazardous wastes.

The majority of the contamination is in the water, but is also evident on the ground. Distressed plant life around the area.

b) ***Current Site Condition and Use -*** Provide the common name of the site, address, approximate acreage, zoning, and types of buildings. Please attach a site map or aerial photograph showing the site's location in the community, adjacent land use, and areas of known or suspected contamination. Identify approximate property boundaries.

Common name for the site is the "Big Lake". (see enclosed map). Latitude: 62 degrees 11'37.57" N, Longitude: 159 degrees 46'32.81" W Approximate acreage: 4 – 5 acres, no zoning, building located N of lake, Holy Cross City Shop. City Shop has fuels, acids, etc., hazardous substances are located here. Little or no plant life in the surrounding area. Distinctive diesel smell in the shop.

c) ***Prior Environmental Assessment Activities*** - Please describe any prior site assessment or cleanup activities at the site and briefly state what you know about the findings of that work. Attach the summary or conclusion sections of the reports if available. If reports are not available, provide the consultant, client, approximate date of the study, and any other pertinent information.

No clean up activity at this site known.

3. Environmental Concerns

a) ***Reason for Concern*** - What is the reason for concern by the community, and what do you hope to gain by our involvement? Is there specific information that you are seeking? Please discuss community concerns in general, and identify any specific problems if possible.

Concern for the community, Big Lake leeches off to Walker Slough, Walker Slough joins the Yukon River. Contamination is leeching off into the Yukon River. All of the hazardous materials will affect our salmon and all fish species. We are subsistence fishermen and there is a growing concern for the safety of consumption of all fish in the general area. If DEC gets involved, we will have the means of cleaning up the Big Lake, restore it to its original pristine condition before all of the contamination. Some fishing for pike was done prior to the contamination, so, we hope that once the site is cleaned up, we can plant fish there.

b) ***Proposed Project Need*** - Describe to the best of your ability what your project team believes are the needed assessment activities, and what result you would like to see from this project. Indicate

any constraints as to when this work must be completed (e.g., to meet construction timeline, property transaction pending, etc.).

A good start would be to have the lake water tested, conduct some ground sampling, get a good estimate of how many vehicles, motors, pieces of equipment, etc., are in the lake. Results of the above; give us a good estimate of what amount of refuse, etc., has to be removed in order to accomplish the goal of restoration. We have barges backhauling, there would be at least two or three barges in for the season, the window of opportunity for this would be in September 2008.

4. Community Planning and Reuse Goals

a) ***Other Community Plans or Projects*** - It is helpful to know if other state or federal agencies are planning work in your community. List any community *plans* that may exist or are in development, such as: economic development plans, hazard mitigation plans, or erosion studies. Describe any other community *projects* that may be scheduled or pending, such as: water and sewer construction, a new landfill, road or airport construction, a new school or addition, fuel-storage tank farms, new housing, or other facilities.

We are currently waiting on the airport expansion. The fuel-storage tank farm is pending also. No new construction for this season.

b) ***Reuse or Redevelopment Plans*** - Does the community have well defined plans for how they would like to reuse this site if it were not for the real or perceived environmental problems? Is this site affecting the use of adjacent properties, subsistence habitat, or other resources? Do reuse plans include the incorporation of greenspace or sustainable, green building practices? If so, please describe.

The community does not have any plans for this site, until it is cleaned up. Yes, this site is affecting adjacent properties, (the community garden is off to the left of the road coming from the South), the subsistence habitat is being affected, (there is a beaver house on the lower end of the lake, which no one traps), the Big Lake drains into Walker Slough, which in turn joins the Yukon River. If this site were to be cleaned up, re-use of the lake for fishing, swimming, beaver sets, etc., could take place.

5. Public Involvement

a) ***Public Benefit*** - Briefly discuss how your proposed reuse or redevelopment plans for the property will provide a benefit to the public. Why is this important to your community? (Things to consider: creation of jobs, preservation of historically or culturally significant property, preservation of subsistence habitat, reuse or recycling of materials, cost savings to the community, or increased property values.)

The benefit to the public, start using the site for swimming, preservation of subsistence habitat, protect the environment surrounding the area, just the restoration of the Big Lake to its original condition would be a plus.

b) ***Community Support*** - Is the community strongly supportive of this project? Please identify other organizations in your community with whom you are coordinating on this reuse or redevelopment project. (Providing names and phone numbers of contacts is helpful here, and include resolutions or letters of support as applicable.)

The three entities are in full support of this project. Letters of support attached. Contact names; Holy Cross Village Council, Eugene Paul, 476-7124, Deloycheet, Inc., Rudy D. Walker, President, 780-6413, City of Holy Cross, Matthew Burkett, 476-7139

c) ***Community Resources*** - Our assessment often requires local assistance with site visits, lodging, excavation equipment, and transportation. Describe local resources that are available for this project. Does the community have financial or other resources to supplement this DBA or for

other phases of the project, such as equipment, in-kind services, or funding for cleanup or new construction? Can this DBA be used to leverage other funding or services for the project?

Lodging would be provided by the Holy Cross Village Council as an in-kind contribution, some equipment would also be available for use. City of Holy Cross also has some equipment for utilization. All entities are willing to provide resources in this endeavor. Currently we do not have funding to supplement this DBA other than the equipment for in-kind.

The selection of a site for a DBA in no way implies that DEC is accepting liability for any contamination that may exist at the site, nor is DEC responsible for any necessary cleanup of hazardous substances that may be found at the site. Liability for contamination on a property is specifically addressed in Alaska Statute (AS) 46.03.822, which outlines those who are liable for the release of a hazardous substance. The general liability categories include: (1) those with an ownership interest in the property; (2) those in control of the substance at the time of the release; or (3) those who arrange for disposal or transport of the substance.

Submit Completed Forms by April 30, 2008, to:

By email: Sonja.Benson@alaska.gov or
John.Carnahan@alaska.gov
By fax: (907) 451-2155 c/o Sonja Benson or John Carnahan

Or by regular mail:

DEC Brownfield Assessments
c/o Sonja Benson or John Carnahan
Department of Environmental Conservation
610 University Avenue
Fairbanks, Alaska 99709

If you have questions, call Sonja Benson at (907) 451-2156 or John Carnahan at (907) 451-2166.

APPENDIX B

STAKEHOLDER MEETING MINUTES AND COMMUNITY CONTACT LIST

Meeting Summary

Date: March 2, 2009, 10:00 A.M. to 11:00 A.M.

Re: Holy Cross Brownfield Environmental Management Plan (EMP) Planning Meeting

Attendees: Rudy Walker, President, Deloycheet Incorporated
Samuel Demientieff, Deloycheet Incorporated
Jeff Demientieff, Chairman of the Board, Deloycheet Incorporated
Darlene Aloysius, IGAP Assistant Coordinator, Holy Cross Tribal Council
John Carnahan, Brownfield Coordinator, ADEC
Deborah Williams, Project Manager, ADEC
Sonja Benson, ADEC
Mary Goolie, EPA Brownfield Program
Michael Rieser, Program Director, SLR
Carl Benson, Project Manager, SLR
Rose Hewitt, YRITWC Brownfield Program
Leah Anderson, YRITWC Brownfield Program

Meeting Opening:

The planning meeting was opened with brief introductions from each of the meeting attendees. The ownership of the properties was summarized. The City of Holy Cross owns the shop building at the north end of Big Lake. Big Lake and the surrounding land are on tribal land managed by the Deloycheet Corporation. The Holy Cross Village Council was listed as the applicant on the 2008 DEC Brownfields Assessment Request Form while the Deloycheet Corporation was listed as the land owner on the Request Form. Mr. Carnahan said that the applicant name should be changed to that of Deloycheet, Inc.

Mr. Carnahan then spoke briefly about the EPA-funded Brownfield, reuse and development, program and included a brief description of how the Brownfield program benefits the upcoming project. Mr. Carnahan added that the purpose of this work will be to define the project by collecting background information for the Environmental Management Plan (EMP), and that assessment work would not be performed. Environmental problems with respect to the debris in the lake, former sawmill, road, and city shop must be defined. Mr. Carnahan concluded that this could best be achieved by summarizing a history of the environmental issues around the lake, and the intended future use of the property.

Mr. Carnahan then introduced Mr. Rieser from SLR to present a project summary.

SLR Project Summary:

Mr. Rieser started by saying that the intent of the project was to collect and document historical information because the site has had minimal characterization work performed to date. There will be a 1.5-day site visit to assess the Big Lake area and soil conditions. Mr. Rieser said that, based on soil screening, on-site and aerial photos, and interviews with local residents, the environmental problems would be estimated to the degree possible. A summary of practical remedies to these problems will then be presented in the EMP to allow beneficial reuse of the property by the community in Holy Cross. Mr. Rieser said the process would look to people with experience at the City Shop to see what the environmental concerns have been in the past. Regarding the lake itself, Mr. Rieser said it would be inherently difficult to assess, and may recommend future assessment for submerged areas.

The process would then be used to come up with recommendations, or treatment options, for the identified environmental problems. Mr. Rieser said that terrestrial contamination is typically managed by excavation followed by treatment or disposal. The soil management options include land farming, encapsulation within a new roadbed, biocell construction, or use as landfill cover. The option chosen will be driven somewhat by available labor and equipment. Mr. Rieser said the EMP would develop the understanding of options available to deal with debris materials as well. Debris management could include disposal at a local landfill or backhaul for recycling or disposal based on the nature of the materials in question.

