STATE OF ALASKA
2024
Application for Permits to Mine in Alaska (APMA)

☐ Single Year _____ ☑ Multi-year Start: 2024 Finish: 2028 APMA Number (A/F/J,Year,****) 5690

What type activity are you planning to perform? *REQUIRED (1)

☐ Suction Dredging/Reclamation ☐ Reclamation Only
☐ Placer Mining/ Reclamation ☐ Access
☑ Hardrock Exploration/ Reclamation

Surface estate of mineral properties: *REQUIRED (2)

☑ State (General) ☑ State (Mental Health)
☑ Federal ☐ Private
☐ City or Borough

Check All That Apply: ☑ Mineral Property Owner ☑ Lessee ☐ Operator *Required (3)

Name: Constantine Mining LLC
Primary Phone Number: 907-766-2057
Address: 102 2nd Avenue North
Haines, AK 99827
Secondary Phone Number:
Email: Merlin@ConstantineMetals.com

Click here for the Department of Commerce Link

Alaska Business/Corporation Entity# 10063019 Registered Agent (Corp./LLC/LP)

Check All That Apply: ☐ Mineral Property Owner ☑ Lessee ☑ Operator *Required (4)

Name: Constantine North Inc.
Primary Phone Number: 907-766-2057
Address: 800 West Pender Street, Suite 320
Vancouver, BC, Canada V6C2V6
Secondary Phone Number:
Email:

Alaska Business/Corporation Entity# 63048D Registered Agent (Corp./LLC/LP)

Check All That Apply: ☑ Mineral Property Owner ☐ Lessee ☐ Operator *Required (5)

Name: Alyu Mining Inc. & Haines Mining-Exploration Inc.
Primary Phone Number: 541-785-3543
Address: PO Box 130, Haines, AK, 99827
Secondary Phone Number:
Email: N/A

Alaska Business/Corporation Entity# Registered Agent (Corp./LLC/LP)

Check All That Apply: ☐ Mineral Property Owner ☐ Lessee ☐ Operator *Required (6)

Name:
Primary Phone Number:
Address:
Secondary Phone Number:
Email:

Attach a separate sheet for additional contacts

Alaska Business/Corporation Entity# Registered Agent (Corp./LLC/LP)

Project Name If Applicable: (7)	Average Number of Workers: *REQUIRED (8)	Start-Up/Shut Down: (Month/Day) (9)
Palmer Project	40-60	05/01 to 10/31

Mining District: *REQUIRED (10)	Applicable USGS Map(s): *REQUIRED (11)	On What Stream Is This Activity? (12)
Porcupine	Skagway B4	Klehini River - 2 miles away

Legal Description of mineral properties to be worked (MTRS) *REQUIRED (13)
Example: Fairbanks Meridian Township 001N Range 003E Sections 15, 16, and 21 or F 001N 003E Sec. 15, 16, and 21

Copper River Meridian - Township 28S: R53E Sec 15,16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36
Copper River Meridian - Township 28S: R54E Sec 25, 26, 28, 29, 30, 31, 32, 34, 35, 36
Copper River Meridian - Township 29S: R53E Sec 1
Copper River Meridian - Township 29S: R54E Sec 6

Internal Use Only:

Internal Use Only:
Date Application Received Complete: Adjudicator: LAS Entry:
Sec 3 CID: Sec 4 CID: Sec 5 CID: Sec 6 CID:

MINERAL PROPERTIES LIST (14)

Properties that have previous mining disturbance requiring reclamation, active mining/exploration activities, surface improvements, location of a camp, or provides access through the claim block for mining activities. DO NOT LIST CLAIMS UNLESS LISTED ACTIVITIES ARE ASSOCIATED WITH THEM.

If requesting more than 12 claims, are additional sheets with ADL/BLM/USMS and legal descriptions attached? ☑ Yes ☐ No

Are any of these mineral properties an Upland or Offshore Mining Lease? Yes ☐ ☑ No

	ADL/BLM/USMS #	PROPERTY NAME		ADL/BLM/USMS #	PROPERTY NAME
1.		See Box 14 Supplement	7.		
2.			8.		
3.			9.		
4.			10.		
5.			11.		
6.			12.		

INVENTORY OF EQUIPMENT (15)

List all mechanized equipment to be used (make, model, type, size, purpose, and number of each, including pumps). Attach additional sheets as necessary. If you are transporting on a trailer to the claim block, include the trailer size.

	Make, Model, Type, Size, Purpose of Equipment or Pump	Quantity of this type	Check One: Located on the claim block?	Check One: Transporting to claim block?
1.	See equipment listed in State Plan of Operations			
2.	See equipment listed in Federal Plan of Operations and Appendix 1			
3.				
4.				
5.				
6.				
7.				
8.				

ACCESS TO THE CLAIM BLOCK (16)

Access across surface estates not owned by the State requires approval of the managing agency. It is the responsibility of the applicant to contact the owners of private property to obtain authorization for access.

When are you going to be transporting equipment and/or traveling to and from the claim block? ☐ Winter ☑ Summer

Access to the claim block crosses what type of land(s)?

State ☑ City/Borough ☑ Federal ☑ Private ☐

Indicate type(s) Existing Access to the claim block:

☑ All season Road (These are public easements maintained by municipal, borough, private, or state funds for year round use). List road(s) to claim block: Haines Highway, Porcupine Road

☑ Existing Route or a RST/ RS 2477 Easement with a mineral base surface.
If the RST/ RS 2477 Easement(s) has a State of Alaska number, please list: RST1225 - Dalton Trail

☐ Navigable Waterway

☐ Aircraft Supported

Indicate type(s) of access to be constructed within the claim block for development of the mineral resource:

Road(s) ☑ Helicopter Pad ☑ Airstrip ☐ No Improvments or Construction Proposed ☐

ACCESS TO THE CLAIM BLOCK, CONTINUED (16)

Please describe your construction activities and include mitigation measures to protect water, fish and game resources. Include a time frame for final closure and a reclamation plan for access within the claim block. Attach additional pages if necessary:

See PoO for proposed exploration activities, mitigation measures and schedule for reclamation and other activities on state claims.

See Federal PoO for activities conducted on BLM Claims, as well as Appendix 1 which outlines anticipated work for 2024.

A access map **MUST** be submitted with your application. Topographic maps at a scale of 1"=1 mile must clearly indicate the proposed access route from start to finish, location of proposed construction activities, and appropriate legal descriptions (township and range) on each map sheet. Paper size should be limited to 8 ½" x 11". Do not tape maps together.

Name the individual(s) or business(es) who will be conducting the travel:

N/A

List all equipment and vehicles conducting travel to/from the claim block, including vehicle weights and season of travel:

N/A

State the average total miles traveled in one round trip: N/A. State the number of trips proposed: N/A.

State the start and end date(s) or period(s) of proposed travel: N/A.

Select the following terrain type(s) that best describes your route of travel: ☐ Wetlands ☐ Tundra ☐ Uplands ☐ Rivers or Other Water Bodies ☐ Wooded Areas (6" Trees or larger at breast height)

Will water be needed to construct ramps/ ice bridges? ☐ Yes ☐ No

If Yes, estimated quantity of water will be used: _____ gallons/day Water Source: _____

Are you transporting fuel? ☐ Yes ☑ No

Maximum volume of fuel (in gallons) that is being transported by one vehicle and any trailers or sleds it is towing:

Are you transporting other hazardous substances? ☐ Yes ☐ No If "Yes" indicate type and amount (e.g. gallons, lbs, psi):

How are petroleum products contained? (i.e., drums, bladders, steel tanks, etc.) Indicate size of containers:

How are petroleum products being transported? (i.e., skid-mounted tank, trailer, 55 gallon drums on skid, etc.)

ACCESS TO CLAIM BLOCK CONTINUED (16)

Does your travel include the staging or storage of equipment or structures off the claim block? ☐ Yes ☐ No

If Yes, describe the location and dimensions of the long term or short term parking and/or storage areas.

PETROLEUM PRODUCT STORAGE (17)

Do you have an Oil Discharge Prevention and Contingency Plan approved by the Alaska Department of Environmental Conservation? ☑ Yes ☐ No

Do you have either a trained spill response team or a contract with a spill response company? ☑ Yes ☐ No

Describe any measures you plan to take to minimize drips or spills from leaking equipment or vehicles:

SPCC document provided as attachment.

Quantitiy Petroleum Products to be Stored on the Project Site?

☐ 0-1,320 gallons of total storage (Secondary Containment recommended, but not required)

☑ 1,321-10,000 gallons of total storage (count only containers with a capacity of 55 gallons or greater). A self-certified Spill Prevention, Control, and Countermeasure (SPCC) plan is required and applies to all products, such as diesel fuel, gasoline, lube oil, hydraulic oil and waste oil. The self certified SPCC form can be downloaded at: https://www.sfdph.org/dph/files/EHSdocs/ehsHMUPAdocs/TIERIQFSPCCPlan.pdf.

BLM Operators are encouraged to use the optional BLM-Spill contingency plan that can be downloaded at: https://www.blm.gov/sites/blm.gov/files/BLM-AK_spill-contingency-plan_APMA_worksheetSup.pdf

☐ 10,000+ gallons of total storage (count only containers with 55 gallons or greater storage capacity). An SPCC certified by a professional engineer is required and applies to all oil products, such as diesel fuel, gasoline, lube oil, hydraulic oil and waste oil.

Indicate Distance Stored From Flowing Waters: >100 Feet. (Minimum distance from naturally occurring water bodies required by DNR is 100 feet).

Is waste oil stored on the project site? ☐ Yes ☑ No If Yes, describe quantity and storage modality:

Are fuel containment berms around storage containers? ☑ Yes ☐ No Is berm area lined? ☑ Yes ☐ No

TEMPORARY STRUCTURES/FACILITIES (18)

Is a camp or placement of *any* temporary structure requested? ☐ Yes ☑ No
If "No", Please explain: Camp facilities are located on private land.

Describe all temporary improvements (including buildings, tent platforms, out-buildings, etc., including their quantity, dimensions and building type.

What type of property is the camp located on? ☐ State ☐ Federal ☐ Private (Patented) ☐ City or Borough ☐ MHTL
If camp is on private land, provide location: _____

Proposed perimeter dimensions of camp: _____ Length (feet) _____ Width (feet).

☐ Request use of **existing** facilities, list ADL(s): _____
☐ Year-Round ☐ Seasonal, from Approx. _____ to _____, annually.

☐ Request to place **new** temporary structures, list ADL(s): _____
☐ Year-Round ☐ Seasonal, from Approx. _____ to _____, annually.

	Temporary New Structures Quantity	Existing Structure Quantity	Use (Shop, office, etc.)	Dimensions (ft x ft)	Dimensions (ft x ft)	Dimensions (ft x ft)
Framed						
Tent						
Trailer						
Platforms						
Out-Buildings						
Other:						

** If Required, list any other structures on a separate sheet, include dimensions, use, and type.*

Grey Water and Biological Waste - Describe storage and proposed method of disposal (*e.g.*, leach line, septic, holding tank, or pit privy):

Solid Waste - Describe the types of waste that will be generated on-site including garbage, scrap metal, industrial; and describe its disposal method. Note: For on-site disposal on state land, additional authorization is required by DEC and DNR outside of the APMA.

What is the distance grey water, biological, and solid waste will be located from the ordinary high water mark of the nearest freshwater body (lake, stream, river, rivulet, etc.), or the mean high water mark of a saltwater body: _____
Will there be any use of animals (horses, dogs, goats/sheep, etc)? ☐ Yes ☐ No

Required: Dismantle and Removal for Structures: Provide a plan for dismantling and removing structures, equipment, and storage tanks. Include the method and timeline for restoration of all location areas.

MINING METHOD (19)

☐ Mechanical Placer Mining (e.g., terrestrial open-cut operations with dozer or excavator, etc.)
Estimated cubic yards processed annually: _____
☐ Suction Dredge ☐ Mechanical Dredge (e.g., excavator or clam-shell)

List all suction and mechanical dredges. If information is not applicable, write "N/A." Attach extra sheet if necessary.

	Dredge 1		Dredge 2		Dredge 3	
Vessel ID (Name or Number)						
Vessel Dimensions						
Suction Dredge Intake Nozzle Diameter / Pump Size	Inches:	HP:	Inches:	HP:	Inches:	HP:
Mechanical Dredge Bucket Volume	Cubic Yards:		Cubic Yards:		Cubic Yards:	
Processing Rate	Yds.^{3}/Hr.:		Yds.^{3}/Hr.:		Yds.^{3}/Hr.:	
Wastewater Discharge Rate	GPM:		GPM:		GPM:	
Maximum Water Depth	Feet:		Feet:		Feet:	
Average Daily Operating Hours						
Operation on Sea Ice (Yes/No)	Yes ☐ / No ☐		Yes ☐ No ☐		Yes ☐ / No ☐	
Vessel Registration # / State	#:	State:	#:	State:	#:	State:

Location: ☐ Offshore / Salt Water ☐ Stream ☐ Mine cut isolated from stream ☐ Pond connected to stream ☐ Pond isolated from stream

PLACER EXPLORATION DRILLING AND TEST PITS (20)

Please provide topographic maps showing drilling and/or test pit locations that corresponds with the table below. Maps should (at minimum) have labeled Mineral Properties and labeled locations of proposed activities. Methodology and reclamation of exploration activities must be described in the placer narrative.

Test Pits: ☐ **Yes** ☐ **No**

Estimated number of pits to be excavated: _____. How long will the test pit be open if not converted into an active mine cut? _____.

Average Size: Length: _____Ft. Width: _____Ft. Depth: _____Ft.

Placer Drilling: ☐ **Yes** ☐ **No**

Total number of holes to be drilled: _____ Type of drill(s) used: _____

Drilling and Test Pit Identification and Mineral Property Information	
Trench/Hole ID on Map	ADL/BLM/USMS NUMBER

If more than 8 Pits/drill sites, please provide data in tabular format

EXPLOSIVES (21)

Will explosives be used? ☑ Yes ☐ No If "Yes", Indicate: Type: see PoO _____ Amount: _____.

Explosive Handler's Certification/ATF Permit Numbers: Pending _____

Describe your blast design, blast schedule, and explosives handling plan in the project narrative.

WATER ENTRAPMENT (22)

Will you be capturing water for use in mining operations? ☐ Yes ☐ No The entrapment is: ☐ Existing ☐ To be constructed

Where does the water have a potential to being stored? ☐ Above ground ☐ Below ground level ☐ Both

If above ground, what is the Length ____ ft Height ____ ft Width at crest ____ ft Width at base _____ft of the berm(s)

What is the purpose of the water use? ☐ Makeup water pond ☐ Settling/recycle pond ☐ Stream diversion Other_____

How long do you expect for the entrapment to be in place ☐ Permanent ☐ 1-3 years ☐ 3-5 years ☐ 5 or more

If above ground, how many acre-feet is the maximum capacity of water stored from ground level to crest of the berm?_____
Total volume in acre-feet = surface area (acres) x average depth (feet) (1 acre = 43,560 square feet)

Where is the topographic location of the water storage area? ☐ Valley bottom ☐ Hillside

If on a hillside, Approximately how many feet is the water storage above the valley floor_____ft

IN-STREAM ACTIVITIES and STREAM CROSSINGS (23)

List any equipment (refer to Box 15 if necessary) that will be crossing streams (including low-water crossings along established trails/roads) or used in any natural waterbody or used in-stream:

See PoO

List all stream crossings, suction dredge or pump locations, including unnamed streams.

	Stream Name/ Water Source	NAD 83 Datum (approximate) Coordinates can be obtained using Alaska Mapper http://dnr.alaska.gov/mapper/controller		MTRSC ¼ ¼ Ex: F001S001N01 SWSW	Check boxes to indicate type(s) of activity		
		Latitude ddd.mmmm	Longitude -ddd.mmmm		Crossing	Dredging	Water Intake
1.							
2.							
3.							
4.							
5.							

If in-stream activities and/or stream crossings are requested at more than 5 locations, please provide tabular data format.

(24)

WATER USE AUTHORIZATIONS

If water is impounded, withdrawn, or diverted, the ADNR Water Resources Section needs to review the water sources and water uses to determine if a water use authorization is needed. Water usage (including from 100% recycle pond systems) may require approval by issuing a Temporary Water Use Authorization (TWUA) or a Water Right. Information provided below will be used to determine the quantity of water that you may be authorized to use for your mining operation. When estimating water quantities, please estimate withdrawal amounts typical of a dry summer and provide the maximum quantity that you may withdraw from a particular source (e.g., stream, pond, groundwater, etc.) in a season. A TWUA application may be initiated from this APMA, unless a Water Right is requested. Please contact the ADNR, Water Resources Section at telephone number (907) 451-2790 for more information.

- Is there a current Water Right within the proposed mineral property boundary? Yes ☐ No ■
- If yes, provide the LAS or ADL Water Right Case File number: _____
- What are the months of water use needed (for example May 1st through October 31st)? _____

Name & Location of Water Source(s):

- If water is required ***to fill*** or ***to maintain*** water in the recycle/settling pond system check the applicable box (table below in part A) for each water source used. Please note that a recycle/settling pond system is a water source (5 sources per TWUA). Stormwater from rainfall or snowmelt do not require water use authorizations.
- Identify each water source and its geographic location using MTRS. Include Lat/Long coordinates if available.

Example: Finger Lake: Fairbanks Meridian, Township 3 North, Range 3 West, Section 20.
MTRS: F3N3W 20
Lat/Long: 65° 4' 15" N; 148° 12' 43" W

A. Name & Location of Water Source(s). No more than 5 water sources per TWUA. Attach list of additional sources if needed. A $450 fee is associated with each TWUA. The APMA paperwork is all that is needed to apply for TWUAs. For example, if there are 20 sources listed in the APMA, 4 TWUA case files will be generated.
When submitting an APMA, a separate Application for Temporary use of Water form is not needed.

Provide the geographic name or locally know name of water Source. *(Recycle/settling ponds, creek, stream, well, etc.)* If requesting a stream reach, clearly identify the entire stream reach on a legible map.	Meridian	Township	Range	Section(s)	Start-Up Water and/or Make-Up Water? Check each applicable box.			
Example: Unnamed Creek	F	3N	3W	20	Start-Up	X	Make-Up	X
1. See supplement to box 24					Start-Up	☐	Make-Up	☐
	Latitude:			Longitude:				
2.					Start-Up	☐	Make-Up	☐
	Latitude:			Longitude:				
3.					Start-Up	☐	Make-Up	☐
	Latitude:			Longitude:				
4.					Start-Up	☐	Make-Up	☐
	Latitude:			Longitude:				
5.					Start-Up	☐	Make-Up	☐
	Latitude:			Longitude:				

WATER USE AUTHORIZATIONS CONT. (24)

B. Water Use Activities. Complete applicable information for each source. For recycle/settling pond system complete part **C. Recycle/Settling Pond System**. For stream diversions also complete Section 29.

Geographic Name of Water Source *(Same as sources Above).* Describe the water use information for each source. For recycle/settling pond system complete Section C.	**Diversion (gpm/cfs)**	**Withdrawal Rate (gpm/pump)**	**Number of Pumps**	**Hours per Day**	**Days per Month**
1.					
2.					
3.					
4.					
5.					

C. Recycle/Settling Pond System	**Withdrawal Rate (gpm/pump)**	**Number of Pumps**	**Hours per Day**	**Days per Month**	**Additional Notes:**
This system will also need to be listed as a water source in Section A. This entire pond system counts towards the 5 sources allowed per TWUA. Provide Length (L), Width (W), and Depth (D), of each pond. Beaver ponds or similar nature made impoundments will not be permitted for use as settling ponds.					
	Pond # 1: L:__ ft W:__ ft D:__ ft			Pond # 2: L:__ ft W:__ ft D:__ ft	
	Pond # 3: L:__ ft W:__ ft D:__ ft			Pond # 4: L:__ ft W:__ ft D:__ ft	

D. Camp Water Uses	**Maximum # of People in Camp**	**Withdrawal Rate (gpm/pump)**	**Number of Pumps**	**Hours per Day**	**Days per Month**	**Source(s) of Water** Well, Haul, Stream, Spring, Lake Source(s) will count towards the 5 sources identified in Section A.
Provide information on camp water uses. If an ADEC public drinking water system is used, please attach certificate to operate and/or associated documents.						
	Additional Notes:					

WATER USE AUTHORIZATIONS CONTINUED

(24)

E. Exploration Activities A map of your requested drilling water sources is required with the following information: -MTRS sections, -stream reaches or other water sources (please label, including take points if known) -and drill hole locations.	Is Water Needed for Exploration Trenching or Drilling?	Withdrawal Rate (gpm/pump)	Number of Pumps	Hours per Day	Days per Month	Source(s) of Water Well, Haul, Stream, Spring Lake, etc. Source(s) will count towards the 5 sources identified in Section A.
	Yes	20 GPM	3	24	30	See supplement to box 24

D. SUCTION DREDGING.

If suction dredging activity is occurring, please ensure that you have completed the dredge table in Section (19) MINING METHOD.

TIMBER CLEARING AND USE

(25)

(Operations on State Lands Only)

Pursuant to AS 38.05.255, timber from land open to *mining without lease*, except "timberland", may be used by a mining claimant or prospecting site locator for the mining or development of the location or adjacent claims under common ownership. Timber not used for the mining or developement of the location or adjacent locations, that is *removed* from the operation must be acquired via timber sale or written letter of non-objection from the Alaska Division of Forestry.

For questions on the appropriate use of timber on federal mining claims, contact your local BLM field office.

On other lands ("timberlands" and in areas that are closed to mining without lease), timber cleared, used and/or removed must be acquired via a timber sale or a written letter of non-objection from the Alaska Division of Forestry.

Will timber be used for the mining or development of the location or lease? ☐ Yes ☑ No

Describe the timbered area or areas to be cleared; include a map or drawing of the ares of timber to be cleared.

See PoO

Describe the amount of timber to be used for the mining or development of the location or lease and the clearing methods you will use.

No timber will be used for mining or development - timber will be felled and stacked in accordance with the Haines State Forest forester for someone elses use.

Are more than 40 acres of timbered area(s) to be cleared? ☐ Yes ☑ No

11 AAC 86.145. "A classification or designation indicating that timber and other forest products of significant value are included within a mining property is prima facie evidence that the land on which the property is located is considered to be "timberlands" for purposes of AS 38.05.255"

WASTEWATER DISCHARGE PERMIT APPLICATION (26)

All mechanical placer mine, suction dredge, and mechanical dredge operations that discharge to a water of the U.S. require an Alaska Pollutant Discharge Elimination System (APDES) permit from DEC. See Cover Pages for a list of APDES permit fees.

Operations wishing to discharge under the APDES Small Suction Dredge General Permit (dredges with intake diameters of 6" or less, or highbankers) may skip this section but must complete annual online registrations, including $25 fee payments, at https://dec.alaska.gov/water/edms.

Previously issued DEC-APDES Wastewater discharge permit #:_____

Do you want this APMA to act as an application or renewal for any of the following APDES general permits (GPs)*:

Mechanical Placer Miners GP (open-cut terrestrial operations): ☐ Yes ☐ No

Medium-Size Suction Dredge GP (nozzle diameter greater than 6" to 10"): ☐ Yes ☐ No

Norton Sound Large Dredge GP (nozzle diameter greater than 10" or mechanical dredge): ☐ Yes ☐ No

Waterbody the discharge flows directly into, or would potentially flow: _____

Approximate coordinates of mine site:

Latitude: _____ Longitude: _____

Source (e.g., DNR - Alaska Mapper): _____

*Mechanical placer operations that do not elect coverage under the Mechanical Placer Miners GP may be required to obtain coverage under the Multi-Sector General Permit for Storm Water. Contact DEC to terminate a permit.

Optional* - Mixing Zone Request or Termination for Mechanical Placer Mine Operations

Do you wish to apply for a mixing zone and modified turbidity limit from DEC? ☐ Yes ☐ No

If a mixing zone is requested, provide the following:

Coordinates of discharge location: Latitude: _____ Longitude: _____.

Maximum Effluent Flow anticipated from your operation _____ (GPM) [must be greater than zero (0)].

Distance to nearest downstream drinking water source _____ and downstream placer mine _____ .

Do you wish to terminate an active authorized mixing zone? ☐ Yes (APDES#_____) ☐ No

*A mixing zone authorizes an increase in the permit's turbidity limit based on available dilution from the surface water. Permittees without mixing zones must meet the water quality standard for turbidity at the point of discharge into the surface water.

Certification Statement – applicable only to information required for DEC authorizations (required for all DEC permit or mixing zone applicants)

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 on my inquiry of the person or persons who manage 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Responsible Party: _____.

Responsible Party Name (First Last, Position) - Printed: _____ .

Business Name (if applicable) - Printed: _____.

SECTION 404 WETLANDS PERMIT

JURISDICTIONAL DETERMINATION (CORPS JD) and MITIGATION STATEMENT

All Placer Mining applicants are required to contact the Corps of Engineers for submittal requirements.

A complete application for a Department of the Army (DA), U.S. Army Corps of Engineers (Corps) Section 404 permit includes a description of project impacts (contained in the APMA), a Jurisdictional Determination (JD) and a Mitigation Statement. The applications for the JD and the Mitigation Statement are contained in two Corps Supplements, which may be attached to this APMA. The Supplements may be downloaded from the Corps and DNR websites, or obtained directly from a Corps office in paper copy, by email, or mail. Please contact the Corps to determine what supplements are required.

The Supplements are available at: **https://www.poa.usace.army.mil/Missions/Regulatory/Placer-Mining/**

Corps Supplement, Attachment 1, Jurisdictional Determination: Attachment 1 must be filled in and submitted to the Corps for **all new placer applications (New and Existing Operations).** Photos of your mine site are required. Your JD will be valid for five years. Your photos will be used only for the purpose of conducting an offsite JD.

Corps Supplement, Attachment 2, Mitigation Statement: Alaska District regional mitigation policy for placer mining operations under this General Permit (GP) emphasizes avoidance and minimization of impacts; **compensatory mitigation is not required**. However, by regulation, a Mitigation Statement covering measures for avoidance, minimization, and compensatory mitigation, or, a reason why compensatory mitigation is not proposed, must be submitted to the Corps with each new APMA for projects that impact waters of the U.S.

Provide the Latitude and Longitude of the operation location (DD, NAD83):

Latitude: _____ Longitude: - _____

Source (e.g., DNR - Alaska Mapper): _____

Please list Corps permits previously issued for this site: POA- _____- _____ , POA- _____-_____

Certification Statement

The Alaska District will accept the APMA as a pre-construction notification, pursuant to 33 CFR 320.1 (c). Application is hereby made for a permit to authorize the work described in this APMA. I certify the information in the APMA, and any required Supplements, is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the operator/ applicant.

Operator or Agent:

_____

Print Name Signature Date

STREAM DIVERSION (28)

A MAP OF COMPLETE STREAM DIVERSION IS REQUIRED: The map MUST show the entire length of the diversion (i.e., where the water is diverted from the natural stream channel to where it returns to the natural stream channel) with start and end locations clearly marked. Pending on the scale of the proposed diversion, additional maps, construction details, and a stream reclamation plan may be requested in addition to this section after initial review. Operations on BLM lands that are proposing a stream diversion are encouraged to contact their local field office as early as possible in the permitting process due to additional requirements. **Contact ADF&G, Habitat Section for Fish Habitat Permitting information regarding diversion requirements.**

Please note: A stream diversion structure may also qualify as a dam and be subject to the Alaska Department of Natural Resources Dam Safety Program per definitions provided in AS 46.17.900(3). If you require further regulatory guidance regarding dams, please contact our Dam Safety and Construction Unit, Dam Safety Engineer at (907) 269-8636, or for more information go to the Alaska Dam Safety Program website at: http://dnr.alaska.gov/mlw/water/dams/

Is Stream Diversion Required? ☐ **Yes** (if **Yes**, complete information below). ☐ **No**

Stream Name:_____

☐ Existing (Date Constructed_____) ☐ To Be Constructed (Date_____)

Diversion Start/upstream Location (Lat/Long)_____

Diversion End/Downstream Location (Lat/Long)_____

Is Stream Diversion? ☐ Permanent ☐ Temporary _____ year(s) _____ months

Will diversion be reclaimed annually prior to freeze-up or be retained throughout the mine life?

☐ Annually reclaimed/returned to natural stream ☐ Maintained throughout mine life

Dimensions of existing stream in diversion area:

Length _____(ft) Top Width___(ft) Bottom Width___(ft)) Floodplain Width_____(ft)

Dimensions of proposed diversion:

Dominant substrate type (Choose Two): ☐ Bedrock ☐ Boulder ☐ Cobble ☐ Gravel ☐ Sand ☐ Silt/Clay

Length _____(ft) Top Width___(ft) Bottom Width___(ft) Depth___(ft) Floodplain Width_____(ft)

Note: The general geomorphology (e.g., meander, width/depth, pools/runs, etc.) and instream components (e.g., large woody debris, boulder/cobble, etc.) of the natural stream should be mimicked to the extent practicable.

*Required: **A written stream diversion narrative in addition to this form. The narrative should describe the following:**

1.) Step by Step Procedures
2.) Construction Techniques
3.) Reclamation Techniques
4.) Timelines

PLAN MAP OF OPERATION *REQUIRED

(29)

VICINITY MAP

See draft PoO for a number of figures describing the proposed activities for this project.

APMA #	ADLs:

(Attach additional sheets, along with detailed explanations as necessary)

CROSS SECTION SKETCH *REQUIRED

BEFORE ACTIVITY (30)

DURING ACTIVITY

AFTER ACTIVITY

PLACER/SUCTION DREDGE NARRATIVE *REQUIRED

(31)

A narrative of the operation is required. Please use this space to describe the access, mining process, environmental protection measures and reclamation measures to be used for the duration of this permit. Use multiple sheets if necessary.

DESCRIBE ACCESS, PERSONNEL HOUSING AND CAMP LAYOUT:

See PoO

DESCRIBE PROGRESSIVE STEPS OF MINING METHOD:

See PoO

DESCRIBE PLANNED RECLAMATION MEASURES INCLUDING TIMELINE FOR RECLAMATION TO TAKE PLACE:

See PoO

DISCUSS WATER MANAGEMENT PLANS, INCLUDING USE, SOURCE, QUANTITY AND SURFACE WATER/ EROSION MANAGMENT PLAN:

See PoO

DISCUSS FUEL STORAGE, HANDLING, AND SPILL PREVENTION AND RESPONSE PLANS:

See PoO and included SPCC Plan

DISCUSS HOW THE OPERATION WILL AVOID/MITIGATE POTENTIAL IMPACTS TO FISH, WILDLIFE AND CULTURAL RESOURCES:

See PoO

HARDROCK EXPLORATION TRENCHING and DRILLING (32)

(Indicate target and trenching locations on sketch sheet and/or topographic map)

Trenching: ☑ Yes ☐ No

Estimated number of trenches to be excavated: See PoO. How long will trenches be open? _____.

Average Size: Length: _____ Ft. Width: _____ Ft. Depth: _____ Ft.

Drilling: ☑ Yes ☐ No Type of Drill(s) Used: Diamond Drill and Reverse Circulation

Total Number of Holes TBD Diameter of Drill Rod/Casing Rod Variable (NQ/HQ/H,Etc.)

Drilled: Estimated Maximum Depth: TBD Indicate how many pumps per water source: Up to 3

Will water be used? ☐ Yes ☐ No

Water source name(s): Water sources identified in the TWUA section.

Describe detailed drill plan, closure, plugging methodology, reclamation and abandonment in project narrative.

Trench/Drilling Location and Mining Claim Information			
Trench/Drill ID on Map	ADL/BLM/USMS NUMBER	Decimal Degrees, NAD 83 Datum	
		Latitude	Longitude (approximate)
See PoO			

If more than 8 trenches/drill sites, please provide data in tabular format (APMA tabular data template for reporting proposed activities and reclamation)

HARDROCK NARRATIVE *REQUIRED

(33)

A narrative of the operation is required. Please attach a written narrative to this application. The narrative should include the information to answer the prompts provided below and include any additional information relevant to the proposed activities.

1.) Describe access to property, drill/trench sites, including length and type of access routes. Describe access reclamation measures to be conducted and timeline.

2.) Describe exploration method, scope of work proposed, equipment, when and where activities will occur, personnel housing location and camp description.

3.) Describe site preparation activities and pre-reclamation measures.

4.) Describe pad construction and dimensions.

5.) Describe drill core management, to include transportation of core, storage, and removal or disposal from the exploration project.

6.) Describe drill waste and drill water management, drill fluids and disposal methods. Attach msds/sds for all substances.

7.) Describe fuel handling at exploration drill sites (pads and trenches) and off site (camp or base operations).

8.) Discuss spill prevention and response plan.

9.) Describe water use including estimate of daily water use.

10.) Describe how the operation will avoid and/or mitigate potential impacts to fish, wildlife and cultural resources: describe closure, plugging methodology, surface reclamation and abandonment.

Extended Hard Rock Narrative

This APMA application is being filed so that Constantine may meet its reclamation bonding obligations, for surface use authorizations on state land, and for approval of water use associated with the operations. Additionally, this application is being prepared for review by agencies who participate in the authorization process under the APMA process. The application has been prepared for these purposes and a map detailing the claim holdings for Constantine has been provided as a supplement to Section 32.

Exploration activities on the 340 unpatented federal mining claims are authorized under BLM Records of Decision approving Constantine's Plan of Operations for those federal claims dated 8/18/2016 and 9/21/2017 under casefile AA-094088 and authorizes up to 40 acres of disturbance, construction of the Glacier Creek access road, a fuel storage facility and laydown area, as well as exploration drilling. Current disturbance on BLM lands is approximately 17 acres. This is further detailed in Constantine's 2023 Annual Reclamation Report. As part of a reclamation plan associated with Constantine's waste management permit issued by ADEC, Constantine holds a bond for approximately $392,000 which accounts for the majority of disturbance on BLM land including Glacier Creek access road and laydown areas.

Exploration activities on MHT lands are authorized by MHT Plan of Operations Approvals dated 4/19/2018 and 7/23/2019 and authorize drilling activities, road construction, settling pond construction, and portal pad construction, underground activities, and construction of a water disposal system which is also authorized by ADEC under a waste management permit.

Exploration activities on the 63 state mining claims is described in detail in the attached Plan of Operations document and Constantine is requesting formal approval of this Plan of Operations as part of this APMA application process.

Constantine has previously been meeting the surface reclamation bonding requirements for all of this work on the broader Palmer Project land holdings by participating in the statewide bond pool under APMA #5690 which has been administratively continued until April 30, 2024. Constantine is requesting to continue participating in the statewide bond pool going forward.

The most current accounting of surface disturbance and reclamation is in the reclamation report/statement filed for the 2023 calendar year filed by Constantine.

Box 14 Additional Information

State Claim Work – See Plan of Operations

Federal Claim Work – Anticipated 2024 Work Area - For additional detail see Attachment 1

Federal Claim #	Property Name
AA 27188	#3 of Marmot Core
AA 27186	#1 of Marmot Core
AA 27223	Marmot #111
AA 27222	Marmot #110
AA 27187	#2 of Marmot Core
AA 27193	Marmot #6
AA 27194	Marmot #7
AA 27195	Marmot #8
AA 29590	Rat Dawg #77
AA 29593	Rat Dawg #87
AA 27197	Marmot #10
AA 29592	Rat Dawg #86
AA 29589	Rat Dawg #76
AA 29591	Rat Dawg #85
AA 29588	Rat Dawg #75
AA 29586	Rat Dawg #67
AA 29587	Rat Dawg #68
AA 27191	M.V.P. Mining Claims #1
AA 27213	Marmot #101
AA 27214	Marmot #102

TWUA Narrative for Work on State / MHT Claims (Section 25 – E)

APMA #5690

Submitted to ADNR November, 2023

Constantine is requesting to add eight water sources: "Glacier Creek", "Upper Plateau", "Lower Plateau", "Argillite", "Upper Argillite", "Marble", "Pump Valley / Sara Creek", and "Pump Valley Pond" associated with work related to the November Plan of Operations submitted to DNR by Constantine North Inc. (Constantine) and the Plan of Operations approved by MHT in 2018. Of the eight sources requested, four sources have been previously permitted: "Glacier Creek", "Lower Plateau Creek", "Pump Valley / Sara Creek", and "Marble". The other four sources are newly requested sources.

Request to add the following sources on MHT / State Claims:

Source Name	Easting NAD 83	Northing NAD 83	Meridian	Township	Range	Section	Quarter section	Length (Ft.)
Glacier Creek	426147.4688	6587272	C	028S	054E	30	NW ¼	328
Upper Plateau Creek	423929.1794	6586937.877	C	028S	053E	25; 26	SW ¼	1871
Lower Plateau Creek	424562.1694	6587229.841	C	028S	053E	25; 26	SW ¼ NW ¼ NE ¼	6549
Argillite	422817.4	6585351.5	C	028S	053E	34; 35	NE ¼ SW ¼	4793
Upper Argillite	421753.6404	6585737.812	C	028S	053E	34	NE ¼	1,295
Marble	430270.8	6587170	C	028S	054E	28	NE ¼	701
Pump Valley/Sara Creek	420843.5	6586549	C	028S	053E	27; 28	SE ¼	1480
			C	028S	53E	34		
Pump Valley Pond	421132.4	6587069	C	028S	053E	27	SE ¼	N/A

Details on Glacier Creek:
The requested water withdrawal point for Glacier Creek is at the bridge crossing above the confluence with the Klehini River. At this point, Glacier Creek is mapped for resident fish only and does not have anadromous fish (last investigated by ADFG in 2021).

Details on Upper Plateau Creek:
This is an unnamed creek, referred to by Constantine as "Plateau Creek". Plateau Creek is a tributary of Glacier Creek, and its lower reaches are mapped as anadromous fish habitat by Alaska Department of Fish and Game (ADFG). ADFG surveyed the lower portions of this creek in 2019 and 2021 and indicated that portions of the creek are dry during drought conditions. Limited instantaneous discharge data is available for this site, only collected within 30 meters of the confluence with Glacier Creek. Little is known about the creek conditions in the mid to upper portion of the applied for reach, this is why a reach of 1,871 feet is requested. Additionally, work was conducted on this creek by ADFG in 2023 but a report has not yet been generated to our knowledge.

Details on Lower Plateau Creek:
See details for Upper Plateau Creek. The lower section request is for approximately 6,500 ft.

Details on Argillite Creek:
This is an unnamed creek, referred to by Constantine as "Argillite Creek". It is a tributary to Glacier Creek. Little is known about the flow conditions of the creek, and this is why a reach of 4,793 ft is requested.

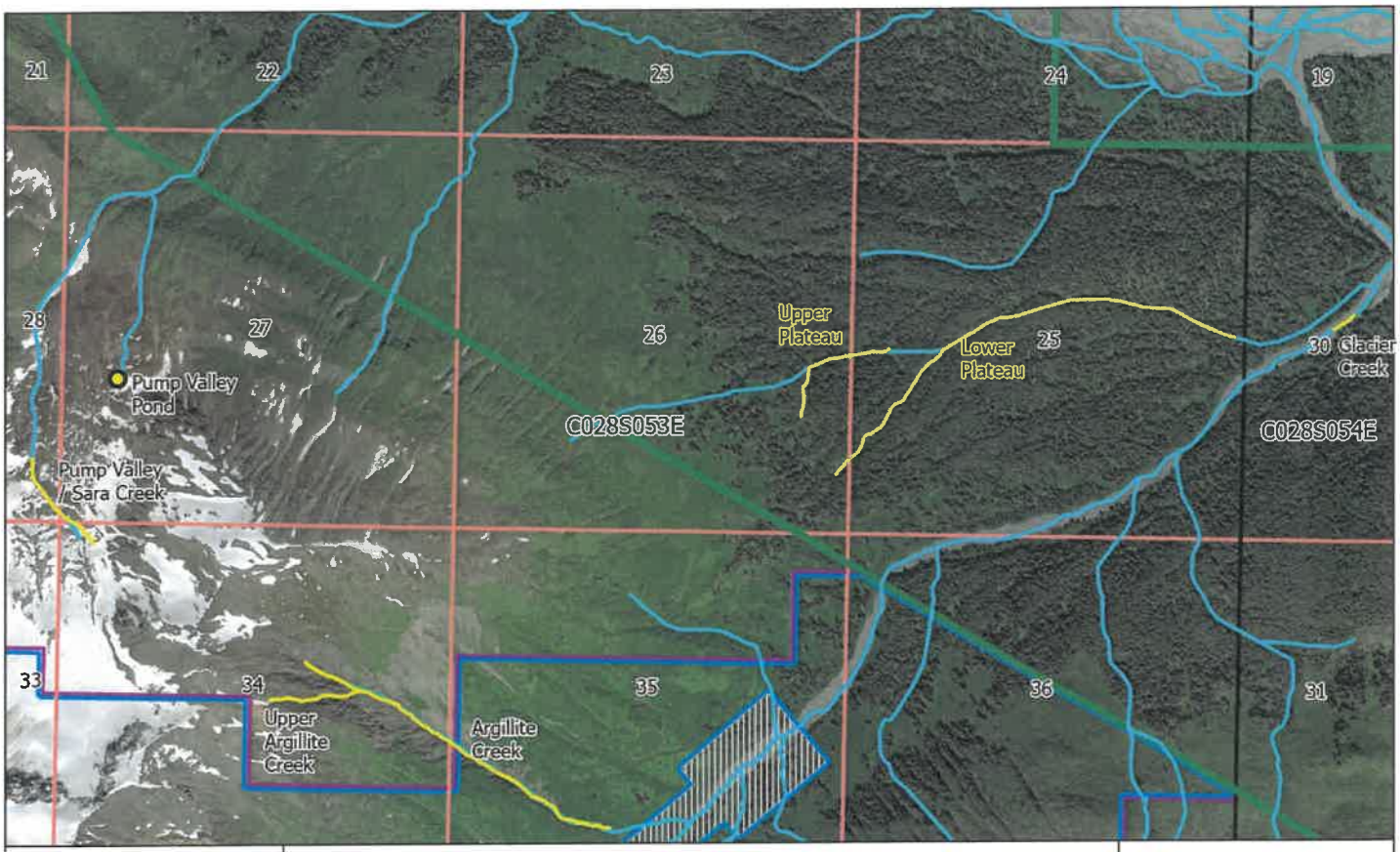
Details on Upper Argillite Creek:
This is an unnamed creek, referred to by Constantine as "Upper Argillite Creek". It is a tributary to Argillite Creek, which feeds Glacier Creek. Little is known about the flow conditions of the creek, and this is why a reach of 1,295 ft is requested.

Details on Marble:
"Marble" is a high alpine ephemeral stream that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on Pump Valley/Sara Creek:
"Pump Valley / Sara Creek" is a high alpine unnamed ephemeral stream that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted. The reach has been extended in this application to allow for flexibility in the water source as snow melt occurs.

Details on Pump Valley Pond:
"Pump Valley Pond" is a high alpine pond that is seasonally available as a result of snowmelt. This source is being selected due to proximity to anticipated activities, safe access, and consistency in the presence of water.

Description / use:
Water from the above sources will be used to support geotechnical drilling activities outlined in the Plan of Operations submitted by Constantine for consideration by DNR in November 2023. Holding tanks may be used to provide buffering capacity. Water is used in drilling to cool and wash away cuttings from the drill bit. All pump-related materials are removed at the end of each exploration season.



CONSTANTINE

Section 24E - Temporary Water Use Authorization Map - Requests on State / MHT Claims

0 0.3 0.5 1 Miles

N

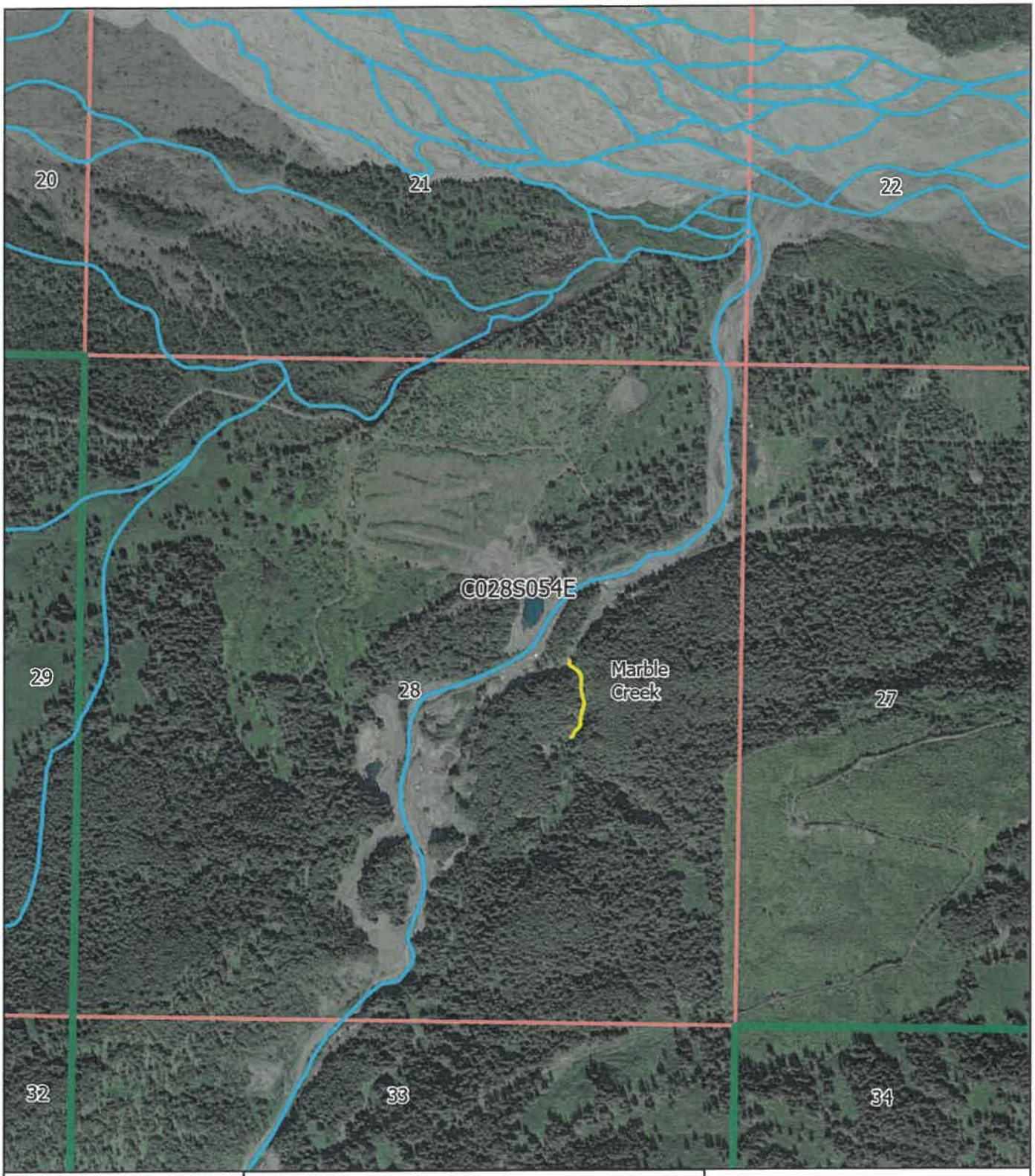
Figure 1

Maxar

Spatial Reference: NAD 1983 2011 UTM Zone 8N

Legend

- Requested Source Locations
- Stream
- PLSS - Range
- PLSS - Township
- State Mining Claims
- Federal Mining Claims
- MHT Mineral Lease Block
- Other Non-Palmer



CONSTANTINE

Temporary Water Use Authorization Map - Section 24E

0 0.1 0.1 0.2 Miles

N

Figure 2

Maxar

Spatial Reference: NAD 1983 2011 UTM Zone 8N

Legend

- Requested Source Locations
- Stream
- PLSS - Range
- PLSS - Township
- State Mining Claims
- Federal Mining Claims
- MHT Mineral Lease Block
- Other Non-Palmer

TWUA Narrative for Work on Federal Claims (Section 25 – E)

APMA #5690

Submitted to ADNR November, 2023

Constantine is requesting to add seven water sources to support work anticipated on Federal Claims. Of the seven water sources requested, five of these sources have been previously permitted including: "Little Jarvis", "64b", "60", "61b aka Brazil", and "B". Two of the sources have not been previously permitted: "Stryker" and "B-Lo".

Request to add the following sources associated with work outlined in the approved Plan of Operations from BLM:

Source Name	Easting NAD 83	Northing NAD 83	Meridian	Township	Range	Section	Quarter section	Length (Ft.)
Little Jarvis	420029.8	6586069	C	028S	053E	33	NW ¼, NE ¼	914
64b	420790.2	6584380	C	029S	054E	6	NW ¼	N/A
60	421365.1	6584782	C	029S	054E	6	NW ¼	N/A
61b aka Brazil	421648.3	6584530	C	029S	054E	6	NE ¼	N/A
B	422013.5	6584751	C	029S	054E	6	NE ¼	630
Stryker	421185.2	6585118	C	028S	053E	34	SW ¼	N/A
B-Lo	421257.8	6584403	C	029S	054E	6	NW ¼	N/A

Details on Little Jarvis:
"Little Jarvis" is a high alpine unnamed ephemeral stream that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on 64b:
"64b" is a drill hole on Max Pad that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on 60:
"60" is a drill hole on Marmot Pad that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on 61 aka Brazil:
"61 aka Brazil" is a drill hole on Brazil Pad that has been selected due to proximity to anticipated activities, safe access, and

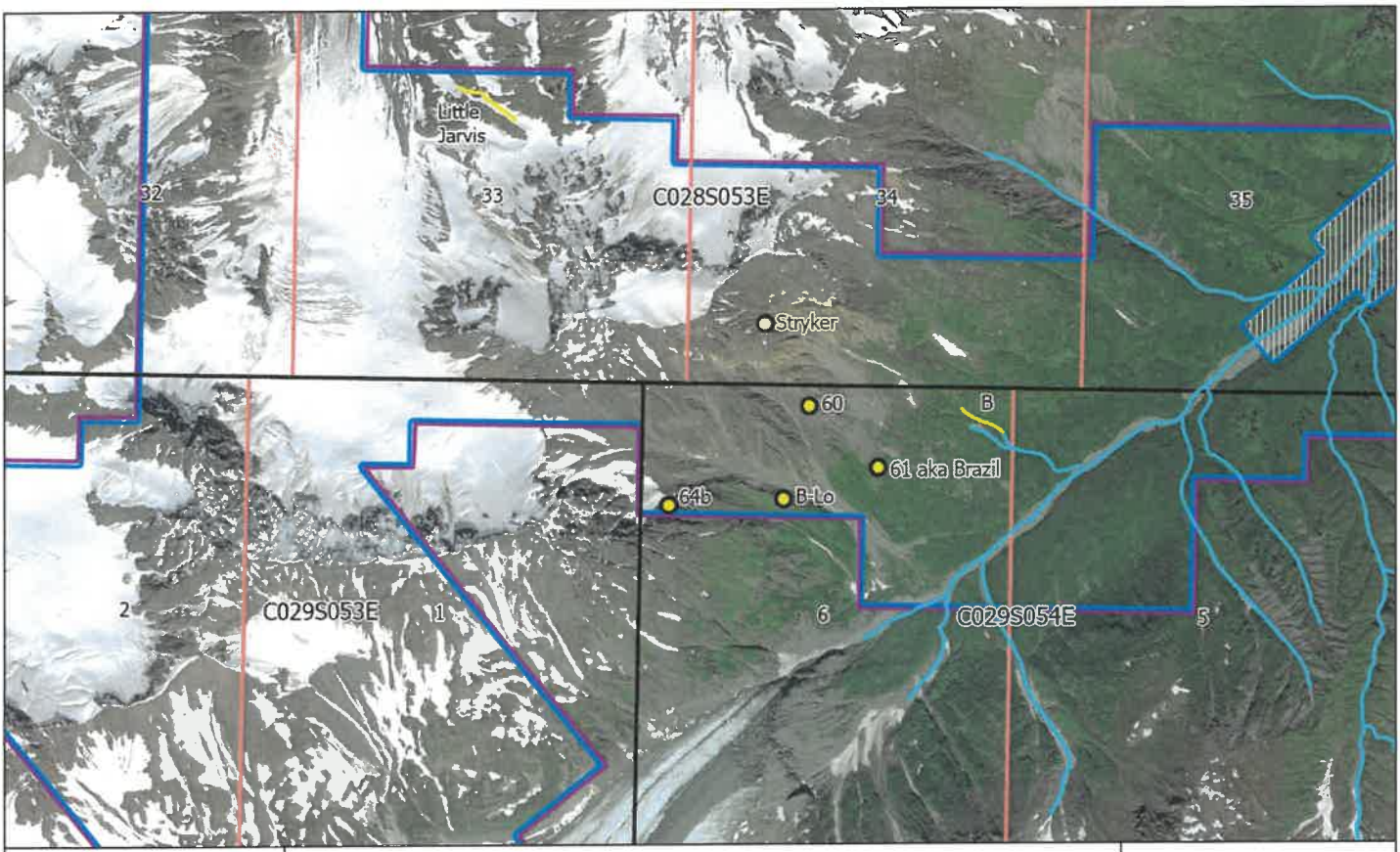
consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on B:
"B" is a high alpine ephemeral stream that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities. This source has been previously permitted.

Details on Stryker:
"Stryker" is a drill hole on Stryker Pad that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities.

Details on B-Lo:
"B-Lo" is a drill hole on B-Lo Pad that has been selected due to proximity to anticipated activities, safe access, and consistency of flow characteristics necessary to support activities.

Description / use:
Water from the above sources will be used to support exploration drilling activities outlined in the Plan of Operations approved by BLM in 2016. Holding tanks may be used to provide buffering capacity. Water is used in drilling to cool and wash away cuttings from the drill bit. All pump-related materials are removed at the end of each exploration season.



CONSTANTINE

Section 24E - Temporary Water Use Authorization Map - Requests on Federal Claims

0 0.3 0.5 1 Miles

N

Figure 3

Legend

- Requested Drill Hole Source
- Stream
- PLSS - Range
- PLSS - Township
- State Mining Claims
- Federal Mining Claims
- MHT Mineral Lease Block
- Other Non-Palmer

Maxar

Spatial Reference: NAD 1983 2011 UTM Zone 8N

Supplement to Section 33 - Palmer Project Mineral Interests

Plan of Operations

PALMER ADVANCED EXPLORATION PROJECT

HAINES, ALASKA

Draft Prepared March 2024

PREPARED FOR

Alaska Department of Natural Resources

CONSTANTINE

Plan of Operations
Palmer Advanced Exploration Project
Haines, Alaska

State Mining Claims

Prepared for:
Alaska Department of Natural Resources
Division of Mining, Land & Water (Mining Section)
3700 Airport Way
Fairbanks, Alaska 99709

CONSTANTINE

Prepared by:
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On behalf of:
Constantine Mining LLC (Mineral Property Owner)
120 2nd Ave N.
Haines, AK 99827

March 2024

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Abbreviations

AAC	Alaska Administrative Code
ACOE	Army Corp. of Engineers
ADEC	Alaska Department of Environmental Conservation
ADOT	Alaska Department of Transportation
ADNR	Alaska Department of Natural Resources
AHEA	Alaska Hardrock Exploration Application
AKNHP	Alaska National Heritage Program
ANSI	American National Standards Institute
APMA	Application for Permits to Mine in Alaska
APE	Area of Potential Effect
ARD/ML	Acid Rock Drainage/Metal Leaching
ASBP	Alaska Statewide Bonding Pool
AWAP	Wildlife Action Plan
BLM	Bureau of Land Management
BMP	Best Management Practice (s)
BMRR	Bureau of Mining Regulation and Reclamation
CAN	Canada
CEM	Constantine North, Inc. or Constantine Metal Resources
DMLW	Division of Mining, Land and Water
EPA	Environmental Protection Agency
ESA	Endangered Species Act
HDPE	High Density Polyethylene
JDR	Jurisdictional Determination Report
km	Kilometers
m	Meters
mi	miles
MSGP	Multi-Sector General Permit
MSDS	Material Safety Data Sheet (s)
MSHA	Mine Safety and Health Administration
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NLURA	Northern land Use Research Alaska, LLC
NPDES	National Pollutant Discharge Elimination System

OHA	Office of History and Archaeology
Plan	Mining Plan
Project	Palmer Exploration Project
QAP	Quality Assurance Plan
ROW	Right-of-Way
SPCCP	Spill Prevention Control Countermeasure Plan
SOA	State of Alaska
SOI	Species of Interest
SSOC	State Species of Conservation Concern
SWPPP	Stormwater Pollution Prevention Plan
US	United States
UUD	Unnecessary and Undue Degradation
SOA	State of Alaska
SOI	Species of Interest
SSOC	State Species of Conservation Concern
UUD	Unnecessary and Undue Degradation

Executive Summary

This Plan of Operations (Plan) is submitted to the Alaska Department of Natural Resources (ADNR) by the operator Constantine North, Inc. (Constantine or the Company) on behalf of the state mining claim owner Constantine Mining, LLC, for the Palmer Advanced Stage Exploration Project (Palmer Project or the Project) located in the Porcupine Mining District in Southeast Alaska. The activities described within this Plan are planned for the next 5 year permit cycle and are directed at further evaluation of the mineral deposits located within the Project claim holdings (Palmer Deposit and surrounding area). This is NOT a request to permit resource extraction. The Company is assessing and documenting environmental, social, technical and economic aspects associated with further developing the mineral property.

