

centerraGOLD



Kemess Underground Mine 2019 Annual Report

Prepared for:

Canadian Environmental Assessment Agency

Report Authored by:

Centerra Gold Inc.

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EXECUTIVE SUMMARY

Aurico Metals Inc., a wholly own subsidiary of Centerra Gold Inc., obtained the Canadian Environmental Ministers Decision Statement on March 13, 2017 for the Kemess Underground Mine, an underground mine located in the mountains of north-central British Columbia (BC), 430 kilometres northwest of Prince George. Construction activities commenced July 2018. The project is located within the territories of the Takla Lake First Nation (TLFN) and Tsay Key Dene Nation (TKDN). The traditional territory of the Kwadacha Nation (KwN) is adjacent to and downstream from the project. The Implementation Schedule was provided to Aboriginal groups and the Canadian Environmental Assessment Agency (CEAA) in 2017. Construction for the Kemess Underground Project Commenced July 16, 2018.

At the mine site, fish and fish habitat protection continues to be achieved through the implementation of erosion and sediment control (ESC) techniques as part of the KUG construction activities in 2019. Very limited construction activities were located within the mine site water management area (MSWMA). Runoff water from the East Pit Quarry continued to flow into the Kemess Underground (KUG) tailings storage facility (TSF). All water that reports to the MSWMA is either pumped to the KUG tailings storage facility (TSF) or flows to sediment settling features (i.e. settling ponds, check-dams) prior to release into the natural environment. Kemess implemented supplementary construction site water management and erosion control measures including the implementation of check dams, French drain features, placement of rip-rap, and hydroseeding efforts.

Metal Mining Effluent Regulations (MMER) water quality monitoring continued in 2019.

Prior to pre-construction clearing of vegetation, migratory bird surveys were conducted by qualified professionals in consultation with indigenous groups. No nesting birds or active nests were observed within the construction areas during any of these surveys.

Monitoring of the Omineca Resource Access Road (ORAR) was completed to ensure adequate escape pathways were present to allow ungulates to exit the plowed roads during winter months when snowbanks were greater than 1 metre in height. One moose kill observation was reported in the 2019 reporting year, located just outside the security gate of the mine site. A Hunting, Fishing and Gathering Policy was implemented in 2018 to prohibit fishing, hunting, and trapping within the Project area.

No pre-clearing sweeps for Western Toad (*Anaxyrus boreas*) were completed in 2019, due to very little construction activities. The only construction activities in 2019 occurred on previously disturbed ground and a small expansion of the selenium pond. No evidence of Western Toad breeding (egg masses, tadpoles, or adults) were encountered during this time. Considering this, there was a very low chance of encountering Western Toad breeding in the affected areas.

Pre-Clearing surveys were conducted for little brown myotis (*Myotis lucifugus*) and Northern myotis (*Myotis septentrionalis*) prior to construction from April 17 to April 22, 2018 and thirty-five nursery bat boxes were installed before the start of construction. The April 2018 pre-clearing surveys did not reveal any active hibernacula or roosting activities therefore no active buffer zones are required at this time.

No heritage or archaeological sites were discovered during the 2019 construction activities or during

archaeological monitoring.

No accidents or malfunctions occurred in 2019 that had the potential to cause adverse environmental effects or trigger the emergency response plan.

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1. Introduction

Aurico Metals Inc. (Aurico) is a wholly own subsidiary company of Centerra Gold Inc. and is developing the Kemess Underground Project (KUG, Project), an underground copper-gold mine at the site of the former Kemess South mine.

The Project consists of the economic extraction of copper and gold ore from the underground deposit using panel caving techniques and processing approximately 9 million tonnes per year (average 36,500 tonnes per day equivalent) with an average annual production rate estimated at 105,000 ounces of gold and 44 million pounds of copper, for a total of 1.3 million ounces of gold and 563 million pounds of copper produced over a mine life of approximately 11 years. The project is located at the former Kemess South mine, which operated as an open pit copper-gold mine until 2011 and will use existing infrastructure to the extent possible. Other than the existing Kemess South development, the Project is located in a relatively undeveloped area in north central BC with limited sources of anthropogenic air emissions. Mineral exploration and forestry activities are the primary industrial related activities in the region.

Aurico received a BC provincial Environmental Assessment Certificate (#M17-01) on March 13, 2017 and a Canadian Environmental Ministers Decision Statement on March 9, 2017. All the various provincial and federal permits required to construct the mine have been received. Surface construction activities began at the Kemess Mine Site on July 6, 2018.

This report has been developed to meet Decision Statement Condition 2.9: *“the Proponent Shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report”*. The report is laid out such that each heading addresses an annual reporting requirement defined within the subheadings of Condition 2.9.

2. Condition 2.9.3: Consideration for consultation

2.9.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation

The following sections identify the Decision Statement conditions that required consultation and how the Proponent has considered the views and information received as per the requirements set out in Condition 2.2.

2.2 The Proponent shall, where consultation is a requirement of a condition set out in this Decision Statement:

2.2.1 provide a written notice of the opportunity for the party or parties being consulted to present their views and information on the subject of the consultation;

2.2.2 provide sufficient information on the scope and the subject matter of the consultation and a reasonable period of time to permit the party or parties being consulted to prepare their views and information;

2.2.3 provide a full and impartial consideration of any views and information presented by the party or parties being consulted on the subject matter of the consultation; and

2.2.4 advise in a timely manner the party or parties being consulted on how their views and information have been considered by the Proponent.

3. Condition 3: Fish and Fish Habitat

3.1. Condition 3.1

The Proponent shall implement erosion and sedimentation control measures within the Project are during all phases of the Designated Project to avoid the deposit of deleterious substances in water frequented by fish.

As per the Erosion Prevention and Sediment Control Plan, erosion and sediment control (ESC) techniques were implemented as part of all the KUG activities in 2019. Very little of the construction activities were located within the mines site water management area (MSWMA). Additional riprap (Approximately 500 tonnes) was placed along Jordan River during the summer of 2019. All water that reports to the MSWMA is either pumped to the KUG tailings storage facility (TSF) or flows to sediment settling features (i.e. settling ponds, check-dams) prior to release into the natural environment.

Settlement ponds were successful in reducing sediment transport within the MSWMA, verified by in-situ turbidity measurements at discharge points.

3.2. Condition 3.2

The Proponent shall, taking into consideration Fisheries and Oceans Canada's Measures to Avoid Causing Harm to Fish and Fish Habitat Including Aquatic Species at Risk, implement mitigation measures when conducting Designated Project activities to avoid causing harm to fish and fish habitat, including timing work in or around water to respect the timing windows identified to protect fish.

No in-stream works were conducted during the reporting period. To avoid and mitigate any potential for serious harm to fish, the following measures will be implemented:

- Works will be completed during the November- February low flow period;
- A qualified environmental professional will be present to monitor for the presence of fish in the immediate construction areas; and
- Riparian clearing will be kept to a minimum.

3.3. Condition 3.3

The Proponent shall comply with the Metal Mining Effluent Regulations and subsection 36(3) of the Fisheries Act regarding the deposit of effluent from the Designated Project in water frequented by fish, taking into account the Canadian Council of Ministers of the Environment's Water Quality Guidelines for the Protection of Aquatic Life, from the start of construction to the end of decommissioning. In doing so, the Proponent shall:

3.3.1 place all acid-generating and potentially acid-generating material into the tailings storage facility

and submerge all such materials placed in the tailings storage facility under a permanent water cover; and

During construction activities at the Kemess mine site, all acid-generating and potential acid-generating material was deposited into the KUG tailings storage facility under a permanent water cover.

In 2019, it was identified that potential acid-generating rock was placed as a roadbed material. Approximately 1500 m³ of this roadbed material will be removed and placed in the Tailings Storage Facility. The excavated rock will be replaced with suitable non-acid generating material.

3.3.2 collect and treat all waters affected by the Designated Project that do not meet the requirements of the Metal Mining Effluent Regulations and subsection 36(3) of the Fisheries Act, as applicable, prior to the affected waters being deposited in waters frequented by fish.

As per the Metal Mining Effluent Regulation and the *Fisheries Act*, water quality monitoring was conducted in accordance with the Canadian Council of Ministers of the Environment's Water Quality Guidelines for the Protection of Aquatic Life. MMER water quality monitoring will be ongoing through construction to the end of decommissioning.

Contact seepage water from the NAG Waste Rock Dump was collected in the selenium seepage pond. Selenium rich seepage water was then pumped directly to the KUG tailing storage facility through a pump and pipeline system.

3.4. Condition 3.6

The Proponent shall divert all runoff from the East Pit quarry into the tailings storage facility during construction and operation.

