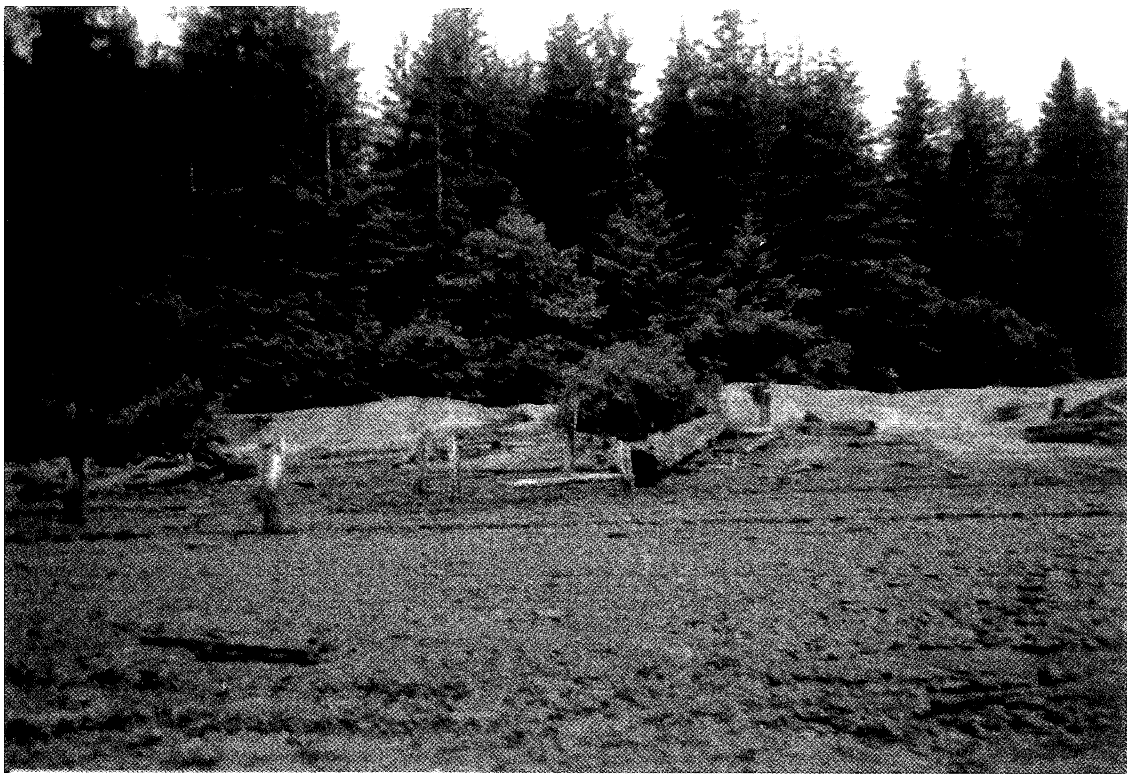
Smith Bayliss LeResche Inc — Environmental Consultants and Engineers

Richard Smith P.E. (907) 747-5775
Randolph Bayliss P.E. (907) 586-6813
Robert LeResche PhD (907) 586-8338

119 Seward Street #10
Juneau Alaska 99801
fax (907) 586-6819

AJT Mining Properties, Inc
Treadwell Mine Cyanide Tailings Investigation Report
Douglas Island, Alaska

Contents



Lower Tailings Area

Site Investigation Report

Summary

AJT Mining Properties, Inc. owns Treadwell Mine site on Douglas Island, Alaska. The Treadwell Mine site is a complex of four mines located on the southeastern shore of the Island, boarded by Gastineau Channel, and accessible from the end of St. Ann's Avenue.

Operation of the Treadwell mine began in 1891 and ceased in 1922. The two primary groups of waste generated at the mine were processed ore tailings and chemical wastes from ore concentrating practices. The Alaskan-Mexican Mine was part of the Treadwell Mine complex and has two tailing piles associated with its operation. The upper tailings pile covers about 2,800 square feet and is located just downhill of the concentrate building, and the lower tailings pile covers about 9,100 square feet and is located near Gastineau Channel.

Three previous sampling investigations in 1988, 1991 and 1996 sought to quantify concentrations of cyanide and mercury, as well as eight other substances of concern that are associated with mining in the Treadwell area. The three investigations found soil samples from the tailings sites had higher concentrations of lead, zinc, arsenic, mercury and cyanide than did the background soil samples.