The proposed activities covered in this Plan would occur on a group of 63 State mining claims, comprising 9,185 acres situated within the Haines State Forest Resource Management Area (Haines State Forest). As such, proposed surface activities would be coordinated with the ADNR Division of Forestry by the ADNR Mining Section as part of the review of this Plan.

All the surface disturbance and reclamation activities proposed in this Plan would occur on State of Alaska Mining Claims. There are no Federal actions associated with permitting the activities proposed in this Plan. As such there is no National Environmental Policy Act (NEPA) analysis required for the activities proposed in the Plan.

The State mining claims discussed throughout this Plan are situated within the Haines State Forest. Alaska Statutes (AS) 41.15.300 established the Haines State Forest in 1982, concomitant with establishing the Alaska Chilkat Bald Eagle Preserve under AS 41.21.611, which is surrounded by the Haines State Forest. This legislation was the result of cooperation among a host of diverse interest groups including: City of Haines, Haines Borough, Schnabel Lumber Company, Lynn Canal Conservation Council, Audubon Society, Southeast Alaska Conservation Council, Alaska Miners Association, and United States Fish and Wildlife Service. AS 41.15.310 instructs the Alaska Division of Forestry to consult the Division of Parks, the Department of Fish and Game (ADF&G) and the Alaska Chilkat Bald Eagle Preserve Advisory Council to promote effective, efficient, and coordinated administration of the Haines State Forest and the Alaska Chilkat Bald Eagle Preserve for the values for which each was established.

Constantine is also currently authorized for surface exploration activities on adjacent lands, including helicopter-supported core drilling under US Bureau of Land Management (BLM) Decision Records dated 8/18/2016 and 9/21/2017, Case File AA-094088; exploration and evaluation activities on Mental Health Trust lands authorized by the Mental Health Trust Land (MHT) Office Plan of Operations Approvals dated 4/19/2018 and 07/23/2019; and ADEC Waste Management Permit 2019DB0001as amended 6/02/2023. This Plan does not incorporate, or discuss further, those activities on adjacent lands that are already authorized under other MHT, ADEC or BLM approvals. Constantine would continue those activities under those existing approvals concurrent with the activities described in this Plan.

Previous work on the State mining claims that are the subject of this Plan was authorized under APMA #5690 which expires December 31, 2023.

Constantine has been performing environmental monitoring, characterization, and mapping programs for the overall Project area, started as early as 2008. The effort has included surface water and groundwater quality and hydrology monitoring, aquatic life surveys, wildlife surveys, terrestrial ecosystem and vegetation surveys (including invasive species), wetlands surveys, cultural resources surveys, meteorological monitoring, snow surveys and monitoring, and development rock characterization studies. The objectives of the expanded environmental program detailed in this Plan remain as they are on the overall Project area; it contributes to a fundamental understanding of the natural environment in the Project area, including a baseline of environmental conditions. They define an environmental backdrop that Constantine can design around, and one against which Constantine can detect changes, over time, including those that might be related to future Project activities.

The purpose of this Plan is to acquire approval from the ADNR for the activities, including reclamation, on State of Alaska mining claims, as described herein.

The activities proposed in this Plan of Operations include:

1. Road Development: Approximately 6.55 miles of road would be developed to allow access for drilling equipment. Approximately 2.75 miles of this road would include re-establishment of a previously established logging road and development of a Plateau Road spur and 3.8 miles of spur road to access new drill sites.
2. Geotechnical Drilling: Sonic and/or diamond drill rigs will be utilized to gather the information necessary to characterize subsurface conditions both west of Glacier Creek and east of Glacier Creek. Up to 33 drill pads would be developed to support this drilling.
3. Engineering Test Sites: Up to 40 test pits would be excavated to gather additional information and further assess ground conditions.
4. Laydown Area: A lay down area approximately one (1) acre in size would be developed for storage and assembly of drilling and seismic equipment.
5. Geophysical Surveys: Up to 5.5 miles of seismic surveys would be conducted to characterize depth to bedrock.
6. Monitoring Wells: Up to 20 groundwater monitoring wells would be installed to further characterize hydrogeologic conditions.
7. Meteorological monitoring stations: Air/meteorological monitoring stations would be installed to assist in characterizing current meteorological conditions.
8. Expansion of an environmental monitoring and characterization program that has been ongoing on adjacent federal and MHT lands.
9. Mineral exploration on all mining claims to include geologic mapping, surface rock and soil sampling.

The activities described in this Plan would create approximately 22.48 acres of new surface disturbance on State lands. Concurrent (annual) reclamation would occur whenever possible with the goal of limiting the total surface area disturbed at any one time. Constantine would

meet its reclamation bonding responsibilities by continuing to participate in the statewide reclamation bond pool.

1.0 LOCATION

This section includes brief descriptions of the location and access to the property, Constantine's land tenure for the overall Project, and the Haines State Forest that affects the surface work on State mining claims.

The Project is in the Porcupine Mining District, 34 miles northwest of Haines, Alaska, on the eastern margin of the Saint Elias Mountain range. The western boundary of the Project is the international border with the Canadian province of British Columbia (Figure 1).

1.1 Access and Property Description

The Project Area is proximal to the paved Haines Highway (Alaska Hwy 7), which leads to the town of Haines, Alaska, 34 miles to the southeast, (Figure 1). Haines (population of approximately 2,400) is a year-round deep-sea port at the northern end of the Alaska Marine Highway System. Klukwan (population of approximately 70 people) is located between Haines and the Project area along the Haines Highway. Haines and Klukwan have been providing services, skilled labor, accommodations, and equipment to support Constantine's exploration activities to date.

The nearest major economic centers are Juneau (4.5 hours by Ferry) and Whitehorse, Yukon (249 miles by Haines/Alaska Hwy 7). Daily scheduled flights connect Haines with Juneau (< 1 hour), which has daily connections with the continental US.

A gravel road, known as "Porcupine Road," connects the Project Area to Alaska Hwy 7 via a bridge across the Klehini River at 26 Mile, -known as Porcupine Crossing, and currently extends to Glacier Creek Road. A portion of Porcupine Road is an RS 2477 right-of-way, maintained by the Haines Borough under the Historic Dalton Trail Road Maintenance Service Area (RMSA). Drill core storage and camp facilities are located on privately-owned land, approximately 7 miles from Porcupine Crossing (Figure 2). Except for Porcupine Road and Glacier Creek Road, practical access to most of the Project is currently by helicopter.

Surface access to the State mining claims Porcupine Road. Constantine previously re-established portions of Porcupine Road leading up to Glacier Creek Road. Glacier Creek Road was originally constructed as a CAT trail in 1977 and enhanced by Constantine under approval from the ADNR and BLM in 2014, 2016, and 2017. As discussed in Section 3, Constantine is proposing to reestablish a portion of a previously established logging road and develop a Plateau Road spur on the far (northern) side of Glacier Creek to provide access for the work described in this Plan.

The overall Project land package is defined by 340 federal unpatented lode mining claims, which cover an area of approximately 6,567 acres; 63 state mining claims that cover an area of approximately 9,185 acres and approximately 42,237 acres under lease from the MHT (Figure 3; Table 1). The surface rights are managed by the BLM, the State of Alaska and the MHT,

respectively; all the work proposed in this Plan of Operations is limited to the 63 State mining claims on which ADNR manages both the surface and subsurface estates. Appendix A contains a list of the State mining claims where activities described in this Plan are proposed.

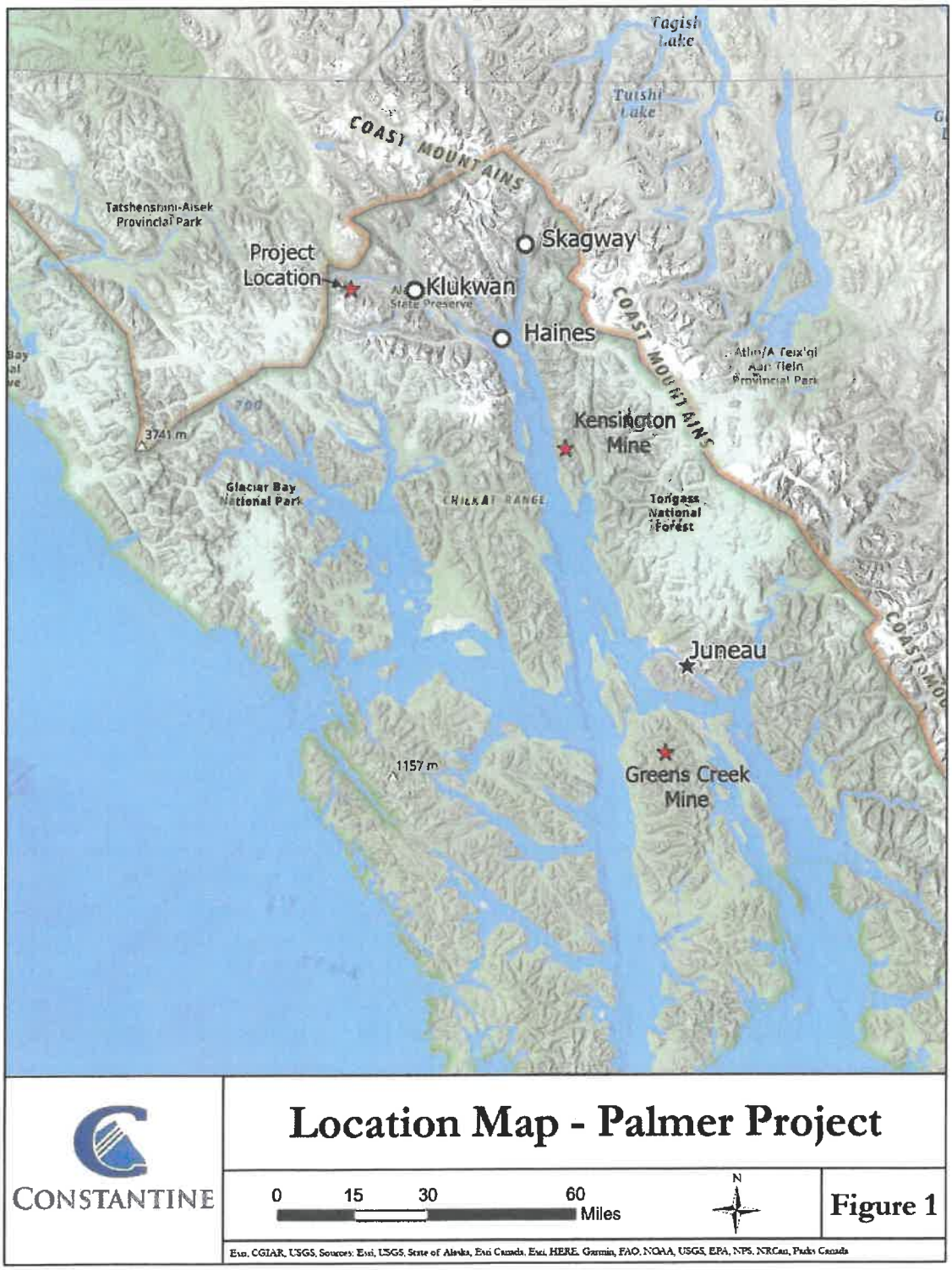

Figure 1 - Location Map – Palmer Exploration Project

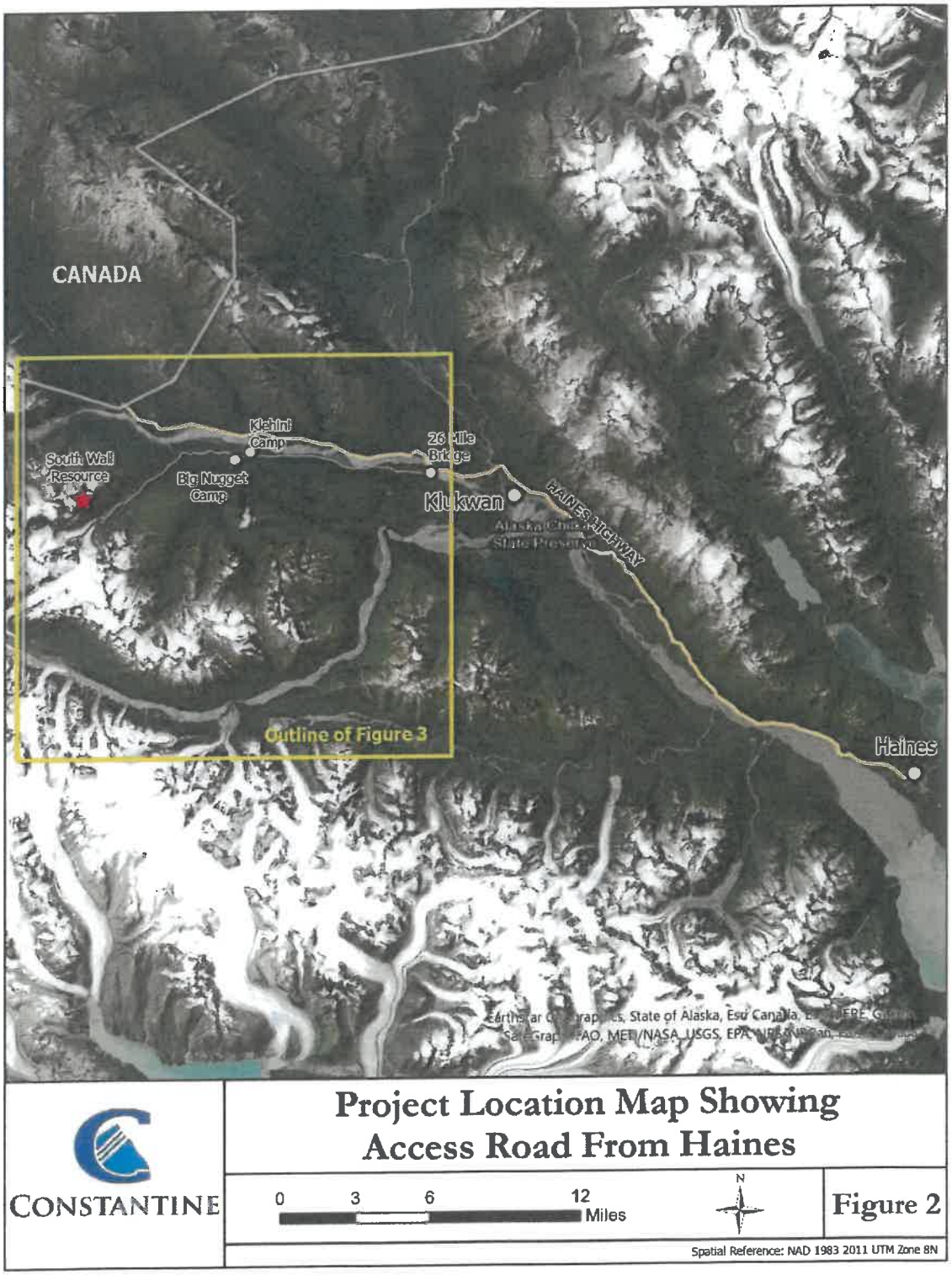

Figure 2 - Project Location Map Showing Road Access from Haines

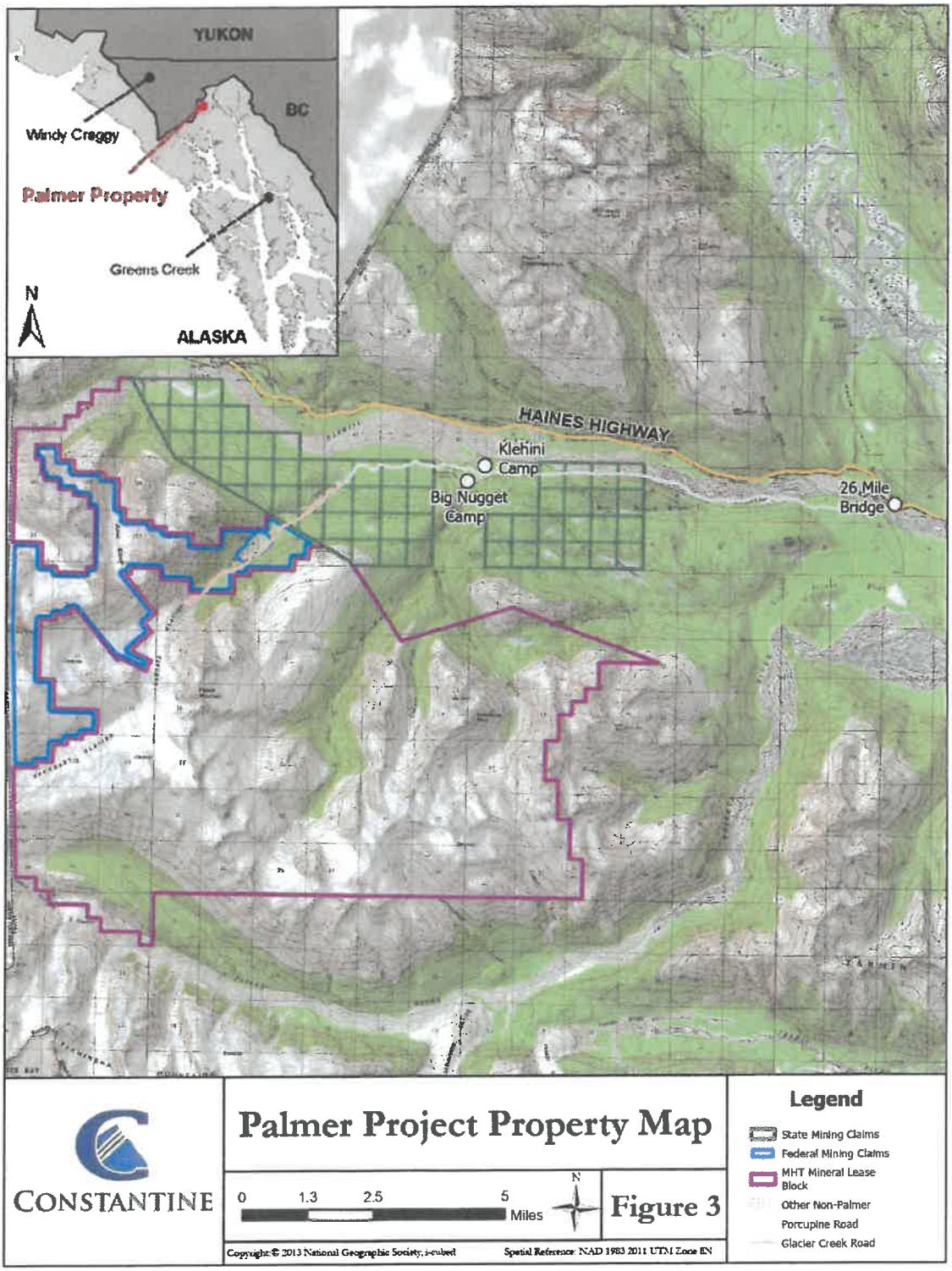

Figure 3 - Palmer Project Property Map

Land Owner	Land Right Instrument	Acreage
State of Alaska	63 State Mining Claims	9,185
Alaska Mental Health Trust	Surface and Subsurface Lease	1,465
Alaska Mental Health Trust	Subsurface Lease	40,772
U.S. Bureau of Land Management	340 Federal Mining Claims	6,567

Table 1 - Mining Claims and Mineral Leases

1.2 Haines State Forest Resource Management Area

The State mining claims discussed throughout this Plan are situated within the Haines State Forest Resource Management Area. Alaska Statutes (AS) 41.15.300 established the Haines State Forest in 1982, concomitant with establishing the Alaska Chilkat Bald Eagle Preserve under AS 41.21.611, which is surrounded by the Haines State Forest. This legislation was the result of cooperation among a host of diverse interest groups including: City of Haines, Haines Borough, Schnabel Lumber Company, Lynn Canal Conservation Council, Audubon Society, Southeast Alaska Conservation Council, Alaska Miners Association, and United States Fish and Wildlife Service. AS 41.15.310 instructs the Alaska Division of Forestry to consult the Division of Parks, the Department of Fish and Game (ADF&G) and the Alaska Chilkat Bald Eagle Preserve Advisory Council to promote effective, efficient, and coordinated administration of the Haines State Forest and the Alaska Chilkat Bald Eagle Preserve for the values for which each was established.

The legislature intended the Haines State Forest to be a 'working forest' to include multiple uses such as timber harvest, recreation, mining, traditional uses, fish and wildlife habitat protection, and tourism. The type, intensity, and location of these uses was, under AS 38.04.005, to be derived from a planning process that would determine the best balance of these uses. Multiple use management could include a mix of those uses identified under AS 38.05.112(c) and varying levels of use, depending on the results of the planning analysis.

The Chilkat Bald Eagle Preserve in contrast has an 'exclusive use' management intent, rather than multiple use. Its management focuses on the protection of bald eagles and their habitat, including the spawning and rearing areas of the anadromous streams that provide food for the bald eagle population. The traditional lifestyle of the Haines community is recognized as an important value and its continuation is included in the management of the Preserve. AS 41.21.60 (c) also includes language that the legislature determines that there is no need for legislation expanding or contracting the boundary of the Alaska Chilkat Bald Eagle Preserve in the future.

2.0 REGULATORY REQUIREMENTS

This section provides a discussion of the regulatory requirements that apply to the activities proposed in this Plan. Constantine has reviewed the applicable State, Federal and local statues and regulations and believes that the activities proposed in the Plan require the following submittals, regulatory reviews and approvals, and plans;

- Review and approval of this Plan by the ADNR, including a multi-state agency review.
- An updated Storm Water Pollution Prevention Plan (SWPPP) for Constantine's existing Construction General Permit that includes the new roads on State mining claims proposed in this Plan.
- Maintain a current self-certified EPA-compliant Tier 1 Spill Prevention Control and Countermeasure (SPCC) Plan for their fueling operations, that meets all the requirements of 40 CFR part 112.7.
- Temporary Water Use Authorizations

The basis for the identified regulatory requirements is described in the following Sections 2.1 and 2.2.

2.1 State of Alaska Regulations

2.1.1 Plan of Operations Regulations

All the lands (surface and subsurface estates) included in this Plan are State of Alaska lands. Per 11 AAC 86.150 a person intending to conduct mineral exploration or development activities that would require a land use permit may file a plan of operations for approval instead of applying for a land use permit. Constantine is filing this Plan of Operations for formal approval, rather than renewing their miscellaneous land use permit (MLUP). A Plan of Operations Approval is consistent with the use of Plan Approvals on the adjacent Mental Health Trust and BLM lands and is consistent with the advanced exploration stage of the Project.

The requirements for a Plan of Operations are defined in 11 AAC 86.800. This Plan is written to meet all the applicable requirements for a Plan of Operations defined under 11 AAC 86.800.

2.1.2 Temporary Water Use Authorizations

Constantine would require water to complete the drilling activities on State lands as described in this Plan. Water would be withdrawn from natural sources including streams, ponds or wells for this purpose. Constantine anticipates using water in volumes that would require authorization from the ADNR-Water Section under 11 AAC 93.035 and 11 AAC 93.220. Prior Temporary Water Use Authorizations (TWUA) on the lands included in this Plan will expire December 31, 2023. As a

result, Constantine will be applying for new TWUA's prior to withdrawing any water for activities approved under this Plan.

2.1.3 Haines State Forest Authorizations

Constantine is not aware of the need for any authorization from the ADNR Division of Forestry for activities Constantine is proposing on State mining claims within the Haines State Forest. Constantine maintains open dialogue with the Haines area State Forester and discusses plans and proposed activities. In the absence of any authorizations from ADNR Division of Forestry, Constantine would formally rely on the ADNR Plan of Operations approval process, with the Mining Section as lead state agency, to solicit any formal input from the Division of Forestry on the activities proposed in this Plan. Constantine assumes that DNR's approval of this Plan includes review and concurrence by the Division of Forestry.

2.1.4 Reclamation Bonding Regulations

The activities proposed in this Plan are limited to surface disturbance activities that would require conventional reclamation including recontouring, replacement of the organic material including woody debris, and reseeding. Constantine proposes continuing to participate in the State of Alaska bond pool to meet all reclamation bonding responsibilities for work described in this Plan.

2.1.5 Stormwater Regulations

Stormwater on the Project site is regulated by ADEC under the APDES Program. Stormwater is managed under the terms of the Construction General Permit (CGP, Permit No. AKR100000) for stormwater discharges associated with industrial activity. Stormwater discharges associated with industrial activities are defined by 40 CFR 122.26(b) (14) (i-ix and xi). The CGP authorizes and sets conditions on the discharge of pollutants from certain industrial activities to waters of the United States. To ensure protection of water quality and human health, the permit establishes control measures and best management practices (BMPs) that must be used to control the types and amounts of pollutants that can be discharged from certain industrial activities. This general permit is intended to regulate stormwater (rain and snowmelt) runoff which encounters industrial activities and materials which have the potential to cause contamination. The quantities and types of stormwater discharged are dependent on many variables, including the type of industrial activity that the facility is engaged in (sector of industry), pollutants of concern, and the type and intensity of the runoff event.

To obtain authorization to operate under the CGP the permittee must develop a SWPPP according to the requirements of permit Part 5 and submit the SWPPP to ADEC. Further, the permittee must select, design, install and implement control measures (BMPs) to meet effluent limits. Finally, the permittee must submit a complete and accurate Notice of Intent (NOI) to operate under the CGP to ADEC and pay the general permit authorization fee in accordance with 18 AAC 72.

Beginning in 2014 Constantine has been operating under the CGP and maintaining a SWPPP and installed BMPs to meet the pollution minimization requirements of the CGP along the segments of the Glacier Creek access road that it constructed through 2017. Constantine will be updating their SWPPP to accommodate any new road construction on the State mining claims described in this Plan.

2.2 Federal Government Regulations

2.2.1 Waters Of The US

Surface disturbance associated with the activities in this Plan would affect Waters of the US (WOTUS), including wetlands and streams. Constantine has taken steps to minimize wetlands disturbance to less than one-tenth of an acre (0.1 acres). To operate under a Section 404 permit from the US Army Corps of Engineers (USACE), Constantine has determined that this Plan can operate under the terms of Nationwide Permit #14 authorizing the loss of up to 0.5 acres of wetlands. Constantine estimates that the total loss of wetlands would be less than one-tenth of an acre (0.1 acres) disturbance, therefore filing a Pre-Construction Notice with USACE is not required.

It is anticipated that development of the Glacier Creek Road spur would require crossing Plateau Creek at approximately three locations. Each crossing would require the installation of culverts. The number of creek crossings would be kept to a minimum, and after ground truthing the road may be re-aligned to reduce the number of crossings where possible.

2.2.2 Fuel Spill Prevention

Fuel spill prevention is regulated under EPA's Oil Spills Prevention and Preparedness Regulations under 40 CFR Part 112. Constantine is already operating under an EPA-compliant Tier 1 SPCC Plan and would continue to do so. Under CFR 112.6 Tier I-qualified facilities must either: comply with the requirements of paragraph 112 (a)(3) of this section; or prepare and implement an SPCC Plan that meets all requirements of paragraph (b) of this section; or prepare and implement a plan meeting the general plan requirements in §112.7 and applicable requirements in subparts B and C, including having the plan certified by a Professional Engineer as required under §112.3(d)). Paragraph 112 (a)(3) lists the requirements that must be met in the SPCC plan and describes a template that may be used as the SPCC Plan, once completed, and certified by the facility owner.

2.2.3 Migratory Bird Treaty of 1918 and Bald Eagle Protection Act

The goal of both the Migratory Bird Treaty of 1918 and the Bald Eagle Protection Act is to protect migratory bird species. Constantine would continue to integrate pre-disturbance surveys into their field programs on State land to identify and avoid impacts to nesting Bald Eagles and other migratory birds.

2.2.4 BLASTING

Constantine will be using explosives as part of its proposed geophysical surveys. Explosives are regulated by the US Bureau of Alcohol, Tobacco and Firearms. Constantine will rely on licensed contractors including a licensed blasting technician in the field to perform all aspects of the blasting operations, including ensuring public safety and will rely on that contractor(s) to ensure compliance with all federal regulation pertaining to the transportation, storage, and use of explosives.

2.2.5 NATIONAL HISTORIC PRESERVATION ACT

Constantine recognizes its obligation to protect potentially significant historic properties, including sites, buildings, structures, and/or objects. As part of its expanding environmental baseline program, Constantine will engage a qualified archeology contractor to perform pedestrian cultural resource clearance surveys of areas that Constantine intends to disturb, prior to that disturbance. Constantine understands that those surveys will be coordinated by the contractor with the Alaska Office of History and Archeology.

3.0 DESCRIPTION OF PROPOSED OPERATIONS

This section describes the activities being proposed under this Plan of Operations to allow Constantine to conduct exploration and geotechnical investigations on State mining claims.

The major activities proposed in this Plan of Operations include:

1. Road Development: Approximately 6.55 miles of road would be developed to allow access for drilling equipment. Approximately 2.75 miles of this road would include re-establishment of a previously established logging road and development of a Plateau Road spur and 3.8 miles of spur road to access new drill sites.
2. Geotechnical Drilling: Sonic and/or diamond drill rigs will be utilized to gather the information necessary to characterize subsurface conditions both west of Glacier Creek and east of Glacier Creek. Up to 33 drill pads would be developed to support this drilling.
3. Engineering Test Sites: Up to 40 test pits would be excavated to gather additional information and further assess ground conditions.
4. Laydown Area: A lay down area approximately one (1) acre in size would be developed for storage and assembly of drilling and seismic equipment.
5. Geophysical Surveys: Up to 5.5 miles of seismic surveys would be conducted to characterize depth to bedrock.
6. Monitoring Wells: Up to 20 groundwater monitoring wells would be installed to further characterize hydrogeologic conditions.
7. Meteorological monitoring stations: Air/meteorological monitoring stations would be installed to assist in characterizing current meteorological conditions.
8. Expansion of an environmental monitoring and characterization program that has been ongoing on adjacent federal and MHT lands.
9. Mineral exploration on all mining claims to include geologic mapping, surface rock and soil sampling.

3.1 GLACIER CREEK / DRILL ROAD SPURS

Constantine proposes reestablishing a portion of a previously established logging road as well as developing a Plateau Road spur for approximately 2.75 miles on the western side of Glacier Creek (Figure 4). The Plateau Road spur is anticipated to continue onto MHT claim lands and appropriate approvals would be obtained from MHT. Additionally, 3.8 miles of drill pad spur roads would be developed to access drill pad sites (Figure 4, 5). This development would provide access for mechanized equipment on the State mining claims. In 2023 an independent logging contractor, under permit with ADNR/Forestry, constructed a new bridge across lower

Glacier Creek on Constantine's mining claims. This bridge would be used to mobilize equipment across Glacier Creek to accomplish the work proposed in this Plan.

Any new roads, spurs or trails would be constructed using cut and fill construction. Road driving surfaces would be approximately 15 ft. wide. In areas, the road surface may approach up to 30 ft wide to allow safe passage of two-way traffic. Cut and fill volumes for roadbed material, surfacing material, and berm material are anticipated to be net zero. Any additional material needed for surfacing would be sourced from previously existing, active borrow sources and coordinated with DNR if necessary. Constantine would continue to follow BLM requirements to minimize invasive species introduction along the existing access road. Constantine requires that all outside vehicles are pressure washed prior to entering the Glacier Creek access road to reduce the likelihood of introducing invasive plant material from the tires and wheel wells. Constantine's continued diligence with this requirement would have the effect of reducing the introduction of invasive species on MHT and Haines State Forest lands as well.

Ditches would be constructed along the uphill/cut sides of roads to manage stormwater. The stormwater ditches would typically terminate near road curves and discharge stormwater to uplands where it would naturally seep into the ground and vegetation would filter settleable solids. Where conditions warrant, BMP's including energy dissipaters, relief culverts, and sediment basins, or similar, would also be installed to reduce sediment transport and encourage sedimentation. All BMP's will be maintained throughout the life of the permit.

The following is a representative list of mobile equipment used for road and pad construction:

- One excavator approximately CAT 320 to CAT 335 size
- One excavator approximately CAT 335 to CAT 345 size
- One front end loader approximately CAT 980 size
- One dozer approximately CAT D-6 size
- One dozer approximately CAT D-8 size
- Three center articulated trucks approximately CAT 725 size
- One vibratory roller approximately CAT 563 size
- One road grader approximately CAT 14G size
- One air-track drill
- Four pickup trucks

3.1.1 TIMBER CLEARING

Timber clearing is likely to be required as part of road development as well as development of drill pad sites and the laydown area (Section 3.2). Regulation 11 AAC 86.800(6) specifies that the Plan of Operations must include information that defines the area of timber to be cleared, amount to be used and clearing methods. To appropriately manage timber, the following process would be followed:

- Under the direction of the Haines State Forester, the trees would be felled in line with trail layout and bucked to desired length.
- Limbed tops may be used as decking material for salvaged logs.

- A skidder would be used to move economic logs onto decks spaced at nominal ¼ mile intervals.
- Logs would later be recovered by timber industry interests.

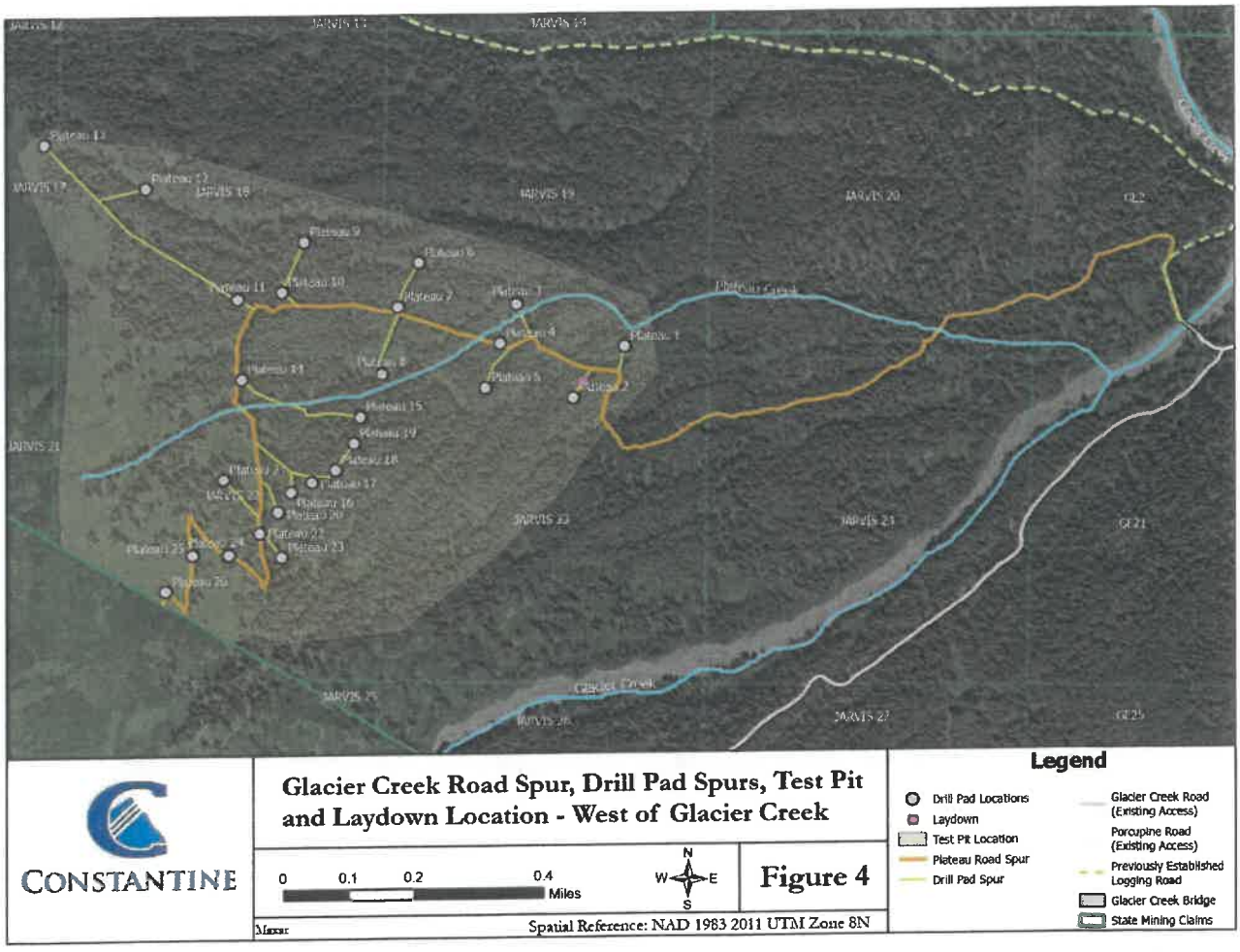

Figure 4 – Plateau Road Spur, Drill Pad Spurs, Drill Pads, Test Pit and Laydown Location – West of Glacier Creek

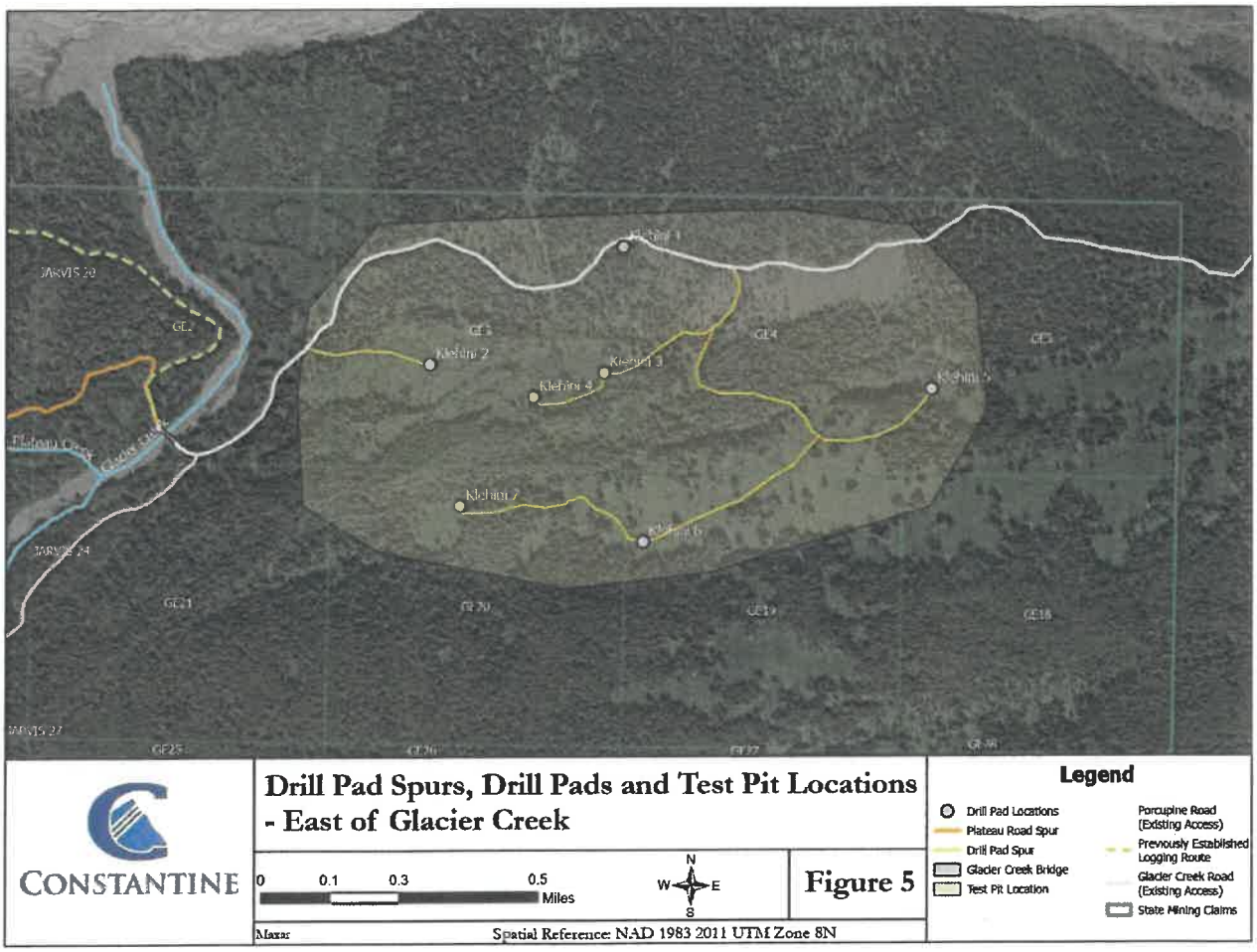

Figure 5 – Drill Pad Spurs, Drill Pads and Test Pit Locations – East of Glacier Creek

3.2 Geotechnical Drilling

An estimated 33 total drill pads to support geotechnical drilling are planned on State mining claims. Drill pads are estimated to be 30' x 60' to facilitate movement of drilling equipment and support vehicles and increase worker safety by allowing visibility for wildlife, setbacks from potential treefall, and adequate space for equipment movement. The location of drill pads is not exact and would require field fit to minimize disturbance due to topography and minimize timber removal; however, the anticipated locations are generally depicted in Figures 4 and 5.

Geotechnical drillholes would be advanced via a sonic or diamond drill rig (Figure 6), generally using 5-inch inner diameter core barrel and 6-inch outer diameter casing. The shallower holes will target overburden, rather than bedrock, and the bulk of these holes would be unlined and would naturally close after the required samples are collected. The top of completed holes would be filled with bentonite clay or grout. Geotechnical holes drilled using a diamond drill rig would inform structural stability analysis, allow for hydrologic planning, and samples of the core would be subject to geochemical characterization. The total number of holes to be subject to geochemical characterization is anticipated to be 10 – 15. Historical drilling at the Palmer project has required very little use of sumps due to the fractured nature of the rock; however, if sumps are required to support diamond drilling, hand-dug sumps will be constructed to encourage drill solid settling before the overflow is allowed to seep into the ground. Should any drilling fluids be necessary to complete diamond drilling, a list of additives has been provided in Appendix B.

Up to 20 monitoring wells are planned to be installed and would be located in the same location as one of the drill pad locations identified in Figure 4 or Figure 5 to the greatest extent practicable. Monitoring wells serve as long-term data collection infrastructure and would remain in use for the life of the permit. Holes identified for an environmental monitoring well would be drilled through overburden to bedrock and then developed for their intended use. The wells would consist of a 5-inch hole, approximately 65 - 265 ft deep, and developed using schedule-80 PVC pipe. A well consists of a pre-packed well screen and a silica sand filter pack installed within the annulus between the screen and hole wall (Figure 7). A bentonite seal is installed above the filter pack near surface to prevent surface water from entering the well. Figure 7 shows a flush mounted well; however, for the purposes of sampling, it is anticipated that a monument approximately 2 ft. tall would remain. Figure 8 shows an example of a monument which would be constructed to protect the well. Additionally, a visual identifier (flagging, reflective tape, snow poles) would be used to mark the wells to avoid safety incidents or damage from timber or recreational vehicles. Nested shallow and deep wells may be installed at select sites. Prior to abandonment, the wells would be plugged and capped.

A laydown area approximately 1 acre in size would be developed west of the Plateau Road spur (Figure 4) and be used for storage and staging of equipment and supplies, including a 500-gallon fuel tank (Section 3.7). The laydown would also serve as a temporary holding area for construction waste materials until they can be removed and disposed of offsite.

Figure 6 - Example of Track Mounted Sonic Drill Rig (Palmer Project, 2021)

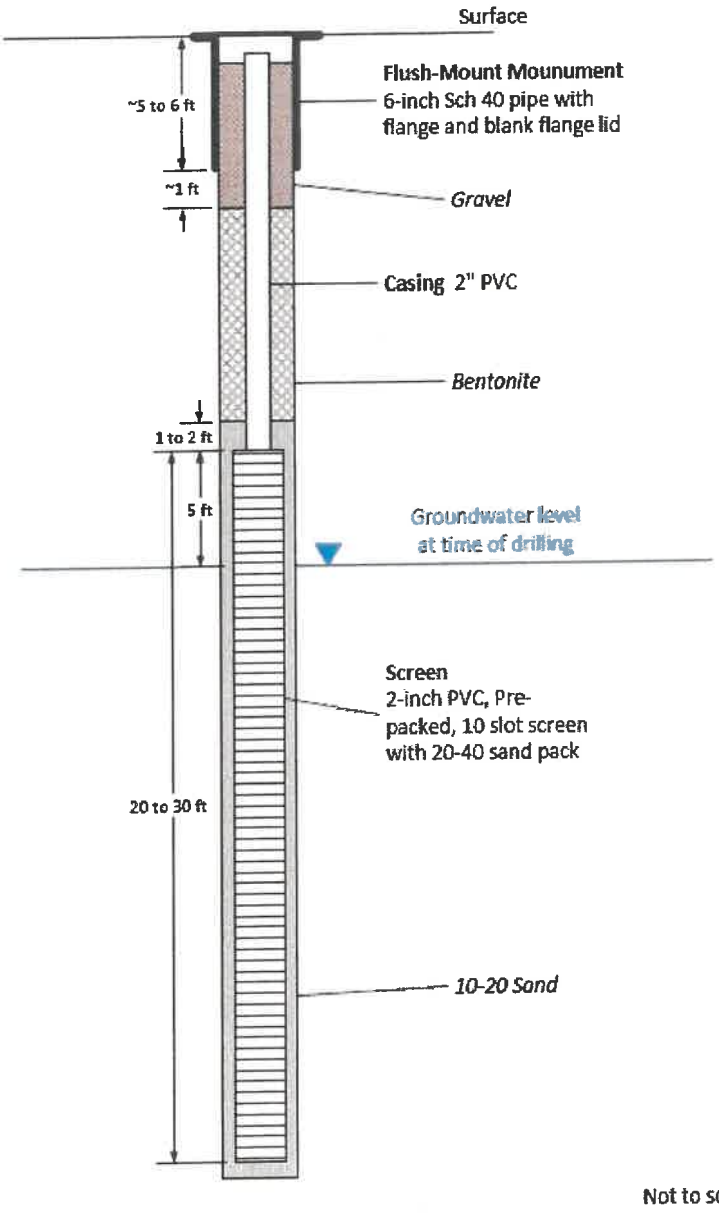

Figure 7 - Example Schematic of Monitoring Well Construction

Figure 8 - Example of Environmental Monitoring Well (Palmer Project, 2021)

3.3 Engineering Test Sites

Constantine estimates excavating and rehabilitating approximately 40 test pits to assess ground conditions. Test pits will remain as small as possible and will be preferentially sited in areas disturbed by other activities outlined as part of the Plan (i.e., within road development areas, drill pads, or seismic line locations). Test pits will generally be 5-15 ft. long and as wide as the natural angle of repose dictates. Test pits would be excavated until refusal (bedrock or maximum excavator reach). During excavation, a record of soil horizons and material competency would be logged and samples would be collected. Material not removed for analysis would be piled next to the excavation until the test pit is completed. After completing the test pit, the excavated material would be replaced into the excavation and any vegetation removed would be placed back on top. It is Constantine's intention that test pits dug during any given season are also reclaimed that same season. The precise location of test pits is yet to be identified but would occur within the areas outlined in Figures 4 and 5.

3.4 Geophysical Surveys

An estimated 5.5 miles of shallow refraction seismic surveys would be conducted (Figure 9). The purpose of the work is to broadly map overburden depth and bedrock type, with results calibrated by the overburden drilling program. Prior to the seismic survey, lines must be brushed to allow access. Surveyed lines would be brushed roughly 5 ft. wide by hand or mechanical brusher with the intended goal of minimizing ground disturbance. Survey lines may be up to 15 ft.

wide where necessary for safe passage due to local vegetation. Minimal earthwork is expected for geophysics lines. Once cleared, the geophysics team would access work points along the brushed lines by foot. Helicopter support may also be required for deployment of personnel and equipment.

Along each cleared line geophones would be placed at predetermined intervals. Seismic energy would be provided from small charges buried in hand-excavated holes. Charges would be transported by helicopter, truck and finally by hand. A licensed blaster would be on site to supervise the transportation, handling, and detonation of the explosives. Minimal surface disturbance is expected from the explosives due to the ½ pound charge size and the fired charge being buried.

3.4.1 BLASTING

3.4.1.1 Blast Design

Electric detonators would be used to set off the charges. Typically, the smallest 10-foot leads are used, but contractors will use longer leads if deemed necessary.

Cables and geophones are expected to be laid out in 755 feet increments. Each charge is triggered by one detonator. Approximate average explosives use is 5.5 pounds per 330 feet of seismic line.

3.4.1.2 Explosive Handler and Certification

Constantine would use a licensed explosive handler. Certifications and ATF Permit Number(s) would be provided upon request. All explosives handling and storage would comply with applicable state and federal regulations.

3.4.1.3 Type and Amount of Explosives

Explosive type is anticipated to be ½ pound dynamite sticks. Approximately 500 pounds is estimated for this Project. Any leftover explosives would be consumed via detonation or returned to the supplier. Storage of explosives would be controlled by the explosives handler and located entirely on private lands.

3.4.1.4 Public Safety

- Before a charge is connected the blaster would confirm that all non-crew personnel are outside of the 330 feet buffer zone, and the blasting apprentice would visually confirm the immediate area is clear of personnel and wildlife.
- Members of the trained geoscience crew would take guarding positions to ensure that no public, personnel, or wildlife encroaches upon the blast area.
- Additionally, the general public would be notified through the Haines Borough, advertisements in the Chilkat Valley News, social media posts, and signage present in the work area.

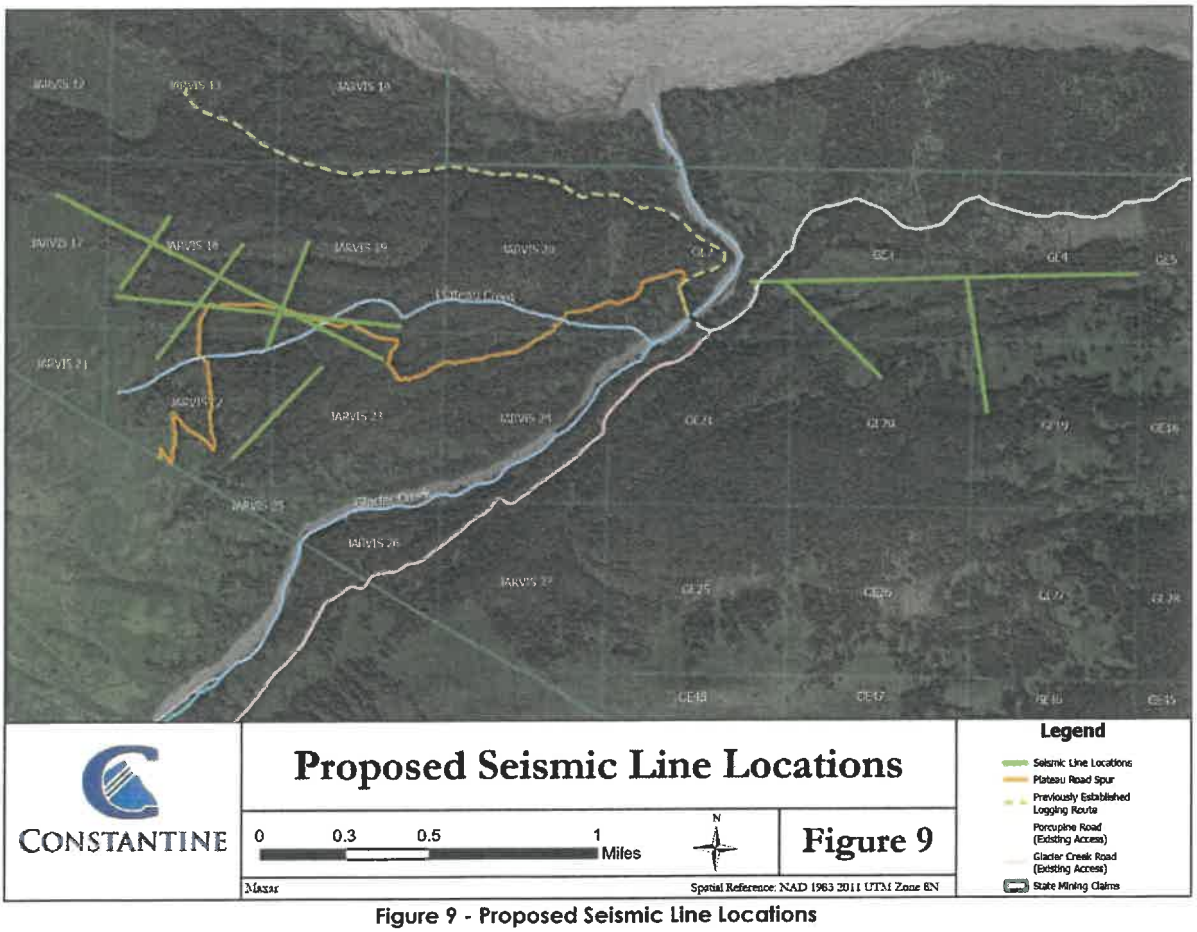

Figure 9 - Proposed Seismic Line Locations

3.5 Meteorological / Ambient Air Monitoring Stations

Constantine plans to install up to two meteorological / ambient air monitoring stations as part of this Plan. The exact locations of the monitoring stations are subject to further review and will be within state claims with a surface footprint not anticipated to exceed 40 ft. x 40 ft. each. Air monitoring stations are likely to be located in one or more of the following state claim areas: Jarvis 17, 18, 19, 21, 22, 23. Additional road development to these locations is not anticipated. If the monitoring stations are located outside of the additional road development proposed as part of this Plan, development of the monitoring stations would be supported via helicopter. Information collected from these stations would include precipitation, snowpack, wind direction, wind speed, and other meteorological data. If Constantine identifies the need for these stations to collect air quality samples, instrumentation to collect that information would be installed. The data collected by such stations would further Constantine's baseline data collection efforts and continue to inform the understanding of the local environment.

3.6 Surface Mineral Exploration

Constantine staff and/or consultants would complete geologic mapping and surface rock and soil sampling throughout the State mining claims during the period of this Plan approval. Access would include use of the proposed access road and helicopter. If required, limited vegetation hand clearing may be performed to allow safe landing for the helicopter in order to provide surface access to the more remote portions of the State mining claims.

3.7 Fuel Management

Fuel and fuel-related substances that would be used for activities contemplated under this Plan include gasoline, diesel, and lubricating grease and oils.

Constantine has a permitted fuel storage facility on BLM land adjacent to the lower section of the Glacier Creek Road at 2.4 mile. It consists of a 5,000-gallon diesel fuel storage tank and a 3,000-helicopter fuel (Jet A) storage tank. Transient 70-gallon fly tanks are also stored and refilled within the secondary containment here.

Constantine would continue to use this facility as the primary fuel storage and transfer facility. All fuel storage containers greater than 55-gallons would be double-walled or stored within secondary containment capable of holding at least 110% of the largest container within the containment. Smaller containers (e.g., fuel drums and jerry cans) would be stored in containment where practicable. Fuel transfer would take place within containment or over drip pans where practicable. Absorbent pads and spill kits would be readily available at fuel storage and transfer sites.

Fuel levels in the storage tanks would be maintained by local (Haines)fuel service providers. The entire fuel tank area at 2.4 mile employs secondary spill containment measures that meet or

exceed State and Federal regulations. Secondary containment is designed to hold 110% of fuel volume of the largest container.

Light-duty vehicles and heavy equipment will be utilized on the Project. Approximately 500 gallons of diesel would be stored in a portable diesel tank located at the laydown. This tank would be placed in temporary secondary containment and berms would be placed around the containment for additional protection. Constantine would ensure the location of the portable diesel tank is greater than 100 ft. from natural occurring water bodies as is required by DNR.

Constantine personnel are trained in spill prevention and spill response procedures. Spill kits are maintained in key areas. An assigned worker inspects spill kits weekly to check equipment serviceability and ensure that kits are fully stocked. Select Constantine personnel complete documented task-training in fuel handling, fuel storage, and fuel transferring procedures at least once a year. This includes training in visual inspections of fuel containers. All new personnel to the Project must complete the same training before they are authorized to carry-out any fuel-related tasks.

Fuel storage containers are visually checked weekly (or more frequently, as required) by an assigned worker either with a dip-stick or by viewing the liquid level through the fill. Fuel levels (and volumes) are also checked in the same manner before storage tanks are re-filled. On a weekly basis, an assigned and qualified worker visually inspects all tanks, couplings, valves, fittings, filter housings, nozzles, and other fittings for signs of deterioration, damage, or leakage. On a weekly basis, or after heavy rainfalls, an assigned worker would also conduct inspections of containments checking for signs of damage, deterioration, discharge, or fuel accumulation.

3.8 Expansion of Environmental Baseline Program

Constantine has been performing environmental monitoring, characterization, and mapping programs for the overall Project area, started as early as 2008. The effort has included surface water and groundwater quality and hydrology monitoring, aquatic life surveys, wildlife surveys, terrestrial ecosystem and vegetation surveys (including invasive species), wetlands surveys, cultural resources surveys, meteorological monitoring, snow surveys and monitoring, and development rock characterization studies.

