Pogo Mine Monitoring Plan

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Definitions

AAC: Alaska Administrative Code
ADEC: Alaska Department of Environmental Conservation
ADF&G: Alaska Department of Fish & Game
ADNR: Alaska Department of Natural Resources
APDES: Alaska Pollutant Discharge Elimination System
ARD: Acid Rock Drainage
BMP: Best Management Practices
CIP: Carbon-in-Pulp
DMR: Discharge Monitoring Report
DSTF: Drystack Tailing Facility
EDMS: Environmental Data Management System
GWUDISW: Ground Water Under the Influence of Surface Water
MDMR: Multi Sector General Permit Discharge Monitoring Report
MSGP: Multi Sector General Permit (Stormwater)
MWTP: Mine Water Treatment Plant
ORTW: Off-River Treatment Work
PWSID: Public Water System Identification
PWTP: Potable Water Treatment Plant
RTP: Recycle Tailing Pond
SWPPP: Stormwater Pollution Prevention Plan
TWUA: Temporary Water Use Authorizations
USGS: United States Geological Survey
WAD: Weak Acid Dissociable
WET: Whole Effluent Toxicity
XRF: X-Ray Fluorescence Spectrometer

Pogo Mine Monitoring Plan

This document addresses the requirements of the Sumitomo Metal Mining Pogo LLC Pogo Mine Waste Disposal Permit 0131BA002, the solid waste regulations 18 AAC 60.800 – 860, the Alaska Pollutant Discharge Elimination System (APDES) permit (AK-0054334-1) and addresses the requirements of the Potable Water System Operation Approval for PWSID: 372643 (Pogo Lower Camp) and PWSID 372685 (Pogo Permanent Camp) as well as the State of Alaska Drinking Water Regulations, 18 ACC 80.

The Pogo Mine Monitoring Plan includes the following components:

- Visual monitoring plan, including the Drystack Tailings Facility (DSTF)
- Fluid Management Plan including the Recycle Tailings Pond (RTP);
- Geochemical monitoring plan;
- Surface water monitoring plan;
- Groundwater monitoring plan;
- Effluent monitoring plan;
- Drinking water monitoring plan;
- Appendix A: Rock Segregation Plan;
- Appendix B: Pogo Facilities Map and Monitoring Locations; and
- Appendix C: Inspection Forms.

The geotechnical monitoring plan for the drystack tailings facility is described in the Pogo Mine Drystack Tailings Facility Construction and Maintenance Plan, which is attached to Pogo's **Plan of Operations as Appendix F**.

1.0 PERMIT MANAGEMENT

Implementation of the Waste Management Permit falls under the Environmental Department Manager who has direct reporting responsibilities to the Pogo General Manager.

Permit compliance and sampling and reporting activities are tracked by the Environmental Manager. All monitoring and inspection data is managed using the Environmental Data Management System (EDMS) data management software.

2.0 VISUAL MONITORING PLAN

The visual monitoring program includes daily, weekly and annual inspections of the project facilities comprising the waste management system. These facilities are described in the Plan of Operations and shown schematically in plan view on Pogo Facilities Map and Monitoring Locations (**Appendix B**). Copies of the Drystack Weekly Inspection Form and the RTP Dam Inspection Monthly Form are shown in **Appendix C**.

2.1 Drystack Tailings Facility (DSTF)

The physical characteristics of the drystack are visually inspected by equipment operators on days when tailings are being placed. As part of their regular daily inspections, operations personnel look for unusual cracks, bulging, and signs of settlement, seepage and erosion on the drystack.

2.2 Incidental, Non-hazardous Waste Disposal within the DSTF

Incidental, non-hazardous, waste is placed within the mineralized rock layer. Incidental waste is encapsulated with drystack tailings in the same manner as mineralized rock. It is placed at least 50 feet from the drystack margins and contained in six foot thick lift of compacted mineralized rock and then covered with at least a two foot thick lift of compacted drystack tailing. Filter cake, from the Water Treatment Plants, is placed on compacted drystack tailing and covered with more compacted drystack tailings. Operations personnel are trained to place and cover inert, incidental waste so as to prevent blowing debris. Records are kept of the volume and description of the incidental non-hazardous waste placed in the DSTF.

2.3 Monitoring Wells

An environmental department individual observes the monitoring wells at least once per month for physical damage and maintains a record of observations.

2.4 Wildlife

Operations personnel monitor wildlife interactions with the surface waste disposal facilities in order to evaluate impacts that operations may have on wildlife. Records of wildlife interactions observed during the visual site inspections are recorded. The drystack operating personnel are trained to record observations of wildlife interaction at the DSTF and the RTP reservoir. Any wildlife mortalities that are observed are recorded in a log maintained at the project site and the Environmental Manager or designate will contact the Alaska Department of Fish & Game (ADF&G) to report wildlife mortalities.

3.0 FLUID MANAGEMENT PLAN

3.1 Recycle Tailings Pond (RTP) Dam

The Environmental Department conducts a visual inspection of the RTP dam weekly, and at least once per month conducts a more thorough inspection. Inspections are recorded and the department maintains a record of their observations. (See inspection forms in **Appendix C**). The visual observations include looking for unusual cracks, bulging, settling, seepage and erosion on the RTP dam. A complete checklist was developed as part of the "RTP Dam Operation and Maintenance Manual".

Once every three years, as required by permit, a formal Periodic Safety Inspection (PSI) is completed by a professional engineer and the results shared with the State Dam Safety official.

3.2 Water Balance Management

Process water is managed by accounting for water discharged into, and withdrawn, from the RTP, as well as RTP water recycled to the mill and water treated and discharged to the Off-River Treatment Works (ORTW).

In periods where precipitation inflows are inadequate, makeup fresh water may be taken from the gravel ponds and pumped into MWTP#3.

In the case of an emergency underground (e.g., potential flooding situations), treated water may be pumped to the RTP for storage. Whenever treated water is pumped into the RTP, ADEC will be notified.

Flow meters are associated with water that is pumped. Precipitation is recorded by a rain gauge and monitored daily during summer months. A snow survey is performed annually in the first quarter on the Drystack and RTP watersheds. Four flumes are installed in Liese Creek. They are checked weekly when water is flowing. Flow rate is measured by a visual observation and by datalogger (datalogger also measures pressure and temperature).

A monthly water balance is determined from data provided by the monitoring schedule presented in **Table 3.1**.

Table 3.1: Fluid Management Monitoring Schedule

Fluid Stream	Measurement Type	Units	Frequency
Recycle Tailing Pond	Water Level	gallons	Continuous
Precipitation	Met Stations/ Rain Gauge	inches	Recording/Daily Reading
Snow Survey	Depth and Density	inches	Annual
Seepage Collection Wells	Flow Meter	gallons	Continuous
Gravel Pond Water to MWTP	Flow Meter	gallons	Continuous
Flume #1	flow	gallons	Weekly
RTP Water to Mill, Mine or MWTP	Flow Meter	gallons	Continuous
Mine Water to Mill or MWTP	Flow Meter	gallons	Continuous
Outfall 011 Discharge to ORTW	Flow Meter	gallons	Continuous

3.3 Hydrology Characterization

Flumes and piezometers were installed as part of ongoing hydrology data collection. Four flumes were installed to help determine surface flows. Flumes are visually inspected weekly during the summer months and daily during rain events. Flume Weekly Inspection Form is shown in **Appendix C**. Data is downloaded at least monthly when water if flowing. Flume #1 is located below the toe of the DSTF, collects water from the DSTF under drain, potential seepage from within the Drystack and any potential rain water that has migrated through the Diversion Ditch. Flume #2 is located at the toe of the RTP Dam. It measures rain water from the South Diversion Ditch, surface flow form Liese Creek, and potential seepage from the RTP. Flume #3 is located between Flume #2 and the 1875 Portal, and receives flow from Flume #2 and from the North Diversion Ditch. Flume #4 is located near the Liese Creek Bridge.

Nests of piezometers are installed in three locations within the DSTF to monitor water pressure, hydraulic head and temperature. They are inspected and data downloaded monthly. Piezometer RR-1 is located at the upper end of the DSTF where the red rock is being placed. It has three piezometers set as follows: RR-1-P3-S (shallow), RR-1-P4-M (mid-depth) and RR-1-P4-D (deep). GP-1 is located in the general placement area of the DSTF in front of the starter dam. It has two piezometers set as follows: GP1-P1-S (shallow) and GP-1-P2-D (deep). SB-1 is located within DSTF Shell 1. It has two piezometers set as follows: SB-1-P1-S (shallow) and SB-1-P2-D (deep).

Table 3.2: Hydrology Characterization Monitoring Schedule

Equipment Type	Measurement Type	Units	Frequency
Flume #2	Flow	gallons	Weekly
Flume #3	Flow	gallons	Weekly
Flume #4	Flow	gallons	Weekly
GP1-P1-Shallow	Piezometer	PSI & temperature (^{0}F)	Monthly
GP1-P2-Deep	Piezometer	PSI & temperature (^{0}F)	Monthly
RR-1-P3-Shallow	Piezometer	PSI & temperature (^{0}F)	Monthly
RR-1-P4-Deep	Piezometer	PSI & temperature (^{0}F)	Monthly
RR-1-P5-Mid	Piezometer	PSI & temperature (^{0}F)	Monthly
SB1-P1-Shallow	Piezometer	PSI & temperature (^{0}F)	Monthly
SB1-P2-Deep	Piezometer	PSI & temperature (^{0}F)	Monthly

3.4 Water Rights and Temporary Water Use Authorizations

Pogo has a number of Permits to Appropriate Water (LAS designations) and Temporary Water Use Authorizations (TWUA designations), granted by ADNR. **Table 3.2** lists permits and associated water sources and water quantity limits. These water sources are monitored and gallons pumped are reported annually to ADNR. **Table 3.3** lists Temporary Water Use Authorizations, associated water sources and water quantity limits.

Table 3.3: Permits to Appropriate Water & Water Quantity Limits

Permit	Location	Measurement Type	Water Quantity Limits		
			Acre-feet per Year	Gallons per Year	Gallons per Minute
LAS 24611	Drinking Water Wells DW02 & DW03	Flow Meter	81.77	26.6 million	NA
LAS 24612	Gravel Pit Pond	Flow Meter	241.95	78.8 Million	NA
LAS 24613	Goodpaster River ORTW Influent	Flow Meter	24195.11	7,879 Million	15,000
LAS 24614	2 wells proposed upstream of ORTW	NA	3226.01	1,051 Million	NA
LAS 24615	4 wells proposed at headwaters of Liese Creek	NA	322.6	105.0 Million	NA
LAS 24616	Surface Water collected in RTP	Flow Meter	387.12	126.1 Million	NA
LAS 24617	Groundwater from Underground Workings	Flow Meter	395.19	128.7 Million	NA

Table 3.4: Temporary Water Use Authorizations & Water Quantity Limits

Permit	Location	Measurement Type	Water Quantity Limits
TWUA F2016-104 Pogo Mine Access Road	Rosa Creek	Truck tanker loads	200 gallons a minute 528,000 gallons a day 112,992,000 per year
	Caribou Creek		
	Gilles Creek		
	Shaw Creek		
TWUP F2016-109	Drystack Tailings Facility Diversion Ditches	Calculated	163 cubic feet a second in South Ditch 41 cubic feet a second in South Ditch Combine 1,460.0 acre-feet per year
TWUP F2011-131	RTP Seepage Collection System	Flow meters	370 gallons per minute 532,800 gallons per day 194.5 million gallons per year
TWUP F2013-023	Dewatering Underground Mine workings (in addition to water right Permit to Appropriate LAS 24617)	Flow meter	1,000 gallons per minute 1,613.3 acre-feet per year
TWUP F2013-143	Water for Pogo Underground Mining (2150 Portal)	Flow meter	400 gallons per minute 646.97 acre-feet per year

4.0 GEOCHEMISTRY

4.1 Drystack

The purpose of the geochemical monitoring program is to track trends in the tailings geochemistry and to compare the geochemical nature of the tailings material to the test work and assumptions used for the drystack design. It is applied to the materials placed on the general placement area.

A sampling schedule for Flotation Tailings, Flotation Interstitial Water and Mineralized Development Rock is shown in **Table 4.1**. Quarterly composites of monthly tailings samples collected from the process plant are submitted for geochemical analysis. Monthly Mineralized Development Rock samples are composited into a quarterly sample for analysis. The solid samples are analyzed for acid-base accounting using procedures generally recommended (Sobek et al, (1978)[1] see **Table 4.2**. The Target Range of greater than 1.4 for the Neutralization Potential/Acid Potential ratio was developed from average flotation tailings test material characteristics shown in Table 8 of the SRK 3 Kinetic Report. The solid samples are also analyzed for 48 element-ICP metals (plus mercury) monitoring parameters for flotation tailings and mineralized development rock placed in the Drystack, see **Table 4.3**. Process water is extracted from the tailings and analyzed for the parameters indicated in **Table 4.4**. A target range was established using actual operating data taking the mean plus or minus two standard deviations to cover the range of measured data. In many cases, the standard deviation is greater than the mean, making the lower range zero.