Runoff from the East Pit Quarry drainage reports directly into the tailings storage facility via existing drainage ditches. Most flow is captured by gravity, and the rest is collected in a ditch that reports to Dump Pond 1 which is then pumped to the KUG tailings storage facility. No additional measures or works were implemented. Monitoring of the drainage pattern from the East Pit Quarry will continue through the Construction and Operations phases of the mine life in accordance with the Mine Site Water Management Plan. Photo documentation of the East Pit Quarry drainage area into the KUG tailings storage facility (plate 3.6-1) is present in Appendix B.

3.5. Condition 3.7

Discuss consultation activities relative to Condition 3.7: The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Gitxsan Wilp Nii Kyap, and relevant authorities, and implement, from the start of construction to the end of decommissioning, a follow-up program to verify the accuracy of the environmental assessment as it pertains to fish and fish habitat and to determine the effectiveness of mitigation measures referred to in conditions 3.1 to 3.6. As part of the follow-up program, the Proponent shall:

3.7.1 monitor quality of water discharged in Attichika Creek during the dewatering of the Kemess South Pit and treat that water to meet the requirements of subsection 36(3) of the Fisheries Act;

3.7.2 monitor surface water quality in Amazay Lake and groundwater movement between the subsidence zone identified by the Proponent during the environmental assessment and Amazay Lake;

3.7.3 monitor changes in channel form and sediment load downstream of the discharge location in Attichika Creek;

3.7.4 monitor changes in water quality in Waste Rock Creek and the tailings storage facility, including changes in selenium concentrations;

*3.7.5 monitor the presence and use of spawning habitat by bull trout (*Salvelinus confluentus*) and rainbow trout (*Oncorhynchus mykiss*) downstream of the discharge location in Attichika Creek prior to and after the installation of the discharge pipeline into Attichika Creek. The Proponent shall offset any loss of spawning habitat for bull trout (*Salvelinus confluentus*) and rainbow trout (*Oncorhynchus mykiss*) in Attichika Creek if monitoring results show that spawning habitat loss has occurred; and monitor contaminants, including mercury, in the tissue of fish species harvested by Indigenous groups in Thutade Lake, including bull trout (*Salvelinus confluentus*)*

AuRico Metals submitted its permit application to the Major Mines Permitting Office (MMPO) on August 31, 2017. Prior to the official permit application submission, AuRico Metals consulted with Tsay Keh Nay (TKN) on the development of Fish and Aquatic Effects Monitoring Plans (FAEMP), Wildlife Management and Monitoring Plan, and Mine Site Water Management Plan (MSWMP), circulating draft copies of these plans on June 30, 2017, 60 days in advance of official permit application submission. These plans were developed in consideration of Condition 3.7. AuRico and TKN continue to consult on management plans through the permitting process and through established collaboration and consultation methods espoused within the 2017 Impact Benefit Agreement. Permitting and permitting consultation activities with relevant authorities and TKN as part of the Mine Review Committee (MRC) for KUG is ongoing.

During the permitting process, TKN, via their consultants at Environment Dynamics Incorporated (EDI), provided feedback on Fish and Fish Habitat. TKN comments focused on the Selenium Management Plan which outlines a selenium monitoring plan as well as mitigation measures for capturing flows with elevated selenium and addressing potential flow reduction in Waste Rock Creek. TKN is concerned that reduced flows in Waste Rock Creek may result in the environmental flow needs for fish and fish habitat not being met in Waste Rock Creek. In response, AuRico installed an additional monitoring station (WQ-14ds) in 2018 to gather flow data to verify model flow predictions, data from which will be used to inform management decisions if the environmental flow needs in Waste Rock Creek are not being met.

The TKN and AuRico IBA and its precursor the IMA, allows for capacity funding to support Additional Environmental Studies initiated by TKN, proposals for which are put forward to AuRico by TKN. In 2016 the Additional Studies program researched bull trout migration behaviour, spawner residence time and critical habitats in Lower Attichika Creek. Year three of the three-year study was scheduled to continue in summer 2019. Results from the Attichika Creek Bull Trout Study are shared between TKN and AuRico and reported out in the joint TKN/ AuRico community newsletter.

AuRico circulated the FAEMP and MSWMP to the Gitxsan Wilp Nii Kyap on December 22, 2017. No comments on the plans have been received to date.

During the 2019 season of May-October, the Attichika Creek diffuser program was put into operation. Daily monitoring of flows entering Attichika Creek through the diffuser were taken and volumes adjusted to meet the permit requirements. Both Water Quality sampling and Toxicity testing continued throughout the pumping duration. No Toxicity failures were noted and all information was relayed to the Environmental Monitoring Committee (EMC) on a monthly basis. Attichika Diffuser is shown in photo plate 3.5.1.

4. Condition 4: Migratory Birds

4.1. Condition 4.1

The Proponent shall carry out Designated Project activities in a manner that protects migratory birds and avoids harming, killing, or disturbing migratory birds or destroying, disturbing, or taking their nests or eggs. In this regard, the Proponent shall take into account Environment and Climate Change Canada's Avoidance Guidelines. The Proponent's actions in applying the Avoidance Guidelines shall be in compliance with the Migratory Birds Convention Act, 1994 and with the Species at Risk Act.

No construction activities in 2019 resulted in any vegetation clearing with the exception of very limited tree removal due to the expansion of the selenium capture pond.

No nesting birds or active nests were observed within the construction areas during any of these surveys.

Condition 4.2

The Proponent shall deter migratory birds from accessing the tailings storage facility and seepage ponds until water quality is not harmful to migratory birds.

Use of the KUG tailing storage facility and seepage ponds by migratory birds was monitored throughout the 2019 reporting year as part of the on-site wildlife reporting. No instances of birds accessing or inhabiting the tailing storage facility or seepage ponds were reported in 2019. Monitoring for use by migratory birds will continue in and deterrent(s) will be implemented as necessary. Although the water quality of the KUG tailings storage facility does not meet guidelines for some parameters, it is not considered harmful to migratory birds.

5. Condition 5: Human Health

5.1. Condition 5.1

The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to adverse effects on the health of Indigenous Peoples caused by changes in concentrations of contaminants of potential concern identified during the environmental assessment in air, soil, water, and sediment. The Proponent shall implement the follow-up program during construction and operation. As part of the development of the follow-up program, the Proponent shall:

5.1.1 identify levels of environmental change relative to established baseline conditions for contaminants of potential concern that would require the Proponent to implement modified or

additional mitigation measure(s) to mitigate increased risks to human health; and

5.1.2 if monitoring results demonstrate that concentration levels for contaminants of potential concern are greater than the identified levels of environmental change, update the human health risk assessment for the consumption of traditional foods exposed to these contaminants and communicate the results of the updated human health risk assessment to Indigenous groups.

AuRico Metals circulated the proposed Human Health Follow-up Program to TKN via email on March 20, 2018. A reminder of requests for feedback was discussed at the April 20, 2018 EMC meeting. To date no comments have been received. The Human Health Follow-Up Program dated February 2018 is present in Appendix C. In addition, the Health Canada comments on the Human Health Follow up Program are also included in this report under Appendix C.

6. Condition 6: Current Use of Lands and Resources for Traditional Purposes

6.1. Condition 6.1

*The Proponent shall install and maintain, during construction and operation, ramps every 100 to 300 metres over the discharge line between the tailing storage facility and Attichika Creek to provide passage for moose (*Alces alces*), woodland caribou (*Rangifer tarandus caribou*), grizzly bear (*Ursus arctos*), and furbearers. The Proponent shall identify the locations of ramps in consultation with Indigenous groups and relevant authorities.*

The KUG discharge line between the tailing storage facility and Attichika Creek was installed in 2018. There are no other impediments relating to this condition. The entire discharge line was buried at the time of installation; therefore, wildlife access will not be impeded, and installation of ramps became unnecessary.

6.2. Condition 6.2

The Proponent shall create and maintain, during construction and operation, escape pathways along all access roads associated with the Designated Project, including the northern section of the Omineca Resource Access Road, to allow ungulates to exit the plowed roads. The Proponent shall identify the locations of escape pathways in consultation with Indigenous groups and relevant authorities.

As per the Wildlife Management and Monitoring Plan, Kemess conducted a monitoring program of the Omineca Resource Access Road (ORAR) snowbanks during the winter months of 2019. Management of snowbanks on the ORAR included ensuring banks remained under one metre in height or that sufficient gaps were presents to provide escape pathways to allow ungulates to exit the plowed roads. Monthly monitoring events were carried out by Kemess Environmental staff augmented by the contracted snow removal company on a regular, sometimes daily basis. Any events of ORAR snowbank non-compliance were noted in 2019. Photo documentation of the ORAR snowbank survey (plate 6.2-1) is present in Appendix B.