The data from these efforts contribute to a fundamental understanding of the natural environment in the Project area, including a baseline of environmental conditions. They define an environmental backdrop that Constantine can design around, and one against which Constantine can detect changes, over time, including those that might be related to future Project activities.

Constantine intends to expand aspects of the baseline program onto the State mining claims including, but not limited to:

- Wetland delineations

- Surface water flow measurements and quality monitoring
- Fish surveys and wildlife surveys
- Meteorological/Ambient air quality monitoring
- Cultural resource surveys
- Geochemical characterization of bedrock that might be part of any future development and material sites

The objectives of the expanded environmental program remain as they are on the overall Project area; it contributes to a fundamental understanding of the natural environment in the Project area, including a baseline of environmental conditions. They define an environmental backdrop that Constantine can design around, and one against which Constantine can detect changes, over time, including those that might be related to future Project activities.

3.9 Minimizing Detrimental Effects on Fish and Wildlife and Their Habitats

Constantine would execute the proposed work in this Plan with an emphasis on avoiding or minimizing the effects of that work on fish and other wildlife. All stream crossing in fish-bearing streams would be pre-approved by ADF&G. Constantine would minimize land clearing activities during sensitive migratory bird nesting seasons or conduct bird nest surveys in advance of any land clearing activities with the intent of avoiding nests. Constantine currently conducts annual eagle nest surveys to understand active and historic eagle nest locations and also supports Alaska Department of Fish and Game's fish monitoring work within the Project area. Constantine has a no-hunting policy for employees on the overall Project lands. Constantine would adhere to best practices in all its activities to avoid contamination of surface waters by fuels, drilling additives or other substances. Constantine would continue to implement its invasive species policies aimed at minimizing the introduction of invasive plant species along any newly constructed roads.

3.10 SCHEDULE

Constantine's tentative schedule is presented in Table 2 below. The schedule is subject to change due to field conditions, contractor availability, funding availability and new project information. In developing this Plan, Constantine has done its best to anticipate activities to be included in the 5-year period and would submit an amendment for any future activities that may be required but are not captured in this initial Plan.

Table 2 – Proposed Activity Schedule

Activity	2024	2025	2026	2027	2028
Road Construction and Use	X	X	X	X	X
Geotechnical Drilling	X	X	X	X	X
Seismic Surveys	X	X			
Laydown Construction and Use	X	X	X	X	X
Air Monitoring Station Installation and Use	X	X	X	X	X
Monitoring Well Installation and Data Collection	X	X	X	X	X
Surface Mineral Exploration	X	X	X	X	X
Reclamation (largely concurrent)	X	X	X	X	x

4.0 RECLAMATION

Since all activities proposed in the Plan are surface activities and do not include construction of any permanent facilities, Constantine will follow applicable reclamation requirements set forth in 11 AAC 97.200 that define the reclamation performance standards and include(paraphrased):

- Reclaiming areas disturbed so that any surface that would not have a stream flowing over it is left in a stable condition.

- Stable is defined a condition the "allows for the reestablishment of renewable resources on the site within a reasonable period of time by natural processes" means a condition that can reasonably be expected to return waterborne soil erosion to pre-mining levels within one year after the reclamation is completed, and that can reasonably be expected to achieve revegetation, where feasible, within five years after the reclamation is completed, without the need for fertilization or reseeding. If rehabilitation of a mined site to this standard is not feasible because the surface materials on the mined site have low natural fertility or the site lacks a natural seed source, the department recommends that the miner fertilize and reseed or replant the site with native vegetation to protect against soil erosion; however, AS 27.19 does not require the miner to do so. Rehabilitation to allow for the reestablishment of renewable resources is not required if that reestablishment would be inconsistent with an alternate post-mining

land use approved under AS 27.19.030(b) on state, federal, or municipal land, or with the post-mining land use intended by the landowner on private land.

- Segregating topsoil for reuse and protecting it from erosion and contamination while stored.
- Recontouring disturbed ground to be conducive to natural revegetation.

Constantine can meet all reclamation requirements by employing standard practices with equipment that is readily available and proposes participating in the Statewide Bond Pool to meet reclamation bonding requirements for the activities proposed in this Plan.

All drill hole casings would be removed or cut off at, or below, ground level, except for those maintained as monitoring well locations. All drill holes would be plugged by the end of the exploration season with bentonite hole plug or equivalent slurry, for a minimum of 10 feet within the top 20 feet of the drill hole. The remainder of the hole would be backfilled to the surface with drill cuttings. If water is encountered in any drill hole, a minimum of 7 feet of bentonite hole plug or equivalent slurry would be placed immediately above the static water level in the drill hole. Drill holes would be completely filled, from bottom to top, with bentonite hole plug or equivalent slurry, unless communicated otherwise by ADNR.

Constantine would perform drill site reclamation on a concurrent basis, performing that reclamation as soon as practical after the site is no longer needed. Drill holes would be closed before the site is reclaimed except for those drillholes that are developed into monitoring wells or otherwise require reentry.

Constantine would collaborate with the Haines State Forester in determining the long-term plans for new roads constructed by Constantine. Constantine understands that ADNR-Forestry may want some of the new road to remain in place long-term to accommodate public access and timber access.

The area of expected disturbance has been calculated in Table 3. This calculation is representative of the disturbance that can be expected from the proposed activities. It is understood that State bonding obligations for mining disturbances do not include drill roads when calculating total disturbance acreages.

Table 3 – Anticipated Surface Disturbance

Activity	Disturbance Area (acres)	Note
Plateau / Drill Road Spur Development	Plateau Road Spur Drill Spurs *Total = 19.85 acres*	For disturbance calculation, trail width is estimated conservatively at an average of ~25 feet with a total expected length of 6.55 miles.
Drill Pads	*Total = 1.36 acres*	An estimated 33 drill pads are proposed. Disturbance area is for 33 pads at 30 ft. x 60 ft.
Test Pits	Total = ~0.17 acres	An estimated 40 test pits are proposed. Disturbance area for each is anticipated at 15 ft. x 12ft.
Laydown	*Total = ~1 acre*	Laydown footprint anticipated at 175 x 250 ft.
Air/Meteorological Monitoring Stations	*Total = >0.1 acre*	Includes two air monitoring stations at 40 x 40 ft. each.
Total	22.48 acres	Reclamation of trails to be discussed with Haines State Forester.

APPENDIX A – MAP AND LIST OF STATE MINING CLAIMS COVERED IN THIS PLAN OF OPERATIONS

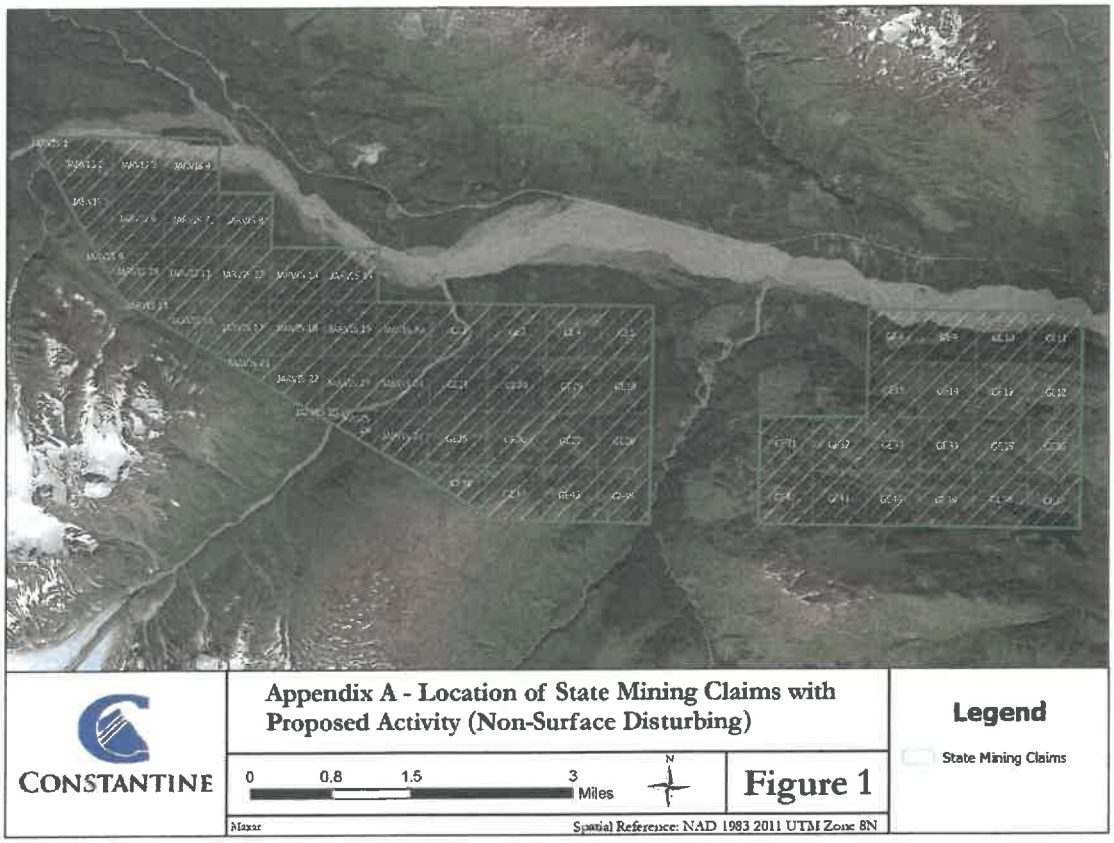

FIGURE 1 – STATE MINING CLAIMS WITH PROPOSED ACTIVITY

TABLE 1 – LIST OF STATE MINING CLAIMS WITH PROPOSED ACTIVITY (INCLUSIVE OF NON-SURFACE DISTRUBING WORK)

Claim Name	Claim Number	Claim Owner
GE2	662062	Constantine Mining LLC
GE3	662063	Constantine Mining LLC
GE4	662064	Constantine Mining LLC
GE5	662065	Constantine Mining LLC
GE8	662068	Constantine Mining LLC
GE9	662069	Constantine Mining LLC
GE10	662070	Constantine Mining LLC
GE11	662071	Constantine Mining LLC
GE12	662072	Constantine Mining LLC
GE13	662073	Constantine Mining LLC
GE14	662074	Constantine Mining LLC
GE15	662075	Constantine Mining LLC
GE18	662078	Constantine Mining LLC
GE19	662079	Constantine Mining LLC
GE20	662080	Constantine Mining LLC
GE21	662081	Constantine Mining LLC
GE25	662082	Constantine Mining LLC
GE26	662083	Constantine Mining LLC
GE27	662084	Constantine Mining LLC
GE28	662085	Constantine Mining LLC
GE31	662088	Constantine Mining LLC
GE32	662089	Constantine Mining LLC
GE33	662090	Constantine Mining LLC
GE34	662091	Constantine Mining LLC
GE35	662092	Constantine Mining LLC
GE36	662093	Constantine Mining LLC
GE37	662094	Constantine Mining LLC
GE38	662095	Constantine Mining LLC
GE39	662096	Constantine Mining LLC
GE40	662097	Constantine Mining LLC
GE41	662098	Constantine Mining LLC
GE42	662099	Constantine Mining LLC
GE45	662102	Constantine Mining LLC
GE46	662103	Constantine Mining LLC

GE47	662104	Constantine Mining LLC
GE48	662105	Constantine Mining LLC
JARVIS 1	661267	Constantine Mining LLC
JARVIS 3	661269	Constantine Mining LLC
JARVIS 4	661270	Constantine Mining LLC
JARVIS 5	661271	Constantine Mining LLC
JARVIS 6	661272	Constantine Mining LLC
JARVIS 7	661273	Constantine Mining LLC
JARVIS 8	661274	Constantine Mining LLC
JARVIS 9	661275	Constantine Mining LLC
JARVIS 10	661276	Constantine Mining LLC
JARVIS 11	661277	Constantine Mining LLC
JARVIS 12	661278	Constantine Mining LLC
JARVIS 13	661279	Constantine Mining LLC
JARVIS 14	661280	Constantine Mining LLC
JARVIS 15	661281	Constantine Mining LLC
JARVIS 16	661282	Constantine Mining LLC
JARVIS 17	661283	Constantine Mining LLC
JARVIS 18	661284	Constantine Mining LLC
JARVIS 19	661285	Constantine Mining LLC
JARVIS 2	661268	Constantine Mining LLC
JARVIS 20	661286	Constantine Mining LLC
JARVIS 21	661287	Constantine Mining LLC
JARVIS 22	661288	Constantine Mining LLC
JARVIS 23	661289	Constantine Mining LLC
JARVIS 24	661290	Constantine Mining LLC
JARVIS 25	661291	Constantine Mining LLC
JARVIS 26	661292	Constantine Mining LLC
JARVIS 27	661293	Constantine Mining LLC

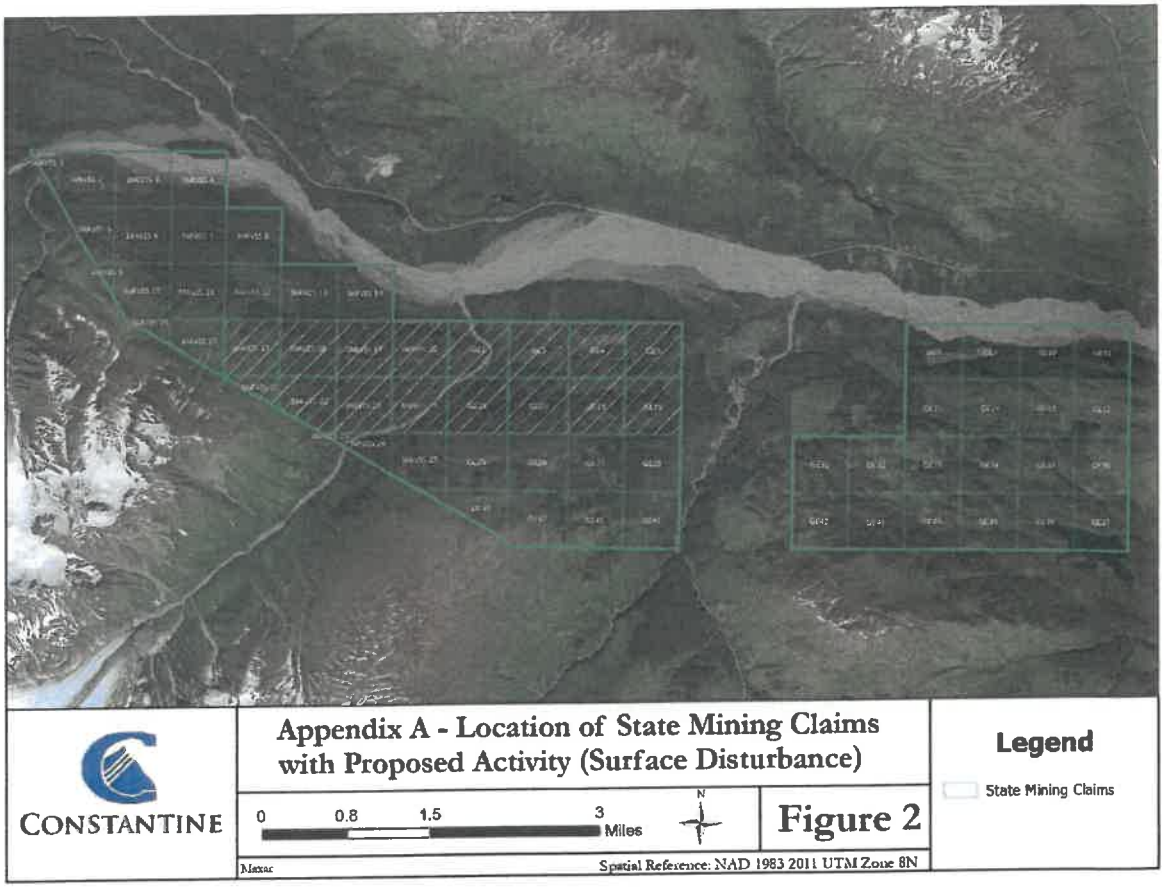

FIGURE 2 – STATE MINING CLAIMS WITH PROPOSED SURFACE DISTURBANCE

TABLE 2 – LIST OF STATE MINING CLAIMS WITH PROPOSED SURFACE DISTRUBANCE

Claim Name	Claim Number	Claim Owner
GE2	662062	Constantine Mining LLC
GE3	662063	Constantine Mining LLC
GE4	662064	Constantine Mining LLC
GE5	662065	Constantine Mining LLC
GE18	662078	Constantine Mining LLC
GE19	662079	Constantine Mining LLC
GE20	662080	Constantine Mining LLC
GE21	662081	Constantine Mining LLC
JARVIS 17	661283	Constantine Mining LLC
JARVIS 18	661284	Constantine Mining LLC
JARVIS 19	661285	Constantine Mining LLC
JARVIS 20	661286	Constantine Mining LLC
JARVIS 21	661287	Constantine Mining LLC
JARVIS 22	661288	Constantine Mining LLC
JARVIS 23	661289	Constantine Mining LLC
JARVIS 24	661290	Constantine Mining LLC

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Appendix 1 – Federal Claim Work

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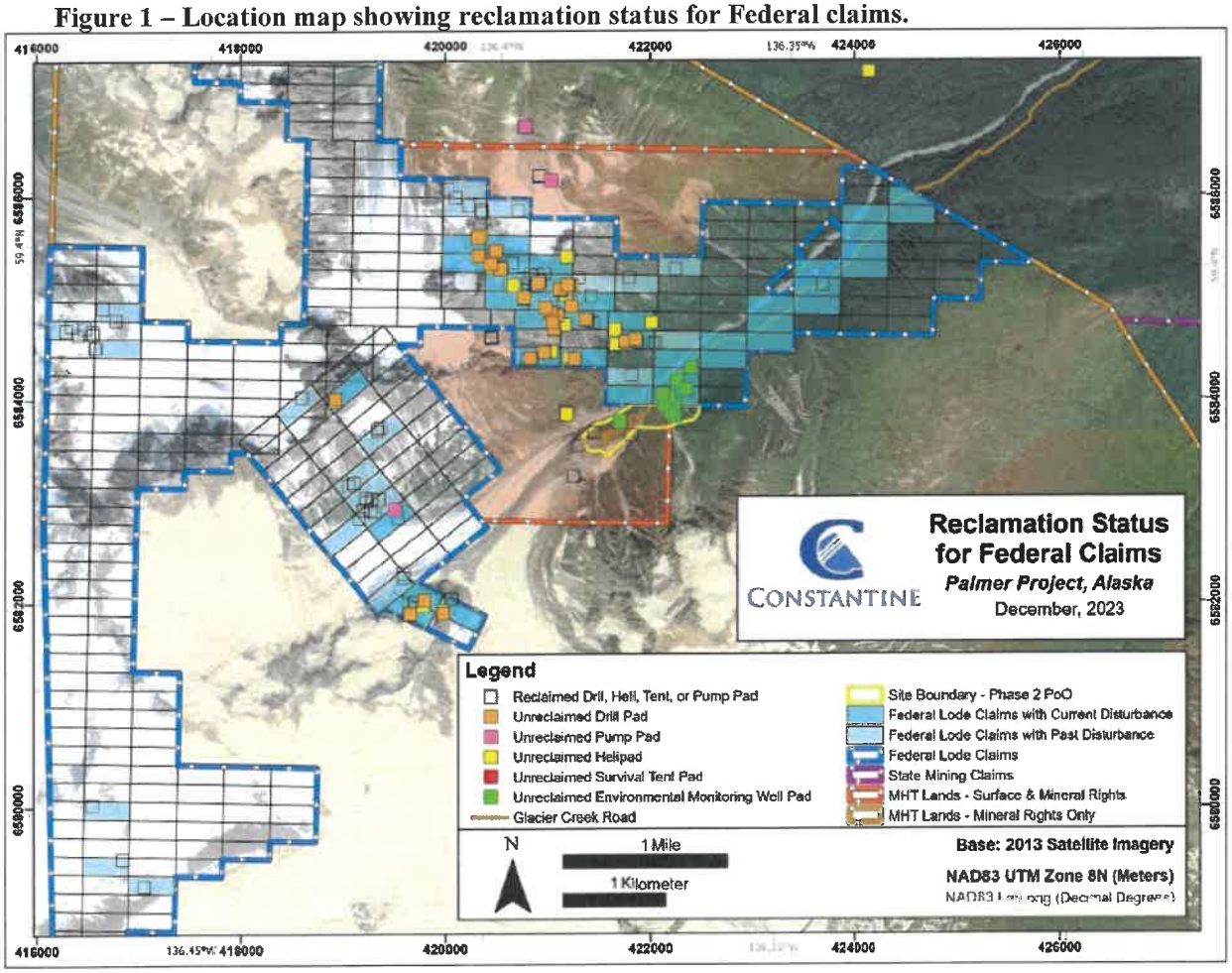
Overview

Constantine is currently authorized for surface exploration activities on Federal Claims, including helicopter-supported core drilling under US Bureau of Land Management (BLM) Decision Records dated 8/18/2016 and 9/21/2017, Case File AA-094088. Currently, Constantine participates in the AK State Bond Pool for exploration activities (pad development, drill holes, etc) associated with the previously referenced approvals. Activities such as the Glacier Creek road and laydown area have been bonded under an approved reclamation plan associated with Constantine's Waste Management Permit and Constantine currently holds a bond as agreed upon by those plans.

The Plan of Operations approved by the BLM allowed for development of up to 40 drill pad locations and drilling of up to 300 holes. Since the Plan of Operations approval, Constantine has developed 18 drill pads and has drilled 136 holes. This information is presented in much greater detail in Constantine's Annual Reclamation Report. Constantine works to ensure that concurrent reclamation is on-going to limit our disturbance footprint to the greatest extent practicable. Reclamation of pads that Constantine no longer intends to utilize occurs as soon as possible. As stated in the Plan of Operations, Constantine has committed to no more than 20 new pads developed and active at any given time. At the end of the 2023 season, Constantine currently has 7 drill pads that were developed post 2016 that remain unreclaimed. Figure 1 has been incorporated to illustrate the current reclamation status on Federal land.

Figure 1 – Location map showing reclamation status for Federal claims.



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2024 Anticipated Work on Federal Claims

The following information is being provided at the request of DNR; however, these are preliminary work plans which are subject to change based on site specific conditions, drilling conditions, exploration findings, etc.

Activity

The exploration activity anticipated for 2024 is similar in nature to the activity that was pursued in 2023 and within the approved activities provided within the Plan of Operations issued by BLM. The activities include helicopter supported exploration drilling, use of Glacier Creek road, use of the laydown area, and use of local water sources as applied for in the Temporary Water Use Authorization section of the APMA application document.

Location of Activities

The activities are anticipated to take place within the following Federal claims:

Table 1 – Anticipated 2024 Federal Claim Activity Area

Federal Claim #	Property Name
AA 27188	#3 of Marmot Core
AA 27186	#1 of Marmot Core
AA 27223	Marmot #111
AA 27222	Marmot #110
AA 27187	#2 of Marmot Core
AA 27193	Marmot #6
AA 27194	Marmot #7
AA 27195	Marmot #8
AA 29590	Rat Dawg #77
AA 29593	Rat Dawg #87
AA 27197	Marmot #10
AA 29592	Rat Dawg #86
AA 29589	Rat Dawg #76
AA 29591	Rat Dawg #85
AA 29588	Rat Dawg #75
AA 29586	Rat Dawg #67
AA 29587	Rat Dawg #68
AA 27191	M.V.P. Mining Claims #1
AA 27213	Marmot #101
AA 27214	Marmot #102

These claims as well as the location of anticipated new pad development for 2024 can be found in Figure 2.

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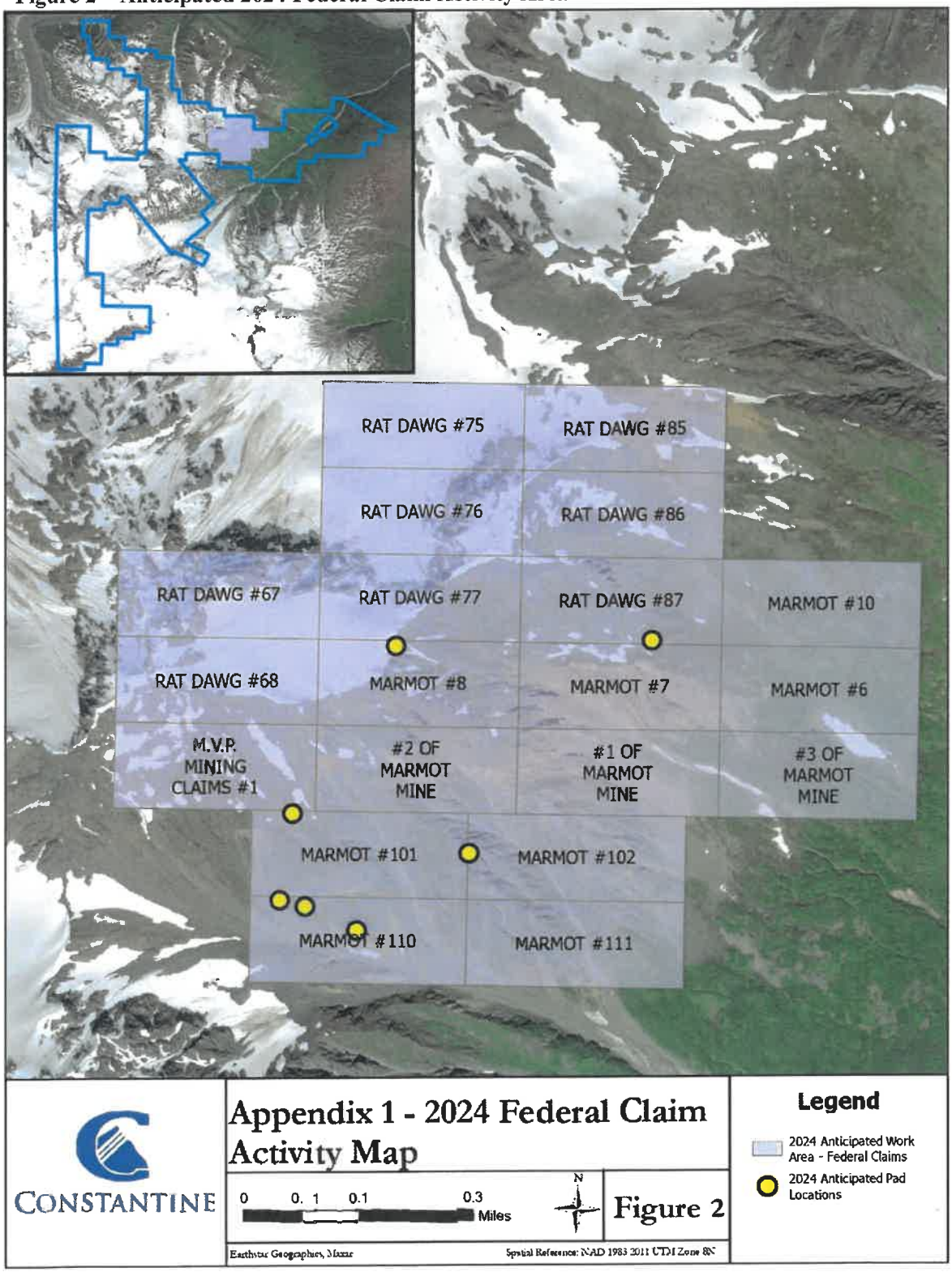
Figure 2 – Anticipated 2024 Federal Claim Activity Area



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Description of Activities

For a complete description of activities, please refer to the BLM approved Plan of Operations. A brief synopsis is provided herein for the purpose of convenience.

Drilling will focus on the claims identified in Figure 1 using 2 to 6 heli-portable diamond core drill rigs. Constantine has been approved by BLM to drill up to 300 total drill holes over the life of the Plan of Operations approval period and has drilled 136 through 2023. Drill holes typically range from 50 to 3,000 feet in depth. Multiple holes may be drilled from a single drill pad; the number of pads will be less than the total number of holes drilled. The density of sites and focus of drilling will depend on results from drilling and budget.

Drilling will be done by heli-portable diamond core drill rigs. Drill sites are completely supplied by helicopter. Drills will operate 24 hours per day, 7 days per week. Drill crews will work 12-hour shifts and travel to and from site via helicopter. Drill crews will be housed in camp on private land leased by Constantine. Constantine may drill monitoring wells as a means to gather baseline environmental and operational data for future use. Exact location of the monitoring wells is usually not determined until mid-season; however, the location of these monitoring wells is provided annually in Constantine's reclamation report.

Equipment to be utilized as part of Constantine's activities include but is not limited to:

- At least 3 diesel pumps
- At least 2 downhole pumps
- 4 to 6 portable light plant/generators
- 1 to 2 portable rock drills
- 4 to 6 portable chainsaws
- 2 to 6 heli-portable diamond core drills and related equipment
- 1 GeoProbe air hammer drill and related equipment
- 2 to 8 4WD pick-up trucks or sport utility vehicles (SUVs) as support vehicles
- and up to 2 helicopters.

Constantine will remove all motorized exploration equipment, trailers, and fuel from the Project area during extended periods of non-operation and seasonal closure.

Drill Sites

Drill and helipad construction causes only minor surface disturbance. Pads are supported by wood cribbing built on small wooden footers or timbers. In steeper areas timbers may be rock bolted to the ground. Most pads are constructed on rocky alpine outcrop and soil disturbance is minimal; no reseeding is required. The footprint for a typical drill pad is 20 ft x 20 ft (400 ft_2) (Figure 3, 4. Some drill pads also require associated helipads for safe access. The footprint of a typical helipad is 14 ft x 14 ft (196 ft_2). The area of disturbance for one drill site, including drill pad and helipad, is typically 0.014 acres. Refuse and scrap are removed at all sites (reclaimed or not) and all sites are left in a tidy state at the end of each season.

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Figure 3 – Example Drill Pad Layout

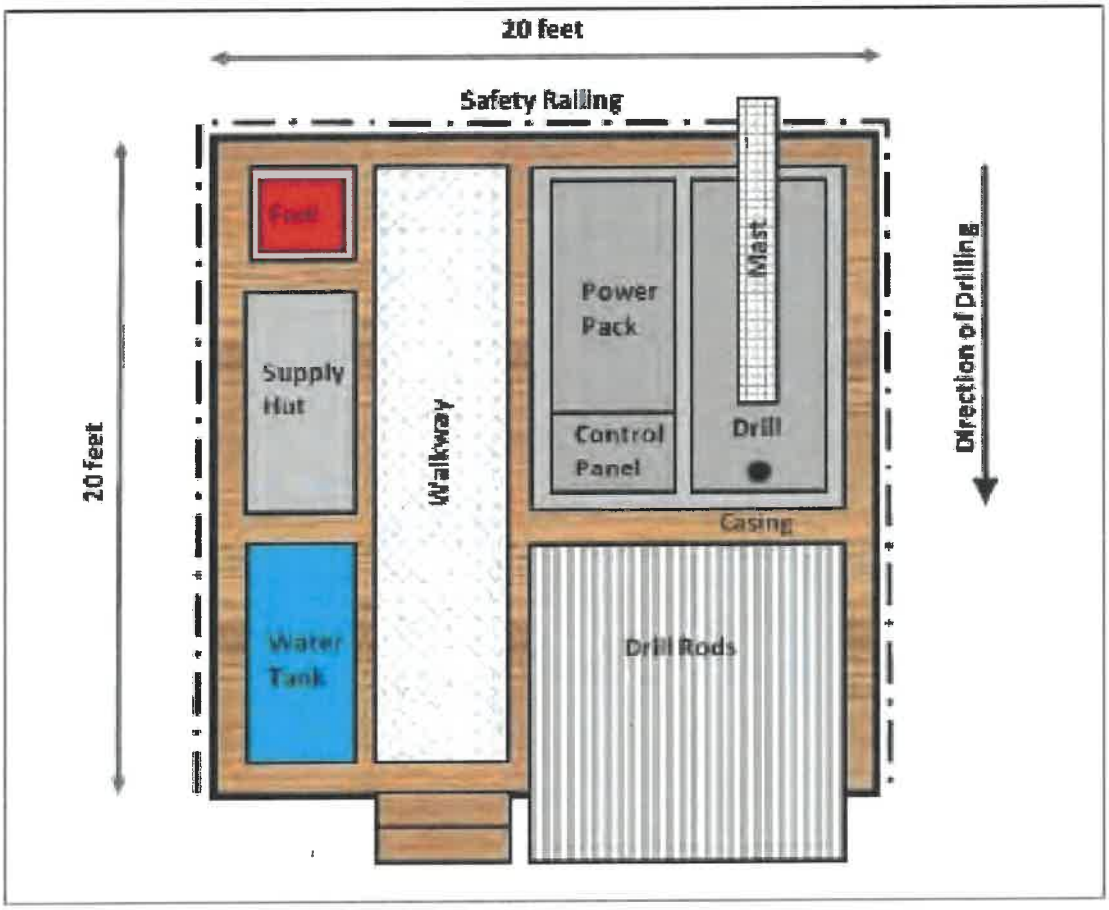

Figure 4 – Photos of Previous Pad Construction

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Drill Fluid Disposal

Drill additives consist of both naturally occurring substances (e.g. bentonite clay) and synthetic materials. Constantine makes every effort to only use NSF International Water Division Standard 60 (NSF60) products. Drill additives are added in dilute concentrations to water that is pumped down the hole. The water provides drill bit cooling, lubrication and washing away of cuttings. Additives are primarily used to enhance water circulation and borehole stability. Due to the fractured nature of the ground and low water table observed in drilling to date on the property, there is virtually no surface return/discharge of drill water and drill cuttings. Table 2 lists all currently used drill fluid additives. Other additives may be used in the future. MSDS sheets for additives used are included with this application and have been provided as Attachment 1 to Appendix 1.

Table 2 – Drill Fluid Additives

AMC Poly Lube
AMC CR-650
AMC PurVis
AMC 117
AMC K-Ion
AMC Rod Great Xtra Tacky
AMC Plug
AMC Linseed Soap

Fuel Handling / Spill Prevention and Response

Constantine is providing a copy of their SPCC plan for site. This document details fuel handling procedures and spill response approaches.

Water Use

Constantine has provided separate documentation within the application regarding temporary water use authorizations requested to support work on Federal claims. Currently, Constantine has two temporary water use authorizations that are active until December of 2025.

Sumps

The fractured, permeable nature of rock drilled at Palmer typically prevents return of water to surface. In instances where a sump is needed, they are hand dug and approximately 6' x 4'. Excavated soils are set aside for reclamation of the sump. A centrifuge is also maintained on site for the purpose of filtering drill cuttings should it be needed.

Cultural and Archaeological Site Plan

Given the terrain, elevation, and limited surface disturbance associated with exploration activities on Federal land, it is unlikely for identification of cultural or archaeological to occur; however, Pursuant to 43 CFR 10.4, Constantine will immediately notify the BLM authorized officer upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2) and will stop all activities in the vicinity of the discovery for a maximum of 30 days or when notified to proceed by the BLM authorized officer. Constantine will not knowingly disturb, alter, injure, or destroy any historical or archaeological site, structure, building, or object.

Drillhole Reclamation

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A complete drillhole reclamation plan was developed in 2018 and will be used going forward for all holes drilled on the property. This plan succeeds the BLM approved Palmer Project Exploration Plan of Operations (2015). This plan was designed to comply with permits and regulations, prevent entry of surface water and foreign substances (projectiles) into future underground workings, prevent "gun-barreling" during of loose rock during mining, prevent artesian water from reaching surface, prevent the physical hazard of an open hole in the ground, and conserve groundwater and prevent flowing to waste. Figure 5 illustrates the reclamation procedures for all possible scenarios. Due to the fractured, permeable nature of rock drilled on site, drill cuttings rarely, if ever, reach surface. Constantine maintains a centrifuge on site during the drill season for the event that cuttings do reach surface and would enter surface waters.

Upon completion of drilling, management will decide whether the hole will be a monitoring well (water source, geophysical survey hole, hydrology well, etc.) or if it will be reclaimed.

For monitoring wells, both dry and those containing static water, the holes will be flagged for future reclamation. PVC may be installed, or drill rods may be left to keep the hole open. For drillholes that intersect any reportable intersection of mineralization that may be included in a future resource estimate, holes will be cemented 100 ft above, below, and through the mineralized zone to prevent gun-barreling of loose rock during mining. This is for safety and to meet BLM requirements (Chapter 5, Solid Minerals Reclamation Handbook - BLM). If a hole is thought to have potential for fluid loss within this interval, plugs may be placed to avoid cement loss.

For all holes with static water, 3 m (10 ft) of bentonite pellets will be placed on a van Ruth plug directly above the water table. For all reclaimed holes, a displacement plug with 3 m (10 ft) of bentonite pellets will be placed within 6 m (20 ft) of the collar.

If artesian is encountered, management will contact Allan S. Nakanishi, P.E, from the Mining &Technical Services Section of the Department of Environmental Conservation (DEC) and Kindra Geis from the Division of Mining, Land, and Water (DMLW) of the Department of Natural Resources for advice prior to abandoning the hole and moving the drill. A flow estimate and water quality sample will be taken where appropriate. If groundwater will enter surface water, the hole will be plugged immediately. Each case will be evaluated with help from the DEC and DMLW, and a Margo plug, grout plug, or short packer plug with bentonite may be required.

In all scenarios, casing will be cut to ground level, the hole will be capped with an aluminum or steel cap, and stamped with drillhole information, and reclaimed collars will be photographed in all 4 cardinal directions. Table 2 lists the materials that may be placed downhole as part of these reclamation procedures.

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Figure 5 – Illustration of possible drillhole scenarios and appropriate reclamation results.

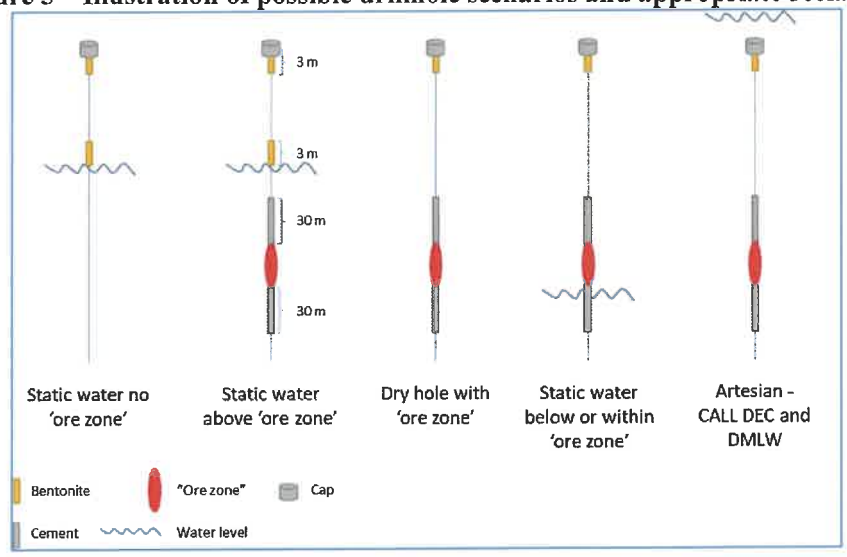


Table 3 – List of potential downhole reclamation materials used.

Item
Portland Cement
Bentonite Pellets
Displacement Plugs
Van Ruth Plugs

APPENDIX B – SAFETY DATA SHEETS

AMC CR-650

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
AMC CR-650

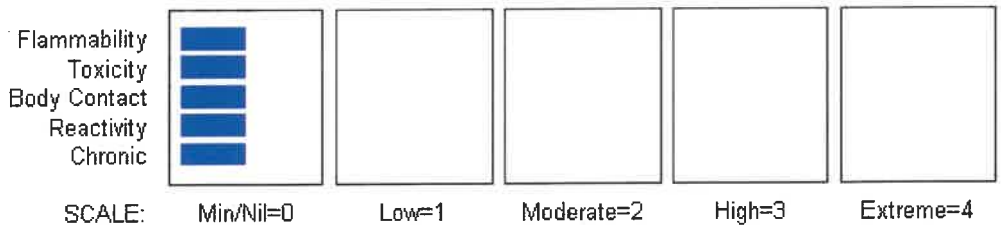
PRODUCT USE
Drilling fluid additive.

SUPPLIER
Company: Australian Mud Company
Address:
5 Pitino Court
Osbourne Park
WA, 6017
Telephone: +61 8 9445 4000
Emergency Tel: +61 80 417 824 710
Fax: +61 8 9445 4040

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE
NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to the Criteria of NOHSC, and the ADG Code.

CHEMWATCH HAZARD RATINGS



POISONS SCHEDULE
None

RISK
None under normal operating conditions.

SAFETY
None under normal operating conditions.

continued...

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
acrylic acid/ acrylamide copolymer, sodium salt	25987-30-8	Not Spec
drilling fluid additive		Not Spec

Section 4 - FIRST AID MEASURES

SWALLOWED
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE
- If this product comes in contact with eyes:
- Wash out immediately with water.
- If irritation continues, seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
- If skin or hair contact occurs:
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED
- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN
- Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

FIRE FIGHTING
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

continued...

FIRE/EXPLOSION HAZARD
- Non combustible.
- Not considered a significant fire risk, however containers may burn.

FIRE INCOMPATIBILITY
- None known.

HAZCHEM: None

PERSONAL PROTECTION
Glasses:
Chemical goggles.
Gloves:
When handling larger quantities:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Wear impervious gloves and safety glasses.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).
- Do NOT use air hoses for cleaning
- Place spilled material in clean, dry, sealable, labelled container.

MAJOR SPILLS
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Control personal contact by using protective equipment and dust respirator.
- Prevent spillage from entering drains, sewers or water courses.
- Avoid generating dust.
- Sweep, shovel up. Recover product wherever possible.
- Put residues in labelled plastic bags or other containers for disposal.
- If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.

continued...

- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY
- Avoid contamination of water, foodstuffs, feed or seed.

STORAGE REQUIREMENTS
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

+	+	+	+	X	+

+: *May be stored together*
O: *May be stored together with specific preventions*
X: *Must not be stored together*

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS
The following materials had no OELs on our records
- acrylic acid/ acrylamide copolymer, sodium salt: CAS:25987- 30- 8 CAS:25085- 02- 3

MATERIAL DATA
AMC CR-650:
Not available

PERSONAL PROTECTION

continued...

EYE
- Safety glasses with side shields
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET
■ Suitability and durability of glove type is dependent on usage. Factors such as:
- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity,

are important in the selection of gloves.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocaoutchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER
■ No special equipment needed when handling small quantities.
OTHERWISE:
- Overalls.
- Barrier cream.
- Eyewash unit.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	P1 Air- line*	- -	PAPR- P1 -
50 x ES	Air- line**	P2	PAPR- P2
100 x ES	-	P3	-
		Air- line*	-
100+ x ES	-	Air- line**	PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS
- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Such protection might consist of:

continued...

(a): particle dust respirators, if necessary, combined with an absorption cartridge;

(b): filter respirators with absorption cartridge or canister of the right type;

(c): fresh-air hoods or masks.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
Fine granular free-flowing solid; soluble in water.

PHYSICAL PROPERTIES
Mixes with water.

Molecular Weight: Not Applicable	Boiling Range (°C): Not Applicable
Melting Range (°C): Not Available	Specific Gravity (water=1): 0.7- 0.8

continued...

Solubility in water (g/L): Miscible
pH (1% solution): ~7.5 (5% sol)
Volatile Component (%vol): Not Available
Relative Vapour Density (air=1): Not Applicable
Lower Explosive Limit (%): Not Applicable
Autoignition Temp (°C): Not Applicable
State: Divided Solid

pH (as supplied): Not Applicable
Vapour Pressure (kPa): Not Applicable
Evaporation Rate: Not Applicable
Flash Point (°C): Not Applicable
Upper Explosive Limit (%): Not Applicable
Decomposition Temp (°C): Not Available
Viscosity: Not Applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

■ Product is considered stable and hazardous polymerisation will not occur.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (eg. liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

EYE

■ Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

INHALED

■ The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

continued...

TOXICITY AND IRRITATION
■ Not available. Refer to individual constituents.

Section 12 - ECOLOGICAL INFORMATION

■ DO NOT discharge into sewer or waterways.
From an analogous product:
freshwater fish (Brachydanio rerio) LC50 (96hr): 357 mg/L
Daphnia magna EC50 (48hr): 212 mg/L
freshwater unicellular algae (Chlorella vulgaris) EC50 (72hr): >1000 mg/L
bacteria (Pseudomonas putida) EC50 (24hr): 892 mg/L
[Australian Mud]
Refer to data for ingredients, which follows:

AMC CR-650:

From an analogous product:
freshwater fish (Brachydanio rerio) LC50 (96hr): 357 mg/L
Daphnia magna EC50 (48hr): 212 mg/L
freshwater unicellular algae (Chlorella vulgaris) EC50 (72hr): >1000 mg/L
bacteria (Pseudomonas putida) EC50 (24hr): 892 mg/L
[Australian Mud]
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
AMC CR- 650		No data		
acrylic acid/ acrylamide copolymer, sodium salt		No data		

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None (ADG7)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: ADG7, UN, IATA, IMDG

continued...

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: None

REGULATIONS
Regulations for ingredients

acrylic acid/ acrylamide copolymer, sodium salt (CAS: 25987-30-8,25085-02-3) is found on the following regulatory lists;
"Australia Inventory of Chemical Substances (AICS)"

No data for AMC CR-650 (CW: 4902-92)

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
acrylic acid/ acrylamide copolymer, sodium salt	25987-30-8, 25085-02-3

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Issue Date: 6-May-2009
Print Date: 18-Sep-2009

This is the end of the MSDS.

AMC K-ION

AMC

Chemwatch: **4751-58**
Version No: **2.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Chemwatch Hazard Alert Code: **2**

Issue Date: **12/16/2015**
Print Date: **12/28/2015**
Initial Date: **Not Available**
L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC K-ION
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Use according to manufacturer's directions. Drilling fluid additive.

Details of the supplier of the safety data sheet

Registered company name	AMC
Address	216 Balcatta Rd, Balcatta 6021 WA Australia
Telephone	+61 (8) 9445 4000, Mobile: +61 (0) 432 187 374
Fax	+61 (8) 9445 4040
Website	www.amcoilandgas.com, www.amcmud.com
Email	amc@imdexlimited.com, amcoilandgas@imdexlimited.com

Emergency telephone number

Association / Organisation	**Chemwatch**
Emergency telephone numbers	**1800 039 008**
Other emergency telephone numbers	Not Available

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
1800 039 008	+612 9186 1132	Not Available

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	0	
Body Contact	2	
Reactivity	0	
Chronic	2	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
GHS Classification [1]	Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, STOT - SE (Resp. Irr.) Category 3, STOT - RE Category 2
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI*

Label elements

GHS label elements

SIGNAL WORD | WARNING

Hazard statement(s)

H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H373	May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s) Prevention

P260	Do not breathe dust/fume/gas/mist/vapours/spray.

Precautionary statement(s) Response

P362	Take off contaminated clothing and wash before reuse.

Precautionary statement(s) Storage

P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	30-60	a blend of clay inhibitive polymers
127-08-2	10-<30	potassium acetate
	balance	nonhazardous ingredients

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact

If this product comes in contact with the eyes:
- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact	If skin or hair contact occurs: ‣ Flush skin and hair with running water (and soap if available). ‣ Seek medical attention in event of irritation.
Inhalation	‣ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ‣ Other measures are usually unnecessary.
Ingestion	‣ If swallowed do **NOT** induce vomiting. ‣ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ‣ Observe the patient carefully. ‣ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ‣ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ‣ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

For potassium intoxications:

- Hyperkalaemia, in patients with abnormal renal function, results from reduced renal excretion following intoxication.
- The presence of electrocardiographic evidence of hyperkalemia or serum potassium levels exceeding 7.5 mE/L indicates a medical emergency requiring an intravenous line and constant cardiac monitoring.
- The intravenous ingestion of 5-10 ml of 10% calcium gluconate, in adults, over a 2 minute period antagonises the cardiac and neuromuscular effects. The duration of action is approximately 1 hour. [Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard.
Fire/Explosion Hazard	‣ Non combustible. Decomposes on heating and produces toxic fumes of; carbon dioxide (CO_2) nitrogen oxides (NOx)

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	‣ Clean up all spills immediately.
Major Spills	Minor hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	‣ Limit all unnecessary personal contact.
Other information	‣ Store in original containers.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Polyethylene or polypropylene container. |20 L pails.
Storage incompatibility	None known

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
potassium acetate	Potassium acetate	9.8 mg/m3	110 mg/m3	640 mg/m3

Ingredient	Original IDLH	Revised IDLH
a blend of clay inhibitive polymers	Not Available	Not Available
potassium acetate	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields ▸ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. ▸ Wear chemical protective gloves, e.g. PVC.
Body protection	See Other protection below
Other protection	▸ Overalls.
Thermal hazards	Not Available

Respiratory protection

Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Odourless liquid, mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.09
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	>100	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	3.1 @ 25C	**Gas group**	Not Available

Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	7.0-9.0
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	Not normally a hazard due to non-volatile nature of product
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Acute potassium poisonings following ingestion are rare because large doses usually induce vomiting and a healthy kidney ensures rapid excretion.
Skin Contact	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects.
Eye	The material may be irritating to the eye, with prolonged contact causing inflammation.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

AMC K-ION	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
potassium acetate	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >20000 mg/kg[1]	Not Available
	Oral (rat) LD50: 3250 mg/kgd[2]	
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

POTASSIUM ACETATE	Asthma-like symptoms may continue for months or even years after exposure to the material ceases.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	✔	**Reproductivity**	⊘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✔
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	✔
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
potassium acetate	LC50	96	Fish	>992.7mg/L	2
potassium acetate	EC50	24	Crustacea	>919mg/L	2
potassium acetate	EC50	48	Crustacea	>919mg/L	2
potassium acetate	EC50	72	Algae or other aquatic plants	>1000mg/L	2
potassium acetate	NOEC	72	Algae or other aquatic plants	1000mg/L	2
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ Recycle wherever possible or consult manufacturer for recycling options.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

POTASSIUM ACETATE(127-08-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

National Inventory	Status
Australia - AICS	Y

Canada - DSL	Y
Canada - NDSL	N (potassium acetate)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

an imdex limited company

AMC Linseed Soap

AMC

Chemwatch: **16-8181**
Version No: **2.1.1.1**
Safety Data Sheet

Chemwatch Hazard Alert Code: **1**

Issue Date: **12/16/2015**
Print Date: **12/18/2015**
Initial Date: **Not Available**
L.GHS.CAN.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	AMC Linseed Soap
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	Core barrel lubricant.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	AMC
Address	10911 72nd Street SE, Calgary T2C 3G2 AB Canada
Telephone	+1 403 259 5112
Fax	+1 403 255 7185
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency phone number

Association / Organisation	Not Available
Emergency telephone numbers	**Chemwatch - (1) 877 715 9305**
Other emergency telephone numbers	-

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
(1) 877 715 9305	+612 9186 1132	Not Available

Once connected and if the message is not in your prefered language then please dial 01

Une fois connecté et si le message n'est pas dans votre langue préférée alors s'il vous plaît cadran 07

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	0	
Body Contact	1	
Reactivity	0	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

CANADIAN WHMIS SYMBOLS

GHS Classification	Not Applicable

Label elements

GHS label elements	Not Applicable
SIGNAL WORD	NOT APPLICABLE

Hazard statement(s)

Not Applicable

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	100	natural fatty acids

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard.
Fire/Explosion Hazard	May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	Slippery when spilt. ▸ Clean up all spills immediately.
Major Spills	Slippery when spilt. Moderate hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation.
Other information	▸ Store in original containers.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Polyethylene or polypropylene container.
Storage incompatibility	None known

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
AMC Linseed Soap	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
natural fatty acids	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard.
Personal protection	

Eye and face protection	‣ Safety glasses with side shields ‣ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. ‣ Wear chemical protective gloves, e.g. PVC.
Body protection	See Other protection below
Other protection	‣ Overalls.
Thermal hazards	Not Available

Respiratory protection

Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Amber-brown liquid with a faint soap odour, mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.0-1.01
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	9.5-11	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	0 (freezing pt)	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	100	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	‣ Unstable in the presence of incompatible materials.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models).
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion".
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects.
Eye	The liquid may produce eye discomfort causing transient smarting, blinking
Chronic	Principal routes of exposure are by accidental skin and eye contact and by inhalation of vapours especially at higher temperatures. As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

	TOXICITY	IRRITATION
AMC Linseed Soap	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ Recycle wherever possible.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (TDG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

National Inventory	**Status**
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	Y
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value

BCF: BioConcentration Factors
BEI: Biological Exposure Index

an imdex limited company

AMC Poly Lube

AMC

Chemwatch: **41-4378**
Version No: **2.1.1.1**
Safety Data Sheet

Chemwatch Hazard Alert Code: **2**

Issue Date: **03/20/2014**
Print Date: **07/25/2015**
Initial Date: **Not Available**
L.GHS.CAN.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC Poly Lube
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Water loss / shale control.

Details of the manufacturer/importer

Registered company name	AMC
Address	10911 72nd Street SE, Calgary T2C 3G2 AB Canada
Telephone	+1 403 259 5112
Fax	+1 403 255 7185
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	**Chemwatch - (1) 877 715 9305**
Other emergency telephone numbers	-

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
(1) 877 715 9305	+612 9186 1132	Not Available

Once connected and if the message is not in your prefered language then please dial 01

Une fois connecté et si le message n'est pas dans votre langue préférée alors s'il vous plaît cadran 07

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	2	
Reactivity	1	
Chronic	2	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

CANADIAN WHMIS SYMBOLS

GHS Classification	Eye Irritation Category 2A, STOT - RE Category 2

Label elements

GHS label elements	
SIGNAL WORD	WARNING

Hazard statement(s)

H319	Causes serious eye irritation
H373	May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s) Prevention

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314	Get medical advice/attention if you feel unwell.

Precautionary statement(s) Storage

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	>90	various proprietary materials
Not Available	>90	various proprietary materials
14808-60-7	<1	silica crystalline - quartz
14808-60-7	<1	silica crystalline - quartz

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes:

	▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If dust is inhaled, remove from contaminated area. ▸ Encourage patient to blow nose to ensure clear passage of breathing. ▸ If irritation or discomfort persists seek medical attention.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

	▸ Water spray or fog. ▸ Foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.
Fire/Explosion Hazard	▸ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. ▸ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions).

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing dust and contact with skin and eyes.
Major Spills	Moderate hazard. ▸ CAUTION: Advise personnel in area.
	Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	silica crystalline - quartz	Silica - Crystalline# : Quartz (respirable fraction++)	0.05 mg/m3	Not Available	Not Available	T20
Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances	silica crystalline - quartz	Silica crystalline (respirable size)	Not Available	Not Available	Not Available	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	silica crystalline - quartz	Silica - Quartz (Respirable Mass) / Silica - Silica Flour (Respirable Mass)	0.1 mg/m3 / 0.05 mg/m3	Not Available	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	silica crystalline - quartz	Silica, Crystalline - Quartz	0.025 mg/m3	Not Available	Not Available	TLV Basis: pulmonary fibrosis; lung cancer
Canada - Prince Edward Island Occupational Exposure Limits	silica crystalline - quartz	Silica, crystalline - α-quartz and cristobalite	0.025 mg/m3	Not Available	Not Available	TLV® Basis: Pulm fibrosis; lung cancer
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	silica crystalline - quartz	Quartz / Silica - Crystalline, Quartz	0.1 mg/m3	Not Available	Not Available	Not Available
Canada - Alberta Occupational Exposure Limits	silica crystalline - quartz	Silica-Crystalline, Respirable particulate - Quartz	0.025 mg/m3	Not Available	Not Available	Not Available
Canada - British Columbia Occupational Exposure Limits	silica crystalline - quartz	Silica, Crystalline - alpha quartz and Cristobalite, Respirable	0.025 mg/m3	Not Available	Not Available	Not Available
Canada - Ontario Occupational Exposure Limits	silica crystalline - quartz	*Silica, Crystalline - Quartz/Tripoli	0.10 mg/m3	Not Available	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	silica crystalline - quartz	Silica - Crystalline# : Quartz (respirable fraction++)	0.05 mg/m3	Not Available	Not Available	T20
Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances	silica crystalline - quartz	Silica crystalline (respirable size)	Not Available	Not Available	Not Available	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	silica crystalline - quartz	Silica - Quartz (Respirable Mass) / Silica - Silica Flour (Respirable Mass)	0.1 mg/m3 / 0.05 mg/m3	Not Available	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	silica crystalline - quartz	Silica, Crystalline - Quartz	0.025 mg/m3	Not Available	Not Available	TLV Basis: pulmonary fibrosis; lung cancer
Canada - Prince Edward Island Occupational Exposure Limits	silica crystalline - quartz	Silica, crystalline - α-quartz and cristobalite	0.025 mg/m3	Not Available	Not Available	TLV® Basis: Pulm fibrosis; lung cancer
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	silica crystalline - quartz	Quartz / Silica - Crystalline, Quartz	0.1 mg/m3	Not Available	Not Available	Not Available

Canada - Alberta Occupational Exposure Limits	silica crystalline - quartz	Silica-Crystalline, Respirable particulate - Quartz	0.025 mg/m3	Not Available	Not Available	Not Available
Canada - British Columbia Occupational Exposure Limits	silica crystalline - quartz	Silica, Crystalline - alpha quartz and Cristobalite, Respirable	0.025 mg/m3	Not Available	Not Available	Not Available
Canada - Ontario Occupational Exposure Limits	silica crystalline - quartz	*Silica, Crystalline - Quartz/Tripoli	0.10 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
silica crystalline - quartz	Silica, crystalline-quartz; (Silicon dioxide)	0.025 mg/m3	0.025 mg/m3	0.025 mg/m3
silica crystalline - quartz	Silica, crystalline-quartz; (Silicon dioxide)	0.025 mg/m3	0.025 mg/m3	0.025 mg/m3

Ingredient	Original IDLH	Revised IDLH
various proprietary materials	Not Available	Not Available
various proprietary materials	Not Available	Not Available
silica crystalline - quartz	N.E. mg/m3 / N.E. ppm	50 mg/m3
silica crystalline - quartz	N.E. mg/m3 / N.E. ppm	50 mg/m3

MATERIAL DATA

Because the margin of safety of the quartz TLV is not known with certainty and given the associated link between silicosis and lung cancer it is recommended that quartz concentrations be maintained as far below the TLV as prudent practices will allow.
Exposure to respirable crystalline silicas (RCS) represents a significant hazard to workers, particularly those employed in the construction industry where respirable dusts of of cement and concrete are common.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
AMC Poly Lube Not Available

Material	CPI

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the

Respiratory protection

Type AX-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Dark brown to black solid powder; mixes with water.