[1] The Sobek method is the most commonly used Acid Base Accounting method – Sobek A.A., W.A. Schuller, J.R. Freeman and R.M. Smith, 1978, “Field and Laboratory Methods Applicable to Overburdens and Minesoils”, prepared for U.S. Environmental Protection Agency, EPA-600/2-78-054, Cincinnati, Ohio.

Table 4.1: Drystack Sampling Schedule

Sample ID	Sample	Location	Frequency	Sample Type
PC003-solids	Flotation Tailing Solids	Mill Filter Building	Quarterly composite of Monthly samples	Grab
PC003	Flotation Tailing Interstitial Water	Mill Filter Building	Quarterly	Grab
PC002	Development Rock	Drystack, Active Area Mineralized Rock	Quarterly composite of Monthly samples	Grab

Table 4.2: Acid-Base Accounting of Flotation Tailing and Mineralized Development Rock Placed in Drystack

Parameter	Units	Method	Target Range
Paste pH	s.u.	Standard	NA
Inorganic Carbon	%	Sobek	NA
Total Carbon	%	Sobek	NA
Sulfate Sulfur (HCL Leachable)	%	LECO	NA
Sulfide Sulfur (calculated)	%	LECO	NA
Sulfur, Total	%	LECO	NA
Sulfur as Sulfate	%	LECO	NA
Neutralization Potential/Acid Potential Ratio (NP/AP)	Ratio	Sobek	greater than 1.4
Maximum Potential Acidity	tCaCO3/1Kt	Sobek	NA
Net Neutralization Potential	tCaCO3/1Kt	Sobek	NA

Table 4.3: Flotation Tailing and Mineralized Development Rock Whole Rock Chemistry

Parameters[1]		
Aluminum	Indium	Strontium
Antimony	Lanthanum	Silver
Arsenic	Lead	Sulfur
Barium	Lithium	Tantalum
Beryllium	Magnesium	Tellurium
Bismuth	Manganese	Thallium
Calcium	Mercury	Thorium
Cadmium	Molybdenum	Titanium
Cerium	Niobium	Tin
Cobalt	Nickel	Tungsten
Chromium	Phosphorus	Uranium
Cesium	Potassium	Vanadium
Copper	Rubidium	Yttrium
Iron	Rhenium	Zinc
Gallium	Scandium	Zirconium
Germanium	Selenium	------
Hafnium	Sodium	-------

[1]Arsenic and sulfur are the only metals required by permit to be monitored, the other metals are for informational purposes.

Table 4.4: Flotation Tailing Interstitial Water Chemistry and Operating Target Ranges

Parameter	Units	Method	Original Target[1]	Operating Target Range[2]	Average[2]	Standard Deviation[2]
Total Dissolved Solids	mg/L	EPA 160.1	3,000	1094 to 5040	3588	726
Chloride, total	mg/L	EPA 300.0	34	26 to 230	128	51
Sulfate, total	mg/L	EPA 300.0	2,000	528 to 2740	1634	553
Ammonia as TKN	mg/L	EPA 351.2	17.8	0 to 70.1	33.3	18.4
Nitrate	mg/L	EPA 300.0	4	8 to 236	122	57
Cyanide, WAD	µg/L	SM4500 – CN I	Not Calculated	0 to 29.1	12.3	8.4
Arsenic	µg/L	EPA 200.8	5,100	0 to 2335	569	883
Cadmium	µg/L	EPA 200.8	5	0 to 1.13	0.374	0.378
Chromium	µg/L	EPA 200.8	14	0 to 4.145	0.681	1.732
Copper	µg/L	EPA 200.8	34	0 to 20.97	5.29	7.84
Iron	µg/L	EPA 200.7	29,600	0 to 103.1	35.9	33.6
Lead	µg/L	EPA 200.8	5	0 to 5.972	0.67	2.651
Mercury	µg/L	EPA 1631E	2	0.001 to 0.0014	0.001	0.0002
Manganese	µg/L	EPA 200.8	4,750	0 to 650	226	212
Nickel	µg/L	EPA 200.8	240	0 to 18.2	7.6	5.3
Selenium	µg/L	EPA 200.8	130	0 to 190	60	65
Silver	µg/L	EPA 200.8	2	0 to 0.276	0.08	0.098
Zinc	µg/L	EPA 200.8	700	0 to 48.4	13	17.7

[1]Original Target based on the geochemical characterization of tailings produced as a result of pre-mine metallurgical tests.
[2]Operating Target Range based on mean plus or minus two standard deviations of data from 2006 through June 2010 while operating.

The tailings geochemical results are used to detect trends in tailings composition. Further investigation to determine an appropriate plan of action will be instituted with the appropriate agencies in the event that the interstitial water chemistry exceeds the operating target range for four consecutive quarters.

4.1.1 Development Rock Segregation and Storage

During development and operations, all rock from underground is handled as "mineralized" unless otherwise analyzed and segregated on a round-by-round basis in accordance with the rock segregation procedures identified in **Appendix A**. The *Development Rock Segregation and Tracking Procedures (September 9, 2010)* is still the standard operating procedure and has remained unchanged.

Table 4.5 presents development rock segregation parameters for non-mineralized and mineralized development rock.

Table 4.5: Development Rock Segregation Parameters

Parameter	Units	Method	Non-mineralized Action Limit	Mineralized Rock Action Limit
Sulfur	%	XRF Spectrometer	Less than 0.5	Greater than 0.5
Arsenic	mg/kg	XRF Spectrometer	Less than 600	Greater than 600

4.2 Cyanide Detox of Carbon-In-Pulp (CIP) Tailings Prior to Paste Backfill

Prior to disposal as part of the paste backfill tailings, the CIP tailings are subjected to cyanide detoxification using the SO_2/air process or other suitable cyanide detoxification process approved by ADEC. Samples of the CIP tailings interstitial water are taken by mill operators before each paste pour (see **Table 4.6**). At least 90% of the samples shall contain less than ten ppm WAD cyanide and 100% of the samples shall contain less than 20 ppm WAD cyanide, based on analysis by Picric Acid Method of the interstitial water

entrained in the CIP tailings prior to placement in the paste backfill (see **Table 4.7**). All CIP tailings are disposed in the underground workings of the mine.

Table 4.6: CIP Tailing Sampling Schedule

Sample ID	Sample	Location	Frequency	Sample Type
PC001	CIP Stock Tank	Mill Complex	Before Every Paste Pour	Grab

The CIP tailing sample is collected from the CIP Stock Tank and analyzed by the Pogo on site Assay Lab.

Table 4.7: CIP Tailing Analysis Profile

Parameter	Units	Method	Permit Limit	
			90% of samples	100% of samples
Cyanide-WAD	ppm	Picric Acid Method	10	20

Samples are collected by Mill Operators.

5.0 SURFACE WATER MONITORING PLAN

The surface water quality monitoring program is designed to detect potential impacts to the surface water quality in the Goodpaster River. Five stations are used to monitor surface water quality (refer **Figure 1** in **Appendix B** for location map).

Surface water monitoring is being undertaken to fulfill the requirements of the Alaska APDES permit (AK-005334-1) and the ADEC Waste Disposal Permit (0131-BA002).
The APDES permit requires receiving water monitoring:

- To monitor any biological impacts to the Goodpaster River;
- To monitor changes that may occur as a result of activities associated with the discharges from the facility;
- To compare upstream and downstream monitoring results (to show any differences) and to compare monitoring results for each station over time, to show any trends; and
- To assure that state water quality standards are met and to provide information for future permitting actions.

The ADEC Waste Disposal permit requires surface water monitoring:

- For parameters at frequencies and locations, which will ensure that sample results are representative and statistically valid; and
- To detect a violation of a water quality standard.

The objective of the surface water monitoring program is to detect any adverse biological impacts and any exceedance of a water quality standard.

The surface water sampling schedule during active mining operations, Phase II, is shown in **Table 5.1**. Surface water parameters collected are shown in **Table 5.2**.

Whole fish samples of juvenile Chinook salmon are collected annually from the Goodpaster River just before freeze up. A minimum of ten fish are collected upstream from Pogo Mine at site SW01 and ten fish downstream of Pogo Mine at site SW12. Samples are collected to show comparisons in metals accumulation in fish tissue between the upstream and downstream locations. The sampling schedule for fish tissue during

active mining operations, Phase II, are shown in **Table 5.1** and fish tissue sampling parameters are located in **Table 5.3**.

Table 5.1: Phase II Active Mining Operations Surface Water Sampling Schedule

Station ID	Sample Location	Sample Frequency	Sample Type
SW01	Above the project site, between Stingray and Otter Creeks	6/year- Late February to mid-March, mid-May, mid-June, early August, late September (including fish tissue samples), December	Grab
SW41	Below the ridge line that divides Liese Creek and Pogo Creek	6/year- Late February to mid-March, mid-May, mid-June, early August, late September, December	Grab
SW42	Near Outfall 002 (Sewage Treatment Plant Discharge)	6/year- Late February to mid-March, mid-May, mid-June, early August, late September, December	Grab
SW15	Below the project site	6/year- Late February to mid-March, mid-May, mid-June, early August, late September, December	Grab
SW12	Furthest downstream sampling point	Annually Late September (including fish tissue samples)	Grab
SW49	Above (upstream) all project facilities. Closer to minesite than SW01. More easily accessible if higher sampling frequency is deemed useful for internal monitoring.	Quarterly	Grab
DRYTOE	Dry Stack Toe	12/year – Monthly when water is present	Grab

Table 5.2: Surface Water Analytical Parameters Profile 13s and Water Quality Standards

Surface Water Parameters	Units	Method	Water Quality Standards
Alkalinity, as CaCO3	mg/L	SM 2320B	NA
Alkalinity, Total	mg/L	SM 2320B	NA
Aluminum, Total R	µg/L	EPA 200.7	87 to 750 if hardness ≥50 mg/L & pH ≥7
Ammonia, as TKN	mg/L	EPA 351.2	pH and temperature dependent
Antimony, Total	µg/L	EPA 200.8	6[1]
Arsenic, Total	µg/L	EPA 200.8	0.10[1]
Cadmium, Total	µg/L	EPA 200.8	0.094 to 0.64[2]
Calcium, Dissolved	mg/L	EPA 200.7	NA
Chromium, Dissolved	µg/L	EPA 200.8	100[1]
Chlorides	mg/L	EPA 300.0	230[3]
Conductivity, Field	µS/cm	EPA 120.1	NA
Copper, Total	µg/L	EPA 200.8	2.7 to 29[2]
Cyanide, WAD	µg/L	SM 4500-CN I	5.2[4]
Fluoride	mg/L	EPA 300.0	NA
Dissolved Oxygen, Field	mg/L	EPA 360.1	NA
Hardness, as CaCO3	mg/L	SM 2340B	NA
Iron, Total	µg/L	EPA 200.7	1000[3]
Lead, Total	µg/L	EPA 200.7	0.54 to 11[2]
Manganese, Total	µg/L	EPA 200.8	50[5]
Magnesium, Dissolved	mg/L	EPA 200.7	NA
Mercury, Total	µg/L	EPA 1631E	0.05[5]
Nickel, Total	µg/L	EPA 200.8	16 to 168[2]
Nitrate-Nitrite as Nitrogen	mg/L	SM4500-NO3E	10[1]
pH, Field	s.u.	EPA 150.1	6.5 to 8.5[6]
Potassium, Dissolved	mg/L	EPA 200.7	NA
Selenium, Total	µg/L	EPA 200.8	4.6[3]

Surface Water Parameters	Units	Method	Water Quality Standards
Silver, Total	µg/L	EPA 200.8	0.30 to 379.30[7]
Sodium, Dissolved	mg/L	EPA 200.7	NA
Sulfate	mg/L	EPA 300.0	250[6]
Temperature, Field	C	EPA 170.1	NA
Total Dissolved Solids	mg/L	EPA 160.1	500[6]
Total Suspended Solids	mg/L	EPA 160.2	NA
Turbidity	NTU	EPA 180.1	NA
Zinc, Total	µg/L	EPA 200.8	36 to 379[7]

[1] Drinking water primary maximum contaminant levels.
[2] Chronic aquatic life fresh water. These criteria are hardness dependent. The range is shown for hardness of 25 to 400 mg/l $CaCO_3$.
[3] Chronic aquatic life fresh water.
[4] APDES Permit # AK0053341 specifies a site specific ML of 20 µg/L for WAD Cyanide.
[5] Human Health criteria for non-carcinogens.
[6] WQS for fresh water uses.
[7] Acute aquatic life fresh water.

Table 5.3: Fish Tissue Analytical Profile 8 and Action Limits

Fish Tissue Parameters	Units	Methods	Action Limits
Arsenic	mg/kg	EPA 200.8	NA
Antimony	mg/kg	EPA 200.8	NA
Cadmium	mg/kg	EPA 200.8	NA
Copper	mg/kg	EPA 200.8	NA
Lead	mg/kg	EPA 200.8	NA
Nickel	mg/kg	EPA 200.8	NA
Selenium	mg/kg	EPA 7740 or 7741A	NA
Silver	mg/kg	EPA 200.8	NA
Mercury (methyl mercury)	mg/kg	EPA 7741A or 1631	NA

Table 5.4 and **Table 5.5** represent the sampling schedule for Phase III and Phase IV Closure Operations and Phase V Post Closure. Refer to Pogo's Reclamation and Closure Plan for more details about the phases of closure.

