



United States Department of the Interior
NATIONAL PARK SERVICE
Kenai Fjords National Park
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KEFJ 1.A.2. Permanent

ACTION MEMORANDUM

To: Shawn P. Mulligan, Lead, Environmental Compliance and Cleanup Division
Through: John Carroll, Superintendent, Kenai Fjords National Park
From: Zachary Taylor, Regional Environmental Coordinator, Interior Region 11
Sarah Venator, Federal Government Lead, Glass-Heifner Mine Site Contaminated Site Team
Subject: Recommendation to Select a TCRA at the Glass-Heifner Mine Site, Kenai Fjords National Park

I. PURPOSE

This Action Memorandum recommends and, upon adoption of this recommendation by the Environmental Compliance and Cleanup Division (ECCD), documents a decision by the National Park Service (NPS) to select a Time Critical Removal Action (TCRA) to respond to the release or threat of release of hazardous substances at or from the Glass-Heifner Mine Site (the Site). The Site is located in Kenai Fjords National Park (Park) in the State of Alaska. The Site's Environmental and Disposal Liabilities (EDL) number is 2659. This Action Memorandum is consistent with guidance developed by the Environmental Protection Agency¹ for the preparation of Action Memoranda selecting removal actions pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Action Memorandum has been prepared pursuant to NPS authority under Section 104 of CERCLA.

The principal objectives of this Action Memorandum are to:

- Substantiate the need for the removal action by summarizing the current and potential threats to public health or welfare or the environment posed by the release or threatened release of hazardous substances at the Site;
- Recommend and memorialize the decision to select the removal action and explain how it will abate or mitigate threats to public health or welfare or the environment;

¹ "Superfund Removal Guidance for Preparing Action Memoranda" (Office of Emergency Management, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency [September 2009]).

- Describe the activities that will be conducted during the removal action, the cleanup goals that will be achieved, and the estimated costs of the removal action; and
- Address whether the removal action is expected to be the final remedy for the Site.

NPS has determined, pursuant to its CERCLA authorities, that threats to public health or welfare or the environment posed by the release or threatened release of hazardous substances at the Site warrant the selection of the removal action described in this Action Memorandum.

NPS has further determined, pursuant to section 300.415(b)(3) and (4) of the NCP, that this removal action should be initiated as soon as possible to abate, prevent, minimize, stabilize, mitigate, or eliminate these threats and that additional planning or analysis is not necessary to select a removal action that will protect human health and the environment.

Hazardous substances were released at the Site as a result of mining and milling operations, conducted intermittently since the mid-1920s but primarily between 1965 and the mid-1970s. As described in further detail in this Action Memorandum, hazardous substances were consolidated in a mine tailings repository (the “Consolidated Tailings Impoundment”) during a non-time-critical removal action (NTCRA) in 1998. Unstable Site conditions including recent erosion and undercutting of a bank adjacent to the Consolidated Tailings Impoundment threaten the integrity of the 1998 NTCRA. The Site’s location adjacent to Ferrum Creek, which is sensitive spawning habitat for four species of salmon and Dolly Varden, support the determination to undertake this TCRA to mitigate exposure of human and ecological receptors to hazardous substances and minimize further migration of these hazardous substances into sensitive ecosystems.

II. SITE CONDITIONS AND BACKGROUND

Section II provides a description of the Site, the physical location and surrounding conditions present at the Site; a summary of the key findings of previous Site investigations including the history of operations that caused or contributed to Site contamination; the contaminants of concern (COCs) and contaminants of ecological concern (CECs) released at the Site; the actions taken to-date to address the contamination; and the degree to which other federal, state, or local agencies have been involved at the Site.

A. Site Conditions

1. Physical Location

The Site is located within the Park approximately one mile from the head of Beauty Bay on the southeastern coast of the Kenai Peninsula. It is located approximately 6-8 hours by boat from the communities of Seward and Homer.

An unmaintained road leads from an overgrown airstrip and the head of Beauty Bay to the Site. NPS cleared and flagged the road in 2021 for foot traffic. The Site is not connected to the state road system. Access to the Site is presently limited to hiking in from Beauty Bay, which is accessible by boat or float plane. While visitation is low and unmonitored, NPS is aware that Park visitors do periodically hike to the Site.