Physical state	Divided Solid	**Relative density (Water = 1)**	1.2-1.5
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Eye	Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Harmful: danger of serious damage to health by prolonged exposure through inhalation.

	TOXICITY	IRRITATION
AMC Poly Lube	Not Available	Not Available
silica crystalline - quartz	TOXICITY Not Available	IRRITATION Nil reported
silica crystalline - quartz	TOXICITY Not Available	IRRITATION Nil reported
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's msds. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

SILICA CRYSTALLINE - QUARTZ	**WARNING:** For inhalation exposure ONLY: This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS** The International Agency for Research on Cancer (IARC) has classified occupational exposures to **respirable** (<5 um) crystalline silica as being carcinogenic to humans . This classification is based on what IARC considered sufficient evidence from epidemiological studies of humans for the carcinogenicity of inhaled silica in the forms of quartz and cristobalite.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	✔
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✔ *– Data required to make classification available*
✘ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration	Effect	Value	Species	BCF
various proprietary materials	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
various proprietary materials	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
silica crystalline - quartz	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
silica crystalline - quartz	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (TDG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

SILICA CRYSTALLINE - QUARTZ(14808-60-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
Canada - British Columbia Occupational Exposure Limits
Canada - Northwest Territories Occupational Exposure Limits (English)
Canada - Nova Scotia Occupational Exposure Limits
Canada - Ontario Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (French)
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances
Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

SILICA CRYSTALLINE - QUARTZ(14808-60-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
Canada - British Columbia Occupational Exposure Limits
Canada - Northwest Territories Occupational Exposure Limits (English)
Canada - Nova Scotia Occupational Exposure Limits
Canada - Ontario Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (French)
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances
Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (silica crystalline - quartz)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y

Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
silica crystalline - quartz	122304-48-7, 122304-49-8, 12425-26-2, 1317-79-9, 14808-60-7, 70594-95-5, 87347-84-0
silica crystalline - quartz	122304-48-7, 122304-49-8, 12425-26-2, 1317-79-9, 14808-60-7, 70594-95-5, 87347-84-0

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

AMC Pure-vis

AMC

Chemwatch: **17-8713**
Version No: **6.1.1.1**
Safety Data Sheet

Chemwatch Hazard Alert Code: 1

Issue Date: **12/16/2015**
Print Date: **12/18/2015**
Initial Date: **Not Available**
L.GHS.CAN.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	AMC Pure-vis
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	Drilling fluid additive.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	AMC
Address	10911 72nd Street SE, Calgary T2C 3G2 AB Canada
Telephone	+1 403 259 5112
Fax	+1 403 255 7185
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency phone number

Association / Organisation	Not Available
Emergency telephone numbers	**Chemwatch - (1) 877 715 9305**
Other emergency telephone numbers	-

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
(1) 877 715 9305	+612 9186 1132	Not Available

Once connected and if the message is not in your prefered language then please dial 01

Une fois connecté et si le message n'est pas dans votre langue préférée alors s'il vous plaît cadran 07

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

CANADIAN WHMIS SYMBOLS

GHS Classification	Not Applicable

Label elements

GHS label elements	Not Applicable
SIGNAL WORD	NOT APPLICABLE

Hazard statement(s)

Not Applicable

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	100	a blend of clay inhibiting and viscofying polymers and vegetable based lubricants

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: ▸ Wash out immediately with water. ▸ If irritation continues, seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- Foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard.
Fire/Explosion Hazard	▸ Combustible. Combustion products include; carbon dioxide (CO_2) acrolein, other pyrolysis products typical of burning organic material **CARE**: Water in contact with hot liquid may cause foaming and a steam explosion with wide scattering of hot oil and possible severe burns.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	Slippery when spilt. ▸ Remove all ignition sources.
Major Spills	Slippery when spilt. Moderate hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin Rags wet / soaked with unsaturated hydrocarbons / drying oils may auto-oxidise; generate heat and, in-time, smoulder and ignite. ▸ Avoid all personal contact, including inhalation.
Other information	▸ Store in original containers.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed. Materials soaked with plant/ vegetable derived (and rarely, animal) oils may undergo spontaneous combustion Many vegetable and animal oils absorb oxygen from the air to form oxidation products. ▸ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
AMC Pure-vis	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
a blend of clay inhibiting and viscofying polymers and vegetable based lubricants	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields ▸ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	Wear general protective gloves, eg. light weight rubber gloves. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities.
Thermal hazards	Not Available

Respiratory protection

Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Brown viscous liquid with a slight odour; partially miscible with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.10
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	>100	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Partly miscible	**pH as a solution (1%)**	7.0-9.0
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials.
Possibility of hazardous reactions	See section 7

Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Fine mists generated from plant/ vegetable (or more rarely from animal) oils may be hazardous.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion".
Skin Contact	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic).
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

AMC Pure-vis	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ Recycle wherever possible or consult manufacturer for recycling options.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (TDG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	Y
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。

IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

AMC Rod Grease - Xtra Tacky

AMC

Chemwatch Hazard Alert Code: **2**

Chemwatch: **7641-76**
Version No: **12.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **03/16/2016**
Print Date: **06/13/2017**
L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC Rod Grease - Xtra Tacky
Synonyms	Barium Grease
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Grease, lubricant for diamond drills.

Details of the supplier of the safety data sheet

Registered company name	AMC
Address	216 Balcatta Rd, Balcatta WA 6021 Australia
Telephone	+61 (8) 9445 4000
Fax	+61 (8) 9445 4040
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency telephone number

Association / Organisation	**Chemwatch**
Emergency telephone numbers	1800 039 008
Other emergency telephone numbers	Not Available

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
1800 039 008	1800 039 008	+612 9186 1132

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	1	
Toxicity	2	
Body Contact	1	
Reactivity	1	
Chronic	1	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Acute Toxicity (Oral) Category 4
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI*

Label elements

Hazard pictogram(s)

SIGNAL WORD	WARNING

Hazard statement(s)

H302	Harmful if swallowed.

Precautionary statement(s) Prevention

P264	Wash all exposed external body areas thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330	Rinse mouth.

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
64742-52-5.	>50	naphthenic distillate, heavy, hydrotreated (severe)
68201-19-4	<25	barium, acetate tallow fatty acid complexes

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.

Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.
For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO2 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]
- Heavy and persistent skin contamination over many years may lead to dysplastic changes. Pre-existing skin disorders may be aggravated by exposure to this product.
- In general, emesis induction is unnecessary with high viscosity, low volatility products, i.e. most oils and greases.
- High pressure accidental injection through the skin should be assessed for possible incision, irrigation and/or debridement.

NOTE: Injuries may not seem serious at first, but within a few hours tissue may become swollen, discoloured and extremely painful with extensive subcutaneous necrosis. Product may be forced through considerable distances along tissue planes.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Foam.
- Dry chemical powder.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. Combustion products include: , carbon dioxide (CO_2) , other pyrolysis products typical of burning organic material. Decomposes at high temperatures to produce barium oxide. Barium oxide is strongly alkaline and, upon contact with water, is exothermic. **CARE:** Water in contact with hot liquid may cause foaming and a steam explosion with wide scattering of hot oil and possible severe burns. Foaming may cause overflow of containers and may result in possible fire.
HAZCHEM	Not Applicable

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	Slippery when spilt. ▸ Clean up all spills immediately. ▸ Avoid contact with skin and eyes.
Major Spills	Slippery when spilt. Minor hazard. ▸ Clear area of personnel.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. 17 kg steel drums.
Storage incompatibility	**CARE**: Water in contact with heated material may cause foaming or a steam explosion with possible severe burns from wide scattering of hot material. Resultant overflow of containers may result in fire. ▸ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
naphthenic distillate, heavy, hydrotreated (severe)	Distillates (petroleum) hydrotreated heavy naphthenic	140 mg/m3	1,500 mg/m3	8,900 mg/m3

Ingredient	Original IDLH	Revised IDLH
naphthenic distillate, heavy, hydrotreated (severe)	Not Available	Not Available
barium, acetate tallow fatty acid complexes	Not Available	Not Available

MATERIAL DATA

NOTE M: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0.005% w/w benzo[a]pyrene (EINECS No 200-028-5). This note applies only to certain complex oil-derived substances in Annex IV.
NOTE L: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346.
European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C.
Thermal hazards	Not Available

Respiratory protection

Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Light brown semi-solid grease with a petroleum-like odour; does not mix with water.

Physical state	Non Slump Paste	**Relative density (Water = 1)**	0.939
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	>315
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	370	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	175	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Immiscible	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	Inhalation hazard is increased at higher temperatures. High inhaled concentrations of mixed hydrocarbons may produce narcosis characterised by nausea, vomiting and lightheadedness. Inhalation of aerosols may produce severe pulmonary oedema, pneumonitis and pulmonary haemorrhage. Inhalation of oil droplets/ aerosols may cause discomfort and may produce chemical pneumonitis.
Ingestion	Ingestion of petroleum hydrocarbons may produce irritation of the pharynx, oesophagus, stomach and small intestine with oedema and mucosal ulceration resulting; symptoms include a burning sensation in the mouth and throat. Large amounts may produce narcosis with nausea and vomiting, weakness or dizziness, slow and shallow respiration, swelling of the abdomen, unconsciousness and convulsions. Ingestion of anionic surfactants/ hydrotropes may produce diarrhoea, intestinal distension and occasional vomiting. Lethal doses in animals range from 1 to 5 gm/kg.
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). Open cuts, abraded or irritated skin should not be exposed to this material The material may accentuate any pre-existing dermatitis condition Aromatic hydrocarbons may produce skin irritation, vasodilation with erythema and changes in endothelial cell permeability. Systemic intoxication, resulting from contact with the light aromatics, is unlikely due to the slow rate of permeation.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. Petroleum hydrocarbons may produce pain after direct contact with the eyes. Slight, but transient disturbances of the corneal epithelium may also result.
Chronic	Repeated or prolonged exposure to mixed hydrocarbons may produce narcosis with dizziness, weakness, irritability, concentration and/or memory loss, tremor in the fingers and tongue, vertigo, olfactory disorders, constriction of visual field, paraesthesias of the extremities, weight loss and anaemia and degenerative changes in the liver and kidney. Chronic exposure by petroleum workers, to the lighter hydrocarbons, has been associated with visual disturbances, damage to the central nervous system, peripheral neuropathies (including numbness and paraesthesias), psychological and neurophysiological deficits, bone marrow toxicities (including hypoplasia possibly due to benzene) and hepatic and renal involvement. Prolonged or repeated skin contact may cause degreasing with drying, cracking and dermatitis following. Principal route of exposure is by skin contact; lesser exposures include inhalation of fumes from hot oils, oil mists or droplets. Prolonged contact with mineral oils carries with it the risk of skin conditions such as oil folliculitis, eczematous dermatitis, pigmentation of the face (melanosis) and warts on the sole of the foot (plantar warts).

	TOXICITY	IRRITATION
AMC Rod Grease - Xtra Tacky	Inhalation (None) LC50: 44 mg/L/4h[2]	Not Available
	Oral (None) LD50: 2000 mg/kg[2]	
naphthenic distillate, heavy, hydrotreated (severe)	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Not Available

	Inhalation (rat) LC50: >3.9 mg/l/4hr[1]	
	Inhalation (rat) LC50: >4.7 mg/l/4hr[1]	
	Inhalation (rat) LC50: >5 mg/l/4hr[1]	
	Inhalation (rat) LC50: >5.2 mg/l/4hr[1]	
	Inhalation (rat) LC50: >5.3 mg/l/4hr[1]	
	Inhalation (rat) LC50: 10.5 mg/l/4hr[1]	
	Inhalation (rat) LC50: 5.7 mg/l/4hr[1]	
	Inhalation (rat) LC50: 9.6 mg/l/4hr[1]	
	Oral (rat) LD50: >2000 mg/kg[1]	
barium, acetate tallow fatty acid complexes	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (SEVERE)	The materials included in the Lubricating Base Oils category are related from both process and physical-chemical perspectives; The potential toxicity of a specific distillate base oil is inversely related to the severity or extent of processing the oil has undergone, since: ▸ The adverse effects of these materials are associated with undesirable components, and ▸ The levels of the undesirable components are inversely related to the degree of processing; ▸ Distillate base oils receiving the same degree or extent of processing will have similar toxicities; ▸ The potential toxicity of *residual base oils* is independent of the degree of processing the oil receives.' ▸ The reproductive and developmental toxicity of the distillate base oils is inversely related to the degree of processing. Highly and Severely Refined Distillate Base Oils **Acute toxicity:** Multiple studies of the acute toxicity of highly & severely refined base oils have been reported. Irrespective of the crude source or the method or extent of processing, the oral LD50s have been observed to be >5 g/kg (bw) and the dermal LD50s have ranged from >2 to >5g/kg (bw). **NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA. The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
BARIUM, ACETATE TALLOW FATTY ACID COMPLEXES	Fatty acid salts are of low acute toxicity. Their skin and eye irritation potential is chain length dependent and decreases with increasing chain length - they are poorly absorbed through the skin nor are they skin sensitisers.
NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (SEVERE) & BARIUM, ACETATE TALLOW FATTY ACID COMPLEXES	No significant acute toxicological data identified in literature search.

Acute Toxicity	✔	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data available to make classification*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

AMC Rod Grease - Xtra	**ENDPOINT**	**TEST DURATION (HR)**	**SPECIES**	**VALUE**	**SOURCE**

Tacky	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

naphthenic distillate, heavy, hydrotreated (severe)	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	EC50	48	Crustacea	>1000mg/L	1
	EC50	96	Algae or other aquatic plants	>1000mg/L	1
	EC50	96	Algae or other aquatic plants	>1000mg/L	1
	NOEC	504	Crustacea	>1mg/L	1

barium, acetate tallow fatty acid complexes	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Authority for disposal.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (SEVERE)(64742-52-5.) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards
Australia Hazardous Substances Information System - Consolidated Lists
Australia Inventory of Chemical Substances (AICS)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

BARIUM, ACETATE TALLOW FATTY ACID COMPLEXES(68201-19-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (naphthenic distillate, heavy, hydrotreated (severe); barium, acetate tallow fatty acid complexes)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (naphthenic distillate, heavy, hydrotreated (severe); barium, acetate tallow fatty acid complexes)
Korea - KECI	Y
New Zealand - NZIoC	N (barium, acetate tallow fatty acid complexes)
Philippines - PICCS	N (barium, acetate tallow fatty acid complexes)
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

AMC PLUG

AMC

Chemwatch: **4902-93**
Version No: **14.1**
Safety Data Sheet according to WHMIS 2015 requirements

Issue Date: **06/11/2021**
Print Date: **01/23/2024**
L.GHS.CAN.EN.E

SECTION 1 Identification

Product Identifier

Product name	AMC PLUG
Chemical Name	Not Applicable
Synonyms	Not Available
Chemical formula	Not Applicable
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	Processing aid for industrial applications.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	**AMC**
Address	1220 N. 2200 W. Suite# 600, Salt Lake City UT 84116 United States
Telephone	801-364-0233
Fax	Not Available
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency phone number

Association / Organisation	**AMC**	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	**Chemwatch - (1) 877 715 9305**	**+1 867 670 2867**
Other emergency telephone numbers	-	**+61 3 9573 3188**

Once connected and if the message is not in your preferred language then please dial 01

Une fois connecté et si le message n'est pas dans votre langue préférée alors s'il vous plaît cadran 07

SECTION 2 Hazard(s) identification

Classification of the substance or mixture

NFPA 704 diamond

Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Canadian WHMIS Symbols

Classification	Not Applicable

Page 1 continued...

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	Not Applicable

Hazard statement(s)

Not Applicable

Physical and Health hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	100	Ingredients determined not to be hazardous

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 First-aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: ▸ Wash out immediately with water. ▸ If irritation continues, seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Fire-fighting measures

Continued...

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves in the event of a fire.
Fire/Explosion Hazard	Combustible. Will burn if ignited. Combustion products include: carbon monoxide (CO) carbon dioxide (CO_2) nitrogen oxides (NOx) other pyrolysis products typical of burning organic material.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	‣ Clean up all spills immediately. ‣ Avoid contact with skin and eyes. Slippery when spilt.
Major Spills	‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard. Slippery when spilt.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ‣ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ‣ Limit all unnecessary personal contact. ‣ Wear protective clothing when risk of exposure occurs.
Other information	‣ Store in original containers. ‣ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Lined metal can, lined metal pail/ can. ‣ Plastic pail.
Storage incompatibility	‣ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Continued...

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
AMC PLUG	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
AMC PLUG	Not Available	Not Available

MATERIAL DATA

These "dusts" have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:

- the architecture of the air spaces remain intact,
- scar tissue (collagen) is not synthesised to any degree,
- tissue reaction is potentially reversible.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Individual protection measures, such as personal protective equipment	
Eye and face protection	▸ "Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ▸ polychloroprene.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities. **OTHERWISE:** ▸ Overalls.

Respiratory protection

Type -P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

· Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
· The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
· Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
· Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
· Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and

Continued...

approved under appropriate government standards such as NIOSH (US) or CEN (EU)
· Use approved positive flow mask if significant quantities of dust becomes airborne.
· Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	White granular solid; insoluble in water.

Physical state	Divided Solid	**Relative density (Water = 1)**	0.6-0.9
Odour	Not Available	**Partition coefficient n-octanol / water**	-2
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature (°C)**	>150
Melting point / freezing point (°C)	>150	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water	Immiscible	**pH as a solution (1%)**	5-8 (5 g/L)
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	‣ Unstable in the presence of incompatible materials. ‣ Product is considered stable.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
Ingestion	Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health).

Continued...

Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness.

	TOXICITY	**IRRITATION**
AMC PLUG	Dermal (Rat) LD50: >5000 mg/kg[2]	Not Available
	Oral (Rat) LD50: >5000 mg/kg[2]	

Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
AMC PLUG	Not Available	Not Available	Not Available	Not Available	Not Available

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	**Persistence: Water/Soil**	**Persistence: Air**
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	**Bioaccumulation**
	No Data available for all ingredients

Mobility in soil

Ingredient	**Mobility**
	No Data available for all ingredients

SECTION 13 Disposal considerations

Continued...

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO

Land transport (TDG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations and the SDS contains all the information required by the Hazardous Products Regulations.

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Not Available
Canada - DSL	Not Available
Canada - NDSL	Not Available
China - IECSC	Not Available
Europe - EINEC / ELINCS / NLP	Not Available
Japan - ENCS	Not Available
Korea - KECI	Not Available
New Zealand - NZIoC	Not Available
Philippines - PICCS	Not Available
USA - TSCA	Not Available
Taiwan - TCSI	Not Available
Mexico - INSQ	Not Available
Vietnam - NCI	Not Available
Russia - FBEPH	Not Available
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

Continued...

SECTION 16 Other information

Revision Date	06/11/2021
Initial Date	04/21/2004

SDS Version Summary

Version	Date of Update	Sections Updated
12.1	11/01/2019	One-off system update. NOTE: This may or may not change the GHS classification
14.1	06/11/2021	Identification of the substance / mixture and of the company / undertaking - Supplier Information, Name

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

- PC—TWA: Permissible Concentration-Time Weighted Average
- PC—STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit。
- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- OSF: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value
- LOD: Limit Of Detection
- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration

- AIIC: Australian Inventory of Industrial Chemicals
- DSL: Domestic Substances List
- NDSL: Non-Domestic Substances List
- IECSC: Inventory of Existing Chemical Substance in China
- EINECS: European INventory of Existing Commercial chemical Substances
- ELINCS: European List of Notified Chemical Substances
- NLP: No-Longer Polymers
- ENCS: Existing and New Chemical Substances Inventory
- KECI: Korea Existing Chemicals Inventory
- NZIoC: New Zealand Inventory of Chemicals
- PICCS: Philippine Inventory of Chemicals and Chemical Substances
- TSCA: Toxic Substances Control Act
- TCSI: Taiwan Chemical Substance Inventory
- INSQ: Inventario Nacional de Sustancias Químicas
- NCI: National Chemical Inventory
- FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

AMC 117

AMC

Chemwatch: **4856-25**
Version No: **7.1.1.1**
Safety Data Sheet according to WHMIS 2015 requirements

Chemwatch Hazard Alert Code: 1

Issue Date: **02/15/2017**
Print Date: **08/20/2019**
L.GHS.CAN.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	AMC 117
Synonyms	Not Available
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	Additive.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	**AMC**
Address	1220 N. 2200 W. Suite# 600, Salt Lake City UT 84116 United States
Telephone	801-364-0233
Fax	801-364-0278
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency phone number

Association / Organisation	**AMC**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**Chemwatch - (1) 877 715 9305**	**+61 2 9186 1132**
Other emergency telephone numbers	**-**	**Not Available**

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

NFPA 704 diamond

Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

CANADIAN WHMIS SYMBOLS

Classification	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
SIGNAL WORD	NOT APPLICABLE

Hazard statement(s)

Not Applicable

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	<80	organic compound
7732-18-5	balance	water

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: • Wash out immediately with fresh running water. • Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. • Seek medical attention without delay; if pain persists or recurs seek medical attention. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: • Immediately remove all contaminated clothing, including footwear. • Flush skin and hair with running water (and soap if available). • Seek medical attention in event of irritation.
Inhalation	• If fumes, aerosols or combustion products are inhaled remove from contaminated area. • Other measures are usually unnecessary.
Ingestion	• If swallowed do **NOT** induce vomiting. • If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. • Observe the patient carefully. • Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. • Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. • Seek medical advice. • For advice, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For exposures to quaternary ammonium compounds;

- For ingestion of concentrated solutions (10% or higher): Swallow promptly a large quantity of milk, egg whites / gelatin solution. If not readily available, a slurry of activated charcoal may be useful. Avoid alcohol. Because of probable mucosal damage omit gastric lavage and emetic drugs.
- For dilute solutions (2% or less): If little or no emesis appears spontaneously, administer syrup of Ipecac or perform gastric lavage.

- If hypotension becomes severe, institute measures against circulatory shock.
- If respiration laboured, administer oxygen and support breathing mechanically. Oropharyngeal airway may be inserted in absence of gag reflex. Epiglottic or laryngeal edema may necessitate a tracheotomy.
- Persistent convulsions may be controlled by cautious intravenous injection of diazepam or short-acting barbiturate drugs. [Gosselin et al, Clinical Toxicology of Commercial Products]

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- Water spray or fog.
- Foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. Combustion products include: carbon dioxide (CO_2) hydrogen chloride phosgene nitrogen oxides (NOx) other pyrolysis products typical of burning organic material.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Glass container is suitable for laboratory quantities ▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
AMC 117	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
water	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Enclosed local exhaust ventilation is required at points of dust, fume or vapour generation. HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapours.
Personal protection	
Eye and face protection	When handling very small quantities of the material eye protection may not be required. For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs: ‣ Chemical goggles.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. ‣ Rubber gloves (nitrile or low-protein, powder-free latex, latex/ nitrile). Employees allergic to latex gloves should use nitrile gloves in preference.
Body protection	See Other protection below
Other protection	‣ For quantities up to 500 grams a laboratory coat may be suitable. ‣ For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
AMC 117

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NEOPRENE	C
PVA	C
VITON	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AB-AUS / Class1 P2	-
up to 50	1000	-	AB-AUS / Class 1 P2
up to 50	5000	Airline *	-
up to 100	5000	-	AB-2 P2
up to 100	10000	-	AB-3 P2
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

‣ Cartridge respirators should never be used for emergency ingress or in

- areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Clear colourless liquid with a very mild amine odour; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.08-1.18
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	>100	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	>93.3	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	8-10
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	• Unstable in the presence of incompatible materials. • Product is considered stable.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Ingestion may result in nausea, abdominal irritation, pain and diarrhoea
Skin Contact	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. The material may accentuate any pre-existing dermatitis condition Open cuts, abraded or irritated skin should not be exposed to this material
Eye	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Prolonged or repeated skin contact may cause degreasing with drying, cracking and dermatitis following.

AMC 117	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

AMC 117	**ENDPOINT**	**TEST DURATION (HR)**	**SPECIES**	**VALUE**	**SOURCE**
	Not Available	Not Available	Not Available	Not Available	Not Available
water	**ENDPOINT**	**TEST DURATION (HR)**	**SPECIES**	**VALUE**	**SOURCE**
	LC50	96	Fish	897.520mg/L	3
	EC50	96	Algae or other aquatic plants	8768.874mg/L	3
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Authority for disposal.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (TDG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)
Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
IMO IBC Code Chapter 18: List of products to which the Code does not apply

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	No (water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes

Thailand - TECI	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	02/15/2017
Initial Date	Not Available

SDS Version Summary

Version	Issue Date	Sections Updated
6.1.1.1	01/31/2017	Acute Health (swallowed), Ingredients
7.1.1.1	02/15/2017	Physical Properties

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

CONSTANTINE

2023 Annual Reclamation Report

APMA #5690

Palmer Project
Surface Exploration
Porcupine Mining District, Alaska

Prepared by:
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Prepared for:
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December 2023

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SUMMARY

Constantine Mining LLC completed ten geotechnical, twenty-seven resource definition and two exploration diamond drillholes at the Palmer Property in 2023. Two resource definition holes remain unplugged for re-entry, one exploration drillhole was installed with PVC pipe for future geophysical studies and five geotechnical drillholes were lined with PVC for water monitoring wells. In total, eight drillholes remain open for future re-entry, geotechnical, and geophysical studies.

One new drill pad, four new survival pads, two new helipads, and two new pump pads were constructed to support 2023 diamond drilling. Five previously reclaimed diamond drill pads and two previously reclaimed helipads were re-built in 2023. One unreclaimed drill pad was modified without changing the surface disturbance of the pad.

Total overburden and diamond drill site related disturbance at the end of the 2023 program increased from 1.42 acres to 1.60 acres. This accounts for the reclamation of four diamond drill pads, three helipads, two survival tent pads, and overburden drill pads and access trails (pending regulatory approval).

No additional construction on Glacier Creek Road was done in 2023 within BLM managed lands. Linear road and cleared area disturbance remains at 11.13 acres. Work on the road within the Phase 2 Plan of Operations area is covered under ADNR Reclamation Plan Approval J20185690RPA.

Total project disturbance after the 2023 program is 16.38 acres, which includes 12.94 acres of unreclaimed disturbance and 3.44 acres of reclaimed ground pending regulatory approval. This remains below the 21 acres of disturbance Constantine North Inc. was bonded for in 2023. An additional disturbance of 20 acres was applied for in April of 2023 through a Plan of Operations Amendment. This Amendment was approved in August of 2023 and Constantine was required to submit an additional $5,000 bond for this work.

The total project disturbance for 2023 accounts for 1.81 acres of newly disturbed ground and 1.63 acres of reclaimed ground (pending approval).

LOCATION AND ACTIVITY DESCRIPTION

The Palmer Property consists of 340 federal unpatented lode mining claims (BLM claims), 63 state mineral claims (Jarvis & GE), and Mental Health Trust (MHT) Lands referred to as the Haines Block, which consists of two parcels – C81210 & C70451 (Figure 1). Thirty-nine (39) new state mineral claims were staked in 2020 as the Big Nugget claim block (Porc 1-3, Cahoon 1-13, Big Nugget 1-23).

Constantine Mining LLC is a Joint Venture company owned by Dowa Metals & Mining Alaska (a 100% owned subsidiary of Dowa Metals & Mining Co. Ltd., of Japan) and Constantine North Inc. (a 100% owned subsidiary of American Pacific Mining Corp. of Vancouver, Canada). Constantine North Inc. ("Constantine") is the project operator. The Constantine-Dowa Joint Venture lands held by Constantine Mining LLC include the 340 federal unpatented lode mining claims, 63 state mineral claims (Jarvis & GE) and MHT parcel C70451. The remaining mineral rights including the MHT parcel C81210 and the Big Nugget claim block are owned 100% by Constantine North Inc.

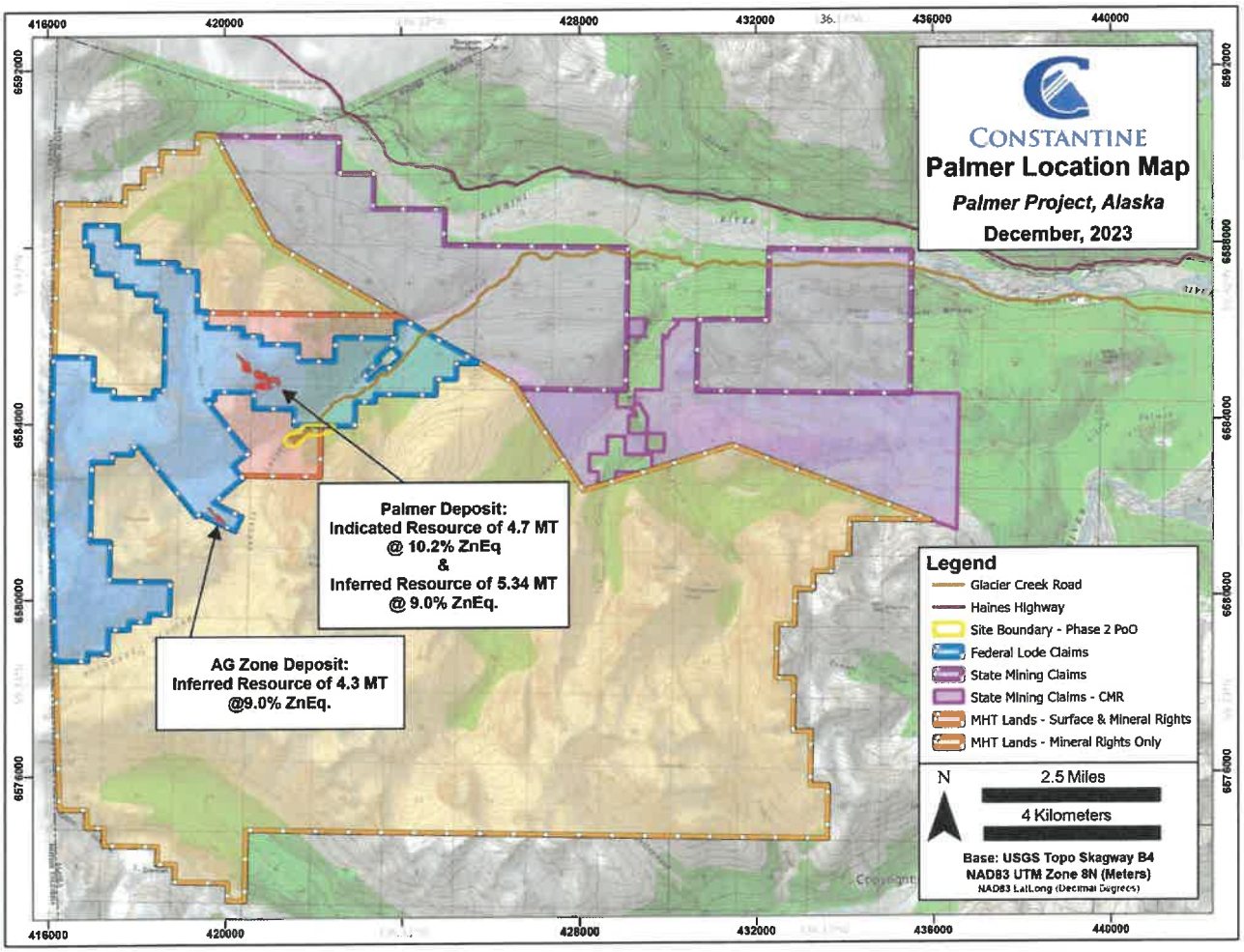

Figure 1. Palmer Project property map with land status.

A Palmer property map of the federal claims showing the location of the 2023 diamond and sonic overburden drilling activities and the location of the Glacier Creek Road is shown in Figure 2.

The Palmer property is host to two volcanogenic massive sulfide deposits, the Palmer Deposit, and the AG Zone Deposit. The deposits have a combined NI 43-101 compliant resource of 4.68 million tonne Indicated Resource (10.2% ZnEq) and 9.59 million tonne Inferred Resource (8.9% ZnEq) using an NSR cut-off of US$75/t. The exploration and geotechnical programs are seasonal, with helicopter-supported drill activity typically from late May to early October each year.

The Palmer Property is located 35 miles (55 km) northwest of the port town of Haines, Alaska. Access from Haines is by the paved, all-weather Haines Highway, across the Klehini river via bridge, and along the Porcupine gravel logging road that leads to the project camp facilities and to the eastern part of the property. Practical access to most of the property is by helicopter. A 2.1 mile (3.4 km) access road was constructed in 2014, to extend the existing gravel Porcupine Road up the Glacier Creek valley to the base of the Palmer deposit area.

A laydown yard, the "Glacier Creek Laydown," was also constructed in 2014 and served as the base for drill supplies and helicopter activity in following field seasons. Another 1.2 miles (2 km) of the Glacier Creek access road was constructed in 2016. In 2017, an additional 0.3 miles (500 m) of road was constructed, of which 0.2 miles (300 m) is on BLM lands. In 2018, the existing borrow pit adjacent to Glacier Creek Laydown was used for resurfacing and a new quarry was developed and subsequently closed.

No additional construction was performed on Glacier Creek Road in 2019, 2020, 2021, 2022, or 2023 on BLM managed lands.

All field personnel were lodged at the privately-owned Big Nugget Camp facility rented by Constantine and the recently developed Klehini Camp facility owned by Constantine. The Big Nugget and Klehini camps are located off the property claim group along Porcupine Creek and accessed by 8 miles (13 km) of gravel road connecting to the Haines highway. A helicopter is based either at the Big Nugget Camp or the Glacier Creek laydown area during the active exploration program to provide daily crew access and supplies to drill sites.

The following structures and equipment are temporarily stored within the BLM claim boundaries at the Glacier Creek Laydown:

1. Fuel storage facility (Photo 1)
    a. Fuel containment structure with holding capacity of >11,000 gallons
    b. 1 x 5,000-gallon steel-walled diesel tank
    c. 1 x 3,000-gallon steel-walled Jet-A tank
    (*Note all tanks have been emptied and winterized as of October 2023)
2. Six shipping containers containing drilling supplies (Photo 2)
3. Miscellaneous drilling equipment and supplies: drill rods, mud tanks, hose line, sling baskets, core boxes,lumber, PVC, and other small items (Photo 2).

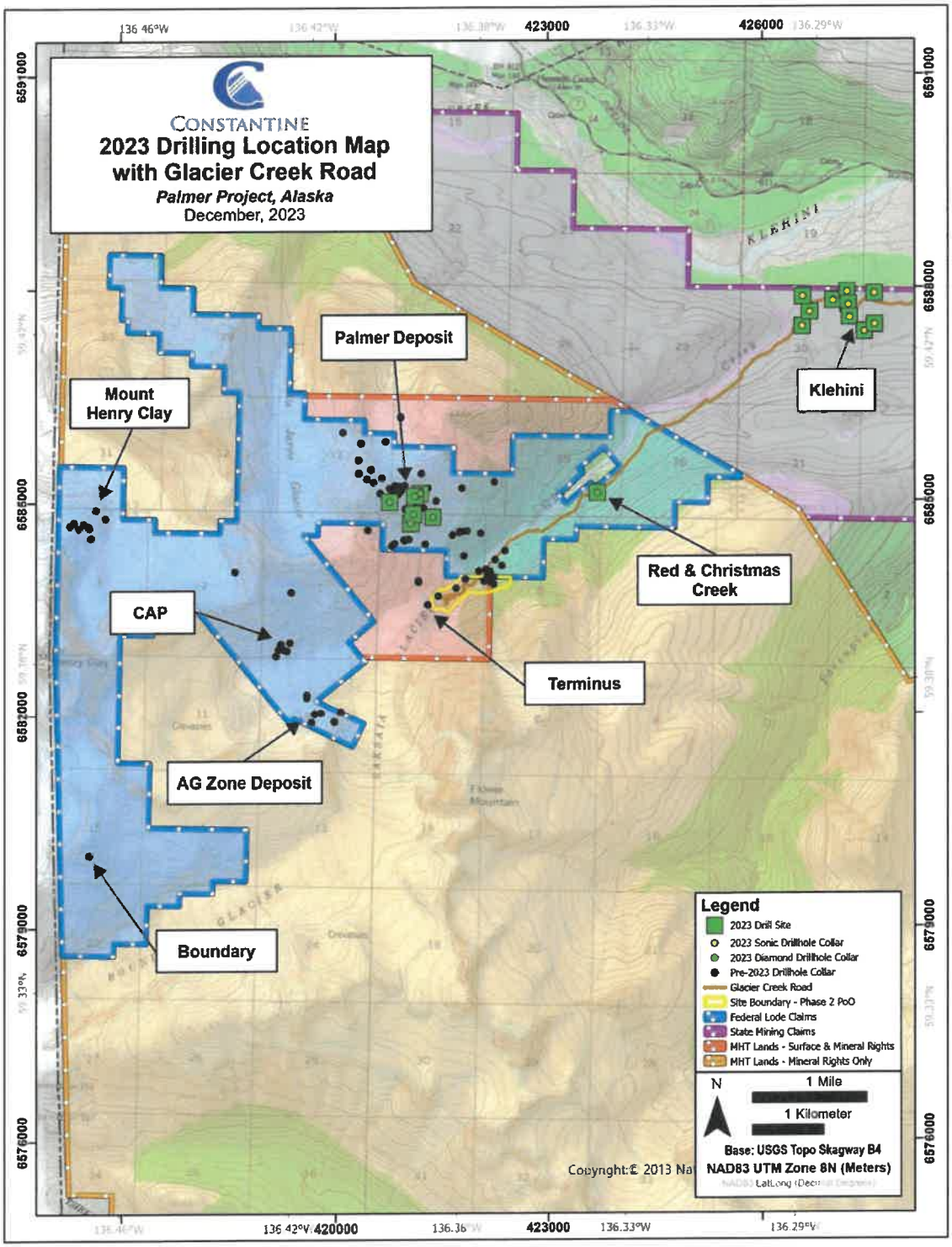

Figure 2. Palmer Project property map of the claims and leases with the location of diamond and sonic drilling activities and the location of the Glacier Creek Road.

SITE RECLAMATION

Reclamation on BLM claims will be designed to achieve post-exploration land uses consistent with the BLM's land use management plans for the area. The reclamation is intended to return disturbed land to a level of productivity comparable to pre-exploration levels. Post-exploration land use includes wildlife habitat, hunting, and dispersed recreational activities. Post-exploration land use is not expected to differ from pre-exploration land use.

Constantine is currently authorized to conduct up to 41.12 acres of surface disturbance within the Project Area under the approval of Project Operations and Environmental Assessment (AA-094088; DOI-BLM-AK-A020-2016-0006-EA) and subsequent 2017 Plan modification and Environmental Assessment (DOI-BLM-AK-A010-2017-0025-EA). Constantine currently holds a surety bond with the state of Alaska for anticipated reclamation costs associated with this work and has made the appropriate bond pool deposits and payments associated with this work.

Additionally, Constantine was authorized to conduct up to 19.59 acres of additional disturbance on State claims within the Project Area under an approved APMA permit amendment received August 8th, 2023 for APMA #5690. A surety bond was obtained as required by the Department of Natural Resources in their 2023 Decision document and Constantine has made the appropriate bond pool deposits and payments.

Constantine follows authorized reclamation guidelines described in APMA #5690 and provided by the BLM. The authorized surface disturbance under APMA and BLM authorization includes drilling and road construction.

Areas defined as reclaimed in this and past reports (0.658 acres of timber pads and 1.16 acres of road shoulders) are pending evaluation and approval by the BLM. The total unreclaimed disturbance for 2023 accounts for 1.81 acres of newly disturbed ground and 1.63 acres of reclaimed ground (pending approval). **As of 2023, 3.44 acres of reclaimed ground are pending approval.**

The current total estimated disturbance as of December 31, 2023, is 12.94 acres. For calculating annual Statewide Bond pool renewal fees, 3.44 acres of approval-pending reclaimed ground are added to the 12.94 acres, for a total of 16.38 acres (rounded up to 17 acres).

The Phase 2 Plan of Operations boundary (Figure 3) was updated in 2022 to account for disturbance related to revised infrastructure for underground development. All disturbance within this boundary is covered under ADNR Reclamation Plan Approval J20185690RPA. No disturbance was completed within the Phase 2 Plan of Operations boundary in 2023.

Tables 1 & 2 summarize the acreage of unreclaimed surface disturbance within the Palmer Project Area and associated disturbance factors. Figure 3 is a location map that shows the updated Phase 2 Plan of Operations boundary and claims that have unreclaimed surface disturbance as of December 31, 2023. Table 3 lists the MHT, State (ADNR), and Federal (BLM) mining claims that contain unreclaimed surface disturbance at the end of 2023.

Table 1. Summary of disturbance components and associated acreage of disturbance, 2023.

Disturbance Component	Current Unreclaimed Disturbance - Federal Claims (Acres)	Current Unreclaimed Disturbance - MHT Lands - Mineral Rights Only (Acres)	Current Unreclaimed Disturbance - MHT Lands - Mineral and Surface Rights (Acres)	Current Unreclaimed Disturbance - State Mining Claims (Acres)	Current Unreclaimed Disturbance - Total (Acres)
Helicopter-Supported Drilling with timber-frame drill pads	0.35	0.01	0.01	0.01	0.38
Overburden Drilling Pads & Access Trails	1.06	N/A*	N/A*	0.15	1.21
Fuel Station Fire Buffer	0.22	0	0	0	0.22
Linear Exploration Road (BLM only)	5.78	N/A*	N/A*	N/A**	5.78
Equipment Laydown Area	0.5	0	0	0	0.50
Helipad	0.11	0	0	0	0.11
Fuel Station	0.05	0	0	0	0.05
Weather Station Clearing	0.16	0	0	0	0.16
Borrow Pit	0.58	0	0	0	0.58
Borrow Pit Extension	0.08	0	0	0	0.08
Quarry 1	0.56	0	0	0	0.56
Executive Laydown (previously Stockpile #1)	0.82	0	0	0	0.82
Stockpile #2	0.94	0	0	0	0.94
The Cut	1.13	0	0	0	1.13
Quarry 2	0.16	0	0	0	0.16
Road Pullouts	0.26	0	0	0	0.26
Total	**12.76**	**0.01**	**0.01**	**0.16**	**12.94**

Note that acreage does not include reclaimed ground pending approval

** Disturbance covered under ADNR Reclamation Plan Approval J20185690RPA*

*** Road on state land is not classified as disturbance*

Table 2. Summary of disturbance changes from 2022 to 2023.

Disturbance Component	Unreclaimed Disturbance reported in 2022 Reclamation Statement (Acres)	Acres Reclaimed 2023*	Additional Acres Disturbed 2023	Unreclaimed Disturbance 2023 (Acres)
Helicopter-Supported Drilling with timber-frame pads	0.34	0.056	0.093	0.377
Overburden Drilling Pads and Access Trails - BLM	1.06	0	0	1.06
Overburden Drilling Pads and Access Trails - State	0	1.57	1.72	0.15
Additional Cleared Areas	0.22	0	0	0.22
Linear Exploration Road + Associated Cleared Areas	11.13	0	0	11.13
Total	**12.75**	**1.626**	**1.813**	**12.937**

Note that acreage of road disturbance is for portion of road located on federal claims only.
**Pending regulatory approval*

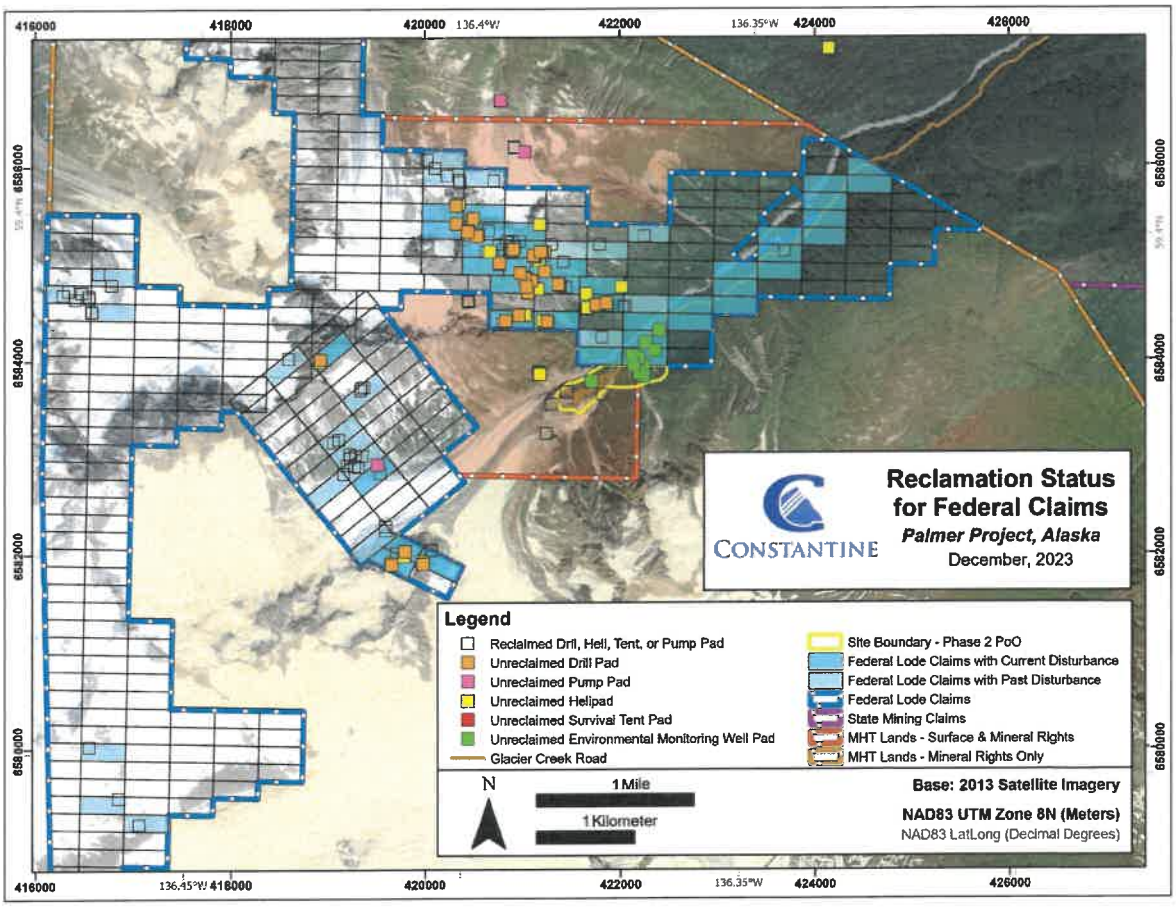

Figure 3. Location Map showing reclamation status for Federal claims (pending BLM approval).

Table 3. List of Palmer Project mining claims with past disturbance, including a designation for the current reclamation status of each claim (pending BLM approval).

Claim Type	Claim Name/ Parcel Number	Claim Number	Disturbance Type	Current Status
Federal	#1 OF MARMOT MINE	AA 27186	Drill	Unreclaimed
Federal	#2 OF MARMOT MINE	AA 27187	Drill	Unreclaimed
Federal	M.V.P. MINING CLAIMS #1	AA 27191	Drill	Reclaimed
Federal	MARMOT #6	AA 27193	Drill	Reclaimed
Federal	MARMOT #7	AA 27194	Drill	Reclaimed
Federal	MARMOT #8	AA 27195	Drill	Unreclaimed
Federal	MARMOT #9	AA 27196	Drill	Reclaimed
Federal	MARMOT CLAIM #20	AA 27198	Drill	Unreclaimed
Federal	MARMOT CLAIM #21	AA 27199	Drill	Unreclaimed
Federal	MARMOT CLAIM #22	AA 27200	Drill	Unreclaimed
Federal	MARMOT CLAIM #25	AA 27203	Drill	Reclaimed
Federal	MARMOT CLAIM #27	AA 27205	Drill	Reclaimed
Federal	MARMOT CLAIM #29	AA 27207	Drill	Reclaimed
Federal	MARMOT CLAIM #30	AA27208	Drill	Reclaimed
Federal	MARMOT #101	AA 27213	Drill	Unreclaimed
Federal	MARMOT #102	AA 27214	Drill	Unreclaimed
Federal	MARMOT #103	AA 27215	Drill	Unreclaimed
Federal	MARMOT #106	AA 27218	Road	Unreclaimed
Federal	MARMOT #112	AA 27224	Drill	Unreclaimed
Federal	MARMOT #113	AA 27225	Drill	Reclaimed
Federal	MARMOT #114	AA 27226	Road	Unreclaimed
Federal	MARMOT #115	AA 27227	Road	Unreclaimed
Federal	MARMOT #116	AA 27228	Drill	Unreclaimed
Federal	MARMOT #117	AA 27229	Drill	Unreclaimed
Federal	MARMOT #119	AA 27231	Road	Unreclaimed
Federal	MARMOT #120	AA 27232	Road	Unreclaimed
Federal	MARMOT #121	AA 27233	Drill	Reclaimed
Federal	MARMOT #122	AA 27234	Road	Unreclaimed
Federal	MARMOT #124	AA 27236	Drill	Unreclaimed
Federal	MARMOT #125	AA 27237	Road	Unreclaimed
Federal	MARMOT #130	AA 27242	Road	Unreclaimed
Federal	MARMOT #131	AA 27243	Road	Unreclaimed
Federal	MARMOT #137	AA 27249	Road	Unreclaimed
Federal	MARMOT #144	AA 27256	Road	Unreclaimed
Federal	MARMOT #150	AA 27262	Road	Unreclaimed
Federal	MARMOT #151	AA 27263	Road	Unreclaimed
Federal	MARMOT #156	AA 27268	Drill & Road	Unreclaimed
Federal	MARMOT #161	AA 27273	Road	Unreclaimed
Federal	MARMOT #162	AA 27274	Road	Unreclaimed
Federal	MARMOT #167	AA 27278	Road	Unreclaimed
Federal	RAT DAWG #53	AA 29577	Drill	Reclaimed

Claim Type	Claim Name/ Parcel Number	Claim Number	Disturbance Type	Current Status
Federal	RAT DAWG #54	AA 29578	Drill	Reclaimed
Federal	RAT DAWG #56	AA 29580	Drill	Unreclaimed
Federal	RAT DAWG #57	AA 29581	Drill	Unreclaimed
Federal	RAT DAWG #64	AA 29583	Drill	Reclaimed
Federal	RAT DAWG #66	AA 29585	Drill	Unreclaimed
Federal	RAT DAWG #67	AA 29586	Drill	Unreclaimed
Federal	RAT DAWG #68	AA 29587	Drill	Unreclaimed
Federal	RAT DAWG #77	AA 29590	Drill	Unreclaimed
Federal	ICE 60	AA 51532	Drill	Unreclaimed
Federal	ICE 70	AA 51542	Drill	Reclaimed
Federal	ICE 74	AA 51546	Drill	Reclaimed
Federal	KIC 5	AA 51562	Drill	Reclaimed
Federal	KIC 12	AA 51569	Drill	Reclaimed
Federal	KIC 14	AA 51571	Drill	Reclaimed
Federal	BOUNDLESS 9	AA 52981	Drill	Reclaimed
Federal	BOUNDLESS 12	AA 52984	Drill	Reclaimed
Federal	BOUNDLESS 28	AA 53000	Drill	Reclaimed
Federal	CONNEXION 26	AA 53043	Drill	Reclaimed
Federal	MARMOT HOLE 6	AA 52950	Drill	Unreclaimed
MHT	MHT C70451	9100759	Drill & Road	Unreclaimed
MHT	MHT C81210	9100759	Drill	Unreclaimed
State	JARVIS 26	661292	Road	Unreclaimed
State	JARVIS 27	661293	Road	Unreclaimed
State	JARVIS 24	661290	Road	Unreclaimed
State	JARVIS 23	661289	Helipad	Unreclaimed
State	GE21	662081	Road	Unreclaimed
State	GE2	662062	Drill & Road	Unreclaimed
State	GE3	662063	Drill & Road	Unreclaimed
State	GE4	662064	Drill & Road	Unreclaimed

DRILLING

Diamond Drilling

In 2023, thirty-nine diamond drillholes were completed for a total of 34,849 feet (10,622 m). Twenty-nine drillholes were dedicated to exploration and infill drilling totaling 27,091.5 feet (8,257 m), and ten drillholes were drilled for geotechnical studies, including five well installations, totaling 7,759 feet (2,365 m). All drillholes were completed from 7 drill pads (KD Pad – 9 drillholes, Stryker Pad – 12 drillholes, Merrill's Pad – 8 drillholes, Canada Pad – 2 drillholes, Marmot Pad – 1 drillhole, UM Pad – 5 drillholes, and Rudolph Pad – 2 drillholes).

One hole (CMR23-178) was installed with slotted PVC pipe (2" (51 mm) schedule-80, 40-slot (0.04" (1 mm) slot diameter) for future downhole tracer and geophysical studies. Five holes (GT23-020, GT23-023, GT23-025, GT23-027, and GT23-028) were installed with mixed slotted (2" (51 mm) schedule-80, 40-slot (0.04" (1 mm) slot diameter) and un-slotted PVC pipe (2" (51 mm) schedule-80) for monitoring wells and hydrogeologic studies. Detailed information is available to regulators from Constantine upon request.

Diamond Drillhole Reclamation (2023)

All 2023 drillholes were cemented (where applicable) and plugged apart from five geotechnical holes with monitoring well installations, one exploration hole lined with PVC for future geophysical studies, and two holes (one infill, one geotechnical) planned for re-entry in 2024. Holes flagged for hydro studies, geophysics and re-entry are slated for future reclamation once these activities have been completed. See the 2019 Annual Reclamation Statement for a detailed description of diamond core drillhole reclamation methods.

After casing has been pulled, a 1.5 m removable casing monument is left at each drillhole collar to provide a permanent marker for hole location, to allow re-entry if required, and to facilitate hole plugging and capping. Labeled aluminum casing caps were used on all drillholes for drillhole identification. All collars were photographed (photos 3-39).

Table 4 summarizes the reclamation status of the diamond drillholes completed in 2023. Figure 4 shows the location and reclamation status of 2023 drillholes.

Table 4. Reclamation status of 2023 diamond drillholes.

