ABBREVIATED PRELIMINARY ASSESSMENT

Apex Mill Site

This is Abbreviated Preliminary Assessment (APA) for the Apex Mill Site within the Standard Copper Mines claims located on the north side of Landlocked Bay in Prince William Sound, Alaska was conducted by the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program (CSP) under the Environmental Protection Agency (EPA) Cooperative Agreement V-00J85601. APAs are intended generally to identify potential hazards at a site, identify sites that require immediate action, and to establish priorities for sites requiring in-depth investigations. This APA is based on readily available information about the site, a field visit, and limited environmental sampling and is not intended to be a full investigation or characterization of the site. This document is intended to meet the requirements of an APA under the Comprehensive, Environmental, Response, Compensation, and Liability Act (CERCLA) but also be in accordance with the Site Cleanup Rules of 18 Alaska Administrative Code (AAC) 75.325-.390.

Preparers:

Danielle Duncan Date: 9/13/16
Alaska Department of Environmental Conservation
Contaminated Sites Program
410 Willoughby Ave., Suite 303
Juneau, Alaska 99811
(907) 465-5207
Danielle.Duncan@Alaska.gov

Anne Marie Palmieri Date: 9/13/16
Alaska Department of Environmental Conservation
Contaminated Sites Program
PO Box 1542
Haines, Alaska 99827
(907) 766-3184
AnneMarie.Palmieri@Alaska.gov

Site Name: Apex Mill Site

Previous Names (aka): None

Site Owner: State of Alaska (uplands and tidelands)

Location: The Apex Mill site is on the north side of Landlocked Bay in Prince William Sound, Alaska approximately 37 nautical miles outside of Valdez.

Township 12 South, Range 8 West, Section 1, Copper River Meridian

Latitude: 60.85472°N **Longitude**: -146.57634°W
Datum: NAD83

Describe the release (or potential release) and its probable nature:
The Apex Mill Site of the Standard Copper Mining Company was investigated by the ADEC on April 23, 2016. The site is located about 37 nautical miles from Valdez and eight (8) miles from Tatitlek on the north side of Landlocked Bay (Appendices 1 and 2). The site is only accessible via boat or float plane. The site is owned by the State of Alaska and managed by the Department of Natural Resources (DNR), Division of Parks and Outdoor Recreation (DPOR).

There are no communities or known drinking water wells within four (4) miles of the site. There is one (1) privately-owned recreational cabin across the site on the other side of Landlocked Bay approximately one (1) nautical mile to the southeast. The cabin is within the Landlocked Bay Mining Company Hoodoo Claim mine site which was also investigated by the ADEC during this reconnaissance to Prince William Sound. Potential human targets in the area are recreationalists and site visitors. The Valdez area of Prince William Sound has a maritime climate with an annual average high temperature of 45 degrees Fahrenheit and an average low of 33 degrees Fahrenheit with an average of 69 inches of rain and 330 inches of snow. The Prince William Sound area is comprised mainly of the Chugach National Forest and Native Corporation lands with only a few private land inholdings. Almost all of the area is considered backcountry or wilderness study area. Forests cover 30% of the land area, comprised mostly of Sitka spruce, mountain hemlock, western hemlock, and yellow-cedar. The area is a primary producer of pink salmon with several salmon hatcheries. The main commercial salmon fisheries in Prince William Sound include both pink and chum salmon. The most abundant wildlife include black and brown bears, bald eagles, seabirds, Sitka black-tailed deer, Steller sea lions, and sea otters. Recreation and tourism occur primarily during the summer months and is largely staged from commercial or private boats. Most of the human access is limited to the shoreline, but some dispersed hiking, hunting, and fishing occurs in the uplands.

There is a single tailings pile located at the high tide line at the Apex Mill Site (Appendix 3). The tailings pile is approximately 10 feet tall and 20 feet wide. There is wood debris in the pile that may be the remnants of an aerial tram. There is limited metal debris in the upland woods including what appeared to be an old safe and an ore bucket near the tailings pile. In an area in the upland woods approximately 300 feet from the tailings pile, the CSP located a pile of red-clay bricks which were partially buried by soil and moss. No other debris or historical mining remnants were found. The mining impacted area of the site appears to be solely the intertidal area.

The Apex Mill Site was likely part of the Standard Copper Mining Company and/or the Threeman Mining Company. It is identified in the US Geological Survey (USGS) Alaska Resources Data File (ARDF) # CV017 and mineral survey 700. According to the ARDF database, there was over 300 feet of underground workings and 900 feet of surface stripping at the site. Also according to the database, there was no production from this mine.

All field and sampling activities were conducted according to the ADEC's Division of Spill Prevention and Response Contaminated Sites Program *Draft* Field Sampling Guidance May 2010 and the Sampling and Analysis Plan developed for the Landlocked Bay – Threeman Mine (Appendix 7). Samples were analyzed for total arsenic, cadmium, copper, lead, and selenium using EPA Methods 3015A and 6020A. Total mercury on selected samples was analyzed using EPA 7473 and total solids were analyzed using SM 2540 G. Hardness was calculated using SM 2340 B. All analyses

were completed at the Alaska State Environmental Health Laboratory. The data met the data quality objectives of the Site Discovery Program Quality Assurance Project Plan dated April 2015. A Contaminated Sites Program Data Review Checklist is included in Appendix 8 and the original laboratory data sheets can be found in Appendix 9. A table of samples collected from the site is included in Appendix 6.

For the purposes of this investigation, analytical sample results were be compared to both ADEC default cleanup levels and EPA APA screening levels as defined by the HRS Final Rule. The appropriate APA screening level is: 1) equal to or greater than the sample's Sample Quantitation Limit (SQL); and 2) equal to or greater than the background sample's SQL when the background concentration is below detection limits; or 3) at least three times greater than the background concentration when the background concentration equals or exceeds the detection limits.

Part 1 – Superfund Eligibility Evaluation

If all answers are "no" go on to Part 2, otherwise proceed to Part 3.

		YES	NO
1.	Is the site currently in CERCLIS or an "alias" of another site?		X
2.	Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		X
3.	Are the hazardous substances potentially released at the site regulated under a statutory exclusion (e.g., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		X
4.	Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		X
5.	Is there sufficient documentation to demonstrate that no potential for a release that could cause adverse environmental or human health impacts exists (e.g., comprehensive remedial investigation equivalent data showing no release above ARARs, completed removal action, documentation showing that no hazardous substance releases have occurred, or an EPA approved risk assessment completed)?		X

Please explain all "yes" answer(s): N/A

Part 2 – Initial Site Evaluation

For Part 2, if information is not available to make a "yes" or "no" response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

		YES	NO
1.	Does the site have a release or a potential to release?	X	
2.	Does the site have uncontained sources containing CERCLA eligible substances?	X	
3.	Does the site have documented on-site, adjacent, or nearby targets?		X

If the answers to questions 1, 2, and 3 above were all "yes" then answer the questions below before proceeding to Part 3.

		YES	NO
4.	Does documentation indicate that a target (e.g., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		X
5.	Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?		X
6.	Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (e.g., targets within 1 mile)?	X	
7.	Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?		X

Site Evaluation Information

Soil Exposure Pathway

Two (2) samples from the tailings pile were collected from the Apex Mill Site: one (1) from the middle of the pile and one from the top of the pile. One duplicate sample was also collected. A background soil sample was not collected, therefore, the background sediment sample collected from an area near the site was used for the APA screening value. The samples were also compared to the most stringent of the ADEC soil cleanup levels from 18 AAC 75.340, Table B1. Arsenic was detected in the two tailings pile samples at concentrations just above the APA screening value of 9.9 milligrams per kilogram (mg/kg). These arsenic concentrations were 18 and 12 mg/kg and are greater than the ADEC cleanup level for arsenic of 3.7 mg/kg. Cadmium was not detected in the samples collected from the Apex Mill Site tailings pile. Copper was detected in exceedance of both the APA screening value of 90 mg/kg and the ADEC cleanup level of 460 mg/kg. The samples had copper values of 820 mg/kg, 8,100 mg/kg (duplicate), and 780 mg/kg. Lead was also present in concentrations greater than the APA screening value (11.4 mg/kg) but less than the ADEC cleanup value of 400 mg/kg. The lead concentrations were between 37 mg/kg and 56 mg/kg. Selenium was present in the tailings pile at concentrations exceeding both the APA screening value of 3.2 mg/kg and the ADEC cleanup level of 3.4 mg/kg and ranged from 16 mg/kg to 27 mg/kg.

Table 1: Soil Sample Analytical Results.

Sample ID	Description	As	Cd	Cu	Pb	Se
SC2SO	Tailings pile – middle	**18**	< 2.8	**820**	**46**	**16**
SC3SO	Duplicate of SC2SO	**15**	< 2.9	**8,100**	**56**	**27**
SC5SO	Tailings pile - top	**12**	< 2.7	**780**	**37**	< 14
Background: SC7SD		3.3	< 0.63	30	3.8	< 3.2
APA screening level		9.9	0.63	90	11.4	3.2
ADEC Soil cleanup		3.7	5.0	460	400	3.4

Notes:

1. All sample results expressed on a dry weight basis in mg/kg.
2. All samples collected from 0-6" below ground surface.
3. Bolded values exceed APA screening levels of 3-times the background concentration for sample analytes greater than the sample quantification limit (SQL) or greater than the SQL for sample analytes not detected/concentrations below the SQL .
4. Underlined values exceed the most stringent ADEC soil cleanup levels from 18 AAC 75.340, Table B1.

Potential Targets

Potential human receptors for the tailings pile on the beach are limited to recreationalists and site visitors as the site is part of an unnamed Alaska State Park. There are no communities or drinking water wells within four (4) miles of the site. There is one (1) recreational cabin within the one (1) mile target distance (this is the cabin associated with the Landlocked Bay Hoodoo Claim site), which is reported by the landowner to be seldom used. The site is remote and only accessible via float plane or boat. The black sand beach is a unique and noticeable feature which could draw recreationalists to the site. Although there are arsenic and copper in the tailings at levels greater than the APA screening levels and ADEC cleanup levels, there are no other metals present in concentrations that present a threat to human health or the environment. The tailings pile is 20 feet wide, 10 feet in depth, and 10 feet high. There are no anadromous streams near the tailings pile. Other potential ecoreceptors for the contaminated soil in the tailings pile are land mammals such as brown and black bears, shrews, weasels, etc. There are no endangered or threatened land mammals or birds at the site. There does not appear to be any contamination in the forest where there is metal debris.

Ground Water Pathway

The likelihood of a release from the tailings area to the groundwater is small and at this time groundwater is not used in the area. While the depth to groundwater is unknown, it is likely shallow in the area studied due to the hydrology of intertidal areas.

Surface Water Pathway

Surface Water Sample Results

One (1) primary and one (1) background surface water samples were collected from the Apex Mill Site. SC1WA was collected from a shallow seep in the upland woods near where a pile of red-clay bricks were found partially covered by soil and moss. The background sample was collected from a stream unaffected by mining activity. A duplicate water sample was not collected at the site but one

was collected from a different site to satisfy the overall 10% duplication requirement. The background surface water sample had no detections of any metals besides copper and had a pH value of 6.99 and a hardness value of 10.

In the primary sample collected from the seep, copper and lead were detected. The copper value was less than the APA screening value of 3.6 μg/L. Lead was present at 2.7 μg/L which exceeded the APA screening value of 0.56 μg/L. The lead value also exceeded the Alaska Water Quality Standards (AWQS) for Aquatic Life for chronic effects but not acute effects. The metals values did not exceed AWQS for Drinking Water.

Table 3: Surface Water Sample Analytical Results.

Sample ID	As	Cd	Cu	Pb	Se	pH	Hardness
SC1WA	< 0.56	< 0.56	1.8	**2.7**	< 2.8	7.14	19
Background: SC6WA	< 0.56	< 0.56	1.2	< 0.56	< 2.8	6.99	10
APA screening level	0.56	0.56	3.6	0.56	2.8	N/A	N/A
AWQS: Drinking	10	5.0	1000	15	50	6.5<pH<8.5	N/A
AWQS: Aquatic Life, Hardness 10	340, 150	0.21, 0.05	1.5, 1.3	4.9, 0.19	*, 4.6	6.5<pH<8.5	10
AWQS: Aquatic Life, Hardness 19	340, 150	0.40, 0.08	2.8, 2.2	10.0, 0.40	*, 4.6	6.5<pH<8.5	19

Notes:

1. All sample results in μg/L except for hardness (mg/L).
2. Values for Alaska Water Quality Standards (AK WQS) for Aquatic Life are hardness dependent and shown are the acute and chronic values separated by a comma, e.g. acute, chronic.
3. Bolded values exceed APA screening levels of 3-times the background concentration for sample analytes greater than the sample quantification limit (SQL) or greater than the SQL for sample analytes not detected/concentrations below the SQL .
4. Italicized values exceed Alaska Water Quality Standards (AK WQS) for drinking water.
5. Underlined values exceed one or more Alaska Water Quality Standards (AK WQS) for aquatic life.
6. * denotes no value available: more information is needed to determine most stringent criteria.

Sediment Sample Results

One (1) sediment sample was collected from the intertidal area approximately 15 feet downgradient from the tailings pile at the Apex Mill Site. A duplicate sediment sample was not collected from this site, but collected from a different site to satisfy the overall duplicate collection rate of 10% for the project. A background sediment sample was collected from an area unaffected by historic mining activity. No metals analyzed exceeded the APA screening levels with the exception of copper which had a concentration of 2,600 mg/kg. The National Oceanic and Atmospheric Administration's (NOAA) threshold effect levels (TELs) were also exceeded for copper and arsenic. The sediment sample results indicate that the intertidal area downgradient of the tailings pile is also affected by past mining activity as evidenced by the elevated copper concentration.

Table 2: Sediment Sample Analytical Results.

Sample ID	Description	As	Cd	Cu	Pb	Se
SC4SD	Intertidal 15 ft. from tailings pile	*6.2*	< 2.7	***2,600***	6.6	< 13
Background: SC7SD		3.3	< 0.63	30	3.8	< 3.2
APA screening level		9.9	0.63	90	11.4	3.2
NOAA TEL		7.2	0.68	19	30	1,000

Notes:

1. All sample results expressed on a dry weight basis in mg/kg.
2. All samples collected from 0-6" below ground surface.
3. Bolded values exceed APA screening levels of 3-times the background concentration for sample analytes greater than the sample quantification limit (SQL) or greater than the SQL for sample analytes not detected/concentrations below the SQL .
4. Italicized values exceed NOAA SQuiRTs freshwater sediment threshold effect level (TEL).

Potential Targets

The surface water migration pathway 15-mile target distance limit begins at the tailings pile at the high tide line and extends into Landlocked Bay. The 15-mile target distance limit for the site contains marine water only. The only fresh surface water found on site was a small seep.

Drinking Water Threat: There are no drinking water protection zones or intakes within the 15-mile target distance limit. The surface water that was sampled was a small seep in the forested upland area near a pile of scattered red-clay bricks. Although the sample contained a concentration of lead greater than the APA and AWQS for aquatic life screening levels, it met the AWQS for drinking water. Although the site is used recreationally, it is unlikely that site visitors would use the sampled seep for drinking water as there are other freshwater streams in the area which are more attractive water sources based on volume and location.

Human Food Chain Threat: No edible plants or berries were observed on site. Fisheries that occur within the Prince William Sound area which could be targets include salmon, groundfish (halibut, rockfish, and lingcod), shrimp, crab, mussels, and clams. The Alaska Department of Fish and Game has determined that the area within the 15 mile target distance limit is suitable for use as a subsistence fishing area. In addition, the area supports both commercial and sport fishing for salmon, shrimp, and groundfish.

Environmental Threat: Several anadromous streams are present in the 15-mile target distance limit. The closest anadromous stream is Reynolds Creek, but it is located at the head of Landlocked Bay and it is unlikely that the small tailings pile and limited historical mining on site has affected the stream. The sampled surface water seep is too small to support aquatic life, however the water flows onto the intertidal area where it disappears into the beach gravels before entering the ocean.

Sensitive environments within the 15-mile target distance limit is the Jack Bay State Marine Park and an unnamed black sand State Park where the site is located. Aside from the Chugach National Forest, there are no other National Parks, wildlife refuges, fragile natural settings, or other areas with unique or highly-valued environmental or cultural features present. The site does have a small black sand beach and is reportedly a frequently used beach for boaters to let their dogs or children off to

run around as much of the nearby shoreline is rocky. The site is not located within a wetland area. There are freshwater forested/shrub wetlands up gradient from the site in addition to lakes and freshwater emergent wetlands within the 15-mile target distance limit. The following species are not threatened or endangered in Alaska but are Species of Special Concern in Prince William Sound and have been monitored following the 1989 Exxon Valdez Oil Spill: Marbled Murrelet (*Brachyramphus marmoratus*), Sea Otters (*Enhydra lutris*), Harbor Seal (*Phoca vitulina*), Pacific herring (*Clupea pallasii*) and Steller Sea Lion (*Eumatopias jubatus*). In addition, the following endangered or rare species occur in the area according to the United States Fish and Wildlife Service: Humpback Whale (*Megaptera novaeangliae*).