2. Site Characteristics

The Site is physically characterized by its mining history and the surrounding rugged landscape, with mountains rising steeply from sea level to over 3,000 feet (ft) and is shaped by current and past glacial processes. The Site surface is inferred to consist of mine waste rock over a thin layer of glacio-alluvial deposits (Shannon & Wilson, 2006), on which the prior tailings ponds and the current Consolidated Tailings Impoundment is located. This area of inferred waste rock fill has been referred to as the gravel pad in previous Site documents. Vegetation on the gravel pad has not naturally recovered to baseline conditions and consists primarily of equisetum and mosses. Above the gravel pad, the mountain slope is marked by surface trenching and adit excavation (horizontal tunneling into the hillside). The Site is situated approximately 80 ft above and 200 ft to the southeast of Ferrum Creek with steep embankments leading down to the creek along the northern and western sides of the pad. Ferrum Creek is a high-velocity stream, which flows to Beauty Bay and carries a moderate suspended load from glacial meltwater (Shannon & Wilson, 2006). Near the Site, the creek is approximately 24 to 30 ft wide and up to 3 ft deep (Shannon & Wilson, 2006). While only limited data are available, the creek has been identified as a breeding ground for anadromous fish. Records indicate the observed presence and spawning of Dolly Varden and Chum, Pink, Coho, and Sockeye Salmons (Giefer and Blossom, 2021; Jones et al., 2005).

Data from nearby weather stations suggest that annual precipitation at the Site is substantial and may exceed 90 inches per year.² Based on field observations and available topographic data, surface water run-off is assumed to drain across the gravel pad to the west via broad shallow channels, towards the steep slope and Ferrum Creek. Water has been observed flowing from the collapsed adit and draining across the northern side of the gravel pad via a 1.5- to 3-ft wide drainage channel with ephemeral flow. In 1995, the flow through this channel was observed to be soaking into the ground (infiltrating) prior to reaching the tailings ponds. In 2021, this channel intersected with the Consolidated Tailings Impoundment and began to undermine it.

No groundwater studies have been conducted at the Site to-date. Shannon & Wilson (2006) suggested that the Site groundwater hydrology is largely controlled by the near-surface presence of bedrock and that groundwater flow would be generally limited to bedrock fractures but speculated about the possible presence of perched groundwater in the soil overlying bedrock. During investigation of the tailings ponds in 1995, groundwater was encountered at approximately 0.8 ft below ground surface (bgs) within what is now the Consolidated Tailings Impoundment. Groundwater was not encountered within the 1- to 1.5-ft exploration depths at other tailings ponds. Shannon & Wilson (2006) attributed this localized observation of groundwater to rainwater infiltration within the bermed extents of the tailings pond. An elevated concentration of arsenic and relatively low pH³ was reported in a sample collected from the observed groundwater.

The mine began operations in the mid-1920s and was a component of the Nuka Bay Historic Mining District. Commercial mining was only conducted between 1965 and the mid-1970s, during which time less than 100 tons of ore is reported to have been processed (Cook and Norris,

² The mean reported annual precipitation at the Nuka Glacier weather station (SNOTEL site number 1037), approximately 9 miles north of the Site, for 1991 through 2021 was 94.8 inches. (<https://wcc.sc.egov.usda.gov/nwcc/site?sitenum=1037>). The mean reported annual precipitation at the Pederson Lagoon weather station (NESS ID 326AD012), approximately 41 miles east of the Site, for 2011 through 2021 was 148 inches (<https://raws.dri.edu/cgi-bin/rawMAIN.pl?akAPED>).

³ An arsenic concentration of 29,600 ug/l was reported for sample 52, a groundwater sample collected in Tailings Pond D on August 29, 1995 (Shannon & Wilson, 1996). According to Shannon & Wilson (2006), a pH of 4 standard units was measured at the time of this observation.

1998). Gold was mined from at least four quartz veins by surface trenching and adit excavation. The ore was reportedly processed by crushing and gravity separation without the need for roasting or chemical treatment (Shannon & Wilson, 1996). Following processing, the tailings were discarded onsite in a series of “tailings ponds⁴.” Arsenopyrite, which was prevalent within the quartz vein system (Shannon & Wilson, 2006), was likely subject to oxidation through atmospheric exposure during mining and mineral processing operations, potentially leading to increased mobility and toxicity of arsenic in the resulting tailings (Nesbitt et al., 1995).

Park staff identified arsenic contamination at the Site following the 1994 discovery of a deceased moose calf that appeared to have been exposed to the tailings and may have been consuming them as a source of salt. Arsenic concentrations exceeding 200,000 mg/kg were observed in the vicinity of the mill building and concentrations as high as 50,000 mg/kg were observed in the tailings pond.

Based on the recommendations of the 1996 EE/CA, NPS completed a non-time-critical removal (NTCRA) action in 1998, during which the tailings were consolidated in one of the tailings ponds and partially solidified, forming the Consolidated Tailings Impoundment.

During a routine inspection of the Consolidated Tailings Impoundment in 2016, Park staff discovered an erosional gully had formed in an existing drainage on the bank of the gravel pad, approximately 35 ft to the south of the Consolidated Tailings Impoundment and adjacent to former tailings pond F. During the next inspection in June 2021, NPS estimated that the gully had grown in length by approximately 10-15 ft, towards the Consolidated Tailings Impoundment. At the head of the gully, a 5- to 6-ft high and 8- to 10-ft-deep undercut, from which water was flowing, was observed. The undercut appeared to be oriented in the direction of the Consolidated Tailings Impoundment and was hypothesized to be caused by a hydraulic process known as soil piping that may have stemmed from the presence of the Consolidated Tailings Impoundment.