Versar (1988), C Johnson Environmental (1991), and E & E Inc. (1996) concurred that the metals and cyanide present in the tailings were relatively immobile under the conditions at the times of study and did not pose a threat to the environment. This was confirmed by analyses of stream water from the tailings piles that showed that the small quantities of metals leaching out of the tailings that remained stable from 1988 to 1996.

AJT Mining Properties has leased the subject area to Alaska Canopy Adventures. Alaska Canopy Adventures conducts recreational aerial zip line tour through the forest canopy over the subject area. They have improved the access road to the Alaska-Mexican mine area; this gravel access road skirts the northern edge of the upper tailings area. The upper tailings were re-vegetated in 1996 as part of a reclamation project.

The State of Alaska Department of Environmental Conservation (ADEC) has requested that the lower tailings area again be sampled due to the recent activity at the site. This Site Investigation work was conducted in response to this request by ADEC.

Statement of Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person(s) who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that falsification of information submitted to ADEC, could lead to a civil action or criminal action, under any and all applicable provisions of Alaska law, including AS 46.03.760 and 46.03.790.

Site Assessment Findings and Analysis

Site

Treadwell Cyanide Mine Tailings
US Mineral Survey Omega 105B and Tract A of A.T.S. 204
Douglas Island, AK

Property Owners

AJT Mining Properties, Inc
5601 Tonsgard Court
Juneau, AK 99801

Contractors

Property Lessee

Alaska Canopy Adventures
PO Box 5425
Ketchikan, AK 99901

Environmental Compliance

Smith Bayliss LeResche Inc
119 Seward Street Suite #10
Juneau, Alaska 99801
(907) 586 6813

Site Description

The subject property is located about one mile southeast of the end of St. Ann's Ave on Douglas Island along the Gastineau Channel shoreline. The area is within the former Treadwell Mine complex, with numerous structures and relics in various stages of decay located on and near the subject property. The area is overgrown with second-growth alder, western hemlock and Sitka spruce.

In early 2006, Alaska Canopy Adventures began construction of an aerial zipline facility, which included construction of an outfitting building and surfacing an access road with gravel. The access road winds past the lower tailing area, continues uphill past the upper tailings and around the Mexican Mine holes to the start of their tour.

The lower tailings are easily recognizable by their gray appearance. The lower tailings have little vegetation, this is attributed to the tightness (small grain size) of the flour-like crushed rock tailings, and not to soil contamination. The upper tailings were successfully re-vegetated 1996 by the State of Alaska Department of Natural Resources.

Site Map

(see Vicinity Map and Site Maps)

Previous Investigations

Three previous sampling investigations in 1988, 1991 and 1996 sought to quantify concentrations of cyanide and mercury, as well as eight other substances of concern that are associated with mining in the Treadwell area. The three investigations found soil samples from the tailings sites had higher concentrations of lead, zinc, arsenic, mercury and cyanide than did the background soil samples.

Versar (1988), C Johnson Environmental (1991), and E & E Inc. (1996) concurred that the metals and cyanide present in the tailings were relatively immobile under the conditions at the times of study and did not pose a threat to the environment. This was confirmed by analyses of stream water from the tailings piles that showed that the small quantities of metals leaching out of the tailings that remained stable from 1988 to 1996.

Table 1 provides a summary of the samples taken and sample results from these previous investigations.

Table 1 - Analyses of Precipitate, Tailings, and Soil Samples, in ppm

Analyte	***Sample Number, and Location***					
	1996	1991		1988		
	SCNT2	004SL	003SL	DT2	DT4	DT3
	Precipitate sample	Upper	*Lower*	*Upper*	*Lower*	Downslope from Upper
Arsenic	ND	**163**	**139**	**191**	**350**	**64**
Barium	1.2	74.6	115	NA	NA	NA
Cadmium	0.34	**51.9J**	**36.0J**	NA	NA	NA
Chromium	3.4	16.7J	10.2B	NA	NA	NA
Lead	2.4	240	450	316	511	60
Mercury	ND	**5.0J**	**5.9J**	**57**	**10**	0.22
Selenium	ND	**38.3**	**10.7**	NA	NA	NA
Silver	ND	ND	ND	NA	NA	NA
Cyanide	ND	ND	ND	19.9	**49.1**	0.79
Zinc	NA	73.3	54.4J	649	147	38

Levels above the levels listed in 18AAC75 Table B1 Method Two – Soil Cleanup Levels are marked in bold text.
J – Listed concentration is an estimate due to quality control limitation
B – Analyte also detected in method blank

The 1988 and 1996 site investigations also measures pH in surface waters near the tailings piles. These results are listed below.