Mr. Rieser said the project would consider exposure pathways for existing contamination. The main starting resource for the project will be interviews with local residents to gain site knowledge and history. Money is currently lacking for the cleanup effort, but the EMP will promote the reuse and development of the property.

A discussion of the project timeline began when a resident of Holy Cross asked about schedule, and Mr. Carnahan said that the completed EMP will be due on June 30, 2009. Mr. Rieser asked when the lake would be ice-free and Mr. Sam Demientieff said the lake was clear of ice anywhere from 10-days to 2-weeks after the breakup of river ice. Mr. Rieser said that the site visit would drive most of the results and findings in the EMP.

Mr. Sam Demientieff said that another participant could be Doyon Limited, Inc. as the subsurface owner of the estate. In the 1980s, the airport project put in the quarry north of Big Lake and that significantly narrowed the lake. Mr. Sam Demientieff suggested contacting the land department at Doyon (land@doyon.com or by phone at (907) 459-2030). Mr. Carnahan said that the community of Holy Cross should contact Doyon directly regarding potential financial resources for redevelopment, and that, although ADEC can provide support, it doesn't direct funding between organizations such as Doyon and Deloycheet.

Mr. Rieser then asked whether there was any large project work scheduled for 2009 in the community. Mr. Sam Demientieff said that the Alaska Village Electric Cooperative (AVEC) would have more information on the tank relocation project through the Denali Commission. Mr. Sam Demientieff added that the contact for AVEC was Marie Becker, in Anchorage. Mr. Rieser

then asked what equipment was located within the village of Holy Cross in 2009. Mr. Jeff Demientieff said that the City has dump trucks, a backhoe, a John Deere grader, and a 650 Caterpillar. Ms. Aloysius added that the tribe has a bobcat, a backhoe/loader and a flatbed truck, and that they were working to get more. Mr. Jeff Demientieff added that there was a 966 loader with 12-foot extensions as well.

Mr. Rieser said that more information would be needed regarding the sawmill and other materials in the lake. By means of clarification, Mr. Rieser asked what the specific concerns were regarding water quality, or what people were noticing in the lake water. Mr. Sam Demientieff said that the lake edge was the solid waste disposal area when he was growing up. Eventually, the area was covered over with fill and the shop was built over the dump site. Ms. Aloysius asked if the sawmill was pushed into the lake. Mr. Sam Demientieff said that old safes and other metal debris were thrown into the lake in the past. One safe from the old store in town allegedly contained strychnine for wolf control. The lake was narrowed in the 1980s to build the airport. When fill was added, it was added to the west bank. Mr. Rieser said that historical photographs would show these changes over time. Mr. Carnahan asked if there were people in the community who may have historical photographs of the area. Mr. Sam Demientieff said that a private land consultant, Mr. Larry Lau, would likely have access to a series of photographs. Mr. Sam Demientieff provided Mr. Lau's telephone number (909) 345-3143. Mr. Sam Demientieff added that the community had concerns about Big Lake because it used to be the location for the community swimming and picnic area.

Mr. Rieser said that the meeting attendees would need to provide contact information to ADEC. Mr. Carnahan and Ms. Williams requested that everyone provide their information following the call.

Mr. Jeff Demientieff asked whether there would only be one site visit, and Mr. Carnahan said yes, there would only be one site visit to set up the plan due to budget limitations. Mr. Carnahan added that since it was an EPA-funded project it had to be completed by the end of June. Mr. Jeff Demientieff said that June was very busy so the site visit should be conducted before June. Mr. Rieser said it would be scheduled before June 1, 2009.

Ms. Aloysius said that there were currently 20 people in the community with 40-hour training and only need the 8-hour refresher. Mr. Rieser said it was good to have so many people trained and asked whether impacts extended to fish or other aquatic life in the lake. Mr. Jeff Demientieff said that there was growth on the surface on the north end of the lake, and said the lake has pike and beaver. Mr. Jeff Demientieff added that the city should be involved since it's their shop on the north end of the lake. Mr. Carnahan asked if the City was aware of the project, Mr. Jeff Demientieff said he wasn't sure. Ms. Williams asked for a City contact. Mr. Jeff Demientieff provided the phone and mayor contact: Mayor Matthew Burkett (907) 476-7139. Mr. Carnahan said that a follow-up with the City would be required to ensure their involvement. Mr. Sam Demientieff said that the Deloycheet board adopted a motion in support of this project. Mr. Carnahan said that the group needed to ensure that this was a community project, and asked if there were any further questions.

Mr. Jeff Demientieff said the Deloycheet board would be meeting in Holy Cross in May. Mr. Sam Demientieff added that the Deloycheet board would be meeting on May 14 and 15 and invited SLR to schedule the site visit at that time to coincide with everyone being in the village.

Meeting Closing:

Mr. Carnahan concluded the meeting with requests for SLR to prepare the meeting notes and asked attendees to provide a list of the meeting attendees in McGrath to Ms. Williams via e-mail. Mr. Carnahan also requested that all e-mail include cc to the SLR project staff so no information is lost.

2009 Holy Cross Environment Management Plan Contact List

Name	Affiliation	Title	e-mail	Phone
Matthew Burkett	City of Holy Cross	Mayor	matthew_burkett@ykhc.org	(907) 476-7139
Rudy Walker	Deloycheet, Incorporated	President	rdwalker@acsalaska.net	(907) 780-6413
Samuel Demientieff	Deloycheet, Incorporated		Samuel@mosquitonet.com	
Jeff Demientieff	Deloycheet, Incorporated	Chairman of the Board	jeff_d_sr@hotmail.com	(907) 476-7129
Darlene Aloysius	Holy Cross Tribal Council	IGAP Assistant Coordinator	draloysius@yahoo.com	(907) 476-7308
Mary Goolie	USEPA Region 10	Brownfield Project Officer	goolie.mary@epa.gov	(907) 271-3414
John Carnahan	ADEC	Brownfield Coordinator	john.carnahan@alaska.gov	(907) 451-2166
Deborah Williams	ADEC	Brownfield Project Manager	deborah.williams@alaska.gov	(907) 451-5174
Sonja Benson	ADEC	Brownfield Project Manager	sonja.benson@alaska.gov	(907) 451-2156
Rose Hewitt	YRITWC	Environmental Technician	rhewitt@yritwc.org	(907) 451-2552
Leah Anderson	YRITWC	Environmental Technician	landerson@yritwc.org	(907) 451-2552
Mike Rieser	SLR	Program Manager	mrieser@slrcorp.com	(907) 222-1112
Carl Benson	SLR	Project Manager	cbenson@slrcorp.com	(907) 455-9005

APPENDIX C

COMMUNITY WELL LOGS

12000

HOLY CROSS WATER WELL W.O. 8R31 P.H.S.

Bethel Area Alaska

5/14/68

This well was drilled to 77' has 78' of 4" casing, 3'11" above ground 7' of 6" casing, one Johnson screen 5'9" long, .030 slot has 2'7" screen exposed. Water is traveling in a crack in sand rock. Static level 41'6"; pumped 24 hr at 6 gal a min, good clear water, but will only produce 6 gal a minute.

Set a screen at 66' to 70', there was not enough water so pulled out the screen and went on down to 77'.

Cap is welded on top of 4" casing and a ring is welded on top of the 6" to the 4" to make a tight seal.

Brown Silt

33'

Soft brown silt

41'6"

46'

Soft black muck and clay

66'

Sand & gravel, wood some water

70' Green clay, sand and gravel
Sand rock and brown clay

74' Green clay and sand rock
Crack in sand rockwater

76' Green clay and sand rock - no water

ROY E. LONGTRAM, JR.

SITE ID

LOCAL NO. SB 24-57-5

25,26,27,28, 29

12000

From telcon between Owen Rye and John C. Helfrich, May 25, 1966, 2 p.m.