Table 5.4: Phase III and IV Closure Operations Surface Water Sampling Schedule

Station ID	Sample Location	Sample Frequency	Sample Type
SW01	Above the project site, between Stingray and Otter Creeks	Monthly for 10 years during closure operations	Grab
SW15	Below the project site	Monthly for 10 years during closure operations	Grab
DRYTOE	Dry Stack Toe	Monthly for 10 years during closure operations	Grab

Table 5.5: Phase V Post Closure Surface Water Sampling Schedule

Station ID	Sample Location	Sample Frequency	Sample Type
SW01	Above the project site, between Stingray and Otter Creeks	Annual sampling on years 1, 2,5,10, 15, 20, and 30	Grab
SW15	Below the project site	Annual sampling on years 1, 2,5,10, 15, 20, and 30.	Grab
DRYTOE	Dry Stack Toe	Annual sampling on years 1, 2,5,10, 15, 20, and 30	Grab

5.1 Storm Water Pollution Prevention Plan and Best Management Practices Plan.

The Pogo Mine Storm Water Pollution Prevention Plan and the Best Management Practices Plan (SWPPP & BMP) sets forth monitoring and inspection guidelines to prevent storm water pollution. It address the requirements of the APDES Multi-sector General Permits for Storm Water Permit AKR060000 (Pogo Permit Tracking Number AKR06AC58). A summary of sampling locations and monitoring requirements are below in **Tables 5.6**.

Table 5.6: Storm Water Sampling Locations

Station ID	Sample Location	Sample Frequency	Sample Type
SW21	Sediment pond, downstream of culvert outlet	Periodic	Grab

Periodic visual exams are performed using the Pogo Mine Storm Water Pollution Prevention Plan Monitoring Report form (**Appendix C**). A summary of visual quality parameters are below in **Tables 5.7**.

Table 5.7: Storm Water Quarterly Visual Quality Sampling

Visual Quality Parameters	
Color	Odor
Clarity	Floating Solids
Settleable Solids	Suspended Solids
Foam	Oil Sheen
Other Obvious Indicators of Storm Water Pollution	Duration of Storm Event
Estimate of Total Gallons of Discharge	Flow Description

Waste Rock and Overburden Piles Discharge Monitoring is required during the second and third quarter of 2016 and 2017. If any analytical results are measured above

benchmark value, require twice annual sampling for that parameter going forward {refer to Section 5.3 of the Pogo Stormwater Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs) Plan}. The results of each benchmark sampling event must be reported within 30 days of receiving the sampling results on the ADEC MSGP Industrial Discharge Monitoring Report (MDMR). During the first and fourth quarters of every year no sampling event occurs due to freezing conditions, however the quarterly MDMR (form is in **Appendix C)** still requires submittal to the State at the end of each quarter.

Storm water quality inspections are required at least monthly from April to October of every year, or between spring break up and winter freeze up. Storm water inspections are also required after every 0.5 rain event. Any deficiencies must be corrected as soon as possible, but not later than 14 days after the inspection. These inspections are performed using the SWPPP Monthly Mine Site Inspection form is in **Appendix C**.

An ADEC Multi-Sector General Permit, MSGP Annual Reporting Form, in conjunction with a comprehensive site inspection, is required and usually takes place in June. It includes a review of the SWPPP & BMP, a visual inspection of the site (also using the SWPPP Monthly Mine Site Inspection form in **Appendix C**) and any recommended revisions. The results are summarized into an annual report and filed in the SWPPP & BMP. Corrective action must be made within 14 days, implementation of any SWPPP & BMP changes must occur within 12 weeks of annual inspection. The MSGP Annual Reporting Form is required to be submitted to ADEC. It must be submitted within 45 days after the annual comprehensive site evaluation, (both forms is in **Appendix C**).

The Pogo Mine Storm Water Pollution Prevention Plan and the Best Management Practices Plan are updated annually or as changes occur. The Best Management Practices Plan (BMP) is reviewed annually by the BMP committee, which also serves as the Storm Water Pollution Prevention Team, and by the Pogo Mine General Manager and the BMP Committee Chairperson. Notice of BMP Certification must be submitted to the Alaska Department of Environmental Conservation as part of the APDES requirements by January 31 of the following year (BMP Committee Annual Review Certification and Signature form, **Appendix C**). **Table 5.8** shows Storm Water Inspections and Reporting Requirements.

Table 5.8: Storm Water Inspections and Reporting Requirements

Inspection/Reporting	Frequency	Deadline
Storm Water Quality Inspections	Monthly, from break up to freeze up, and/or whenever a 0.5 rain event occurs	NA
Annual Comprehensive Site Evaluation	Usually occurs in June	June 31
ADEC MSGP Annual Report	Occurs in conjunction with Annual Comprehensive Site Evaluation	Due 45 days after Site Evaluation
Quarterly Benchmark Sampling	Second and Third Quarters of 2016 and 2017	June 30 and September 30 of 2016 and 2017
ADEC MDMR	Quarterly	Within 30 days of any benchmark sampling event or 30 days after the end of a quarter with no sampling events.
SWPPP & BMP Review	Updated annually, or as changes occur	NA
BMP Certification	Annually	January 31 of the following year

6.0 GROUNDWATER MONITORING PLAN

The groundwater monitoring program is designed to detect potential impacts to groundwater around the mine as per Pogo's ADEC Waste Disposal Permit (0131BA002). It consists of:

- Monitoring wells MW12-500, MW12-501, MW12-502 (refer to **Table 6.3**),
- Monitoring wells MW04-213 and MW11-216, and
- Monitoring wells MW11-001A and MW11-001B below the toe of the Drystack and above the RTP.

Three monitoring wells located approximately 450 feet downstream of the RTP Dam toe (**Figure 1 Appendix B**) monitor shallow alluvial water in this area. The original wells MW03-500, MW03-501, and MW03-502 (bedrock exploration core holes converted to monitoring wells) were plugged and abandoned and replaced with MW12-500, MW12-501 and MW12-502 in 2012. These wells are sampled and compared with baseline conditions and Permit limits.

Table 6.1 represents the sampling schedule for groundwater monitoring during active mining operation phase.

Table 6.1: Phase II Active Operations Groundwater Sampling Schedule

Sample Class	Sample Location	Frequency	Sample Type
Monitoring Wells	MW04-213	Semi-Annually	Grab
	MW11-216	Semi-Annually	
	MW12-500	Quarterly	
	MW12-501	Quarterly	
	MW12-502	Quarterly	
	MW11-001A	Quarterly	
	MW11-001B	Quarterly	
Measurement	LT99-009	Quarterly	Static Groundwater Level
Measurement	MW99-216	Quarterly	Static Groundwater Level

.

The objectives of the groundwater monitoring program are (1) to detect an exceedance of a water quality standard; for those parameters that have a natural condition exceeding the water quality standards, detect an increase in concentration above the natural condition; and (2) to detect a statistically significant increase above background in water quality. Groundwater background water quality summaries are shown in **Appendix D**.

A list of groundwater parameters sampled is located in **Table 6.2**.

Table 6.2: Groundwater Analytical Parameters Profile 13g and Water Quality Standards

Groundwater Parameters	Units	Method	Water Quality Standards
Alkalinity, as CaCO3	mg/L	SM 2320B	NA
Alkalinity, Total	mg/L	SM 2320B	NA
Ammonia, as TKN	mg/L	EPA 351.2	pH and temperature dependent
Antimony, Dissolved	µg/L	EPA 200.8	6[1]
Arsenic, Dissolved	µg/L	EPA 200.8	0.10[1]
Cadmium, Dissolved	µg/L	EPA 200.8	0.094 to 0.64[2]
Calcium, Dissolved	mg/L	SM 2340B	NA
Chloride	mg/L	EPA 300.0	230[3]
Chromium, Dissolved	µg/L	EPA 200.8	100
Conductivity, Field	µS/cm	EPA 120.1	NA
Copper, Dissolved	µg/L	EPA 200.8	2.7 to 29[2]
Cyanide, WAD	µg/L	SM 4500-CN I	5.2
Dissolved Oxygen, Field	mg/L	EPA 360.1	NA
Fluoride	mg/L	EPA 340.2	NA
Hardness, as CaCO3	mg/L	EPA 2340B	NA
Iron, Dissolved	µg/L	SM4500-NO3E	1000[3]

Groundwater Parameters	Units	Method	Water Quality Standards
Lead, Dissolved	µg/L	EPA 200.7	0.54 to 11[2]
Magnesium, Dissolved	mg/L	EPA 200.7	NA
Manganese, Dissolved	µg/L	EPA 200.8	50[4]
Mercury, Dissolved	µg/L	EPA 1631	0.05[3]
Nickel, Dissolved	µg/L	EPA 200.8	16 to 168[2]
Nitrate-Nitrite as Nitrogen	mg/L	SM4500-NO3E	10[1]
pH, Field	s.u.	EPA 150.1 (Field)	6.5-8.5[5]
Potassium, Dissolved	mg/L	EPA 200.7	NA
Selenium, Dissolved	µg/L	EPA 200.8	4.6[3]
Silver, Dissolved	µg/L	EPA 200.8	0.30 to 379.30[6]
Sodium, Dissolved	mg/L	EPA 200.7	NA
Sulfate	mg/L	EPA 300.0	250[6]
Temperature, Field	C	EPA 170.1	NA
Total Dissolved Solids	mg/L	EPA 160.1	500[6]
Zinc, Dissolved	µg/L	EPA 200.8	36 to 379[6]

[1] Drinking water primary maximum contaminant levels.
[2] Chronic aquatic life fresh water. These criteria are hardness dependent. The range is shown for hardness of 25 to 400 mg/l $CaCO_3$.
[3] Chronic aquatic life fresh water.
[4] Human Health criteria for non-carcinogens.
[5] WQS for fresh water uses.
[6] Acute aquatic life fresh water.

Groundwater monitoring wells MW12-500 and MW12-501 and MW12-502 monitor potential seepage from the RTP, which is a zero discharge facility. Exceedance of any value in **Table 6.3** triggers corrective action.

Table 6.3: Upper Tolerance Limit Triggering Corrective Actions

Parameter	Units	Location		
		MW03-500 (MW12-500)	MW03-501 (MW12-501)	MW03-502 (MW12-502)
Antimony, Dissolved	µg/L	0.36	0.35	0.35
Arsenic, Dissolved	µg/L	47.8	47.6	45.0
Chloride	mg/L	0.79	1.23	1.06
Cyanide, WAD	µg/L	5.2	5.2	5.2
Nitrate as Nitrogen	mg/L	1.28	2.66	2.39
Potassium, Dissolved	mg/L	3.18	3.69	3.27
Selenium, Dissolved	µg/L	1.35	0.99	0.64
Sodium, Dissolved	mg/L	5.41	5.27	3.90

Tables 6.4 and 6.5 present the sampling schedule for groundwater monitoring during Phase III and IV Closure Operations and Phase V Post Closure. Refer to Pogo's Reclamation and Closure Plan for more details about phases of closure.

Table 6.4: Phase III & IV Closure Groundwater Sampling Schedule

Sample Class	Sample Location	Frequency	Sample Type
Monitoring Wells	MW04-213	Semi-Annually for 10 years during closure operations	Grab
	MW11-216		
	MW12-500	Quarterly for 10 years during closure operations	
	MW12-501		
	MW12-502		
	MW11-001A		
	MW11-001B		

Table 6.5: Phase V Post Closure Groundwater Sampling Schedule

Sample Class	Sample Location	Frequency	Sample Type
Monitoring Wells	MW04-213	Sample Year 1, 2, 5, 10, 15, 20, and 30 at Post-Closure years during care and maintenance	Grab
	MW11-216		
	MW12-500		
	MW12-501		
	MW12-502		
	MW11-001A		
	MW11-001B		

6.1 Hydrology Characterization Test Wells

Two test wells, MW12-001A (alluvial) and MW12-001B (bedrock) were installed near Pogo's Airstrip in order to conduct a pump test for the East Deep Hydrology Study in 2012. Both wells are sampled quarterly. **Table 6.6** shows the Hydrology Characterization Sampling Schedule.

Table 6.6: Hydrology Characterization Sampling Schedule

Sample Class	Sample Location	Frequency	Sample Type
Monitoring Wells	MW12-001A	Quarterly	Grab
	MW12-001B	Quarterly	

7.0 EFFLUENT MONITORING PLAN

Effluent monitoring is required by the APDES permit (AK-005334-1).

The APDES permit requires effluent monitoring:

- To monitor the limits placed on the types and amounts of pollutants that are discharged to ensure protection of water quality and human health.

The objective of the effluent monitoring program is to detect an exceedance of an effluent limitation or an adverse biological impact.