Drill Site #	Drillpad	Latitude	Longitude	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Fuel Storage (Onsite/Offsite)	Tundra Mat	Trash Containment	Sanitary Facilities	Drill Additives	Artesian Zone	Water Discharged	Reclaimed	Plugged	Plug Type	Cemented	Standing Pipe	Revegetated	Date Reclaimed
CMR23-151	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Rubber displacement + Bentonite	Yes	Yes	N/A	2023-06-23
CMR23-152	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Rubber displacement + Bentonite	Yes	Yes	N/A	2023-06-18
CMR23-153	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	Yes	N/A	2023-06-25
CMR23-154	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	Yes	N/A	2023-06-29
CMR23-155	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	Yes	N/A	2023-06-29
CMR23-156	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	Yes	N/A	2023-07-07
CMR23-157/CMR23-157-01	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-07-16
CMR23-158	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	No	No	N/A	2023-07-12
CMR23-159	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-07-18
CMR23-160/CMR23-160-01	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-07-31
CMR23-161	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-07-22
CMR23-162b	Stryker	59.3973	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-07-28
CMR23-163	Merrill's	59.3969	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-09
CMR23-163b	Merrill's	59.3969	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-09
CMR23-164	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-15

Drill Site #	Drillpad	Latitude	Longitude	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Fuel Storage (Onsite/Offsite)	Tundra Mat	Trash Containment	Sanitary Facilities	Drill Additives	Artesian Zone	Water Discharged	Reclaimed	Plugged	Plug Type	Cemented	Standing Pipe	Revegetated	Date Reclaimed
CMR23-165	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-15
CMR23-166	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-30
CMR23-167	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-20
CMR23-168	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-26
CMR23-169	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-30
CMR23-170	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-09-10
CMR23-171	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-09-03
CMR23-172	Merrill's	59.3970	-136.3890	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-09-08
CMR23-173	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	No	No	N/A	2023-09-11
CMR23-174	Canada	59.3947	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-09-17
CMR23-175	KD	59.3935	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-09-20
CMR23-176	Canada	59.3947	-136.3900	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	Van Ruth + Bentonite	No	Yes	N/A	N/A
CMR23-177	Rudolph	59.3978	-136.3440	NAD83	5690	AA 27268	Off Site	No	Off Site	Off Site	Yes	No	Yes	Yes	Yes	Van Ruth + Bentonite	Yes	No	Yes	2023-09-28
CMR23-178	Rudolph	59.3978	-136.3440	NAD83	5690	AA 27268	Off Site	No	Off Site	Off Site	Yes	No	Yes	No	No	Van Ruth + Bentonite	No	Yes	Yes	N/A
GT23-020	Marmot	59.3944	-136.3850	NAD83	5690	AA 27214	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A
GT23-021	UM	59.3962	-136.3950	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	No	No	N/A	2023-07-09

Drill Site #	Drillpad	Latitude	Longitude	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Fuel Storage (Onsite/Offsite)	Tundra Mat	Trash Containment	Sanitary Facilities	Drill Additives	Artesian Zone	Water Discharged	Reclaimed	Plugged	Plug Type	Cemented	Standing Pipe	Revegetated	Date Reclaimed
GT23-022	UM	59.3962	-136.3950	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	No	No	N/A	2023-07-14
GT23-023	UM	59.3962	-136.3950	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A
GT23-024	UM	59.3962	-136.3950	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	No	No	N/A	2023-08-10
GT23-025	UM	59.3962	-136.3950	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A
GT23-026	Stryker	59.3974	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Van Ruth + Bentonite	Yes	No	N/A	2023-08-31
GT23-027	Stryker	59.3974	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A
GT23-028	Stryker	59.3974	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A
GT23-029	Stryker	59.3974	-136.3880	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	N/A	No	Yes	N/A	N/A

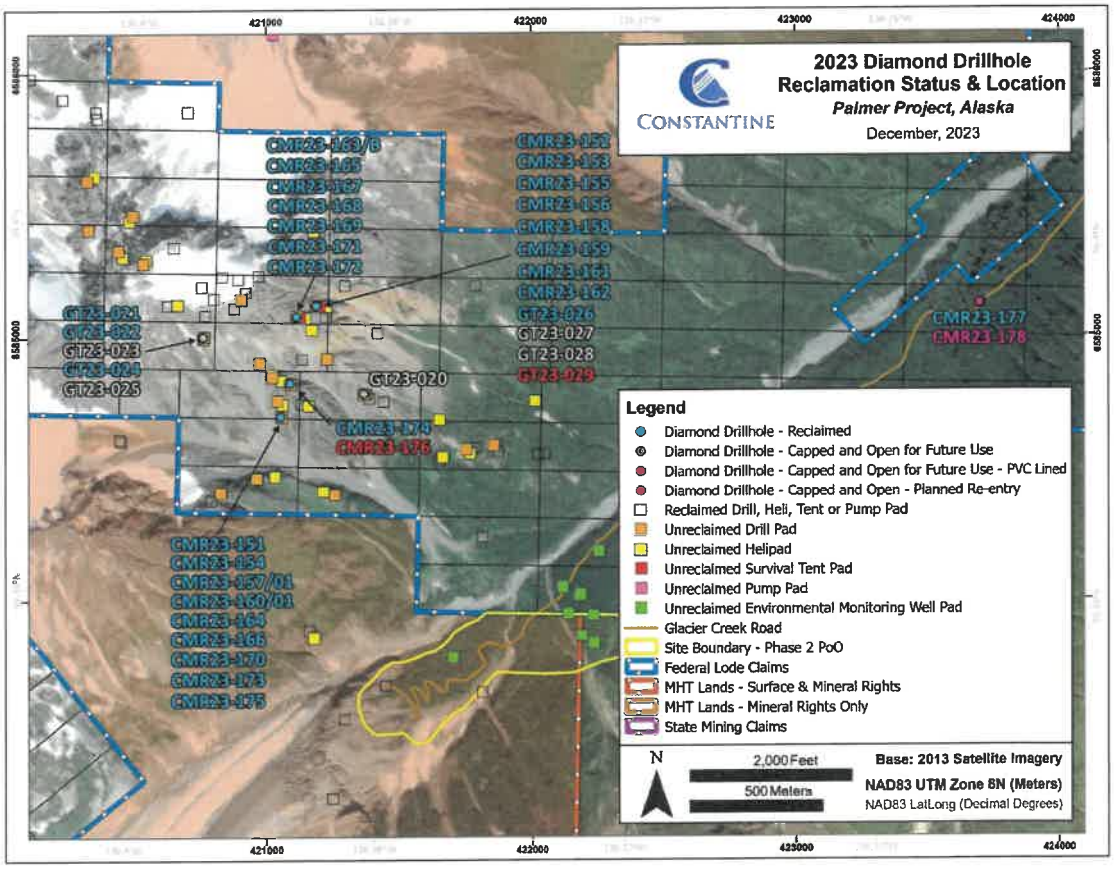

Figure 4. Reclamation status and location of 2023 diamond drillholes.

Overburden Drilling

A total of 1,323.5 feet (403.4 m) in ten overburden drillholes was completed in 2023 to support Palmer geotechnical work. Holes were drilled using a sonic rig and advanced using a 4" (102 mm) inner diameter core barrel and a 6" (152 mm) outer diameter casing. All drillholes were completed on the Klehini site and were collared into overburden material.

Four drillholes (A2023-P1-05, A2023-P1-07, A2023-P1-10, and A2023-P1-12) were installed with PVC pipe for environmental water quality monitoring wells. Each well was constructed using 2 inch (5 cm) PVC with a minimum screen interval of 10 feet (3 m). A sand filter pack (#10-20 filter sand) was placed around the screen with a coated bentonite pellet seal (0.6 cm [1/4 inch] pellet). Bentonite chips (3/8 inch) were used to backfill from the uppermost seal to the ground surface. Each well was completed at the surface with a PVC stickup. These stickups were extended approximately 1 foot above the existing ground surface. Each PVC stickup was closed with a surface cap and enclosed within a metal well-protective casing monument. Nested shallow and deep wells were installed at all monitoring sites except A2023-P1-05.

Overburden Hole Reclamation

Six overburden drillholes (A2023-P1-06, A2023-P1-08, A2023-P1-09, A2023-P2-06, A2023-P2-08, and A2023-P2-09) were reclaimed in 2023. Reclaimed drillholes were plugged with a bentonite hole plug for a minimum of 10 feet within the top 20 feet of the drill hole in competent material. In drillholes that encounter static water, a minimum of 7 feet of bentonite hole plug is placed immediately above the static water level. The remainder of the hole is backfilled to the surface with drill cuttings. All other drillholes remain open (unplugged with monitoring well installations) for future environmental monitoring and hydrogeological studies. The drillholes are flagged for future reclamation once all work has been completed.

Four overburden drillholes were installed with monitoring wells (A2023-P1-05, A2023-P1-07, A2023-P1-10, and A2023-P1-12). All overburden drillholes were photographed (see Photos 39-45).

Selective seeding of reclaimed areas is to commence in 2024 under guidance and coordination with the local Forester.

Table 5 summarizes the reclamation status of the overburden drillholes completed in 2023. Figure 5 shows the location and reclamation status of 2023 overburden drillholes.

Table 5. Reclamation Status of 2023 Overburden Drillholes

Drill Site #	Drillpad	Lat	Long	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Fuel Storage (Onsite/Offsite)	Tundra Mat	Trash Containment	Sanitary Facilities	Drill Additives	Artesian Zone	Water Discharged	Reclaimed	Plugged	Plug Type	Cemented	Standing Pipe	Revegetated	Date Reclaimed
A2023-P1-05	A2023-P1-05	59.4193	-136.2940	NAD83	5690	662062	Offsite	No	Offsite	Offsite	No	No	No	No	No	N/A	No	Yes	No	N/A
A2023-P1-06	A2023-P1-06	59.4211	-136.2922	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-22
A2023-P1-07	A2023-P1-07	59.4226	-136.2865	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	No	No	N/A	No	Yes	No	N/A
A2023-P1-08	A2023-P1-08	59.4237	-136.2830	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-12
A2023-P1-09	A2023-P1-09	59.4221	-136.2826	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-27
A2023-P1-10	A2023-P1-10	59.4206	-136.2823	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	No	No	N/A	No	Yes	No	N/A
A2023-P1-12	A2023-P1-12	59.4236	-136.2762	NAD83	5690	662064	Offsite	No	Offsite	Offsite	No	No	No	No	No	N/A	No	Yes	No	N/A
A2023-P2-06	A2023-P2-06	59.4230	-136.2940	NAD83	5690	662062	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-25
A2023-P2-08	A2023-P2-08	59.4188	-136.2785	NAD83	5690	662063	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-30
A2023-P2-09	A2023-P2-09	59.4197	-136.2759	NAD83	5690	662064	Offsite	No	Offsite	Offsite	No	No	No	Yes	Yes	Bentonite	No	No	No	2023-08-28

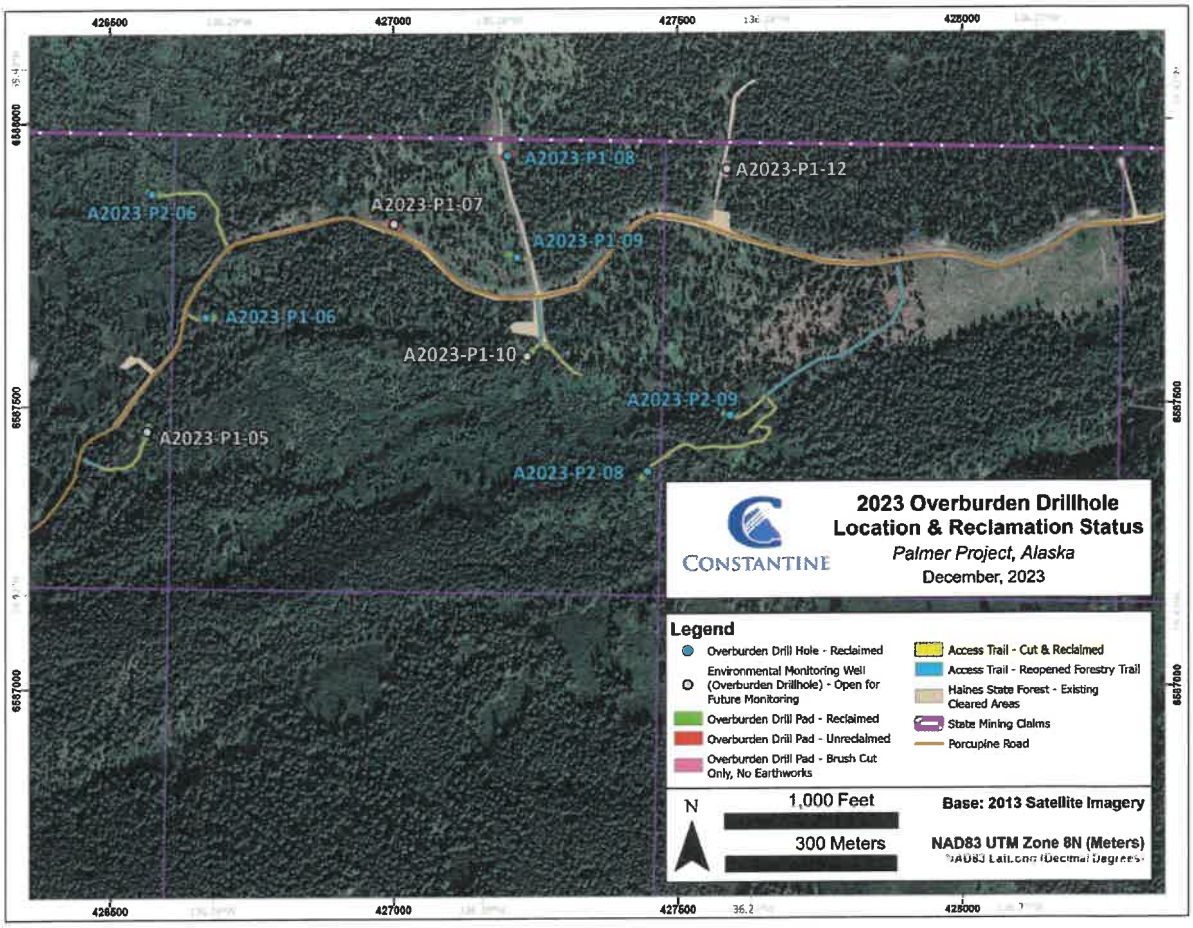

Figure 5. Reclamation Status & Location of 2023 overburden drillholes.

DRILL PAD DISTURBANCE

Diamond Drill Pads, Access Helipads and Pump Pads

Seven wooden diamond drill pads (KD, Stryker, Merrill's, Canada, Marmot, UM, and Rudolph), seven wooden helipads (KD/T&A Heli, Stryker Heli, Merrill's Heli, Canada Heli, Marmot Heli, UM Heli, and Pump Valley Heli), and four wooden survival tent pads (Stryker, Merrill's, Marmot, and UM) were used to support the thirty-nine diamond drillholes completed in 2023. Two wooden pump pad sites in Pump Valley (Sara Creek, Mid-Station) and one wooden pad for a water bladder (Onion) were used to source water for 2023 drilling. A summary of pads used to support the 2023 diamond drill program is featured in Table 6.

One new diamond drill pad (Rudolph) and two new helipads (Pump Valley, Plateau) were constructed in 2023. KD drill pad was modified without changing the surface disturbance of the existing pad. Plateau helipad was constructed on State Lands for geophysics access. Five previously reclaimed diamond drill pads (Stryker, Merrill's, Canada, Marmot, and UM) and two previously reclaimed helipads (Canada and UM) were re-built in 2023. Two new wooden pump pads (Sara Creek and Mid-Station) were constructed during the 2023 field season. Four 10' x 10' survival tent pads (Stryker, Merrill's, Marmot, and UM) were built in 2023.

Table 6. Summary of pads used to support 2023 diamond drilling surface program.

Drill Pad	Access Heli Pad	Pump Pad	Land Status	Area	Drilled Hole ID
KD	KD/T&A Heli	N/A	BLM	SW (Zone 2/3)	CMR23-151
					CMR23-154
					CMR23-157/CMR23-157-01
					CMR23-160/CMR23-160-01
					CMR23-164
					CMR23-166
					CMR23-170
					CMR23-173
					CMR23-175

Drill Pad	Access Heli Pad	Pump Pad	Land Status	Area	Drilled Hole ID
Stryker	Stryker Heli	Mid-Station/Sara Creek	BLM	SW (Zone 1)	CMR23-152
					CMR23-153
					CMR23-155
					CMR23-156
					CMR23-158
					CMR23-159
					CMR23-161
					CMR23-162b
					GT23-026
					GT23-027
					GT23-028
					GT23-029
Merrill's	Merrill's Heli	Mid-Station/Sara Creek	BLM	SW (Zone 1)	CMR23-163
					CMR23-163B
					CMR23-165
					CMR23-167
					CMR23-168
					CMR23-169
					CMR23-171
					CMR23-172
Canada	Canada Heli	Mid-Station/Sara Creek	BLM	SW (Zone 2/3)	CMR23-174
					CMR23-176
Marmot	Marmot Heli	Mid-Station/Sara Creek	BLM	SW (Geotechnical)	GT23-020
UM	UM Heli	Mid-Station/Sara Creek	BLM	SW (Geotechnical)	GT23-021
					GT23-022
					GT23-023
					GT23-024
					GT23-025
Rudolph	N/A – Road Access	N/A	BLM	Xmas/Red Creek	CMR23-177
					CMR23-178

Overburden Drill Pads and Access Roads

Ten overburden pads and four access trails were constructed and used to support the ten overburden drillholes completed on State Lands in 2023. A summary of pads used to support 2023 overburden drilling is shown in Table 7.

Standard drill pads consist of approximately 30 x 10 m (98 x 33 ft) of cleared ground. Overburden drill pad A2023-P1-12 consisted of a hand-brushed area of approximately 30 x 10 m (98 x 33 ft) with no earthworks and thus did not constitute ground disturbance. Overburden drill pads A2023-P1-07 and A2023-P1-08 were developed by a local timber harvester. Pads A2023-P1-07, A2023-P1-08, A2023-P1-09, A2023-P1-10, and A2023-P1-12 were sited on existing logging trails and thus did not require the construction of access trails. Overburden pads and access trails were constructed using an excavator by clearing alders and flattening ground to create trail access for the overburden sonic drill. Access trails were preferentially sited where existing ground disturbance from Haines State Forest forestry trails was located.

The total new 2023 overburden disturbance (pads + trails) is **1.72 acres**. Two overburden drill pads (A2023-P1-07 and A2023-P1-08) were left unreclaimed per the request of the local Forester. All newly cut access trails and other drill pads were reclaimed by placing slash and woody debris over the cleared areas. Selective seeding of reclaimed areas is to commence in 2024 under guidance and coordination with the local Forester. Figure 6 shows the disturbance from 2023 overburden drilling pads and access trails. See Photos 78-101 for documentation of overburden pads and access trails.

Table 7. Summary of pads used to support 2023 overburden drilling.

Drill Pad	Access Heli Pad	Land Status	Area	Drilled Hole ID
A2023-P1-5	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-5
A2023-P1-6	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-6
A2023-P1-7	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-7
A2023-P1-8	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-8
A2023-P1-9	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-9
A2023-P1-10	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-10
A2023-P1-12	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P1-12
A2023-P2-6	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P2-6
A2023-P2-8	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P2-8
A2023-P2-9	N/A (trail access)	JV – State Claim	Klehini Site	A2023-P2-9
			Total	**10**

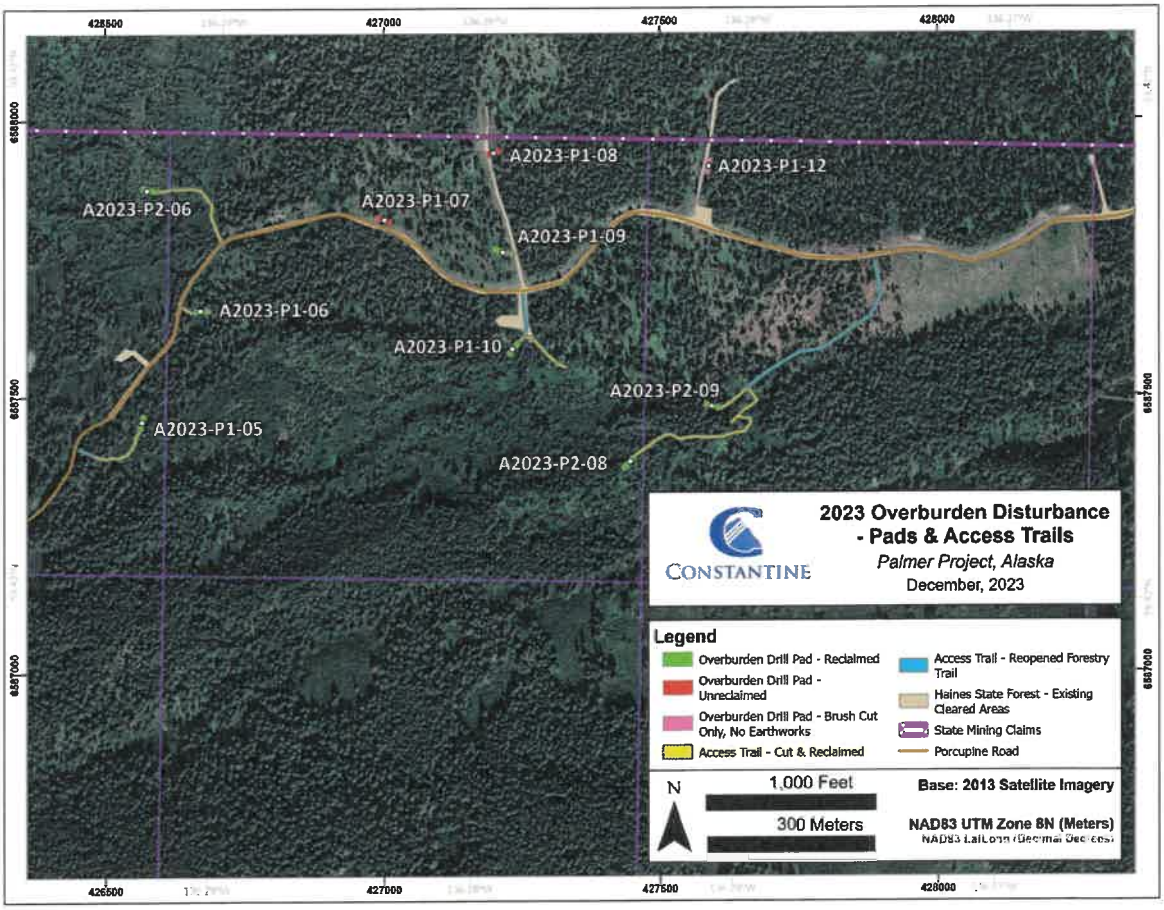

Figure 6. Disturbance from Overburden Pads and Access Trails constructed in 2023.

Drill Site Disturbance

Total existing drill site disturbance prior to the 2023 drill program was 1.42 acres. **Total overburden and diamond drill site related disturbance at the end of the 2023 program increased to 1.60 acres** (pending regulatory approval).

This accounts for the construction of one new diamond drill pad (Rudolph), five previously reclaimed diamond drill pads (Canada, Marmot, Merrill's, Stryker, and UM), two new helipads (Sara Creek, Plateau), two previously reclaimed helipads (Canada and UM), four new survival tent pads (Marmot, Merrill's, Stryker, and UM), and two pump pads (Sara Creek and Mid-Station), as well as the reclamation of three helipads (Camp Heli, Marmot Heli, and U6 Heli), four diamond drill pads (Hari, Paradise City, Rudolph, and Terminus), and two survival tent pads (Marmot and UM). This area also accounts for the construction and reclamation of drill pads and access trails on State Lands to support the 2023 overburden drilling campaign.

Photos 46-77 provide documentation of all drill sites and heli access pads. Photos 102-106 document pump pads. Unreclaimed overburden and diamond drill pad-related disturbance acreage is summarized in Table 8.

Table 8. Summary of disturbance due to unreclaimed overburden/diamond drill pads and access pads/roads.

Pad Type	Dimensions (ft x ft)	Acres per Pad	Unreclaimed Number of Pads (Constantine Status)	Total Acreage of pad disturbance (Constantine Status, pending regulatory approval)
Diamond drill pad	20x20	0.009	25	0.225
Helipad and pump pads	14x14	0.005	29	0.145
Survival tent pad	10x10	0.002	2	0.004
Monitoring Well Pad MW18-02 (cleared alders, dirt)	26x26	0.015	1	0.015
Overburden Pads and Trails – State	*N/A	*N/A	*N/A	0.148
**Overburden Pads and Trails (cleared alders, dirt) - BLM	*N/A	*N/A	*N/A	1.06

**Overburden pad and access trail dimensions vary - acreage calculated from total cleared area.*
***Excluding disturbance covered under ADNR Reclamation Plan Approval J20185690RPA.*

Total Disturbance = 1.60

Table 9 provides a comprehensive list of all diamond drill, heli, survival tent, and pump pads that are currently unreclaimed (56 in total). Figure 4 shows the location of all unreclaimed diamond drill, heli, pump and environmental monitoring well pads in the project area. Constantine plans to utilize all

unreclaimed sites in future programs, both for drilling and as a safety measure to provide secure, safe helicopter access to different areas of the property.

The 2016 Annual Reclamation Statement provides a detailed description, including photos, of pad construction methods. Reclamation of discontinued drill pads and helipads includes salvaging all timber and removal of all associated materials (scrap, etc.). Partial reclamation of drill sites includes removal of all but the main support timbers, and in some places, complete removal of the associated helipad. Refuse and scrap was removed at all sites (reclaimed or not) and all sites were left in a tidy state, with only the secure timbered frame of the drill pads and associated helipads left in place. No fuel, drill additives, or other material were left on site. Decking and timbering prone to damage or weather/snow related dispersion was removed, and safely secured together at a sturdy pad site for future access and re-use.

Table 9. Summary of currently unreclaimed diamond drill, heli, survival tent, and pump pads.

Pad	Pad Type	Pad Use	Pad Status	Decking	Railings	Easting NAD83 (m)	Northing NAD83 (m)	Elevation Geoid12A	Longitude DD	Latitude DD	Mining Claim ADL, BLM # or USMS
B-Lo	Drill		Unreclaimed	Yes	No	421256	6584401	950	-136.3864	59.3909	AA 27229
Camp	Drill		Unreclaimed	Yes	No	421227	6584917	1244	-136.3871	59.3955	AA 27186
Canada	Drill		Unreclaimed	Yes	No	421091	6584821	1257	-136.3895	59.3947	AA 27213
Flip Out	Drill		Unreclaimed	No	No	420321	6585593	1508	-136.4033	59.4014	AA 29580
Go	Drill		Unreclaimed	Yes	No	419657	6581891	1340	-136.4136	59.3681	AA 27200
Green	Drill	Temporary-Use Water Source Access	Unreclaimed	Yes	No	420827	6584409	1246	-136.3940	59.3909	AA 27228
HFE-2	Drill		Unreclaimed	Yes	No	421022	6584848	1304	-136.3907	59.3949	AA 27213
JP	Drill	Monitoring Well Access	Unreclaimed	Yes	No	420976	6584901	1357	-136.3915	59.3953	AA 27187
K3	Drill		Unreclaimed	Yes	No	420325	6585408	1546	-136.4032	59.3998	AA 29581
KD	Drill		Unreclaimed	Yes	Yes	421057	6584697	1172	-136.3900	59.3935	AA 27213
Marmot	Drill		Unreclaimed	Yes	No	421365	6584782	1097	-136.3846	59.3944	AA 27214
Merrill's Pad	Drill		Unreclaimed	Yes	No	421113	6585080	1381	-136.3892	59.3970	AA 27195
Money	Drill	Monitoring Well Access	Unreclaimed	Yes	No	421751	6584572	807	-136.3778	59.3925	AA 27224
Monument	Drill		Unreclaimed	Yes	No	418921	6584012	1819	-136.4274	59.3870	AA 52950
Onion	Drill		Unreclaimed	Yes	No	420908	6585142	1542	-136.3928	59.3975	AA 27195
Peace	Drill		Unreclaimed	Partial	No	420534	6585280	1679	-136.3994	59.3987	AA 29586
Ridge B	Drill	Monitoring Well + Temporary-Use Water Source Access	Unreclaimed	Yes	Yes	420963	6584464	1128	-136.3916	59.3914	AA 27228
RW Pad	Drill		Unreclaimed	Yes	No	420439	6585329	1668	-136.4011	59.3991	AA 29586
Stryker	Drill		Unreclaimed	Yes	No	421185	6585118	1322	-136.3879	59.3973	AA 27195
T&A	Drill		Unreclaimed	Yes	No	421042	6584758	1228	-136.3903	59.3941	AA 27213
U6	Drill	Monitoring Well + Temporary-Use Water Source Access	Unreclaimed	Yes	No	421856	6584588	781	-136.3759	59.3927	AA 27224

Pad	Pad Type	Pad Use	Pad Status	Decking	Railings	Easting NAD83 (m)	Northing NAD83 (m)	Elevation Geoid12A	Longitude DD	Latitude DD	Mining Claim ADL, BLM # or USMS
UM	Drill		Unreclaimed	Yes	No	420764	6585002	1515	-136.3953	59.3962	AA 27191
Whack-a-Mole	Drill		Unreclaimed	Yes	No	420495	6585462	1564	-136.4002	59.4003	AA 29585
Wishbone	Drill		Unreclaimed	Yes	No	419978	6581900	1351	-136.4080	59.3682	AA 27199
Zion	Drill		Unreclaimed	No	No	419794	6582028	1239	-136.4112	59.3693	AA 27198
Barbie Heli	Heli	Snowpack Station Access	Unreclaimed	Yes	No	421650	6584685	881	-136.3796	59.3935	AA 27225
Barney Heli	Heli		Unreclaimed	No	No	421178	6585399	1460	-136.3881	59.3999	AA 29590
B-Lo Heli	Heli		Unreclaimed	Yes	No	421213	6584413	968	-136.3872	59.3910	AA 27229
Brazil Heli	Heli	Monitoring Well + Temporary-Use Water Source Access	Unreclaimed	Partial	No	421662	6584542	822	-136.3793	59.3923	AA 27224
Canada Heli	Heli		Unreclaimed	Yes	No	421057	6584835	1276	-136.3900	59.3900	AA 27213
Fire Heli	Heli		Unreclaimed	Yes	No	420664	6585123	1630	-136.3971	59.3973	AA 29587
Flip Out Heli	Heli		Unreclaimed	Yes	No	420349	6585609	1530	-136.4028	59.4016	AA 29580
Go Heli	Heli		Unreclaimed	Yes	No	419651	6581904	1339	-136.4137	59.3682	AA 27200
Hari Heli	Heli	Monitoring Well Access	Unreclaimed	Yes	No	421179	6583857	882	-136.3876	59.3860	MHT Lands-Parcel C70451
HFE Heli	Heli		Unreclaimed	Yes	No	421019	6584855	1312	-136.3907	59.3949	AA 27213
KD/T&A Heli	Heli	Temporary-Use Water Source Access	Unreclaimed	Yes	No	421060	6584744	1210	-136.3900	59.3939	AA 27213
Long Heli	Heli	Monitoring Well Access	Unreclaimed	Yes	No	421158	6584738	1181	-136.3883	59.3939	AA 27214
Merrill's Heli	Heli		Unreclaimed	Partial	No	421145	6585072	1369	-136.3886	59.3969	AA 27195
Money Heli	Heli	Monitoring Well Access	Unreclaimed	Yes	No	421765	6584557	797	-136.3775	59.3924	AA 27224
Monument Heli	Heli		Unreclaimed	Yes	No	418915	6583989	1813	-136.4275	59.3868	AA 52950
Oxide Creek Heli	Heli	Temporary-Use Water Source Access	Unreclaimed	Yes	No	422012	6584755	768	-136.3732	59.3942	AA 27215
Peace Heli	Heli		Unreclaimed	No	No	420545	6585293	1680	-136.3993	59.3988	AA 29586

Pad	Pad Type	Pad Use	Pad Status	Decking	Railings	Easting NAD83 (m)	Northing NAD83 (m)	Elevation Geoid12A	Longitude DD	Latitude DD	Mining Claim ADL, BLM # or USMS
Plateau Heli	Heli		Unreclaimed	Yes	No	424145	6587207	409	-136.3366	59.4166	661289
RW Heli	Heli		Unreclaimed	No	No	420455	6585304	1697	-136.4008	59.3989	AA 29586
Sara Creek Heli	Heli		Unreclaimed	Yes	No	420775	6586676	1041	-136.3957	59.4112	MHT Lands-Parcel C81210
Stryker Heli	Heli	Drill + Monitoring Well Access	Unreclaimed	Yes	No	421226	6585116	1301	-136.3872	59.3973	AA 27195
TD Heli	Heli	Monitoring Well Access	Unreclaimed	Yes	No	421031	6584471	1091	-136.3904	59.3915	AA 27228
UM Heli	Heli		Unreclaimed	Yes	No	420761	6584994	1511	-136.3953	59.3961	AA 27191
Whack-a-Mole Heli	Heli		Unreclaimed	No	No	420482	6585441	1592	-136.4004	59.4001	AA 29585
Wishbone Heli	Heli		Unreclaimed	Yes	No	419965	6581925	1340	-136.4077	59.3683	AA 27199
Zion Helipad	Heli		Unreclaimed	Yes	No	419782	6581834	1255	-136.4115	59.3691	AA 27198
Merrill's Survival	Tent		Unreclaimed	Yes	No	421124	6585077	1373	-136.3890	59.3970	AA 27195
Stryker Survival	Tent		Unreclaimed	Yes	No	421200	6585119	1312	-136.3877	59.3973	AA 27195
Cantankerous (CAP SE)	Pump	Temporary-Use Water Source Access	Unreclaimed	Yes	No	419508	6582928	1149	-136.4166	59.3774	AA 51532
Mid-Station Pump	Pump		Unreclaimed	Yes	No	421025	6586148	1171	-136.3911	59.4065	MHT Lands-Parcel C70451
Sara Creek Pump	Pump		Unreclaimed	Yes	No	420774	6586673	1171	-136.3957	59.4112	MHT Lands-Parcel C81210

ARTESIAN WELLS

No new artesian conditions were encountered in 2023.

WATER SOURCES

Constantine has four Temporary Water Use Authorizations (TWUA) – TWUA F2019-048 Amendment #3, TWUA F2019-049, TWUA F2021-024 Amendment #1, and F2021-025. An amendment approval was issued on August 10th, 2023 to TWUA F2019-049 (Amendment #3), replacing four permitted sources with four new sources and retaining one permitted source (Sara Creek). Withdrawal from Sara Creek thus occurred under both TWUA2021-048 Amendment #2 and TWUA2021-048 Amendment #3 during the 2023 season. As per regulations, a maximum of five sites can be permitted per authorization. The authorizations approve 19 water sources to supply water for drills and other work. All 5 water sources used in 2023 were not fish-bearing at the point of withdrawal.

In 2023, water sources used to support drilling and project activities were approved under TWUA permit numbers F2019-048 Amendment #2, F2019-048 Amendment #3, F2021-024 Amendment #1, and F2019-049. Water sources included 1 drillhole: "CMR14-63 aka KD" and 3 named streams: "Sara Creek", "Christmas Creek", and "Marble Creek". CMR14-63, Sara Creek, and Christmas Creek were used to supply water for diamond drilling and Marble Creek was used intermittently to provide water for core cutting. Table 10 lists the approved water sources used to support the project in 2023. Photos of the water sources are available in Photos 107-110.

Table 10. Water sources used to supply 2023 project activities.

Water Source Name	CMR14-63 aka KD	Christmas Creek	Sara Creek	Marble Creek
Latitude (ddd.mmmm)	59.3939	59.3934	59.3975	59.4173
Longitude (ddd.mmmm)	-136.3883	-136.3471	-136.3928	-136.2286
Datum	NAD83	NAD83	NAD83	NAD83
Associated TWUA	F2021-024 Amendment #1	F2021-024 Amendment #1	F2019-048 Amendment #2/3	F2019-049
Associated APMA	5690	5690	5690	5690
Mining Claim ADL, BLM # or USMS	AA 27213	AA 27268	Mental Health Trust C81210	NA (Private Land)
Water Source Type	Drillhole	Glacial Melt / Creek	Glacial Melt / Creek	Glacial Melt / Creek
Intake Size	1.25"	2"	2"	1"
Mesh Size	0.125"	0.375"	0.375"	0.125"
Submerged	N/A	Yes	Yes	Yes

Water Source Name	CMR14-63 aka KD	Christmas Creek	Sara Creek	Marble Creek
Start Date	1) 10-Jun-23	1) 21-Sep-23	1) 11-Jun-23	1) 20-May-23
Stop Date	1) 20-Sep-23	1) 03-Oct-23	2) 23-Sept-23	1) 04-Oct-23
Avg GPM	20	20	20	5
Engine Size (HP)	1.54	25	25	5

SUMPS

Two sumps were constructed to control water discharge created from activities on Rudolph Pad during the 2023 season while drilling holes CMR23-177 and CMR23-178. Sumps were approximately 6' x 4' and excavated soils were set aside for sump reclamation. Return was passed through a sediment fence during transport to the sump for settling. All sumps were fully filled and reclaimed in October, 2023.

FUEL AND HAZARDOUS SUBSTANCES

All fuel-related activities are compliant with EPA Tier I Spill Prevention, Control, and Countermeasure (SPCC) Plan requirements and SPCC Spill inspections were conducted on a weekly basis. No reportable spills occurred in 2023.

At the Glacier Creek laydown, within the claim boundaries, the Glacier Creek Fuel Depot (Photo 1) holds 5,000 gallons of diesel and 3,000 gallons of Jet-A fuel. The tanks are in a sturdy 11,000+ gallon containment, built well in excess of 110% capacity of total fuel storage tanks, fulfilling the BLM/EPA requirements. The containment is wood-framed and lined with 30 mL urethane-coated fabric. The 11,000+ gallon containment can also host the portable, 70-gallon, double-walled, steel fly tanks. Containment was pumped of water periodically following heavy rains. All required signage, fire extinguishers, and spill kits are in place. All tanks were emptied, and fuel pumps removed for winterization as of October 2023.

A new white, double-walled, 4,000 gallon Jet-A fuel tank on skids was purchased at the end of the 2023 season to replace the current black 3,000 gallon tank on site. This new tank is currently being stored in Haines for the off season and will be commissioned on site at the start of the 2024 field season when the old tank is removed.

ROAD

Work on the Glacier Creek Road is summarized in the 2018 Annual Reclamation Report. Work on the road within the Phase 2 Plan of Operations area is covered under ADNR Reclamation Plan Approval J20185690RPA. No additional disturbances to BLM managed lands were performed on Glacier Creek

Road in 2023. Glacier Creek Road is divided into 4 phases (Figure 7) spanning 5 years from 2014–2018.

Total acreage of all ground disturbances for the road and related constructions on BLM managed lands has remained unchanged from 2022 to 2023 at an estimated 11.13 acres; see Tables 2, 11 and 12.

Note that the acreage of the reclaimed road shoulders and cut slopes for the BLM section of Phase 1 has been deducted from the total disturbance.

The estimated acreage of disturbance was calculated based on an average nominal road width of 4.3 m (14 ft), and an average road width of 8 m (26 ft), including shoulders and cut slopes (i.e., an average of 1.85 m (6 ft) of ground disturbance on either side of the 4.3 m (14 ft) wide road to include road shoulders and cut slopes). The road shoulders and cut slopes are areas that can be reclaimed while the main road stays open. The shoulders and cut slopes for Phase 1 have been fully reclaimed and approved by BLM. The shoulder and cut slopes for Phases 2 and 3 have been fully reclaimed and are pending approval by the BLM.

The total estimated acreage of disturbance for the road (once reclamation acreage was accounted for) was then added to the disturbance acreage calculated for pullouts and other cleared areas (weather station clearing, the laydown, the fuel station, the helipad, one borrow-pit, the quarry, stockpiles, and "The Cut").

The pullout disturbance area is based on an ideal pullout size of 4.5 m x 30 m (note that many of the pullouts are smaller than 4.5 x 30 m). The geometry of the additional cleared areas was mapped with a Trimble GeoXH and then plotted and converted into polygons in ArcGIS. The ArcGIS geometry calculator tool was used to determine the acreage for each polygon. All existing road on Federal lands has been inspected by BLM and reclamation is pending approval.

Road reclamation includes both concurrent reclamations, focused on immediate stabilization measures during and immediately following construction, and final reclamation, to be performed at such time that the road is no longer needed for exploration access. The 2.1 km (1.3 mile) portion of the road located within the Haines State Forest is expected to remain open indefinitely, providing long term access for timber harvest, mineral resources, and recreation purposes, and therefore only subject to concurrent reclamation.

Table 11. Summary of disturbance calculations for Glacier Creek Road (excluding cleared areas and pullouts). Calculations are for sections of road on BLM lands only.

Agency	Phase	Feature	Length (m)	Calculated Acreage of Disturbance	Acres Reclaimed	Current Disturbance Acreage (*unchanged from 2019*)
BLM	Phase 1	4.3 m wide nominal road width	1274	1.35		1.35
BLM	Phase 1	Road shoulders + cut slopes		1.16	1.16	0
BLM	Phase 2	4.3 m wide nominal road width	644	0.68		0.68
BLM	Phase2	Road shoulders + cut slopes		0.59		0.59
BLM	Phase 3	4.3 m wide nominal road width	1272	1.35		1.35
BLM	Phase 3	Road shoulders + cut slopes		1.16		1.16
BLM	Phase 4a	4.3 m wide nominal road width	329	0.35		0.35
BLM	Phase4a	Road shoulders + cut slopes		0.3		0.3
		Total (BLM only)	**3519**	**6.94**	**1.16**	**5.78**

Table 12. Summary of disturbances of additional cleared land and pullouts associated with Glacier Creek Road. Calculations are for sections of road on BLM lands only.

Agency	Phase	Pullouts	Acreage of Disturbance for Pullouts	Acreage of Disturbance for Cleared Areas	Current Disturbance Acreage (*unchanged from 2019*)
BLM	Phase 1	3	0.1	1.48	1.58
BLM	Phase 2	1	0.03	0	0.03
BLM	Phase 3	3	0.1	3.45	3.55
BLM	Phase 4a	1	0.03	0.16	0.19
	Total (BLM only)		**0.26**	**5.09**	**5.35**

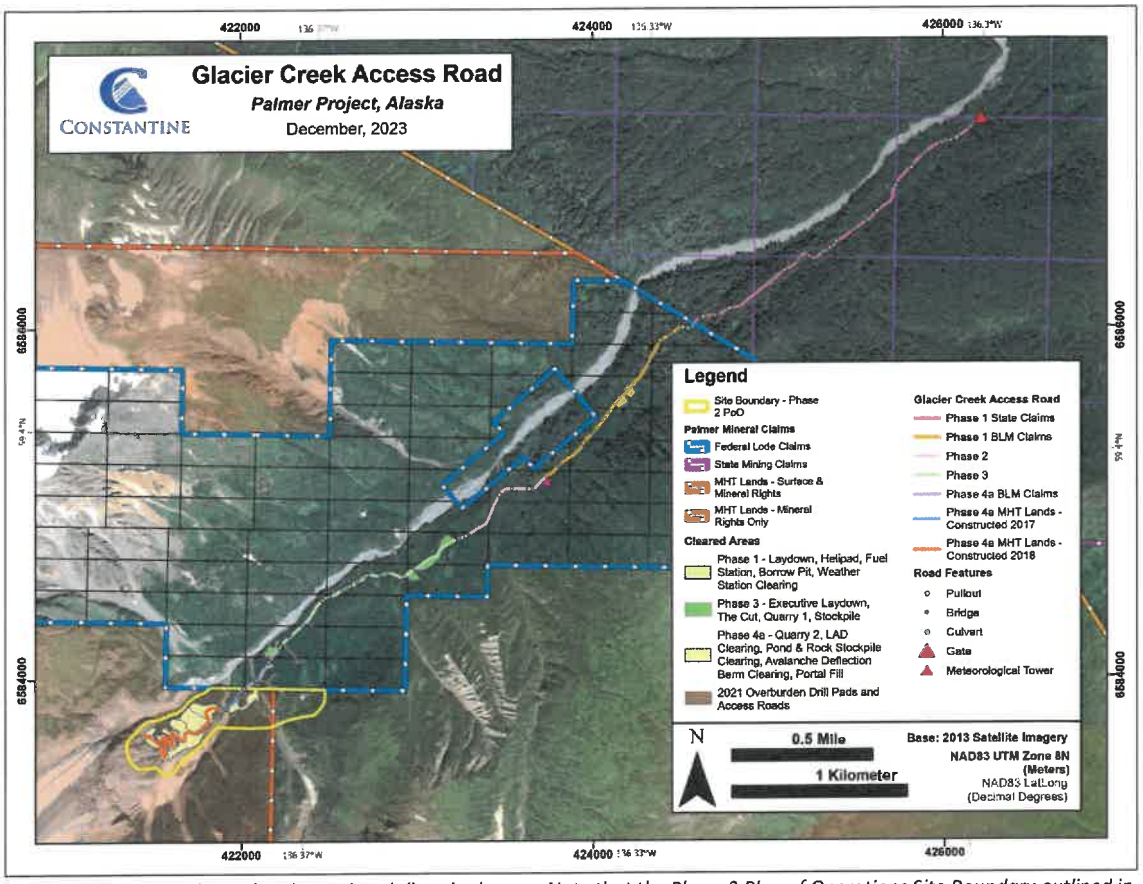

Figure 7. Glacier Creek Road and associated disturbed areas. Note that the Phase 2 Plan of Operations Site Boundary outlined in yellow is discussed in a separate reclamation report (ADNR Reclamation Plan Approval J20185690RPA).

PHOTOGRAPHS
2023 Annual Reclamation Report

Palmer Project
Surface Exploration
Porcupine Mining District, Alaska

Glacier Creek Laydown

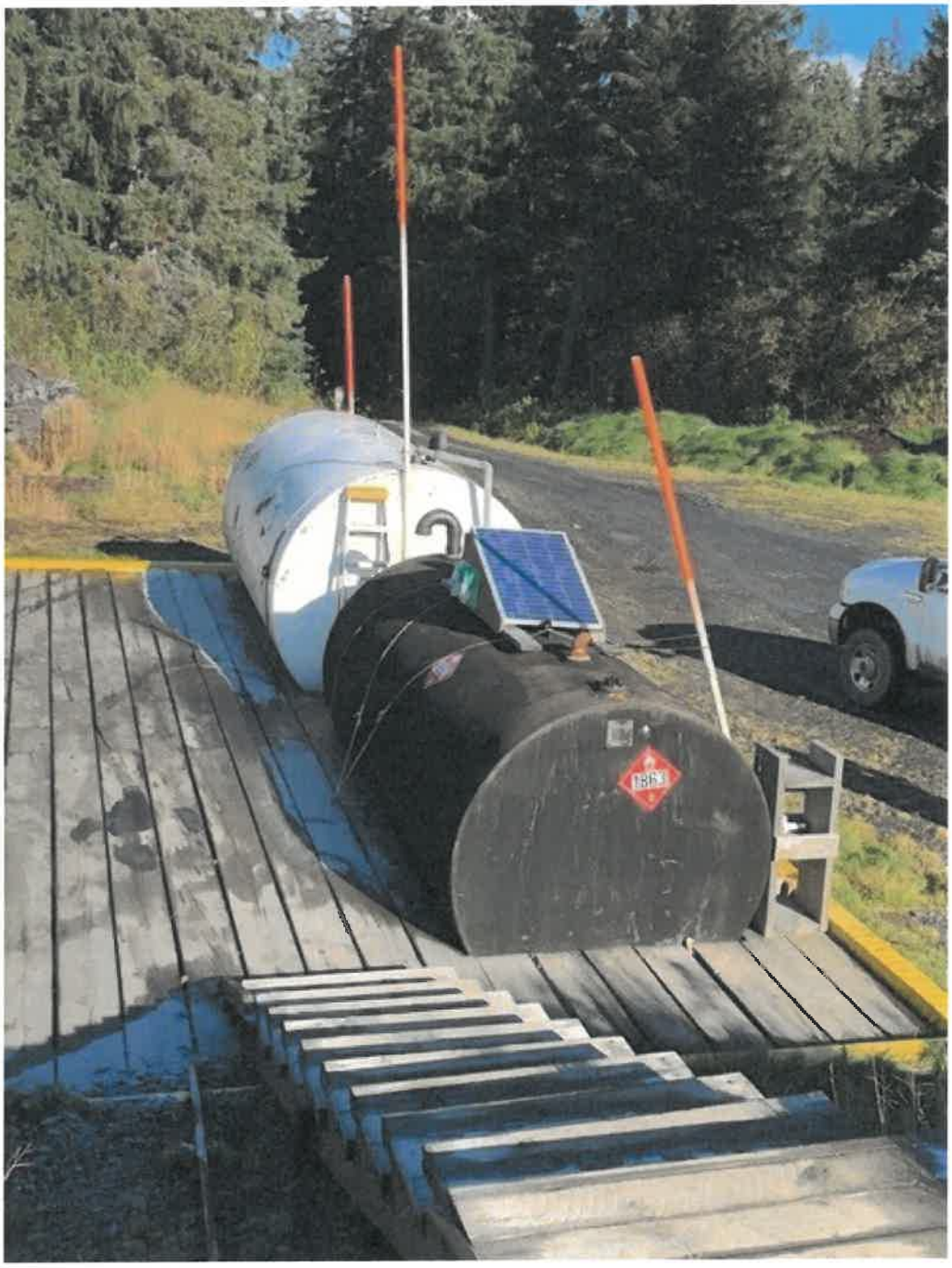

Photo 1. Fuel Station at the Glacier Creek Laydown. Tanks were emptied and winterized in October of 2023 (Photo: Oct 2021).

Photo 2. Glacier Creek Laydown. Six shipping containers, pallets of core boxes, some lumber, and drilling equipment (drill rods, fuel, mud tanks) are temporarily stored at the laydown. Photo is oriented north.

Diamond Drillholes

Photo 3: KD Pad diamond drill hole CMR23-151 is capped.

Photo 4: Stryker Pad diamond drill hole CMR23-152 is capped.

Photo 5: Stryker Pad diamond drill hole CMR23-153 is capped.

Photo 6: KD Pad diamond drill hole CMR23-154 is capped.

Photo 7: Stryker Pad diamond drill hole CMR23-155 is capped.

Photo 8: Stryker Pad diamond drill hole CMR23-156 is covered with removable monument and capped.

Photo 9: KD Pad diamond drill hole CMR23-157/01 is capped.

Photo 10: Stryker Pad diamond drill hole CMR23-158 is covered with removable monument and capped.

Photo 11: Stryker Pad diamond drill hole CMR23-159 is capped.

Photo 12: KD Pad diamond drill hole CMR23-160/01 is capped.

Photo 13: Stryker Pad diamond drill hole CMR23-161 is capped.

Photo 14: Stryker Pad diamond drill hole CMR23-162 is covered with removable monument and capped.

Photo 15: Merrill's Pad diamond drill hole CMR23-163/B is covered with removable monument and capped.

Photo 16: KD Pad diamond drill hole CMR23-164 is capped.

Photo 17: Merrill's Pad diamond drill hole CMR23-165 is covered with removable monument and capped.

Phot 18: KD Pad diamond drill hole CMR23-166 is capped.

Phot 19: Merrill's Pad diamond drill hole CMR23-167 is covered with removable monument and capped.

Photo 20: Merrill's Pad diamond drill hole CMR23-168 is covered with removable monument and capped.

Photo 21: Merrill's Pad diamond drill hole CMR23-169 is covered with removable monument and capped.

Photo 22: KD Pad diamond drill hole CMR23-170 is capped.

Photo 23: Merrill's Pad diamond drill CMR23-171 hole is covered with removable monument and capped.

Photo 24: Merrill's Pad diamond drill hole CMR23-172 is covered with removable monument and capped.

Photo 25: KD Pad diamond drill hole CMR23-173 is capped.

Photo 26: Canada Pad diamond drill hole CMR23-174 is covered with removable monument and capped.

Photo 27: KD Pad diamond drill hole CMR23-175 is capped.

Photo 28: Canada Pad diamond drill hole CMR23-176 is capped.

Photo 29: Rudolph Pad diamond drill hole CMR23-177 is capped.

Photo 30: Rudolph Pad diamond drill hole CMR23-178 is capped.

Photo 31: Marmot Pad diamond drill hole GT23-020 is capped.

Photo 32: UM Pad diamond drill hole GT23-021 is covered with removable monument and capped.

Photo 33: UM Pad diamond drill hole GT23-022 is covered with removable monument and capped.

Photo 34: UM Pad diamond drill hole GT23-024 is covered with removable monument and capped.

Photo 35: UM Pad diamond drill hole GT23-025 is capped.

Photo 36: Stryker Pad diamond drill hole GT23-026 is capped.

Photo 37: Stryker Pad diamond drill hole GT23-027 is capped.

Photo 38: Stryker Pad diamond drill hole GT23-028 is capped.

Photo 39: Stryker Pad diamond drill hole GT23-029 is capped.

Overburden Drillholes

A2023-P1-05

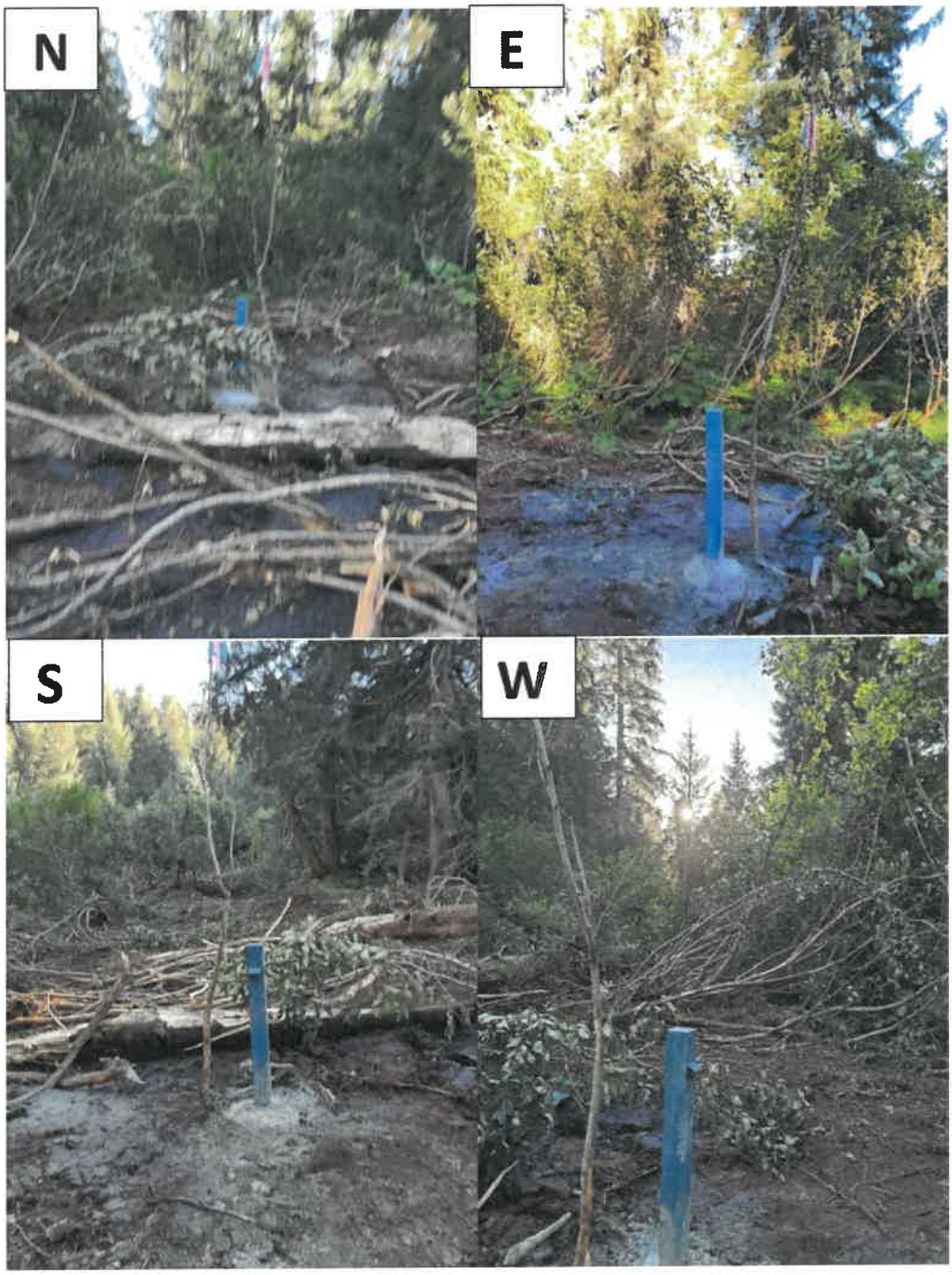

Photo 40: Overburden drillhole A2023-P1-05. A single monitoring well is capped with a protective monument.