Soil samples in Bethel Quarters Project

HOLE NO. 1 - 30 ft. south of Building 302 and 50 Ft. inside of the outer end of the building

0 - 3', surface frost, sandy soils
3'- 12', , frost, soft perma frost, sandy soil
at 12', running water, hole sloughs
12' - 30', frozen, soft perma frost, sandy soil with some clay

HOLE NO. 2 - 90' south of outside end of Building 302

0' - 3', frozen soil, seasonal frost

3' - 14', frozen sandy, perma frost

14' - 32', frozen, sandy clay

HOLE NO. 3 - 50' north of building 317 in line with west side

0' - 2', frozen muck

2' - 3½', ice ~~land~~ limy

3½' - 32', frozen hard, sandy clay

HOLE NO. 4: 90' north of Hole No. 3, in line with east side of Building 317

0 - 2½', frozen muck

2½'- 32', frozen, sandy clay, perma frost

HOLE NO. 5: 120' south of Building 302 and in line with Hole No. 1

0 - 2', frozen hard

2 - 12' frozen but not hard

From 12 - 14', soft ~~sod~~, lots of water sloughed badly

14 - 27', frozen but not hard

SB 24-57-5

62° 12' N 00 } ACC Y
159° 46' W 00 } CODE 5

UNITED STATES DEPARTMENT OF THE INTERIOR
KP GEOLOGICAL SURVEY

2GW 12000

WATER ANALYSIS

AK 50,019

Location Holy Cross well #1 , village well County
Source Depth (ft) 77 Diam (in.)
Cased to (ft) Date drilled 5-15-68 Point of coll.
Owner
Treatment Use public supply
WBF creeks in sandrock WL Yield
Temp (°F) 38 Appear. when coll. clear
Collected May 15, 1968 By Roy Longbotham
Remarks No separate iron sample

	ppm mg/l	epm		ppm mg/l	epm
Silica (SiO_2)	27		Bicarbonate (HCO_3)	97	1.59
Aluminum (Al)	--		Carbonate (CO_3)	0	.00
Iron (Fe)					
			Sulfate (SO_4)	2.1	.04
			Chloride (Cl)	1.6	.05
			Fluoride (F)	.2	.01
Calcium (Ca)	21	1.05			
Magnesium (Mg)	5.6	.46	Nitrate (NO_3)	1.0	.02
Sodium (Na)	4.7	.20			
Potassium (K)	.5	.01			
Total		1.72	Total		1.71

	ppm mg/l		
		Specific conductance (micromhos at 25° C)	162
Dissolved solids: Calculated	112	pH	6.7
Residue on evaporation at 180° C		Color	0
Hardness as $CaCO_3$	76		
Noncarbonate	0		

Lab. No. Col 11342-68-645 Field No. Project Bureau of Indian Affairs

SB24-57-5

C/RH

23724

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH 1972

Public Supply well

LOCATION Holy Cross DATE STARTED Jan 7

DATE COMPLETED Jan 26 DRILLER Greg Bochner

TOTAL DEPTH OF WELL 130± FT. CASING INSTALLED 126 DIAMETER 6 in

GROUT None SCREEN SIZE 30 slot MFG Johnson LENGTH 5 Ft

STATIC WATER LEVEL 39 HRS. PUMPED 18 @ 72 GPM. DRAWDOWN 15 FT.

Well profile:

- 4 — Frozen Silt & Sand
- 75 — Sand & Clay
- 87 — Soft Rock
- 122 — Broken Rock
- 126 — #30 Johnson Screen
- 130± — Bottom of well in Rock

DATE	DEPTH FROM - TO	FORMATION	DRILLER
1/10	0-10	Silt & Sand	
1/11	-20	" "	
	No Drilling		
1/19	-75	Sand & Clay	
1/20	87	Soft Rock	
1/21	95	" "	
1/22	105	" "	
1/24	112	Broken Rock	
1/25	122	" "	
1/26	128	" "	
1/27	130±	" "	

Post-it® Fax Note 7671 — Date | # of pages ▶ 1 — To Roy Ireland/Mary Maurer — From Lynn Johnston — Co./Dept. DNR — Co. DEC — Phone # 269-8630/8640 — Phone # 269-7624 — Fax # 562-1384 — Fax # 269-7655 — FYI

SPECIAL NOTES:

1/3 hp Jacuzzi Sub. pump 354A-5 1/4 Motte Serl. SW1 set at 73± pumps 6 gpm on 1" pipe 1/8" weep hole @ 20 Ft. Put in new 1/2 HP

PAGE 11 of 14

LOCAL NO. SB24-57-5

SITE ID

APPENDIX D

2008 COMMUNITY WELL NON-COLOFORM ANALYTICAL DATA

Water System

Water System No.:	AK2280074	**Federal Type**	C
Water System Name:	HOLY CROSS WATER SYSTEM	**State Type:**	C
Principal County Served:	YUKON-KOYUKUK	**Primary Source:**	GW
Status:	A	**Activity Date:**	1978-03-01 00:00:00.0

Non-Coliform Sample Results

Lab Sample No. :	vo*A0808056-01A	Collection Date	08-05-2008

Analyte Code	Analyte Name	Method Code	Less than Indicator	Level Type	Reporting Level	Concentration Level	Monitoring Period Begin Date	Monitoring Period End Date	MCL
2378	1,2,4-TRICHLOROBENZENE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2010	0.070000000 MG/L
2380	CIS-1,2-DICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.070000000 MG/L
2955	XYLENES, TOTAL	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2010	10.00000000 MG/L
2964	DICHLOROMETHANE	524.2	Y	MRL	2.000000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2968	O-DICHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.600000000 MG/L
2969	P-DICHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.075000000 MG/L
2976	VINYL CHLORIDE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.002000000 MG/L
2977	1,1-DICHLOROETHYLENE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2010	0.007000000 MG/L
2979	TRANS-1,2-DICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.100000000 MG/L
2980	1,2-DICHLOROETHANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2981	1,1,1-TRICHLOROETHANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.200000000 MG/L
2982	CARBON TETRACHLORIDE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2983	1,2-DICHLOROPROPANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2984	TRICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2985	1,1,2-TRICHLOROETHANE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2987	TETRACHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.005000000 MG/L
2989	CHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.100000000 MG/L
2990	BENZENE	524.2	Y	MRL	0.500000000		01-01-2008	12-31-2010	0.005000000

					UG/L				MG/L
2991	TOLUENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	1.000000000 MG/L
2992	ETHYLBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.700000000 MG/L
2996	STYRENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2010	0.100000000 MG/L

Total Number of Records Fetched = 21

APPENDIX E

SITE VISIT NOTES

Holy Cross Site Visit – C. Bentz
5/13/09 0730 depart office for Diamond Airport Parking
0745 at airport parking, waiting for shuttle
0800 at airport - check in for flight w/ Frontier flying services
• Friday flight has availability if needed (8 open seats)
0925 depart Anchorage
1055 arrive in Aniak
1235 depart for Holy Cross
1305 arrive in Holy Cross
get ride to Tribal Council Bldg.
1330 driving tour w/ Evan Newman
photos 38-40 gravel source believed to be owned by Deloycheet (by Evan) located past dump
did video, from gravel source to dump at gravel source and as well as at dump
photos 41-52 photos @ the dump
Continued on page 6.

C. Bentz 5/13/09

5/13/09

Interiew w/ Evan Newman
described old lake outline - shown on map; depth = unknown
copper pipe, safe
lake - bicycles, tires, car parts, soda cans, fire hydrant housing
~20 yrs. ago lake was used for swimming; was clean
fish = pike, white fish
used for canoe race, ice picking contest, ice skating
some stuff has been cleaned out of the lake; safe was fished out of lake
like to see lake cleaned up for swimming, picnic area
15-20 years ago there was a flood (from town) transported to lake
City Shop - previously ~~revie~~ used CB 5/13/09
for storage; equipment maintenance; battery acid, glycol, engine oil, hydraulic oil, brake fluid, batteries, no fuel storage
has lived in Holy Cross ~50 yrs. →

C. Bentz 5/13/09

Interview w/ Evan continued
Tribal wants to use 1/2 shop (closest to lake) for heated vehicle storage & fire fighting
no known asbestos
transformer installed last year
utilities - above ground - about 10 years ago all power moved above ground
water house - well + treatment > most people use this
also supply tank + washeteria
State back hauls used vehicles
plan to get a burn box for dump on 1st barge
lake also used to have sawmill w/ logs floating on lake - rock crusher (owned by Deloycheet) was used for a long time
City + tribal council have good working relationship

Interview Complete

Interview w/ Sam Demientieff (casual conversation)
remembered swimming in Big Lake as a kid 1949 CB 5/13/09
lived in Holy Cross 1939 - ~~1946~~;
on Deloycheet board
Big Lake was clear, big, + had a spring that people would haul

C. Bentz 5/13/09

Interview w/ Sam continued
water from → town
summered here after 1949

Visit City Shop
- conduct video recon. of outside of shop
  - note several areas of staining 1 piece of equipment w/ noticeable leakage
- photos of outside + inside of shop - shop is poorly lit - shop divided into 3 sections - middle area has staining + majority of chemicals (drums, buckets, etc.) all floor is dirt

photo descriptions on page 8
photos 53 - 145
of city shop property

C. Bentz 5/13/09

Photos

53 - City shop from street view
Holy Cross to left, big Lake to right
54 + 55 - same as 53
56 - drums in front of city shop
57 - staining associated w/ drums in front of city shop
58 - staining in front of last large door from town side
59 - debris on lake side of shop
60 - view of area inside fence on back side of shop
61 + 62 - equipment shots
63 - area of stained soil
64 - debris/parts
65 + 66 - soil staining beneath equipment
67 - soil staining behind equipment
68 - standing water behind city shop
69 - equipment (loader/trencher)
70 + 71 - soil staining and leaking fluid from equipment pictured in photo 69
72 - debris/parts
73 - soil staining

C. Bentz 5/13/09

74 - equipment - staining in photo 73 is associated with this
75 - bucket
76 - dump truck
77 - stained soil next to bucket
78 - out of commission dump truck
79 - debris (tires, wood, metal)
80 - equipment shots
81 - broken hydraulic fluid bucket and soil staining
82 - 85 - debris
86 - equipment shot
87 - close up of tank in photo 85 did not see any associated staining
88 - drum
89 - back of shop area from city side
90 - debris (mostly metal)
91 - debris/material
92 - drums behind shop
93 - staining associated w/ drums in photo 92
94 - equipment shot
95 - another dump truck
96 - piping