Part 3 – ADEC Site Assessment Decision

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was "no," then an APA may be performed and the "NFRAP" box below should be checked. Additionally, if the answer to question 4 in Part 2 is "yes," then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the "Lower Priority SI" or "Higher Priority SI" box below; or Option 2 -- proceed with a combined PA/SI assessment.

Check the box that applies based on the conditions of the APA:

X	NFRAP		Refer to Removal Program – further site assessment needed
	Higher Priority SI		Refer to Removal Program - NFRAP
	Lower Priority SI		Site is being addressed as part of another CERCLIS site
	Defer to NRC	X	Other: Refer to State for further evaluation

The ADEC recommends the EPA make a determination that the Apex Mill Site of the Standard Copper Mining Company be designated as NFRAP under CERCLA and that the State of Alaska Contaminated Sites Program manage the site moving forward under 18 AAC 75.325-990.

ADEC Reviewers: Danielle Duncan and Anne Marie Palmieri

PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:

A site inspection was conducted in April of 2016 by the ADEC involving direct observations in addition to limited sample collection found that the contamination is not an immediate threat to human health or the environment. The analytical soil, sediment, and water data were compared to the APA screening levels, ADEC 18 AAC 75.341 soil cleanup levels, NOAA SQuiRT TELs, and ADEC water quality criteria. In the tailings pile, copper, arsenic, selenium, and lead were found in concentrations greater than APA screening levels. The arsenic and selenium concentrations were also greater than the ADEC cleanup levels but were relatively low – having 12-18 mg/kg and 16-27 mg/kg, respectively. Copper was detected in greater quantities: up to 8,100 mg/kg. The downgradient intertidal sediment sample results indicated that the copper may be migrating towards the marine water. In the water sample collected from an upland seep, only lead was present at a concentration that exceeded the APA screening levels and AWQS for aquatic life, however the sample met the AWQS for drinking water. Due to the remote nature of the site and limited metal

contamination (both in concentration and volume), the CSP believes that the site poses a low risk to human health or the environment.

The black sand beach is used by recreationalists and a google search for the name of the beach found a poem by a geocacher copied below from the website: https://www.geocaching.com/geocache/GC1W4PV_thurstonson-jacobson-cache?guid=f2e9b740-aa80-4490-8369-2c892c928f94

A PROSPECT-IVE POEM OF CLUES

Explorers who venture in Prince William Sound
Know minerals and Geological features abound.
Though the deposits and formations are quite timeless,
in 1897 Port Fidalgo was quite mineless.

The Alaska Commercial Company wanted in on the wealth.
They hired two hardy prospectors in good health.
Misters Thurstonson & Jacobson searched mountains and cliffs
for riches, but sometimes they found hieroglyphs.

Eureka! There's copper in Landlocked Bay.
Standard Copper built a mine with an aerial tramway.
Remains of that 1906 tram top a pile of old ore
Before inner Landlocked on the sandy north shore.

Along black sands to the East of the ore dump you'll amble.
Turn into the woods, thru some alder you'll scramble.

Wander till you find a rusty old mystery.
Mine equipment or safe? A piece of old history.
See a 12-foot high old stump not far away.
In its mossy orange swirley wood the treasure does lay.

Appendix 1: Site maps

Figure 1: Location of the Apex Mill Site of the Standard Copper Mining Company and the one (1) and four (4) mile target distance limits.

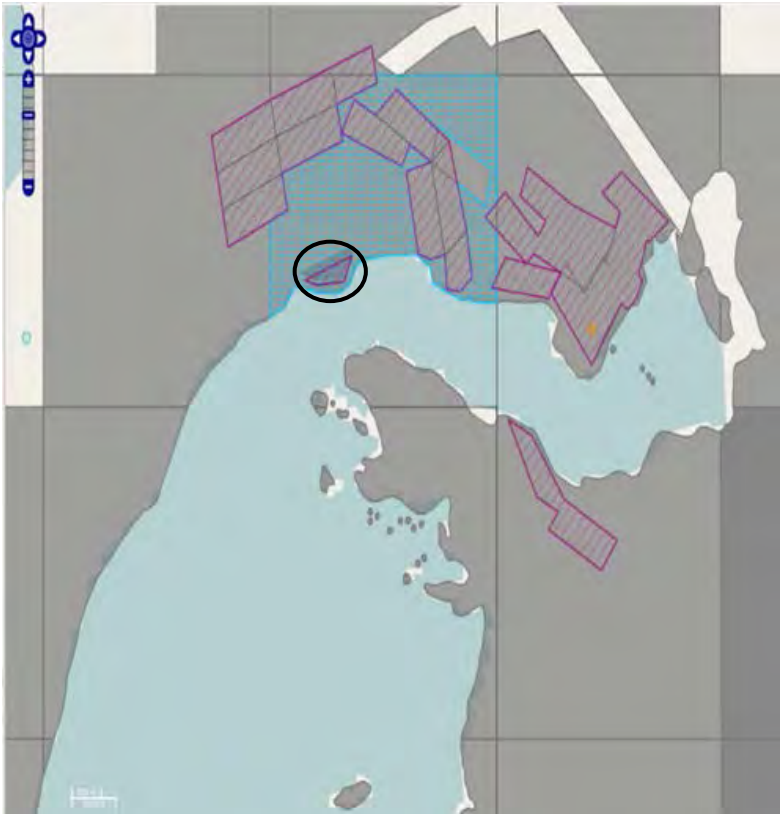


Figure 2: Location of the Apex Mill Site circled in black.

Figure 3: Sampling locations for the Apex Mill Site (right) and background samples (left).

Figure 4: The 15-mile target distance limit for surface water for the Apex Mill Site.

Appendix 2: Historical photos and maps

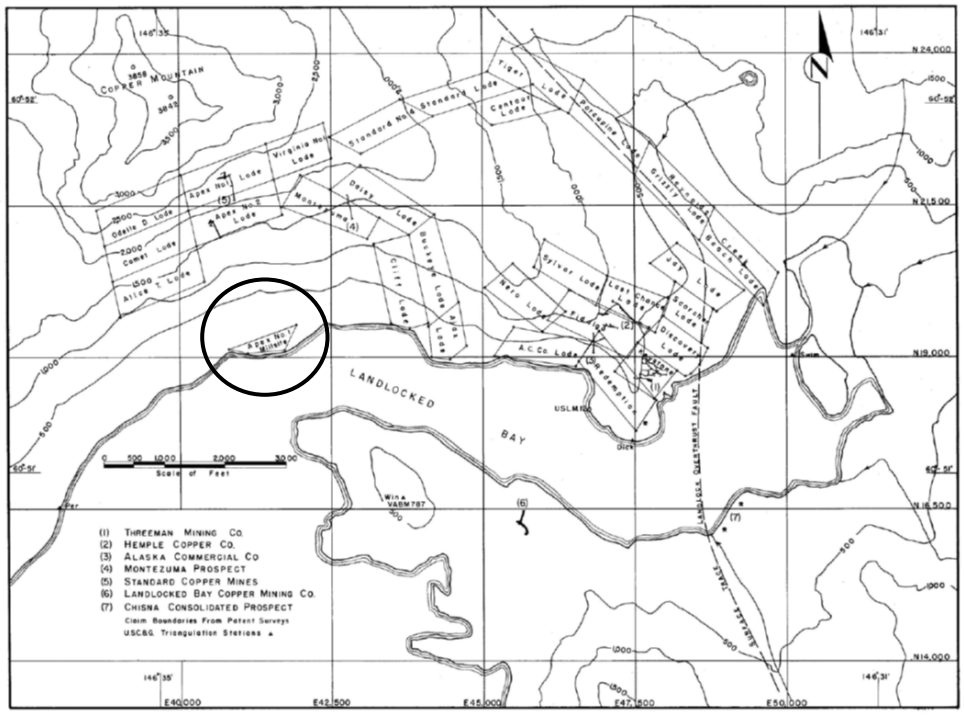


Figure 1: Historical map showing the Threeman Mines Claims – the location of the Apex Mill Site is circled in black. Figure copied from (Mihelich and Wells 1957).

Appendix 3: Site visit photos – all photos taken by ADEC staff unless otherwise stated.

Photo 1: The tailings pile at the Apex Mill Site adjacent to a fine, black sand beach.

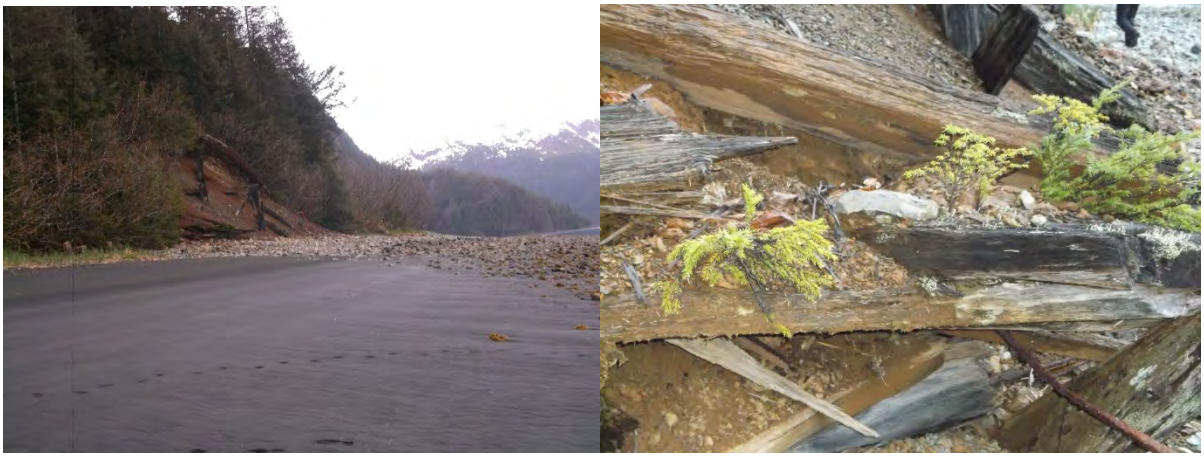


Photo 2: Closer views of the tailings pile, beach, and wood remnants.

Photo 3: Woody debris in the tailings pile.

Photo 4: Old safe found in the upland woods – the door was found nearby.

Photo 5: Sample SC1WA collected from a seep downgradient of the buried brick pile.

Photo 6: Samples SC2SO and SC3SO (duplicate of SC2SO) collected from the middle of the tailings pile.

Photo 7: Sample SC4SD collected from the beach downhill from the tailings pile.

Photo 8: Sample SC5SO collected from the top of the tailings pile.

Photo 9: Sample SC6WA – background water (left) and SC7SD background sediment (right).

Appendix 4: Human health Conceptual Site Model

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Montezuma Claim of the Standard Copper Mining Company

Completed By: Danielle Duncan
Date Completed: 6/15/16

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media	Transport Mechanisms
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil → check soil ☑ Migration to subsurface → check soil ☑ Migration to groundwater → check groundwater ☐ Volatilization → check air ☑ Runoff or erosion → check surface water ☑ Uptake by plants or animals → check biota ☐ Other (list):
☑ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil → check soil ☑ Migration to groundwater → check groundwater ☐ Volatilization → check air ☑ Uptake by plants or animals → check biota ☐ Other (list):
☐ Ground-water	☐ Direct release to groundwater → check groundwater ☐ Volatilization → check air ☐ Flow to surface water body → check surface water ☐ Flow to sediment → check sediment ☐ Uptake by plants or animals → check biota ☐ Other (list):
☑ Surface Water	☑ Direct release to surface water → check surface water ☐ Volatilization → check air ☐ Sedimentation → check sediment ☑ Uptake by plants or animals → check biota ☐ Other (list):
☑ Sediment	☑ Direct release to sediment → check sediment ☑ Resuspension, runoff, or erosion → check surface water ☑ Uptake by plants or animals → check biota ☐ Other (list):

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

(4) *Check all pathways that could be complete. The pathways identified in this column must agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

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

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion			C/F		C/F		
	☑ Dermal Absorption of Contaminants from Soil			C/F		C/F		
	☑ Inhalation of Fugitive Dust			C/F		C/F		
☑ groundwater	☐ Ingestion of Groundwater							
	☐ Dermal Absorption of Contaminants in Groundwater							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ air	☐ Inhalation of Outdoor Air							
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☑ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ sediment	☑ Direct Contact with Sediment			C/F			C/F	
☑ biota	☑ Ingestion of Wild or Farmed Foods			C/F			C/F	

Revised, 10/01/2010

Appendix 5: ADEC Ecoscoping Guidance Form

Ecosystem Conceptual Site Model

Scoping Form

Site Name: Apex Mill Site of the Standard Copper Mining Company
Completed by: Danielle Duncan EPSIII ADEC
Date: 6/15/2016

Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? C*heck the appropriate box.*

☐ Yes – *describe observations below and evaluate all of the remaining sections without taking any off-ramps.*
■ No – *go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

Terrestrial Exposure Routes

■ Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water

■ Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water

■ Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or water body)

■ Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface)

☐ Particulates deposited on plants directly or from rain splash

■ Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom

- [x] Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities
- [x] Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the Policy Guidance on Developing Conceptual Site Models)
- [ ] Other site-specific exposure pathways

Aquatic Exposure Routes

- [ ] Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow
- [ ] Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters
- [ ] Contaminant migration via saturated or unsaturated groundwater zones and discharge at "seep" locations along banks or directly to surface water
- [ ] Deposition into sediments from upwelling of contaminated groundwater
- [x] Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.
- [x] Aquatic plants rooted in contaminated sediments
- [x] Bioaccumulatives (see the Policy Guidance on Developing Conceptual Site Models) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms
- [ ] Other site-specific exposure pathways

If any of the above boxes are checked go on to the next section. If none are checked, end the evaluation and check the box below.

- [ ] OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

3. Habitat

Check all that may apply. See Ecoscoping Guidance for additional help.

- [ ] Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity)
- [ ] Critical habitat or anadromous stream in an area that could be affected by the contamination
- [ ] Habitat that is important to the region that could be affected by the contamination

☐ Contamination is in a park, preserve, or wildlife refuge

If any of the above boxes are checked go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

■ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

The water sample collected although the lead value was above the APA screening and NOAA TEL value, was within the range of Alaska Drinking Water Quality Standards. The soil and sediment contamination is primarily copper - other metals such as lead and selenium are a factor or more lower than the copper values.

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

☐ Endangered-, threatened-, or species of special concern are present

☐ The aquatic environment is or could be affected

☐ Non-petroleum contaminants may be present, or the total area of petroleum-contaminated surface soil exceeds one-half acre

If any of the above boxes are checked go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

5. Toxicity Determination

Check all that apply.

☐ Bioaccumulative chemicals are present (see Policy Guidance on Developing Conceptual Site Models)

☐ Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php)

If either box is checked complete a detailed Ecological Conceptual Site Model (see DEC's Conceptual Site Model Guidance) and submit it with the form to you DEC Project Manager.

If neither box is checked, check the box below and submit this form to your DEC Project Manager.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Appendix 6: Sample description table.

Field Sample ID	Laboratory Sample ID	Analyses Requested	Matrix	Sample Details	Latitude	Longitude
SC1WA	1604072-06	Metals, hardness, pH	Water	Seep downgradient of buried bricks and metal debris	60.85520	146.57851
SC2SO	1604075-07	Metals	Soil	Tailings pile - middle	60.85474	146.57637
SC3SO	1604075-08	Metals	Soil	Duplicate of SC2SO	60.85472	146.57634
SC4SD	1604075-09	Metals	Sediment	Intertidal 15 ft. from tailings pile	60.85469	146.57648
SC5SO	1604075-10	Metals	Soil	Tailings pile - top	60.85473	146.57632
SC6WA	1604072-07	Metals, hardness, pH	Water	Background	60.85248	146.58798
SC7SD	1604075-11	Metals	Sediment	Background sediment collocated with SC6WA	60.85248	146.58788

Appendix 7: Sampling and Analysis Plan

Sampling and Analysis Plan

Landlocked Bay – Threeman Mine

June 30, 2016

Prepared by:

Alaska Department of Environmental Conservation
Contaminated Sites Program
Site Discovery Program

410 Willoughby Ave., Ste. 302
P.O. Box 111800
Juneau, AK 99811-1800

Distribution List

- Patty Burns, DNR
- Vincent McClelland

Project/Task Organization

Individual assigned	Organization	Title	Responsible for:	Authorized to:	Phone	Email
Anne Marie Palmieri	ADEC	Environ Program Spec IV	Field work, reporting	Approve & draft reports, validate data	907-766-3184	annemarie.palmieri@alaska.gov
Danielle Duncan	ADEC	Environ Program Spec III	Field work, reporting	Approve & draft reports, validate data	907-465-5207	danielle.duncan@alaska.gov
Steve Crupi	State of Alaska Environmental Health Lab	QA/QC manager	Data QA/QC	Approve data	907-375-8211	steve.crupi@alaska.gov

Table of Contents

Preface

This Sampling and Analysis Plan (SAP) is a supplement to the Quality Assurance Project Plan (QAPP) for the Alaska Department of Environmental Conservation (DEC) Contaminated Sites Program (CSP) Site Discovery Program (SDP). Information provided in the QAPP regarding Quality Assurance/Quality Control (QA/QC) procedures and sample collection methods are referenced but not repeated herein.