In June 2021, NPS performed sampling to characterize mercury and arsenic contamination surrounding an abandoned ball mill and identified mercury concentrations as high as 38 mg/kg and arsenic concentrations as high as 16,000 mg/kg within several feet of the mill. Additionally, NPS collected 10 discrete surface soil samples for background mercury and arsenic analysis. NPS defined background concentrations of 170 mg/kg and 0.2 mg/kg for arsenic and mercury, respectively, based on 95% upper tolerance levels (UTLs) (Ahtna, 2021).

In July 2021, NPS performed limited soil sampling at the Site and sediment and water sampling from Ferrum Creek, less than a half-mile downstream from the Site. Water and soil samples could not be collected from the erosional gully at that time due to safety concerns regarding footing and stability of the bank. Arsenic concentrations within the drainage channel intersecting with the impoundment ranged from 2,260 mg/kg to 3,180 mg/kg. The reported arsenic concentration in the Ferrum Creek sediment was 18.7 mg/kg, which is above the NPS risk-based ecological screening value (ESV) for freshwater sediment but may be consistent with naturally occurring background concentrations. Background sediment sampling has not been conducted at the Site. The water sample concentration was below the reporting limit of 5.0 µg/l.

⁴ Due to the apparent limited availability of water at the Site and the ore processing equipment remaining at the Site, it is unclear whether the tailings ponds were ever true ponds such that the tailings were deposited there in suspension. Tailings may have been deposited in the ponds by other means (Shannon & Wilson, 2006). The terminology has been maintained for consistency with previous documents.

Visual observations made in July 2021 indicated that the erosion in the gully to the south of the Consolidated Tailings Impoundment had worsened since June. NPS staff attributed the erosion to subsurface flow of water. At the time, the Park concluded that temporary measures to stop or slow the erosion were not possible with the resources available at the Site. During the July 2021 visit, a 2- to 3-ft-wide dry drainage was observed adjacent to the northern edge of the Consolidated Tailings Impoundment. At that time, the drainage appeared to be just beginning to erode beneath the impoundment. As a temporary measure, in August 2021, the Park diverted the drainage away from the impoundment using hand tools and reinforced the diversion with logs available at the Site.

3. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The Site is comprised primarily of the Consolidated Tailings Impoundment, a gravel pad, and a collapsed adit. During routine inspections in 2016 and 2021, Park staff observed an erosional gully on the bank of the gravel pad that worsened with time. In addition, in 2021, Park staff observed a deep undercut at the head of the gully and conditions that suggested erosion was beginning to occur underneath the Consolidated Tailings Impoundment. Soil and sediment samples taken in 2021 at various locations around the Site, including at the Consolidated Tailings Impoundment, identified high mercury and arsenic concentrations. These high concentrations, along with the potential failure of the Consolidated Tailings Impoundment or the bank could pose a significant threat of a release of hazardous substances into the environment that would threaten public health or welfare or the environment. Concentrations of arsenic within the Consolidated Tailings Impoundment are high with an historical mean concentration of 13,000 mg/kg, which exceeds the 2021 estimated Site background value by more than 70 times. Based on observations from 1994, salt precipitate formation on the unsolidified tailings may have been attractive to wildlife and linked to the death of at least one moose calf. Based on the NPS ESVs, which are based on negative effect levels, ecological exposure risks associated with the high arsenic concentrations in the tailings would be unacceptable. Failure of the Consolidated Tailings Impoundment could re-expose contaminants contained within the impoundment to wildlife and human visitors to the Site. Failure of the bank could additionally expose contaminants to aquatic wildlife in Ferrum Creek.

4. NPL Status

The Site is not listed or proposed for listing on the National Priorities List.

B. Other Actions to Date

Since 1994, NPS has conducted various activities at the Site to investigate and mitigate impacts related to presence of arsenic in the mine tailings, abandoned hazardous materials, abandoned explosives, and a release of mercury from a remaining ball mill.

In June 1994, an NPS explosives removal team observed a deceased moose calf at the Site along with white precipitate on the surface of the tailings ponds. The precipitate had been observed only intermittently and was assumed to include toxic arsenic oxides. NPS returned to the Site in July and August 1994 to collect water samples from the adit and soil samples from the gravel

pad, the tailings ponds, and the drainage channels. NPS returned to the Site again in May and August 1995 to collect additional discrete soil samples from the tailings ponds and undisturbed areas around the Site as well as water samples from Ferrum Creek. The reported concentrations of arsenic in soil were elevated across the Site, including on the gravel pad inferred to consist of waste rock. The highest concentrations of arsenic (220,000 mg/kg to 257,359 mg/kg)⁵ were observed in samples collected from the ore box adjacent to the mill building. Reported concentrations from samples collected within an area of stained soil downslope of the ore box were highly variable, ranging from 7,400 mg/kg to 230,000 mg/kg. Within the tailings ponds, reported arsenic concentrations ranged between 3,200 mg/kg to 50,000 mg/kg. Elsewhere on the gravel pad, concentrations were highly variable, ranging from 410 mg/kg to 50,000 mg/kg, with the highest concentrations observed within the drainage channel along the northern side of the gravel pad.