Table 2 - Stream Water pH Measurements

Sample Location	**1996**	**1988**
Above upper cyanide tailings	7.91	6.71
Adjacent to upper cyanide tailings	3.30	NM
Immediately below upper cyanide tailings	3.11	2.67
Sixty feet below upper cyanide tailings	2.91	2.80
At bottom of slope adjacent to beach	2.81	2.80

NM – Not measured

2006 Site Investigation

On July 20, 2006 Jason Ginter, Megan O'Mullane and Trahern Jones of Smith Bayliss LeResche conducted a site investigation and sampling of the lower tailings area using incremental sampling techniques as requested and approved by Bruce Wanstall of ADEC. Mr. Wanstall's July 10, 2006 approval letter for this work is attached. The incremental sampling techniques involved taking three sets of 50 grab samples from the lower tailings at depths varying from the ground surface to five feet below the ground surface. We selected the sample areas at random and used hand tools such as shovels, post-hole diggers and a hand auger to obtain samples from various depths throughout the tailings area. Each individual field sample consisted of about 100 grams of material placed into a Ziploc bag. The bags were labeled according to the sample set, and stored in five-gallon buckets.

After we had obtained 50 field samples for each of the three sample sets, we returned to our office. Here, we mixed the 50 individual samples into three polyethylene tubs. We manually removed any large rocks and sticks that were present in the sample material. We then homogenized the material using a metal trowel to break up the clumped tailings.

After each of the three batches of material had been homogenized, we used a polyethylene plunger to extract 50 random aliquot samples from each tub (similar to using a cookie cutter). Each aliquot sample contained about 5 grams of material, this material was then placed directly into an eight-ounce sample jar. This was done twice for each tub of material, once for the material to be analyzed for RCRA metals, and again for the material to be analyzed for zinc and cyanide.

We sent the samples to SGS Laboratories in Anchorage. SGS analyzed the samples for the eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), total cyanide, and zinc. The sample areas are shown on the attached site sketch, laboratory results are listed in the following table.

Laboratory Results in parts per million (ppm)

Analyte/Sample ID	LT-A	LT-B	LT-C
Arsenic	**169**	**173**	**151**
Barium	33	27.9	50.8
Cadmium	0.296	0.348	0.406
Chromium	4.87	4.32	7.44
Lead	307	382	696
Mercury	**31.8**	**30.8**	**51.7**
Selenium	**35.9**	**51**	**35.7**
Silver	6.71	8.7	9.19
Cyanide	1.2	4.1	1.6
Zinc	35.9	36	50

Levels above the levels listed in 18AAC75 Table B1 Method Two – Soil Cleanup Levels are marked in bold text. All quality control indicators are within acceptable limits and all results are deemed valid.

We also took pH measurements of the stream just south of the tailing area using test strips. All readings taken from this stream were between a pH of 6.5 and 7.0, these readings are within the normal range. No water or drainage flows through either tailings area. We did find a small area of standing water just south of the upper tailings area that may be the "drainage stream" discussed in earlier reports. The water found here was not flowing despite the 7.81 inches of rain that had fallen during the preceding 45 days and can be described as intermittent at best. We took pH measurements from three areas of standing water along this area, with a pH range from 5.5 closest to the upper tailings, to 6.5 in standing water in two locations, about midway between the two tailings areas and just above the lower tailings. None of the pH readings taken during this investigation are outside of normal readings for the area.