The facility discharges to the Goodpaster River through two outfalls. Outfall 001 is the discharge point for treated mine drainage and excess precipitation. Outfall 002 is the discharge point for treated domestic wastewater. The outfalls and additional monitoring stations are shown on **Figure 1** in **Appendix B** and described below in **Table 7.1**.

Table 7.1: Effluent Monitoring Outfall Locations

Station ID	Location	Purpose
Outfall 001	Mine water effluent stream after the last treatment unit prior to discharge into the receiving waters.	To monitor the effluent quality before discharge into the receiving waters.
Outfall 011	At the Mine Water Treatment Plant (MWTP) near the 1525 Portal.	To monitor the MWTP performance.
NPDES 001B	Influent pond (Pond 1), upstream inlet of the Goodpaster River prior to any mine influence.	To establish the natural condition concurrent with the discharge.
Outfall002	Sewage effluent stream after the last treatment unit prior to discharge into the receiving waters.	To monitor the effluent quality before discharge into the receiving waters.
STP002	Influent to the Sewage Treatment Plant (STP).	To monitor the STP performance.

The effluent monitoring schedules can be found in **Table 7.2**.

Table 7.2: Effluent Monitoring Schedule

Station ID	Frequency	Sample Type
Outfall 001	Weekly, Monthly, and Annual (prior to August 1)	Grab
NPDES 001b	Monthly	Grab
Outfall 011	Weekly & Quarterly	Grab
Outfall 002	Monthly & Quarterly	Grab
STP 002	Quarterly	Grab

Stream Gauging is necessary to determine whether there is sufficient water flowing in the Goodpaster River to allow discharge. If the flow drops below 20 cf/s discharge is not allowed. The USGS maintains a stream flow gauge on the Goodpaster River near the Goodpaster Bridge and the data is made available to Pogo. During winter months USGS continues to monitor river flow on site at approximately monthly intervals, or as needed if river water flow approaches 20cf/s. Pogo may also perform stream gauging to determine river flow as needed.

A list of weekly, monthly and annual parameters sampled at Outfall 001 is included in **Table 7.3, Table 7.4, and Table 7.5**.

Table 7.3: Outfall 001 Weekly Analytical Parameters Profile 10a and Effluent Limits

Effluent Parameters	Units	Methods	APDES Effluent Limit	
			(Daily Maximum)	(Monthly Average)
Copper, Total Recoverable	µg/L	EPA 200.8	6.4	2.8
Cyanide, WAD	µg/L	SM 4500-CN I	9.0[1]	4.1[1]
Iron, Total Recoverable	µg/L	EPA 200.7	1780	590
Lead, Total Recoverable	µg/L	EPA 200.8	1.4	0.4
Manganese, Total Recoverable	µg/L	EPA 200.8	109	50
pH	s.u.	EPA 150.1	6.5 to 8.5	6.5 to 8.5
Floating Solids	Presence/Absence	NA	Trace Amounts	Trace Amounts
Outfall Flow	gpm	Continuous Recording	15,600	NA
Visible Foam	Presence/Absence	NA	Trace Amounts	Trace Amounts

[1]APDES Permit # AK0053341 specifies a site specific ML of 20 ug/L for WAD Cyanide

Table 7.4: Outfall 001 Monthly Analytical Parameters Profile 10b and Effluent Limits

Effluent Parameters	Units	Methods	APDES Effluent Limit	
			(Daily Maximum)	(Monthly Average)
Hardness, as CaCO3	mg/L	EPA 2340B	NA	NA
Turbidity, effluent	NTU	EPA 180.1	NA	5[1]
Turbidity, natural condition (Station NPDES001B)	NTU	EPA 180.1	NA	NA

[1] Difference in Turbidity between Outfall 001 and NPDES001B cannot be greater than 5 NTU

Table 7.5: Outfall 001 Annual Whole Effluent Toxicity (WET) Testing and Target Level

Effluent Parameter	Units	Method	APDES Target Level
Whole Effluent Toxicity, chronic	TU_c	EPA/821-R-02-013, October 2002	2

A list of weekly and quarterly parameters sampled at Outfall 011 is included in **Table 7.6, and Table 7.7**.

Table 7.6: Outfall 011 Weekly Analytical Parameters Profile 11a and Effluent Limits

Effluent Parameters	Units	Method	APDES Effluent Limit	
			(Daily Maximum)	(Monthly Average)
Cyanide, WAD	µg/L	SM 4500-CN I	NA	NA
pH	s.u.	EPA 150.1	6.0 to 9.0	NA

Table 7.7: Outfall 011 Quarterly Analytical Parameters Profile 11b and Effluent Limits

Effluent Parameters	Units	Method	APDES Effluent Limit	
			(Daily Maximum)	(Monthly Average)
Arsenic, Total Recoverable	µg/L	EPA 200.8	NA	NA
Cadmium, Total Recoverable	µg/L	EPA 200.8	100	50
Copper, Total Recoverable	µg/L	EPA 200.8	300	150
Iron, Total Recoverable	µg/L	EPA 200.7	NA	NA
Lead, Total Recoverable	µg/L	EPA 200.8	600	300
Manganese, Total Recoverable	µg/L	EPA 200.8	NA	NA
Mercury, Total	µg/L	EPA 1631E	2	1
Selenium, Total Recoverable	µg/L	EPA 200.8	NA	NA
Zinc, Total Recoverable	µg/L	EPA 200.8	1500	750
Hardness, as $CaCO_3$	mg/L	SM 2340B	NA	NA
Outfall Flow	gpm	Continuous Recording	800	NA
Sulfates	mg/L	EPA 300.0	NA	NA
Total Dissolved Solids	mg/L	EPA 160.1	NA	NA
Total Suspended Solids	mg/L	EPA 160.2	30	20

A list of monthly and quarterly parameters sampled at Outfall 0002 is included in **Table 7.8, and Table 7.9**.

Table 7.8: Monthly Effluent Sewage Treatment Plant Outfall 002 Analytical Parameters Profile 12a and Effluent Limits

Effluent Parameters	Units	Methods	APDES Effluent Limit		
			(Daily Maximum)	(Monthly Average)	(Weekly Average)
Biochemical Oxygen Demand (BOD_5)	mg/L	EPA 405.1 or SM 5210B	60	30	45
Dissolved Oxygen	mg/L	EPA 360.1	> 2	NA	NA
Fecal Coliform	#/100 mL	SM 9222D	400	200	NA
Floating Solids	Presence/ Absence	NA	Trace Amounts	NA	NA
Foam	Presence/ Absence	NA	Trace	NA	NA
Nitrate-Nitrite as Nitrogen	mg/L	SM4500-NO3E	160	80	NA
Oily Wastes (Sheen on Receiving Water Surface)	Presence/ Absence	NA	Absent	NA	NA
Outfall Flow	gpd	Daily Recording	72,000	NA	NA
pH	s.u.	EPA 150.1	6.0 to 9.0	NA	NA
Total Suspended Solids	mg/L	EPA 160.2	60	30	45

Table 7.9: Quarterly Effluent Sewage Treatment Plant Outfall 002 Analytical Parameters Profile 12q and Effluent Limits

Effluent Parameters	Units	Methods	APDES Effluent Limit		
			(Daily Maximum)	(Monthly Average)	(Weekly Average)
Arsenic, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA
Cadmium, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA
Copper, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA
Lead, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA
Manganese, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA
Zinc, Total Recoverable	µg/L	EPA 200.8	NA	NA	NA

Table 7.10: Quarterly Influent SewageTreatment Plant (STP002) Analytical Parameters Profile 12b and Effluent Limits

Influent Parameters	Units	Methods	APDES Effluent Limit (% Removal)
Biochemical Oxygen Demand (BOD_5)	mg/L	EPA 405.1 or SM 5210B	85
Total Suspended Solids	mg/L	EPA 160.2	85

8.0 DRINKING WATER MONITORING PLAN

The Drinking Water Monitoring fulfills the requirements of the Potable Water System Operation Approval for PWSID: 372643 (Pogo Contractor Camp) and PWSID 372685 (Pogo Permanent Camp) as well as the State of Alaska Drinking Water Regulations, 18ACC80. Both water systems are classified as Type: Non-Transient, Non Community (Class A) Source: GWUDISW (Ground Water Under the Influence of Surface Water).

The drinking water monitoring program consists of:

- Water quality detection monitoring at entry points Potable Water Treatment 3 (PWT3) Lower Camp and Potable Water Treatment 2 (PWT2) Permanent Camp, and designated locations throughout the distribution system.

Tables 8.1 and **8.2** represent the sampling schedule for drinking water monitoring during active mining operating and **Table 8.3** shows the drinking water parameters and ADEC maximum contaminant limits.

Table 8.1: Drinking Water Monitoring Schedule for Pogo Lower Camp PWSID: 372643

Drinking Water Parameter	Sample Location	Frequency	Sample Type
Arsenic	Entry Point of Distribution System Next sampling event between 2020 and 2028	1 sample/ 9 year cycle	Grab
Asbestos	Distribution System, Waiver granted until 2014, no renewal required unless new piping installed.	NA	NA
Bromate	Entry Point of Distribution System	Quarterly	Grab
Chlorine Residual, End Points	Rotating Throughout the Distribution System associated with Total Coliform Bacteria Sampling	Monthly	Grab
Disinfection Residual (Chlorine) at Entry Point	Entry Point of Distribution System	Daily	Grab
Lead and Copper	Designated Sites Throughout Distribution System Next Sampling Event in 2017	5 samples every 3 years	Grab
Inorganics	Entry Point of Distribution System Next sampling event between 2020 and 2028	1 sample/ 9 year cycle	Grab
Nitrate	Entry Point of Distribution System	Annual	Grab
Pesticides & Other Organics SOC/OOC	Waiver, renew by 9/30/2018, 9/30/2021, 9/30/24	Waiver renew every 3 years	NA
Total Coliform Bacteria	Rotating Throughout the Distribution System	Monthly	Grab
TTHM & HAA5	End of Distribution System	Annual	Grab
Sanitary Survey	Entire Potable Water System, next survey due in 2022	Every 5 Years	NA
Turbidity	After Filters	Daily	Grab
Volatile Organic Compounds	Entry Point of Distribution System	Annual	Grab
Emergency Response Plan/Priority Measures Plan	Plan update due 12/31/2017, 12/31/2019, 12/31/2020	Biennial Update	NA

Table 8.2: Drinking Water Monitoring Schedule for Pogo Permanent Camp PWSID: 372685

Drinking Water Parameter	Sample Location	Frequency	Sample Type
Arsenic	Entry Point of Distribution System Next sampling event between 2020 and 2028	1 sample/ 9 year cycle	Grab
Asbestos	Distribution System, Waiver granted until 2014, no renewal required.	NA	NA
Bromate	Entry Point of Distribution System	Quarterly	Grab
Chlorine Residual, End Points	Rotating Throughout the Distribution System associated with Total Coliform Bacteria Sampling	Monthly	Grab
Disinfection Residual (Chlorine) at Entry Point	Entry Point of Distribution System	Daily	Grab
Lead and Copper	Designated Sites Throughout Distribution System	5 samples Annually	Grab
Inorganics	Entry Point of Distribution System Next sampling event between 2020 and 2028	1 sample/ 9 year cycle	Grab
Nitrate	Entry Point of Distribution System	Annual	Grab
Pesticides & Other Organics SOC/OOC	Waiver, renew by 9/30/2018, 9/30/2021, 9/30/24	Waiver renew every 3 years	NA
Sanitary Survey	Entire Potable Water System, next survey due in 2021	Every 5 Years	NA
Total Coliform Bacteria	Rotating Throughout the Distribution System	Monthly	Grab
TTHM & HAA5	End of Distribution System	Annual	Grab
Turbidity	After Filters	Daily	Grab
Volatile Organic Compounds	Entry Point of Distribution System	Annual	Grab
Emergency Response Plan/Priority Measures Plan	Plan update due 12/31/2017, 12/31/2019, 12/31/2020	Biennial Update	NA

Table 8.3: Drinking Water Sampling Parameters for: Pogo Lower Camp PWSID: 372643 and Pogo Permanent Camp PWSID: 372685 and Maximum Contaminate Limits

Drinking Water Parameters	Units	Method	ADEC Drinking Water Maximum Contaminate Limit
Arsenic	µg/L	EPA 200.8	10
Bromate	µg/L	EPA 300.1	10
Chlorine Residual, End Points	mg/L	EPA 334.0	At Least Detectable
Disinfection Residual (Chlorine) at Entry Point	mg/L	EPA 334.0	Greater Than 0.2
Copper	µg/L	EPA 200.8	1300
HAA5	µg/L	EPA 552.2	60
Lead	µg/L	EPA 200.8	15
Inorganics	various	various	various
Nitrate	mg/L	EPA 300.0	10
Total Coliform Bacteria	#/100ml	SM 9223B-PA	1
TTHM	µg/L	EPA 524.2	80
Volatile Organic Compounds	µg/L	EPA 524.2	various
UV Transmittance	cm-1	5910B/5910B (Aqueous) UV254-UVA	NA

Pogo drinking water treatment plants operate in compliance with the Public Water System Final Operation Approval. **Tables 8.4** and **8.5** represent the Operation Approval parameter limits for drinking water monitoring during active mining operating.