A2023-P1-06

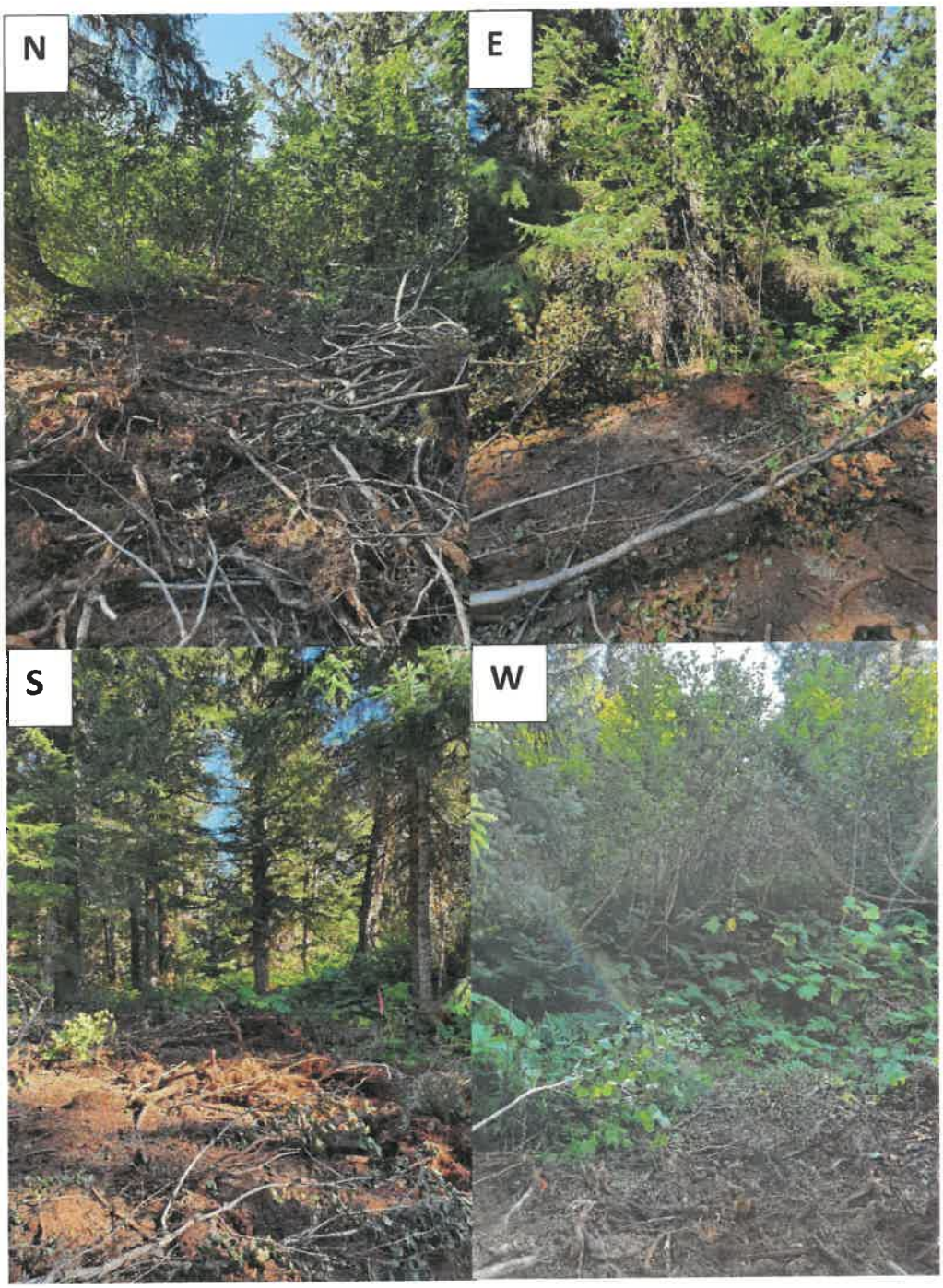

Photo 41: Overburden drillhole A2023-P1-06. Hole has been plugged and reclaimed.

A2023-P1-07

Note: No drillhole A2023-P1-07 photo available.

A2023-P1-08

Note: No drillhole A2023-P1-08 photo available.

A2023-P1-09

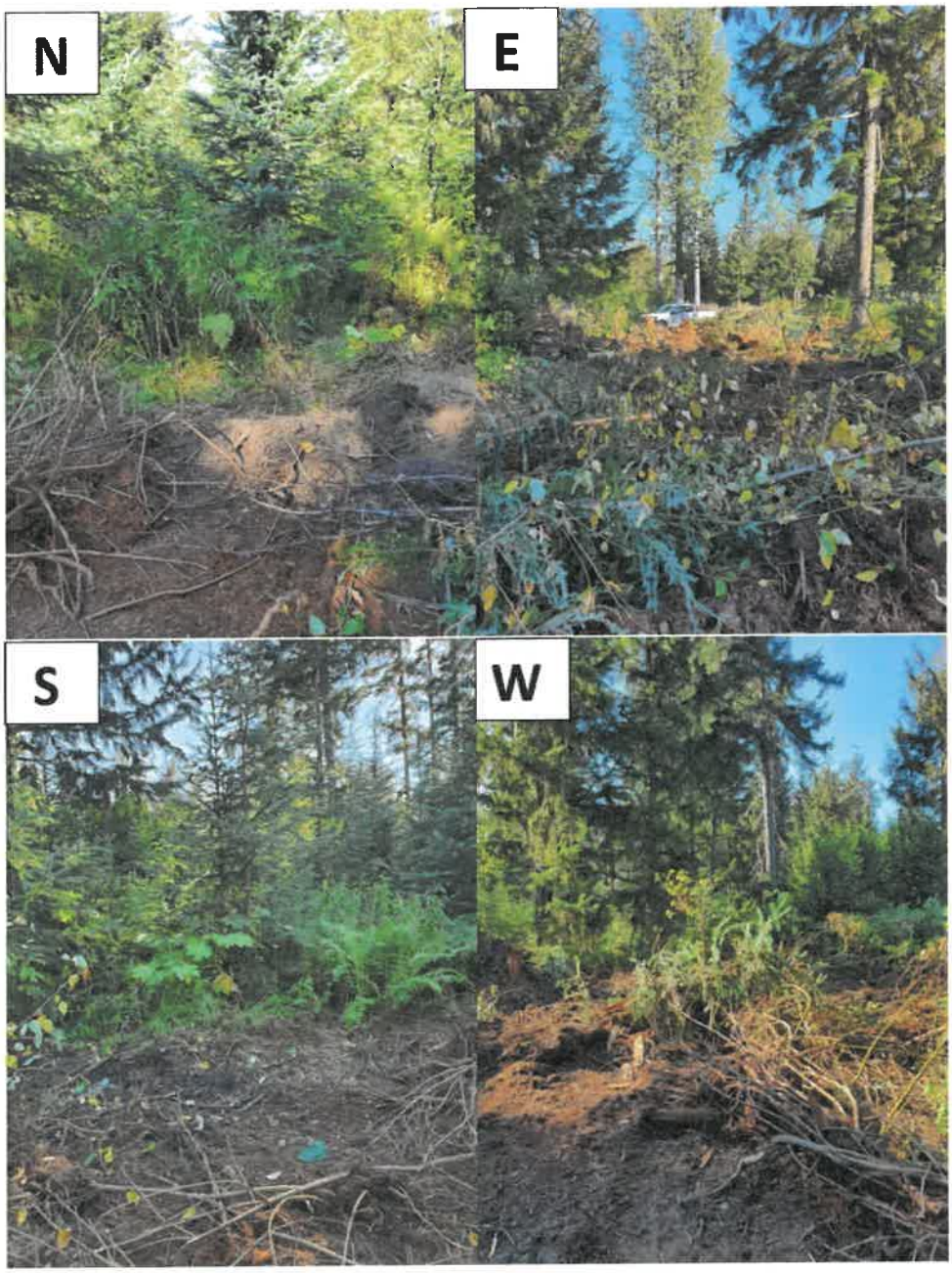

Photo 42: Overburden drillhole A2023-P1-09. Hole has been plugged and reclaimed.

A2023-P1-10

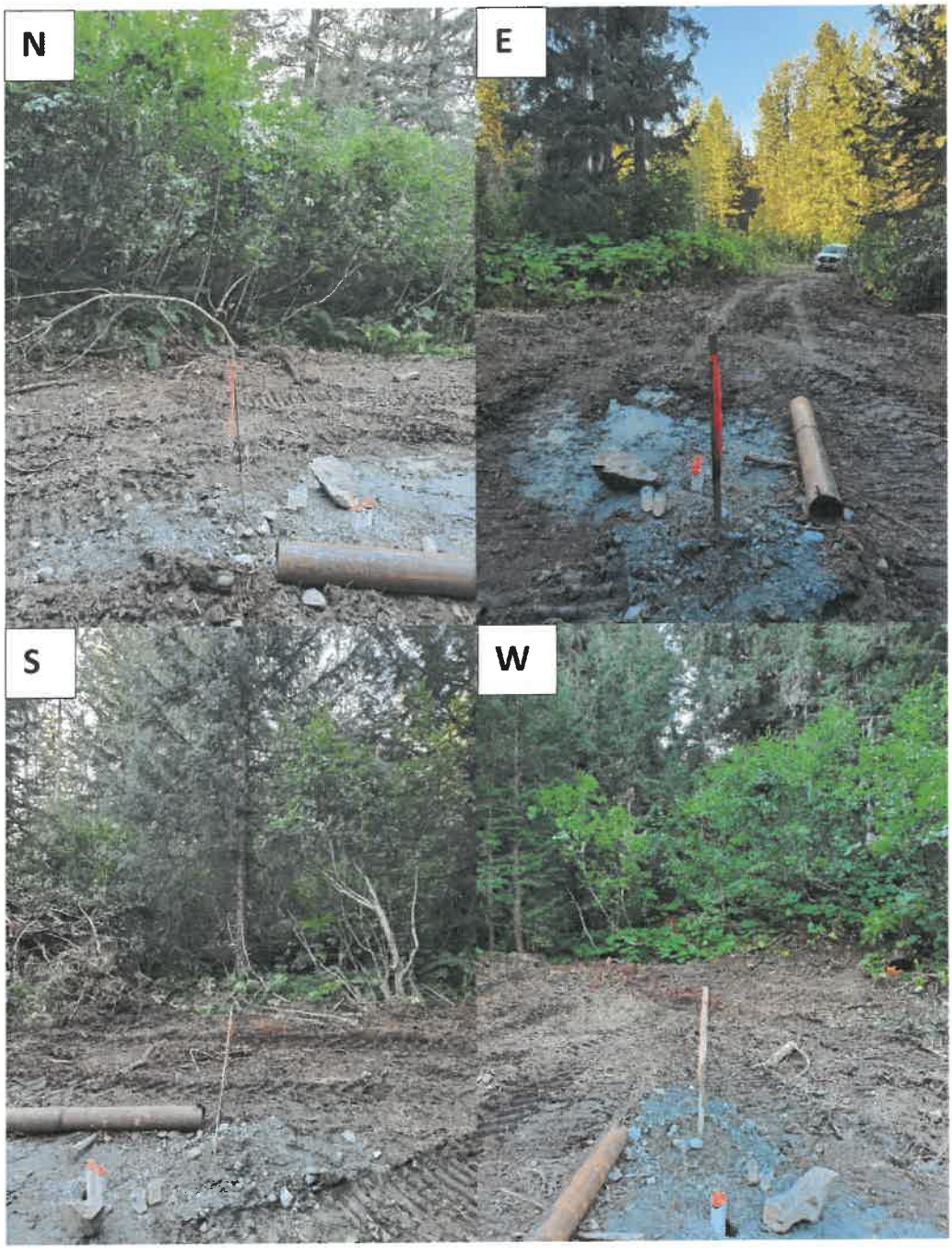

Photo 43: Overburden drillhole A2023-P1-10. Two nested monitoring wells are installed, protective monument removed.

A2023-P1-12

Note: No drillhole A2023-P1-12 photo available.

A2023-P2-06

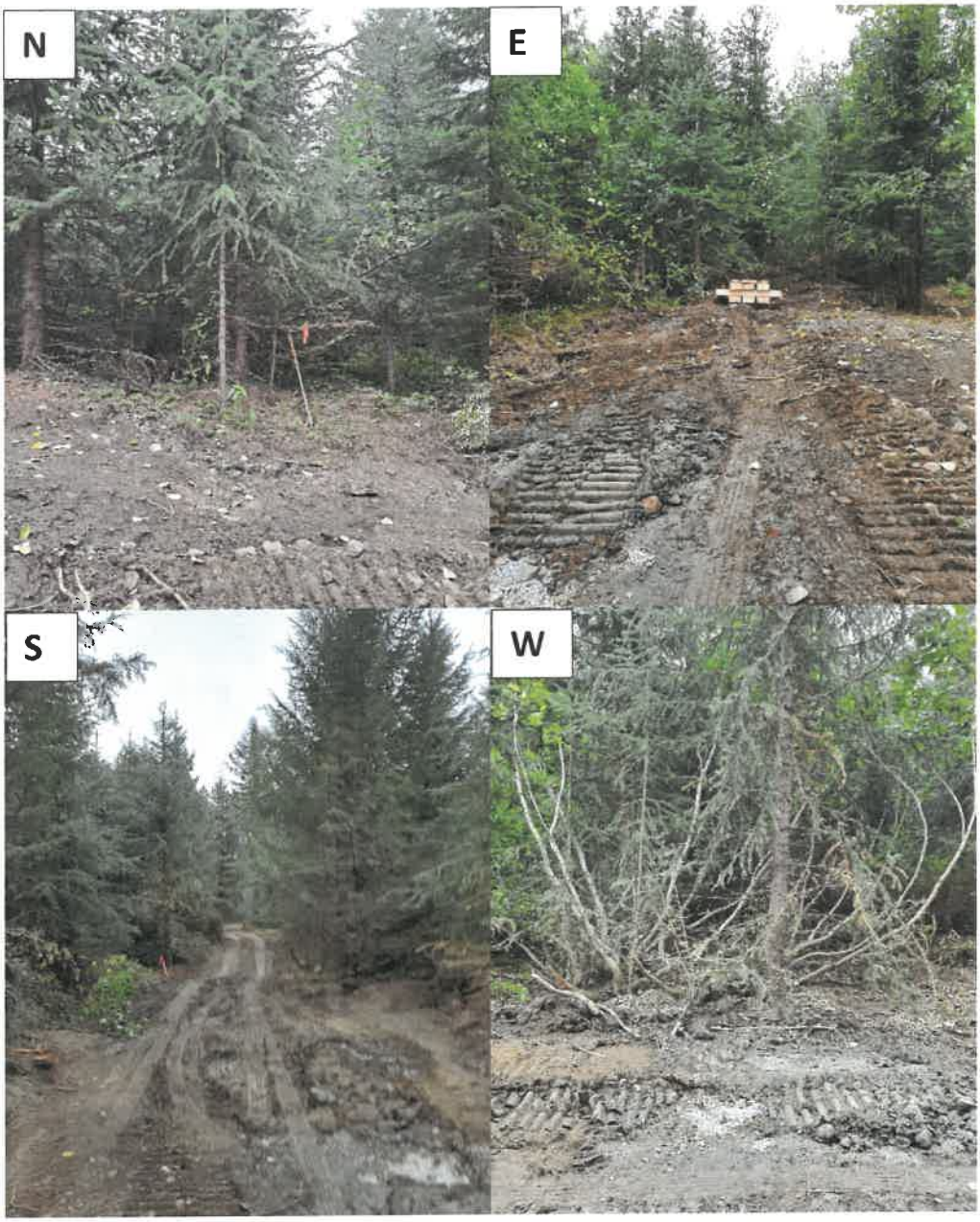

Photo 44: Overburden drillhole A2023-P2-06. Hole has been plugged and reclaimed.

A2023-P2-08

Note: No drillhole A2023-P2-08 photo available.

A2023-P2-09

Photo 45: Overburden drillhole A2023-P2-09. Hole has been plugged and reclaimed.

Drill Pads & Heli Access Pads

Marmot

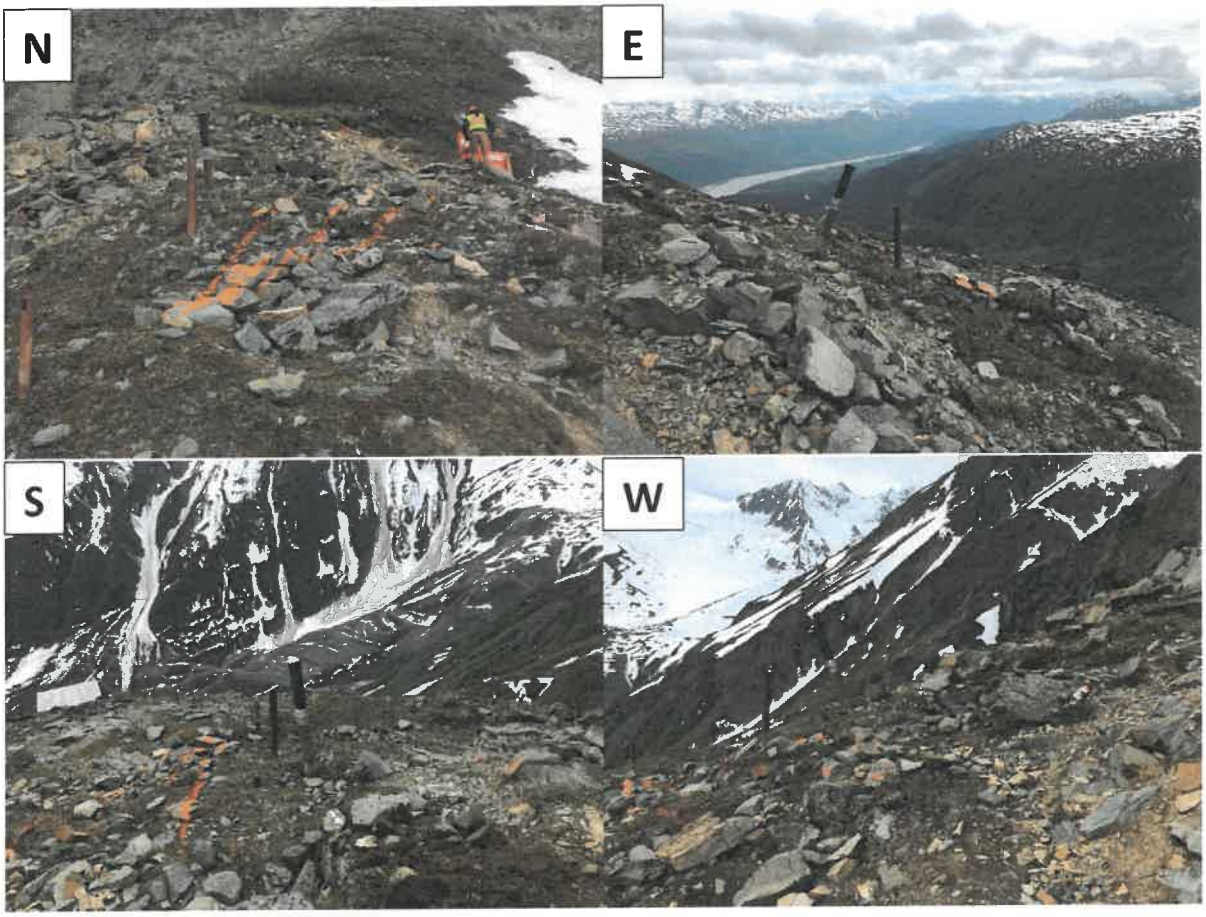

Photo 46: Marmot Drill Pad site pre-build.

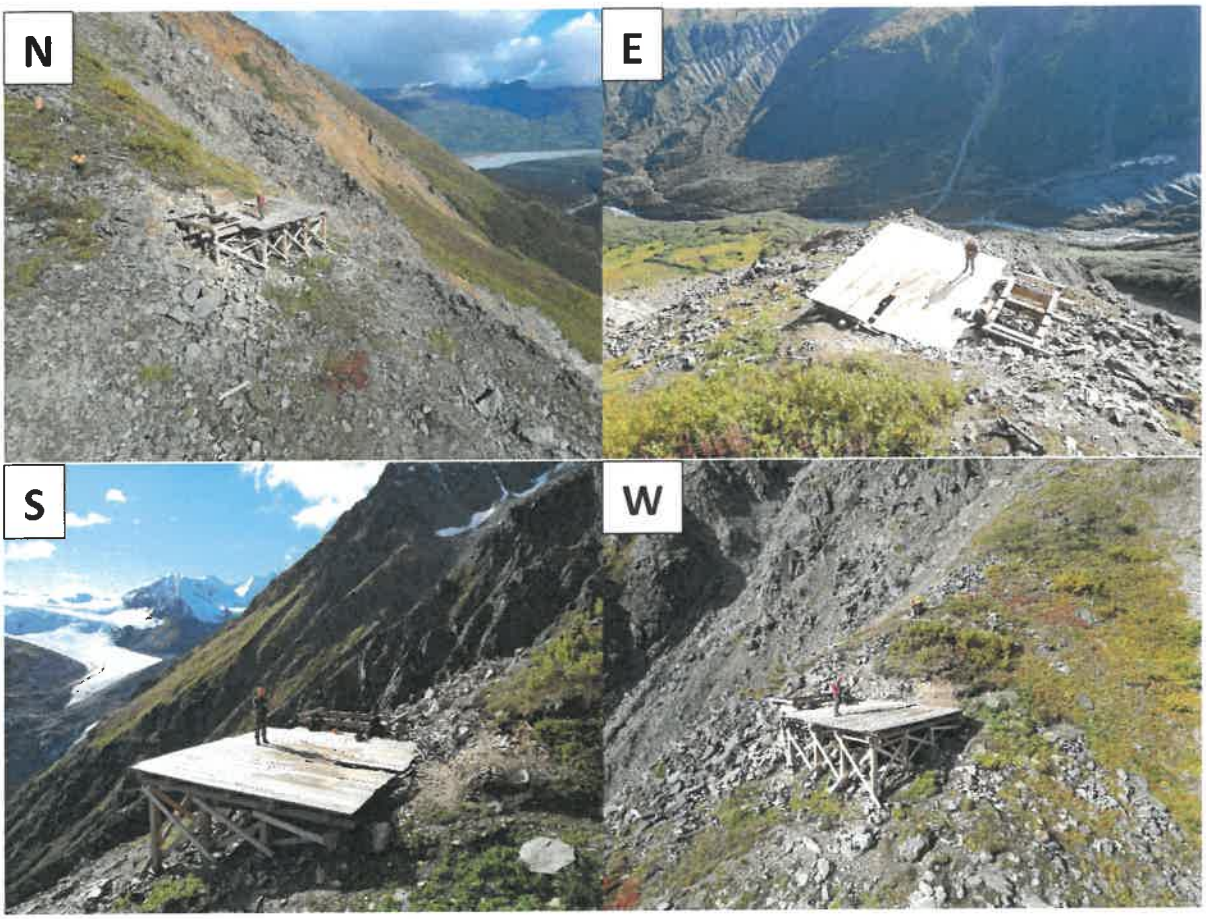

Photo 47: Marmot Drill Pad completed build.

Photo 48: Marmot Heli Pad before reclamation (note: photo from 2022).

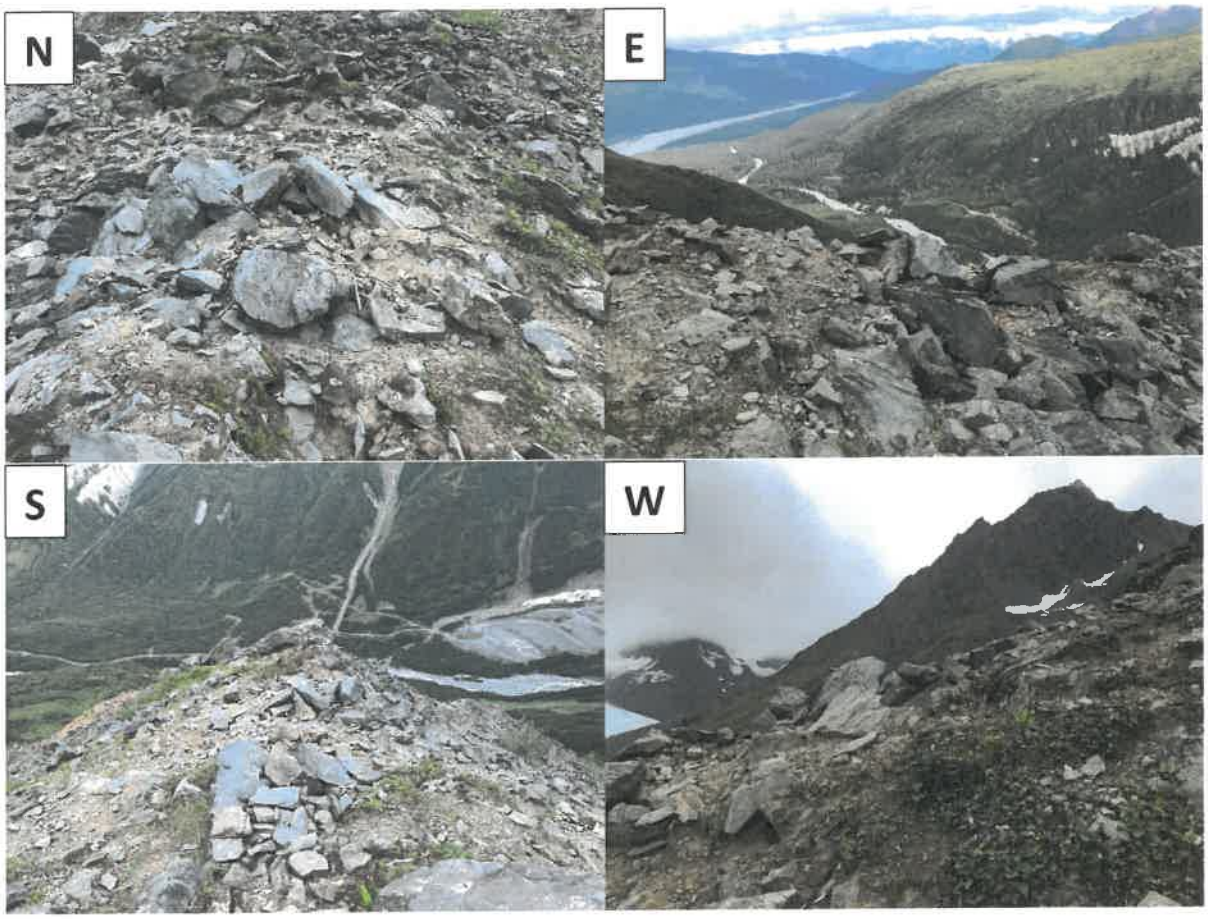

Photo 49: Marmot Heli Pad after reclamation.

KD

Photo 50: KD Drill Pad before modification (Note: photo from 2022).

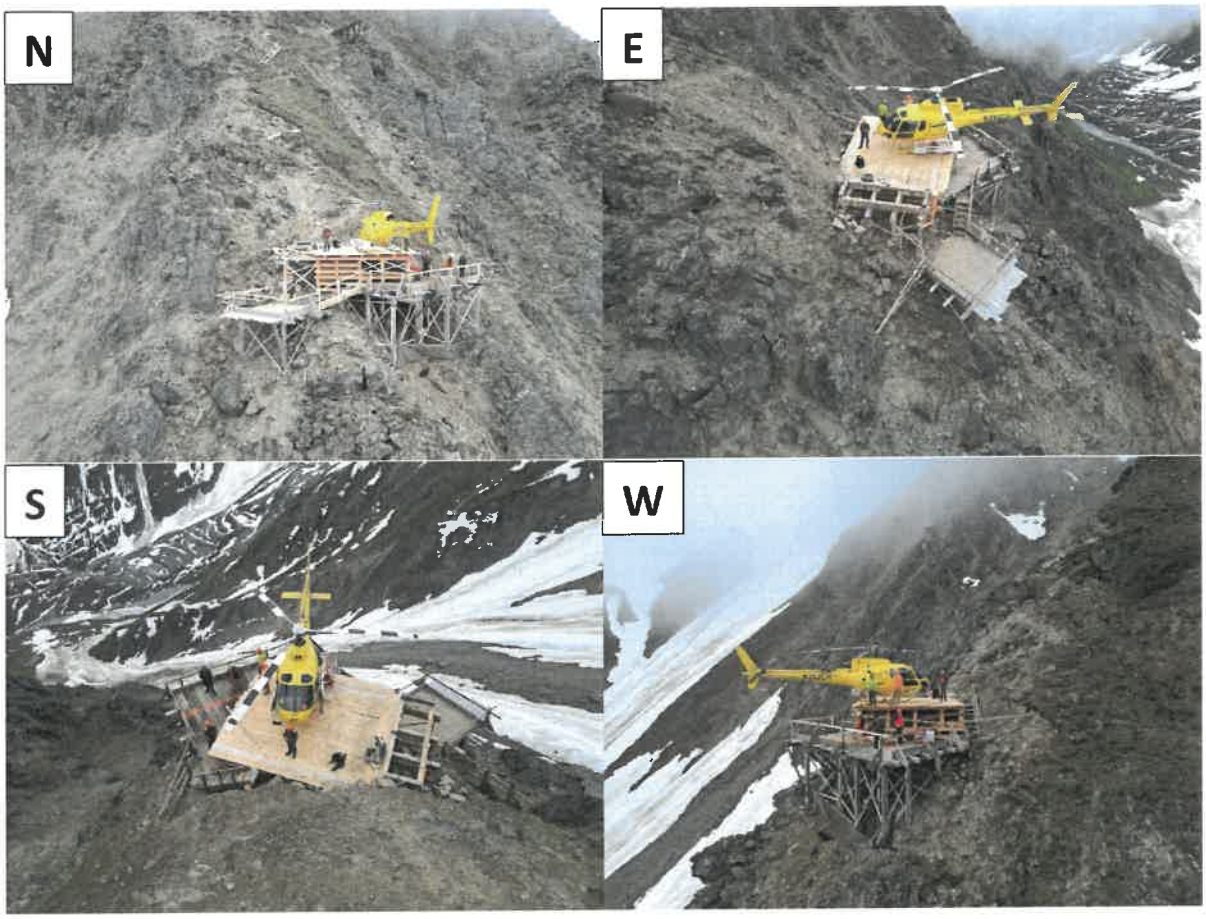

Photo 51: KD Drill Pad after modification.

UM

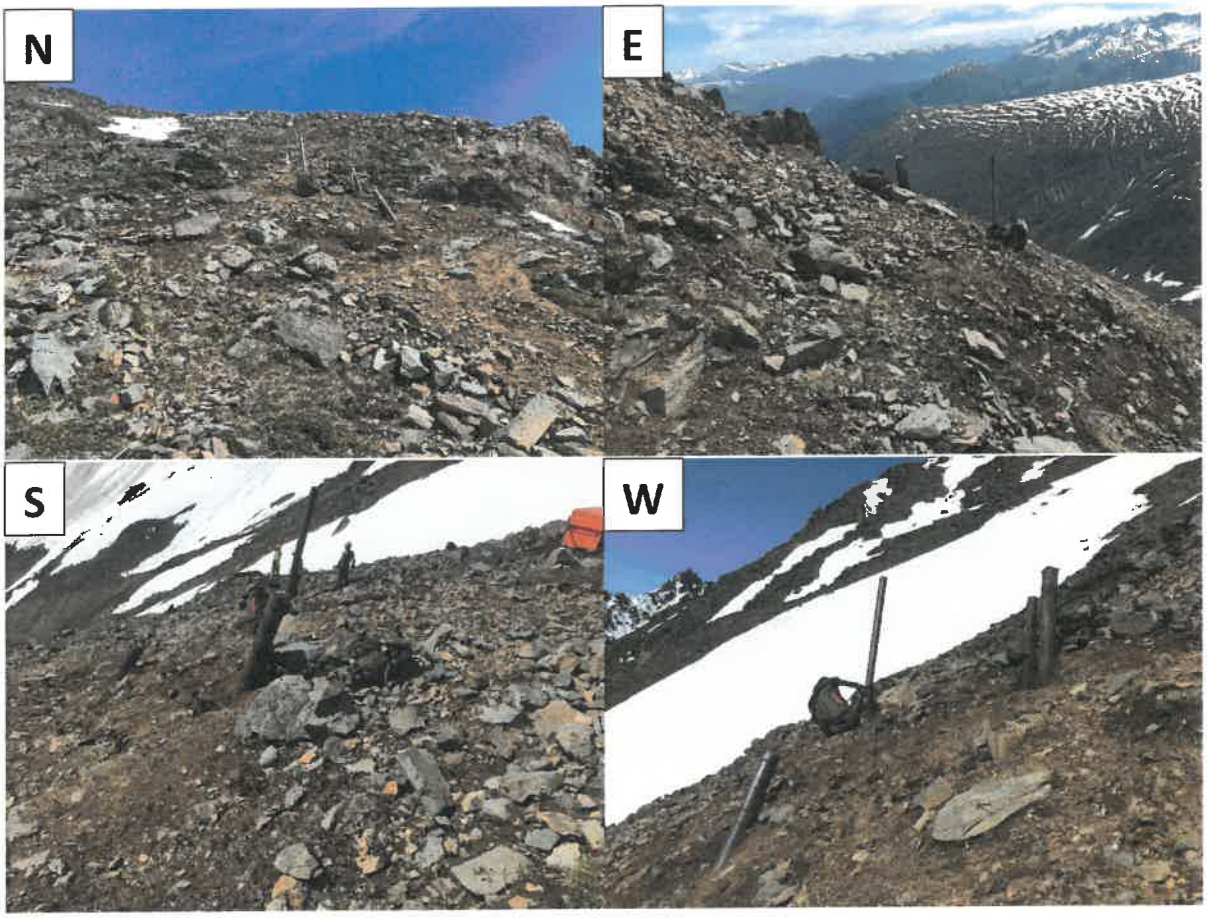

Photo 52: UM Drill Pad before construction.

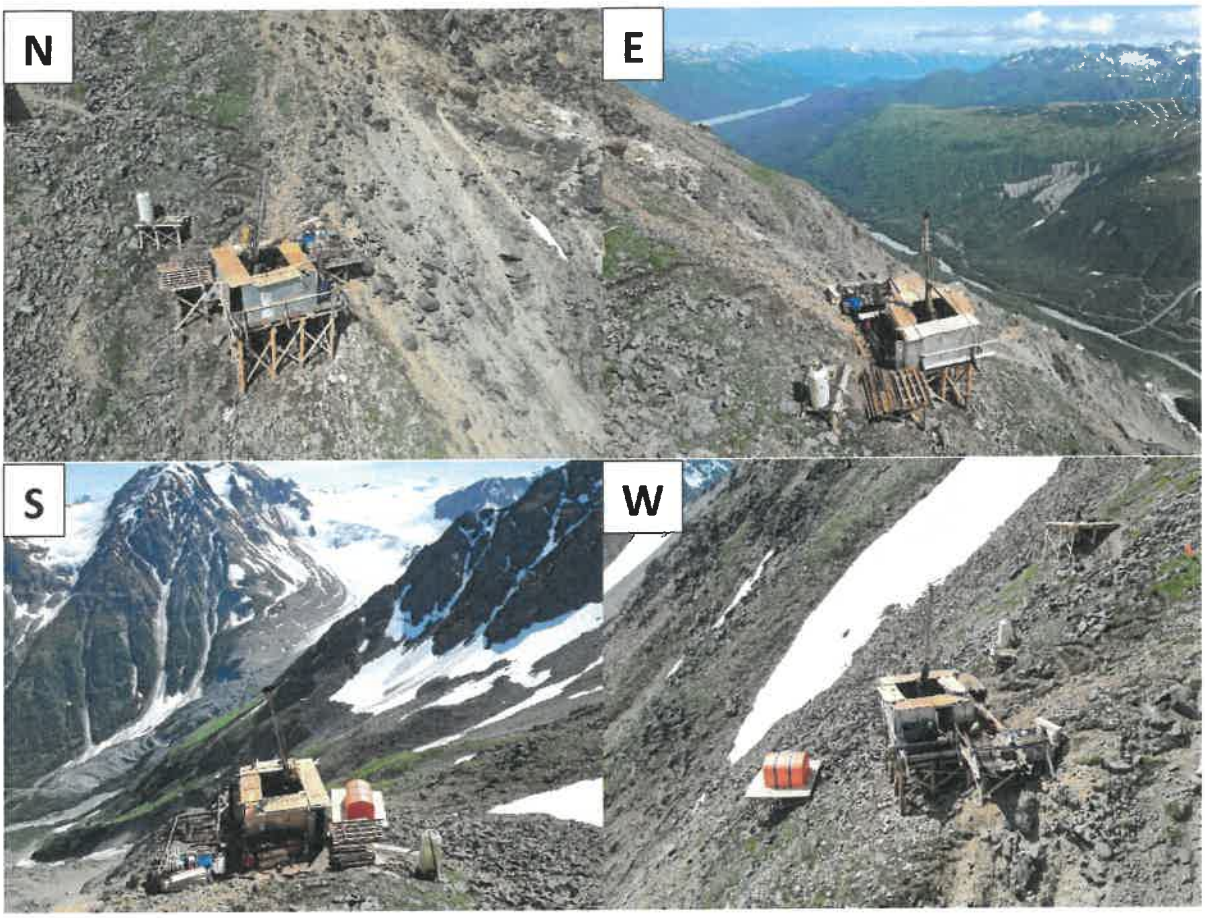

Photo 53: UM Drill Pad in use after construction.

Photo 54: UM Heli Pad site before construction.

Photo 55: UM Heli Pad after construction.

Photo 56: UM Water Pad before construction (left) during use (right) and after reclamation (lower).

Canada

Photo 57: Canada Drill and Heli Pads site before construction.

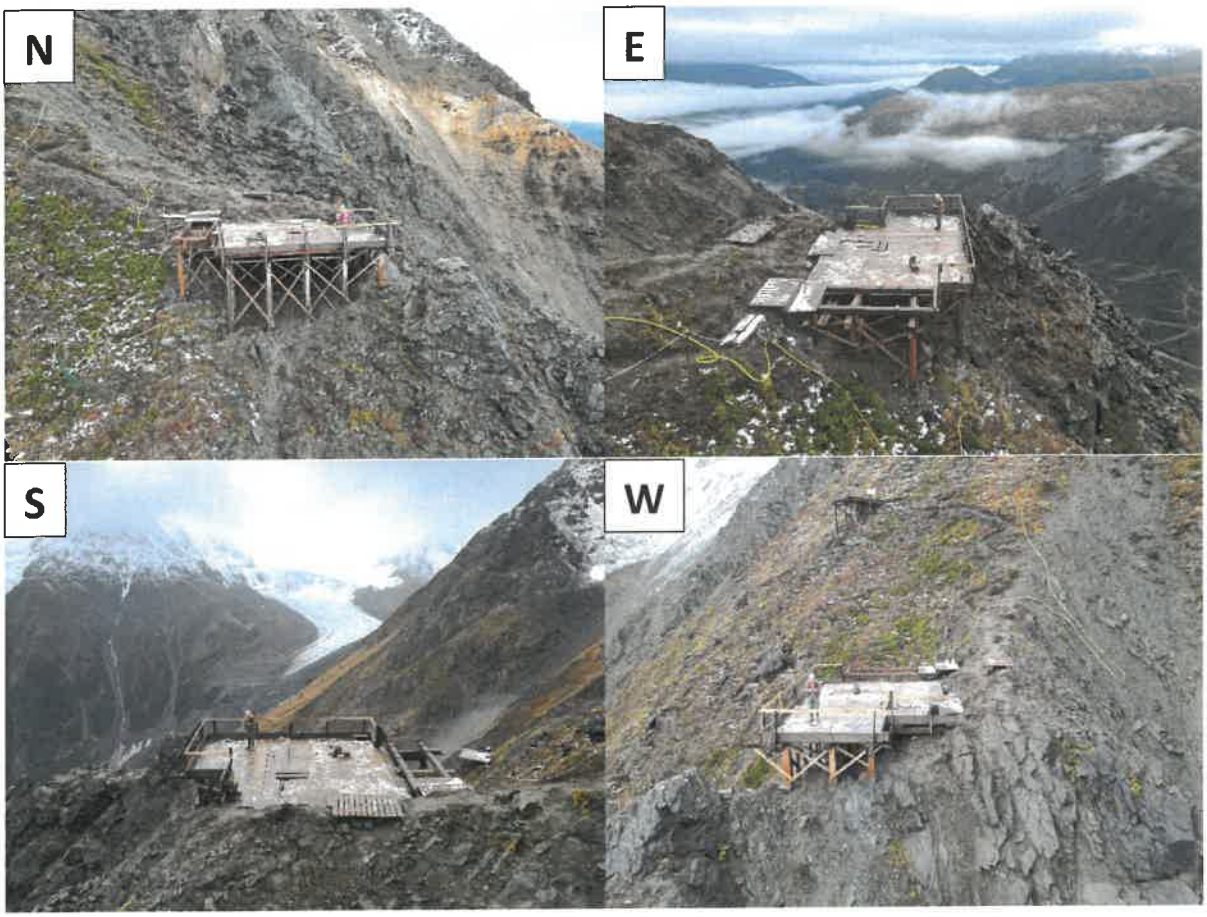

Photo 58: Canada Drill Pad after construction.

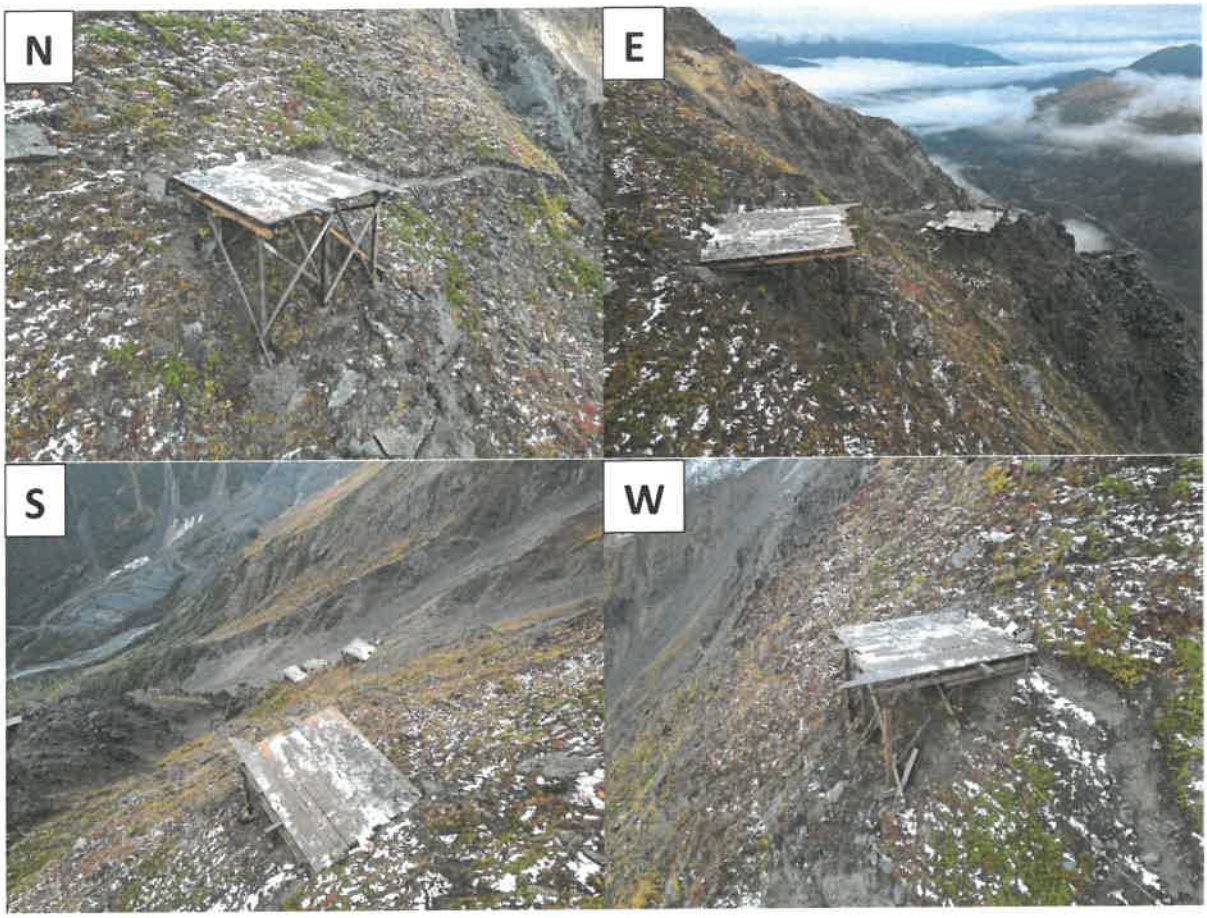

Photo 59: Canada Heli Pad after construction.

Stryker

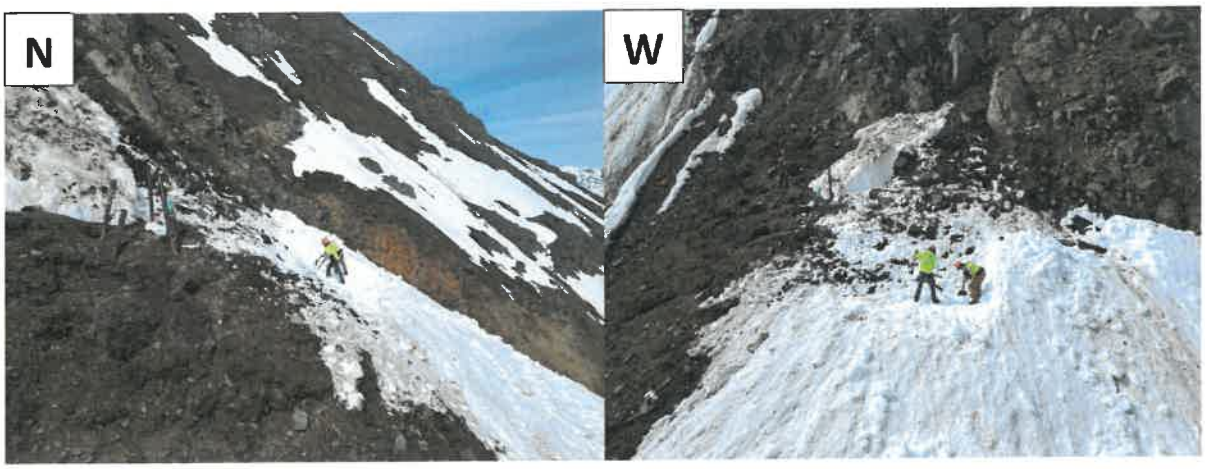

Photo 60: Stryker Pad site before construction.

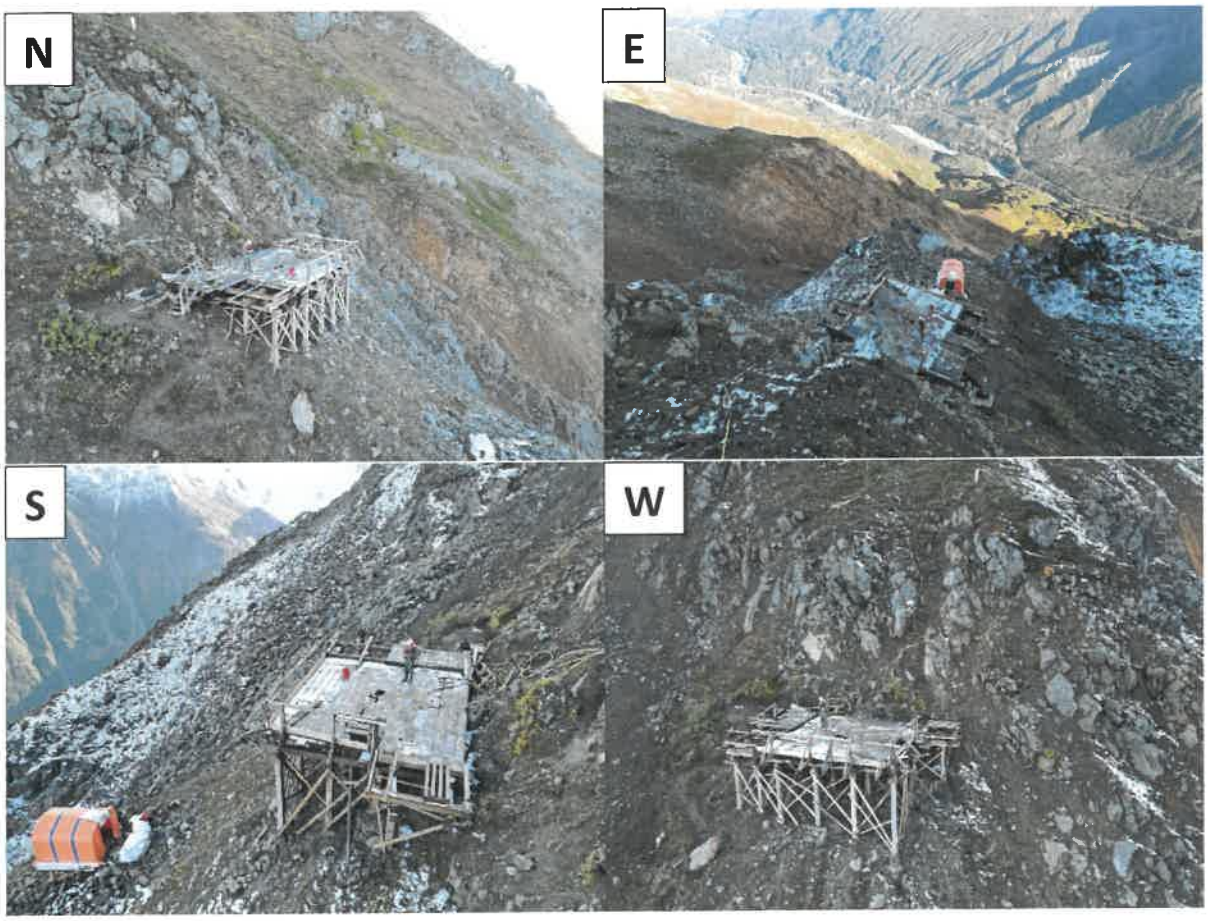

Photo 61: Stryker drill and survival tent pads after construction.

Photo 62: Stryker Helipad. Pad retains full decking and is unreclaimed for future use.

Merrill's

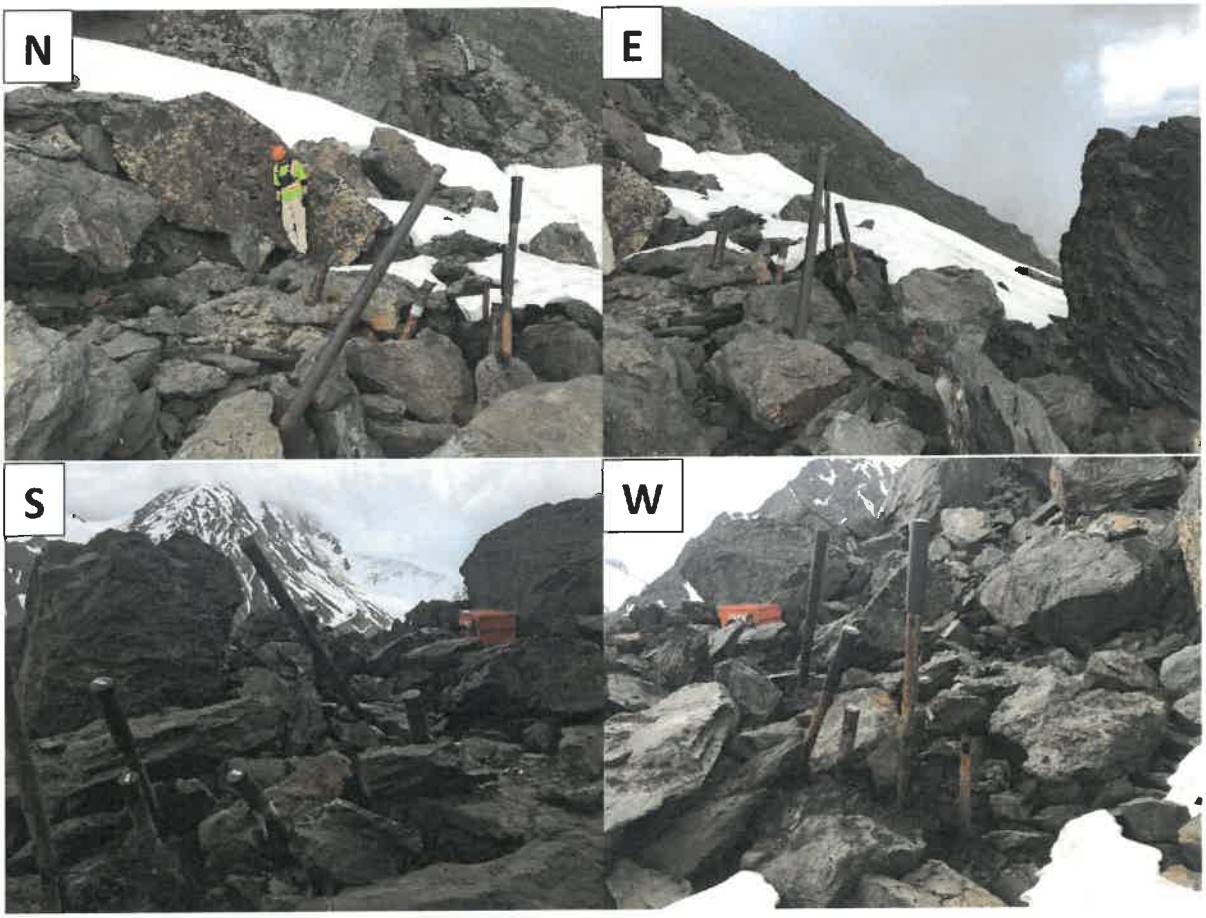

Photo 63: Merrill's Pad site before construction.

Photo 64: Merrill's Drill Pad after construction.

Rudolph

Photo 65: Rudolph Drill Pad site before construction.

Photo 66: Rudolph Drill Pad after construction.

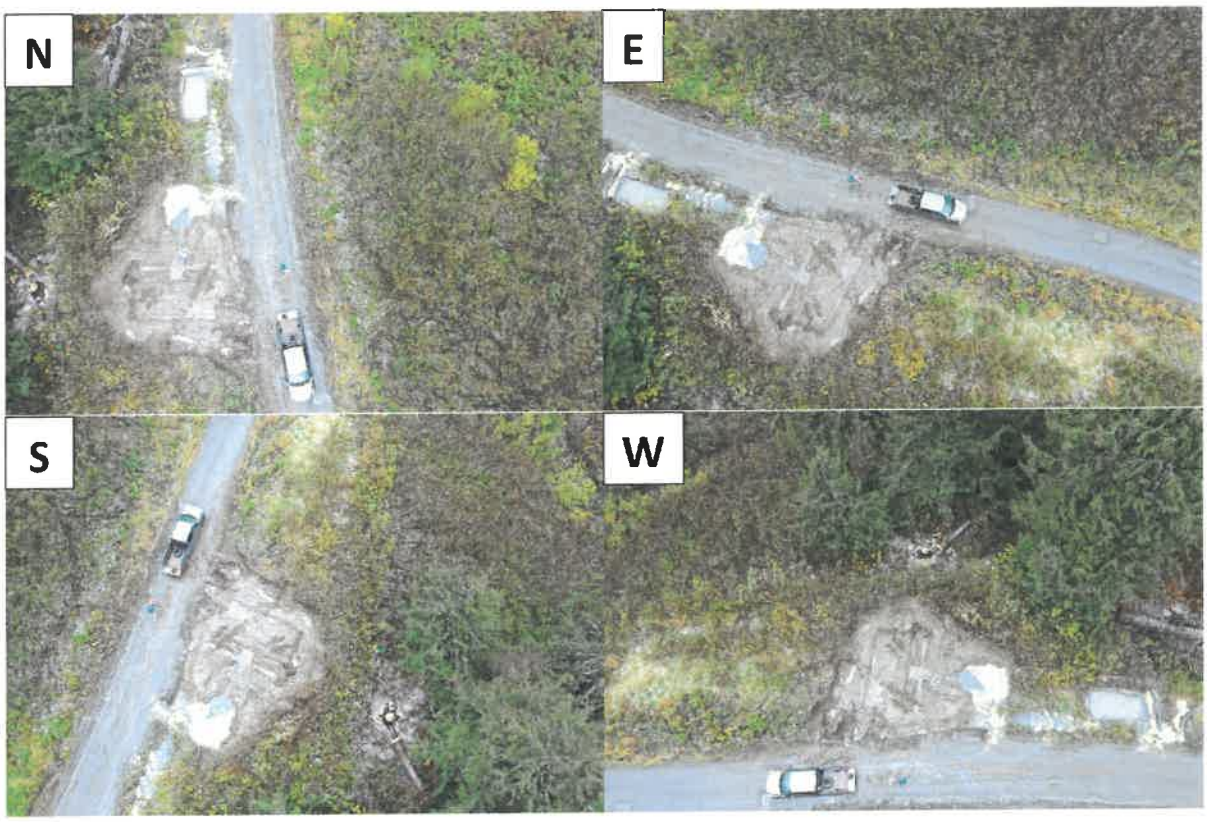

Photo 67: Rudolph Drill Pad after reclamation (sumps not reclaimed in photo).