NPS finalized an Engineering Evaluation/Cost Analysis (EE/CA) for the Site in January 1996.

The final EE/CA Report evaluated six removal action alternatives and recommended solidification/stabilization of the tailings at the Site. Based on the recommendations of the final EE/CA (Shannon & Wilson, 1996), in 1998 NPS consolidated and partially solidified material from the tailings ponds at the Site into a single pond, referred to as the Consolidated Tailings Impoundment. The upper portion of tailings in “Pond D” was solidified by blending the material with portland cement using a rototiller and compacting with a plate compactor. Based on drawings provided by Shannon & Wilson (2006), approximately 2 ft of tailings in Pond D remained unsolidified. Tailing materials from Ponds C, F, and G were subsequently excavated and placed in Pond D in 7- to 8-inch lifts. Each lift was blended with portland cement and compacted. The final lift was sloped to avoid ponding of surface water. After the 1998 removal action, NPS visited the Site annually for two years following the removal action and approximately every five years thereafter to inspect the condition of the impoundment.

C. Engagement by Other Governmental Authorities

The Site was added to the Alaska Department of Environmental Conservation (DEC) contaminated site database in May 2020 under file number 2332.38.053. NPS has been in contact with the Alaska Department of Natural Resources during the TCRA planning for the Site, including reviewing State proposed Applicable or Relevant and Appropriate Requirements (ARARs) related to the Site.

NPS has coordinated with the English Bay Corporation, an Alaska Native Claims Settlement Act (ANCSA) Village Corporation which holds a cultural resource easement over portions of Park land surrounding the Site, and the Chugach Alaska Corporation, an ANCSA Regional Corporation which holds subsurface mineral rights over portions of Park land surrounding the Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

⁵ Arsenopyrite is approximately 46% arsenic by weight, or 460,000 mg/kg. According to Shannon & Wilson (1996), the ore box was covered and was likely therefore subject to less weathering than material elsewhere at the Site.

Section 104(a) of CERCLA authorizes the President to take any response action consistent with the NCP which the President deems necessary to protect the public health or welfare or the environment from threats posed by the release or threatened release of hazardous substances into the environment. This response authority has been delegated to the Department of the Interior (DOI) and, with respect to any release on or from land under NPS jurisdiction, further delegated to NPS by DOI Departmental Manual Part 207 Chapter 7. The NPS Director has redelegated these authorities to ECCD within the Park Planning, Facilities and Lands Directorate.

Section 300.415(b)(2) of the NCP establishes eight factors relevant to determining whether it is appropriate to undertake a removal action:

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- (iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;
- (iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;
- (v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;
- (vi) Threat of fire or explosion;
- (vii) The availability of other appropriate federal or state response mechanisms to respond to the release; and
- (viii) Other situations or factors that may pose threats to public health or welfare or the environment.⁶

Of these eight factors, four support the determination to select and implement the recommended TCRA at this Site, as described below:

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants

Hazardous substances released at the Site as a result of past mining activities include arsenic and mercury. Based on sampling data of the tailings ponds, arsenic concentrations within the Consolidated Tailings Impoundment are expected to be multiple orders of magnitude greater than Site-specific background concentrations and NPS ESVs.

If bank undercutting and soil piping cause the Consolidated Tailings Impoundment to fail, the unsolidified portion of the tailings would be released into the environment, where they would be accessible to wildlife and pose an exposure risk to wildlife and visitors.

- (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems

The Site is located within Kenai Fjords National Park which is a sensitive environment.

In addition, the Site is located on a bank approximately 200 feet from Ferrum Creek, a tributary to the Nuka River. Ferrum Creek has been identified as a breeding ground for

⁶ NCP Section 300.415(b)(2)

anadromous fish. Coho, Sockeye, Pink and Chum salmon and Dolly Varden have been documented in Ferrum Creek. This habitat is a sensitive ecosystem that may become contaminated by hazardous substances released in the event the Consolidated Tailings Impoundment fails. Metals including arsenic are toxic to fish, have negative growth impacts when digested, and can have acute lethal impacts. It is likely that this aquatic habitat will be adversely impacted if hazardous substances at the Site are not contained or removed from the Site.

- (iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate

Based on historical sampling data of the tailings ponds, arsenic concentrations within the Consolidated Tailings Impoundment are expected to be multiple orders of magnitude greater than Site-specific background concentrations and NPS ESVs. The Consolidated Tailings Impoundment is about 10 yards from an eroding bank, and soil piping is believed to have caused undermining of the bank adjacent to the impoundment to encroach within approximately 5 yards of the impoundment. Erosion was observed to have increased between 2021 and 2022.