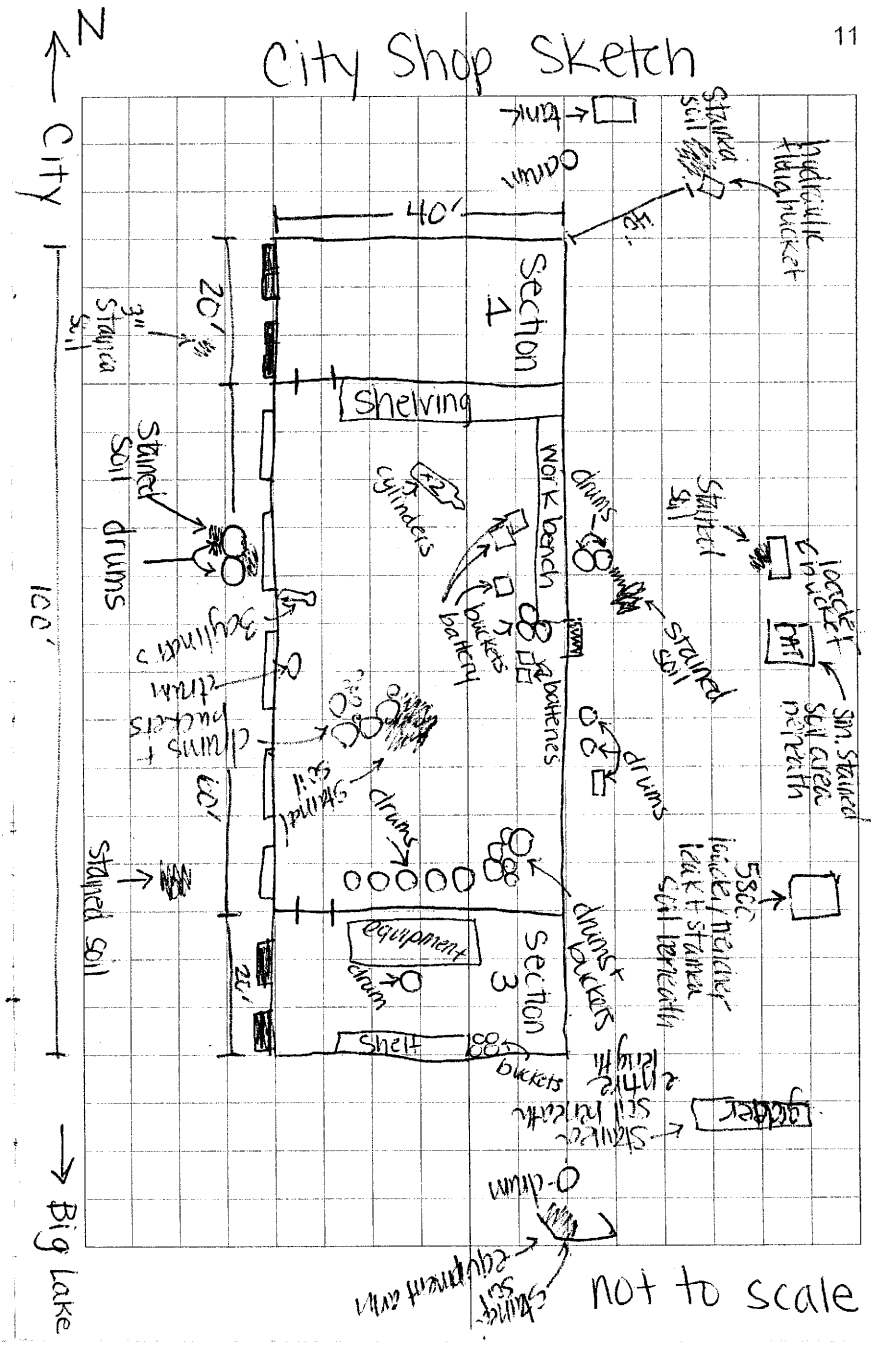
C. Bentz 5/13/09

97 - more drums behind shop
98 - " " " "
99 - debris/tires behind shop
100 - " " " "
101 - debris behind shop
102 - inside shop - section 1 (closest to city)
103 - " " " "
104 - inside shop main room
photos 104 - ~~103~~ 138 all in this room
(CB 5/13/09)

139 - 145 inside shop section 3

C. Bently 5/13/09

City Shop Sketch



700p meeting w/ mayor, city clerks, tribal leader + counsil members
participants = Matthew Burkett (mayor), Carolyn Burkett, Connie Edwards, Christine Edwards, Evan Newman, Eugene Paul (tribal leader)
Information gathered =
* City Shop - at current location for 25 years - previous to that it was the old dump - when land use changed supposidly stuff from old dump was plowed to the new dump - no inventory of chemicals/ products used at the shop - used oil stored in drums - a small quantity was burned at dump ~3 years ago - future plans for shop are to clean it out (section 1 already done) - hoping to get this done before fall - section 1 will be used for community members to repair/work-on vehicles - section 2 (main center portion) will be used by the city for their equipment - section 3 will be

C. Beals 5/13/09

700pm meeting cont'd
used to store a new fire/foam truck due in on the 1st barge
* Big Lake - lake used to be longer and wider until part of it was filled, estimated to be ~1/2 its original size - stated that the following things have been observed or pulled out of the lake: bikes, dead animals, drums, trash, small batteries, drowning victim - observe algae during summer on wooded side of lake - lake has small pike + beavers living in it - no idea how deep the lake is - future plans = would like to see the lake cleaned out so it can be used as a recreational site for swimming, picniking, etc. - currently only used for canoe races - no known drainage
* Other info - potential projects include planned tank farm (not yet funded - through Denali Commission), DOT airport improvement (new runway)

C. Beals 5/13/09

700pm Meeting cont.'d
in 2011, and potential Weatherization for housing by Tanana Chiefs Conference in 2012 (Contact = Howard Daning); Operational equipment = 2 dump trucks, loader, CAT, grader + tiller; 2 qualified operators who may or may not have 40 hour training; estimate 30-60 people have 40 hour; barge service through Crowley, Inland Marine + Ruby Marine; currently land owned by Deloycheet - want to get all land transfered to city; plan to clean up the dump - have a burn box expected on the 1st barge - may burn plastic bags; no known lead paint, asbestos, PCBs, or pesticides/herbisides; no known sampling

* City Shop - would like to see old, non-working equipment shipped to Anchorage for trade in or recycling
* Other Info - had some contaminated soil that was put in a lined, dike area near the current dump.

C. Beatty 5/13/09

800pm meeting w/ Deloycheet Inc.
participants = Robert Walker, Rudy Walker (via phone), Sam Demientieff, and Jeff Demientieff
information gathered =

* City Shop - built in 1980s; previously used as a solid waste disposal site; before that a sawmill; and prior to that a recreational site w/ footpath that had lots of vegetation and was used for picnicking, fishing, swimming, and ice skating. The site was covered with gravel + made into a shop. No known spills, ASTs, or USTs; lead paint may have been used in Holy Cross - not sure about shop, no known asbestos, PCBs; military sprayed the area w/ herbicides in 1950 - military presence in 1940s + 1950s. Agree with City/Tribe plan to use site as a shop in the future. Conserned that trash may still be underneath + build up methane gas - interested in assessing this.

C. Beatty 5/13/09

800pm meeting cont.'d

* Big Lake – lake was wider + longer (maybe 1/2 length now – lake had extended further north where shop is now) – lake used for swimming, ice skating, picnicking, + fishing historically. Lake depth = unknown; indicated that it is shallower in some areas with terraces that lead to deeper areas. Disposal of trash was done in late 60s to late 70s and included batteries, trucks, safe, general household trash; there was a well house near Big Lake where people got water – by foot in summer + dog team in winter. At one point a trench was dug to try and drain the lake – trench still exists, but there is no known source of discharge. During fire fighting operations Robert indicated he pumped the lake for 5 days with less than 1 foot of drawdown and within 1 day was back to its original level – lake historically had black fish + pike

C. Bailey 5/13/09

850pm meeting cont.'d

would like to see lake restored to its original condition as a recreational site – remove anything dumped into the lake – would like to see park-like setting for picnicking + swimming – suggested water testing and sediment sampling. There was an iron cross in the lake where someone drowned – the body may or may not have been recovered

* Other information=
no known previous samplings; one main well in town ~125' deep; work in Holy Cross may include 1) airport project – it is currently in the review process and 2) have application in to the Denali Commission; 10-12 people recently underwent 40 hour training. Delo sheet indicated they could make an in-kind donation (Rudy Walker) + will do what they can to help support

C. Bailey 5/13/09

the city/village with this - in kind donation could include assistance with permitting + securing gravel, which is owned by Doyon Lmt.; indicated that there was no space for land spreading / soil stockpile as most of the land area available is within the flood plain; suggested possible sampling of vegetation / fish / beavers - everyone is afraid to trap + eat beavers in the lake.