Table 8.4: Drinking Water Operation Approval Limits for Pogo Lower Camp PWSID: 372643

Water Quality Parameter	Units	Limit
UV Transmittance (at inlet to UV reactor)	%	≥ 75%[1]
UV Intensity "Lamp" Sensor	%	≥ 63% or 0.5 mV
UV Intensity "Water" Sensor (labeled Net UVT)	%	≥ 75%
Treatment Plant Flow Rate	gpm	≤ 20[2]
Percent of monthly water volume treated that is within UV reactor validated conditions (i.e. within specification)	%	≥ 95%
Turbidity – 95 percentile of readings	NTU	≤ 1.49
Turbidity - maximum	NTU	≥ 5 NTU
Distribution entry – point chlorine residual		≥ 0.2 mg/L[3]
Orthophosphate dose	mg/L	≤ 15

[1] Collected during interim operational phase
[2] Record flow rate daily during peak WTP flow and submit with monthly operating report.
[3] Chlorine residual may need to be higher to meet disinfection CT requirements.

Table 8.5: Drinking Water Operation Approval Limits for Pogo Permanent Camp PWSID: 372685

Water Quality Parameter	Units	Limit
Ozone Residual (at outlet of first contactor)	mg/L	≥ 0.3
Water Temperature entering ozone contactor	C	≥ 5
Turbidity (after filtration but before orthophosphate and chlorine addition)	NTU	≤ 1.49[1]
Treatment Plant Flow Rate	gpm	≤ 28[2]
Orthophosphate dose	mg/L	≤ 15

[1] 95% of monthly reported reading must be less than limit; no spikes greater than 5 NTU.

[2] Record flow rate daily during peak WTP flow and submit with monthly operating report.

9.0 REVISIONS

2017 Plan of Operations Revisions			
Revision #	**Date**	**Change**	**By**
1			
2			
3			
4			
5			
6			

Table 9.2: Table of Significant Changes

Revision	Change Requested By	Description	Affected Section
1			
2			
3			
4			
5			
6			
7			
8			

Appendix A

Development Rock Segregation and Tracking Procedures (September 9, 2010)

Pogo Development Rock Segregation and Tracking Procedures September 9, 2010

1.0 Introduction

Development rock are classified as 'mineralized' if it contains >600 ppm arsenic or >0.5% sulfur. Mineralized development rock are segregated for long-term storage because of the potential for generating acid rock drainage (ARD) and/or neutral arsenic leaching as a consequence of weathering.

This section describes the procedures that are utilized to sample, analyze, segregate, and track this development rock during the pre-production and production phases of the mine.

2.0 Development Rock Sampling

A 20 lb sample is collected from the blast hole drill cuttings for each round prior to blasting. The sample is hand collected from the accumulation of drill cuttings at the base of the face by a miner, and is collected so as to provide a representative sample. The miner will then mark the blasted rock with a 1"x36" wood lathe with a unique label indicating the heading from which it came and the shift and date it was shot. A geologist will assign a unique sample number to the sample, and deliver it to the on-site laboratory as soon as practical.

3.0 Development Rock Geochemical Analysis

At the on-site laboratory, the samples are dried at 105 degrees C. Once dry, the sample is passed through the TM crusher to attain a particle size of 85% minus 10 mesh. The sample is then riffled to a mass of 200-300 grams. This amount is then pulverized in an 800 gram barrel for five minutes. The final grind is 90% minus 150 mesh. For samples high in clay, or oxidized or carbonaceous, it may be necessary to add 1.0 ml of methanol to prevent sticking during the pulverizing process. The sample is then rolled on Kraft paper. Two grams of binder and 18 grams of sample are weighed, mixed and compressed at 60,000 psi to form a pellet.

The pellet is analyzed by a wavelength dispersive x-ray fluorescence spectrometer (XRF) to determine the sulfur (S), arsenic (As) and iron (Fe) content. Sensitivities for the XRF are 1 ppm arsenic and 0.01% sulfur. The accuracy of the XRF is maintained through the use of pure element standards and a library of known standards made previously from Pogo development rock samples. Mineralized development rock thresholds are established at >600 ppm arsenic or >0.5% sulfur.

4.0 Development Rock Segregation

The objective of the segregation plan is to keep individual rounds of development rock separated until they can be classified as 'mineralized' or 'non-mineralized' and ensure that all mineralized development rock is placed in the 1525 mineralized stockpile, underground, or the tailings dry stack. All mineralized development rock that comes to the surface will eventually be placed in the dry stack for permanent storage.

Development rock is moved from the face directly to a temporary storage pad on the surface or, most often, to a remuck bay near the face. In both cases the round (muck pile) are kept separate from other rounds of development rock pending geochemical analysis of the sample for that round. The use of remuck bays shortens mucking time, thus enabling quicker access to the new face for another drill-load-blast cycle.

The mine-crew supervisor will ensure that the scoop or haul truck driver plants the labeled picket into the visible end of the muck pile after it is moved to the surface or a remuck bay. By default, any time a picketed muck pile must be moved to another location, the picket must be moved and re-inserted in the most visible end of the pile at the new location by the miner/operator that moves the pile.

Under no circumstances shall a pile be moved without a picket. If an operator encounters a pile that does not have a picket, the operators shall not move the pile without first contacting the shift supervisor, who shall then contact the geology department. The geology department shall review the tracking information to determine if the pile can be accounted for. If so, the pile shall be re-picketed and handled appropriately. If the pile cannot be accounted for, it shall be picketed as a mineralized pile and handled as mineralized rock.

As soon as practical after the chemical analyses for a round is reported to the geology staff by the on-site laboratory, a geologist will flag the appropriate picket either fluorescent

green for a ‘non-mineralized’ classification or orange for a ‘mineralized’ classification. Once the muckpile has been classified, the surface shift supervisor may instruct an operator to move the rock to its final destination.

If the development rock is classified ‘mineralized’, it is hauled to long term storage. If the rock is ‘non-mineralized’ it may be used on surface for construction.

If limited space or other operational limitations preclude the temporary segregation of any individual round, or obtaining a chemical analysis for any round, that round are classified and picketed as ’mineralized’ and disposed as if it had been determined to be mineralized on the basis of a chemical analysis.

5.0 Development Rock Tracking and Documentation

Each round of development rock is tracked by its unique number from blast to its classification as ‘mineralized’ or ‘non-mineralized’. Documentation of the sampling, analysis, classification, tracking and disposition will include an AutoCAD map accompanied by an Excel spreadsheet that is updated daily to reflect the origin and destination of each round.

Appendix B

Figures: Monitoring Locations and Water Rights Locations

Appendix C

Inspection Forms

Sumitomo Metal Mining Pogo LLC
Dry Stack Weekly Inspection

Inspection Information

Location: Drystack Inspection Date: _____ Time: _____

Inspector: _____ Status: _____

Comments:

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Free of Unusual Cracks	☐	☐			
Free of Bulging	☐	☐			
Free of Signs of Settlement	☐	☐			
Free of Seepage	☐	☐			
Free of Erosion	☐	☐			

Inspection Instructions

Inspection Certification

_____ _____

Authorized Signature Date

Report Date: 11/16/2016 Page 1 of 1

Sumitomo Metal Mining Pogo LLC
RTP Dam Inspection Monthly

Inspection Information

Location: RTP Dam Inspection Date: Time:

Inspector: Status:

Comments:

Inspection Criteria	OK	Not OK	Inspection Findings	Numeric Data Entry	Corrective Actions	Date Actions Completed
RTP Water Level (ft. E.L.)	☐	☐				
Seepage Collection Rate #5,6,7,8 (gpm)	☐	☐				
Seepage Collection Rate #9 (gpm)	☐	☐				
Elevation of Survey Monument March and September, Center (ft. E.L.)	☐	☐				
Elevation of Survey Monument March and September, Spillway Side (ft. E.L.)	☐	☐				
Upstream Dam Face Free of Erosion, Collapse, Subsidence	☐	☐				
Upstream Dam Face Free of Vegetation	☐	☐				
Dam Crest Free of Subsidence	☐	☐				
Dam Crest Free of Damage to Facilities.	☐	☐				
Downstream Dam Face Free of Erosion, Collapse, Subsidence	☐	☐				
Downstream Dam Face Free of Seepage	☐	☐				
Downstream Dam Face Free of Vegetation	☐	☐				
Reservoir Walls Free of Erosion and Collapse	☐	☐				
Spillway Inlet (Concrete) Free of Cracks	☐	☐				
Spillway Inlet (Concrete) Properly Connected to Flume	☐	☐				
Spillway Outfall (Flume) Free of Obstacles	☐	☐				
Spillway Outfall (Flume) Free of Damage	☐	☐				
Spillway Outfall (Flume) Free of Erosion on Ground	☐	☐				

Report Date: 11/16/2016 Page 1 of 2

Sumitomo Metal Mining Pogo LLC
RTP Dam Inspection Monthly

Inspection Information						
Location: RTP Dam			Inspection Date:		Time:	
Inspector:			Status:			
Comments:						

Inspection Criteria	OK	Not OK	Inspection Findings	Numeric Data Entry	Corrective Actions	Date Actions Completed

Inspection Instructions

If photos are taken record numbers/names in comment section.

Inspection Certification

Authorized Signature

Date

Sumitomo Metal Mining Pogo LLC

RTP Dam & Flume Weekly Inspection

Inspection Information			
Location: Entire Mine Site		Inspection Date:	Time:
Inspector:		Status:	
Comments:			

Inspection Criteria	OK	Not OK	Inspection Findings	Numeric Data Entry	Corrective Actions	Date Actions Completed
RTP Dam General Housekeeping	☐	☐				
RTP Dam General inspection findings:	☐	☐				
Flume 1 Drystack Toe - Take Manual Weir Reading	☐	☐				
Flume 1 Drystack Toe - Download Data Logger	☐	☐				
Flume 1 Drystack Toe-Inspect Dessicant for Datalogger, Replace if Pink	☐	☐				
Flume 1 Drystack Toe - Sweep Debris From Flume, Note Any Sediment Build-Up	☐	☐				
Flume 1 Drystack Toe - Pump Out Stilling Well, Remove Sediment	☐	☐				
Flume 1 Drystack Toe- Free of Erosion, Settling, Sediment Build-up After High Water Events	☐	☐				
Flume 2 RTP Toe - Take Manual Weir Reading	☐	☐				
Flume 2 RTP Toe - Download Data Logger	☐	☐				
Flume 2 RTP Toe-Inspect Dessicant for Datalogger, Replace if Pink	☐	☐				
Flume 2 RTP Toe - Sweep Debris From Flume, Note Any Sediment Build Up	☐	☐				
Flume 2 RTP Toe - Pump Out Stilling Well, Remove Sediment	☐	☐				
Flume 2 RTP Toe - Free of Erosion, Settling, Sediment Build-up After High Water Events	☐	☐				
Flume 3 North Diversion Ditch Return - Take Manual Weir Reading	☐	☐				
Flume 3 North Diversion Ditch Return - Download Data Logger	☐	☐				

Sumitomo Metal Mining Pogo LLC

RTP Dam & Flume Weekly Inspection

Inspection Information						
Location: Entire Mine Site			Inspection Date:		Time:	
Inspector:			Status:			
Comments:						

Inspection Criteria	OK	Not OK	Inspection Findings	Numeric Data Entry	Corrective Actions	Date Actions Completed
Flume 3 North Diversion Ditch Return -Inspect Dessicant for Datalogger, Replace if Pink	☐	☐				
Flume 3 North Diversion Ditch Return - Sweep Debris From Flume, Note Any Sediment Build-up	☐	☐				
Flume 3 North Diversion Ditch Return - Pump Out Stilling Well, Remove Sediment	☐	☐				
Flume 3 North Diversion Ditch Return - Free of Erosion, Settling, Sediment Build-up After High Water Events	☐	☐				
Flume 4 Liese Creek Bridge - Take Manual Weir Reading	☐	☐				
Flume 4 Liese Creek Bridge - Download Data Logger	☐	☐				
Flume 4 Liese Creek Bridge-Inspect Dessicant for Datalogger, Replace if Pink	☐	☐				
Flume 4 Liese Creek Bridge - Sweep Debris From Flume, Note any Sediment Build-up	☐	☐				
Flume 4 Liese Creek Bridge - Pump Out Stilling Well, Remove Sediment	☐	☐				
Flume 4 Liese Creek Bridge - Free of Erosion, Settling, Sediment Build-up After High Water Events	☐	☐				
LT99-009 Download Data Logger (monthly March - October)	☐	☐				
MW99-216 Download Data Logger (monthly March - October)	☐	☐				

Inspection Instructions

Inspection Certification

Report Date: 12/20/2016 Page 2 of 3

Sumitomo Metal Mining Pogo LLC
RTP Dam & Flume Weekly Inspection

Inspection Information						
Location: Entire Mine Site			Inspection Date:		Time:	
Inspector:			Status:			
Comments:						
Inspection Criteria	OK	Not OK	Inspection Findings	Numeric Data Entry	Corrective Actions	Date Actions Completed