If the Consolidated Tailings Impoundment fails, tailings will be eroded into a steep gully, where the tailings can be washed down the slope toward Ferrum Creek, 200 feet horizontally and 80 feet vertically distant from the impoundment.

- (v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

The Site receives approximately 90 inches of precipitation annually. The combination of heavy rains, steep terrain, and fresh erosion immediately downslope of the Consolidated Tailings Impoundment leading toward Ferrum Creek makes the migration of hazardous substances likely if these substances are not contained or removed from the Site.

Based upon an evaluation of these factors, NPS has determined that undertaking a time-critical removal action at the Site is necessary to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of hazardous substances at or from the Site. Based on the observed worsening of the stability of the Consolidated Tailings Impoundment, NPS has further determined that such removal action should be taken as quickly as possible to prevent the release of hazardous substances that would occur if the impoundment fails and the resultant migration and exposure of human and ecological receptors to these hazardous substances.

IV. ENDANGERMENT DETERMINATION

As described above and in the administrative record established for this Site, actual or threatened releases of hazardous substances from the Consolidated Tailings Impoundment may present an imminent and substantial endangerment to public health or welfare or the environment if not addressed. NPS has determined that the removal action selected by this Action Memorandum is necessary to protect the public health or welfare or the environment from threats associated with the release or threatened release of hazardous substances at or from the Site.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

The recommended TCRA will remove the contaminated mine tailings and tailings-imbued cement cap from the Site for off-site disposal. Due to the remote nature of the Site and the difficult access, it is not feasible to conduct frequent regular monitoring visits to the Site. Removing the tailings and tailings-imbued cement cap from the Site will remove a source of potential releases into the environment from the Site with few long-term maintenance needs.

1. Proposed Action Description

The recommended TCRA comprises the following specific components.

- An initial site visit will be conducted in advance of full-scale mobilization. This will allow for sampling and characterization of the tailings and tailings-imbued cement cap in the Consolidated Tailings Impoundment, and to assess conditions of the overgrown access road to plan for Site mobilization and road clearing activities.
- A shallow-draft landing craft will transport equipment and supplies from the town of Seward to the head of Beauty Bay. Before mobilization, equipment will be cleaned to remove any invasive plant seeds. Equipment will be offloaded and staged near the upper gravel beach. During this process, mud mats will be used to reduce impacts to areas of soft soil and beach vegetation.
- The road will be cleared of recent vegetation to the minimal extent necessary to allow access for equipment. No threatened or endangered species or rare vegetation are present in the area. Clearing will be conducted after the end of migratory bird nesting season.
- Temporary erosion controls such as silt fencing, wattles, etc. will be implemented to prevent migration of disturbed soils into Ferrum Creek during excavation and until Site removal measures are completed.
- A small excavator will be used to break up the cement cap and excavate the contents of the Consolidated Tailings Impoundment. Tailings and tailings-imbued cement will be placed in lined flexible intermediate bulk containers. A crawler carrier or similar low-pressure tracked vehicle will transport the containerized tailings to the landing craft for transportation offsite.
- There are no landfills in Alaska that are licensed to accept the tailings. The tailings will be transported by barge from the Site to Seward, where bulk containers of waste will be consolidated into shipping containers and shipped to Washington State. They will then be transported by railroad to a licensed Subtitle C landfill. The tailings and cement-imbued tailings will be transported as a USDOT Hazardous Material due to the quantity of arsenic present.
- Following excavation, soil samples will be collected from the floors or walls of the impoundment in accordance with the Sampling and Analysis Plan (SAP). Soil samples from within the former impoundment are anticipated to be collected to determine metals concentrations remaining in place. The samples will be transported to a laboratory for analysis for total metals and soil pH.

- After excavation is completed, the excavation area and adjacent slopes will be graded and recontoured, using the excavator and hand tools, such that ponding, or erosion is less likely to occur. Any temporary sediment and erosion controls will be removed at the conclusion of field work. Subsequently, decontamination of all applicable equipment/tools will be performed.

The recommended TCRA is not expected to achieve all requirements necessary to constitute the final cleanup needed to address contamination at the Site and therefore will be considered an interim measure. Based upon the results of the 2021 PA/SI of the ball mill area of the Site and a review of sampling data taken during the 1996 EE/CA, Contaminants of Concern (COCs) above background levels will remain on-Site after the recommended TCRA is conducted. Funding is being sought for an EE/CA addendum to assess remaining human health and environmental risks at the Site.