Section 1 Landlocked Bay – Threeman Mine Project Description

This section defines the objectives and scope for sampling activities at the Threeman, Chisna Consolidated (Buckeye Group), and Hoodoo Mines in Landlocked Bay in Prince William Sound approximately 24 miles from Ellamar, Alaska, performed by the CSP. The objective of this project is to perform an investigation involving reviewing historical information, conducting a site visit, and collecting analytical soil, sediment, and/or surface water samples to determine if there was a release, if there is contamination present at the site, and if so, identifying potential and complete exposure pathways. The results of the investigation will be documented in a report which will be submitted to the Environmental Protection Agency (EPA) and other interested parties.

Problem Definition

The CSP will conduct limited sampling at potential contaminant source and target areas for site characterization purposes at the Threeman, Chisna Consolidated (Buckeye Group), and Hoodoo Mines near Ellamar, Alaska. The CSP will report the results of its investigation to the EPA as either a Preliminary Assessment (PA) or an Abbreviated PA (APA) report, as appropriate, fulfilling the CSP's EPA grant responsibility. This document details the technical and analytical methods the CSP will employ during field work. This document is a supplement to the CSP QAPP which defines the quality assurance protocols and data analysis techniques that will be used.

Site Locations

Site Name:	Threeman Mine	Chisna Mine	Hoodoo Mine
CERCLIS ID Number:	None assigned	None assigned	None assigned
Latitude:	N 60.852475	N 60.848044	N 60.849381
Longitude:	W -146.540750	W -146.534914	W -146.551565
Borough:	Valdez-Cordova	Valdez-Cordova	Valdez-Cordova
Congressional District:	AK0	AK0	AK0
Site Owner(s):	Mr. and Mrs. John A. Petersen, Vincent McClelland	Unknown	Vincent McClelland
Site Operator(s):	Threeman Mining Company, Alaska Commercial Company, and Standard Copper Mines	Threeman Mining Company	Threeman Mining Company
ARDF #	CV023	CV022	CV021

Site Descriptions

The Threeman Mine is the largest operation of the three (3) mines in Landlocked Bay that the CSP is investigating. The mine was in operation from about 1906 to 1911 (Koski et al. 2008). The copper mine is located on the north shore of inner Landlocked Bay at about 300 feet elevation about 0.25 mile north-northeast of VABM Dick. According to the Alaska Resource Data File, (ARDF), the mine had "medium production." The mine consists of thousands of feet of workings on three different levels using five (5) adits at elevations of 70, 137, 186, 253, and 333 feet. There was an aerial tram which transferred ore from the tunnels to a 500-ton ore bin and wharf on the north shore. A total of 6000 tons of ore was shipped via steamships from the Threeman Mine to a smelter during its operation (Koski et al. 2008). In 1957, remains of several buildings, a short aerial

tram, a sorting bin, an ore bunker, and a pier were visible on the property (Mihelich and Wells 1957). In 1974 and in 1986, three (3) adits had caved in (ARDF). There are reports of a mine dump and a sample from it had 4.9% copper, 0.49% zinc, and 50 parts per million gold according to ARDF.

The Chisna and Hoodoo mines/prospects appear to have been part of the Threeman Mining Company claims according to historical maps and information. The Chisna mine or prospect is on the south shore of inner Landlocked Bay reportedly slightly east of the mouth of China Creek (ARDF). The production at Chisna is reported to be small and there are two (2) exploratory shafts. The Chisna mine/prospect appears to be associated with Mineral Survey 1486 which was part of the Threeman Mining Company claims. Mineral Survey 1486 also includes the Hoodoo claim (State of Alaska Recorders Office). The Hoodoo mine or prospect consists of extensive surface stripping and possibly tunnels.

Site Ownership Histories

The Threeman Mine is located in Landlocked Bay outside of Valdez in Prince William Sound. Three mining companies operated in the Threeman area: Threeman Mining Company, Alaska Commercial Company, and Standard Copper Mines. The Threeman Mining Company patented the Redemption, Keystone, Discovery, Scorcher, Jay, Buckeye, Ajax, Cliff, Daisy, Bay View Claim, Hoodoo Lodes, and Montezuma claims. The Threeman Mining Company also purchased the ACCo claim from the Alaska Commercial Company. Standard Copper Mines owned the Apex No. 1, Apex No. 2, Odelle D, Alice T., Virginia No. 1, and Cornet mining claims and the Apex No. 1 millsite claim. (Mihelich and Wells 1957).

Many of these claims correspond to mineral survey (MS) numbers which can be used to determine current ownership. The Redemption, Keystone, Discovery Scorcher, and Jay lodes are MS 669 and are owned by the Petersen Family revocable Trust of 2001. Also owned by the Petersen Trust are MS 737 (Nero, Sylvar, Last Chance, and Fidalgo lodes) and 783A (Odelle D, Apex No 1, Virginia No 1, Comet, Apex No 2, and Alice T lodes). Vincent McClelland of LandVest owns MS 1485 (Nero, Fidalgo, Redemption, and ACCo lodes), MS 1486 (Bay View Claim and Hoodoo Lodes), and MS 700 (Ajax, Cliff, Daisy, and Montezuma claims). These holdings also include the Chisna and Hoodoo mines/prospects.

Sites Operations and Source Characteristics

It is currently unknown whether mercury or other hazardous substances were used in the mining operations at the mines in Landlocked Bay. There were likely ore mills and bunkers on site. At the Threeman Mine, there is documentation of an ore bunker and tailings on the beach (Koski et al. 2008). There is no information to suggest that the ore was concentrated or further treated at the mines in Landlocked Bay. Shipments of crushed ore were probably sent to the Lower 48 or to Canada for processing.

Previous Investigations

The United States Geological Survey (USGS) conducted field work at abandoned copper mines in Prince William Sound in 2003 and 2005. During these field expeditions, the researchers visited the Threeman Mine site where they observed sulfide oxidation resulting in acid mine drainage and metals transport into the marine environment. They also collected sediment, rock, and biological samples (Table 1) (Koski et al. 2008).

Table 1: Ranges in metals values reported for selected metals. All values in mg/kg.

Matrix	Location	As	Cd	Cr	Hg	Pb
Sediment	Intertidal	9.7-67	0.08-2.3	43-280	<0.02-0.19	7.8-98
Clam (dry weight)	Intertidal	13	1.5	2.2	0.03	<0.2

Surface Water Migration Pathways and Targets

Lagoon Creek is one (1) to two (2) miles northeast of the Threeman Mine at the head of Landlocked Bay and is an anadromous stream. There are two (2) streams within a mile of the Chisna and Hoodoo Mines: Horsetail Falls Creek is anadromous and China Creek according to the Alaska Department of Fish and Game anadromous web map. There are no known drinking water wells nor drinking water protection areas in the investigation area according to the Alaska Department of Environmental Conservation Drinking Water Protection Map.

Areas of Potential Contamination (Sources and Targets)

Sources of potential contamination include waste rock piles, tailings sediments, and surface water flowing through mine wastes. These sources are located within the intertidal zone and potentially upland. Potential targets are people visiting the mine sites and fish and wildlife in the area. Koski et al. provided a map of their sampling locations that will be used to guide our activities. MS 669 contains the bulk of mining debris according to the owner.

Potential contaminants of concern

The potential contaminants of concern for the mines in Landlocked Bay are metals associated with copper mining and identified in previous sampling events: copper, arsenic, lead, and mercury.

Potential Exposure Pathways

Landlocked Bay is only accessible by float plane and boat which limits the number of people who might visit the area. However, the sites could be used by recreationalists and visitors/trespassers. Human exposure pathways could include direct contact with contaminated soil, sediment, and water, ingestion of wild foods, and incidental ingestion or inhalation of contaminated soil and/or sediment. Ecological exposure pathways within the scope of the investigation that are potentially complete are within the marine intertidal zone and include direct contact with/ingestion of contaminated soil and/or sediment, and direct contact with/ingestion of surface water. The following endangered or rare species occurs in the area according to the United States Fish and Wildlife Service: Humpback Whale (*Megaptera novaeangliae*). The following species are not threatened or endangered in Alaska but are Species of Special Concern in Prince William Sound and have been monitored following the 1989 Exxon Valdez Oil Spill: Marbled Murrelet (*Brachyramphus marmoratus*), Sea Otters (*Enhydra lutris*), Harbor Seal (*Phoca vitulina*), and Steller Sea Lion (*Eumatopias jubatus*). There may be others not noted here. Both human health and ecological Conceptual Site Models will be provided in the report.

Numbers of Samples and Types

The exact number of samples that will be collected from each media is unknown. Due to available funding, CSP has estimated total numbers of samples by media for the entire project. The number of analytical samples collected at a specific area will depend on the site conditions and field screening results, and will affect the remaining number available for the rest of the sites.

Table 2: Numbers of samples and types.

Parameter	Total Number	Ellamar	Port Fidalgo	Landlocked Bay/Threeman	Cliff	Boulder Bay/Rua
Soil: As, Cd, Cu, Pb, Se	60	15	10	15	10	10
Soil: Hg	30	8	5	8	8	1
Water: As, Cd, Cu, Pb, Se	30	10	5	10	3	2
Water: Hg	30	8	5	8	8	1
pH	30	10	5	10	3	2
Hardness	30	10	5	10	3	2

Maps and figures

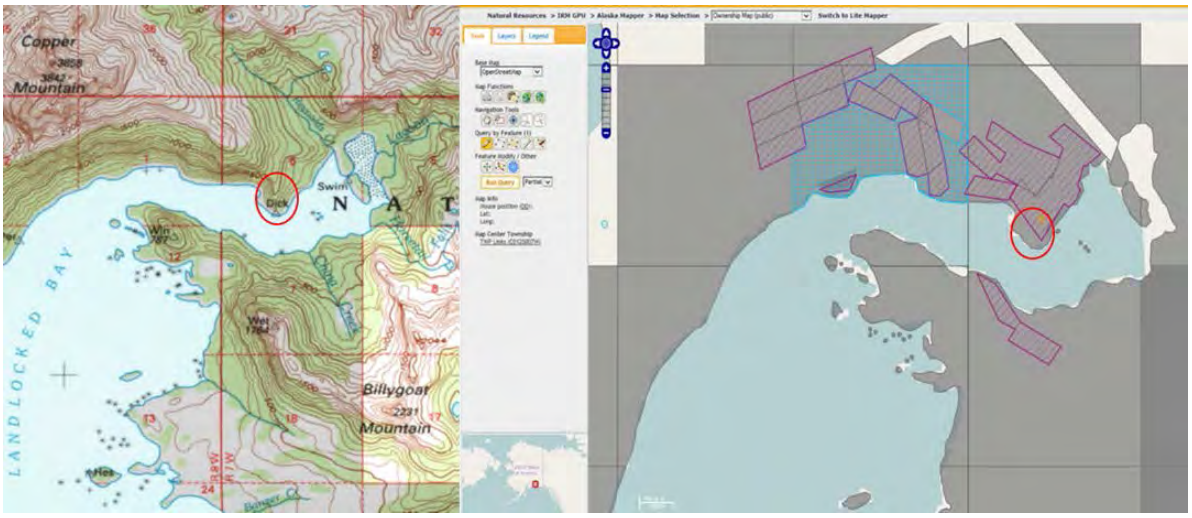


Figure 1: Topographic map (left) and Alaska Department of Natural Resources ownership map showing the location of the Threeman Mine (circled in red on both maps at VABM Dick).

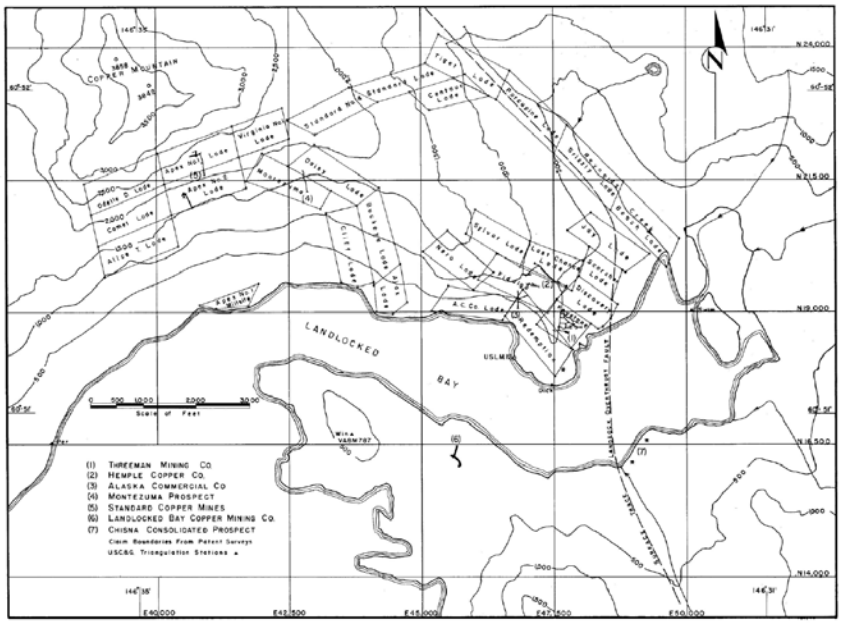


Figure 2: Threeman Mine claims. Figure copied from (Mihelich and Wells 1957).

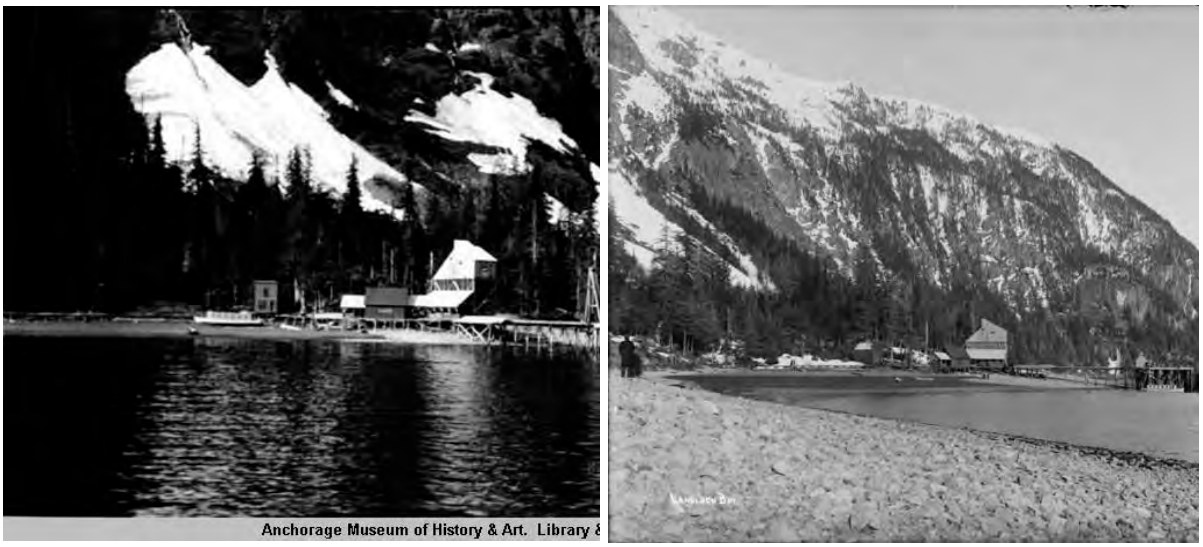


Figure 3: Unnamed mine in Landlocked Bay. Photos copied from the Alaska State Library Digital Archives, AMRC-b62-1-1969, UAF-1975-84-378.

Figure 4: Threeman sampling locations and Threeman Mine site photo copied from Koski et al. 2008.