Conclusions

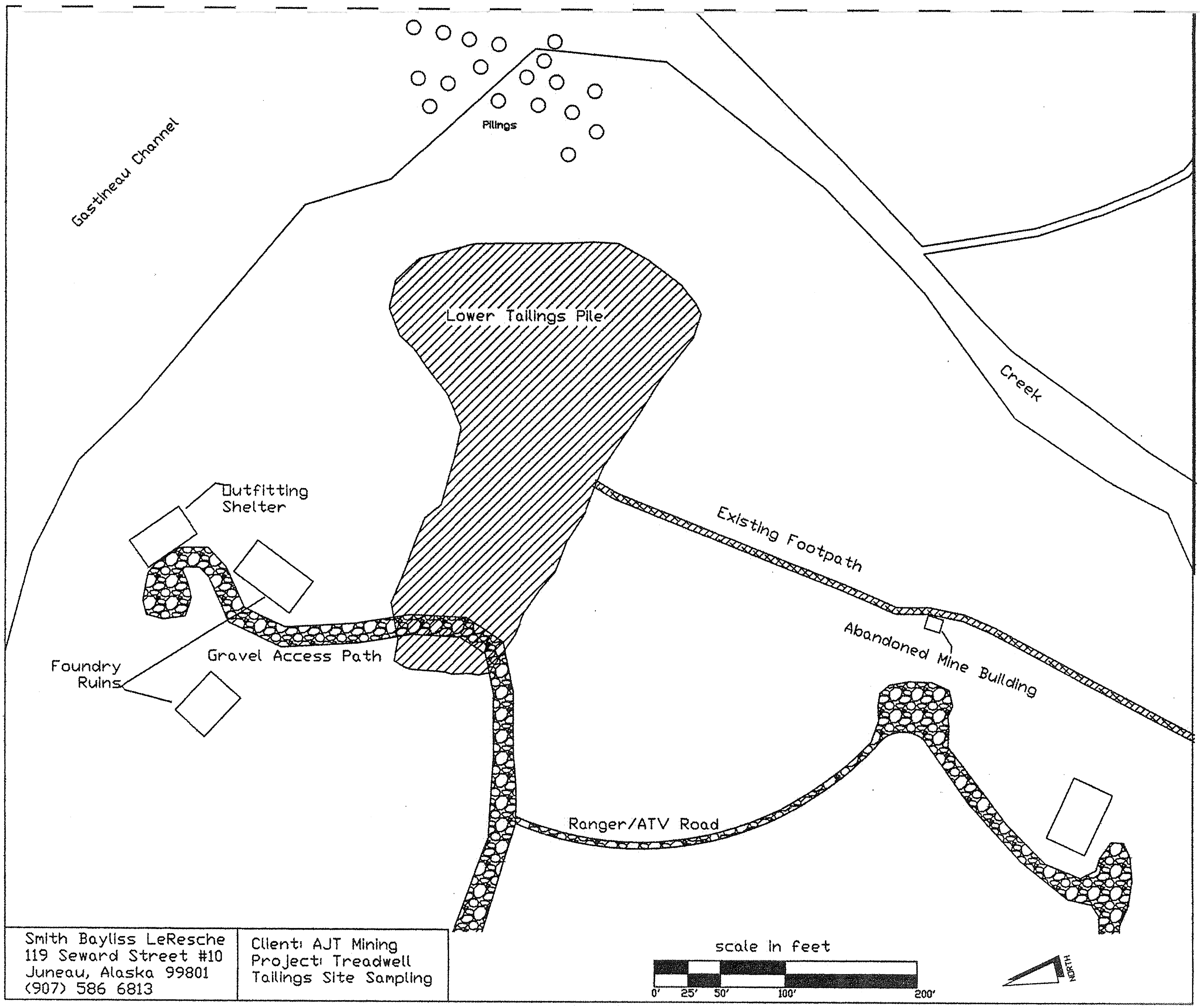
The lower tailings area consists of about 9,200 cubic yards of clay-consistency tailings from historic gold extraction. Three past sampling events have documented the elevated presence of some metals in the tailings. We used incremental sampling procedures as directed and approved by ADEC to again characterize the presence of RCRA metals, cyanide and zinc present within the lower tailings. We found elevated levels of arsenic, mercury and selenium present in all three of the samples analyzed from this site. These results matched those from previous site investigations. Tailings of gold bearing ore within the historic Juneau gold mining district can be expected to contain elevated levels of the heavy metals geologically associated with gold.