Kemess also completed snow track surveys to monitor the use of escape gaps and high-traffic crossing areas created in snowbanks along the ORAR. This data will be used to selectively install wildlife crossing signs along the ORAR in high-traffic areas in the future.

6.3. Condition 6.3

The Proponent shall, from the start of construction to the end of decommissioning, remove carrion within 24 hours of its discovery by the Proponent from all access roads associated with the Designated Project, including the northern section of the Omineca Resource Access Road.

As per the Wildlife Management and Monitoring Plan, Kemess tracked incidental wildlife occurrences on-site and on the Omineca Resource Access Road (ORAR). All wildlife observations by Kemess staff and contractors were communicated to the Kemess environmental department via in-person communication, radio communication, self-documentation, or reporting through the wildlife email hotline. Employees are encouraged to submit photos along with the location, date and time of observation to help confirm the ID of the species and track movement. Supplementary data were collected from truck drivers coming to Kemess along the ORAR, as well as Avalanche Technicians who frequented the ORAR. One instances of carrion were observed on the ORAR during the 2019 reporting year. Carrion monitoring and removal will continue through the life of mine to the end of decommissioning.

6.4. Condition 6.4

The Proponent shall prohibit employees and contractors associated with the Designated Project from fishing, hunting, and trapping within the Project Area, unless an employee or a contractor is provided access by the Proponent for traditional purposes or for exercising Aboriginal rights, to the extent that such access is safe.

As per condition 6.4, AuRico has created the No Fishing, Hunting and Gathering Policy on June 29, 2018 and is reviewed within the new worker orientation. The Kemess Mine Fishing and Hunting Policy (FaHP) is designed to ensure safety of Kemess Mine personnel, contractors and the general public in the Kemess Mine area as well as for the protection of fish, wildlife and plant resources at the mine site. The policy defines that hunting, fishing or trapping, mushroom, berry picking, or the gathering of plants is not permitted by mine personnel or contractors at the mine site at any time. The policy is communicated to all employees at the Kemess Mine site through the mandatory Mine Site Orientation. Supplementary signage is posted around site displaying the policy.

6.5. Condition 6.5

*The Proponent shall, prior to construction and in consultation with Indigenous groups and relevant authorities, conduct pre-clearing surveys to identify Western toad (*Anaxyrus boreas*) breeding habitat, and shall implement measures to mitigate the loss of Western toad (*Anaxyrus boreas*) breeding habitat caused by the Designated Project.*

Prior to the official permit application submission AuRico Metals consulted with Tsay Keh Nay (TKN) on the development of the Wildlife Management and Monitoring Plan. To date no comments on the Western Toad preclearing surveys have been received. AuRico and TKN continue to consult on management plans and follow up program development through established collaboration and consultation methods espoused within the 2017 Impact Benefit Agreement.

Since minimal construction activities occurred in 2019, no amphibian surveys were conducted. AuRico, through

its joint Environmental Management Committee (EMC) with TKN discuss plans for any preclearing surveys and results with TKN.

6.6. Condition 6.6 and 6.7

The Proponent shall conduct pre-clearing surveys to determine the distribution of little brown myotis (Myotis lucifugus) and Northern myotis (Myotis septentrionalis), and establish, in consultation with Indigenous groups and relevant authorities, buffer zones around active hibernacula and active roosts.

During the permitting process, TKN, via their consultants at Environment Dynamics Incorporated (EDI), provided feedback on the bat pre-clearing surveys, submitting seven questions. TKN comments focused on the methodology used to identify what species of bat were using roosting structures and identify which roosting structures or nursery bat boxes were actively used.

AuRico conducted initial bat habitat surveys in November of 2017 to inform the initial offsetting requirements for roosting structures. Pre-Clearing surveys were conducted prior to construction from April 17 to April 22, 2018 and thirty-five nursery bat boxes were installed before the start of construction. During 2019, monthly surveys of the bat boxes showed no activity at these sites. Installed bat boxes will be subject to ongoing monitoring to determine usage and if active, will assist in identifying active hibernacula and active roosts and establishing buffer zones.

6.7. Condition 6.10

The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the presence of hoary marmot (Marmota caligata), white-tailed ptarmigan (Lagopus leucura), and short-eared owl (Asio flammeus) within the subsidence zone identified by the Proponent during the environmental assessment and within a buffer area of 250 metres along the limits of that subsidence zone. The Proponent shall implement the follow-up program during construction and operation.

AuRico Metals submitted its permit application to the Major Mines Permitting Office (MMPO) on August 31, 2017. Prior to the official permit application submission AuRico Metals consulted with Tsay Keh Nay (TKN) on the development of the Wildlife Management and Monitoring Plan circulating a draft copy of the plan for comment and feedback on June 30, 2018, 60 days in advance of the official permit submission. Permitting and permitting consultation activities with relevant authorities and TKN as part of the Mine Review Committee (MRC) for KUG concluded in Q2 2018. To date no specific feedback has been received on the subsidence zone follow up program. AuRico and TKN continue to consult on management plans and follow up program development through the permitting process and through established collaboration and consultation methods espoused within the 2017 Impact Benefit Agreement.

6.8. Condition 6.11

*The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the effects of changes caused by the Designated Project to the Chase herd of Southern mountain caribou (*Rangifer tarandus caribou*) and the Thudade herd of Northern mountain caribou (*Rangifer tarandus caribou*) on caribou hunting activities for traditional purposes and to determine the effectiveness of the mitigation measures. The Proponent shall implement the follow-up program from the start of construction to the end of decommissioning. As part of the follow-up program, the Proponent shall:*

*6.11.1 monitor, during construction and the first three years of operation, the use by moose (*Alces alces*), woodland caribou (*Rangifer tarandus caribou*), grizzly bear (*Ursus arctos*), and furbearers of the ramps referred to in condition 6.1 and of the escape pathways referred to in condition 6.2; and*

6.11.2 monitor mortality of wildlife on all access roads associated with the Designated Project, including the northern section of the Omineca Resource Access Road.

Follow up programs for conditions 6.11.1 and 6.11.2 are outlined in previous sections 6.1 and 6.2, respectively. Photo documentation of the wildlife cameras set up for KUG (plate 6.8-1) is present in Appendix B. These programs commenced with the start of construction in 2018 and will continue to the end of mine decommissioning.

7. Condition 7: Physical and Cultural Heritage and Structures, Sites, or Things of Historical, Paleontological, or architectural Significance

7.1. Condition 7.1

The Proponent shall, for any previously unidentified archeological structures, sites, or things of historical, archaeological, paleontological, or architectural significance discovered by the Proponent or brought to the attention of the Proponent by an Indigenous group, Gitksan Wilp Nii Kyap, or another party during any phase of the Designated Project: 7.1.1 immediately halt work at the location of the discovery; 7.1.2 have a qualified individual conduct an assessment at the location of the discovery; 7.1.3 inform, forthwith, in writing, Indigenous groups and Gitksan Wilp Nii Kyap of the discovery, and allow for monitoring by Indigenous groups and Gitksan Wilp Nii Kyap during archeological work; and 7.1.4 comply with all applicable legislative or legal requirements and associated regulations and protocols respecting the discovery, recording, transferring, and safekeeping of previously unidentified archeological structures, sites, or things of historical, archaeological, paleontological, or architectural significance.

In early August 2017, an Archeological Impact Assessment (AIA) of five ancillary development areas to the proposed KUG was conducted to ensure compliance with the Heritage Consultation Act (HCA) prior to any ground altering activities. A total of 70 ha of area was surveyed, 295 tests were excavated, and 15 exposures were inspected. The field crew consisted of Millennia personnel and members of Tsay Keh Dene, Kwadacha, and Takla Lake First Nations.

In 2018 an Archaeological Chance Find Procedure was developed for the Project. It provides a standard operating procedure should heritage sites, not identified during baseline studies, be discovered during Construction or Operations. The Archaeological Chance Find Procedure includes the following steps if personnel

suspect archaeological, traditional use, and paleontological materials or human remains are discovered:

- immediately contact the Environmental Superintendent or Construction Manager to implement a stop work order to reduce/minimize impacts to the site;
- leave the material in place and protect and/or mark the area around the site, and do not disturb or collect any archaeological, paleontological, heritage materials, or human remains; and
- report the discovery to their immediate Supervisor.

The General Manager and the Project Archaeologist will also be notified as outlined in the management plan. The Archaeology Branch and local Aboriginal groups/organizations will be advised of the discovery, if necessary. Final mitigation measures will be determined through consultation with the Archaeology Branch.

No new archaeological sites were identified in 2019 from chance encounters.

7.2. Condition 7.2

The Proponent shall not undertake any ground altering activities within 50 metres of the boundaries of archeological sites, unless authorized by relevant authorities.