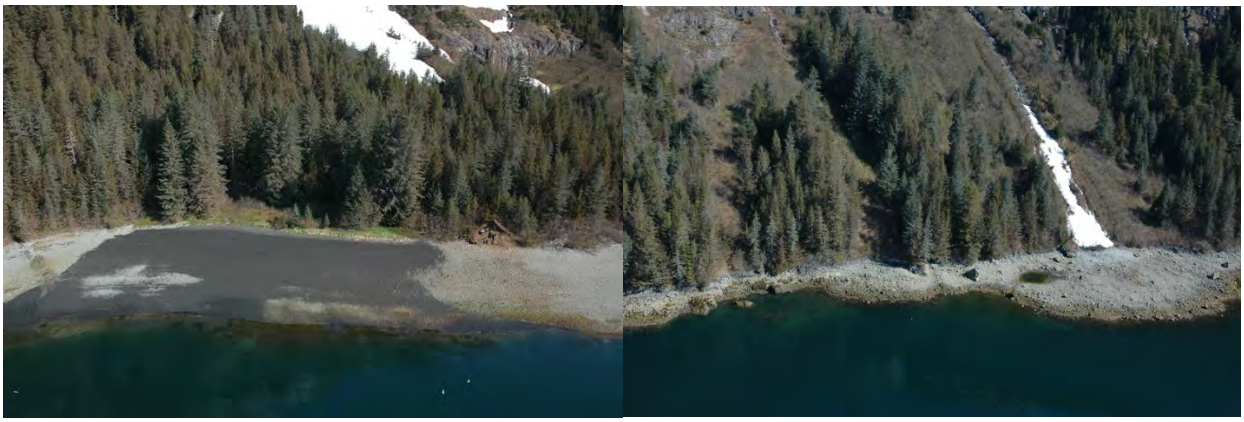


Figure 5: Shore Zone images in the area of the Threeman Mine. Photo on left: note debris on right hand side and contrast in soil type. Photo on right: note what may be the remains or footprint of an aerial tram.

Figure 6: Shore Zone image in the area of the Threeman Mine. Note the orange deposit that may be a tailings pile.

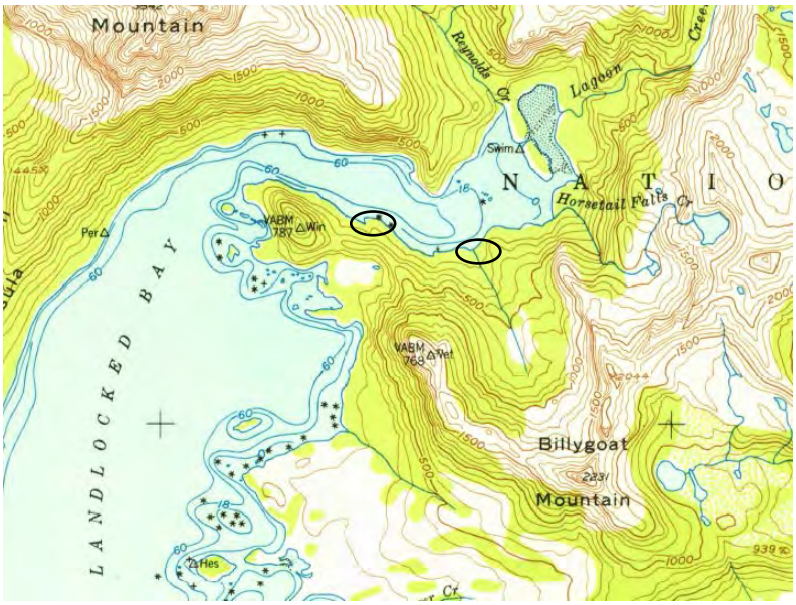


Figure 7: Topographic map showing the locations of the Chisna mine circled (right) at the head of China/Chisna Creek and the Hoodoo mine possibly on left.

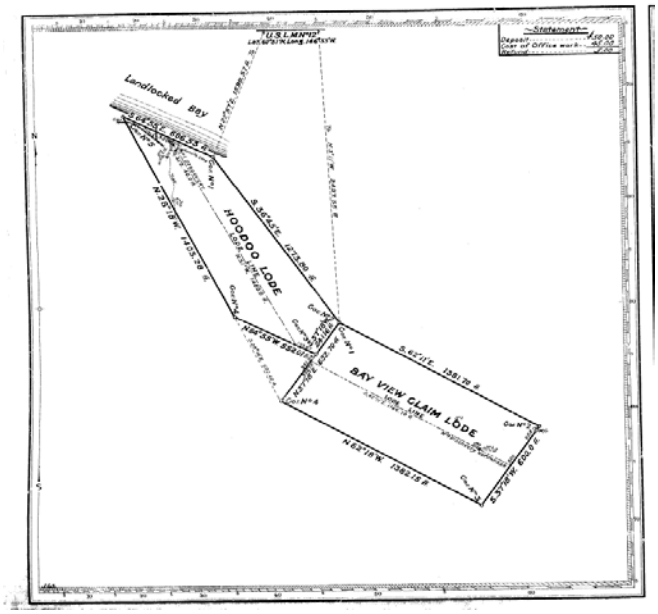


Figure 8 Mineral Survey 1486 - the Hoodoo claim.

Figure 9: The Chisna and Hoodoo Mines area. Note the potentially discolored gravel.

Section 2 Sampling Process Design

A judgment-based sampling methodology will be used for sampling at the abandoned mine sites in Prince William Sound: samples will be collected at locations having the highest probability of contamination. In addition, background samples will be taken from unaffected areas for comparison purposes and to calculate the 3-times EPA APA screening value. The sampling locations will be chosen based on field observations and x-ray fluorescence (XRF) screening results.

Sampling Locations and Analytical Protocol

Site-specific sampling locations and quantities of samples to be collected are outlined in a table for each sampling area and are not described here. A XRF will be used to field screen and select samples for laboratory analysis. All sample locations will be described in the field logbook and located on a site sketch. Photographs and GPS readings will be taken of the sample locations. The date and time each sample is collected will be recorded in the field logbook. Any specific potentially relevant information about the sample location or the sample itself will also be recorded in the logbook.

Background Locations

One representative background soil/sediment sample will be collected from an unaffected area to be determined in the field. If surface water samples are collected, then one representative background surface water sample will also be collected from a location to be determined in the field.

Table 3: Analytical methods, preservation techniques, and holding times.

Parameter	Analytical Method	Matrix	Container	Preservation/Holding Time
Metals except Hg	EPA 3015A and 6020A	Sediment/soil	Glass I-Chem jars	None/6 months
Metals except Hg	EPA 3015A and 6020A	Water	HDPE plastic	HNO^3 to pH < 2/6 months
Hg	EPA 7473	Sediment/soil	Glass I-Chem jars	≤ 6° C/28 days
Hg	EPA 7473	Water	HDPE plastic	HNO^3 to pH < 2/28 days
Hardness	SM 2340 B	Water	HDPE plastic	HNO^3 to pH < 2/6 months
Percent solids	SM 2540 G	Sediment/soil	Glass I-Chem jars	4° C/14 days
pH	EPA 150.1 & Field measured using pH Litmus paper or portable meter	Water	HDPE plastic	None/ASAP

QA/QC Samples

QA/QC procedures are outlined in detail in the QAPP. Briefly, a duplicate sample will be taken for each set of 10 samples (or portion thereof) collected for each matrix and analytical test, with a minimum of 1 sample per matrix per sampling day. For metals analysis, trip and field blanks are not required. The analytical laboratory will follow standard QA/QC procedures as stated in the QAPP and individual method. The CSP will complete laboratory data checklists for each sample batch.

Sampling Methodologies

This section describes the sampling methods that will be employed for the investigation. All samples collected will be maintained under chain-of-custody and shipped in iced coolers as soon as possible to the laboratory. Further information regarding sample collection methodology can be found in the QAPP. The anticipated matrices to be sampled are sediment, soil, and surface water. Sampling locations are judgment based and will be determined prior to the investigation, but could be modified based on observations made once on-site. All field sampling will be performed by a Qualified Person, in accordance with 18 AAC 75.355. Sampling efforts will be biased to target locations that are potential and/or known sources of COCs and locations and media potentially impacted by the migration of COCs. The objective of the sampling effort is to determine whether a release has occurred and to identify possible complete exposure pathways and media. Discrete sampling methods will be used and all sampling will comply with EPA SW-846 protocols for inorganics.

XRF Field Screening- A XRF will be used in the field to aid in sample selection. XRF samples having the highest concentrations of metals (particularly lead, mercury, and arsenic) will be selected for laboratory analysis. The XRF will be placed inside a 2-gallon Ziplock bag for weather protection. Prior to field deployment, the XRF will be placed in the Ziplock bag and analytical standards including a blank will be tested to verify accurate calibration of the instrument. The XRF will be placed in direct contact with the soil or sediment to be tested and allowed to make a 30-second reading. The results will be tabulated in the field notebook as will the samples collected for laboratory analysis.

Sediment and soil- A fresh pair of gloves will be worn and changed before each analytical sample is taken. Samples will be taken from depths ranging from ground surface to 1 ft. below ground surface. A clean, plastic trowel and disposable plastic spoon will be used to collect sediment and soil samples. If samples are heterogeneous, they will be placed into a disposable bowl and homogenized removing any rocks and/or organic litter prior to being placed into laboratory provided glass jars. A duplicate sample will be collected for every ten samples. Metals samples do not require special preservation; they need only to be maintained at $< 6°$ C.

Surface water- A fresh pair of gloves will be worn while collecting water samples and changed before each sample is taken. Samples will be collected using a "grab" technique and laboratory-provided sample containers. A duplicate sample will be collected for every ten samples. Care will be taken to not to disturb any underlying sediment. Water samples will be acidified upon receipt at the laboratory.

Sample Handling and Custody

Sample containers may be labeled prior to field work commencing. The basic labeling strategy will be to use a prefix indicating the site it originated from, number the sample sequentially in the order

collected, and add a suffix to indicate matrix type. The suffixes will be either 'SO' (soil), 'SD' (sediment), or 'WA' (water).

The samples will remain in the custody of the sample team until they are transferred to another person, under proper chain of custody rules. A chain of custody record will be completed for each batch of samples, and included in the sample cooler to be sent to the laboratory. A duplicate copy of the chain of custody will be made for CSP records. Minimum documentation of sample handling and custody included on the COC is the following:

- Sample identification and matrix type
- Latitude and longitude of the sample location
- Sample collection date and time
- Analytical method requested
- Initials of the person collecting the sample
- Date the sample was sent to the laboratory

The samples will be transported to Anchorage by CSP staff, or Ravn or Alaska Air depending on flight schedules. The samples will be housed wrapped in bubble wrap inside coolers outfitted with blue ice under custody. Multiple gel packs will be frozen prior to the day of travel in order to ensure that the temperature of the samples remain < 6° C.

<u>Supplies</u>
Clean, plastic trowels
XRF screening device
Tablet
Black sharpie markers, pencils, pens
Sterile/clean latex gloves
Laboratory-provided sampling containers
Disposable plastic spoons
Disposable bowls
Coolers (2): 48 Quart and 16 Quart
Gel ice
Watch
Rite in the Rain notebook
Chain of custodies
Fuji Finepix AX Camera
Garmin GPS 76
Packing tape
First Aid Kit
Outdoor survival kit
Bosch GLM 15 Distance Finder
Clipboards (2)
Disposal bags
YSI pH 100 meter
Cooler bag
Backpacks

Sampling Equipment Decontamination

Decontamination will not be required because only dedicated or disposable sampling equipment will be used.

Investigation-Derived Waste

Every effort will be made to minimize the generation of investigative-derived waste. Disposable sampling gear will be contained in a dedicated gallon Ziplock bag and disposed of at the local municipal landfill.

Logistics

The CSP plans on conducting the investigation in Prince William Sound outside of Valdez April 22nd – 26th 2016 and has scheduled a charter boat (The Auklet) operated by David Janka for the sampling activities. Mr. Janka has extensive experience in aiding scientific studies in Prince William Sound and has provided his services to the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS) among others. Mr. Janka also provided charter services for the Koski et al. study in much of the same area that this SAP addresses. He is knowledgeable in the abandoned mine sites and will be able to navigate us to them in a timely manner. The CSP staff will travel to Anchorage via Alaska Airlines and continue on to Valdez on Ravn Air. In Valdez, the CSP staff will board the Auklet and begin travel to the first sites. The sampling team will have in their possession all of the supplies needed to complete the investigation. The sampling team will be on board the Auklet for the duration of the sampling trip. The samples will be delivered to Anchorage on the final sampling day (April 26th) at the latest.

Schedule

The scheduled field sampling dates are April 22nd – 26th 2016.

Section 3 Data Quality Objectives

The Data Quality Objective (DQO) process is a system used to define project decisions, the data quality needed to support the decisions, the data types needed, and data collection requirements. It safeguards that the analytical techniques used in the investigation will generate the specified data quality (EPA 2000) and that the resources required to generate the data are justified. More information on data quality can be found in the QAPP.

There are seven steps and the output from each step influences the choices that will be made later in the process.
The DQO steps as defined by the EPA are as follows.
1. State the problem.
2. Identify the decision.
3. Identify the inputs to the decision.
4. Define the study boundaries.
5. Develop a decision rule.
6. Specify tolerable limits on decision errors.
7. Optimize the design.

Step 1: Problem Statement
The first step in the DQO process is to clearly state the problem to be addressed. The intent of this step is to clearly define the problem so that the focus of the sampling and analysis will be unambiguous.

Problem statement: Data are required to determine if there are hazardous concentrations of contaminants of concern (COCs), specifically metals associated with historical mining and milling at the site, and if so, does the contamination pose a risk or potential risk to human health and the environment, and if so, does site require listing on the CSP database and/or further investigation.

Step 2: Decision Statement
This step in the DQO process is used to identify the decisions and the potential actions that will be affected by the data collected. Crafting a decision statement is performed by specifying a principal study question, alternative actions that could result, and a resulting decision statement.

Analytical samples collected will be used to answer the following **Principal Study Questions:**

1. Are metals present in soil, sediment, and/or surface water at concentrations that exceed the respective DEC cleanup or screening levels?

2. Are metals present in soil, sediment, and/or surface water at concentrations that exceed the background by three times or more?

The Alternative Actions to be taken depending on the results are as follows:

- Alternative Action 1: If concentrations of COCs exceed the respective cleanup or screening levels to such an extent that the site poses an imminent and substantial risk to human health and the environment, immediate action may be taken, the site will

be included on the CSP database and referred to EPA for screening using the Hazard Ranking Score system to determine eligibility for the National Priorities List.

- Alternative Action 2: If concentrations of COCs exceed the respective cleanup or screening levels, then the site will be included on the CSP database and further investigation of the site may be required. A recommendation will be made to EPA that additional investigation and cleanup be managed by CSP, with no further action from EPA.

- Alternative Action 3: If concentrations of COCs do not exceed the respective cleanup or screening levels, then no further investigation will be required by CSP. A recommendation for no further action will be made to EPA.

Step 3: Decision Inputs
The purpose of this step is to identify informational inputs that are required to resolve the Decision Statement and to determine which inputs require measurement. The necessary inputs to address the Decision Statement are the concentrations of COCs present in various media. During this step of the DQO process, the basis for a screening level is established. The screening level is the threshold value that provides the criterion for choosing among Action Alternatives. The screening levels for this project are listed below.

Screening Levels
Soil
Maximum detected concentrations in soil will be compared to a calculated value of 3-times the respective results of the background soil sample. In addition, the soil sample results will also be compared to the ADEC Method 2 most stringent exposure pathway cleanup levels for direct contact, outdoor inhalation, and groundwater protection for the over 40-inches of rainfall climate zone, as defined in 18 AAC 75.341(c), Table B1.

Surface Water
Maximum detected concentrations in surface water will be compared to a calculated value of 3-times the respective results of the background surface water sample. In addition, the surface water sample results will also be compared to the ADEC water quality criteria (18 AAC 70) and drinking water criteria (18 AAC 80), and 18 AAC 75.345(b) Table C groundwater cleanup levels.

Sediment
The ADEC does not have established sediment screening values, but instead relies on federal standards and guidelines outlined in the ADEC guidance document titled *Sediment Quality Guidelines* dated January 2013. Maximum detected concentrations in sediment will be compared to a calculated value of 3-times the respective results of the background sediment samples.

The sediment sample results will also be compared to the appropriate freshwater sediment or marine sediment Threshold Effects Level (TEL) and the Probable Effects Level (PEL) for marine sediments published in the US National Oceanic and Atmospheric Administration's (NOAA) Screening Quick Reference Tables (SQuiRTs). The TEL represents the concentration below which adverse effects are expected to occur only rarely and the PEL represents the concentration above which adverse effects are frequently expected.

Step 4: Study Boundaries
Step 4 in the DQO process defines the spatial and temporal boundaries of the study covered by the Decision Statement. The spatial boundaries define the physical extent of the study area and may be subdivided into specific areas of interest. The temporal boundaries define the duration of the study or specific parts of the study.

The spatial boundaries for sampling at the sites are the State-owned tidelands from 0-1 feet below ground surface and upland properties when permitted by the landowner(s).

The temporal boundaries of the study involves the timeframe in which the decision applies and determining when to collect data. The project schedule is defined below but may change due to weather and time constraints as necessary.

Table 4: Temporal Boundaries of the Study

Event	**Approximate date(s) of Completion**
Field Sampling	April 20-26, 2016
Sample Delivery to Laboratory	April 26, 2016
Laboratory Analyses Complete	May 30 2016
ADEC Laboratory Data Review	June 2016
ADEC PA Report Submitted to EPA	By June 30, 2016

Step 5: Decision Rule
The objective of this step is to define the parameter(s) of interest in the population being characterized and integrate previous DQO outputs into statements defining conditions that direct decision makers to choose among Action Alternatives.