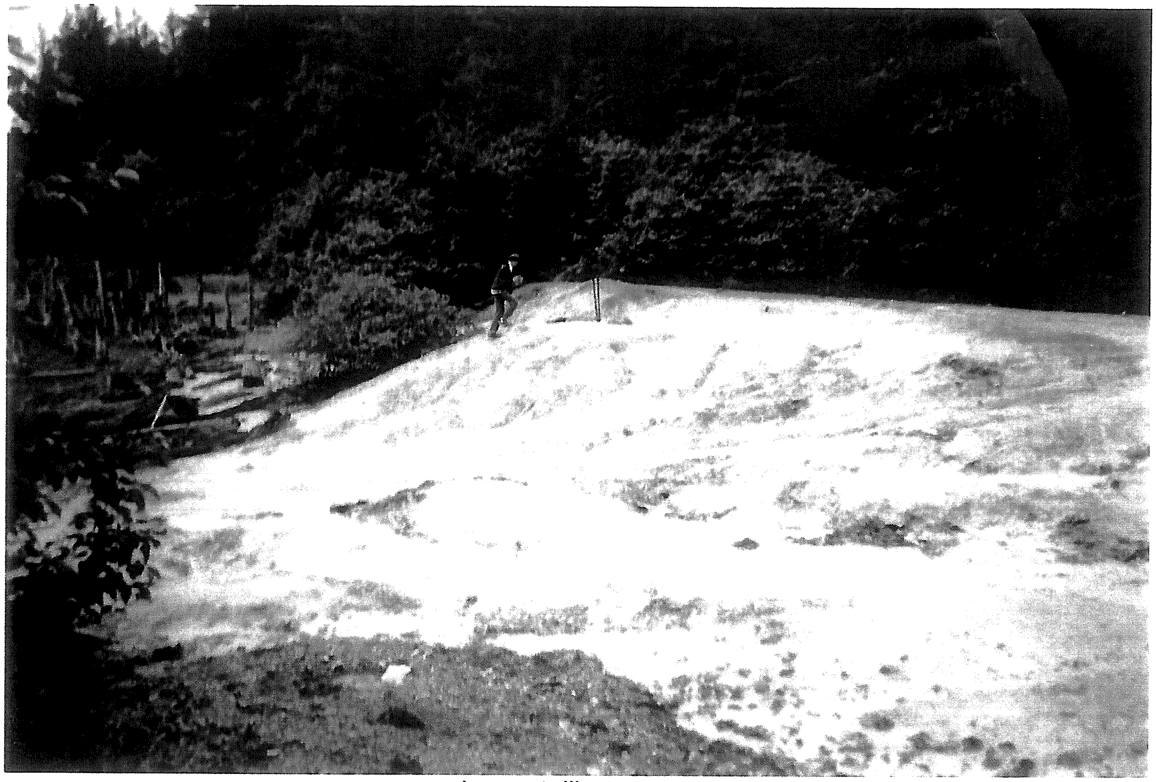
The 80-plus year old tailings area consists of rock that had been finely crushed and is densely packed. Test holes dug in the tailings to acquire samples did not display any water saturated material nor did we find subsurface water. The tailings were placed over native material, and are not present at the level of the local groundwater. While the tailings do contain concentrations of three metals above migration to groundwater standards as listed in 18AAC75 Table B1 Method Two, groundwater is not a likely source of drinking water in this area. The proximity of the tailings to the shoreline indicate a high probability of salt-water intrusion in the subsurface water below the tailings area. There are no residential buildings on the property, nor are there any dwellings within ½ mile of the property.

The improved ATV trail used by Alaska Canopy Adventures has not impacted the tailings area. AJT Mining plans to perform reclamation on the lower tailings area similar to the reclamation work by DNR on the upper tailings area in 1996. AJT will cover the area with a geotextile fabric such as Typar 3401, Mirafi 140N or equivalent. This will be covered with a layer of topsoil, fertilized and seeded with a blend of grass and wildflowers. AJT will continue to ensure that all water drainages are situated to prevent surface water run-off from entering the tailings area.

After reviewing the available data gathered during four sampling events over 18 years, we find that the Treadwell Mine Cyanide Tailings areas are stable and well documented. Area groundwater is not likely to be used as a drinking water source. The upper tailings area is capped and re-vegetated, and AJT Mining proposes to cap and re-vegetate the lower tailings area. These actions have and will remove the possibility of exposure to the tailings through the inhalation and ingestion pathways and further limit the possibility of contaminant migration through the groundwater pathway. AJT Mining is requesting that "No Further Action" status be granted for the subject area.