C. Burby 5/13/09

May 14, 2009

0800 review interview notes

0830 at city shop

Complete audio commentary on inside of shop; update sketch

Shop is 100' x 400'

N. of shop property is storage yard

E. of shop is sewage lagoon

S. of shop is Big Lake

W. of shop is road, debris, then hillside

CB

Do video and photographs for Big Lake observed general trash on edge of Lake (Soda bottles); tabletted bucket at N. end; 2 beaver dens more towards south end; ducks; 3 barrels (s. end) — one on near bank, one on far bank, and one in lake. Photo descriptions on pg. 21

C. Burby 5/14/09

Shop Inventory –
Main Area

1 – cylinder dissolved acetylene
1 – cylinder compressed oxygen
2 – jugs muriatic acid
5 – cans paint/stain
1 – bucket primer
1 – jerry can gas
5 – Strongbox batteries
3 – buckets tractor hydraulic fluid
2 – jugs antifreeze/coolant
2 – buckets motor oil
2 – drums Delo® 400 heavy duty motor oil
1 – bucket tractor hydraulic fluid
1 – drum Transguard SAE 10W transmission fluid
1 – drum special low pour hydraulic oil
1 – drum AW hydraulic oil
1 – drum transguard ATF dexron-III/ mercon
1 – drum h duty af coolant
1 – drum Citgard® 500E engine oil
4 – drums used oil + buckets
3 – cylinders nitrogen

C. Beuty 5/14/09

Advanced hand auger boring at several stained locations – all outside staining appears to be surficial. Inside near used motor oil drums, could not advance past rocks @ 6" – soil @ 6" appeared to still be impacted

CB

Big Lake Photos –
149 – S. end Big Lake
150 – barrel in Lake – S. end
151 – S. portion Big Lake looking from road
152 " " " "
153 – barrel on far bank near South end of Big Lake
154 – looking towards N. end of Big Lake
155 – barrel on near bank (S. end)
156 – Beaver den # 1
157 – floating bottle
158 – berries @ edge of lake
159 – Beaver den # 2
160 – trash @ lake edge
161 – looking N. – Shop @ far end

C. Beuty 5/14/09

162 - looking south
163 - lake
164 - trash near shore
165 - " " "
166 - bucket at N. end of Lake
167 - table (?) at N. end of lake
168 - Big Lake looking South
from very north end
169 - more debris @ N. end of lake

1145 arrive @ airport - flight came
2 hrs early
photos 170-172 of Holy Cross
from the air
450p depart airstrip + return to ANC

C. Bluth 8/15/09

APPENDIX F

SITE VISIT PHOTOGRAPH LOG

PHOTOGRAPHIC LOG

Photograph 1:
Big Lake; looking south from the northern shore.

Photograph 2:
Big Lake; from close the south end, looking North. The City Shop (see arrow) can be seen in the distance.

Photograph 3:
Table or box floating just under ice surface in the northern portion of Big Lake.

Photograph 4:
Upside down bucket near the north shore of Big Lake. Red bucket is similar to buckets of Hydraulic Oil observed in the City Shop.

Photograph 5:
Trash located along the western shore of Big Lake. Trash including plastic bottles, packaging and other debris was noted along the western shore of Big Lake.

Photograph 6:
Beaver dam on the eastern shore of Big Lake. This was one of two beaver dams observed.

Photograph 7:
Abandoned 55-gallon barrel in south end of Big Lake. Two other 55-gallon barrels were observed at the south end of Big Lake, one on the east shore and one on the west shore.

Photograph 8:
Northern portion of City Shop. Two barrels were located on a pallet in front of the shop; these are also shown in Photograph 7.

Photograph 9:
Close up of 55-gallon barrels in front of City Shop. The black barrel is buldging and stained soil can be seen in front of the pallet (see arrow).

Photograph 10:
View of the south end of the shop and part of the outside area adjacent and behind the shop used for equipment storage.

Photograph 11:
Example of stained soil located underneath equipment. This particular piece of equipment had an active leak and appeared to be dripping hydraulic fluid.

Photograph 12:
View of some of the debris located within the fenced property the shop is located on. Old steel tank, bathtub, and metal and wood debris visible.

Photograph 13:
Area directly behind the shop; looking from north to south. Tires, barrels, stained soil (see arrow), and miscellaneous debris can be observed.

Photograph 14:
Close up of stained soil observed directly behind shop.

Photograph 15:
Inside Section 1 of the City Shop (northern most portion). This section had been cleaned out by the City prior to the site visit.

Photograph 16:
Section 2 of the City Shop (center portion); taken from the doorway from Section 1.

Photograph 17:
55-gallon barrels and buckets of used oil staged in Section 2 of the shop.

Photograph 18:
Area of stained soil associated with used oil barrels inside Section 2 of the City Shop.

Photograph 19:
Lead-acid batteries observed in the City Shop.

Photograph 20:
Fluid storage and transfer area inside the central portion of the City Shop.

Photograph 21:
Section 3 in the City Shop. This section is the planned location for the new fire foam trailer. The dirt floor in this section of the shop was very wet.

Photograph 21:
Gravel source located south of the City's landfill.

Photograph 23:
City of Holy Cross landfill.

APPENDIX G

SLR'S CONCEPTUAL SITE MODEL, SCOPING FORM, AND DIAGRAM

This Conceptual Site Model (CSM) was developed to qualitatively assess the risk to potential human and ecological receptors from potential contaminants at the Site. This CSM is based solely on interviews; observations made during the site visit; and ground water results from the community well (located approximately 0.25 miles from the Site). No analytical data has been collected at the Site to date.

This CSM was prepared in accordance with the DEC *Draft Guidance on Developing Conceptual Site Models* (DEC, 2005) using the DEC Draft Human Health Conceptual Site Model Scoping Form. The DEC Draft Human Health Conceptual Site Model Diagram was used to summarize the results of the checklist. All cleanup levels referenced in this CSM are with respect to DEC Method Two cleanup levels.

1.1 Impacted Media

Impacted media at the Site is the environmental substance to which a contaminant is directly released (DEC, 2005). All media are discussed in the subsequent sections with respect to whether the media is impacted or not.

1.1.1 Surface Soil

Surface soil is defined as the interval from 0 foot to 2 feet below ground surface (bgs) (DEC, 2005). A release or discharge associated with the historic activities would directly affect surface soil. Therefore, for this CSM, surface soil is considered an impacted media.

Surface soil was observed both inside and outside the City Shop

1.1.2 Subsurface Soil

Subsurface soil is defined as the interval from 2 feet to 15 feet bgs (DEC, 2005); soil below 15 feet bgs is not considered in this CSM because it is below the depth interval for direct contact by human or ecological receptors. The presence of subsurface soil contamination at this time is unknown. The majority of the stained soil observed appeared to be surficial; however, without further investigation, the impact (if any) to subsurface soil is unknown. At this time, subsurface soil is not considered an impacted media for this CSM as contaminants would directly impact surface rather than subsurface soil.

1.1.3 Ground Water

The community well, located approximately 0.25 miles from the Site, was drilled to a depth of 130 feet bgs. Routine sampling of the community water well is conducted. No major violations have been issued for volatile organic compounds (VOCs) and the most recent monitoring results from August 2008 indicated that all VOC concentrations were less than the method reporting limits (DEC, 2009).

The depth to ground water at the site is unknown. It is not anticipated that ground water would be used from the Site since the community has a well in town, which supplies water for the majority of the population.

No known ground water samples have been collected from the Site. For the purposes of this CSM, ground water is not considered an impacted media.

1.1.4 Surface Water

Previous activity at the Site could have directly affected surface water and thus, for this CSM, surface water is considered an impacted media. In addition, the Site is subject to flooding, increasing the risk of overland migration of contaminants from surface soil.

No known surface water samples have been collected from the Site.

1.1.5 Sediment

A release at the Site would not directly affect sediments associated with Big Lake. Therefore, for this CSM, sediment is not considered an impacted media.

No known sediment samples have been collected from the Site.

1.2 Transport Mechanisms and Exposure Media

Transport mechanisms are the pathways through which contaminants may move from impacted media to other exposure media. Exposure media are the media to which contaminants are transported, which may result in exposure of human or ecological receptors to the contaminants. Six transport mechanisms were identified at the Site including migration or leaching to subsurface, migration or leaching to ground water, volatilization, runoff or erosion, sedimentation, and uptake by plants and animals. Based on the impacted media and transport mechanisms, six exposure media (soil, air, ground water, surface water, sediment, and biota) are present.

Possible transport mechanisms and exposure media are depicted on the DEC Draft Human Health CSM Diagram included at the end of this CSM.

1.3 Exposure Pathways

Each potential exposure pathway was evaluated using the DEC Draft Human Health CSM Scoping Form. Based on this evaluation, eight potentially complete exposure pathways were identified. These pathways include incidental soil ingestion, dermal absorption of contaminants from soil, ingestion of ground water, inhalation of outdoor air, inhalation of indoor air, ingestion of surface water, direct contact with sediment, and ingestion of wild foods. The determination of complete or incomplete exposure pathways is explained in the following sections.

1.3.1 Complete or Potentially Complete Exposure Pathways

The direct contact exposure pathway via incidental soil ingestion is considered complete because soil contamination exists between 0 foot and 15 feet bgs and the Site will be used by human receptors.

The dermal absorption of contaminants from soil exposure pathway is potentially complete because polynuclear aromatic hydrocarbons (PAHs), which can permeate the skin, may be present in the soil between 0 foot and 15 feet bgs. Without analytical data, this pathway cannot be ruled out nor a determination made whether the pathway is significant or not.