If the concentration of at least one COC in the media sampled in an investigated area exceeds its cleanup or screening level, or if evidence of contamination is observed at the site outside of the sampling boundaries, then further evaluation of the site may be necessary.

If the concentrations of COCs in the media sampled do not exceed their cleanup or screening levels, and if no visual observation is made of contamination outside the sampling boundaries, then no further evaluation of the site will be required.

Step 6: Decision Error Limits
The purpose of this step is to minimize data uncertainty by specifying tolerable limits on decision errors that are used to establish performance goals for the data collection design. It is necessary to determine the possible range for the parameter of interest and to define both the types of decision errors and the potential consequences of the errors.

The two types of decision errors for the characterization of sample data are either (a) determining that the concentrations of all COCs for a sampled area are less than the corresponding screening levels when, in fact, at least one exceeds the screening level, or (b) determining that the concentration of at least one COC of a sampled area exceeds its screening level when, in fact, none of them do. The outcome of the first error is the determination that no further assessment is needed and the site does not pose a threat or potential threat to human health and/or the environment when it may. The second error type could result in further assessment and cost. The

least favorable of these errors is the first where a COC exceeding its screening level is overlooked and no further assessment is done based on the incorrect decision. In the second case, more assessment would occur and an appropriate decision would be made.

Step 7: Design Optimization
The purpose of design optimization in the DQO process is to identify the best sampling and analysis approach that satisfies all of the previous steps in the process. The activities involved in design optimization include:

- Reviewing the outputs of the first six steps and existing environmental data
- Developing general data collection design alternatives
- Selecting the most resource-effective data collection design that satisfies all of the DQOs.

Sample locations are identified based upon site history and information gathered prior and during the site visit. The sampling locations will be focused on the footprint of the former mines and the intertidal area. Additional samples may be collected from biased areas with the highest likelihood of contamination based on field observations and XRF screening results.

References

Alaska Department of Environmental Conservation Drinking Water Protection map. https://dec.alaska.gov/eh/dw/DWP/protection_areas_map.html

Alaska Department of Natural Resources (DNR). Dnr.alaska.gov/mapAK/browser?map_select

Alaska Resource Data File (ARDF). Ardf.wr.usgs.gov

Alaska State Libray Digital Archives. Vilda.alaska.edu

Bureau of Land Management (BLM). Sdms.ak.blm.gov/scanned_images/surveyindex.html

EPA (U.S. Environmental Protection Agency). 2000. Data Quality Objectives Process for Hazardous Waste Site Investigations. EPA QA/G-4HW. January.

Koski, R. A., L. Munk, A. L. Foster, W. C. Shanks III, and L. L. Stillings. 2008. Sulfide oxidation and distribution of metals near abandoned copper mines in coastal environments, Prince William Sound, Alaska, USA. Applied Geochemistry 23 227-254.

Mihelich, M. and R. R. Wells. 1957. Bureau of Mines Report of Investigations 5320 Copper Mines and Prospects Adjacent to Landlocked Bay, Prince William Sound, Alaska. United States Department of the Interior.

United Stated Geological Society (USGS). 2004. Mineral Resources On-Line Spatial Data Alaska Resource Data File. [cited 7 April 2015] Available from: http://mrdata.usgs.gov/ardf/

Appendix 8: ADEC Data Review Checklist

Laboratory Data Review Checklist

Completed by:	Kristin L. Brown		
Title:	Graduate Intern II	Date:	Jun 1, 2016
CS Report Name:	Site Discovery Project	Report Date:	May 18, 2016
Consultant Firm:	n/a		
Laboratory Name:	Alaska State Environmental Health Laboratory	Laboratory Report Number:	1604072
ADEC File Number:	n/a	ADEC RecKey Number:	n/a

1. Laboratory

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

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

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

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

2. Chain of Custody (COC)

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

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

b. Correct analyses requested?

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

3. Laboratory Sample Receipt Documentation

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

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

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

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

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

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

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

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

The pH results are flagged as exceeding holding time because the testing was performed later than 24 hours from the time of collection.

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

Comments:

The pH data may be affected.

4. Case Narrative

a. Present and understandable?

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

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

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

c. Were all corrective actions documented?

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

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

Comments:

None.

5. Samples Results

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

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

b. All applicable holding times met?

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

The pH testing was performed later than 24 hours from the time of collection.

c. All soils reported on a dry weight basis?

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

No soils were analyzed.

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

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

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

Comments:

6. QC Samples

a. Method Blank

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

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

ii. All method blank results less than PQL?

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

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

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

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

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

Testing was performed outside of the holding time for pH and therefore pH results may be affected.

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

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

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

No organics were analyzed.

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

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

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

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

Insufficient sample volume was available to generate a MS/MSD set using one sample source. One of the control spikes with concentrations near the reporting limits yielded two outliers, calcium (54%) and copper (288%). Both of these metals yielded acceptable recoveries in the other two control spike samples. Since the detected calcium concentrations are well above the reporting limit and the copper cleanup level is well above the reporting limit, data quality is not impacted by these outliers.

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

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

The arsenic RPD (28) in the lab sample duplicate analysis exceeded the QC limit. However, since both the sample and duplicate results are below the reporting limit, data quality is not impacted by the outlier.

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

Comments:

None.

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

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

The pH results were flagged for exceeding holding time. None of the other samples were affected. The QC samples are flagged as appropriate.

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

Potentially - pH results are likely affected due to holding time exceedence.

c. Surrogates - Organics Only

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

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

No organics analyzed.

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

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

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

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

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

Comments:

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

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

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

No organics analyzed.

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

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

iii. All results less than PQL?

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

iv. If above PQL, what samples are affected?

Comments:

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

Comments:

e. Field Duplicate

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

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

ii. Submitted blind to lab?

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

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

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

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

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

f. Decontamination or Equipment Blank (if applicable)

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

The CSP used clean or disposable sampling equipment.

i. All results less than PQL?

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

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

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

a. Defined and appropriate?

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

Some metal results are reported at a dilution even though the result is ND due to unknown matrix constituents that interfered with internal standard recoveries.

Reset Form

Laboratory Data Review Checklist

Completed by:	Kristin L. Brown		
Title:	Graduate Intern II	Date:	Jun 2, 2016
CS Report Name:	Site Discovery Project	Report Date:	May 20, 2016
Consultant Firm:	n/a		
Laboratory Name:	Alaska State Environmental Health Laboratory	Laboratory Report Number:	1604075
ADEC File Number:	n/a	ADEC RecKey Number:	n/a

1. Laboratory

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

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

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

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

2. Chain of Custody (COC)

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

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

b. Correct analyses requested?

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

3. Laboratory Sample Receipt Documentation

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

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

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

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

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

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

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

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

No discrepancies

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

Comments:

4. Case Narrative

a. Present and understandable?

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

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

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

Two sets of three control spikes at varying concentrations were generated for this batch. The two lower control spikes in both sets, one at the method reporting limit (MRL) and one at two times the MRL, both yielded copper recoveries above the control chart QC limits, but within the advisory limits (70-130) established for these two level spikes until enough data can be gathered to generate controls charts. Copper recoveries within the QC limits for the other two LCSs were achieved. Copper recoveries in the associated MS/MSD sets could not be calculated due to the high amount of copper native to the sample relative to the amount spiked.

c. Were all corrective actions documented?

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

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

Comments:

None

5. Samples Results

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

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

b. All applicable holding times met?

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

c. All soils reported on a dry weight basis?

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

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

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

The PQL for cadmium, copper, and selenium exceeded the cleanup levels in some cases due to sample dilution as a result of high copper concentrations.

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

Comments:

No - the data is still useful even though copper overshadowed other metals in the samples. The selenium reporting limits do not have an adverse effect on the samples because of the metal concentrations above cleanup criteria.

6. QC Samples

a. Method Blank

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

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

ii. All method blank results less than PQL?

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

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

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

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

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

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

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

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

No organics were analyzed.

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

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

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

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

Some recoveries could not be calculated because the amounts found in the MS and/or MSD samples were less than the amount found for the original sample analysis.

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

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

The high RPD results in the sample duplicate are indicative of a heterogeneous character for both samples. The high RPDs were also observed in comparison of the MS and MSD results. For metals analyses, in several cases, the amounts spiked were overshadowed by high concentrations of metals in the native sample. The data is not negatively affected.

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

None.

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

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

The samples were not affected, but the QC samples are flagged.

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

No.

c. Surrogates - Organics Only

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

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

No organics analyzed.

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

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

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

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

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

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

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

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

No organics analyzed.

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

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

iii. All results less than PQL?

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

iv. If above PQL, what samples are affected?

Comments:

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

Comments:

e. Field Duplicate

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

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

ii. Submitted blind to lab?

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

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

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

Field duplicate pair (SC02SO, SC03SO) RPD for Cu exceeded due to sample heterogeneity despite field homogenization.

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

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

The samples still provide useful data.

f. Decontamination or Equipment Blank (if applicable)

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

The CSP used clean or disposable sampling equipment.

i. All results less than PQL?

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

ii. If above PQL, what samples are affected?

Comments:

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

Comments:

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

a. Defined and appropriate?

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

Some metal results are reported at a dilution even though the result is ND due to unknown matrix constituents that interfered with internal standard recoveries.

Reset Form

Appendix 9: Original laboratory reports

ANALYTICAL REPORT

Alaska State Environmental Health Laboratory
5251 Dr. Martin Luther King Jr. Avenue
Anchorage, AK 99507
www.dec.alaska.gov/eh/lab

Work Order Number: 1604072
Project Name: Site Discovery Project

For:

AKDEC Contaminated Sites Program
410 Willoughby Ave, Suite 303
Juneau, AK 99811-1800

Attn: Danielle Duncan

Steve R Crupi
Quality Assurance Manager
steve.crupi@alaska.gov

Report Date: 05/18/2016

ALASKA Department of Environmental Conservation

The results in this report apply to the samples analyzed in accordance with the sample submission form. This analytical report must be reproduced in its entirety. This report has been electronically signed and authorized by the signatory.

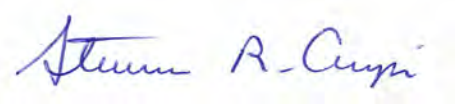
Sample Summary

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/2016 18:43

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
1604072-01	TM1WA	Water	04/24/2016	04/27/2016
1604072-02	TM8WA	Water	04/24/2016	04/27/2016
1604072-03	TM9WA	Water	04/24/2016	04/27/2016
1604072-04	TM10WA	Water	04/24/2016	04/27/2016
1604072-05	LB4WA	Water	04/24/2016	04/27/2016
1604072-06	SC1WA	Water	04/24/2016	04/27/2016
1604072-07	SC6WA	Water	04/24/2016	04/27/2016

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Methods

All samples were analyzed and conform with the following methods unless otherwise specified in the Case Narrative:

EPA 150.1
EPA 3015A/6020A
SM 2340 B

Case Narrative

All samples were analyzed for pH on the day of receipt, before adding nitric acid to preserve the samples for metals testing. The results are flagged as exceeding holding time because the testing was performed later than 24 hours from the time of collection.

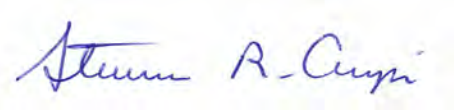
The arsenic RPD (28) in the sample duplicate analysis exceeded the QC limit. However, since both the sample and duplicate results are below the reporting limit, data quality is not impacted by the outlier.

Insufficient sample volume was available to generate a matrix spike/matrix spike duplicate set using one sample source. Consequently, two matix spike samples were generated, each with a different source sample, to generate batch accuracy information. Batch precision (i.e. RPD) information can be obtained from the duplicate analysis set.

Three control spikes at varying concentration levels were generated for this batch. The control spike (B16D096-BS1) with concentrations near the reporting limits yielded two outliers, calcium (54%) and copper (286%). Both of these metals yielded acceptable acceptable recoveries in the other two control spike samples, one of which was at concentrations of about two times the reporting limits and the other near the high end of the calibration curve. Since the detected calcium concentrations are well above the reporting limit and the copper cleanup level (1,000 ppb) is well above the reporting limit, data quality is not impacted by these outliers.

Notes and Definitions

Z-REP	Recovery was outside of the advisory limits of 70-130%. Control chart data is being gathered to establish appropriate low-level LCS limits for this analyte.
Q-08	The Relative Percent Difference for duplicate analyses was outside of advisory limits. The analyte value in the sample is greater than the MDL, but less than the MRL (J value).
HOLDTIME	Hold time exceeded. See case narrative.



Steve R Crupi, Quality Assurance Manager

Analytical Data

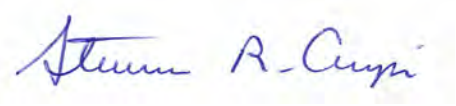
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: TM1WA
Lab Sample ID: 1604072-01
Date Collected: 04/24/16 9:04
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**14**	0.056	mg/L	2	"	"	16-May-16	"	
Copper	**0.21**	0.00056	mg/L	1	"	"	16-May-16	"	
Hardness	**53**	0.25	mg eq. CaCO3/L	2	[CALC]	"	16-May-16	SM 2340 B	
Lead	ND	0.00056	mg/L	1	B16D096	"	16-May-16	EPA 3015A/6020 A	
Magnesium	**4.2**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**6.94**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

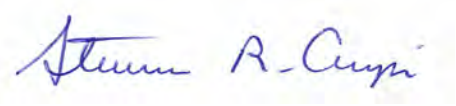
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: TM8WA
Lab Sample ID: 1604072-02
Date Collected: 04/24/16 10:32
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**18**	0.056	mg/L	2	"	"	16-May-16	"	
Copper	**0.22**	0.0011	mg/L	"	"	"	"	"	
Hardness	**51**	0.25	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	ND	0.00056	mg/L	1	B16D096	"	16-May-16	EPA 3015A/6020 A	
Magnesium	**1.3**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**7.29**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

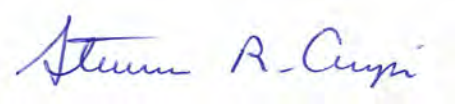
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: TM9WA
Lab Sample ID: 1604072-03
Date Collected: 04/24/16 10:32
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**18**	0.056	mg/L	2	"	"	16-May-16	"	
Copper	**0.23**	0.0011	mg/L	"	"	"	"	"	
Hardness	**51**	0.25	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	ND	0.00056	mg/L	1	B16D096	"	16-May-16	EPA 3015A/6020 A	
Magnesium	**1.3**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**7.26**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

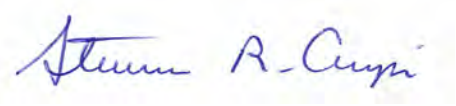
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: TM10WA
Lab Sample ID: 1604072-04
Date Collected: 04/24/16 11:06
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**4.8**	0.028	mg/L	"	"	"	"	"	
Copper	**0.00070**	0.00056	mg/L	"	"	"	"	"	
Hardness	**14**	0.18	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	ND	0.00056	mg/L	"	B16D096	"	"	EPA 3015A/6020 A	
Magnesium	**0.45**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**7.43**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

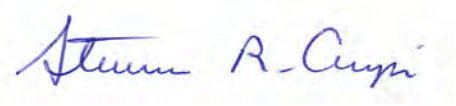
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: LB4WA
Lab Sample ID: 1604072-05
Date Collected: 04/24/16 11:51
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**3.2**	0.028	mg/L	"	"	"	"	"	
Copper	**0.0087**	0.00056	mg/L	"	"	"	"	"	
Hardness	**10**	0.18	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	ND	0.00056	mg/L	"	B16D096	"	"	EPA 3015A/6020 A	
Magnesium	**0.50**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**6.88**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: SC1WA
Lab Sample ID: 1604072-06
Date Collected: 04/24/16 15:02
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**6.9**	0.028	mg/L	"	"	"	"	"	
Copper	**0.0018**	0.00056	mg/L	"	"	"	"	"	
Hardness	**19**	0.18	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	**0.0027**	0.00056	mg/L	"	B16D096	"	"	EPA 3015A/6020 A	
Magnesium	**0.57**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**7.14**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

Alaska State Environmental Health Laboratory

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

Analytical Data

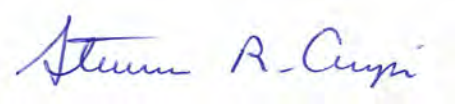
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604072
Report Date: 05/18/16 18:43