Authorized Signature

Date

Report Date: 12/20/2016

Page 3 of 3

SWPPP Monitoring Report

Sample Source:	Sample ID#	Date:
Facility Name: Pogo Mine		Monitoring Time:
Mailing Address:	Monitoring Personnel:	
Description of Monitoring: Nature of the discharge (circle): Runoff Snowmelt Probable Sources of Any Observed Storm Water Contamination:	Visual Quality of Storm Water Discharge: Color: Odor: Clarity: Floating Solids: Settled Solids: Suspended Solids: Foam: Oil Sheen: Other Obvious Indicators of Storm Water Pollution:	
Storm Event Data: Date of Storm: Duration of storm (hrs): Rainfall Measurement or Estimate (inches): Estimate of total volume (gallons) of discharge samples: Time Discharge From Outfall Began: Duration between storm event samples and the end of the previous measurable (greater than 0.1 inch rainfall) storm event:		
Outfall ID#: Outfall SW21	Signature of Sampler:	
Diagram of Site:	Comments:	
Flow Description:	Ship Via:	
"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated 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."		
_____	Date: _____	

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Inspection Type: Prior to Forecast Rain/After a Storm Event/24-hr intervals During Extended Rain/Other	☐	☐			
Season: Rainy/Non-Rainy	☐	☐			
Storm Data: Date and Time	☐	☐			
Storm Data: Duration of Storm (hrs)	☐	☐			
Storm Data: Time Elapsed Since Last Storm (min/hrs/days)	☐	☐			
Rainfall Measurement or Estimate (inches)	☐	☐			
Figure 3A-1 Stockpile 1525 Portal - Are stockpiles protected from run-on/run-off?	☐	☐			
Figure 3A-2 Silt Fencing - Is the build-up of sediment less than 1/3 of the height of the barrier on the basin?	☐	☐			
Figure 3A-2 Silt Fencing - Does the roadway drainage flow in the design channel?	☐	☐			
Figure 3A-3 Outfall Discharge Point SW21 - Is culvert free of garbage and debris?	☐	☐			
Figure 3A-3 Outfall Discharge Point SW21 - Is it free of erosion or undercutting of the culvert?	☐	☐			
Figure 3A-4 Goodpaster River Bridge Abutments - Is it free of debris or garbage collected on the pillions or abutments?	☐	☐			
Figure 3A-4 Goodpaster River Bridge Abutments - Is it free of erosion or undercutting of the abutments?	☐	☐			
Figure 3A-4 Goodpaster River Bridge Abutments - Does the bridge appear to be straight and structurally sound?	☐	☐			
Figure 3A-5 Mineralized Pad Containment - Is the containment free of have any visible leaks, cracks, or overflows?	☐	☐			

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3A-5 Mineralized Pad Containment - Is the water surface free of any oil sheens or evidence of petroleum products?	☐	☐			
Figure 3A-6 1525 Fuel Island - Is the contianment free of any visible leaks, cracks or overflow?	☐	☐			
Figure 3A-6 1525 Fuel Island - Is the water surface free of any oil sheens or evidence of petroleum products?	☐	☐			
Figure 3A-7 Burn Pit - Are the contents in their designated area and secure from high wind gusts?	☐	☐			
Figure 3A-7 Burn Pit - Is the area free of any petroleum products?	☐	☐			
Figure 3A-7 Burn Pit - Is water drainage contained within the burn facility?	☐	☐			
Figure 3A-8 Trash Containers - Do the containers have suffcient capacity to prevent overfilling?	☐	☐			
Figure 3B-1 Liese Creek Bridge Abutments - Is it free of debris or garbage collected on the pillions or abutments?	☐	☐			
Figure 3B-1 Liese Creek Bridge Abutments - Is it free of erosion or undercutting of the abutments?	☐	☐			
Figure 3B-1 Liese Creek Bridge Abutments - Does the bridge appear to be straight and structurally sound?	☐	☐			
Figure 3B-2 Infiltation Gallery (Wetlands) Below Road #7 - Is the sediment trap below 1/3 of the barrier height?	☐	☐			
Figure 3B-2 Infiltation Gallery (Wetlands) Below Road #7 - Are drainage channels cut into safety berms to allow water off the roadway?	☐	☐			
Figure 3B-2 Infiltation Gallery (Wetlands) Below Road #7 - Does the roadway appear to be sound and has no indication of movement or softness.	☐	☐			

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3B-3 Culvert - Is the culvert free of garbage and debris?	☐	☐			
Figure 3B-3 Culvert - Is culvert free of erosion or undercutting?	☐	☐			
Figure 3B-4 Airport Runway - Is the runway free of erosion, garbage or obstacles?	☐	☐			
Figure 3B-5 Primary Pond Inlet - Is the pond free of storm water drainage into it?	☐	☐			
Figure 3B-5 Primary Pond Inlet - Is the pond free of eroision at the inlet from the river?	☐	☐			
Figure 3B-5 Primary Pond Inlet - Is the pond free of debris blocking the pond inlet?	☐	☐			
Figure 3B-5 Primary Pond Inlet - Are the pond banks stable and free of slumping?	☐	☐			
Figure 3B-6 Material Site A Sediment Pond - Is the build-up of sediment less than 1/3 the height of the barrier on the basin?	☐	☐			
Figure 3B-6 Material Site A Sediment Pond - Are berms and sediment basin free of accumulated litter?	☐	☐			
Figure 3B-6 Material Site A Sediment Pond - Are stockpiles protected from run-on/run-off?	☐	☐			
Figure 3C-1 1690 Portal - Are flows into the portal?	☐	☐			
Figure 3C-1 1690 Portal - Are the berms in place and directing all flows into the portal?	☐	☐			
Figure 3C-1 1690 Portal - Is the Liese Creek culvert free of garbage and debris?	☐	☐			
Figure 3C-1 1690 Portal - Is the protal free of erosion or undercutting of the culvert?	☐	☐			
Figure 3C-2 Storm Water Collection Pond - Is the pond liner intact?	☐	☐			

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3C-2 Storm Water Collection Pond - Is the pond free of debris?	☐	☐			
Figure 3C-2 Storm Water Collection Pond - Does the pond have adequate freeboard?	☐	☐			
Figure 3C-2 Storm Water Collection Pond - Is the sedimant in the pond less than 4 feet	☐	☐			
Figure 3C-3 Ore Stockpile Pad Drainage - Is the drainage directed into the culvert to the storm water pond?	☐	☐			
Figure 3C-3 Ore Stockpile Pad Drainage - Are the slopes stable and free of erosion around the pad?	☐	☐			
Figure 3C-3 Ore Stockpile Pad Drainage - Is the pad free of debris and garbage?	☐	☐			
Figure 3C-3 Ore Stockpile Pad Drainage - Is the pad free of petroleum sheens and/or spills?	☐	☐			
Figure 3C-4 Mill Drainage Culverts and Sediment Ponds - Is the culvert free of garbage and debris?	☐	☐			
Figure 3C-4 Mill Drainage Culverts and Sediment Ponds - Is the culvert free of erosion or undercutting?	☐	☐			
Figure 3C-4 Mill Drainage Culverts and Sediment Ponds - Is the drainage directed to the culvert free of debris?	☐	☐			
Figure 3C-6 Mill Drainage Culverts and Sediment Ponds - Is the culvert free of garbage and debris?	☐	☐			
Figure 3C-6 Mill Drainage Culverts and Sediment Ponds - Is the culvert free of erosion or undercutting?	☐	☐			
Figure 3C-6 Mill Drainage Culverts and Sediment Ponds - Is the drainage directed to the culvert free of debris?	☐	☐			
Figure 3C-8 Mill Drainage Culverts and Sediment Ponds - Is the drainage ditch and road drainage directed to the culvert located at AST-1?	☐	☐			

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3C-8 Mill Drainage Culverts and Sediment Ponds - Does AST-1 have adequate containemtn space?	☐	☐			
Figure 3C-8 Mill Drainage Culverts and Sediment Ponds - Is AST-1 free of erosion and undercutting?	☐	☐			
Figure 3C-8 Mill Drainage Culverts and Sediment Ponds - Is the discahrge of AST -1 culvert free of debris and garbage?	☐	☐			
Figure 3C-5 1875 Portal - Are the flows into the portal?	☐	☐			
Figure 3C-5 1875 Portal - Are the berms in place and directing all flows into the portal?	☐	☐			
Figure 3C-5 Culvert - Is the culvert free of garbage and debris?	☐	☐			
Figure 3C-5 Culvert - Is the culvert free of erosion and undercutting?	☐	☐			
Figure 3C-7 Sediment Basin at Road to MS-B - Is the build-up of sediment less than 1/3 of the height of the barrier on the basin?	☐	☐			
Figure 3C-7 Sediment Basin at Road to MS-B - Are berms and sediment basin free of acumulated litter?	☐	☐			
Figure 3C-7 Sediment Basin at Road to MS-B - Are stockpiles protected from run-on/run-off?	☐	☐			
Figure 3D-1 Northern Diversion Flume Headwall - Is the structure free of debris and garbage?	☐	☐			
Figure 3D-1 Northern Diversion Flume Headwall - Is the strucutre free of movement and failure?	☐	☐			
Figure 3D-1 Northern Diversion Flume Headwall - Is the structure free of sediments?	☐	☐			
Figure 3D-2 Seepage Wells at Toe of RTP - Is the flume intact and free of erosion?	☐	☐			

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information					
Location: Entire Mine Site			Inspection Date:		Time:
Inspector:			Status:		
Comments:					

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3D-2 Seepage Wells at Toe of RTP - Is the flume capturing all of the water?	☐	☐			
Figure 3D-2 Seepage Wells at Toe of RTP - Is the sediment basin free of garbage and debris?	☐	☐			
Figure 3D-2 Seepage Wells at Toe of RTP - Is the build up of sediemnt less than 1/3 of the height of the barrier on the basin?	☐	☐			
Figure 3D-3 Basin 1 Diversion Ditch - Is the basin free of erosion and failure?	☐	☐			
Figure 3D-3 Basin 1 Diversion Ditch - Is the basin free of channelized flow causing eroison?	☐	☐			
Figure 3D-4 Basin 2 Diversion Ditch - Is the basin free of erosion and failure?	☐	☐			
Figure 3D-4 Basin 2 Diversion Ditch - Is the basin free of channelized flow causing eroison?	☐	☐			
Figure 3D-5 Basin 3 Diversion Ditch - Is the basin free of erosion and failure?	☐	☐			
Figure 3D-5 Basin 3 Diversion Ditch - Is the basin free of channelized flow causing eroison?	☐	☐			
Figure 3D-6 Basin 4 Diversion Ditch - Is the basin free of erosion and failure?	☐	☐			
Figure 3D-6 Basin 4 Diversion Ditch - Is the basin free of channelized flow causing eroison?	☐	☐			
Figure 3D-7 South Diversion Flume Headwall - Is the structure free of debris and garbage?	☐	☐			
Figure 3D-7 South Diversion Flume Headwall - Is the structure free of movement and failure?	☐	☐			
Figure 3D-8 Dry Stack Surface - Is the surface free of erosion?	☐	☐			
Figure 3D-8 Dry Stack Surface - Is the surface free of ponding or concentrations of water?	☐	☐			

Report Date: 11/16/2016 Page 6 of 7

Sumitomo Metal Mining Pogo LLC
SWPPP Mine Site Inspection

Inspection Information

Location: Entire Mine Site Inspection Date: _____ Time: _____

Inspector: _____ Status: _____

Comments:

Inspection Criteria	Y	N	Inspection Findings	Corrective Actions	Date Actions Completed
Figure 3D-8 Dry Stack Surface - Are erosion controls id place? (i.e. cross tracks, 2% slopes etc.)	☐	☐			
Figure 3D-9 Recycle Tailing Pond - Is the RTP free of bulges, slumps or cracks in the dam?	☐	☐			
Figure 3D-9 Recycle Tailing Pond - Is the RTP free of visible channels causing erosion on the dam?	☐	☐			
Figure 3D-9 Recycle Tailing Pond - Is the RTP spillway free of debris and garbage?	☐	☐			
Figure 3D-9 Recycle Tailing Pond - Are the berms in place to direct flows into the RTP?	☐	☐			
Figure 3C-X 2150 Portal - Are the flows into the portal?	☐	☐			
Figure 3C-X 2150 Portal - Are the berms in place and directing all flows into the portal?	☐	☐			

Inspection Instructions

Print out the SWPPP Inspection Figures 3A, 3B, 3C and 3Dto help identify all locations. G:\Environmental\SWPPP\SWPPP 2011\SWPPP 2011 Attachments\Attachment D Figure 3A to 3D . The site-wide inspection form corresponds to the drawings. This form is to be used when there has been a 0.5 inch rain event within 24 hours, or as required by the MSGP during (April-October) and/or annual (June) inspection.