The ingestion of ground water exposure pathway is considered potentially complete because the depth of soil contamination and the depth to ground water are unknown at the Site and contaminants could potentially migrate to ground water. However, it is not anticipated that ground water from the Site, if encountered, would be used since the community has a well that supplies the majority of the population with water.

The inhalation of outdoor air exposure pathway and the inhalation of indoor air pathway are considered complete because of the likely presence of volatile contaminants in soil between 0 foot and 15 feet bgs and the future use of the Site by human receptors.

The ingestion of surface water exposure pathway is considered potentially complete because of the potential for contaminants to be present in surface water and the future use of the lake for recreation and/or subsistence activities.

The direct contact with sediments exposure pathway is potentially complete because of the intended future use of Big Lake for recreational activities such as swimming and wading, which could disrupt sediments. It is unknown whether sediments have been impacted by previous Site activities.

The ingestion of wild foods exposure pathway is considered potentially complete because of indicated contamination present in the top 6 feet of soil where they are available for uptake, the potential for future subsistence activities, and the uncertainty whether contaminants with the potential to bioaccumulate are present at the Site.

1.3.2 Incomplete Exposure Pathways

The remaining exposure pathways were determined to be incomplete based on site data, features, or other pertinent information in accordance with the DEC Draft Human Health CSM Scoping Form. These incomplete pathways of note are discussed briefly here.

None of the additional exposure pathways are considered completed based on site data, features, or other pertinent information as described in the preceding sections.

1.4 Current and Future Receptors

The City Shop portion of the Site is currently used for storage and maintenance of City vehicles. Big Lake is currently used for limited recreational activities such as canoe races, ice picking contests, and reportedly people walk by the lake for pleasure. Future work at the Site may or may not require construction workers. Based on current development plans, the following human receptors are considered to be potentially exposed to site contaminants:

- Commercial or industrial workers (current and future);

- Construction workers (future);
- Site visitors, trespassers, or recreational users (current and future); and,
- Subsistence harvesters and consumers (current and future).

Based on interviews, the Site is not being used for hunting or gathering; however, since those activities cannot be ruled out, the subsistence harvester and consumer area are considered both current and future receptors.

Human Health Conceptual Site Model
Scoping Form

Site Name: Big Lake Former Dump Site, Holy Cross, AK

File Number: N/A

Completed by: SLR International Corp

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, a CSM graphic and text must be submitted with the site characterization work plan.

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: Trash, Miscellaneous Debris

Release Mechanisms *(check potential release mechanisms at the site)*

- ☑ Spills
- ☑ Leaks
- ☑ Direct discharge
- ☐ Burning
- ☑ Other: Dumping

Impacted Media *(check potentially-impacted media at the site)*

- ☑ Surface soil (0-2 feet bgs*)
- ☐ Subsurface Soil (>2 feet bgs)
- ☐ Air
- ☐ Groundwater
- ☑ Surface water
- ☐ 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

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

If both boxes are checked, label this pathway complete: Complete

2 Dermal Absorption of Contaminants from Soil

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Can the soil contaminants permeate the skin? (Contaminants listed below, or within the groups listed below, should be evaluated for dermal absorption). ☑

Arsenic	Lindane
Cadmium	PAHs
Chlordane	Pentachlorophenol
2,4-dichlorophenoxyacetic acid	PCBs
Dioxins	SVOCs
DDT	

If all of the boxes are checked, label this pathway complete: Complete

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 ADEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.* ☑

If both the boxes are checked, label this pathway complete: Complete

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: Complete

3 Ingestion of Wild Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild food? ☑

Do the site contaminants have the potential to bioaccumulate (*see* Appendix A)? ☑

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. the top 6 feet of soil, in groundwater that **could be** connected to surface water, etc.) ☑

If all of the boxes are checked, label this pathway complete: Complete

c) Inhalation

1 Inhalation of Outdoor Air

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Are the contaminants in soil volatile (*See Appendix B*)? ☑

If all of the boxes are checked, label this pathway complete: Complete

2 Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be placed on the site in an area that could be affected by contaminant vapors? (i.e., within 100 feet, horizontally or vertically, of the contaminated soil or groundwater, <u>or</u> subject to "preferential pathways" that promote easy airflow, like utility conduits or rock fractures) ☑

Are volatile compounds present in soil or groundwater (*See Appendix C*)? ☑

If both boxes are checked, label this pathway complete: Complete

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

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- Climate permits recreational use of waters for swimming,
- Climate permits exposure to groundwater during activities, such as construction, without protective clothing, or
- Groundwater or surface water is used for household purposes.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Household Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- The contaminated water is used for household purposes such as showering, laundering, and dish washing, and
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix B)

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Generally DEC soil ingestion cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway, although this is not true in the case of chromium. Examples of conditions that may warrant further investigation include:

- 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. This size can be inhaled and would be of concern for determining if this pathway is complete.

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 recreational or some types of subsistence activities. People then incidentally **ingest** sediment from normal hand-to-mouth activities. In addition, **dermal absorption of contaminants** may be of concern if people come in contact with sediment and the contaminants are able to permeate the skin (see dermal exposure to soil section). This type of exposure is rare but it should be investigated if:

- Climate permits recreational activities around sediment, and/or
- Community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

ADEC soil ingestion cleanup levels are protective of direct contact with sediment. If they are determined to be over-protective for sediment exposure at a particular site, other screening levels could be adopted or developed.

Check the box if further evaluation of this pathway is needed: ☑

Comments:

Further evaluation of this pathway may be needed as proposed future usage includes recreational swimming and wading, which could disrupt sediments.

4. Other Comments (*Provide other comments as necessary to support the information provided in this form.)*

APPENDIX A

BIOACCUMULATIVE COMPOUNDS

Table A-1: List of Compounds of Potential Concern for Bioaccumulation

Organic compounds are identified as bioaccumulative if they have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5. Inorganic compounds are identified as bioaccumulative if they are listed as such by EPA (2000). Those compounds in Table X of 18 AAC 75.345 that are bioaccumulative, based on the definition above, are listed below.

Aldrin	DDT	Lead
Arsenic	Dibenzo(a,h)anthracene	Mercury
Benzo(a)anthracene	Dieldrin	Methoxychlor
Benzo(a)pyrene	Dioxin	Nickel
Benzo(b)fluoranthene	Endrin	PCBs
Benzo(k)fluoranthene	Fluoranthene	
Cadmium	Heptachlor	Pyrene
Chlordane	Heptachlor epoxide	Selenium
Chrysene	Hexachlorobenzene	Silver
Copper	Hexachlorocyclopentadiene	Toxaphene
DDD	Indeno(1,2,3-c,d)pyrene	Zinc
DDE		

Because BCF values can relatively easily be measured or estimated, the BCF is frequently used to determine the potential for a chemical to bioaccumulate. A compound with a BCF greater than 1,000 is considered to bioaccumulate in tissue (EPA 2004b).

For inorganic compounds, the BCF approach has not been shown to be effective in estimating the compound's ability to bioaccumulate. Information available, either through scientific literature or site-specific data, regarding the bioaccumulative potential of an inorganic site contaminant should be used to determine if the pathway is complete.

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000). The BCF can also be estimated from a chemical's physical and chemical properties. A chemical's octanol-water partitioning coefficient (K_{ow}) along with defined regression equations can be used to estimate the BCF. EPA's Persistent, Bioaccumulative, and Toxic (PBT) Profiler (EPA 2004) can be used to estimate the BCF using the K_{ow} and linear regressions presented by Meylan et al. (1996). The PBT Profiler is located at http://www.pbtprofiler.net/. For compounds not found in the PBT Profiler, DEC recommends using a log K_{ow} greater than 3.5 to determine if a compound is bioaccumulative.

APPENDIX B

VOLATILE COMPOUNDS

Table B-1: List of Volatile Compounds of Potential Concern
Common volatile contaminants of concern at contaminated sites. A chemical is defined as volatile if the Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater and the molecular weight less than 200 g/mole (g/mole; EPA 2004a). Those compounds in Table X of 18 AAC 75.345 that are volatile, based on the definition above, are listed below.

Acenaphthene	1,4-dichlorobenzene	Pyrene
Acetone	1,1-dichloroethane	Styrene
Anthracene	1,2-dichloroethane	1,1,2,2-tetrachloroethane
Benzene	1,1-dichloroethylene	Tetrachloroethylene
Bis(2-chlorethyl)ether	Cis-1,2-dichloroethylene	Toluene
Bromodichloromethane	Trans-1,2-dichloroethylene	1,2,4-trichlorobenzene
Carbon disulfide	1,2-dichloropropane	1,1,1-trichloroethane
Carbon tetrachloride	1,3-dichloropropane	1,1,2-trichloroethane
Chlorobenzene	Ethylbenzene	Trichloroethylene
Chlorodibromomethane	Fluorene	Vinyl acetate
Chloroform	Methyl bromide	Vinyl chloride
2-chlorophenol	Methylene chloride	Xylenes
Cyanide	Naphthalene	GRO
1,2-dichlorobenzene	Nitrobenzene	DRO

APPENDIX C

COMPOUNDS OF CONCERN FOR VAPOR MIGRATION

Table C-1: List of Compounds of Potential Concern for the Vapor Migration

A chemical is considered sufficiently toxic if the vapor concentration of the pure component poses an incremental lifetime cancer risk greater than 10-6 or a non-cancer hazard index greater than 1. A chemical is considered sufficiently volatile if it's Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater.