As per the Heritage Management Plan, all known archaeological sites within 150 m of the Project footprint have been clearly indicated on development maps in relation to the Project footprint components. If construction is occurring within 150 m of a protected heritage site, the site will be flagged or temporarily fenced to serve as a visible barrier. The Kemess Environment Monitor will monitor for archaeological site impacts or situations where construction activities occur less than 50 m from a site. Should impacts be anticipated or found to have occurred within 50 m of an archaeological site, the Project Archaeologist will be contacted to determine if additional mitigation measures are required. Environment Department staff members will be fully briefed on the HMP and resulting mitigation measures.

During construction the preferred mitigation measure for archaeological sites was avoidance, therefore, construction monitoring was only required on one occasion during the 2018 reporting year. Construction of the KUG tailing storage facility water discharge pipeline was within 150 metres of archaeological site HfSq-3. Construction did not encroach within 50 metres of the Archaeological site HfSq-3 and no adverse effects to the site were found.

8. Condition 8: Independent Environmental Monitor

8.1. Condition 8.1

Prior to the start of construction, the Proponent shall retain the service of an independent environmental monitor, who is a qualified individual as it pertains to environmental monitoring of mining projects in British Columbia, to observe, record, and report on the implementation of the mitigation measures set out in this Decision Statement.

Environmental Dynamics Inc. (EDI) was retained in 2018 as the KUG Mine Site independent environmental

monitor (IEM). A formal Terms of Engagement Document was submitted to AuRico by EDI in April 2018. EDI has been performing as an IEM throughout the reporting period.

8.2. Condition 8.2

The Proponent shall give the independent environmental monitor the authority to stop Designated Project activities that do not comply with the conditions set out in this Decision Statement.

As per the 2018 IEM Terms of Engagement document, the IEM will have authority for stop work and will keep record of all stop work orders where works are resulting in, or are at imminent risk of, causing material environmental damage, in accordance with the EA Certificate and applicable legislation.

A Stop Work Order may be issued under two circumstances:

- In the event where an environmental incident, or where the completion of works at or in proximity to the location of the incident, has the potential to cause material unauthorized environmental impacts.
- In the event that a lack of compliance with the Certificate conditions, authorizations/permits and management plans has the potential to cause unauthorized adverse material environmental effects and previous communications with the responsible parties have not led reasonable corrective action.

Under both circumstances, the IEM will inform the responsible parties, EAO, CEAA and the Holder of the issue within 24 hours and provide rationale and high-level options/considerations for achieving compliance as soon as possible. A recommendation to lift the stop work order will occur when the IEM is satisfied that the appropriate steps have been taken to ensure compliance. To date no STOP WORK orders have been issued by the IEM.

8.3. Condition 8.3

The Proponent shall require the independent environmental monitor to prepare reports that include:

8.3.1 a description, including through photo evidence, of the Designated Project activities that occurred and the mitigation measures that were applied during the period covered by the report; and
8.3.2 if any, a description, including through photo evidence, of occurrences of non-compliance related to the implementation of mitigation measures set out in this Decision Statement Page 12 of 14 observed during the period covered by the report, the date of the occurrence(s) of non-compliance, whether Designated Project activities were stopped as a result of non-compliance, how the occurrence(s) of non-compliance was or were corrected by the Proponent, the date that the corrective action(s) was or were completed by the Proponent, or, if any, the status of pending occurrence(s) non-compliance that have not been corrected yet, and a description of any adverse environmental effect(s) associated with the occurrence(s) of non-compliance.

As per the 2018 IEM Terms of Engagement document, a monthly meeting is proposed to occur with the IEM,

the Holder, EAO, CEAA, and other Regulators and Aboriginal Groups. This will be aligned with EMC meetings. The Holder will provide a summary of Project activities since the last meeting and forecasted construction activities. The IEM will provide an update on the following items.

- Review of previous environmental concerns and status; and
- Summary of new environmental non-compliances and incidences, all corrective actions undertaken and successes of those actions.

A summary of compliance will be provided in a monthly report. The IEM will document, through written and photo documentation, any relevant inspections and communications pertaining to any non-compliance within the IEM checklist and the issue tracking log. Non-compliances will be closed out pending corrective action and removed from the issue tracking log in the subsequent report following indication of closure. Corrective actions by the Holder will be documented in the monthly report along with the date of corrective actions, the status of pending occurrences that have not been corrected yet, and a description of any adverse environmental effects associated with the occurrences of non-compliance.

The first IEM inspection commenced July 11-12, 2018, and AuRico Metals has received monthly IEM compliance reports summarizing site visits for July through December 2019. IEM reports will continue to be received by AuRico Metals through all phases of the Kemess mine life.

8.4. Condition 8.4

The Proponent shall require the independent environmental monitor to retain the reports referred to in condition 8.3 until the end of decommissioning. The Proponent shall require the independent environmental monitor to provide the reports referred to in condition 8.3 to the Agency, Indigenous groups, and relevant federal authorities within 10 days of their production. If occurrence(s) of non-compliance are observed by the independent environmental monitor, the Proponent shall require the independent environmental monitor to report all occurrence(s) of non-compliance directly to the Agency, Indigenous groups, and relevant federal authorities immediately.

AuRico has communicated the requirement for the IEM to retain compliance reports until the end of decommissioning. The IEM and IEM Support will be tasked with documenting compliance with the Certificate conditions and management plan commitments throughout all Project phases. The IEM will provide information to EAO, CEAA, Ministry Energy and Mines (MEM), Ministry of Environment (ENV), Forests, Lands, Natural Resources Operations & Rural Development (MFLNRORD) and to Aboriginal Groups as directed by EAO and set out in the Decision Statement. The IEM will not provide such information or reports to the Holder in advance of providing such information or reports to the EAO and CEAA. The IEM will submit monthly (or following their site visit) a report to the Holder, the EAO, and CEAA simultaneously via email. Information or reports related to non-compliance will not be submitted to the Holder in advance of providing the information to the EAO and CEAA. To align with Condition No. 12 of the Certificate related to the Environmental Monitoring Committee (EMC), and item 8.4 of the Decision Statement to provide reports to Indigenous groups, the IEM will submit the monthly (subject to site visit) and end of phase reports to the EMC on behalf of the Holder.

9. Condition 9: Accidents and Malfunctions

9.1. Conditions 9.1, 9.2, 9.3, 9.4

9.1 The Proponent shall take all reasonable measures to prevent accidents and malfunctions that may result in adverse environmental effects.

9.2 The Proponent shall, prior to construction, consult with Indigenous groups and relevant authorities on the measures to be implemented to prevent accidents and malfunctions.

9.3 The Proponent shall, prior to construction and in consultation with Indigenous groups and relevant authorities, develop an emergency response plan in relation to the Designated Project.

9.4 In the event of an accident or malfunction with the potential to cause adverse environmental effects, the Proponent shall implement the emergency response plan referred to in condition 9.3 and shall:

9.4.1 notify Indigenous groups, Gitxsan Wilp Nii Kyap, and relevant authorities of the accident or malfunction as soon as possible, and notify the Agency in writing;

9.4.2 implement immediate measures to mitigate any adverse environmental effects associated with the accident or malfunction;

9.4.3 submit a written report to the Agency no later than 30 days after the day on which the accident or malfunction took place. The written report shall include:

9.4.3.1 a description of the accident or malfunction and of its adverse environmental effects;

9.4.3.2 the measures that were taken by the Proponent to mitigate the adverse environmental effects of the accident or malfunction;

9.4.3.3 any views received from Indigenous groups, Gitxsan Wilp Nii Kyap, and relevant authorities with respect to the accident or malfunction, its adverse environmental effects, and measures taken by the Proponent to mitigate adverse environmental effects; Page 13 of 14

9.4.3.4 a description of any residual adverse environmental effects and any modified or additional measures required by the Proponent to mitigate residual adverse environmental effects;

9.4.3.5 details concerning the implementation of the emergency response plan referred to in condition 9.3; and

9.4.4 submit a written report to the Agency, no later than 90 days after the day on which the accident or malfunction took place, on the changes made to avoid a subsequent occurrence of the accident or malfunction, and on the implementation of any modified or additional measures to mitigate and monitor residual adverse environmental effects and to carry out any required progressive reclamation, taking into account the information in the written report submitted pursuant to condition 9.4.3.

AuRico Metals submitted its permit application to the Major Mines Permitting Office (MMPO) on August 31, 2017. Prior to the official permit application submission AuRico Metals consulted with Tsay Keh Nay (TKN) on the development of the Emergency Response Plan, circulating a draft copy of the plan for comment and feedback on June 30, 2018, 60 days in advance of the official permit submission. The Mine Emergency Response Plan (MERP) is developed in consideration to conditions 9.3 and 9.5. To date no comments from TKN have been received on the draft Mine Emergency Response Plan or the draft Accidents and Malfunctions Communication Plan. AuRico and TKN continue to consult on management plans through the permitting process and through established collaboration and consultation methods espoused within the 2017 Impact Benefit Agreement. Permitting and permitting consultation activities with relevant authorities and TKN as part of the Mine Review Committee (MRC) for KUG is ongoing.