Client Sample ID: SC6WA
Lab Sample ID: 1604072-07
Date Collected: 04/24/16 17:05
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	ND	0.00056	mg/L	1	B16D096	07-May-16	16-May-16	EPA 3015A/6020 A	
Cadmium	ND	0.00056	mg/L	"	"	"	"	"	
Calcium	**3.3**	0.028	mg/L	"	"	"	"	"	
Copper	**0.0012**	0.00056	mg/L	"	"	"	"	"	
Hardness	**10**	0.18	mg eq. CaCO3/L	"	[CALC]	"	"	SM 2340 B	
Lead	ND	0.00056	mg/L	"	B16D096	"	"	EPA 3015A/6020 A	
Magnesium	**0.51**	0.028	mg/L	"	"	"	"	"	
Selenium	ND	0.0028	mg/L	"	"	"	"	"	
pH	**6.99**		pH unit	1	B16D088	27-Apr-16	27-Apr-16	EPA 150.1	HOLDT IME

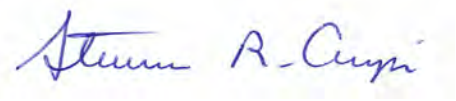
Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D096 - EPA 3015A										
Blank (B16D096-BLK1)				Prepared: 07-May-16 Analyzed: 16-May-16						
Arsenic	ND	0.00056	mg/L							
Magnesium	ND	0.028	"							
Cadmium	ND	0.00056	"							
Copper	ND	0.00056	"							
Lead	ND	0.00056	"							
Selenium	ND	0.0028	"							
Calcium	ND	0.028	"							
LCS (B16D096-BS1)				Prepared: 07-May-16 Analyzed: 16-May-16						
Arsenic	0.00051	0.00056	mg/L	0.00055556		92	80-120			
Magnesium	0.023	0.028	"	0.027917		81	80-120			
Cadmium	0.00050	0.00056	"	0.00055556		90	80-120			
Copper	0.0016	0.00056	"	0.00055556		286*	80-120			Z-REP
Lead	0.00056	0.00056	"	0.00055556		101	80-120			
Selenium	0.0026	0.0028	"	0.0027778		92	80-120			
Calcium	0.015	0.028	"	0.027722		54*	80-120			Z-REP
LCS (B16D096-BS2)				Prepared: 07-May-16 Analyzed: 16-May-16						
Arsenic	0.0011	0.00056	mg/L	0.0011111		101	80-120			
Magnesium	0.053	0.028	"	0.055833		95	80-120			
Cadmium	0.0011	0.00056	"	0.0011111		98	80-120			
Copper	0.0012	0.00056	"	0.0011111		110	80-120			
Lead	0.0011	0.00056	"	0.0011111		100	80-120			
Selenium	0.0053	0.0028	"	0.0055556		96	80-120			
Calcium	0.046	0.028	"	0.055444		84	80-120			
LCS (B16D096-BS3)				Prepared: 07-May-16 Analyzed: 16-May-16						
Arsenic	0.11	0.00056	mg/L	0.11111		98	80-120			
Magnesium	5.5	0.028	"	5.5833		98	80-120			
Cadmium	0.11	0.00056	"	0.11111		97	80-120			
Copper	0.11	0.00056	"	0.11111		98	80-120			
Lead	0.11	0.00056	"	0.11111		101	80-120			
Selenium	0.55	0.0028	"	0.55556		99	80-120			
Calcium	5.5	0.028	"	5.5444		100	80-120			



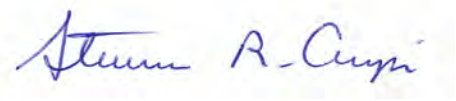
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D096 - EPA 3015A										
Duplicate (B16D096-DUP1)		**Source: 1604072-02**		Prepared: 07-May-16		Analyzed: 16-May-16				
Arsenic	0.000041	0.00056	mg/L		0.000054			28*	20	Q-08
Magnesium	1.3	0.028	"		1.3			0.4	20	
Cadmium	0.00036	0.00056	"		0.00037			2	20	
Copper	0.23	0.0011	"		0.22			2	20	
Lead	0.000036	0.00056	"		0.000036			0	20	
Selenium	0.0015	0.0028	"		0.0015			2	20	
Calcium	18	0.056	"		18			1	20	
Matrix Spike (B16D096-MS1)		**Source: 1604072-03**		Prepared: 07-May-16		Analyzed: 16-May-16				
Arsenic	0.11	0.00056	mg/L	0.11111	0.000040	102	80-130			
Magnesium	6.9	0.028	"	5.5833	1.3	100	75-125			
Cadmium	0.11	0.00056	"	0.11111	0.00048	100	75-125			
Copper	0.34	0.0017	"	0.11111	0.23	101	75-125			
Lead	0.12	0.00056	"	0.11111	0.00017	105	75-125			
Selenium	0.57	0.0028	"	0.55556	0.0014	102	90-140			
Calcium	24	0.083	"	5.5444	18	94	75-125			
Matrix Spike (B16D096-MS2)		**Source: 1604072-04**		Prepared: 07-May-16		Analyzed: 16-May-16				
Arsenic	0.11	0.00056	mg/L	0.11111	0.00014	102	80-130			
Magnesium	6.1	0.028	"	5.5833	0.45	101	75-125			
Cadmium	0.11	0.00056	"	0.11111	0.000012	100	75-125			
Copper	0.11	0.00056	"	0.11111	0.00070	101	75-125			
Lead	0.12	0.00056	"	0.11111	0.000038	105	75-125			
Selenium	0.57	0.0028	"	0.55556	0.00036	103	90-140			
Calcium	10	0.028	"	5.5444	4.8	101	75-125			

Classical Chemistry Parameters - Quality Control
Alaska State Environmental Health Laboratory

Work Order: 1604072

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D088 - NO PREP										
Duplicate (B16D088-DUP1)	**Source: 1604072-06**			Prepared & Analyzed: 27-Apr-16						
pH	7.19		pH unit		7.14			0.7	20	
Reference (B16D088-SRM1)				Prepared & Analyzed: 27-Apr-16						
pH	4.02		pH unit	4.0100		100	90-110			
Reference (B16D088-SRM2)				Prepared & Analyzed: 27-Apr-16						
pH	7.01		pH unit	7.0000		100	99.3-100.7			

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

State of Alaska
Environmental Health Laboratory
5251 Dr. MLK Jr. Avenue
Anchorage, AK 99507
(907) 375-8200

Chain of Custody Record

ALASKA Department of Environmental Conservation

Environmental Health Laboratory

Client Contact	Project Manager: Steve Crupi	Site Contact: Danielle Duncan	Shipping Date:	COC No:
Danielle Duncan	Tel/Fax: 907-375-3799 steve.crupi@alaska.gov	Lab Contact: Steve Crupi	Shipping Carrier:	2 of 4 COCs
Dept CS/CS Program	**Analysis Turnaround Time**			Job No. CC 18664730 (EHL)
410 Willoughby Ave. Suite 303	Calendar (C) or Work Days (W) 28 W			1604072
Juneau, AK 99811-1800	TAT if different from Below:			Comments:
907-465-5207 danielle.duncan@alaska.gov	☐ 2 weeks			
Project Name: Site Discovery Project	☐ 1 week			
Project Number: RSA#18-50201 (CS)	☐ 2 days			
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	6020 Arsenic (As)	6020 Cadmium (Cd)	6020 Copper (Cu)	6020 Lead (Pb)	6020 Selenium (Se)	7473 Mercury (Hg)	150.1 pH	6020 Calcium (Ca)	6020 Magnesium (Mg)	Hardness Calculation	Moisture content	AK102/103 DRO/RRO	Sample Specific Notes:
E05SD	4/22/16	1110	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E06SD		1158	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E07SD		1210	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E08SD		1227	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E09SD		1241	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E10SD		1257	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
E11SD		1315	Sed	Sed	1	✓	✓	✓	✓	✓	✓							
TM4SD	4/24/16	851	Sed	Sed	1	✓	✓	✓	✓	✓								
TM1WA		909	Water	WA	1	✓	✓	✓	✓	✓		✓	✓	✓	✓			-01
TM3SD		926	Soil	Soil	1	✓	✓	✓	✓	✓								
TM2SD		914	Sed.	Sed	1	✓	✓	✓	✓	✓								
TM5SD		941	Sed	Sed	1	✓	✓	✓	✓	✓								

TMB 4-27-16

TMB 4-27-16

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ■ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments: Samples arrive to lab unpreserved.
all sediment on dry wt.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	ADEC	4-26-16 1047	Tera M. Barlow	ADEC-EHL	4-27-16 0805
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

G:\SPAR\Spar-Contaminated Sites\38 Case Files (Contaminated Sites)\Site Discovery\SDP Chain of Custody.xls

State of Alaska
Environmental Health Laboratory
5251 Dr. MLK Jr. Avenue
Anchorage, AK 99507
(907) 375-8200

Chain of Custody Record

ALASKA Department of Environmental Conservation

Environmental Health Laboratory

Client Contact	Project Manager: Steve Crupi	Site Contact: Danielle Duncan	Shipping Date:	COC No:
Danielle Duncan	Tel/Fax: 907-375-3799 steve.crupi@alaska.gov	Lab Contact: Steve Crupi	Shipping Carrier:	3 of 4 COCs
Dept CS/CS Program	**Analysis Turnaround Time**			Job No. CC 18664730 (EHL)
410 Willoughby Ave. Suite 303	Calendar (C) or Work Days (W) _28 W_			1604072
Juneau, AK 99811-1800	TAT if different from Below:			Comments:
907-465-5207 danielle.duncan@alaska.gov	☐ 2 weeks			
Project Name: Site Discovery Project	☐ 1 week			
Project Number: RSA#18-50201 (CS)	☐ 2 days			
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	6020 Arsenic (As)	6020 Cadmium (Cd)	6020 Copper (Cu)	6020 Lead (Pb)	6020 Selenium (Se)	7473 Mercury (Hg)	150.1 pH	6020 Calcium (Ca)	6020 Magnesium (Mg)	Hardness Calculation	Moisture content	Sample Specific Notes:
TM6SD	9/24/16	955	Sed	Sed	1	✓	✓	✓	✓	✓							TMB 4-27-16
TM7SD		1010	Sed	Sed	1	✓	✓	✓	✓	✓							
TM8WA		1032	Water	Water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		-02
TM9WA		1032	Water	Water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		-03
TM10WA		1106	Water	Water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		-04
TM11SD		1112	Sed	Sed	1	✓	✓	✓	✓	✓							
LB1SD		1137	Sed	Sed	1	✓	✓	✓	✓	✓							TMB 4-27-16
LB2SD		1140	Sed	Sed	1	✓	✓	✓	✓	✓							
LB3SD		1204	Sed	Sed	1	✓	✓	✓	✓	✓							
LB4WA		1151	Water	WA	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		-05
SC1WA		1502	Water	Water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		-06
SC2SD		1517	Soil	Soil	1	✓	✓	✓	✓	✓							TMB 4-27-16

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ■ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments: Samples arrive to lab unpreserved.
all sediment on dry wt.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	ADEC	4-26-16 1047	Jenarm. Barbour	ADEC-EHL	4-27-16 0805
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

G:\SPAR\Spar-Contaminated Sites\38 Case Files (Contaminated Sites)\Site Discovery\SDP Chain of Custody.xls

State of Alaska
Environmental Health Laboratory
5251 Dr. MLK Jr. Avenue
Anchorage, AK 99507
(907) 375-8200

Chain of Custody Record

ALASKA Department of Environmental Conservation

Environmental Health Laboratory

Client Contact	Project Manager: Steve Crupi	Site Contact: Danielle Duncan	Shipping Date:	COC No:
Danielle Duncan	Tel/Fax: 907-375-3799 steve.crupi@alaska.gov	Lab Contact: Steve Crupi	Shipping Carrier:	4 of 4 COCs
Dept CS/CS Program	**Analysis Turnaround Time**			Job No. CC 18664730 (EHL) 1604072
410 Willoughby Ave. Suite 303	Calendar (C) or Work Days (W) _28 W_			Comments:
Juneau, AK 99811-1800	TAT if different from Below:			
907-465-5207 danielle.duncan@alaska.gov	☐ 2 weeks			
Project Name: Site Discovery Project	☐ 1 week			
Project Number: RSA#18-50201 (CS)	☐ 2 days			
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	6020 Arsenic (As)	6020 Cadmium (Cd)	6020 Copper (Cu)	6020 Lead (Pb)	6020 Selenium (Se)	7473 Mercury (Hg)	150.1 pH	6020 Calcium (Ca)	6020 Magnesium (Mg)	Hardness Calculation	Moisture content	Sample Specific Notes:
SC3SO	4/24/16	1520	soil	soil	1	✓	✓	✓	✓	✓							
SC4SD		1531	sediment	sed	1	✓	✓	✓	✓	✓							
SC5SO		1546	soil	soil	1	✓	✓	✓	✓	✓							
SC6WA		1705	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		
SC7SD		1715	sed	sed	1	✓	✓	✓	✓	✓							
FM01SD	4/25/16	0915	sed	sed	1	✓	✓	✓	✓	✓							
FM02SD		0916	sed	sed	1	✓	✓	✓	✓	✓							
FM03SD		0927	sed	sed	1	✓	✓	✓	✓	✓							
FM04SD		0937	sed	sed	1	✓	✓	✓	✓	✓							
FM05SD		0951	sed	sed	1	✓	✓	✓	✓	✓							
FM06SD		1009	sed	sed	1	✓	✓	✓	✓	✓							

TMB 4/27/16 -07

TMB 4/27/16

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ■ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments: Samples arrive to lab unpreserved.
all sediment on dry wt.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	ADEC	1047 4-26-16	Tina M. Barbour	ADEC-EHL	4-27-16 0805
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

G:\SPAR\Spar-Contaminated Sites\38 Case Files (Contaminated Sites)\Site Discovery\SDP Chain of Custody.xls

ADEC EHL Sample Receipt Checklist

Environmental Health Laboratory
5251 Dr. MLK Jr. Ave., Anchorage, AK 99507
(907) 375-8200

Received Within Regulatory Hold Time? Y [X] N [ ] Non-Conformances? Y [ ] N [X]

Received By:
Initials: VS/TMB
Date: 04/27/16
Time: 08 05

Login In By:
Initials: TMB
Date/Time: See Element 4-27-16

Workorder Status:
[Accepted] Due Date: 7-21-16
Rejected:
Subcontracted:

Sample Temperature @ Receipt: 3.4 °C

Folder # 160472
Submitter: ADEC CONTAMINATED SITES
Client: " " "
Client Notes:

# of Samples: 7
Sample Type: water
Test(s) Requested: metals, pH, Ca, mg Hardness

COC Seals:
[X] On ship. container (strapping tape)
[ ] On bottle
[ ] None

Received via:
[ ] USPS
[ ] UPS
[ ] FedEx
[ ] Client Delivered
[X] Courier
[X] Other Ak Airlines
Shipment Tracking # 027-8887-6093

Container Type:
[ ] Box
[X] Cooler
[ ] Envelope
[ ] Hand Carry
[ ] Styro-box
[ ] Other

Packaging Type:
[ ] Biohazard Bag
[ ] Bubble Wrap
[ ] Paper
[ ] Plastic / Ziploc Bag
[ ] Styrofoam
[X] Other Jars; 125 ml idex
[ ] None

Refrigerant:
[ ] Dry Ice
[X] Gel / Ice Pack
[ ] Loose Ice
[ ] Other
[ ] None

Sample Containers:

Intact?	Y	[X]	N	[ ]	Samples Match Form?	Y [X]	N [ ]
Correct Type?	Y	[X]	N	[ ]	Properly Preserved?	Y [X]	N [ ]
Adequately Labeled?	Y	[X]	N	[ ]	Adequate Amt for Tests?	Y [X]	N [ ]
IDs/time/date match Form?	Y	[X]	N	[ ]			

Sample Submission Form:

Is Sample Submission Form Complete?	Y	[X]	N	[ ]	
Is client information in Database accurate?	Y	[X]	N	[ ]	
Phone	Y	[X]	N	[ ]	
Address	Y	[X]	N	[ ]	
Client Contacted Regarding Incomplete Data?	N	[X]	Y	[ ]	Y? Date: Time: Spoke to:

Comments:

Cooler

027 CDV 8887 6093 027-8887 6093

Shipper's Name and Address: Adec contaminated site pr 410 willoughby ave suite 303 Jnu, AK 99811 USA Tel: 907-303-2996	Shipper's Account Number Customer's ID Number ~004939500S
Not Negotiable **Air Waybill** Issued By: Alaska AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKACARGO.COM	
Consignee's Name and Address: Edec-eh laboratory 5251 dr martin luthere king jr ave Anc, AK 99507-1293 USA Tel: 907-375-8231	Consignee's Account Number
Also notify N LMSQ 4-26 Tel:	
Issuing Carrier's Agent and City	Accounting Information ~004939500S Adec contaminated site program 410 willoughby ave suite 303 Jnu, AK 99811 USA GoldStreak
Agent's IATA Code / Account No.	
Airport of Departure (Addr. of First Carrier) and Requested Routing Cordova	

To	By First Carrier	To / By	To / By	Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
ANC	Alaska Airlines			USD	PZ	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Anchorage	AS 061/26		XXX

Handling Information
PERISHABLE CARGO (NON - FOOD)
HFP NOA 907-375-8231

SCI

No of Pieces	Gross Weight	kg lb		Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	43.0	L	N		43.0		AS AGREED	SOIL SAMPLES Dims: 24 x 12 x12 x 1 PER GSX SOA
1	43.0						AS AGREED	Volume: 2.000

Prepaid	Weight Charge	Collect	Other Charges
AS AGREED			XBC 0.00
Valuation Charge			
Tax			
Total Other Charges Due Agent			
Total Other Charges Due Carrier			
Total Prepaid	Total Collect		
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Adec contaminated site program

Signature of Shipper or his Agent

RMP THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Executed On (Date)	at (Place)	Signature of Issuing Carrier or its Agent
26 Apr 2016 10:54	Cordova	Alaska Airlines

027-8887 6093

ANALYTICAL REPORT

Alaska State Environmental Health Laboratory
5251 Dr. Martin Luther King Jr. Avenue
Anchorage, AK 99507
www.dec.alaska.gov/eh/lab

Work Order Number: 1604075
Project Name: Site Discovery Project

For:

AKDEC Contaminated Sites Program
410 Willoughby Ave, Suite 303
Juneau, AK 99811-1800

Attn: Danielle Duncan

Steve R Crupi
Quality Assurance Manager
steve.crupi@alaska.gov

Report Date: 05/20/2016

ALASKA Department of Environmental Conservation

The results in this report apply to the samples analyzed in accordance with the sample submission form. This analytical report must be reproduced in its entirety. This report has been electronically signed and authorized by the signatory.