Acenaphthene	Dibenzofuran	Hexachlorobenzene
Acetaldehyde	1,2-Dibromo-3-chloropropane	Hexachlorocyclopentadiene
Acetone	1,2-Dibromoethane (EDB)	Hexachloroethane
Acetonitrile	1,3-Dichlorobenzene	Hexane
Acetophenone	1,2-Dichlorobenzene	Hydrogen cyanide
Acrolein	1,4-Dichlorobenzene	Isobutanol
Acrylonitrile	2-Nitropropane	Mercury (elemental)
Aldrin	N-Nitroso-di-n-butylamine	Methacrylonitrile
alpha-HCH (alpha-BHC)	n-Propylbenzene	Methoxychlor
Benzaldehyde	o-Nitrotoluene	Methyl acetate
Benzene	o-Xylene	Methyl acrylate
Benzo(b)fluoranthene	p-Xylene	Methyl bromide
Benzylchloride	Pyrene	Methyl chloride chloromethane)
beta-Chloronaphthalene	sec-Butylbenzene	Methylcyclohexane
Biphenyl	Styrene	Methylene bromide
Bis(2-chloroethyl)ether	tert-Butylbenzene	Methylene chloride
Bis(2-chloroisopropyl)ether	1,1,1,2-Tetrachloroethane	Methylethylketone (2-butanone)
Bis(chloromethyl)ether	1,1,2,2-Tetrachloroethane	Methylisobutylketone
Bromodichloromethane	Tetrachloroethylene	Methylmethacrylate
Bromoform	Dichlorodifluoromethane	2-Methylnaphthalene
1,3-Butadiene	1,1-Dichloroethane	MTBE
Carbon disulfide	1,2-Dichloroethane	m-Xylene
Carbon tetrachloride	1,1-Dichloroethylene	Naphthalene
Chlordane	1,2-Dichloropropane	n-Butylbenzene
2-Chloro-1,3-butadiene (chloroprene)	1,3-Dichloropropene	Nitrobenzene
Chlorobenzene	Dieldrin	Toluene
1-Chlorobutane	Endosulfan	trans-1,2-Dichloroethylene
Chlorodibromomethane	Epichlorohydrin	1,1,2-Trichloro-1,2,2-trifluoroethane
Chlorodifluoromethane	Ethyl ether	1,2,4-Trichlorobenzene
Chloroethane (ethyl chloride)	Ethylacetate	1,1,2-Trichloroethane
Chloroform	Ethylbenzene	1,1,1-Trichloroethane
2-Chlorophenol	Ethylene oxide	Trichloroethylene
2-Chloropropane	Ethylmethacrylate	Trichlorofluoromethane
Chrysene	Fluorene	1,2,3-Trichloropropane
cis-1,2-Dichloroethylene	Furan	1,2,4-Trimethylbenzene
Crotonaldehyde (2-butenal)	Gamma-HCH (Lindane)	1,3,5-Trimethylbenzene
Cumene	Heptachlor	Vinyl acetate
DDE	Hexachloro-1,3-butadiene	Vinyl chloride (chloroethene)

Source: EPA 2002.

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: Big Lake Former Dump Site
Holy Cross, Alaska

Follow the directions below. Do not consider engineering or land use controls when describing pathways.

Completed By: SLR International Corp
Date Completed: May 2009

(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. Briefly list other mechanisms or reference the report for details.*

(3) *Check exposure media identified in (2).*

(4) *Check exposure pathways that are complete or need further evaluation. The pathways identified must agree with Sections 2 and 3 of the CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathways	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil → check soil	☑ soil	☑ Incidental Soil Ingestion		C/F	C/F	F	F	F	
	☑ Migration or leaching to subsurface → check soil		☑ Dermal Absorption of Contaminants from Soil		C/F	C/F	F	F	F	
	☑ Migration or leaching 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	☑ groundwater	☑ Ingestion of Groundwater				F			
	☐ *Migration to groundwater* → check groundwater		☐ Dermal Absorption of Contaminants in Groundwater							
	☐ *Volatilization* → check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ *Other (list):*									
☐ Ground-water	☐ Direct release to groundwater → check groundwater	☑ air	☑ Inhalation of Outdoor Air		C/F	C/F	F			
	☐ *Volatilization* → check air		☑ Inhalation of Indoor Air		C/F	C/F	F			
	☐ *Flow to surface water body* → check surface water		☐ Inhalation of Fugitive Dust							
	☐ *Flow to sediment* → check sediment									
	☐ *Uptake by plants or animals* → check biota									
	☐ *Other (list):*									
☑ Surface Water	☑ Direct release to surface water → check surface water	☑ surface water	☑ Ingestion of Surface Water			C/F	F	F	F	
	☑ *Volatilization* → check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☑ *Sedimentation* → check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☑ *Uptake by plants or animals* → check biota									
	☐ *Other (list):*									
☐ Sediment	☐ Direct release to sediment → check sediment	☑ sediment	☑ Direct Contact with Sediment			C/F	F	F	F	
	☐ *Resuspension, runoff, or erosion* → check surface water									
	☐ *Uptake by plants or animals* → check biota	☑ biota	☑ Ingestion of Wild Foods			C/F		F	F	
	☐ *Other (list):*									

Revised 3/21/06

APPENDIX H

COST ESTIMATE SPREADSHEETS

Cost Estimate for FY 2010 Work (6/9/2009) - Interim Removal Action, Village of Hughes School Tank Farm and Former Generator Areas Soils, Alaska

	Clerical	Drafting	Environmental Scientist	Project Manager	Project Director	Total		Comments / Backup
1. Direct Labor	$55.00	$90.00	$90.00	$100.00	$130.00	Hours	Cost	
Task 1 - Workplan Preparation	8	24	40	40	16	128	$12,280.00	Work plan
Task 2A - Big Lake - Surface Water and Sediment Assessment	0	4	56	8	4	72	$6,720.00	Will require approximately one day on site for sampling plus travel and mobilization time.
Task 2B - Big Lake - Bathymetric and Debris Survey	0	20	80	16	8	124	$11,640.00	Will require two days onsite plus travel and mobilization time. Equipment rental includes travel time to/from the site.
Task 3A - City Shop - Debris Removal	0	0	40	8	4	52	$4,920.00	Assumes two days of loading debris and hauling to landfill or barge for backhaul.
Task 3B - City Shop - Excavation of Contaminated Soils, Confirmation Sampling, and Transport Soil to Landfill	0	24	56	8	4	92	$8,520.00	Assumes one day to complete excavation activities. Excavation floor sampling/mapping will take place during excavation. Dump trucks will dump soils at the landfill and the loader will then spread soils immediately.
Task 3C - City Shop - Backfill Excavations (35 cubic yards)	0	0	56	8	4	68	$6,360.00	Assumes one day to backfill excavations.
Task 4 - City Shop - SPCC	0	0	100	8	8	116	$10,840.00	Assumes 100 hours of plan preparation and a site visit.
Task 5 - City Shop - Administrative Controls and Training	0	0	96	40	4	140	$13,160.00	Includes 40 hours worth of preparation and two days in Holy Cross to train local workers plus travel.
Task 6 - Reporting	8	24	80	60	8	180	$16,840.00	Final report
Total Hours	16	96	604	196	60	972		
Labor Cost	$880	$8,640	$54,360	$19,600	$7,800	**Labor Cost Total**	**$91,280**	

Task 1 - Workplan Preparation	No. of Units	Unit	Cost Per Unit	Subtotal
Reproduction	1	estimate	$250.00	$250

SubTotal Task 1 (ODC)	**$250**
SubTotal Task 1 (Labor)	**$12,280**
Task 1 - Total Costs	**$12,530**

Cost Estimate for FY 2010 Work (6/9/2009) - Interim Removal Action, Village of Hughes School Tank Farm and Former Generator Areas Soils, Alaska

Task 2A - Big Lake - Surface Water and Sediment Assessment

	No. of Units	Unit	Cost Per Unit	Subtotal	
Consultant RT Airfare, Anchorage to Holy Cross	2	Each	$582	$1,164	Based on airfare paid for May 2009 Site Visit
Water Sample Analysis- BTEX EPA 624	4	Sample	$125.00	$500	Based on cost provided by SGS Environmental Services
Water Sample Analysis- PAH EPA 610	4	Sample	$250.00	$1,000	Based on cost provided by SGS Environmental Services
Water Trip Blank Analysis- BTEX EPA 624	1	Trip Blank	$62.50	$63	Based on cost provided by SGS Environmental Services
Sediment Sample Analysis- PAH EPA 8270	1	Sample	$185.00	$185	Based on cost provided by SGS Environmental Services
Vehicle Rental (with fuel)	1	Days	$100	$100	Estimated
Transportation of Consultant Equip/Materials to Holy	1	Each	$1,000	$1,000	Estimated
Lodging	2	Man Days	$70	$140	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	2	Man Days	$65	$130	Estimated daily cost for food and meals.
Digital Camera	1	Days	$15	$15	Based upon one digital camera.
PPE / Consumables	2	Man Days	$20	$40	

SubTotal Task 2A (ODC)	**$4,337**
SubTotal Task 2A (Labor)	**$6,720**
Task 2A - Total Costs	**$11,057**