Regarding Condition 9.5, AuRico circulated the draft Accidents and Malfunctions Communication Plan to Gitxsan Wilp Nii Kyap on December 22, 2017. No comments on the plan have been received from Gitxsan Wilp Nii Kyap to date.

During the 2019 reporting year, the ERP was not invoked as there were no events that had the potential to cause adverse environmental effects.

9.2. Condition 9.5

The Proponent shall develop and implement a communication plan in consultation with Indigenous groups and Gitxsan Wilp Nii Kyap. The Proponent shall develop the communication plan prior to construction and shall implement and maintain it up to date from the start of construction to the end of decommissioning. The plan shall include:

9.5.1 the types of accidents and malfunctions requiring the Proponent to notify the respective Indigenous groups and Gitxsan Wilp Nii Kyap;

9.5.2 the manner by which Indigenous groups and Gitxsan Wilp Nii Kyap shall be notified by the Proponent of an accident or malfunction and of any opportunities for the Indigenous groups and Gitxsan Wilp Nii Kyap to assist in the response to the accident or malfunction; and

9.5.3 the contact information of the representatives of the Proponent that the Indigenous groups and Gitxsan Wilp Nii Kyap may contact and of the representatives of the respective Indigenous groups and Gitxsan Wilp Nii Kyap to which the Proponent provides notification.

As per condition 9.5, the Accidents and Malfunctions Communication Plan was developed in 2018 to guide the co-ordination of communications between the organization and any applicable outside agencies (e.g. regulatory agencies, stakeholders, and the public) in the event of an accident and/or malfunction resulting from the KUG Project. This plan identifies the types of accidents and malfunctions requiring notification to external stakeholders and the timeframe of notification (including updates subsequent to the initial notification) to each Aboriginal Group community and other users of the area that could be affected by the accident and/or malfunction. The Accidents and Malfunctions Management Plan is present in Appendix C.

Appendix A:

Human Health Follow Up Program Comments

KEMES UNDERGROUND PROJECT
Health Canada comments on the Human Health Follow-up Program

#	Document	Section, Page	Context and Rationale for the Request	Suggested Information Request	Response
			<i>Provide applicable background information.</i>	<i>Ask a specific question, or describe the specific request for additional information.</i>	
1	Human Health Follow-up Plan (HHFP)	1.2 General Approach, pp 1-3	The proponent states that "monitoring air is not required for the HHFP"; however, KUG Condition 5 (Human Health) states that "the proponent shall develop...a follow-up program to verify the accuracy of...adverse environmental effects on the health of Indigenous Peoples caused by changes in concentrations of contaminants of potential concern identified during the environmental assessment in air, soil, water and sediment." Health Canada suggests that non-threshold, non-carcinogenic compounds such as NO2 and PM should be evaluated during all phases of the project, since any increase in these compounds may result in a potential risk to human health.	Health Canada suggests implementing continuous air quality monitoring, at locations relevant to human receptors, to verify project predictions and to allow for future adaptive management should there be any unanticipated exceedances of CAC.	<i>The Air Quality Management Plan and Fugitive Dust Management Plan outline site-specific air quality monitoring, consisting of dustfall monitoring of total metals proportions in dustfall and passive air sampling system (PASS) for NO2 and SO2. A Partisal™ 2025i Sequential Air Sampler (www.thermofisher.com) is currently being sourced for implementation at the KUG Project, which will capture PM2.5 and PM10 particulate matter concentrations. The Partisal will be located where human activity is representative of the mine site.</i>
2	Human Health Follow-up Plan	1.2 General Approach, pp 1-3 4.4 Soil, pp 4-2	The proponent states that the HHFP relies on input from other monitoring and management plans, and assumes that if there is no change in environmental media according to these other plans, the quality of country foods will not change. These other monitoring plans do not describe how they will feed into the HHFP. For example, the MSWMP appears to be geared towards satisfying permitting requirements with minimal mention of human health. The HHFP states that "only the top 0 to 20 cm of the soil horizon should be sampled for metal analysis consistent with the HHERA approach in the EAC Application." However, the Ecosystem Management Plan which outlines the soil sampling states that "soil samples will be collected from within the top 30 cm of the soil pits" (pp. 21).	To address inconsistencies between the HHFP and other monitoring programs, ensure the monitoring programs that feed into the HHFP acknowledge they are being used for the HHFP and update any protocols in these plans that do not sufficiently address the needs of the HHFP. Provide information in the HHFP on how the triggers for the other monitoring programs are appropriate for human health. Explain who will be looking at the data from a human health perspective, and with what frequency.	<i>The following plans will be updated to acknowledge that data collected through the plans will be used for the HHFP: Mine Site Water Management Plan, Selenium Management Plan, Fish and Aquatic Effects Monitoring Plan, and Ecosystem Management Plan.</i> <i>The sampling protocol for vegetation tissue metals in the Ecosystem Management Plan will be updated to require sampling concurrent with soil sampling every 3 to 5 years, rather than only when soil exceedances are detected. This revised monitoring approach recognizes that vegetation tissue metals concentrations can be affected by both uptake from soils and by aerial deposition of dust, and is more protective of human health than the current approach. This revision to the Ecosystem Management Plan will be incorporated into the description of vegetation monitoring in the HHFP.</i> <i>The trigger for an updated HHRA for country foods based on vegetation monitoring will be updated to be consistent with other HHFP triggers: if the results of vegetation monitoring indicate that COPC concentrations in vegetation samples exceed predicted concentrations during the Construction or Operations phases (as shown in Tables 4.6.1 and 4.6.2 of Appendix 18-B of the EAC Application) plus 30% (40% for high variability metals) for at least three consecutive samples (i.e., for at least nine to 15 years), a HHRA for country foods will be triggered.</i> <i>For the other environmental media (soils, water, sediment), triggers for an updated HHRA are based on laboratory precision and anticipated natural variability (BC/MCE 2015, Section 4; Laboratory Quality Assurance Quality Control, in BC Environmental Laboratory Manual, Ed.) and are considered appropriate for the protection of human health.</i> <i>All soils sampling completed for the HHERA in the EAC application was completed within the top 30 cm of the soil horizon. The HHFP text will be corrected accordingly.</i> <i>The monitoring data collected from other monitoring programs will be reviewed annually from a human health perspective and reported on in annual HHFP reports.</i>
3	Mine Site Water Management Plan	4.3.4 Potable Water Supply Wells	The report notes that there are 3 existing potable water supply wells that continue to be operated.	With regards to the potable wells, please describe the proposed monitoring program (including the parameters and frequency of monitoring) that will be implemented to ensure the protection of human health.	<i>Samples are taken on a monthly basis for total coliforms and E. Coli. On a quarterly basis samples are analyzed for total metals, dissolved metals, anions, nutrients and general parameters.</i>
4	Mine Site Water Management Plan (MSWMP)	9.0 Plan Revision	The plan is a "living document".	HC suggests the proponent commit to, at minimum, an annual or semi-annual review of standards and objectives, update to the most conservative values and note any potential risks to human health. For example, the Canadian Council of Ministers of the Environment have recently released Canadian Ambient Air Quality Standards for NO2. These are lower than the previous standards and are applicable as of 2020 which will be during the life of the project. https://www.ccmec.ca/en/current_priorities/air/caaq5.html	<i>Annual review of all standards and objectives will be completed for the Mine Site Water Management Plan. Any potential risks to human health will be identified in the annual report from the Human Health Follow Up Program.</i>
5	Fish and Aquatic Effects Monitoring Plan (FAEMP)	8.3.5.7 Fish Monitoring Studies (Sentinel Species Studies)	The report states that "ten fish of similar age and length from each of the three locations (for a total of 30 fish) will be retained for analysis of metals and moisture content in body tissue."	Health Canada suggests these data be used to help verify project predictions for concentrations of metals in fish tissues.	<i>Agreed. The tissue metal data from the sentinel species monitoring will be available for a future review of project predictions.</i>
6	Fish and Aquatic Effects Monitoring Plan	8.3.5.7 Fish Monitoring Studies (Adult Fish Monitoring Studies)	The report states that "adult fish monitoring studies will include...non-lethal fish tissue monitoring of adfluvial bull trout from Thutade Lake..."	Health Canada suggests these data are used to help verify project predictions for concentrations of contaminants in fish tissues.	<i>Agreed. The tissue metal data from the bull trout monitoring will be available for a future review of project predictions.</i>
7	Fish and Aquatic Effects Monitoring Plan	Appendix G (Fish Monitoring Studies)	The FAEMP states that total metal concentrations in dermal punch samples will be compared against applicable provincial and federal fish tissue guidelines, and site-specific toxicity thresholds for selenium in tissue.	Please specify what guidelines will be used and why they are appropriate for the protection of human health. In addition, it is suggested that MEHg be included in any fish monitoring program as it is more toxic than total mercury.	<i>In addition to the BC selenium guideline for the protection of aquatic life, fish tissue selenium concentrations will be compared to the BC selenium human consumption screening values, which are derived from Health Canada's recommended calculation of ingestion and tolerable upper intake.</i> <i>Fish tissue total mercury concentrations will be compared to the BC total mercury aquatic life guidelines when human diet is based primarily on fish. The addition of methyl mercury analysis will be considered, but sample volume is limited in dermal punch samples.</i>
8	Human Health Follow-up Plan	3.4 Ecosystem Management Plan, pp 3-3	The report states that "soil samples will also be collected from a non-impact control site for comparison".	Please provide information on the location of the non-impact control site.	<i>The non-impact control site will be selected at the time of sampling, based on accessibility and air quality modeling. Based on PM2.5, the preferred location of the non-impact control site is southwest of the mine site and south of the ORAR, at least 1 km away from the ORAR.</i>
9	Human Health Follow-up Plan	3.4 Ecosystem Management Plan, pp 3-4	"frequency of sampling will be every 3 to five years to match the frequency of the Reclamation and Closure Plan review/update."	Provide rationale as how this frequency of sampling will be protective of human health.	<i>The predicted effects on soil metals concentrations during Construction and Operations were very small (Table 3.4-2 of Appendix 18-B of the EAC Application) and changes to soil metals are expected to occur over a long time horizon (e.g., several decades). Therefore, sampling every 3 to 5 years is considered sufficient for the protection of human health.</i> <i>As described in the response to #2, above, the Ecosystem Management Plan will be revised to require vegetation tissue sampling concurrent and co-located with soil sampling every 3 to 5 years, rather than only if exceedances are detected for soils. This approach is more protective of human health because it recognizes that vegetation tissue metals concentrations are affected through two pathways: uptake from soil and aerial deposition.</i>
10	Human Health Follow-up Plan	3.4 Ecosystem Management Plan, pp 3-4	The report states that "if vegetation sampling commences, the frequency of sampling would be the same as that of soil sampling - every three to five years... or every three years at a minimum should COPC concentrations in soil exceed CME Soil Quality Guidelines for the Protection of Environmental and Human Health - Agricultural, as well as baseline concentrations plus 30% (40% for high variability metals)."	Please provide rationale as to how the proposed vegetation sampling strategy is protective of human health.	<i>The predicted effects on vegetation tissue metals concentrations during Construction and Operations were very small (Tables 4.6.1 and 4.6.2 of Appendix 18-B of the EAC Application). Therefore, sampling every 3 to 5 years is considered sufficient for the protection of human health.</i>
11	Human Health Follow-up Plan	4.2 Sediment, pp 4-1	Sediment should be included in the HHFP as it can be an exposure route for fish and aquatic plants. Sediment is not included in the list of media provided on page 1-3 and has not been discussed in the report up until this point, but does appear as a trigger for fish metal characterization for potential country foods risk assessment in Section 4.3 Fish.	It is unclear why sediment is highlighted in section 4.2 but mentioned earlier in the report. Please update the HHFP with a discussion of sediment. Include a discussion of how triggers for sediment monitoring are suitable for assessment of HH.	<i>Sediments form part of the exposure pathway related to fish tissues for human health. Triggers for sediment are utilized in the HHFP as metals concentrations in sediment are less variable than those in fish tissues. Sediment sampling is completed as part of the Fish and Aquatic Effects Monitoring Plan and the Selenium Management Plan, as described in Sections 3.2 and 3.3 of the HHFP. Sediment will be added to the list of media discussed on page 1-3 of the HHFP.</i>
12	Human Health Follow-up Plan	4.5 Vegetation, pp 4-2	"Vegetation sampling will then be conducted every three years, co-located and during the same season as soil sampling." Health Canada notes that collection of samples (from plants consumed by people, such as medicinal plants and berries is included in the monitoring plan for the project. In order to understand the potential intake of contaminants by consumers of local vegetation, it is essential that representative species and specific portions of those species (e.g. bark for tea, berries, etc.) are analyzed separately (i.e. do not composite leaves with berries from the same plant in one sample). Sufficient numbers and volumes of samples should be collected at individual locations. Ideally one sample volume collected from each plant rather than compositing samples from the same species located in a similar area (i.e. collecting berries from one plant as a sample, not collecting berries from multiple plants in an area and compositing those into one sample). Vegetation samples collected should be co-located with soil samples from the root zone to evaluate the difference between soil contaminant concentrations and concentrations in the plants themselves. This sampling will also identify variations between plants and between specific portions of plants (if more than one portion of the plant is consumed, e.g. leaves and bark).	Health Canada suggests that plant and soil sampling should occur at a time when plants are normally harvested in order to best reflect the COPCs present in the traditional foods and associated soil. Health Canada suggests that proponent communicate with Indigenous groups to ensure they have an accurate list of traditional plants, what parts are collected, how they are collected and in what season they are collected.	<i>The vegetation sampling plan in the EMP will be updated as described in the response to #2 above. In addition, the vegetation sampling plan in the EMP and associated references in the HHFP will be revised to clarify the following:</i> <i>1. Vegetation sampling will be completed during the peak of the growing season, or when berries are ripe (if berries are the target).</i> <i>2. Representative species and portions of those species (e.g., berries) will be collected and analyzed separately.</i> <i>3. Composite vegetation samples will be collected from at least 5 individuals at a sampling location. Collection methods will be consistent with the methods used during baseline data collection for vegetation tissue metals. Although composite samples have lower variability than those collected from single plants, they are more representative of what would be collected and consumed by humans or browsing wildlife. Consistency with the sampling approach taken during baseline data collection is required to evaluate levels of environmental change.</i> <i>4. Vegetation samples will be co-located with soil samples from the rooting zone (top 30 cm).</i> <i>5. Species selected for sampling will include country foods (i.e., crowberry and soapberry) and diet species for moose, hare and grouse assessed in the HHERA in the EAC Application to ensure comparability with baseline studies.</i> <i>6. Multiple species will be co-collected with each soil sample where possible.</i>