Paradise

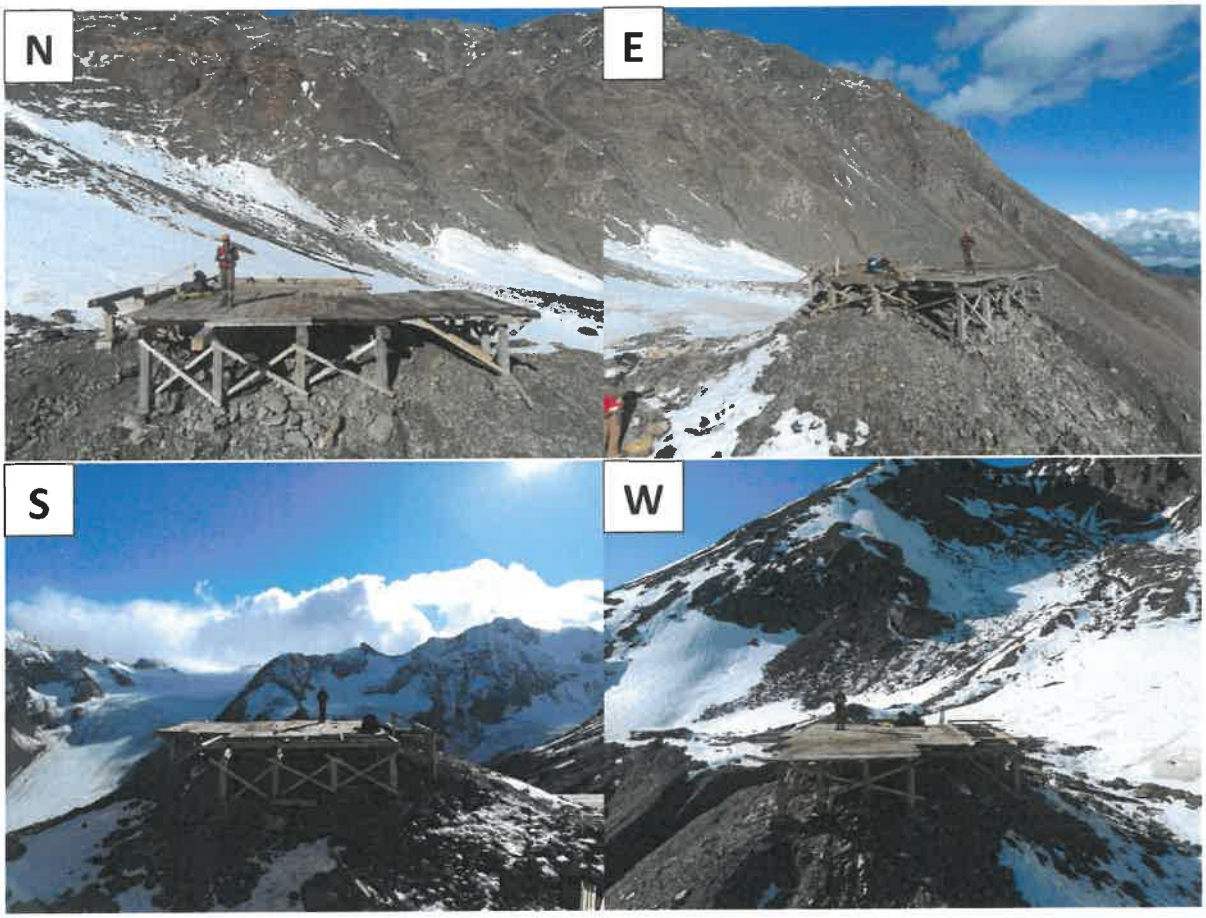

Photo 68: Paradise Drill Pad before reclamation (Note: photos taken in 2022).

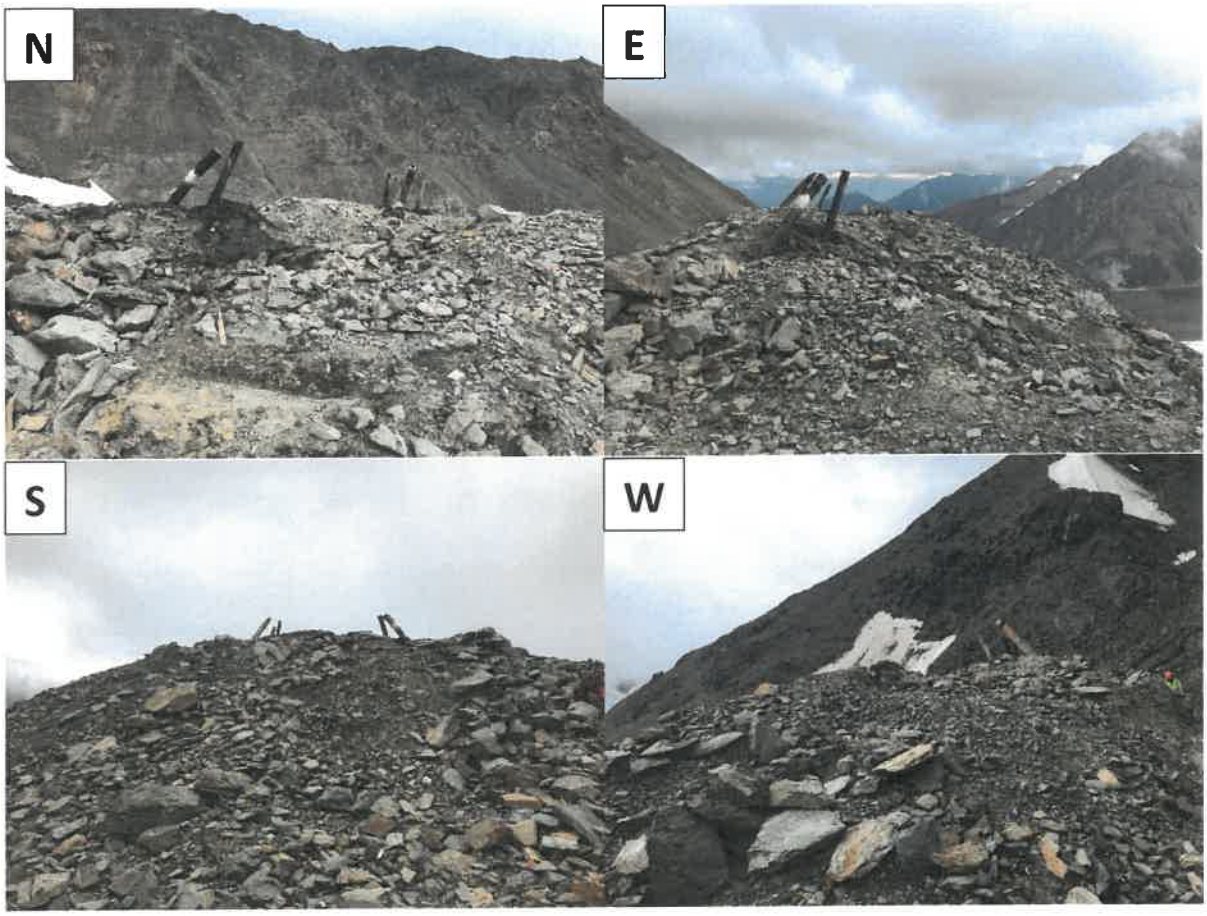

Photo 69: Paradise Drill Pad after reclamation.

Terminus

Photo 70: Terminus Drill Pad before reclamation (Note: Photo taken in 2022).

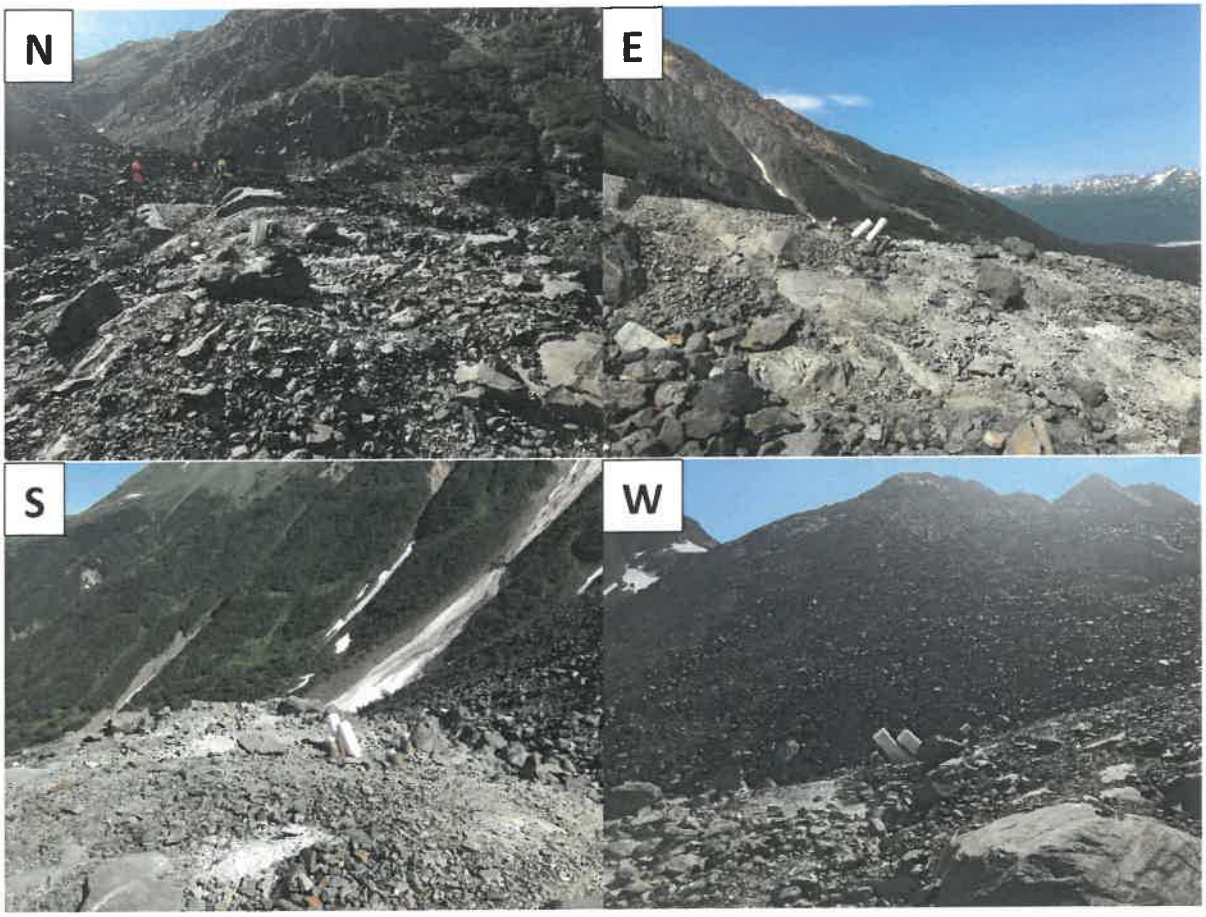

Photo 71: Terminus Drill Pad after reclamation.

Sara Creek

Photo 72: Sara Creek Helipad pre-build.

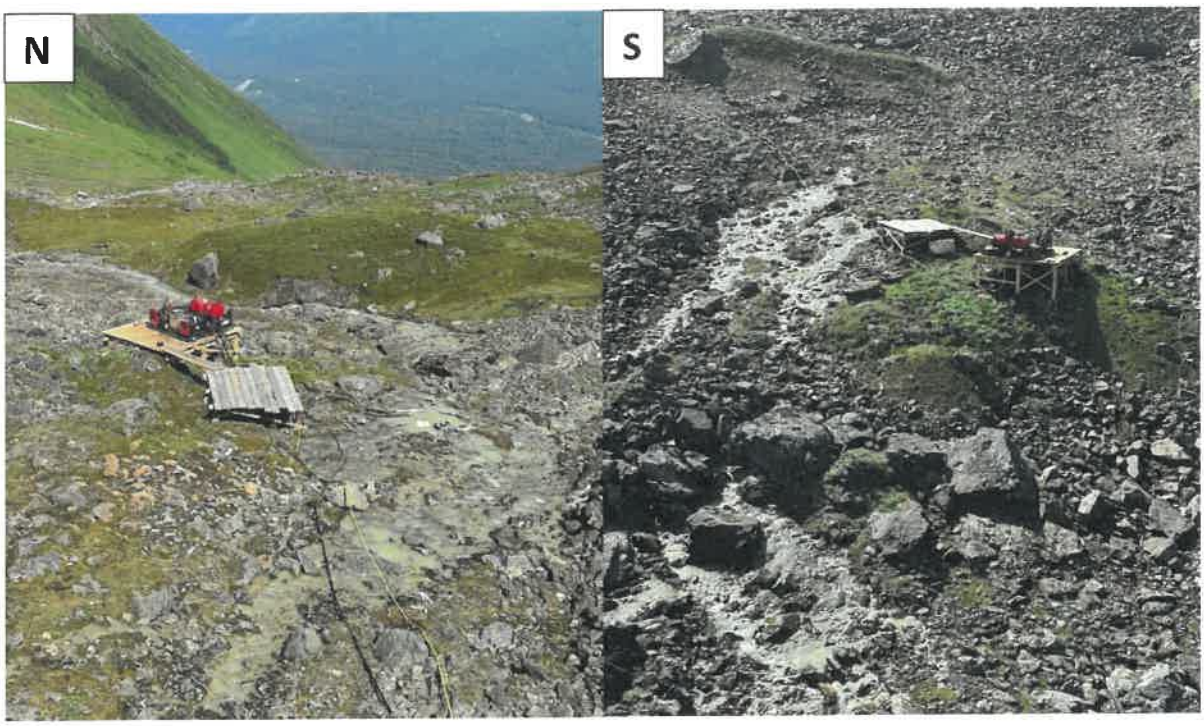

Photo 73: Sara Creek Helipad (no equipment on deck). Pad retains full decking for future use.

U6

Photo 74: U6 Heli Pad before reclamation (Note: Photo taken in 2022).

Photo 75: U6 Heli Pad after reclamation.

Camp

Photo 76: Camp Heli Pad before reclamation.

Photo 77: Camp Heli Pad after reclamation (no longer exists).

Overburden Drill Pads

A2023-P1-05

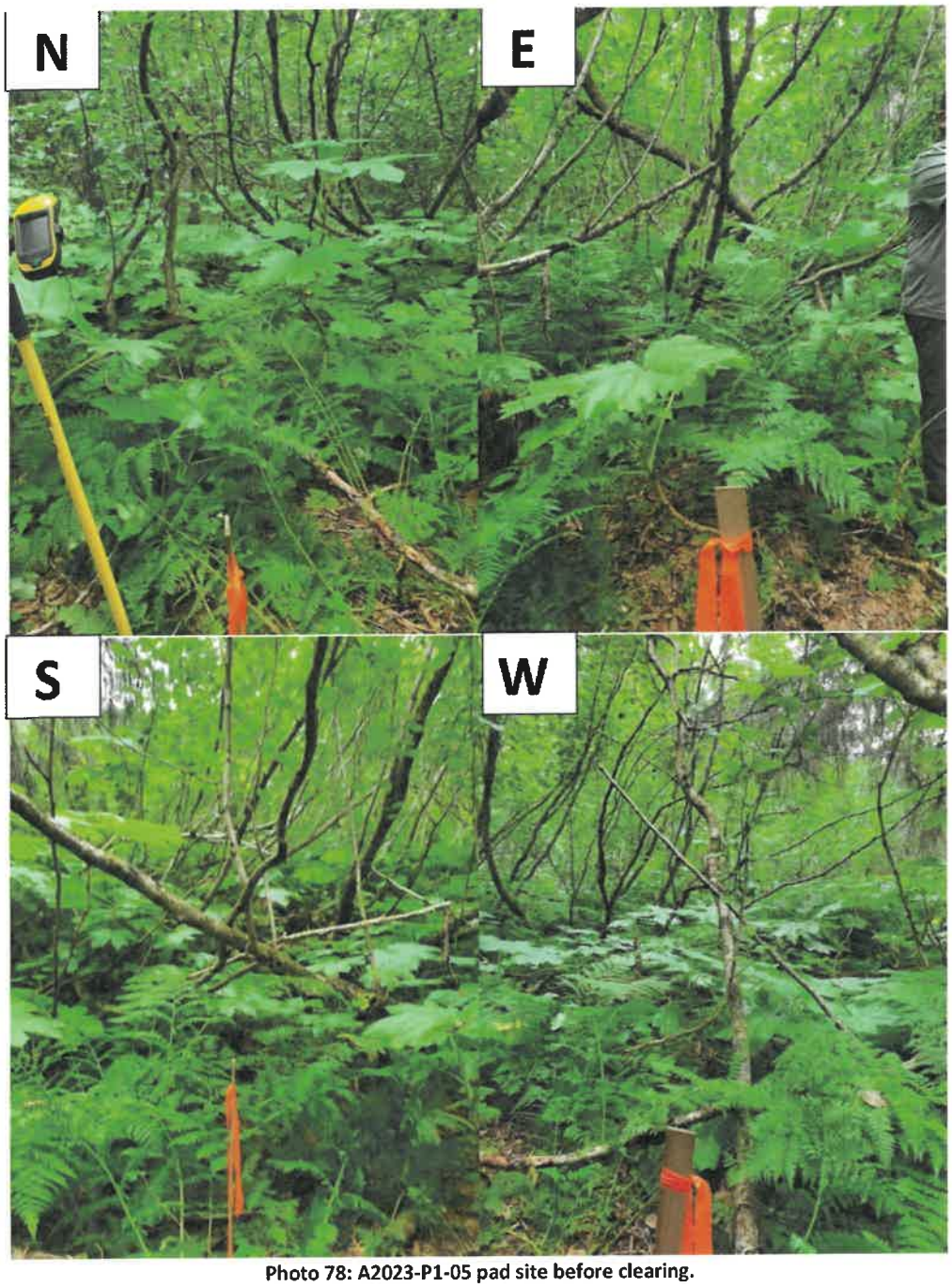

Photo 78: A2023-P1-05 pad site before clearing.

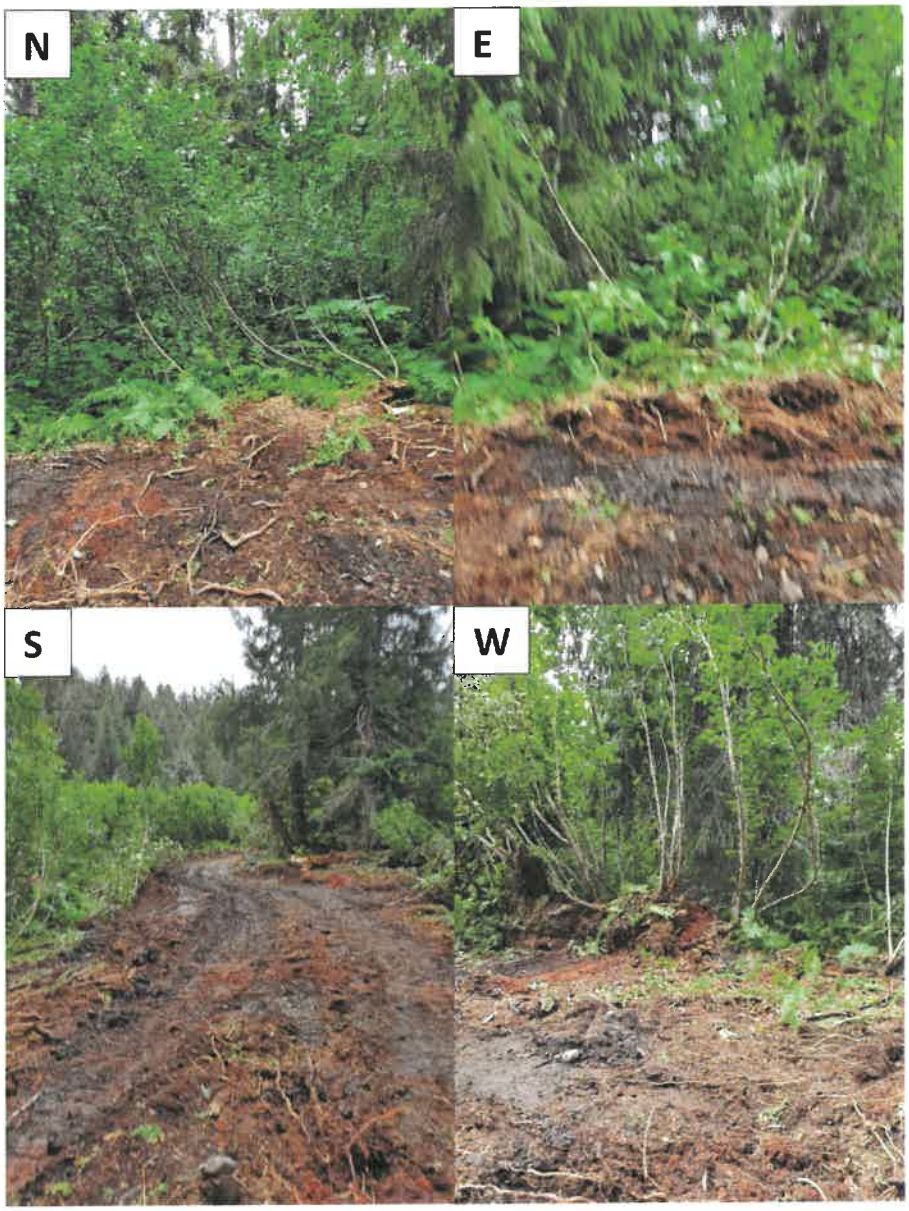

Photo 79: A2023-P1-05 pad site after clearing.

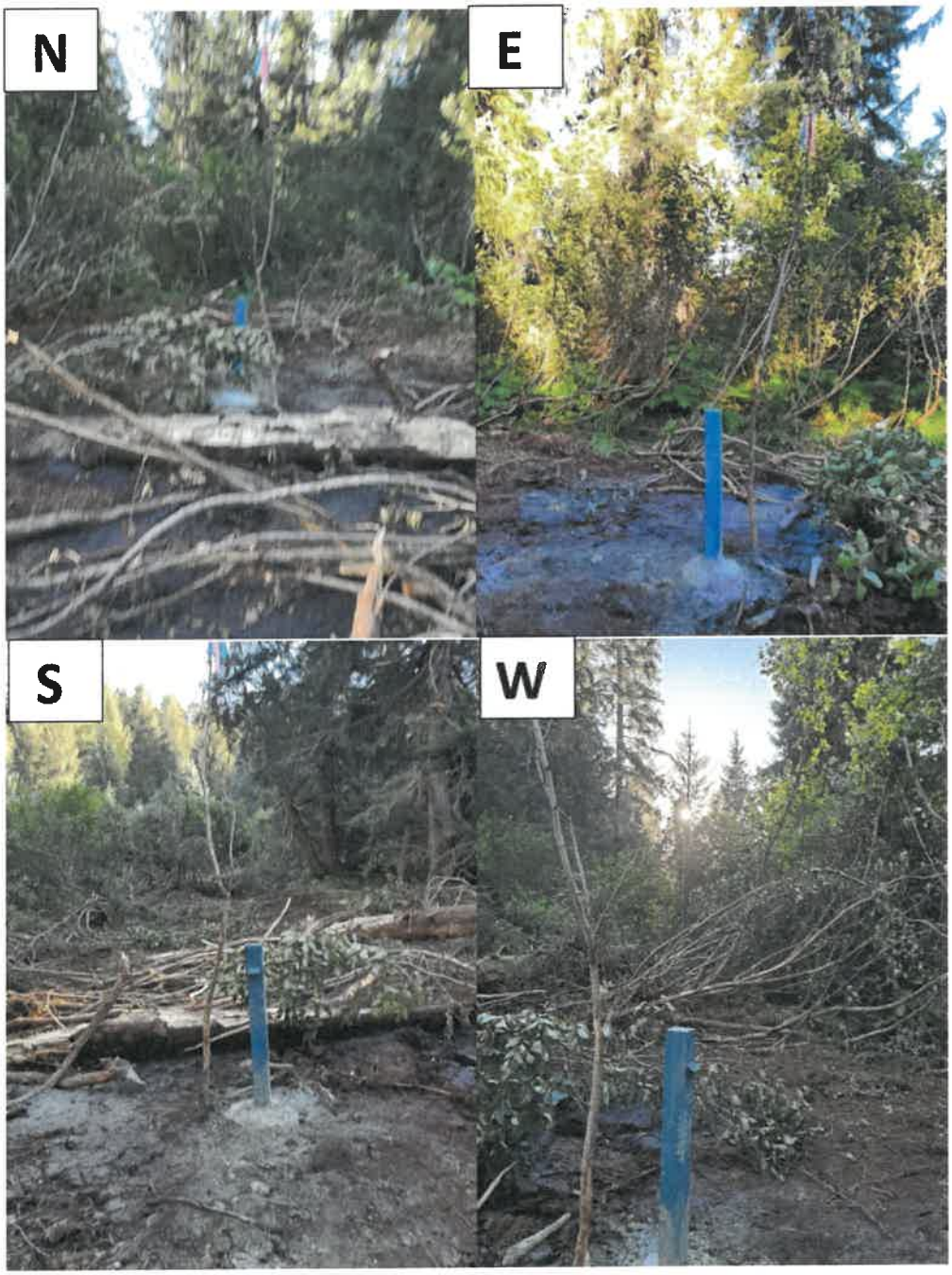

Photo 80: A2023-P1-05 pad after reclamation.

A2023-P1-06

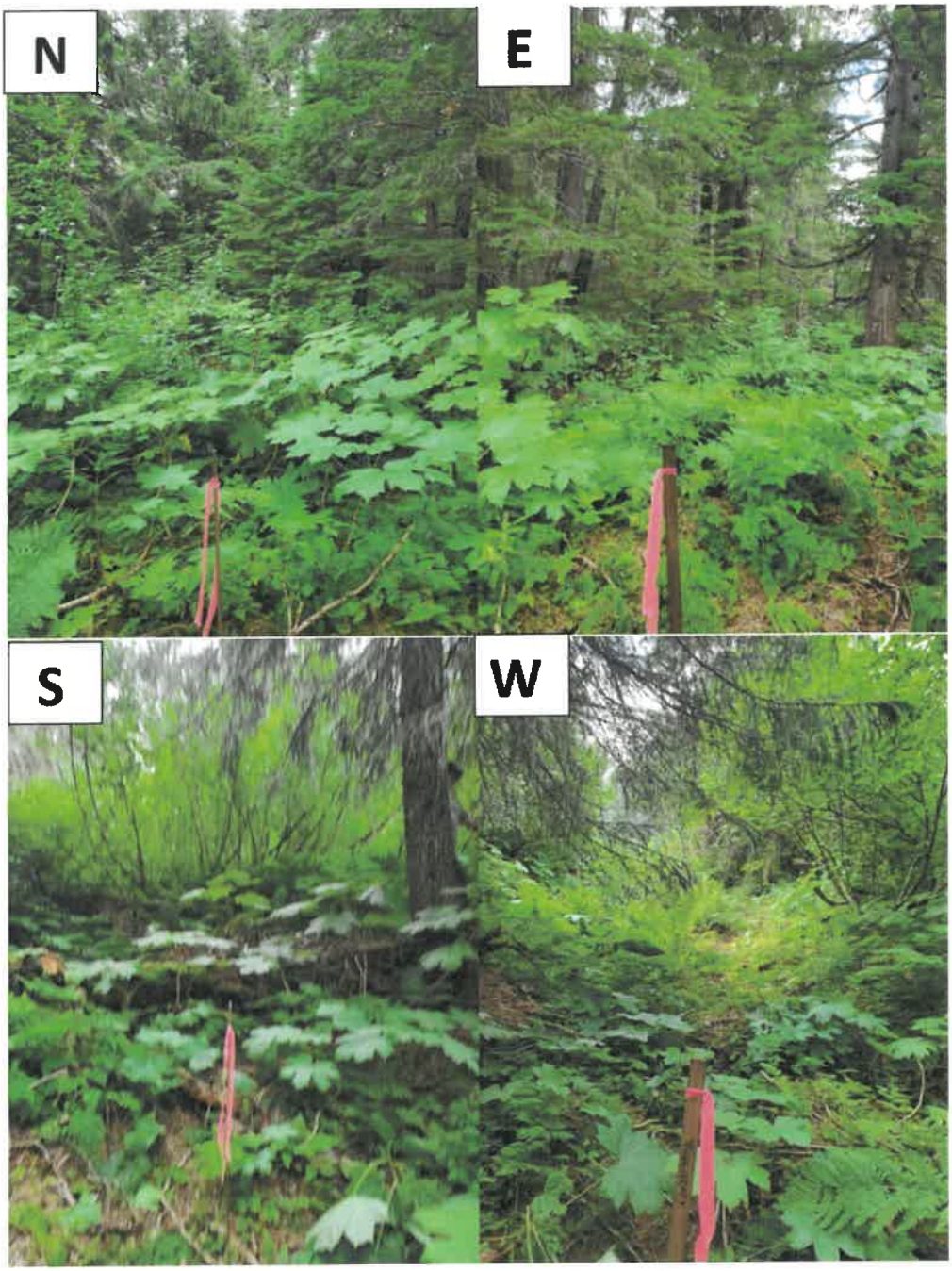

Photo 81: A2023-P1-06 pad site before clearing.

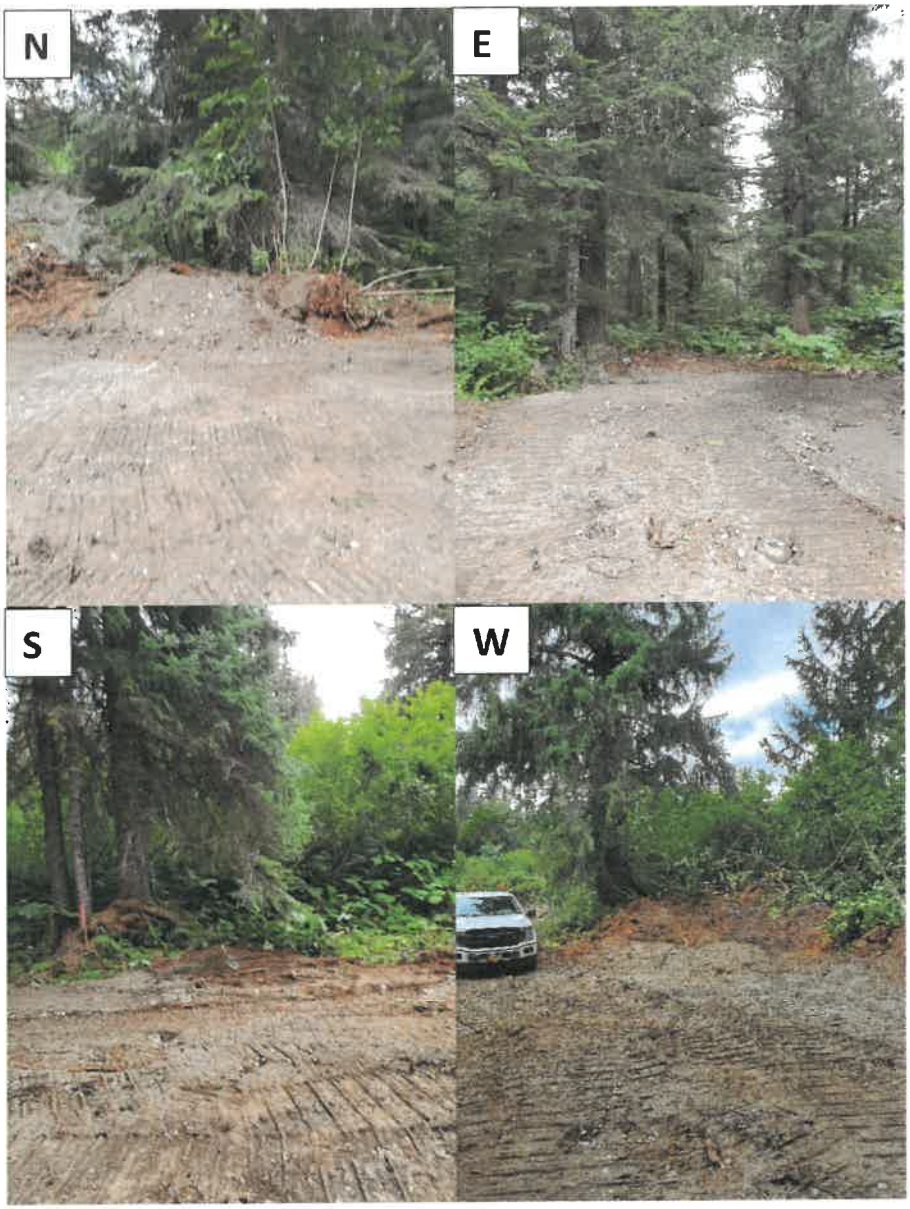

Photo 82: A2023-P1-06 pad site after clearing.

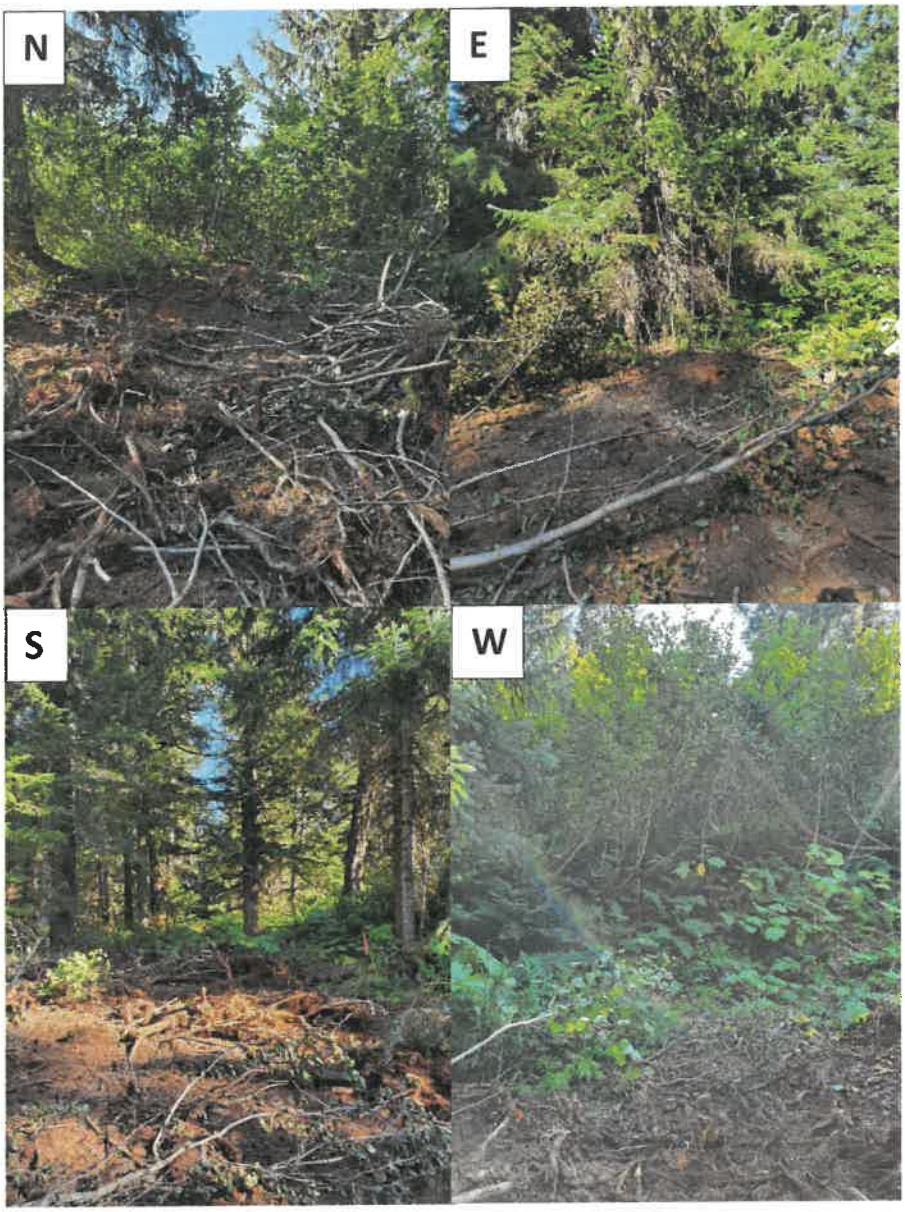

Photo 83: A2023-P1-06 pad site after reclamation.

A2023-P1-07

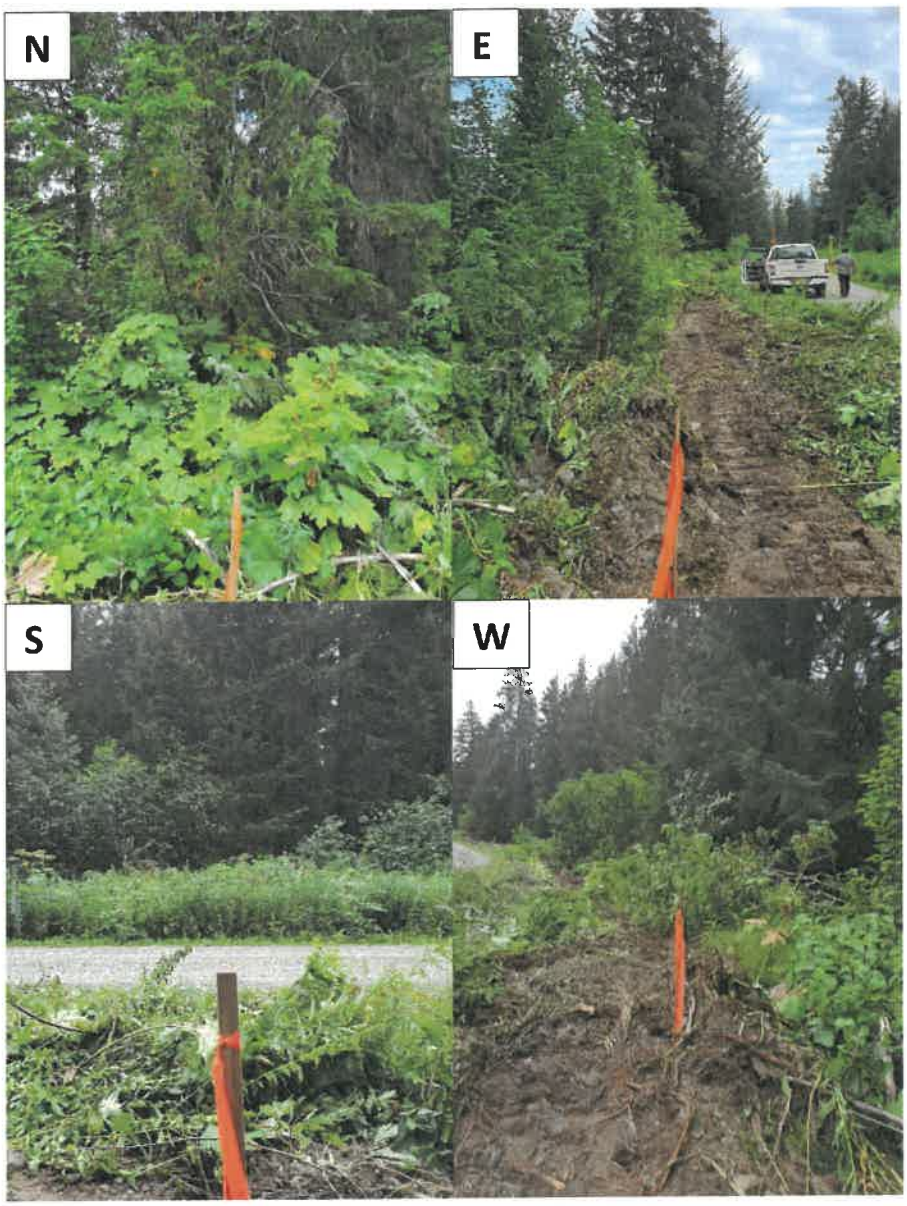

Photo 84: A2023-P1-07 pad site before clearing.

Photo 85: A2023-P1-07 pad site after clearing. Site not reclaimed by Constantine per forester.

A2023-P1-08

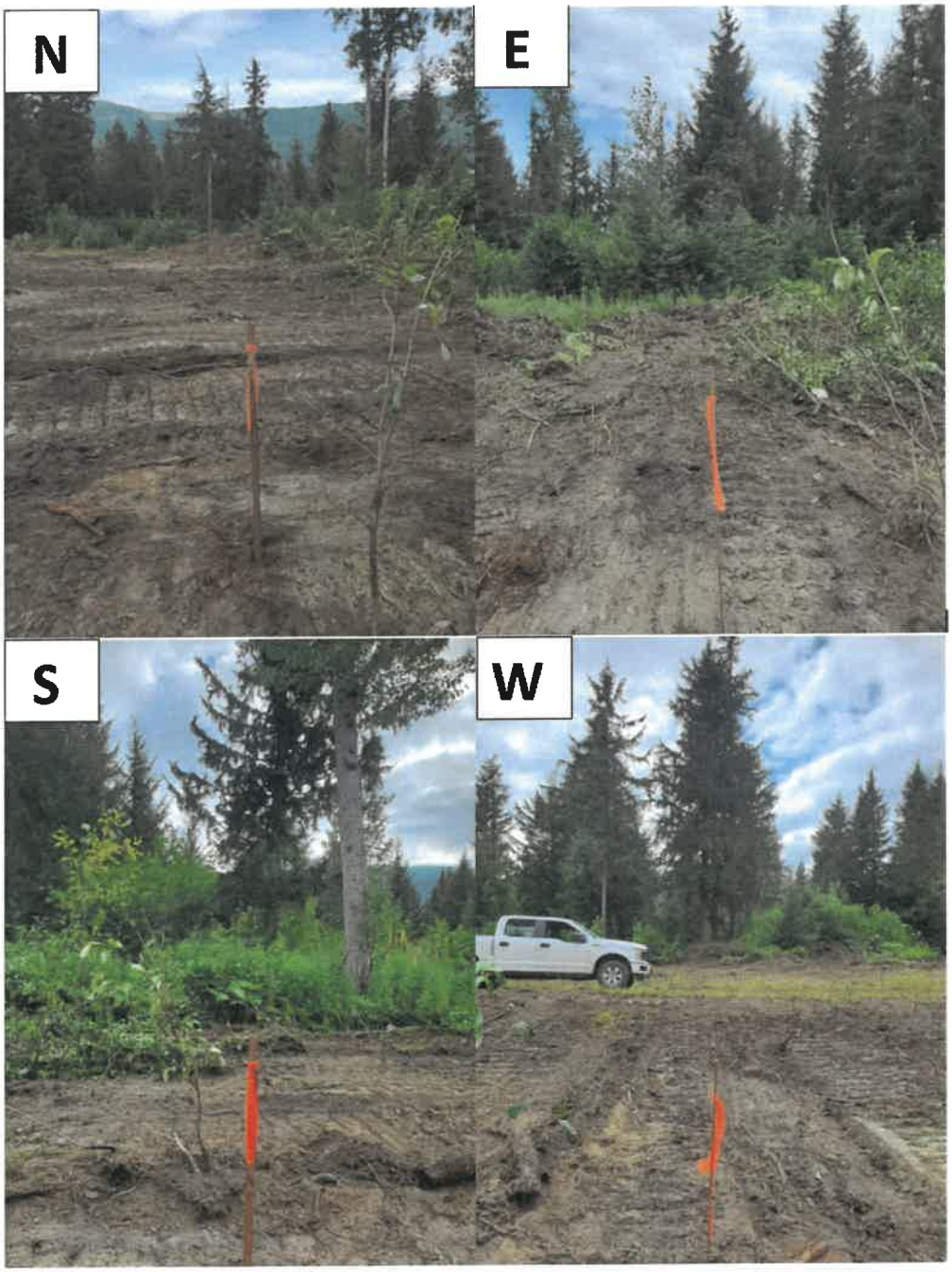

Photo 86: A2023-P1-08 pad site before clearing. Site not reclaimed by Constantine per forester.

A2023-P1-09

Photo 87: A2023-P1-09 pad site before clearing.

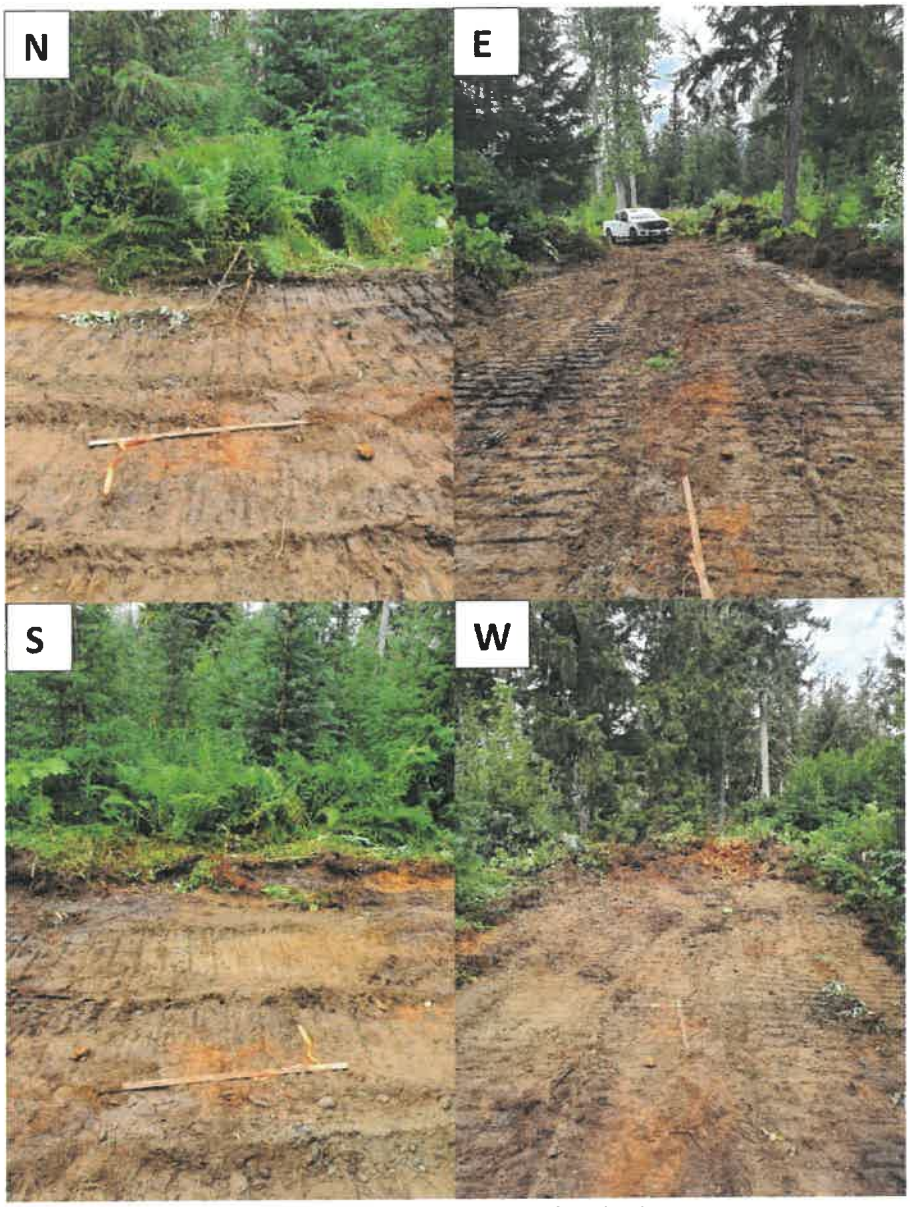

Photo 88: A2023-P1-09 pad site after clearing.

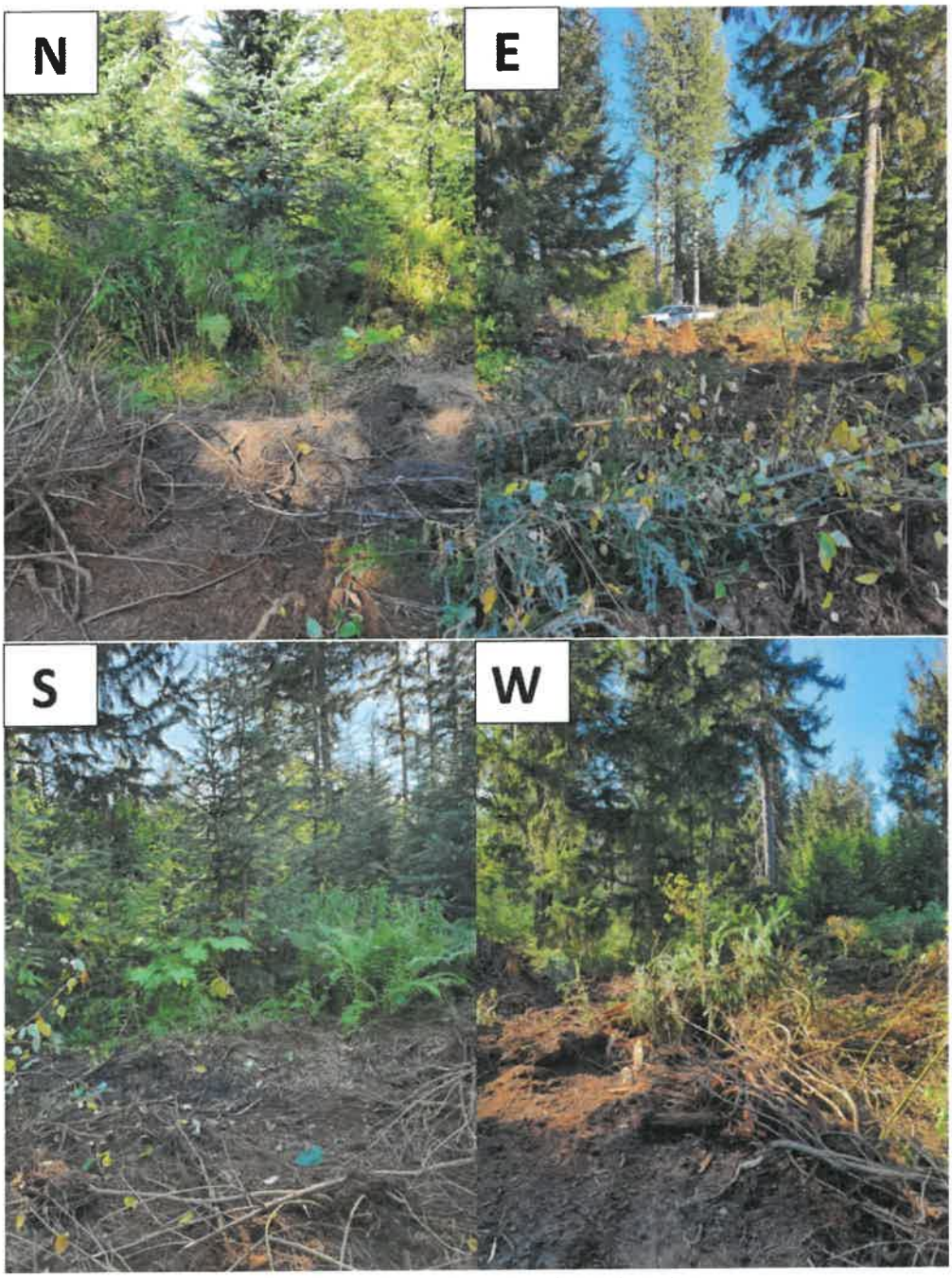

Photo 89: A2023-P1-09 pad site after reclamation.

A2023-P1-10

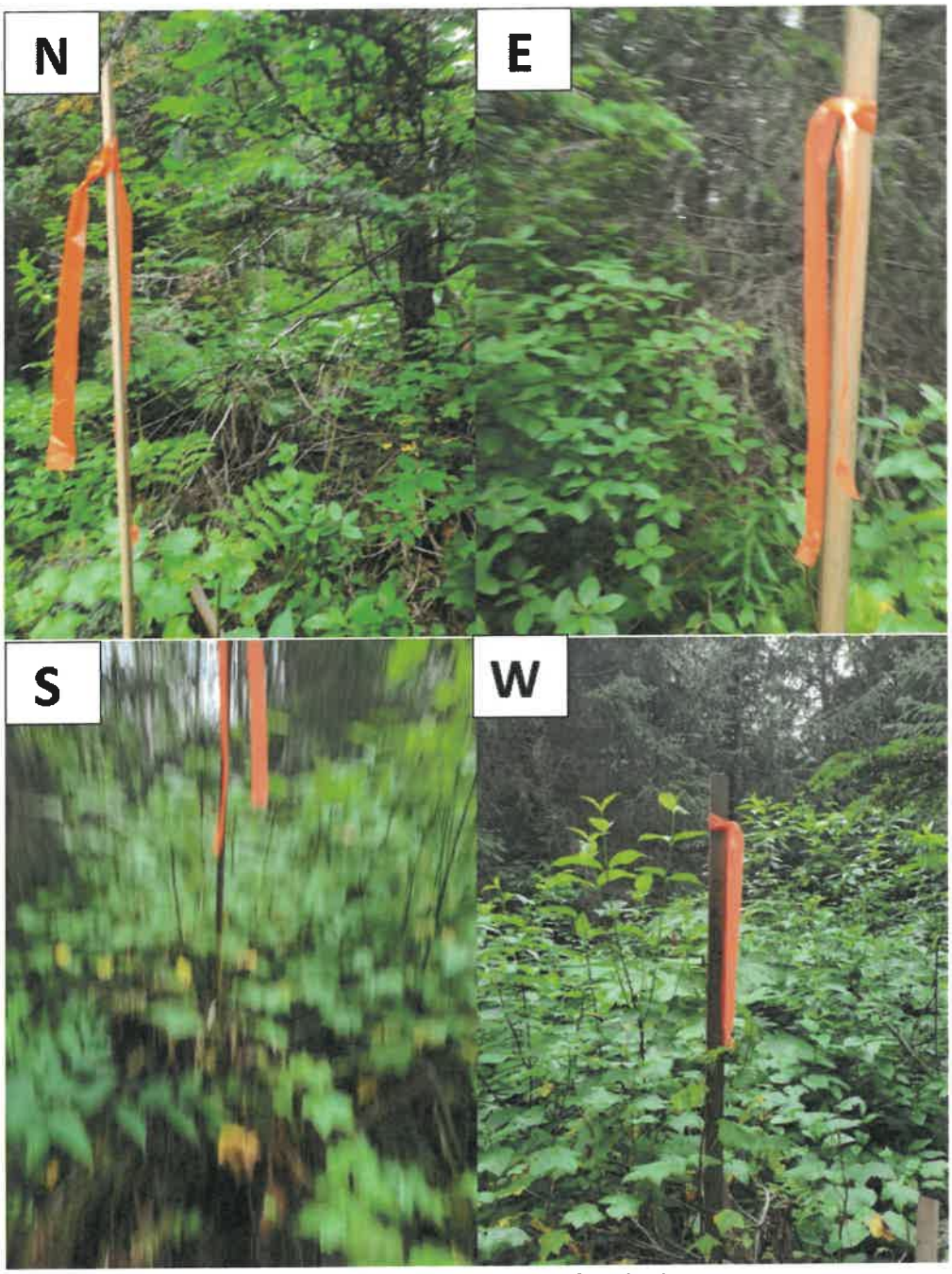

Photo 90: A2023-P1-10 pad site before clearing.

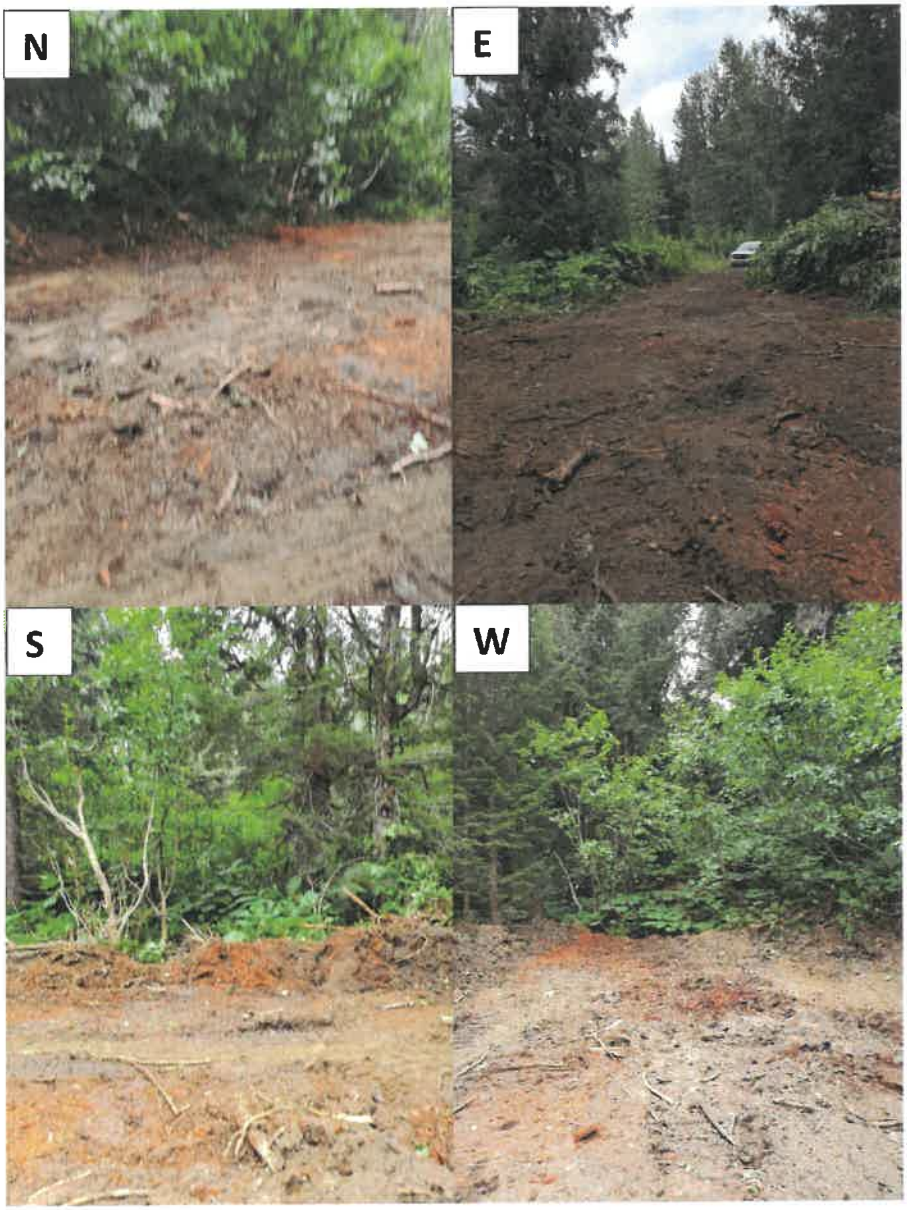

Photo 91: A2023-P1-10 pad site after clearing.