The recommended TCRA will eliminate the threats associated with a failure of the Consolidated Tailings Impoundment. These threats include the migration of high concentrations of hazardous substances in Ferrum Creek and the exposure, or potential exposure, of human and ecological receptors that would result. The recommended TCRA will reduce current exposure to hazardous substances at the Site, reduce the volume of hazardous substances at the Site, remove the hazardous substances with the highest known concentrations of COCs at the Site, and reduce the potential for off-Site migration of hazardous substances until further investigation can be conducted. The recommended TCRA will be designed so that the short-term mitigation of risks achieved through implementation of the TCRA is consistent with and will contribute, to the extent practicable, to the efficient performance of any anticipated long-term remedy for the Site.

B. Applicable or Relevant and Appropriate Requirements (ARARs)

This Action Memorandum addresses the proposed TCRA at the Site. Removal actions conducted under CERCLA are required, to the extent practicable considering the exigencies of the situation, to attain ARARs. In determining whether compliance with an ARAR is practicable, the lead agency may consider appropriate factors, including the urgency of the situation and the scope of the removal action to be conducted. NPS has determined that the urgency of the situation presented by the potential failure of the Consolidated Tailings Impoundment makes compliance with all potential Site ARARs impracticable. A table containing potential Site-specific ARARs, and identifying those ARARs that will be attained by the recommended TCRA, is provided as an Attachment to this Action Memorandum.

C. Estimated Costs

The estimated cost of the removal action is \$834,300. This does not include any cost of oversight by the NPS. The source of funds used to fund the TCRA is the Bipartisan Infrastructure Law's Ecosystem Restoration fund source.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Erosion of the gully to the south of the Consolidated Tailings Impoundment and drainage channel to the north of the impoundment is anticipated to continue due to normal and extreme weather events. If the TCRA were to be delayed or not taken, the Consolidated Tailings

Impoundment would present a continuing and likely worsening failure and migration risk. Failure of the Consolidated Tailings Impoundment would likely result in contaminants being released into an anadromous water body. Due to the remoteness of the Site, it is not possible to closely monitor or rapidly respond to changes to Site conditions; a delay to the TCRA would increase the probability of changing Site conditions that could lead to a failure of the impoundment. Should the impoundment fail and tailing materials be allowed to migrate down the embankment towards Ferrum Creek, the degree of effort required for a future removal action would be substantially increased.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues triggered by the selection of the recommended TCRA.

VIII. ENFORCEMENT

NPS is working with the Department's Office of the Solicitor to determine whether Potentially Responsible Parties (PRPs) exist for this Site and, if so, the viability of an enforcement case.

IX. RECOMMENDATION

For the reasons outlined in this Action Memorandum, we recommend that ECCD issue this Action Memorandum selecting the recommended removal action described herein.

X. APPROVAL

Based upon the information and analysis presented in this Action Memorandum and the administrative record established for the Site, ECCD is issuing this Action Memorandum in concurrence with the recommendations contained herein.

**SHAWN
MULLIGAN**

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MULLIGAN
Date: 2023.09.14 21:12:01
-04'00'

Lead, Environmental Compliance and Cleanup Division
National Park Service

Date

XI. REFERENCES

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APPENDIX A: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Glass-Heifner Mine Site, Kenai Fjords National Park, Alaska				
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TBCs				
Standard, Requirement, Criteria, or Limitation	Citation	Requirement Description	Potentially Applicable, Relevant and Appropriate, or To Be Considered (TBC)	Type
NPS mandate to ensure the non-impairment of national park resources for the enjoyment of future generations and the non-derogation of national park values and purposes.	NPS Organic Act of 1916, as amended 54 USC §100101(a), <i>et seq.</i> 36 CFR Part 1 General Authorities Act, as amended 54 U.S.C §100101(b)	The NPS Organic Act, as recently recodified and modified in Title 54, directs the NPS “to promote and regulate the use of ... national parks ... by such means and measures as conform to the fundamental purpose of the said parks ... which purpose is to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” The General Authorities Act, as recently recodified and modified in Title 54, further provides that “the protection, management, and administration of the System units shall be conducted in light of the high public value and integrity of the System and shall not be exercised in derogation of the values and purposes for which the System units have been established, except as directly and specifically provided by Congress.”	Applicable to all NPS decisions and Site activities that may impact park resources and values.	Location
NPS policy on implementation of the non-impairment mandate	2006 NPS Management Policies (MP), §1.4	NPS MP §1.4.5: “The impairment that is prohibited . . . is an impact that . . . would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact, the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. . . . An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is: necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or identified in the park’s general management plan or other relevant NPS planning documents as being of significance. . . . An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.” NPS MP §1.4.3: “The fundamental purpose of all parks also includes providing for the enjoyment of park resources and values by the people of the United States. The enjoyment that is contemplated by the statute is broad; it is the enjoyment of all the people of the United States and includes enjoyment both by people who visit parks and by those who appreciate them from afar. It also includes deriving benefit (including scientific knowledge) and inspiration from parks” NPS MP §1.4.6 describes the ‘park resources and values’ subject to non-impairment. NPS MP §1.4.7 provides that “before approving a proposed action that could lead to an impairment of park resources and values, an NPS decision-maker must consider the impacts of the proposed action and determine, in writing, that the activity will not lead to an impairment of park resources and values. If there would be an impairment, the action must not be approved.”	TBC for guidance on the implementation of the non-impairment mandate.	Location