Inspection Certification

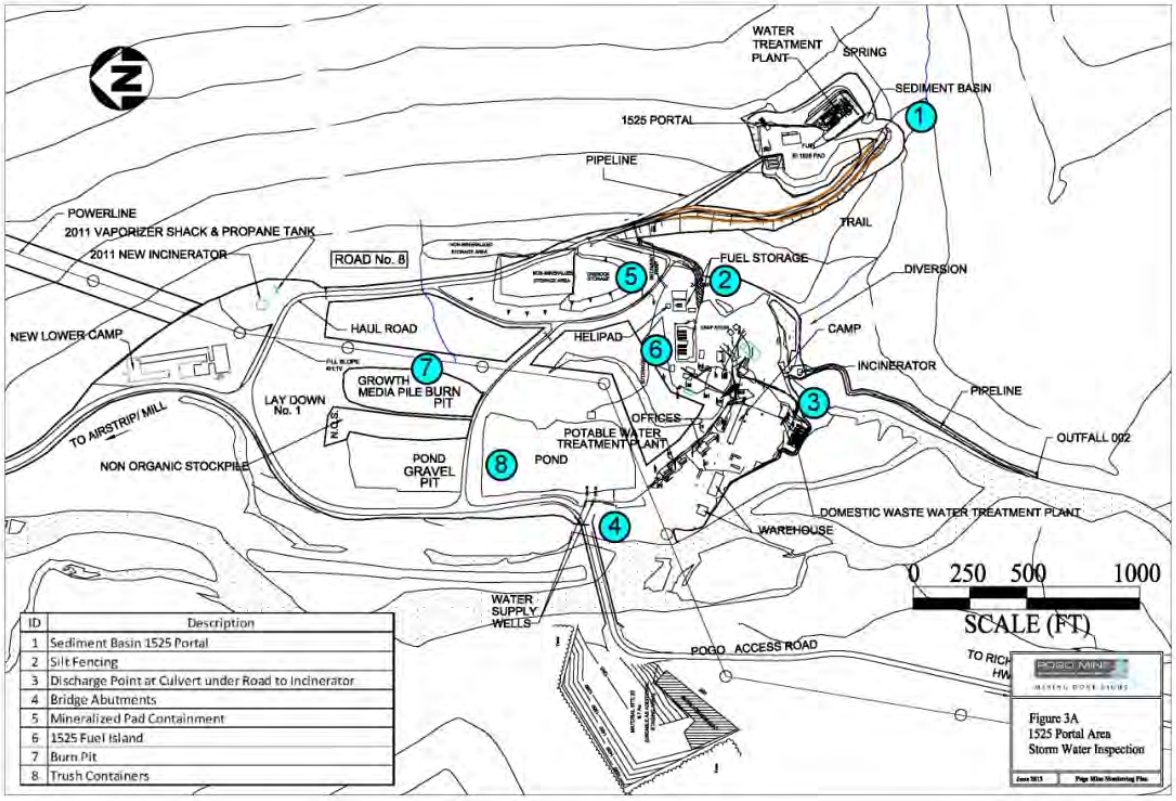
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage 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 possibiity of fine and imprisonment for knowing violations.
Printed Name: Title:

_____ _____

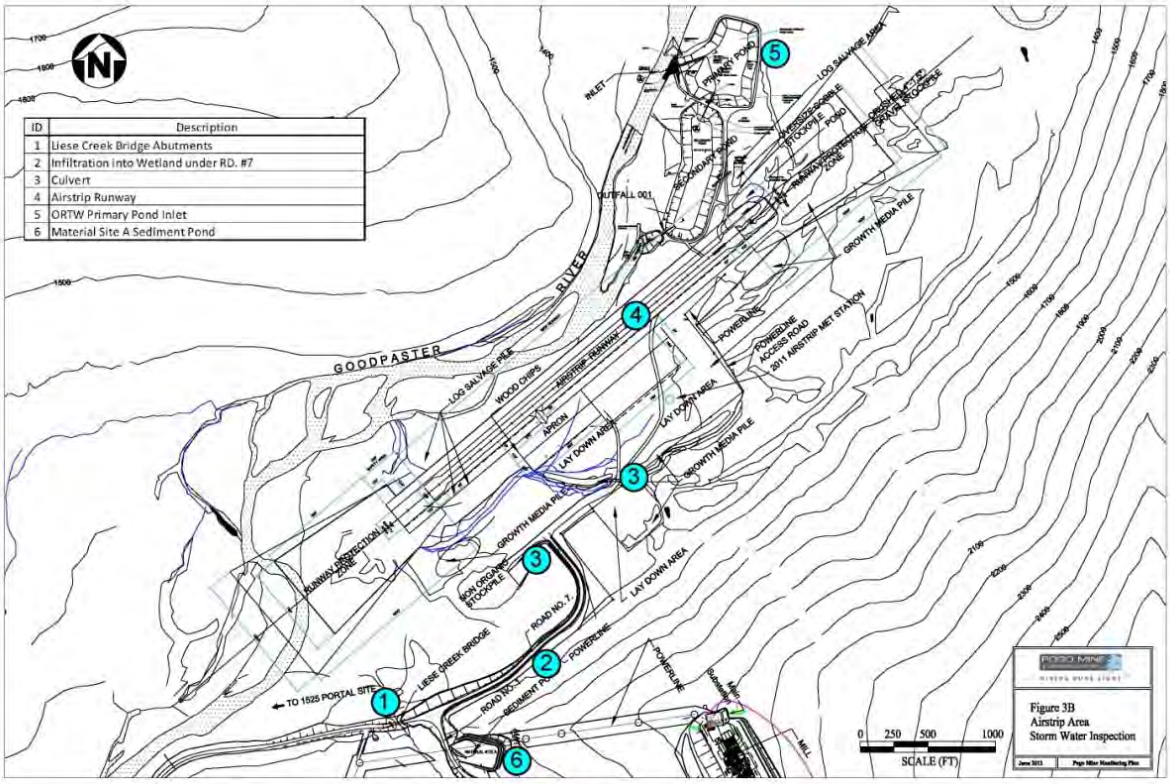
Authorized Signature Date

Report Date: 11/16/2016 Page 7 of 7

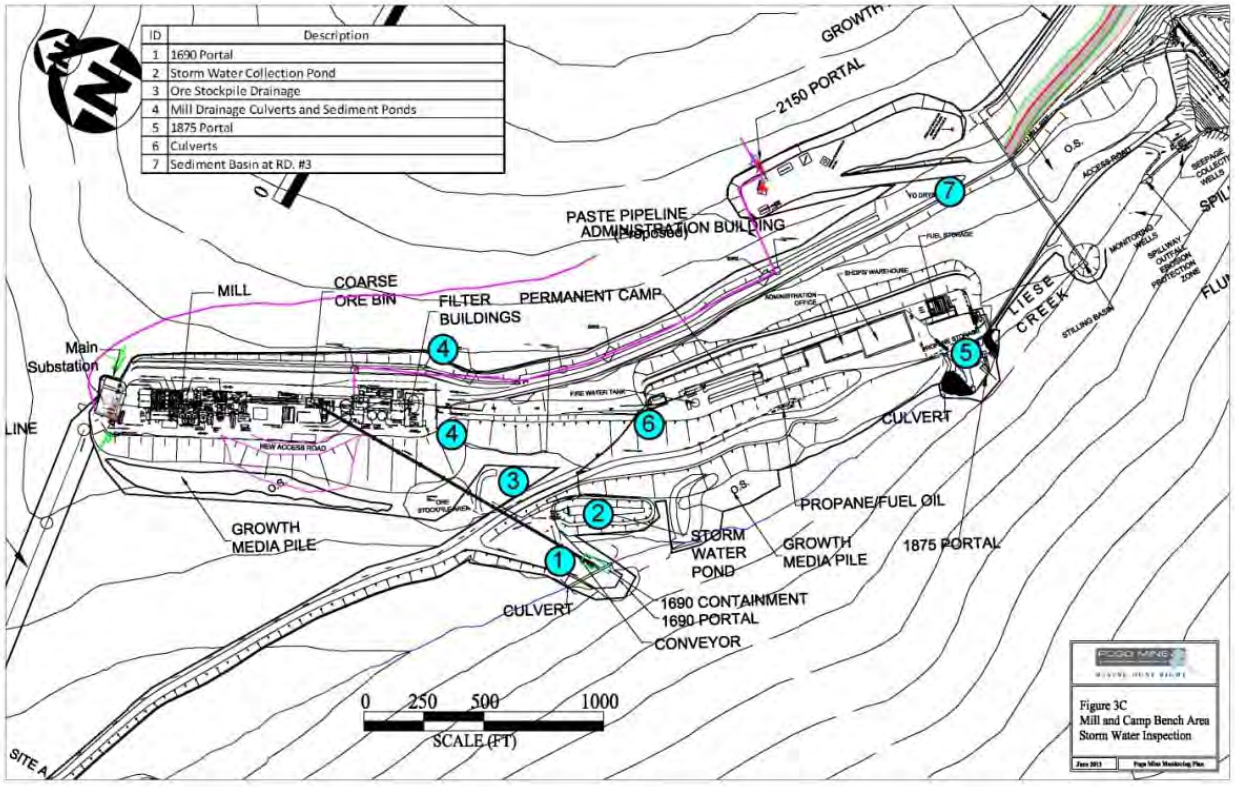

SWPPP Inspection Locations
Primary Pond Inlet
Airstrip
Culvert
Culvert
Infiltration into Wetlands Under Rd 7
Liese Bridge Abutments
Mill Drainage Culverts and Sediment Ponds
Material Site A - Sediment Pond
Ore Pad Drainage
Sediment Basin at Road to MS D
1690 Portal
North Diversion Ditch Flume Headwall
Basin 1 Diversion Ditch
Storm Collection Pond
Trash Containers
Culvert
RTP
Burn Pit
1875 Portal
Basin 2 Diversion Ditch
Seepage Collection Wells
Mineralized Pad Containment
RTP Toe
Basin 3 Liese Creek North Fork
Bridge Abutments
Silt Fencing
AST Fuel Island
Drystack Surface
Sediment Basin 1525 Portal
South Diversion Ditch Flume Headwall
Discharge Point at Culvert - Old Incinerator
Basin 4 Liese Creek South Fork
1:22,000
0 1,000 2,000 4,000 6,000
Feet
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Martin Weiser, Environmental Technician
File Location: P:\Geology\Environmental\Maps

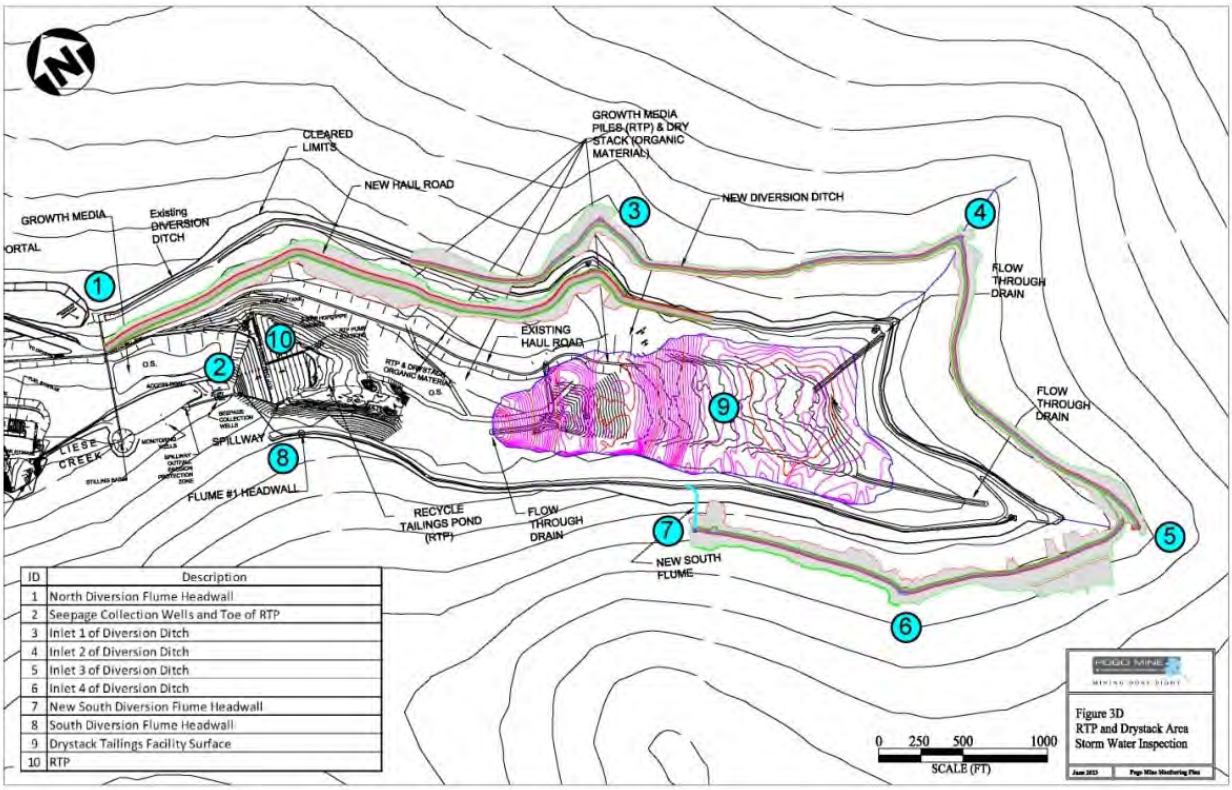


ID	Description
1	Sediment Basin 1525 Portal
2	Silt Fencing
3	Discharge Point at Culvert under Road to Incinerator
4	Bridge Abutments
5	Mineralized Pad Containment
6	1525 Fuel Island
7	Burn Pit
8	Trush Containers