Smith **B**ayliss **L**e**R**esche Inc by
Jason Ginter, Environmental Chemist
30 August 2006


Gastineau Channel
Pilings
Creek
Lower Tailings Pile
Outfitting Shelter
Existing Footpath
Abandoned Mine Building
Gravel Access Path
Foundry Ruins
Ranger/ATV Road
scale in feet
0' 25' 50' 100' 200'
NORTH
Smith Bayliss LeResche
119 Seward Street #10
Juneau, Alaska 99801
(907) 586 6813
Client: AJT Mining
Project: Treadwell
Tailings Site Sampling



Lower tailings area.

Upper tailings area.

Gravel road over lower tailings area.

Breaking up clumps and removing debris from samples.

Human Health Conceptual Site Model
Scoping Form

Site Name: Treadwell Mine Cyanide Tailings

File Number:

Completed by: Smith Bayliss LeResche Inc

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, a CSM graphic and text must be submitted with the site characterization work plan.

General Instructions:* *Follow the italicized instructions in each section below.

1. *General Information:*

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☑ Other: historic mine tailings

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

- ☐ Spills
- ☐ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☑ Other: historic mine tailings

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

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

Receptors (*check receptors that could be affected by contamination at the site)*

- ☐ Residents (adult or child)
- ☐ Commercial or industrial worker
- ☑ Construction worker
- ☐ Subsistence harvester (i.e., gathers wild foods)
- ☐ Subsistence consumer (i.e., eats wild foods)
- ☑ Site visitor
- ☑ Trespasser
- ☑ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs – below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact –

1 Incidental Soil Ingestion

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

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

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

2 Dermal Absorption of Contaminants from Soil

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

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

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

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

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

b) Ingestion –

1 Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, OR are contaminants expected to migrate to groundwater in the future? ☐

Could the potentially affected groundwater be used as a current or future drinking water source? *Please note, only leave the box unchecked if ADEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.* ☐

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

2 Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water OR are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? *Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).* ☑

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

3 Ingestion of Wild Foods

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

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

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

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

c) Inhalation

1 Inhalation of Outdoor Air

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

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

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

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

2 Inhalation of Indoor Air

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

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

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

3. *Additional Exposure Pathways:* *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

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

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

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

Comments:

Inhalation of Volatile Compounds in Household Water

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

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

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

Comments:

Inhalation of Fugitive Dust

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

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers. This size can be inhaled and would be of concern for determining if this pathway is complete.

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

Comments:

Direct Contact with Sediment

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

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

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

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

Comments:

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

The site contains mine tailings with elevated levels of metals. Three parameters exceed the Method Two Standards for the Migration to ground water pathway. The area in question consists of tailings placed over native rocky gravels. Water does not penetrate the densely packed clay-like tailings. The tailings are located within 100 yards of the Gastineau Channel shoreline. Groundwater is not a likely source of drinking water here due to salt-water intrusion. The property owners plan to cap the lower tailings with a geomembrane, place fill over the membrane, and seed the area, consistent with the reclamation work performed at the upper tailings area.

APPENDIX A

BIOACCUMULATIVE COMPOUNDS

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

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

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

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

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

APPENDIX B

VOLATILE COMPOUNDS

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

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

APPENDIX C

COMPOUNDS OF CONCERN FOR VAPOR MIGRATION

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

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

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

Source: EPA 2002.

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: AJT Mining Properties
Treadwell Mine Cyanide Tailings
Douglas Island, AK

Completed By: Jason Ginter, SBL Inc
Date Completed: 8/30/06

Follow the directions below. Do not consider engineering or 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. Briefly list other mechanisms or reference the report for details.*

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

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

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

Media / Transport Mechanisms

Media	Transport Mechanisms
☑ Surface Soil (0-2 ft bgs)	Direct release to surface soil — check soil
	☐ Migration or leaching to subsurface — check soil
	☐ Migration or leaching to groundwater — check groundwater
	☐ Volatilization — check air
	☑ Runoff or erosion — check surface water
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil — check soil
	☐ Migration to groundwater — check groundwater
	☐ Volatilization — check air
	☐ 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):

Exposure Media / Exposure Pathways / Current & Future Receptors

Exposure Media	Exposure Pathways	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	C/F			
	☐ Dermal Absorption of Contaminants from Soil							
☐ 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							
☐ biota	☐ Ingestion of Wild Foods							