NPS Policies for Restoration of Natural Systems	<p>2006 NPS MP §4.1.5</p> <p>Find at: DataStore - NPS Management Policies 2006</p>	<p>Section 4.1.5 provides: “The Service will reestablish natural functions and processes in parks unless otherwise directed by Congress. Landscapes disturbed by natural phenomena, such as landslides, earthquakes, floods, hurricanes, tornadoes, and fires, will be allowed to recover naturally unless manipulation is necessary to protect other park resources, developments, or employee and public safety. Impacts on natural systems resulting from human disturbances include the introduction of exotic species; the contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of the landscape and biological community structure and function.”</p>	TBC	Location
Restrictions on solid waste disposal sites in National Parks	<p>Federal statute</p> <p>54 USC 100903</p> <p>NPS implementing regulations, 36 CFR Part 6</p>	<p>The federal statute 54 USC 100903 prohibits operation of any solid waste disposal site that was not in operation on September 1, 1984, except for sites used only for disposal of wastes generated within the park unit, so long as such site will not degrade any natural or cultural resources of the park unit.</p> <p>The NPS regulations implementing 54 USC 100903 are codified at 36 CFR Part 6. Among other things, the regulations prohibit the operation of any solid waste disposal site, except as specifically provided for in the regulations. 36 CFR § 6.4 specifies 12 conditions that must be met before a new solid waste disposal site may be authorized in a National Park, including the condition that there will be no disposal at the site of solid waste containing hazardous waste, polychlorinated biphenyls (PCBs), or radioactive materials.</p>	Applicable to sites where on-site waste disposal is considered in response action planning.	Location
Alaska National Interest Lands Conservation Act (ANILCA) and Establishment of KEFJ	P.L 96-487 (ANILCA); 16 U.S.C. § 410hh(9)	The park shall be managed for the following purposes, among others: To maintain unimpaired the scenic and environmental integrity of the Harding Icefield, its outflowing glaciers, and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes.	Applicable to all NPS decisions and Site activities in the specified Park.	Location
KEFJ Resource Management Plan	<p>Find at: https://irma.nps.gov/DataStore/Reference/Profile/630335</p>	The KEFJ resource management plan (RMP) describes Kenai Fjords National Park’s resource management visions/objectives and the actions necessary to achieve that vision. The plan provides that "The park will work with the Alaska Support Office's Physical Resources Team and Lands Division staff to seek funding for and to implement hazardous substances mitigation projects on former mining claims. "	TBC	Location
NPS Policies Concerning Waste Management and Contaminant Issues	<p>2006 NPS MP §9.1.6-</p> <p>DataStore - NPS Management Policies 2006</p>	<p>Section 9.1.6.1 (Waste Management) states that all disposal of solid waste on lands and waters within the boundaries of a park system unit must comply with the regulations in 36 CFR Part 6 (see above), and further states that NPS will “remove landfill operations and associated impacts from parks where feasible.”</p> <p>Section 9.1.6.2 (NPS Response to Contaminants) provides that NPS “will make every reasonable effort to prevent or minimize the release of contaminants on or that will affect NPS lands or resources, and . . . will take all necessary actions to control or minimize such releases when they occur.” This section further provides that NPS “will identify, assess and take response actions as promptly as possible to address releases and threatened releases of contaminants into the environment.” Contaminants are broadly defined to include “any substance that may pose a risk to NPS resources or is regulated or governed by statutes referenced in this subsection.”</p>	TBC	Location
NPS Policies Concerning Climate Change	NPS Policy Memorandum (PM) 15-01, “Addressing Climate Change and Natural Hazards” (Jan. 20, 2015) and accompanying Level 3 Handbook	<p>NPS Policy Memorandum (PM) 15-01 and its accompanying Handbook provide guidance on the design of facilities in national parks to incorporate impacts of climate change and natural hazards.PM 15-01 is the third “policy pillar” of the Service-wide climate change response, joining NPS PM 12-02 addressing the implications of climate change on the guiding principles of NPS natural resource management, and NPS PM 14-02 providing guidance on the stewardship of cultural resources in relation to climate change.</p> <p>PM 15-01 specifically references NPS MP Section 9.1.1.5, which directs NPS to “strive to site facilities where they will not be damaged or destroyed by natural physical processes,” and also discusses siting considerations in areas where dynamic natural processes cannot be avoided.</p>	TBC in developing removal alternatives and selecting a removal action.	Location