ID	Description
1	Liese Creek Bridge Abutments
2	Infiltration into Wetland under RD. #7
3	Culvert
4	Airstrip Runway
5	ORTW Primary Pond Inlet
6	Material Site A Sediment Pond


ID | Description
1 | 1690 Portal
2 | Storm Water Collection Pond
3 | Ore Stockpile Drainage
4 | Mill Drainage Culverts and Sediment Ponds
5 | 1875 Portal
6 | Culverts
7 | Sediment Basin at RD. #3
GROWTH
2150 PORTAL
PASTE PIPELINE
ADMINISTRATION BUILDING (Proposed)
MILL
COARSE ORE BIN
FILTER BUILDINGS
PERMANENT CAMP
Main Substation
LINE
LIESE CREEK
CULVERT
PROPANE/FUEL OIL
GROWTH MEDIA PILE
STORM WATER POND
GROWTH MEDIA PILE
1875 PORTAL
CULVERT
1690 CONTAINMENT
1690 PORTAL
CONVEYOR
0 250 500 1000
SCALE (FT)
SITE A
Figure 3C
Mill and Camp Bench Area
Storm Water Inspection


CLEARED LIMITS
GROWTH MEDIA PILES (RTP) & DRY STACK (ORGANIC MATERIAL)
NEW HAUL ROAD
NEW DIVERSION DITCH
GROWTH MEDIA
Existing DIVERSION DITCH
FLOW THROUGH DRAIN
EXISTING HAUL ROAD
FLOW THROUGH DRAIN
LIESE CREEK
SPILLWAY
FLUME #1 HEADWALL
RECYCLE TAILINGS POND (RTP)
FLOW THROUGH DRAIN
NEW SOUTH FLUME
ID | Description
1 | North Diversion Flume Headwall
2 | Seepage Collection Wells and Toe of RTP
3 | Inlet 1 of Diversion Ditch
4 | Inlet 2 of Diversion Ditch
5 | Inlet 3 of Diversion Ditch
6 | Inlet 4 of Diversion Ditch
7 | New South Diversion Flume Headwall
8 | South Diversion Flume Headwall
9 | Drystack Tailings Facility Surface
10 | RTP
0 250 500 1000
SCALE (FT)
Figure 3D
RTP and Drystack Area
Storm Water Inspection

For Agency Use
Permit Tracking #: _____

Alaska Department of Environmental Conservation
MSGP Annual Reporting Form

Section I. General Information

Facility Name	APDES Permit Tracking Number

Facility Physical Address

Street	City	State	Zip Code
		Alaska	

Contact Person	Title	Phone	Email

Lead Inspector's Name	Additional Inspector's Name	Additional Inspector's Name	Inspection Date

Section II. General Inspection Findings

1. As part of this comprehensive site inspection, did you inspect all potential pollutant sources, including areas where industrial activity may be exposed to storm water? ☐ Yes ☐ No
   If NO, describe why not:

***Note**: Complete Section III of this form for each industrial activity area inspected and included in your SWPPP or as newly defined, in Section II parts 2 and 3 below, where pollutants may be exposed to storm water.*

2. Did this inspection identify any storm water or non-storm water outfalls not previously identified in your SWPPP? ☐ Yes ☐ No
   If YES, for each location, describe the sources of those storm water and non-storm water discharges and any associated control measures in place:

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3. Did this inspection identify any sources of storm water or non-storm water discharges not previously identified in your SWPPP? ☐ Yes ☐ No
   If YES, describe these sources of storm water or non-storm water pollutants expected to be present in these discharges, and any control measures in place:

4. Did you review storm water monitoring data as part of this inspection to identify potential pollutant hotspots? ☐ Yes ☐ No ☐ NA, no monitoring performed
   If YES, summarize the findings of that review and describe any additional inspection activities resulting from this review:

5. Describe any evidence of pollutants entering the drainage system or discharging to surface waters, and the condition of and around outfalls, including flow dissipation measure to prevent scouring:

6. Have you taken or do you plan to take corrective actions, as specified in Part 8 of the permit, since your last annual report submission (or since you received authorization to discharge under this permit if this is your first annual report), including any corrective actions identified as a result of this annual comprehensive site inspection? ☐ Yes ☐ No
   If YES, how many conditions requiring review for corrective action as specified in Parts 8.1 and 8.2 of the MSGP were addressed by these corrective actions?

Note: *Complete the attached Corrective Action Form (Section IV) for each condition identified, including any conditions identified as a result of this comprehensive storm water inspection.*

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Section III. Industrial Activity Area Specific Findings				
Complete one block for each industrial activity area where pollutants may be exposed to storm water. *Copy this page for additional industrial activity areas. In reviewing each area, you should consider:* • *Industrial materials, residue, or trash that may have or could come into contact with storm water;* • *Leaks or spills from industrial equipment, drums, tanks, and other containers;* • *Offsite tracking of industrial or waste materials from areas of no exposure to exposed areas; and* • *Tracking or blowing of raw, final, or waste material from areas of no exposure to exposed areas.*				
Industrial Activity Area:				
1. Brief Description:				
2. Are any control measures in need of maintenance or repair?	☐ Yes	☐ No		
3. Have any control measures failed and require replacement?	☐ Yes	☐ No		
4. Are any additional/revised control measures necessary in this area?	☐ Yes	☐ No		
If YES, to any of these three questions, provide a description of the problem: *(Any necessary corrective actions should be described on the attached Corrective Action Form.)*				
Industrial Activity Area: 1. Brief Description:				
2. Are any control measures in need of maintenance or repair?	☐ Yes	☐ No		
3. Have any control measures failed and require replacement?	☐ Yes	☐ No		
4. Are any additional/revised control measures necessary in this area?	☐ Yes	☐ No		
If YES, to any of these three questions, provide a description of the problem: *(Any necessary corrective actions should be described on the attached Corrective Action Form.)*				

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Industrial Activity Area: 1. Brief Description:				
2. Are any control measures in need of maintenance or repair?	☐	Yes	☐	No
3. Have any control measures failed and require replacement?	☐	Yes	☐	No
4. Are any additional/revised control measures necessary in this area?	☐	Yes	☐	No
If YES, to any of these three questions, provide a description of the problem: *(Any necessary corrective actions should be described on the attached Corrective Action Form.)*				
Industrial Activity Area: 1. Brief Description:				
2. Are any control measures in need of maintenance or repair?	☐	Yes	☐	No
3. Have any control measures failed and require replacement?	☐	Yes	☐	No
4. Are any additional/revised control measures necessary in this area?	☐	Yes	☐	No
If YES, to any of these three questions, provide a description of the problem: *(Any necessary corrective actions should be described on the attached Corrective Action Form.)*				

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Section IV. Corrective Actions

Complete this page for each specific condition requiring a corrective action or a review determining that no corrective action is needed. Copy this page for additional corrective actions or reviews.

Include both corrective actions that have been initiated or completed since the last annual report, and future corrective actions needed to address problems identified in the comprehensive storm water inspection. Include an update on any outstanding corrective actions that had not been completed at the time of your previous annual report.

1. Corrective Action # of for this reporting period.

2. Is this corrective action:
   - ☐ An update on a corrective action from a previous annual report; or
   - ☐ A new corrective action?

3. Identify the condition(s) triggering the need for this review:
   - ☐ Unauthorized release of discharge
   - ☐ Numeric effluent limitation exceedance
   - ☐ Control measures inadequate to meet applicable water quality standards
   - ☐ Control measures inadequate to meet non-numeric effluent limitations
   - ☐ Control measures not properly operated or maintained
   - ☐ Change in facility operations necessitated change in control measures
   - ☐ Average benchmark value exceedance
   - ☐ Other (describe):

4. Briefly describe the nature of the problem identified:

5. Date problem identified:

6. How problem was identified:
   - ☐ Comprehensive site inspection
   - ☐ Quarterly visual assessment
   - ☐ Routine facility inspection
   - ☐ Notification by EPA or DEC
   - ☐ Other (describe):

7. Description of corrective action(s) taken or to be taken to eliminate or further investigate the problem (e.g., describe modifications or repairs to control measures, analysis to be conducted, etc.) or if no modification is needed, basis for that determination.

8. Did/will this corrective action require modification of your SWPPP? ☐ Yes ☐ No

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9. Date corrective action initiated:
10. Date corrective action completed: Or expected to be completed:
11. If corrective action not yet completed, provide the status of the corrective action as the time of the comprehensive site inspections and describe any remaining steps (including timeframes associated with each step) necessary to complete the corrective action:

Section V. Annual Report Certification

Compliance Certification

Do you certify that your annual inspection has met the requirements of Part 6.3 of the permit, and that, based upon the results of this inspection, to the best of your knowledge, you are in compliance with the permit? ☐ Yes ☐ No

If NO, summarize why you are not in compliance with the permit:

Annual Report Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those person directly responsible for gathering 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.

Name of Authorized Representative	Title	Email
Signature		Date Signed

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Alaska Department of Environmental Conservation
MSGP Industrial Discharge Monitoring Report (MDMR)

Reason(s) for Submission (Check all that apply):	
☐	Submitting monitoring data (fill in all Sections).
☐	Reporting no discharge for all outfalls for this monitoring period (fill in Sections I, II, III, IV, and VI).
☐	Reporting that your site status has changed to inactive and unstaffed (fill in Sections I, II, VI and include date of status change in comments field in Section V).
☐	Reporting that your site status has changed to active (fill in all sections and include date of status change in comments field in Section V).
☐	Reporting that no further pollutant reductions are achievable for all outfalls and for all pollutants via Part 7.2.1.4 of the MSGP (fill in Sections I, II, and VI).

Section I. Permit Information		
Permit Tracking Number:		
Section II. Facility Information		
Facility Name:		
Facility Physical Address Street:		
City:	State: Alaska	Zip:
Contact Name:	Email:	
MDMR Preparer (Complete if MDMR was prepared by someone other than the person signing the certification in Section VI):		
Prepared By:	Organization:	
Email:	Phone:	

Section III. Discharge Information		
Identify Monitoring Period:	Check here if proposing alternative monitoring periods due to irregular storm water runoff. Identify alternative monitoring schedule and indicate for which alternative period you are reporting monitoring data.	
Quarter 1 (January 1- March 31)	Quarter 1: From	To
Quarter 2 (April 1- June 30)	Quarter 2: From	To
Quarter 3 (July 1- September 30)	Quarter 3: From	To
Quarter 4 (October 1- December 31)	Quarter 4: From	To
Are you required to monitor for cadmium, copper, chromium, lead, nickel, silver, or zinc?	☐ Yes	☐ No (Skip to Section IV)
What is the hardness level of the receiving water?	mg/L	

Section IV. Outfall Information		
How many outfalls are identified in your SWPPP?	List names of outfalls required to be monitored in the table below.	
Do any of your outfalls discharge substantially identical effluents?	☐ Yes	☐ No
If YES, for each monitored outfall, indicate outfall names that are substantially identical in the table below.		

a. Monitored Outfall Name*	b. Substantially Identical Outfalls [List name(s) of outfall(s) that are substantially identical to outfall in a.]	c. No Discharge?

*Reference attachment if additional space is needed to complete the table.

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Section V. Monitoring Information

Permit Tracking Number:

Nature of Discharge: ☐ Rainfall (complete a, b, and c below) ☐ Snowmelt

a. Duration of the rainfall event (hours): b. Rainfall amount (inches): c. Time since previous measurable storm event (days):

Outfall Name	Monitoring Type (QBM, ELG, S, I, O)*	Parameter	Quality or Concentration	Units	Results Description	Collection Date	Exceedance due to natural background pollutant levels	No further pollutant reductions achievable?

* (QBM) – Quarterly benchmark monitoring; (ELG) – Annual effluent limitation guidelines monitoring; (S) – State specific monitoring; (I) – Impaired waters monitoring; (O) – Other monitoring as required by DEC

Comment and/or Explanation of Any Violations (Reference all attachments here)

Section VI. Certification

	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated 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.		
Printed Name and Title of Principal Executive Officer or Authorized Agent		Signature of Principal Executive Officer or Authorized Agent	Date

Email of Principal Executive Officer or Authorized Agent:

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BMP Committee Annual Review Certification and Signature

I certify that I have reviewed the Pogo Mine Site BMP Plan and that the BMP Plan fulfills the requirements set forth in APDES Permit No. AK-0055334-1.

Signature :	Date:
Name (printed) :	Title:
Signature :	Date:
Name (printed) :	Title:
Signature :	Date:
Name (printed) :	Title:
Signature :	Date:
Name (printed) :	Title:
Signature :	Date:
Name (printed) :	Title:
Signature :	Date:
Name (printed) :	Title:

Appendix D

Baseline Data Summary for Groundwater Monitoring Locations