13	Human Health Follow-up Plan	7.1 Hazard Quotients, pp 7-1	It is noted that the Equation 1 in Section 7.1 is a dose or exposure estimate for the ingestion of traditional foods not an estimated daily intake. An EDI by definition is an estimate of exposure from all known or suspected sources via a multimedia exposure, whereas this equation only looks at one exposure pathway. Canadian Council of Ministers for the Environment (CCME). 2006. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines.	Please clarify in text.	Text will be updated to replace EDI with Estimated Exposure, consistent with Health Canada 2010a and CCME 2006 Health Canada. 2010a. Federal Contaminated Site Risk Assessment In Canada, Part I. Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA). Version 2.0. Revised 2012. Contaminated Sites Division, Safe Environments Directorate. Ottawa, ON.
14	Human Health Follow-up Plan	7.1 Hazard Quotients, pp 7-1	It is noted that Equation 1 is used to estimate the dose of COPCs from a single traditional food (e.g., blueberries). These doses would then be summed to get the total traditional foods dose, and the total traditional foods does would be used in the calculation of the HQ.	Please clarify in text.	Additional text will be added after Equation 1 to clarify that estimated exposures per country food will be summed within COPCs to a total estimated exposure prior to use in Equation 2
15	Human Health Follow-up Plan	7.2 Incremental Lifetime Cancer Risks, pp 7-2	It is noted that for Equation 3 in Section 7.2 the estimated lifetime daily exposure (ELDE) is more commonly referred to as the dose.	Please clarify in text.	Text will be updated to replace ELDE with Lifetime Average Daily Dose, consistent with Health Canada 2010a
16	Human Health Follow-up Plan	7.2 Incremental Lifetime Cancer Risks, pp 7-2	It is noted that Equation 3 is used to estimate the dose of COPCs from a single traditional food (e.g., blueberries). These doses would then be summed to get the total traditional foods dose, and the total traditional foods does would be used in the calculation of the ILCR.	Please clarify in text.	Additional text will be added after Equation 3 to clarify that estimated exposures per country food will be summed within COPCs to a total estimated exposure prior to use in Equation 4

Appendix B:

Photo Plates



Plate 3.6-1 East Pit Quarry Drainage area into the KUG tailings storage facility



Plate 3.5-1: Attichika Creek Diffuser in operation.