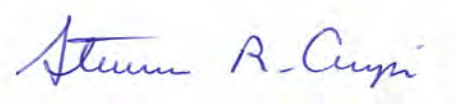
Sample Summary

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/2016 14:05

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
1604075-01	TM6SD	Sediment	04/24/2016	04/27/2016
1604075-02	TM7SD	Sediment	04/24/2016	04/27/2016
1604075-03	TM11SD	Sediment	04/24/2016	04/27/2016
1604075-04	LB1SD	Sediment	04/24/2016	04/27/2016
1604075-05	LB2SD	Sediment	04/24/2016	04/27/2016
1604075-06	LB3SD	Sediment	04/24/2016	04/27/2016
1604075-07	SC2SO	Soil	04/24/2016	04/27/2016
1604075-08	SC3SO	Soil	04/24/2016	04/27/2016
1604075-09	SC4SD	Sediment	04/24/2016	04/27/2016
1604075-10	SC5SO	Soil	04/24/2016	04/27/2016
1604075-11	SC7SD	Sediment	04/24/2016	04/27/2016
1604075-12	FM01SD	Sediment	04/25/2016	04/27/2016
1604075-13	FM02SD	Sediment	04/25/2016	04/27/2016
1604075-14	FM03SD	Sediment	04/25/2016	04/27/2016
1604075-15	FM04SD	Sediment	04/25/2016	04/27/2016
1604075-16	FM05SD	Sediment	04/25/2016	04/27/2016
1604075-17	FM06SD	Sediment	04/25/2016	04/27/2016

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Methods

All samples were analyzed and conform with the following methods unless otherwise specified in the Case Narrative:

EPA 3051A/6020A
SM 2540 G

Case Narrative

The dilution samples of seven of the samples in this set resulted in Se reporting limits above its cleanup criterion (3.4 ppm) with ND (not detected results). Five of these samples required dilution analyses due to concentrations above cleanup criteria for one or more metals. Also, the dilution analyses were also necessitated by matrix interference with the internal standards used for quantitation, which impacted two additional samples. Lower dilution analyses for Se were not possible because of the matrix interference, which in some cases, was directly related to a high concentration of another metal. The Se RLs do not have an adverse effect on these samples because of the metal concentrations above cleanup criteria.

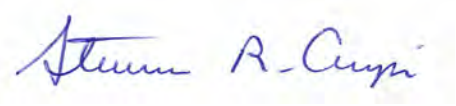
Two sets of three control spikes at varying concentration levels were generated for this batch. The two lower control spikes in both sets, one at the method reporting limit (MRL) and one at two times the MRL, both yielded Cu recoveries above the control chart QC limits, but within the advisory limits (70-130) established for these two level spikes until enough data can be gathered to generate control charts. Cu recoveries within the QC limits for the other two LCSs were achieved. Cu recoveries in the associated MS/MSD sets could not be calculated due to the high amount of Cu native to the sample relative to the amount spiked.

Samples SC5SO and FM03SD were used as source samples for the SW6020A duplicate and MS/MSD QC analyses. The high RPD results in the sample duplicate are indicative of a heterogeneous character for both samples. The high RPDs were also observed in the comparison of the MS and MSD results. Some recoveries within these two sets could not be calculated (NR=not recovered) because the amounts found in the MS and/or MSD samples were less than the amount found for the original sample analysis. In several cases, the amounts spiked were overshadowed by the amounts native to the sample.

Notes and Definitions

Z-REPa	Recovery was outside of the advisory limits of 70-130%. Control chart data is being gathered to establish appropriate low-level LCS limits for this analyte.
Z-REP	Copper is within 70-130% recovery for the 1ppb BS and within 80-120% for the 100ppb BS. Evaluation of the 0.5 and 1ppb spikes are in process.
Q-07	The Relative Percent Difference for MS/MSD analyses was outside of advisory limits. The high RPD may be due to non-homogeneous sample.
Q-06	The Relative Percent Difference for duplicate analyses was outside of advisory limits. The high RPD may be due to non-homogeneous sample.
Q-03	The Matrix Spike/Matrix Spike Duplicate recovery was below advisory limits. However, the Laboratory Control Sample results were within acceptance limits. The low recovery in the MS/MSD may be due to matrix effects.
Q-02	The Matrix Spike/Matrix Spike Duplicate recovery was above advisory limits. However the Laboratory Control Sample results were within acceptance limits. The high recovery in the MS/MSD may be due to matrix effects.

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

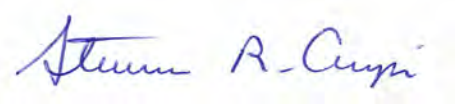
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: TM6SD
Lab Sample ID: 1604075-01
Date Collected: 04/24/16 9:55
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**22**	0.70	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.70	mg/kg dry	"	"	"	"	"	
Copper	**130**	0.70	mg/kg dry	"	"	"	"	"	
Lead	**4.8**	0.70	mg/kg dry	"	"	"	"	"	
Selenium	ND	3.5	mg/kg dry	"	"	"	"	"	
% Solids	**74.4**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

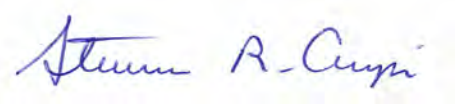
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: TM7SD
Lab Sample ID: 1604075-02
Date Collected: 04/24/16 10:10
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**4.8**	0.67	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.67	mg/kg dry	"	"	"	"	"	
Copper	**910**	6.7	mg/kg dry	100	"	"	13-May-16	"	
Lead	**32**	0.67	mg/kg dry	10	"	"	16-May-16	"	
Selenium	ND	3.4	mg/kg dry	"	"	"	"	"	
% Solids	**76.5**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

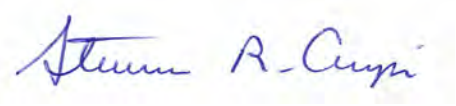
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: TM11SD
Lab Sample ID: 1604075-03
Date Collected: 04/24/16 11:12
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**9.3**	0.72	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.72	mg/kg dry	"	"	"	"	"	
Copper	**37**	0.72	mg/kg dry	"	"	"	"	"	
Lead	**8.2**	0.72	mg/kg dry	"	"	"	"	"	
Selenium	ND	3.6	mg/kg dry	"	"	"	"	"	
% Solids	**72.6**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

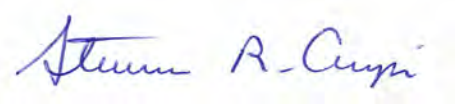
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: LB1SD
Lab Sample ID: 1604075-04
Date Collected: 04/24/16 11:37
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**9.2**	0.79	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.79	mg/kg dry	"	"	"	"	"	
Copper	**1900**	7.9	mg/kg dry	100	"	"	13-May-16	"	
Lead	**13**	0.79	mg/kg dry	10	"	"	16-May-16	"	
Selenium	ND	3.9	mg/kg dry	"	"	"	"	"	
% Solids	**63.6**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

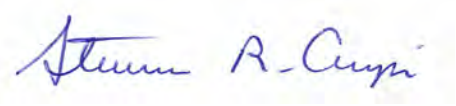
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: LB2SD
Lab Sample ID: 1604075-05
Date Collected: 04/24/16 11:40
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**10**	0.76	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.76	mg/kg dry	"	"	"	"	"	
Copper	**2000**	7.6	mg/kg dry	100	"	"	13-May-16	"	
Lead	**14**	0.76	mg/kg dry	10	"	"	16-May-16	"	
Selenium	ND	3.8	mg/kg dry	"	"	"	"	"	
% Solids	**67.5**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

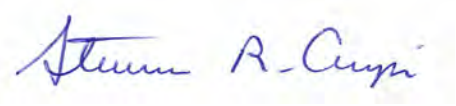
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: LB3SD
Lab Sample ID: 1604075-06
Date Collected: 04/24/16 12:04
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**1.0**	0.55	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.55	mg/kg dry	"	"	"	"	"	
Copper	**740**	5.5	mg/kg dry	100	"	"	13-May-16	"	
Lead	**3.1**	0.55	mg/kg dry	10	"	"	16-May-16	"	
Selenium	**2.8**	2.8	mg/kg dry	"	"	"	"	"	
% Solids	**92.0**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: SC2SO
Lab Sample ID: 1604075-07
Date Collected: 04/24/16 15:17
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**18**	2.8	mg/kg dry	50	B16D098	05-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.8	mg/kg dry	"	"	"	"	"	
Copper	**820**	2.8	mg/kg dry	"	"	"	"	"	
Lead	**46**	2.8	mg/kg dry	"	"	"	"	"	
Selenium	**16**	14	mg/kg dry	"	"	"	"	"	
% Solids	**92.1**		% by weight	1	B16D092	05-May-16	06-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory

Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

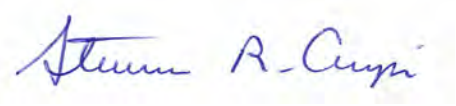
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: SC3SO
Lab Sample ID: 1604075-08
Date Collected: 04/24/16 15:20
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**15**	2.9	mg/kg dry	50	B16D098	05-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.9	mg/kg dry	"	"	"	"	"	
Copper	**8100**	110	mg/kg dry	2000	"	"	16-May-16	"	
Lead	**56**	2.9	mg/kg dry	50	"	"	17-May-16	"	
Selenium	**27**	14	mg/kg dry	"	"	"	"	"	
% Solids	**91.2**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

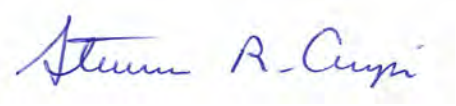
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: SC4SD
Lab Sample ID: 1604075-09
Date Collected: 04/24/16 15:31
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**6.2**	2.7	mg/kg dry	50	B16D098	05-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.7	mg/kg dry	"	"	"	"	"	
Copper	**2600**	210	mg/kg dry	4000	"	"	16-May-16	"	
Lead	**6.6**	2.7	mg/kg dry	50	"	"	17-May-16	"	
Selenium	ND	13	mg/kg dry	"	"	"	"	"	
% Solids	**94.9**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: SC5SO
Lab Sample ID: 1604075-10
Date Collected: 04/24/16 15:46
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**12**	2.7	mg/kg dry	50	B16D098	05-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.7	mg/kg dry	"	"	"	"	"	
Copper	**780**	2.7	mg/kg dry	"	"	"	"	"	
Lead	**37**	2.7	mg/kg dry	"	"	"	"	"	
Selenium	ND	14	mg/kg dry	"	"	"	"	"	
% Solids	**91.9**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

Analytical Data

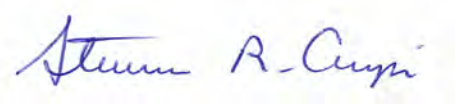
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: SC7SD
Lab Sample ID: 1604075-11
Date Collected: 04/24/16 17:15
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**3.3**	0.63	mg/kg dry	10	B16D098	05-May-16	16-May-16	EPA 3051A/6020 A	
Cadmium	ND	0.63	mg/kg dry	"	"	"	"	"	
Copper	**30**	0.63	mg/kg dry	"	"	"	"	"	
Lead	**3.8**	0.63	mg/kg dry	"	"	"	"	"	
Selenium	ND	3.2	mg/kg dry	"	"	"	"	"	
% Solids	**80.2**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM01SD
Lab Sample ID: 1604075-12
Date Collected: 04/25/16 9:15
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**3.2**	3.1	mg/kg dry	50	B16E013	05-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	3.1	mg/kg dry	"	"	06-May-16	"	"	
Copper	**750**	3.1	mg/kg dry	"	"	"	"	"	
Lead	**28**	3.1	mg/kg dry	"	"	"	"	"	
Selenium	**56**	15	mg/kg dry	"	"	"	"	"	
% Solids	**82.7**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM02SD
Lab Sample ID: 1604075-13
Date Collected: 04/25/16 9:16
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**3.3**	3.1	mg/kg dry	50	B16E013	06-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	3.1	mg/kg dry	"	"	"	"	"	
Copper	**830**	3.1	mg/kg dry	"	"	"	"	"	
Lead	**30**	3.1	mg/kg dry	"	"	"	"	"	
Selenium	**53**	15	mg/kg dry	"	"	"	"	"	
% Solids	**82.4**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

Analytical Data

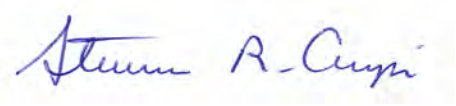
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM03SD
Lab Sample ID: 1604075-14
Date Collected: 04/25/16 9:27
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**5.0**	2.8	mg/kg dry	50	B16E013	06-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.8	mg/kg dry	"	"	"	"	"	
Copper	**4000**	110	mg/kg dry	2000	"	"	16-May-16	"	
Lead	**13**	2.8	mg/kg dry	50	"	"	17-May-16	"	
Selenium	**18**	14	mg/kg dry	"	"	"	"	"	
% Solids	**91.6**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

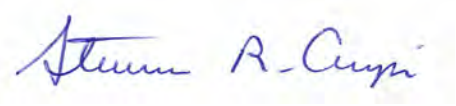
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM04SD
Lab Sample ID: 1604075-15
Date Collected: 04/25/16 9:37
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**16**	2.7	mg/kg dry	50	B16E013	06-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.7	mg/kg dry	"	"	"	"	"	
Copper	**15000**	55	mg/kg dry	1000	"	"	17-May-16	"	
Lead	**9.7**	2.7	mg/kg dry	50	"	"	17-May-16	"	
Selenium	**43**	14	mg/kg dry	"	"	"	"	"	
% Solids	**93.1**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

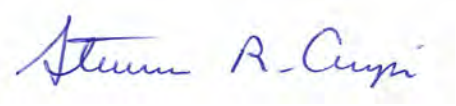
Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM05SD
Lab Sample ID: 1604075-16
Date Collected: 04/25/16 9:51
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**2.8**	2.6	mg/kg dry	50	B16E013	06-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.6	mg/kg dry	"	"	"	"	"	
Copper	**120**	2.6	mg/kg dry	"	"	"	"	"	
Lead	**3.1**	2.6	mg/kg dry	"	"	"	"	"	
Selenium	ND	13	mg/kg dry	"	"	"	"	"	
% Solids	**97.0**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory



Steve R Crupi, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Data

Client: AKDEC Contaminated Sites Program
Project: Site Discovery Project

Work Order: 1604075
Report Date: 05/20/16 14:05

Client Sample ID: FM06SD
Lab Sample ID: 1604075-17
Date Collected: 04/25/16 10:09
Date Received: 04/27/16 08:05
Sampled By: Danielle Duncan
Temperature at Receipt: 3.4 degrees C

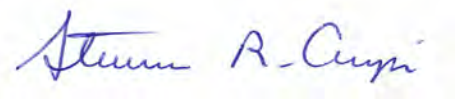
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**2.7**	2.7	mg/kg dry	50	B16E013	06-May-16	17-May-16	EPA 3051A/6020 A	
Cadmium	ND	2.7	mg/kg dry	"	"	"	"	"	
Copper	**34**	2.7	mg/kg dry	"	"	"	"	"	
Lead	ND	2.7	mg/kg dry	"	"	"	"	"	
Selenium	ND	14	mg/kg dry	"	"	"	"	"	
% Solids	**94.0**		% by weight	1	B16D093	07-May-16	08-May-16	SM 2540 G	