	<p>PM 12-02, “Applying NPS Management Policies in the Context of Climate Change” (March 6, 2012) http://www.nps.gov/policy/MPandCC.pdf</p> <p>PM 14-02, “Climate Change and Stewardship of Cultural Resources” http://www.nps.gov/policy/PolMemos/PM-14-02.htm</p> <p>2006 NPS MP §9.1.1.5 DataStore - NPS Management Policies 2006</p>			
NPS Employee Guidance for Managing Cultural Resources	<p>NPS DO #28: Cultural Resource Management</p> <p>NPS-28: Cultural Resource Management Guideline</p>	<p>DO #28 provides that: “[t]he NPS will protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the NPS <i>Management Policies</i>[,]” (Section 3.1) and requires that the NPS comply with the Secretary of the Interior’s Standards and Guidelines for Archeology [stet] and Historic Preservation (Section 3.2).</p> <p>“NPS-28: Cultural Resource Management Guideline” addresses park cultural resource management programs, compliance with Section 106 of the National Historic Preservation Act, and issues related to archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. “Cultural resources” are defined as “the material evidence of past human activities” (NPS-28, Introduction).</p>	TBC	Location
NPS Employee Guidance for Managing Natural Resources	<p>NPS Reference Manual (RM) #77</p> <p>Find at: DataStore - Natural Resource Management Reference Manual #77 (nps.gov)</p>	<p>NPS RM #77 offers comprehensive guidance to NPS employees responsible for managing, conserving, and protecting the natural resources found in park units. It addresses management of natural resources (including air; disturbed land; endangered, threatened and rare species; geologic resources; vegetation; etc.), resource uses, and planning (e.g., emergency management, and environmental compliance). Relevant guidance includes measures to prevent introduction of non-native invasive species to the Site.</p>	TBC	Location
National Historic Preservation Act	54 USC § 306101 – 306131; 36 CFR Part 800	<p>The statute and its implementing regulations require federal agencies to consider the effect of any federally assisted undertaking or licensing on any district, site building, structure, or object that is included in, or eligible for, the National Register of Historic Places and to minimize or mitigate reasonably unavoidable effects. Indian cultural and historical resources must be evaluated, and effects avoided, minimized, or mitigated. The Site is within a historic mining district.</p>	Applicable to soil disturbance and other Site response activities that could impact areas and/or objects of historical or archaeological significance.	Location
Historic Sites, Buildings, and Antiquities Act	54 U.S.C. § 320102(g)	<p>Requires federal agencies to consider, <i>inter alia</i>, the existence and location of historic or prehistoric sites, buildings, objects, and properties of national historical or archaeological significance, when evaluating response action alternatives.</p>	Applicable to soil disturbance and other Site response activities that could impact areas of historical or archaeological significance.	Location
Archaeological and Historic Preservation Act	54 U.S.C. §§ 312502 – 312503	<p>Establishes requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historic data, which may be destroyed through alteration of terrain as a result of federal construction projects or a federally licensed activity or program. If eligible scientific, pre-historical, or archaeological data are discovered during site activities, such data must be preserved in accordance with these requirements.</p>	Applicable to Site removal action activities that could result in the discovery of archeological or historical resources.	Location
Archaeological Resources Protection Act	<p>16 U.S.C. §§ 470ee(a)</p> <p>43 C.F.R. §§ 7.4(a), 7.5, 7.8, 7.9, 7.33</p>	<p>This statute and its implementing regulations provide for the protection of archaeological resources located on public and tribal lands. If an activity involves soil disturbance, the land manager cannot approve the excavation or removal of archaeological resources unless specified criteria are met.</p>	Applicable to soil-disturbing activities involving soil disturbance that could result in the discovery of archeological resources.	Location
Migratory Bird Treaty Act	16 U.S.C. §§ 703 <i>et seq.</i> as amended by Pub. L. No. 116-9, 133 Stat. 580 (2019)	<p>This statute prohibits the intentional and unauthorized taking of migratory birds.</p>	Applicable. Migratory birds may occur at the Site.	Location

Responsibilities of Federal Agencies to Protect Migratory Birds	Executive Order 13186, 66 Fed. Reg. 3853 (Jan. 17, 2001)	This Order directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act, including supporting the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.	Applicable.	Location
Endangered Species Act	16 U.S.C. §§ 1531 – 1544; 50 CFR Part 402	Establishes requirements for the protection of federally designated threatened or endangered species or their habitats. Includes USFWS consultation.	Not an ARAR. No federally listed threatened or endangered species have been identified at or in the vicinity of the Site.	Location
Contaminated Soil Storage and Disposal	18 A.A.C. § 75.370	Establishes requirements for storage and disposal of contaminated soil	Applicable	Action
Solid Waste Management- General Standards, Requirements and Limitations- Transport	18 A.A.C. § 60.015	Establishes requirements for containment of solid waste during transportation and a requirement to promptly pick up any waste resulting from a spill during transport.	Applicable	Action