Plate 6.2.1 ORAR snowbank survey

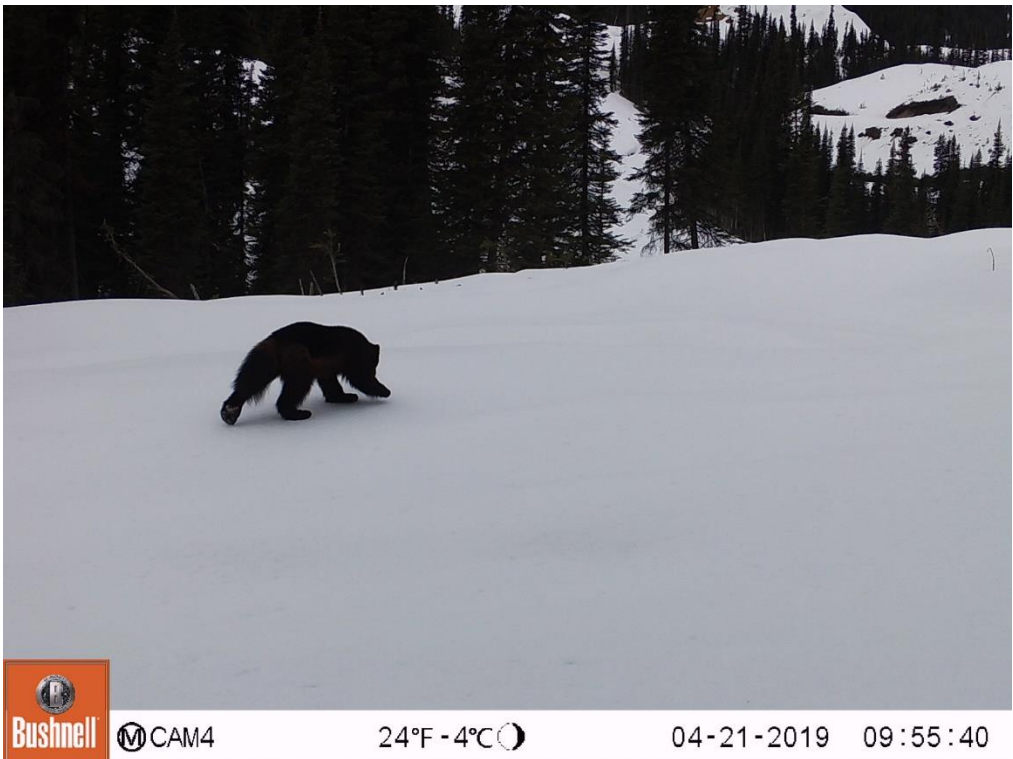
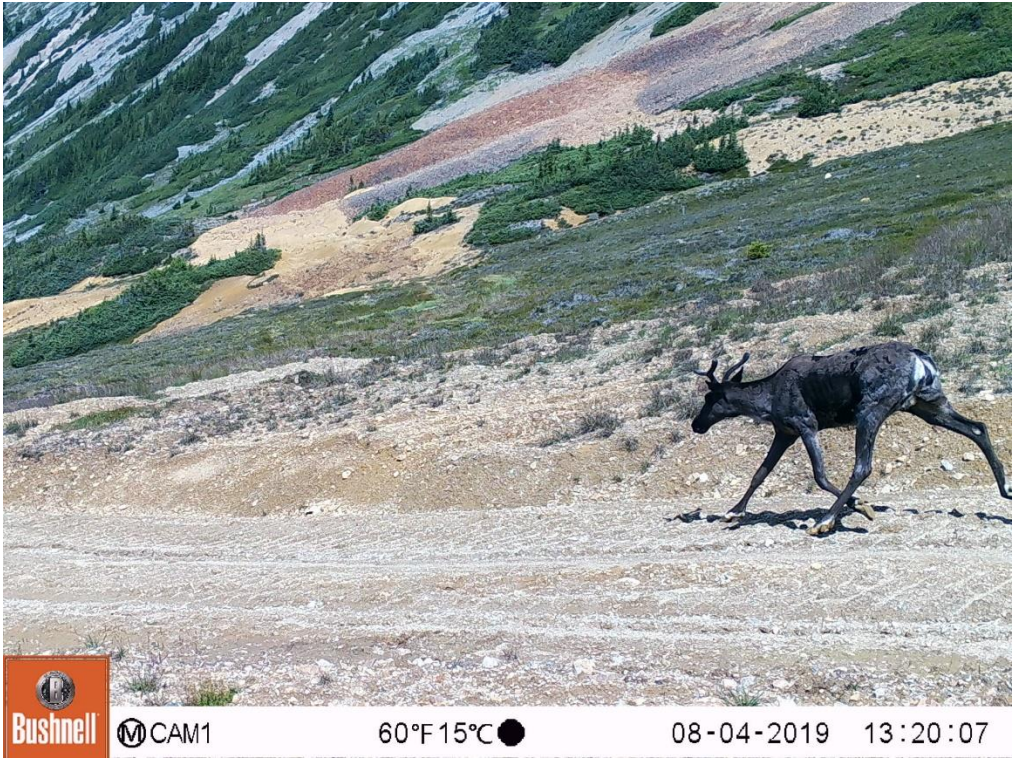


Plate 6.11-1 Wildlife Camera Setup

Appendix C:

Supporting Documents



KEMESS UNDERGROUND PROJECT

AuRico Metals Inc., a subsidiary of Centerra Gold Inc.



Accidents and Malfunctions Communications Plan

Version: 2.0

Date: July 2018

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Accidents and Malfunctions Communications Plan

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ACRONYMS, ABBREVIATIONS AND DEFINITIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

Aboriginal Groups	As defined in the BC EAOM-1701 the term used to describe Takla Lake First Nation, Tsay Keh Dene Nation and Kwadacha Nation.
AuRico	AuRico Metals Inc.
BC	British Columbia
CEAA	Canadian Environmental Assessment Agency
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CEPA 1999	<i>Canadian Environmental Protection Act, 1999</i>
Code (the)	Health, Safety and Reclamation Code for Mines in British Columbia
EA	Environmental Assessment
EAO	Environmental Assessment Office
EMC	Environmental Management Committee
FLNRO	Ministry of Forests, Lands and Natural Resource Operations (British Columbia)
FMEA	Failure Modes and Effects Analysis
IBA	Impact Benefit Agreement
Indigenous Groups	As defined by CEAA to mean Takla Lake First Nation, Tsay Keh Dene First Nation, and Kwadacha First Nation.
KUG	Kemess Underground
MEM	Ministry of Energy and Mines (British Columbia)
MoE	Ministry of Environment (British Columbia)
Project	KUG Project
TKN	Tse Keh Nay
TSF	Tailings Storage Facility

1. PURPOSE AND OBJECTIVES

The Accidents and Malfunctions Communications Plan is developed as an outcome of the Environmental Assessment process and the condition (#17) that is included with the Environmental Assessment (EA) Certificate M17-01 issued on March 15, 2017 under the British Columbia (BC) *Environmental Assessment Act* (2002) and *Canadian Environmental Assessment Act, 2012* (CEAA; 2012) Decision Statement condition 9.5 also issued on March 15, 2017.

2. PLANNING

2.1 ROLES AND RESPONSIBILITIES

AuRico Metals will be responsible for implementing this plan and initiating the communication of Accidents and Malfunctions, if any occur, in accordance with timelines that are mandated by the relevant legislation and conditions of the relevant permit. Where an Accident or Malfunction is of a minor nature and there is no reporting requirement, AuRico will report the event or events on a quarterly basis or in the case of Tsay Keh Nay at the next Environmental Management Committee (EMC) meeting. Additionally, AuRico has a responsibility to keep the BC Environmental Assessment Office (EAO), Canadian Environmental Assessment Agency (CEAA), Takla Lake, Kwadacha, Tsay Keh Dene, Gitksan Wilp Nii Kyap First Nations, Ministry of Forests, Lands and Natural Resource Operations (FLNRO), Ministry of Energy and Mines (MEM), Ministry of Environment (MoE), and Northern Health Authority informed of changes in contact information.

The First Nations, FLNRO, MEM, MoE, and Northern Health Authority likewise have a responsibility to maintain their contact information up to date, and to respond in a timely manner with follow up questions, comments, observations, and offers of assistance.

Indigenous Groups have a responsibility to maintain an up to date register of Aboriginal Businesses that identifies to AuRico where they may have the capacity and resources to assist in the event of accidents and malfunctions for which AuRico has inadequate physical resources to deal with the event in question.

If there is a major accident or malfunction that has the potential to affect people who are on the land in the area of Kemess, Indigenous Groups will have the responsibility of notifying AuRico as to where these people are and how AuRico may communicate with them. Alternately members who are on the land may choose to notify Kemess Security of their whereabouts when they arrive in the area.