Alaska State Environmental Health Laboratory

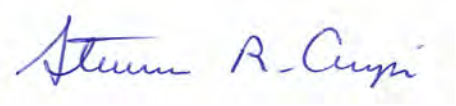
The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D098 - EPA 3051										
Blank (B16D098-BLK1)				Prepared: 05-May-16 Analyzed: 17-May-16						
Arsenic	ND	0.050	mg/kg wet							
Cadmium	ND	0.050	"							
Copper	ND	0.050	"							
Lead	ND	0.050	"							
Selenium	ND	0.25	"							
LCS (B16D098-BS1)				Prepared: 05-May-16 Analyzed: 17-May-16						
Arsenic	0.048	0.050	mg/kg wet	0.050000		96	80-120			
Cadmium	0.047	0.050	"	0.050000		93	80-120			
Copper	0.067	0.050	"	0.050000		133*	80-120			Z-REPa
Lead	0.053	0.050	"	0.050000		107	80-120			
Selenium	0.25	0.25	"	0.25000		102	80-120			
LCS (B16D098-BS2)				Prepared: 05-May-16 Analyzed: 17-May-16						
Arsenic	0.096	0.050	mg/kg wet	0.10000		96	80-120			
Cadmium	0.093	0.050	"	0.10000		93	80-120			
Copper	0.13	0.050	"	0.10000		125*	80-120			Z-REPa
Lead	0.11	0.050	"	0.10000		106	80-120			
Selenium	0.52	0.25	"	0.50000		104	80-120			
LCS (B16D098-BS3)				Prepared: 05-May-16 Analyzed: 17-May-16						
Arsenic	9.2	0.050	mg/kg wet	10.000		92	80-120			
Cadmium	9.3	0.050	"	10.000		93	80-120			
Copper	9.4	0.050	"	10.000		94	80-120			
Lead	9.5	0.050	"	10.000		95	80-120			
Selenium	48	0.25	"	50.000		95	80-120			
Duplicate (B16D098-DUP1)	**Source: 1604075-10**			Prepared: 05-May-16 Analyzed: 17-May-16						
Arsenic	7.0	2.8	mg/kg dry		12			54*	20	Q-06
Cadmium	0.71	2.8	"		0.37			63*	20	Q-06
Copper	2500	11	"		780			105*	20	Q-06
Lead	26	2.8	"		37			34*	20	Q-06
Selenium	12	14	"		9.8			21*	20	Q-06



Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D098 - EPA 3051										
Matrix Spike (B16D098-MS1)	**Source: 1604075-10**			Prepared: 05-May-16	Analyzed: 13-May-16					
Arsenic	18	5.6	mg/kg dry	11.206	12	51*	80-130			Q-03
Cadmium	13	5.6	"	11.206	0.37	113	75-125			
Copper	2100	5.6	"	11.206	780	NR	75-125			Q-02
Lead	56	5.6	"	11.206	37	174*	75-125			Q-02
Selenium	79	28	"	56.028	9.8	123	90-140			
Matrix Spike Dup (B16D098-MSD1)	**Source: 1604075-10**			Prepared: 05-May-16	Analyzed: 13-May-16					
Arsenic	18	5.6	mg/kg dry	11.110	12	51*	80-130	0.4	20	Q-03
Cadmium	11	5.6	"	11.110	0.37	96	75-125	16	20	
Copper	490	5.6	"	11.110	780	NR	75-125	126*	20	Q-03
Lead	47	5.6	"	11.110	37	94	75-125	18	20	
Selenium	56	28	"	55.548	9.8	83*	90-140	34*	20	Q-03
Batch B16E013 - EPA 3051										
Blank (B16E013-BLK1)				Prepared: 06-May-16	Analyzed: 13-May-16					
Arsenic	ND	0.050	mg/kg wet							
Cadmium	ND	0.050	"							
Copper	ND	0.050	"							
Lead	ND	0.050	"							
Selenium	ND	0.25	"							
LCS (B16E013-BS1)				Prepared: 06-May-16	Analyzed: 13-May-16					
Arsenic	0.045	0.050	mg/kg wet	0.050000		90	80-120			
Cadmium	0.047	0.050	"	0.050000		94	80-120			
Copper	0.061	0.050	"	0.050000		121*	80-120			Z-REP
Lead	0.051	0.050	"	0.050000		102	80-120			
Selenium	0.23	0.25	"	0.25000		92	80-120			



Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16E013 - EPA 3051										
LCS (B16E013-BS2)				Prepared: 06-May-16		Analyzed: 13-May-16				
Arsenic	0.098	0.050	mg/kg wet	0.10000		98	80-120			
Cadmium	0.10	0.050	"	0.10000		104	80-120			
Copper	0.12	0.050	"	0.10000		122*	80-120			Z-REP
Lead	0.11	0.050	"	0.10000		108	80-120			
Selenium	0.51	0.25	"	0.50000		102	80-120			
LCS (B16E013-BS3)				Prepared: 06-May-16		Analyzed: 13-May-16				
Arsenic	9.1	0.050	mg/kg wet	10.000		91	80-120			
Cadmium	9.5	0.050	"	10.000		95	80-120			
Copper	9.9	0.050	"	10.000		99	80-120			
Lead	9.9	0.050	"	10.000		99	80-120			
Selenium	48	0.25	"	50.000		96	80-120			
Duplicate (B16E013-DUP1)	**Source: 1604075-14**			Prepared: 06-May-16		Analyzed: 17-May-16				
Arsenic	9.1	2.8	mg/kg dry		5.0			58*	20	Q-06
Cadmium	0.12	2.8	"		0.062			65*	20	Q-06
Copper	8500	55	"		4000			72*	20	Q-06
Lead	16	2.8	"		13			20	20	
Selenium	36	14	"		18			66*	20	Q-06
Matrix Spike (B16E013-MS1)	**Source: 1604075-14**			Prepared: 06-May-16		Analyzed: 13-May-16				
Arsenic	14	5.6	mg/kg dry	11.207	5.0	84	80-130			
Cadmium	11	5.6	"	11.207	0.062	99	75-125			
Copper	5800	110	"	11.207	4000	NR	75-125			Q-02
Lead	24	5.6	"	11.207	13	97	75-125			
Selenium	70	28	"	56.036	18	93	90-140			
Matrix Spike Dup (B16E013-MSD1)	**Source: 1604075-14**			Prepared: 06-May-16		Analyzed: 13-May-16				
Arsenic	23	5.5	mg/kg dry	11.017	5.0	163*	80-130	45*	20	Q-02, Q-07
Cadmium	11	5.5	"	11.017	0.062	102	75-125	2	20	
Copper	8600	110	"	11.017	4000	NR	75-125	39*	20	Q-02, Q-07
Lead	25	5.5	"	11.017	13	108	75-125	4	20	
Selenium	88	28	"	55.086	18	128	90-140	23*	20	Q-02, Q-07

Classical Chemistry Parameters - Quality Control
Alaska State Environmental Health Laboratory

Work Order: 1604075

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B16D092 - % Solids										
Blank (B16D092-BLK1)				Prepared: 05-May-16 Analyzed: 06-May-16						
% Solids	0.00		% by weight							
Duplicate (B16D092-DUP1)		**Source: 1604074-11**		Prepared: 05-May-16 Analyzed: 06-May-16						
% Solids	70.3		% by weight		73.4			4	20	
Batch B16D093 - % Solids										
Blank (B16D093-BLK1)				Prepared: 07-May-16 Analyzed: 08-May-16						
% Solids	0.00		% by weight							
Duplicate (B16D093-DUP1)		**Source: 1604075-13**		Prepared: 07-May-16 Analyzed: 08-May-16						
% Solids	84.0		% by weight		82.4			2	20	

Alaska State Environmental Health Laboratory

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Steve R Crupi, Quality Assurance Manager

State of Alaska
Environmental Health Laboratory
5251 Dr. MLK Jr. Avenue
Anchorage, AK 99507
(907) 375-8200

Chain of Custody Record

ALASKA Department of Environmental Conservation

Environmental Health Laboratory

Client Contact	Project Manager: Steve Crupi	Site Contact: Danielle Duncan	Shipping Date:	COC No:
Danielle Duncan	Tel/Fax: 907-375-3799 steve.crupi@alaska.gov	Lab Contact: Steve Crupi	Shipping Carrier:	3 of 4 COCs
Dept CS/CS Program	Analysis Turnaround Time			Job No. CC 18664730 (EHL)
410 Willoughby Ave. Suite 303	Calendar (C) or Work Days (W) _28 W_			160475
Juneau, AK 99811-1800	TAT if different from Below:			Comments:
907-465-5207 danielle.duncan@alaska.gov	☐ 2 weeks			
Project Name: Site Discovery Project	☐ 1 week			
Project Number: RSA#18-50201 (CS)	☐ 2 days			
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	6020 Arsenic (As)	6020 Cadmium (Cd)	6020 Copper (Cu)	6020 Lead (Pb)	6020 Selenium (Se)	7473 Mercury (Hg)	150.1 pH	6020 Calcium (Ca)	6020 Magnesium (Mg)	Hardness Calculation	Moisture content	Sample Specific Notes:
TM6SD	4/24/16	955	sed	sed	1	✓	✓	✓	✓	✓							-01
TM7SD		1010	sed	sed	1	✓	✓	✓	✓	✓							-02
TM8WA		1032	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		TmB 4/27/16
TM9WA		1032	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		
TM10WA		1106	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		
TM11SD		1112	sed	sed	1	✓	✓	✓	✓	✓							-03
LB1SD		1137	sed	sed	1	✓	✓	✓	✓	✓							-04
LB2SD		1140	sed	sed	1	✓	✓	✓	✓	✓							-05
LB3SD		1204	sed	sed	1	✓	✓	✓	✓	✓							-06
LB4WA		1151	water	WA	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		TmB 4-27-16
SC1WA		1502	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		
SC2SD		1517	soil	soil	1	✓	✓	✓	✓	✓							-07

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ■ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments: Samples arrive to lab unpreserved.
all sediment on dry wt.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	ADEC	4.26.16 1047	Jenann Barbara	ADEC-EHL	4-27-16 0805
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

G:\SPAR\Spar-Contaminated Sites\38 Case Files (Contaminated Sites)\Site Discovery\SDP Chain of Custody.xls

State of Alaska
Environmental Health Laboratory
5251 Dr. MLK Jr. Avenue
Anchorage, AK 99507
(907) 375-8200

Chain of Custody Record

ALASKA Department of Environmental Conservation

Environmental Health Laboratory

Client Contact	Project Manager: Steve Crupi	Site Contact: Danielle Duncan	Shipping Date:	COC No:
Danielle Duncan	Tel/Fax: 907-375-3799 steve.crupi@alaska.gov	Lab Contact: Steve Crupi	Shipping Carrier:	4 of 4 COCs
Dept CS/CS Program	Analysis Turnaround Time			Job No. CC 18664730 (EHL)
410 Willoughby Ave. Suite 303	Calendar (C) or Work Days (W) 28 W			1604075
Juneau, AK 99811-1800	TAT if different from Below:			
907-465-5207 danielle.duncan@alaska.gov	☐ 2 weeks			Comments:
Project Name: Site Discovery Project	☐ 1 week			
Project Number: RSA#18-50201 (CS)	☐ 2 days			
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	6020 Arsenic (As)	6020 Cadmium (Cd)	6020 Copper (Cu)	6020 Lead (Pb)	6020 Selenium (Se)	7473 Mercury (Hg)	150.1 pH	6020 Calcium (Ca)	6020 Magnesium (Mg)	Hardness Calculation	Moisture content	Sample Specific Notes:
SC3SO	4/24/16	1520	soil	soil	1	✓	✓	✓	✓	✓							-08
SC4SD		1531	sediment	sed	1	✓	✓	✓	✓	✓							-09
SC5SO		1546	soil	soil	1	✓	✓	✓	✓	✓							-10
SC6WA		1705	water	water	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		~~~~ TmB 4-27
SC7SD		1715	sed	sed	1	✓	✓	✓	✓	✓							-11
FM01SD	4/25/16	0915	sed	sed	1	✓	✓	✓	✓	✓							-12
FM02SD		0916	sed	sed	1	✓	✓	✓	✓	✓							-13
FM03SD		0927	sed	sed	1	✓	✓	✓	✓	✓							-14
FM04SD		0937	sed	sed	1	✓	✓	✓	✓	✓							-15
FM05SD		0951	sed	sed	1	✓	✓	✓	✓	✓							-16
FM06SD		1009	sed	sed	1	✓	✓	✓	✓	✓							-17

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ■ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Special Instructions/QC Requirements & Comments: Samples arrive to lab unpreserved.
all sediment on dry wt.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	ADEC	4-26-16 1047	Tena M. Barbosa	ADEC-EHL	4-27-16 0805
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

G:\SPAR\Spar-Contaminated Sites\38 Case Files (Contaminated Sites)\Site Discovery\SDP Chain of Custody.xls

ADEC EHL Sample Receipt Checklist

Environmental Health Laboratory
5251 Dr. MLK Jr. Ave., Anchorage, AK 99507
(907) 375-8200

Received Within Regulatory Hold Time? Y [X] N [ ] Non-Conformances? Y [ ] N [X]

Received By:
Initials: VS/TMB
Date: 04/27/16
Time: 08:05

Login In By:
Initials: TMB
Date/Time: See Element 4-27-16

Workorder Status:
[Accepted] Due Date: 7-21-16
Rejected:
Subcontracted:

Sample Temperature @ Receipt: 3.4 °C

Folder # 1604075
Submitter: ADEC CONTAMINATED SITES
Client: " " "
Client Notes:

# of Samples 17
Sample Type: Sediments; Soils
Test(s) Requested: metals

COC Seals:
[X] On ship. container (Strapping Card)
[ ] On bottle
[ ] None

Received via:
[ ] USPS
[ ] UPS
[ ] FedEx
[ ] Client Delivered
[X] Courier
[X] Other Ak Airlines
Shipment Tracking # 027-8887-6093

Container Type:
[ ] Box
[X] Cooler
[ ] Envelope
[ ] Hand Carry
[ ] Styro-box
[ ] Other

Packaging Type:
[ ] Biohazard Bag
[ ] Bubble Wrap
[ ] Paper
[ ] Plastic / Ziploc Bag
[ ] Styrofoam
[X] Other Jars; 125 ml idex
[ ] None

Refrigerant:
[ ] Dry Ice
[X] Gel / Ice Pack
[ ] Loose Ice
[ ] Other
[ ] None

Sample Containers:

Intact?	Y	✓	N		Samples Match Form?	Y	✓	N	
Correct Type?	Y	✓	N		Properly Preserved?	Y	✓	N	
Adequately Labeled?	Y	✓	N		Adequate Amt for Tests?	Y	✓	N	
IDs/time/date match Form?	Y	✓	N						

Sample Submission Form:

Is Sample Submission Form Complete?	Y	✓	N		
Is client information in Database accurate?	Y	✓	N		
Phone	Y	✓	N		
Address	Y	✓	N		
Client Contacted Regarding Incomplete Data?	N	✓	Y		Y? Date / Time / Spoke to:

Comments:

Cooler

027 CDV 8887 6093 027-8887 6093

Shipper's Name and Address: Adec contaminated site pr 410 willoughby ave suite 303 Jnu, AK 99811 USA Tel: 907-303-2996	Shipper's Account Number Customer's ID Number ~004939500S
Not Negotiable **Air Waybill** Issued By: Alaska AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKACARGO.COM	
Consignee's Name and Address: Edec-eh laboratory 5251 dr martin luthere king jr ave Anc, AK 99507-1293 USA Tel: 907-375-8231	Consignee's Account Number
Also notify N LMSq 4.26 Tel:	
Issuing Carrier's Agent and City	Accounting Information ~004939500S Adec contaminated site program 410 willoughby ave suite 303 Jnu, AK 99811 USA
Agent's IATA Code / Account No.	
Airport of Departure (Addr. of First Carrier) and Requested Routing: Cordova	GoldStreak

To	By First Carrier	To / By	To / By	Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
ANC	Alaska Airlines			USD	PZ	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance	
Anchorage	AS 061/26		XXX	

Handling Information
PERISHABLE CARGO (NON - FOOD)
HFP NOA 907-375-8231

SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	43.0	L N		43.0		AS AGREED	SOIL SAMPLES Dims: 24 x 12 x12 x 1 PER GSX SOA
1	43.0					AS AGREED	Volume: 2.000

Prepaid	Weight Charge	Collect	Other Charges
AS AGREED			XBC 0.00
Valuation Charge			
Tax			
Total Other Charges Due Agent			
Total Other Charges Due Carrier			
Total Prepaid	Total Collect		
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Adec contaminated site program

Signature of Shipper or his Agent

ASM THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

26 Apr 2016 10:54 — Executed On (Date)

Cordova — at (Place)

Alaska Airlines — Signature of Issuing Carrier or its Agent

027-8887 6093