Cost Estimate for FY 2010 Work (6/9/2009) - Interim Removal Action, Village of Hughes School Tank Farm and Former Generator Areas Soils, Alaska

Task 2B - Big Lake - Bathymetric and Debris Survey

Cataraft Rental	6	Days	$100.00	$600	Based on rental rate on Alaska Raft and Kayak's website
Handheld Sonar	1	Each	$100.00	$100	Estimate based on purchase of one by SLR in 2008
Handheld GPS	4	Days	$564.00	$2,256	Surveyor's Exchange estimate for handheld GPS unit
Surveying Equipment	1	Week	$300.00	$300	Surveyor's Exchange: laser level that can be operated by one person
Underwater Video Camera & Housing	2	Week	$375.00	$750	Based on rental rate from lower 48 vendor; includes transporation time to/from lower 48.
Safety Equipment	4	Days	$25.00	$100	Estimated
Transportation of Supplies to Holy Cross	1	Each	$2,500.00	$2,500	Estimated
Lodging	4	Man Days	$70	$280	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	4	Man Days	$65	$260	Estimated daily cost for food and meals.
PPE	4	Man Days	$20	$80	Based upon costs of Level D PPE during the effort.
Digital Camera	4	Days	$15	$60	Based upon one digital camera.
Consultant RT Airfare, Anchorage to Hughes	2	Each	$582	$1,164	Based on airfare paid for May 2009 Site Visit

SubTotal Task 2B (ODC)	**$8,450**
SubTotal Task 2B (Labor)	**$11,640**
Task 2B - Total Costs	**$20,090**

Task 3A - City Shop - Debris Removal

Consultant RT Airfare, Fairbanks to Koyukuk	1	Each	$400	$400	Based on cost quoted from Frontier Flying Services
Vehicle Rental (with fuel)	2	Days	$100	$200	
Caterpillar Loader/Backhoe (with fuel)	2	12-hr days	$564	$1,128	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Dump Truck (with fuel)	2	12 -hr days	$564	$1,128	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Operator #1	24	Hour	$52	$1,251	Excavator/Loader operator
Operator #2	24	Hour	$52	$1,251	Dump Truck operator
Laborer #1	24	Hour	$43	$1,043	
Laborer #2	24	Hour	$43	$1,043	
Lodging	3	Man Day	$70	$210	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	3	Man Day	$65	$195	Estimated daily cost for food and meals.
Digital Camera	2	Days	$15	$30	Based upon one digital camera.
PPE / Consumables	3	Days	$20	$60	Based upon costs of Level D PPE during the effort.

SubTotal Task 3A (ODC)	**$7,939**
SubTotal Task 3A (Labor)	**$4,920**
Task 3A - Total Costs	**$12,859**

Task 3B - City Shop - Excavation of Contaminated Soils, Confirmation Sampling, and Transport Soil to Landfill

Caterpillar Excavator/Loader *(with fuel)	2	12-hr days	$564.00	$1,128	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Dump Truck (with fuel)	1	12-hr days	$564.00	$564	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Vehicle (with fuel)	3	12-hr days	$100.00	$300	Estimated
Equipment Operator #1	24	Hour	$52	$1,251	Excavator/Loader operator
Equipment Operator #2	12	Hour	$52	$626	Dump Truck operator
Laborer #1	12	Hour	$43	$521	
Laborer #2	12	Hour	$43	$521	
Soil Sample Analysis (Floor Characterization) - GRO/BTEX AK101/EPA 8021B	12	Sample	$85	$1,020	Based on one floor sample per excavation plus one duplicate sample.
Soil Sample Analysis (Floor Characterization) - DRO/RRO AK101/AK102	12	Sample	$85.00	$1,020	As above for excavation floor

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Soil Sample Analysis (Sidewall Characterization) - GRO/BTEX AK101/SW 8021B	12	Sample	$85	$1,020	Based on one sidewall sample per excavation plus one duplicate sample
Soil Sample Analysis (Sidewall Characterization) - DRO/RRO AK101/AK102	12	Sample	$85.00	$1,020	As above for excavation sidewall
Soil Sample Analysis (Sidewall and Floor) PAH SIM SW 8270	2	Sample	$185.00	$370	Based on 10% frequency; location exhibiting highest screening results will be sampled.
Soil sample analysis (Sidewall and Floor) VOC 8260B	2	Sample	$185.00	$370	Based on 10% frequency; location exhibiting highest screening results will be sampled.
Soil sample analysis (Sidewall and Floor) Metals 6020	2	Sample	$200.00	$400	Based on 10% frequency; location exhibiting highest screening results will be sampled.
Soil Sample Analysis (Sidewall and Floor) - GRO/BTEX Travel Blanks	1	Trip Blank	$42.50	$43	Trip blans for GRO/BTEX analyses
Soil sample analysis (Sidewall and Floor) VOC Travel Blanks	1	Trip Blank	$92.50	$93	Trip blanks for VOC analyses
Ground Water Sample Analysis- GRO/BTEX AK101/EPA 8021B	1	Sample	$85.00	$85	Ground water sample to be collected only if ground water is encountered.
Ground Water Sample Analysis- DRO/RRO AK101/AK102	1	Sample	$85.00	$85	Ground water sample to be collected only if ground water is encountered.
Ground Water Sample Analysis- PAH SIM SW 8270	1	Sample	$185.00	$185	Ground water sample to be collected only if ground water is encountered.
Ground Water Sample Analysis- VOC 8260B	1	Sample	$185.00	$185	Ground water sample to be collected only if ground water is encountered.
Ground Water Sample Analysis- Metals 6020	1	Sample	$200.00	$200	Ground water sample to be collected only if ground water is encountered.
Ground Water Sample Analysis- GRO/BTEX Travel Blanks	1	Trip Blank	$42.50	$43	Trip blans for GRO/BTEX analyses
Ground Water Sample Analysis- VOC Travel Blanks	1	Trip Blank	$92.50	$93	Trip blanks for VOC analyses
Lodging	2	Man Day	$70	$140	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	2	Man Day	$65	$130	Estimated daily cost for food and meals.
PID	3	Days	$50	$150	
PPE	2	Man Day	$20	$40	
Digital Camera	3	Days	$15	$45	Based upon one Digital Camera
Miscellaneous	1	Each	$1,000.00	$1,000	

SubTotal Task 2C (ODC)	**$1,505**
SubTotal Task 2C (Labor)	**$8,520**
Task 2B - Total Costs	**$10,025**

Task 3C - City Shop - Backfill Excavations (35 cubic yards)

Caterpillar Excavator/Loader *(with fuel)	1	12-hr days	$564.00	$564	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Dump Truck (with fuel)	1	12-hr days	$564.00	$564	Based on costs for Hughes; will be updated with costs for Holy Cross once available
Vehicle (with fuel)	3	Days	$100.00	$300	Estimated
Equipment Operator #1	12	Hour	$52	$626	Excavator/Loader operator
Equipment Operator #2	12	Hour	$52	$626	Dump truck operator
Laborer #1	12	Hour	$43	$521	
Laborer #2	12	Hour	$43	$521	
Lodging	2	Man Days	$70	$140	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	2	Man Days	$65	$130	Estimated daily cost for food and meals.
PPE	2	Man Days	$20	$40	
Digital Camera	3	Days	$15	$45	
Backfill gravel for Excavations	50	yards	$2	$75	Based on costs for Hughes; will be updated with costs for Holy Cross once available

SubTotal Task 3 (ODC)	**$4,152**
SubTotal Task 3 (Labor)	**$6,360**
Task 3 - Total Costs	**$6,360**

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Task 4 - City Shop - SPCC					
Consultant RT Airfare, Anchorage to Holy Cross	1	Each	$582	$582	Based on airfare paid for May 2009 Site Visit
Vehicle Rental (with fuel)	2	Days	$100	$200	Estimated
Lodging	2	Man Day	$70	$140	Based on rate charged by Holy Cross Village Council for May 2009 Site Visit
Meals	3	Man Day	$65	$195	Estimated daily cost for food and meals.
Supplies (Drip Pans, Containments, etc.)	1	Each	$3,000.00	$3,000	
Shipping supplies to Holy Cross	1	Each	$1,000.00	$1,000	Estimated

SubTotal Task 4 (ODC)	**$5,117**
SubTotal Task 4 (Labor)	**$10,840**
Task 4 - Total Costs	**$15,957**

Task 5 - City Shop - Administrative Controls and Training					
Consultant RT Airfare, Anchorage to Holy Cross	1	Each	$582	$582	
Lodging	2	Man Day	$70	$140	
Meals	4	Man Day	$65	$260	
Reproduction - B&W	1000	Each	$0.10	$100	
Reproduction - Color	100	Each	$1.00	$100	

SubTotal Task 5 (ODC)	**$1,182**
SubTotal Task 5 (Labor)	**$16,840**
Task 5 - Total Costs	**$18,022**

Task 6 - Reporting					
Reproduction - B&W	1000	Each	$0.10	$100	
Reproduction - Color	100	Each	$1.00	$100	

SubTotal Task 6 (ODC)	**$200**
SubTotal Task 6 (Labor)	**$0**
Task 6 - Total Costs	**$200**

Total, Labor	**$91,280**
Total, Other Direct Costs	**$33,131**
10% Contingency	**$12,441**
TOTAL PROJECT COST (Holy Cross)	***$136,853***