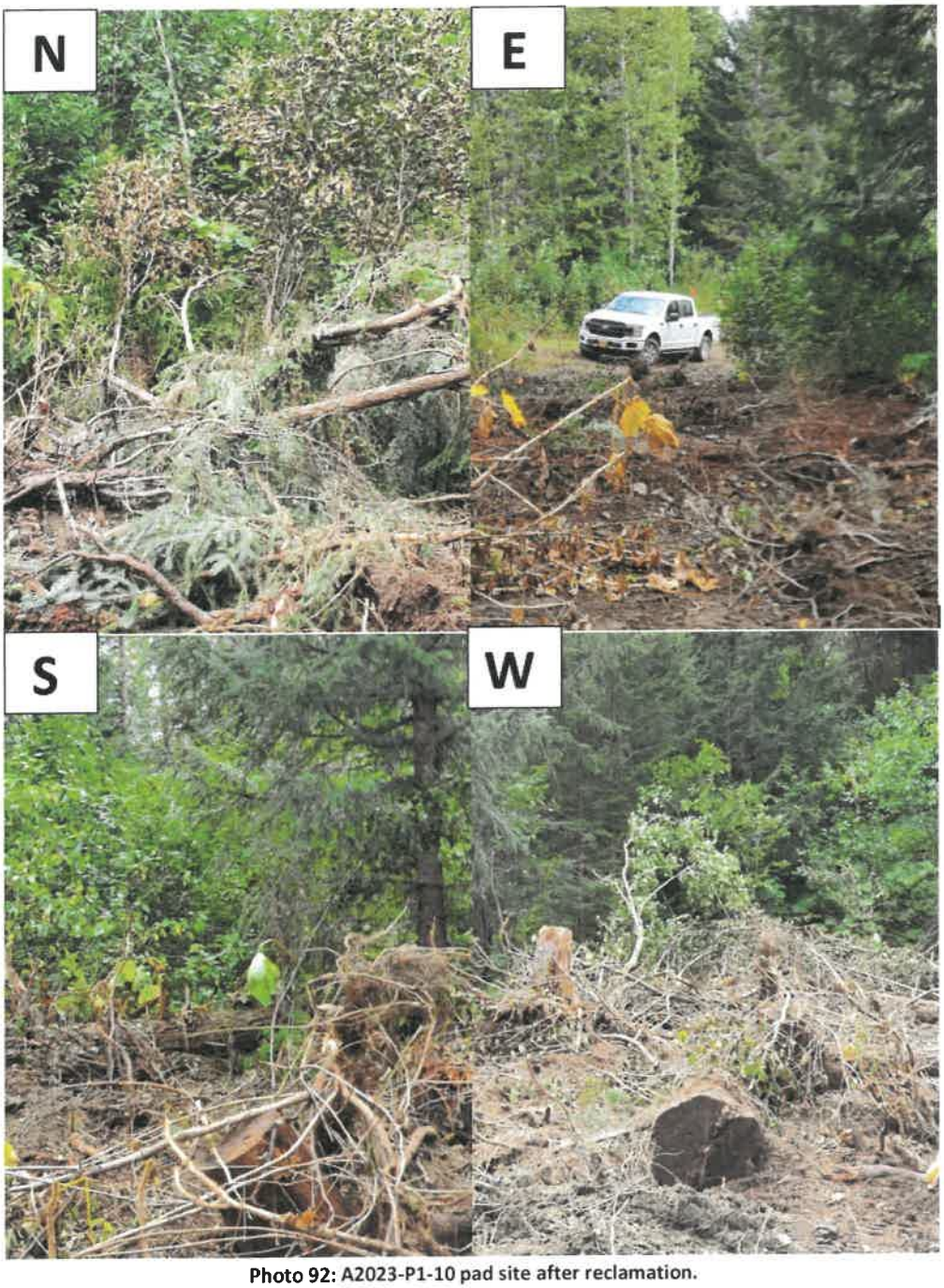

Photo 92: A2023-P1-10 pad site after reclamation.

A2023-P1-12

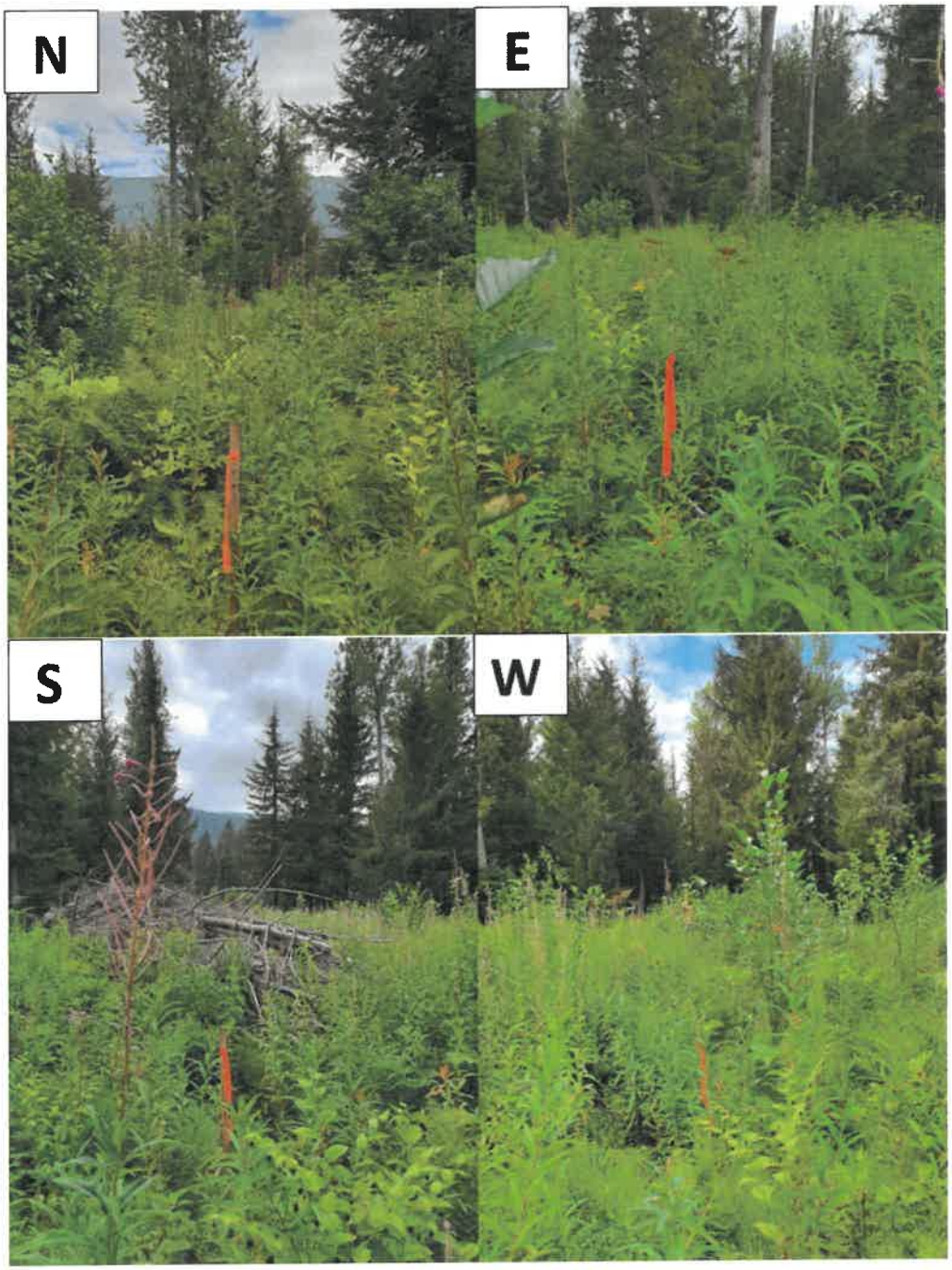

Photo 93: A2023-P1-12 pad site before clearing.

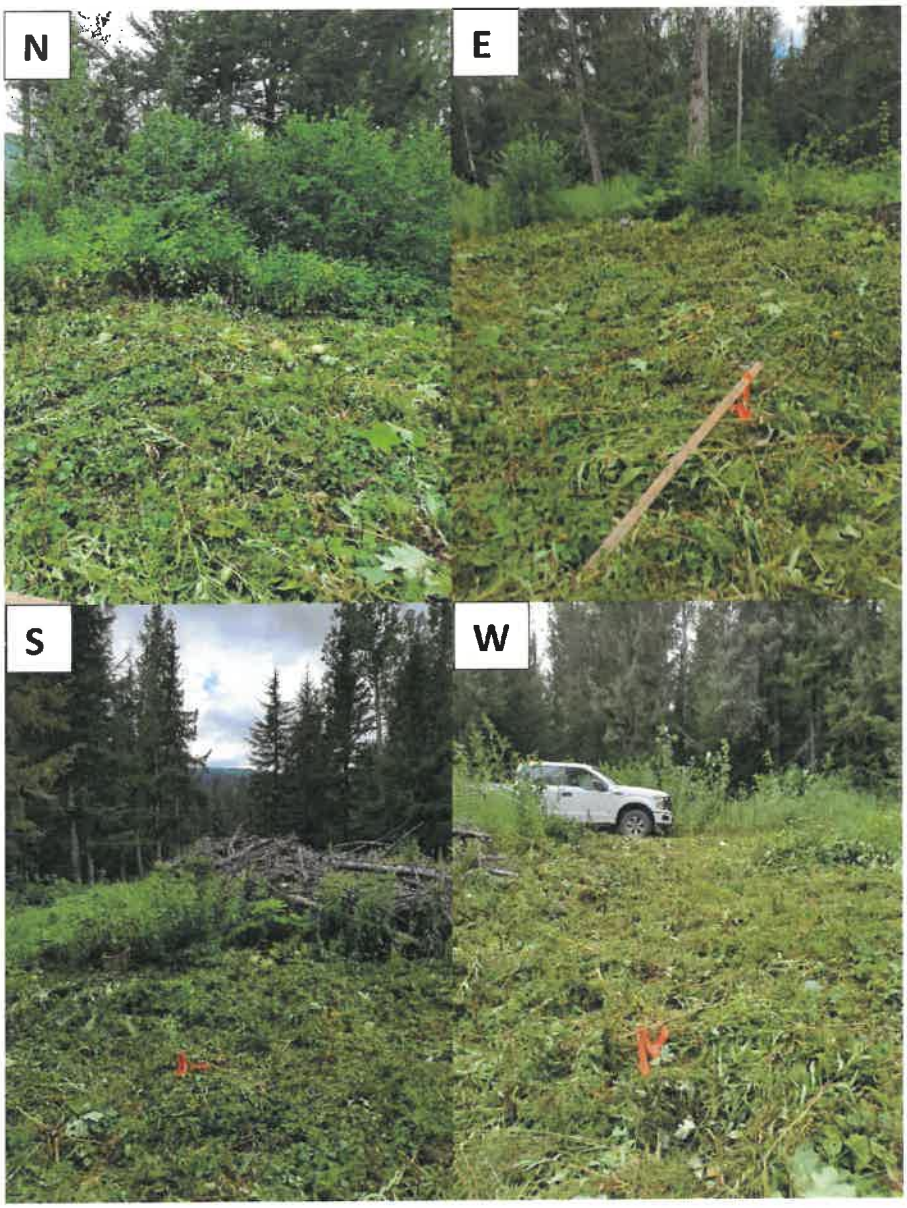

Photo 94: A2023-P1-12 pad site after clearing. Hand brushing only, not included in disturbance calculations. No reclamation required.

A2023-P2-06

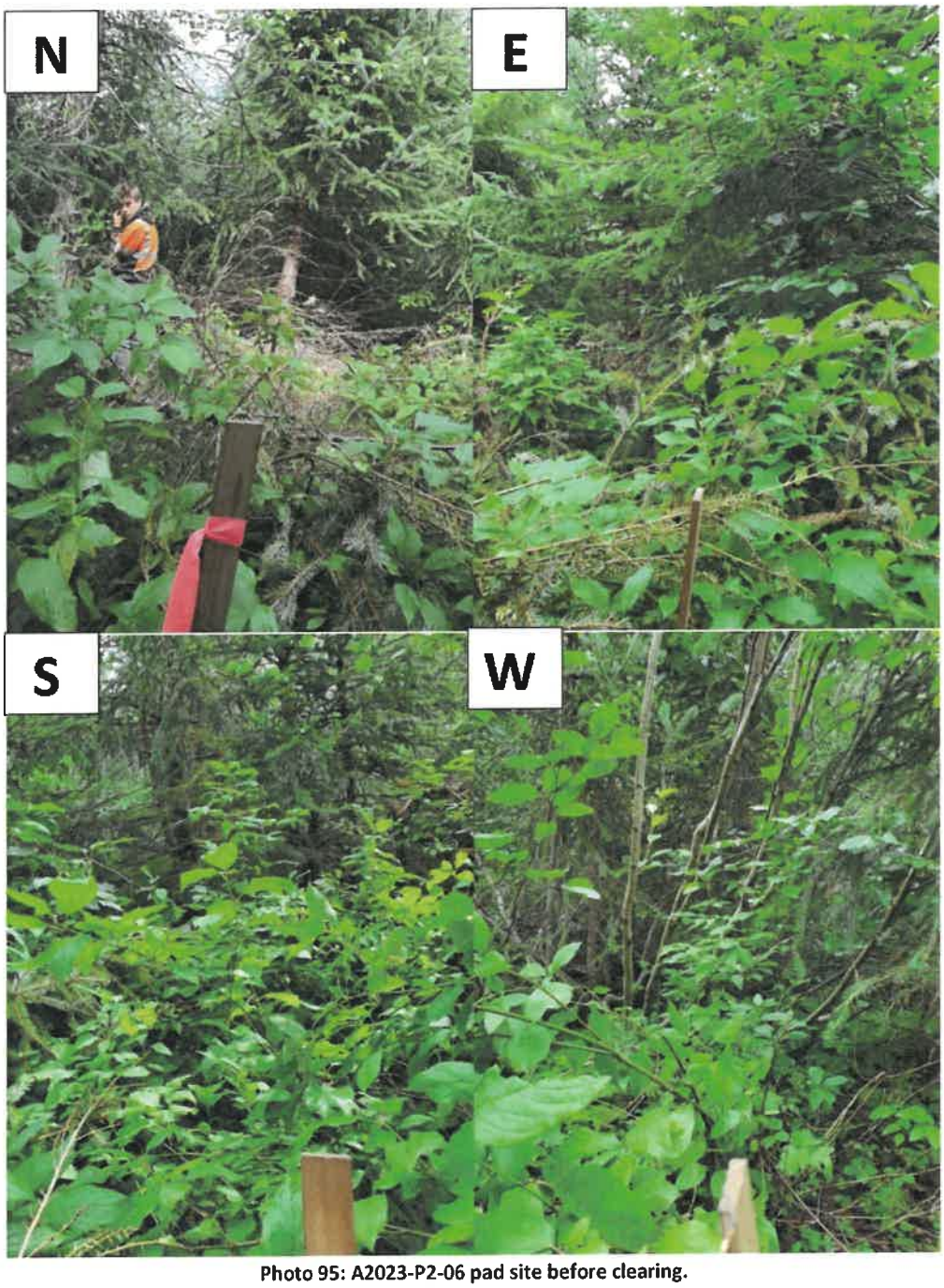

Photo 95: A2023-P2-06 pad site before clearing.

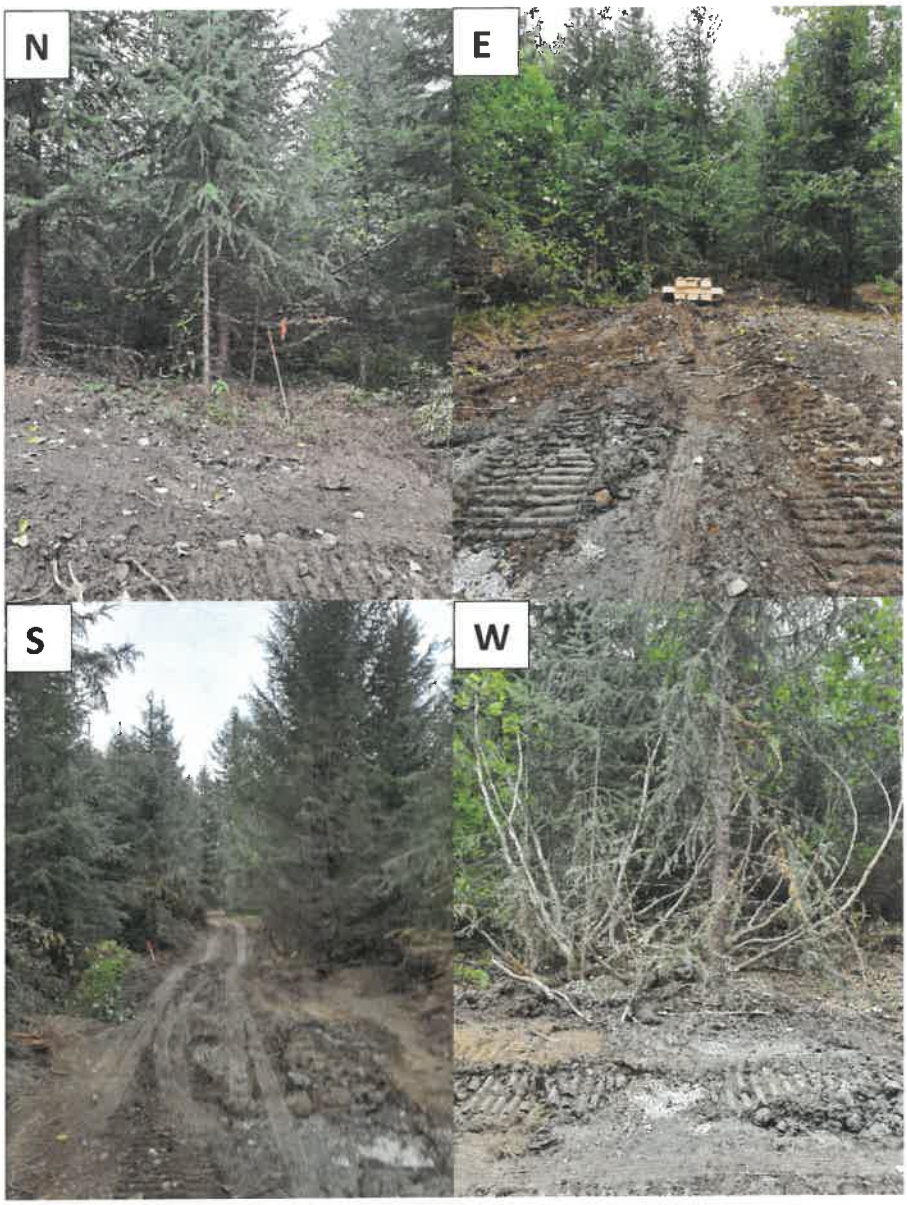

Photo 96: A2023-P2-06 pad site after drilling.

Photo 97: A2023-P2-06 pad site after reclamation.

A2023-P2-08

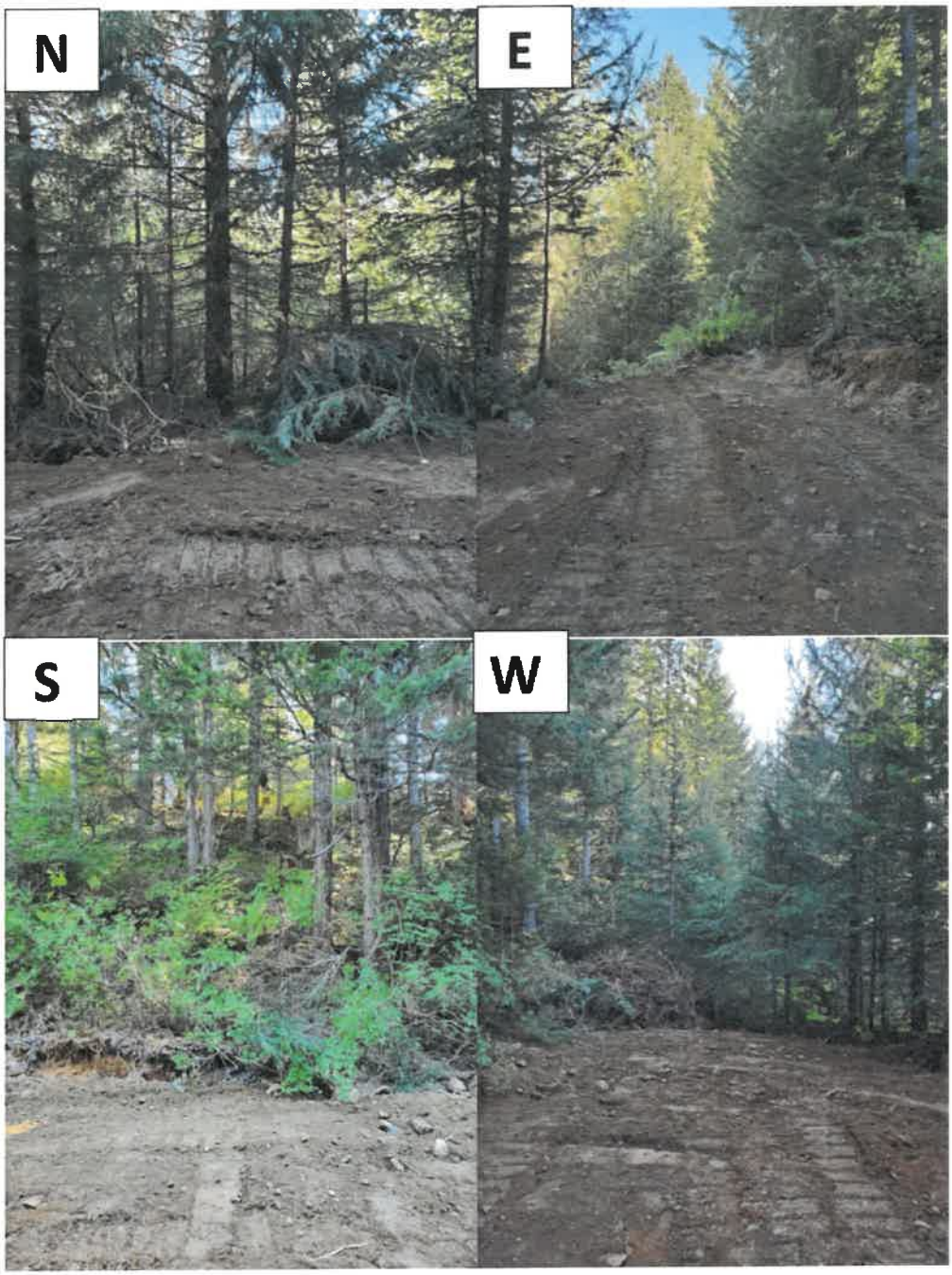

Photo 98: A2023-P2-08 pad site after clearing.

A2023-P2-09

Photo 99: A2023-P2-09 pad site before clearing.

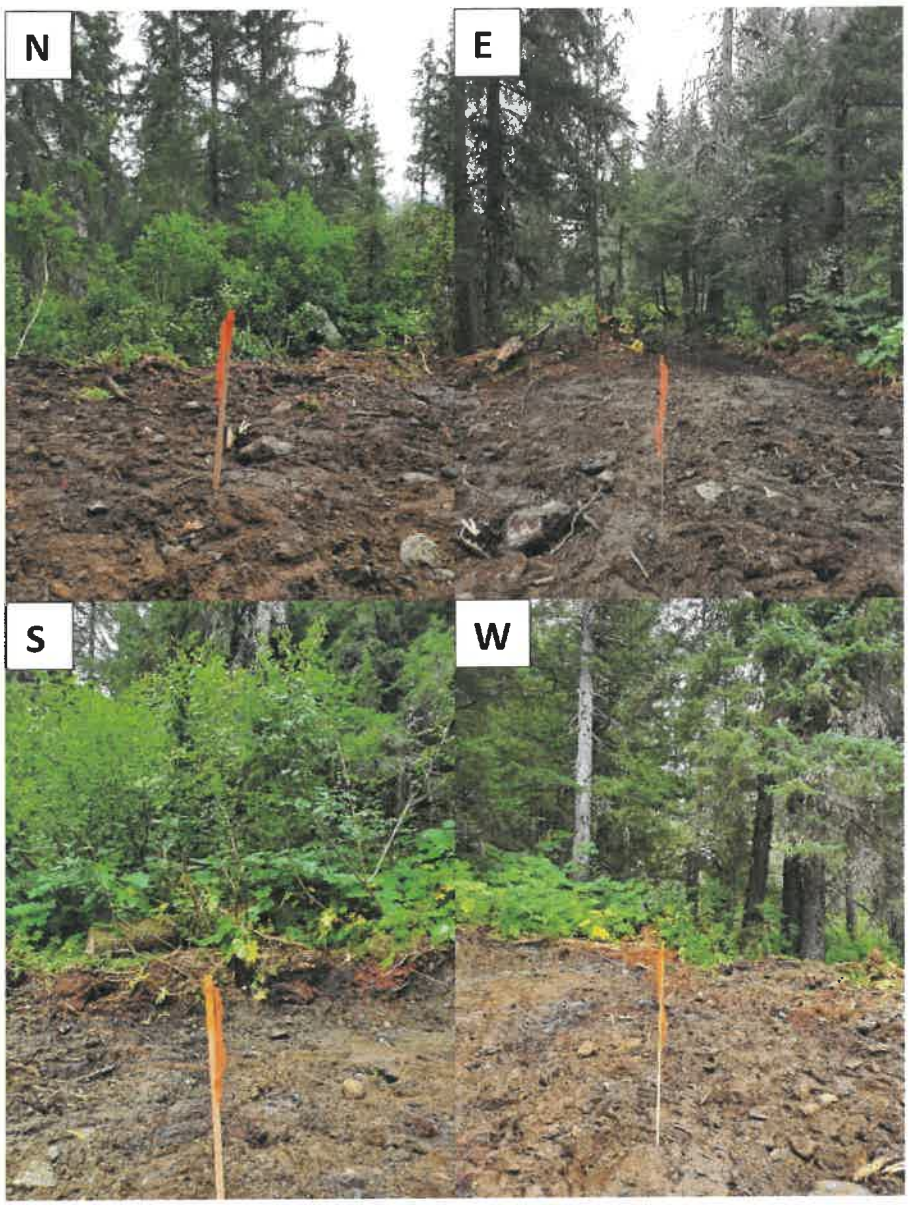

Photo 100: A2023-P2-09 pad site after clearing.

Photo 101: A2023-P2-09 pad site after reclamation.

Pump Pads

Sara Creek

Photo 102: Sara Creek pump pad and Sara Creek helipad site pre-build.

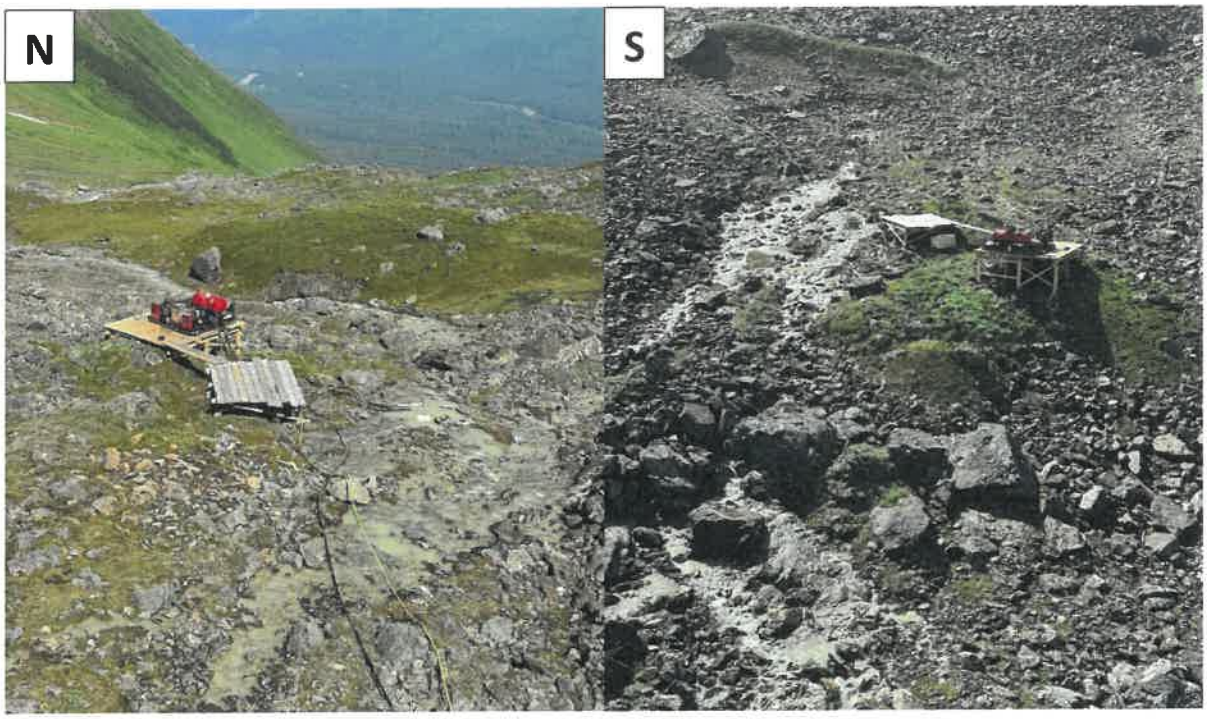

Photo 103: Sara Creek pump pad and Sara Creek helipad (no equipment on deck). Sara Creek was used to source water for UM, Merrill's, Styker, and Canada Pad 2023 drilling. Pad retains full decking and remains unreclaimed for potential future use.

Mid-Station

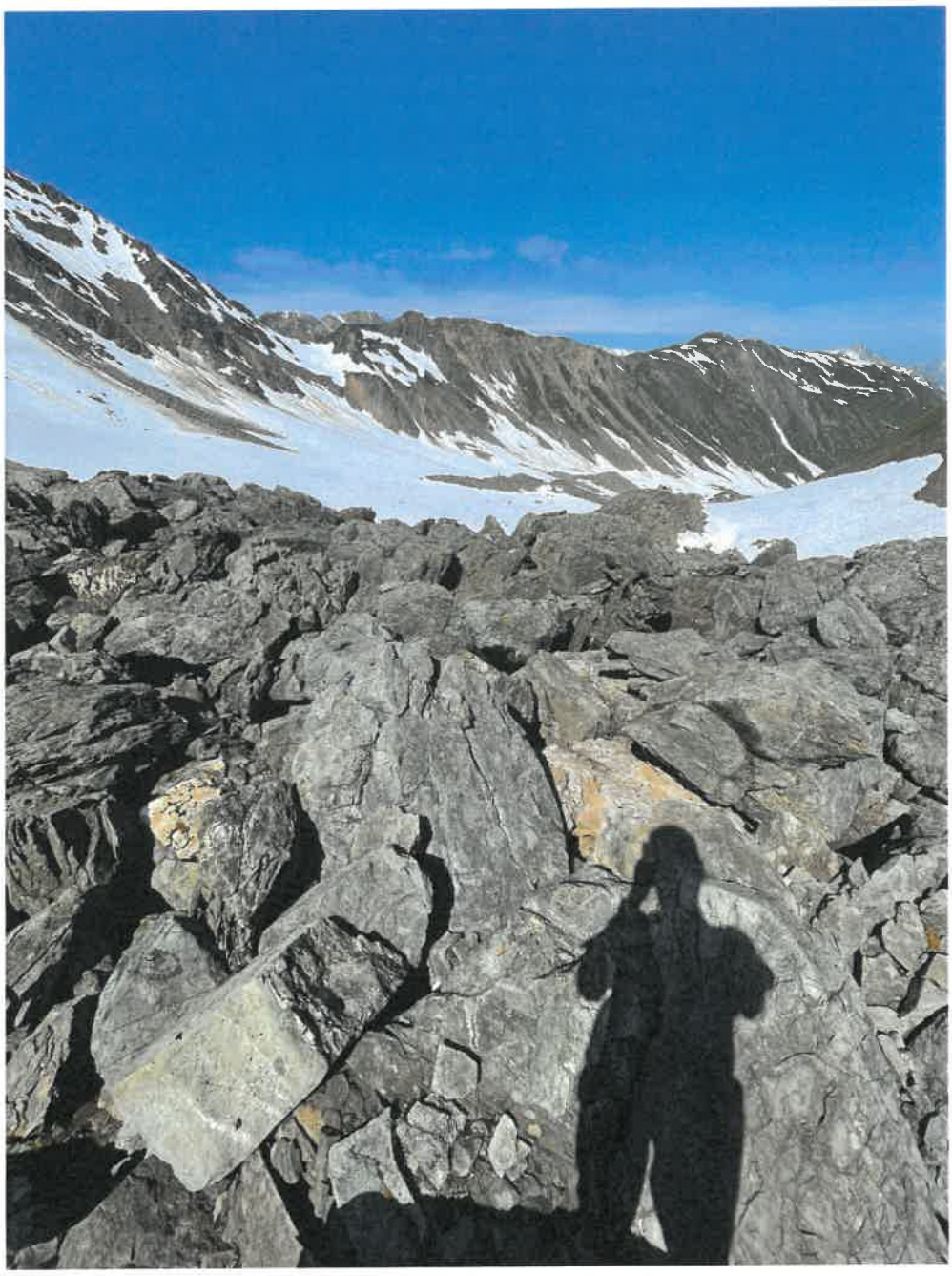

Photo 104: Mid-Station pump pad site pre-build.

Photo 105: Mid-Station Pump pad. Pad retains decking and remains unreclaimed for future use.

Onion

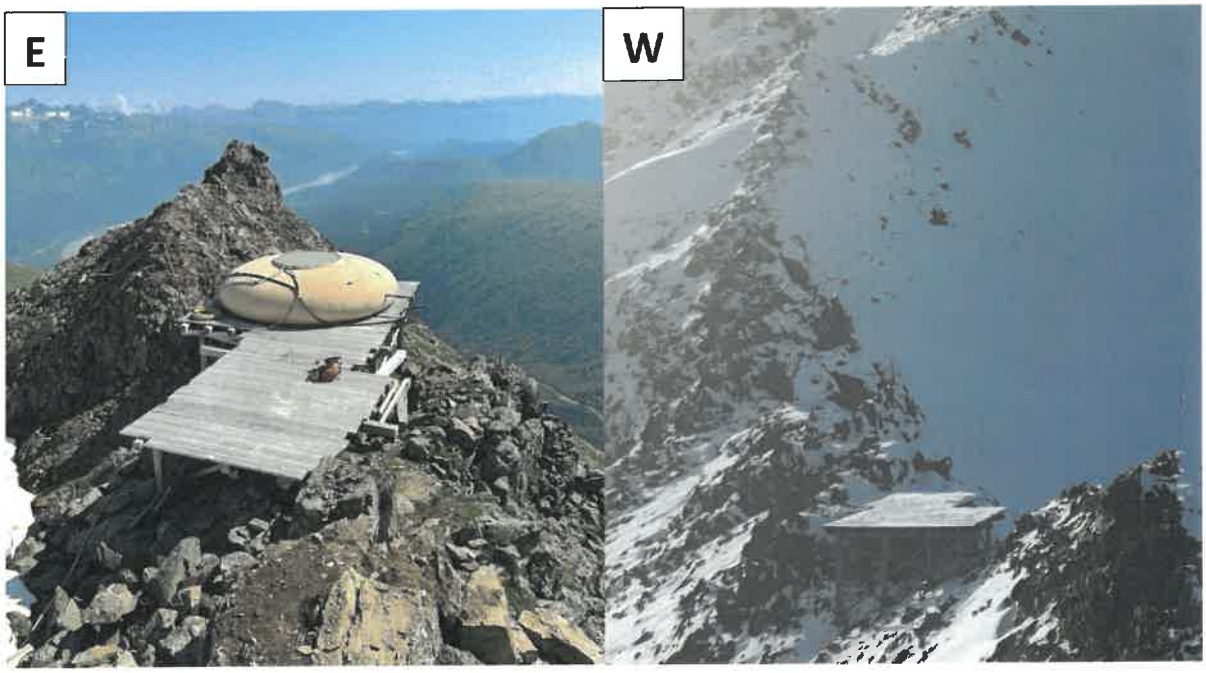

Photo 106: Onion pad with water storage bladder (left) and with bladder removed (right). Pad retains full decking and remains unclaimed for potential future use.

Water Sources

Sara Creek

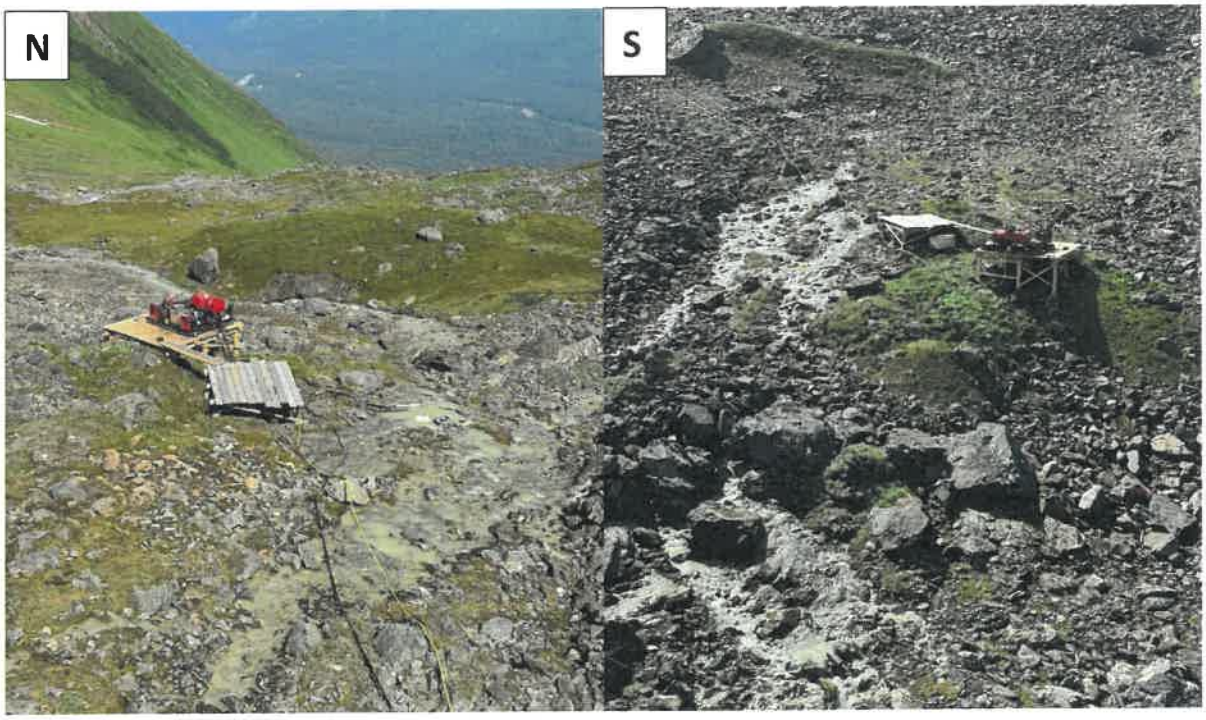

Photo 107: Sara Creek water source under TWUA authorization number F2019-048 Amendment #2/3.

CMR14-63 aka KD

Photo 108: CMR14-63 aka KD water source under TWUA authorization number F2021-024 Amendment #1.

Marble Creek

Photo 109: Orthomosaic image of Marble Creek water source under TWUA authorization number F2019-049.

Christmas Creek

Photo 110: Christmas Creek water source under TWUA authorization number F2021-024 Amendment #1.

Drill Site #	Latitude (ddd.mmmm)	Longitude (-ddd.mmmm)	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Fuel Storage (OnSite/OffSite)	Tundra Mat	Trash Containment	Sanitary Facilities	Drill Additives	Artesian Zone	Water Discharged	Reclaimed (pending regulatory approval)	Plugged	Cemented	Standing Pipe	Revegetated	Date Reclaimed (pending regulatory approval)
CMR23-151	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	6/23/2023
CMR23-152	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	6/18/2023
CMR23-153	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	6/25/2023
CMR23-154	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	6/29/2023
CMR23-155	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	6/29/2023
CMR23-156	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	Yes	N/A	7/7/2023
CMR23-157/CMR23-157-01	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	7/16/2023
CMR23-158	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	No	No	N/A	7/12/2023
CMR23-159	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	7/18/2023
CMR23-160/CMR23-160-01	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	7/31/2023
CMR23-161	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	7/22/2023
CMR23-162B	59.3973	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	7/28/2023
CMR23-163	59.3969	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/9/2023
CMR23-163B	59.3969	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/9/2023
CMR23-164	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/15/2023
CMR23-165	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/15/2023
CMR23-166	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/30/2023
CMR23-167	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/20/2023
CMR23-168	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/26/2023
CMR23-169	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/30/2023
CMR23-170	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	9/10/2023
CMR23-171	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	9/3/2023
CMR23-172	59.397	-136.389	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	9/8/2023
CMR23-173	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	No	No	N/A	9/11/2023
CMR23-174	59.3947	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	9/17/2023
CMR23-175	59.3935	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	9/20/2023
CMR23-176	59.3947	-136.39	NAD83	5690	AA 27213	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
CMR23-177	59.3978	-136.344	NAD83	5690	AA 27268	Off Site	No	Off Site	Off Site	Yes	No	Yes	Yes	Yes	Yes	No	N/A	9/28/2023
CMR23-178	59.3978	-136.344	NAD83	5690	AA 27268	Off Site	No	Off Site	Off Site	Yes	No	Yes	No	No	No	Yes	N/A	N/A
GT23-020	59.3944	-136.385	NAD83	5690	AA 27214	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
GT23-021	59.3962	-136.395	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	No	No	N/A	7/9/2023
GT23-022	59.3962	-136.395	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	No	No	N/A	7/14/2023
GT23-023	59.3962	-136.395	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
GT23-024	59.3962	-136.395	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	No	No	N/A	8/10/2023
GT23-025	59.3962	-136.395	NAD83	5690	AA 27191	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
GT23-026	59.3974	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	Yes	Yes	Yes	No	N/A	8/31/2023
GT23-027	59.3974	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
GT23-028	59.3974	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
GT23-029	59.3974	-136.388	NAD83	5690	AA 27195	Off Site	No	Off Site	Off Site	Yes	No	No	No	No	No	Yes	N/A	N/A
A2023-P1-5	59.4193	-136.294	NAD83	5690	662062	Off Site	No	Off Site	Off Site	No	No	No	No	No	No	Yes	No	N/A
A2023-P1-6	59.4211	-136.2922	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/22/2023
A2023-P1-7	59.4226	-136.2865	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	No	No	No	Yes	No	N/A
A2023-P1-8	59.4237	-136.283	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/12/2023
A2023-P1-9	59.4221	-136.2826	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/27/2023
A2023-P1-10	59.4206	-136.2823	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	No	No	No	Yes	No	N/A
A2023-P1-12	59.4236	-136.2762	NAD83	5690	662064	Off Site	No	Off Site	Off Site	No	No	No	No	No	No	Yes	No	N/A
A2023-P2-6	59.423	-136.294	NAD83	5690	662062	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/25/2023
A2023-P2-8	59.4188	-136.2785	NAD83	5690	662063	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/30/2023
A2023-P2-9	59.4197	-136.2759	NAD83	5690	662064	Off Site	No	Off Site	Off Site	No	No	No	Yes	Yes	No	No	No	8/28/2023

Sump Pit #	Associated Drill Site	Latitude (ddd.mmmm)	Longitude (-ddd.mmmm)	Datum (NAD83)	Associated APMA	Mining Claim ADL, BLM # or USMS	Discharge Trench	Pit Dimensions	Reclaimed	Date Reclaimed
1	Rudolph Pad CMR23-177	59.3978	-136.344	NAD83	5690	AA 27268		6' x 4'	Yes	4-Oct
2	Rudolph Pad CMR23-178	59.3978	-136.344	NAD83	5690	AA 27268		6' x 4'	Yes	4-Oct

2023 ANNUAL RECLAMATION STATEMENT (33)

☐ Placer Mining
☐ Suction Dredging
☑ Hardrock Exploration

APMA # 5690

Complete and return this statement by December 31, 2023. If you did not operate, fill in your name, check bottom box, sign, and return form.

In accordance with AS 27.19 (Reclamation Act):

I, Merlin Benner hereby file an annual reclamation statement for the 2023 mining operation described in subject Application for Permits to Mine in Alaska. (Submission of this statement does not constitute reclamation approval.)

Volume of material disturbed in 2023: _____ cubic yards (Includes strippings and processed material.)

Sluice days last season: _____ Cubic yards of material processed daily: _____ Annually: _____

Total acreage disturbed in 2023: State 4, Federal 13, Private _____. (Includes stripped areas, mining cuts, overburden and tailing stockpiles and disposal areas, temporary stream diversions, stream bypasses, and settling ponds.) Federal operators should include area of camp and access roads.

Length _____ feet and Width _____ feet of stream diversion.

Stream diversion: ☐ Temporary ☐ Permanent ☑ No Diversion (check one).

Total Area reclaimed in 2023: 2 acres.

Total un-reclaimed acres: 15 (This should match "total acreage currently disturbed" on the 2024 Reclamation Plan Form.)

For areas reclaimed, the following reclamation measures were used (check only measures that were used). **You must include photographs or videotapes of the completed reclamation work:**

☐ Spread and contoured tailings
☐ Spread topsoil, vegetation, overburden muck or fines on the surface of contoured tailings
☐ Reestablished flood plain with stream channel in stable position
☐ Ponds are reclaimed
☐ Backfilled and reclaimed temporary stream diversions
☐ Camp removed, cleaned up and left free of debris
☑ Hardrock Exploration: Complete and submit an electronic Annual Reclamation Report

Other Reclamation Measures Taken:

☐ Did not operate in 2023 and therefore did not conduct reclamation.

Relationship to Claim(s)
☐ Owner ☐ Lessee ☐ Operator
☑ Agent For: Constantine North

Signed Merlin Benner Date 3/27/2024

2024 RECLAMATION PLAN FORM (HARDROCK EXPLORATION)

☑ A. RECLAMATION PLAN	☐ B. RECLAMATION PLAN VOLUNTARY	☐ C. LETTER OF INTENT (34)
(REQUIRED if the operation will disturb five or more acres this year, OR 50,000 cubic yards, OR if the operation has a cumulative disturbed area of five or more acres).	(for an operation below limits shown in Box A but wanting to qualify for the statewide bonding pool. (Operations on BLM Lands and others not filing Letter of Intent).	(less than five acres to be disturbed AND less than 50,000 cubic yards AND less than five acres unreclaimed area).

In accordance with Alaska Statute 27.19, reclamation is required of all mining operations. Reclamation bonding is required of operations with disturbance of 5 acres or greater. Completion of this application will meet the requirements for a "Reclamation Plan" for operations 5 acres and larger in size and for a "Letter of Intent To Do Reclamation" for operations under 5 acres. If you do not intend to use the reclamation methods presented below, you must provide additional information concerning your plans for reclamation under separate attachments.

Total acreage currently disturbed: 15 acres. This should match: "Total Unreclaimed Acres" on your 2023 Annual Reclamation Statement for Small Mines, or line #7 on your 2024 Bond Pool Renewal Form. Disturbed ground includes all unreclaimed mining and exploration activity (excluding camps and roads) since October 1991. Federal operators must include areas of camps and roads.

New acres to be disturbed in 2024 6 acres. Total acreage (currently disturbed plus new acres): 21 acres.

Acreage disturbed by land status: 6 State (general) 1 State (Mental Health) N/A Private 14 Federal

Total acreage to be reclaimed in 2024 2 acres; Total volume of material to be disturbed in 2024: _____ cubic yards.

Include strippings and overburden to be removed. Cubic yards = Length (yards) x Width (yards) x Depth (yards).

☑ Reclamation will be conducted concurrently with activity. ☐ Reclamation will be conducted at the end of the season.

THE FOLLOWING RECLAMATION MEASURES SHALL BE USED:

(These measures are required by law. Those that do not apply may be crossed out; but, an explanation must be given.)

- Topsoil, vegetation, and overburden muck, not promptly redistributed to an area being reclaimed, will be individually separated and stockpiled for future use. This material will be protected from erosion and from contamination by acidic or toxic materials and will not be buried by tailings.
- The area reclaimed will be reshaped to blend with the surrounding area using tailings, strippings, and overburden and be stabilized.
- Stockpiled topsoil, overburden muck, will be spread over the contoured exploration sites to promote natural plant growth such that the area can reasonably be expected to revegetate within five years. Stockpiled vegetation will be spread over topsoils.
- Exploration trenches will be backfilled. Brush piles, stumps, topsoil, and other organics will be spread on the backfilled surface to inhibit erosion and promote natural revegetation. All exploration trenches will be reclaimed by the end of the exploration season in which they are constructed, unless specifically approved by the DMLW (Mining operations are required by law to be reclaimed as contemporaneously as practicable with the mining operation to leave the site in stable condition).
- Shallow auger holes (limited to depth of overburden) will be backfilled with drill cuttings or other locally available material in such a manner that closes the hole to minimize the risk to humans, livestock and wildlife.
- All drill hole casings will be removed or cut off at, or below, ground level. All drill holes will be plugged by the end of the exploration season with bentonite holeplug or equivalent slurry, for a minimum of 10 feet within the top 20 feet of the drill hole. The remainder of the hole will be backfilled to the surface with drill cuttings. If water is encountered in any drill hole, a minimum of 7 feet of bentonite holeplug or equivalent slurry will be placed immediately above the static water level in the drill hole. (NOTE: The operator understands that complete filling of the drill holes, from bottom to top, with bentonite holeplug or equivalent slurry is also permitted and is considered to be the preferred method of hole closure, unless communicated otherwise by DMLW.)
- If artesian conditions are encountered, the operator will take all measures practicable to prevent the offsite discharge of those waters subject to 11 AAC 97.240 and will contact the DMLW for approval of hole plugging measures.
- At closure, all shafts, adits, tunnels, and air vents to underground workings will be stabilized and properly sealed to ensure protection of the public, wildlife and the environment.
- On state lands, all buildings and structures constructed, used, or improved will be removed, dismantled, or otherwise properly disposed of unless the surface owner or manager authorizes that the buildings and structures may stay.
- On state lands, all scrap iron, equipment, tools, piping, hardwear, chemicals, fuels, waste, and general construction debris will be removed or properly disposed of.
- Reclamation measures taken will be consistent with any alternative post mining land use approved by the Commissioner, subject to the provisions of 11 AAC 97.300(h) and the conditions (if any) of an approved reclamation plan.

IMPORTANT: 1. Alternative reclamation measures may be approved if the reclamation measures presented above are not applicable to your site. Please explain in separate correspondence. Submit a sketch and describe additional reclamation measures you propose to conduct at your operation. Reclamation measures must comply with AS 27.19.

BONDING: In accordance with AS 27.19, bonding is required for all operations having a mined area of ≥ five acres on State Land. This area must be bonded for $750.00 per acre, unless the miner can demonstrate that a third party contractor can do the needed reclamation for less. The Statewide Bonding Pool may be joined by completing a bond pool application form and meeting certain requirements. No reclamation plan approval goes into effect until the bonding pool deposit and annual nonrefundable fees are paid. Use bond form to calculate area of disturbance for bonding.

BLM requires that a reclamation plan be consistent with §43 CFR 3809.420, Performance Standards for the Surface Management regulations for Federal Operations. Refer to 43 CFR 3809 or the BLM minerals website available at . https://www.blm.gov/programs/energy-and-minerals/mining-and-minerals for more information on what is needed for a reclamation plan on Federal lands, as they may be different than those identified above.

Merlin Benner
Printed name (Applicant)

Signature (Applicant)

Relationship to Mineral Property:

☐ Owner ☐ Lessee ☐ Operator

☑ Agent For: Constantine North

Date: 3/27/2024

APMA #: 5690

STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES
STATE WIDE BOND POOL RENEWAL FORM
FOR 2024 OPERATIONS

APMA # 5690

Constantine North Inc.			
Name			
Suite 320, 800 West Pender Street	Vancouver	British Columbia	V6C 2V6
Mailing Address	City	State	Zip

Submits to the State of Alaska, Department of Natural Resources, a renewal of reclamation bonding in accordance with AS 27.19 for mining activity on claim's: See Plan of Operations and Reclamation Report.

located in T. 28S, 29S, R. 53E, 54E, Sections 1-3, 5, 6, 11, 12, _____ M.

The amount of the refund or amount owed is calculated as follows:

1. Only whole number of acres bonded in 2023: 36.0 acres rounded up to next integer: 36 acres
2. Total whole number of acres disturbed in 2023? 17.0 acres rounded up to next integer: 17 acres

This includes unreclaimed acreage from previous years, October 1991 to present, for state or private lands, and 1981 to present for federal claims. On federal claims include area of camp and access roads.

Bonding credits carried forward from 2023 to 2024:
If you claim any acres in 3 or 4 complete the Bond Pool release form.

3. Number of acres bonded in 2023 but not disturbed: (1 minus 2 above) 19 acres x $ 112.50 = $_____.

4. Number of acres reclaimed in 2023 and approved by BLM/ DNR. 2 acres x $ 112.50 = $ 225.00.
   Federal miners must submit a Financial Guarantee Amount Reduction Letter from BLM. All miners requesting a reduction of acreage must fill out the application for Bond Release Form, and include evidence of their reclamation with Photo/Video documentation unless otherwise specified by DNR.

5. Dollar total of lines 3 + 4: $ 2,362.50.

Bonding obligations for 2024:

6. Acerage disturbed but not bonded in 2023 (2 minus 1 above): _____ acres x $ 150.00 = $_____.
7. Number of all 2023 unreclaimed acres (2 minus 4 above): 15 acres x $ 37.50 = $ 562.50.
   (line 7 should match "total acreage currently disturbed" on your 2023 Reclamation Plan.
8. New acres to be disturbed in 2024: 6 acres x $ 150.00 = $ 900.00.
9. Dollar total of lines 6 + 7 + 8: $ 1462.50.
10. Total acreage bonded in 2024 (7 + 8): 21 acres

If line 5 is larger than line 9 enter the difference here $ 900.00. This amount will be refunded.

If line 9 is larger than line 5, the difference is due DNR $ _____. Make check payable to: DEPARTMENT OF NATURAL RESOURCES.

Jon Mercer Bonner — 3/27/2024
Signed – Miner — Date

Dave Charron — 4/8/2024
ADNR - Division of Mining, Land & Water — Date

Justin Burrows — JUSTIN BURROWS — Digitally signed by JUSTIN BURROWS Date: 2024.04.08 12:36:08 -08'00'
BLM - Bureau of Land Management — Date

Submit to DNR — Clear Form

APPLICATION FOR RELEASE OF RECLAMATION BOND
OR
REFUND OF BOND POOL DEPOSIT

APMA NUMBER: 5690

Name of Applicant: Constantine North Inc.

This form may be used to request release of a reclamation bond or a refund of the refundable portion of the bond pool deposit. **If the bond is for operations on federal claims, reclamation approval is required by the federal land manager before DNR will make the bond deposit refund.** If DNR has not inspected reclamation on the mineral property(s), photographs of the completed reclamation work may be required before the bond is released.

List the mineral property(s) that are subject to a release of a reclamation bond reduction, or refund of the refundable portion of the bond pool deposit. Please provide the casefile type (*e.g.;* ADL/AKFF/USMS) and number, or if Native Land, provide the legal description (MTRS). 662062 662063 662064

Check all that apply: ☐ Reclamation Completed ☑ No Acreage Disturbance ☐ Successor of Interest
Note: _____

In accordance with the above referenced Annual Placer Mining Application (APMA) and approved reclamation plan, the number of acres bonded was 36. I request a release of the bonding obligation and a refund of the refundable bond pool deposit for 21 acres that have been reclaimed, were never disturbed, or a successor of interest has assumed all liability. I understand bond monies are refundable only to those individuals or businesses originally submitting such, unless proper documentation is enclosed indicating refunds should be issued otherwise.

I hereby swear or affirm, under oath, that I have examined Alaska Statute 27.19 (Reclamation Act), 11 AAC 97 (Reclamation Regulations) and my approved reclamation plan and believe myself to have completed the reclamation to the required standards and in accordance with my approved reclamation plan. Photographs of the completed reclamation work are attached: ☑ Yes ☐ No

I understand if the commissioner determines reclamation was not done in accordance with the approved plan of operations and this sworn statement, I remain liable under AS 27.19 to complete the reclamation.

I certify under penalty of perjury the foregoing is true and accurate.

(Signature of Applicant) Jon Martin Bemon **(Date)** 3/27/2024

NOTARY:

Subscribed and sworn before me this

This 27 day of March, 20 24

Signature of Notary: Rhonda Davis

My Commission Expires: May 16, 2027

RHONDA DAVIS My Commission Expires NOTARY PUBLIC May 16, 2027 STATE OF ALASKA