2.2 COMPLIANCE OBLIGATIONS

2.2.1 Legislation and Regulations

Some of the Accidents and Malfunctions that were evaluated in the Failure Modes and Effects Analysis as part of the Environmental Assessment process, and as part of normal best management practice, are covered by Legislation and Regulation. Specifically, many of these potential Accidents and Malfunctions are regulated under the following:

- *Health, Safety and Reclamation Code for Mines in British Columbia* (Code; BC MEM 2017);
- *BC Mines Act* (1996a);
- *Occupational Health and Safety Regulation* (BC Reg. 296/97);
- *Workers Compensation Act* (1996b);
- *BC Environmental Management Act* (2003);
- *Spill Reporting Regulation* (BC Reg. 263/90);
- *Fisheries Act* (1985a);
- *Transportation of Dangerous Goods Act* (1992);
- *Transportation of Dangerous Goods Regulations* (SOR/2001-286);
- *Canadian Environmental Protection Act, 1999* (CEPA; 1999) and *Environmental Emergency Regulations* (SOR/2003-307);
- *Hazardous Products Act* (1985c);
- *Hazardous Materials Information Review Act* (1985b);
- *Controlled Products Regulations* (SOR/88-66); and
- *Workplace Hazardous Materials Information System Regulation (Mines)* (BC Reg. 257/88).

A number of Kemess Underground (KUG) Project permit applications also require the creation of Management Plans, which cover the responses to specific material accidents and malfunctions that were evaluated as part of Failure Modes and Effects Analysis (FMEA)

These Management Plans have been created as part of the KUG Project permitting process and as part of the Environmental Management System.

2.2.2 Provincial EA Certificate

Condition #17 of the Provincial EA Certificate issued on March 15, 2017 under the *BC Environmental Assessment Act* (2002) specifically states:

The Holder must develop a communication plan for accidents and malfunctions. The plan must be developed in consultation with FLNRO, MEM, MoE and Aboriginal Groups.

The plan must include at least the following:

- a) *The types of accidents and malfunctions requiring notification by the Holder and the timeframe of notification (including updates subsequent to the initial notification) to each Aboriginal Group community and other users of the area that could be affected;*
- b) *Information to be included in the notifications required by bullet a), and subsequent notifications, include but are not limited to:*
 - i) *Health advisories;*
 - ii) *Remedial action being taken by the Holder; and*
 - iii) *Details of subsequent monitoring.*
- c) *The manner by which Aboriginal Groups, communities or other users of the area must be notified by the Holder of an accident or malfunction, and of any opportunities for the Aboriginal Groups, communities and other users of the area to assist in response to the accident or malfunction; and*
- d) *The contact information of the representatives of the Holder and the Aboriginal Groups, communities and other users of the area to which the Holder must provide notification and a plan to regularly update this information.*

The Holder must provide this draft plan to FLNRO, MEM, MoE, Aboriginal Groups and EAO for review a minimum of 45 days prior to the planned commencement of Construction.

The plan and any amendments thereto, must be developed and implemented throughout Construction, Operations, Closure and Post Closure to the satisfaction of EAO.

2.2.3 Federal EA Decision Statement

Condition 2.11 of the Federal Decision Statement issued on March 15, 2017 under CEAA 2012 specifically states:

The Proponent shall publish on the Internet, or any medium which is widely publicly available [...] the reports related to accidents and malfunctions referred to in conditions 9.4.3 and 9.4.4, the communication plan referred to in condition 9.5.

Condition 9.4

9.4 In the event of an accident or malfunction with the potential to cause adverse environmental effects, the Proponent shall implement the emergency response plan referred to in condition 9.3 and shall:

- *9.4.1 notify Indigenous groups, Gitksan Wilp Nii Kyap, and relevant authorities of the accident or malfunction as soon as possible, and notify the Agency in writing;*
- *9.4.2 implement immediate measures to mitigate any adverse environmental effects associated with the accident or malfunction;*
- *9.4.3 submit a written report to the Agency no later than 30 days after the day on which the accident or malfunction took place. The written report shall include:*
 - *9.4.3.1 a description of the accident or malfunction and of its adverse environmental effects;*

- 9.4.3.2 the measures that were taken by the Proponent to mitigate the adverse environmental effects of the accident or malfunction;
- 9.4.3.3 any views received from Indigenous groups, Gitxsan Wilp Nii Kyap, and relevant authorities with respect to the accident or malfunction, its adverse environmental effects, and measures taken by the Proponent to mitigate adverse environmental effects;
- 9.4.3.4 a description of any residual adverse environmental effects and any modified or additional measures required by the Proponent to mitigate residual adverse environmental effects;
- 9.4.3.5 details concerning the implementation of the emergency response plan referred to in condition 9.3; and
- 9.4.4 submit a written report to the Agency, no later than 90 days after the day on which the accident or malfunction took place, on the changes made to avoid a subsequent occurrence of the accident or malfunction, and on the implementation of any modified or additional measures to mitigate and monitor residual adverse environmental effects and to carry out any required progressive reclamation, taking into account the information in the written report submitted pursuant to condition 9.4.3.

Condition #9.5 of the Federal Decision Statement specifically states:

The Proponent shall develop and implement a communication plan in consultation with Indigenous groups (a defined term meaning Takla Lake, Tsay Keh Dene, and Kwadacha First Nations) and Gitxsan Wilp Nii Kyap. The Proponent shall develop the communication plan prior to construction and shall implement and maintain it up to date from the start of construction to the end of decommissioning. The plan shall include:

- 9.5.1 *the type of incidents and malfunctions requiring the Proponent to notify the respective Indigenous groups and Gitxsan Wilp Nii Kyap;*
- 9.5.2 *the manner by which Indigenous groups and Gitxsan Wilp Nii Kyap shall be notified by the Proponent of an accident or malfunction and of any opportunities for the Indigenous groups and Gitxsan Wilp Nii Kyap to assist in the response to the accident or malfunction; and*
- 9.5.3 *the contact information of the representatives of the Proponent that the Indigenous groups and Gitxsan Wilp Nii Kyap may contact and of the representatives of the respective Indigenous groups and Gitxsan Wilp Nii Kyap to which the Proponent provides notification.*

3. IMPLEMENTATION

3.1 TYPE OF ACCIDENTS AND MALFUNCTIONS REQUIRING NOTIFICATION AND TIMELINE OF NOTIFICATION

High Environmental Risk accidents and malfunctions – of which two were identified in the FMEA process: 1) KUG Tailings Storage Facility (TSF) East Dam failure and 2) KUG TSF East Dam or pit wall overtopping – will require notification on a timeline as per the Mine Emergency Response Plan and the Code (BC MEM 2017). AuRico will conduct a post remediation Human Health Risk Assessment for High Environmental Risks accidents and malfunctions.

Four Moderate Environmental Risks were identified in the FMEA process. These events are as follows:

1. Leak/spill of hazardous substances stored on-site;
2. Leak/spill during road, air or water transport;
3. Fires or explosions; and
4. Discharge water quality exceedance to the receiving waterbody, Attichika Creek, during construction and operations.

Low Risk Failure Modes include a broad spectrum of leaks, releases of contaminants or sediments, industrial accidents, equipment malfunctions, and geotechnical hazards. Depending of the nature of the event, these will be reported to MEM and/or MoE as per requirements of various permits such as in Incident Reports or Annual Compliance Reports. In all cases, these events will be reported internally in accordance with internal reporting procedures and reporting to Tse Keh Nay via the EMC (i.e., the TKN-AuRico committee and not the EMC of Condition #12 of the BC EA Certificate). The frequency of EMC meetings is on an as-needed basis but no less than quarterly. Gitxsan Wilp Nii Kyap will receive quarterly reports.

Updates subsequent to the initial notification to each Aboriginal Group's, Gitxsan Wilp Nii Kyap, community and other users of the area that could be affected will be on a case by case basis as determined by either the EMC or the First Nations Chief of the potentially affected community in consultation with AuRico. Updates will use best practices and include communication process to clearly and carefully relay information to mitigate and minimize mental health impacts of an environmental accident or malfunction. A variety of communication tools and methods will be used to reach the target audience, get information to the audience when they need it, for as long as they need it and can be accessed within resource limitations.

3.2 INFORMATION TO BE INCLUDED IN THE NOTIFICATION OF THE ACCIDENT AND MALFUNCTION

Information to be provided for High to Moderate environmental risk accidents and malfunctions will, as a minimum, be determined by legislation/permit conditions and/or relevant Management Plans such as, but not limited to, the Mine Emergency Response Plan and the Code (BC MEM 2017). The information will include remedial actions that have been taken and those planned actions to be undertaken, a schedule indicating the timing and nature of the actions taken, resources available and additional resources required. Health advisories will be included, as deemed necessary, in consultation with key agencies such as Northern Health and First Nations that are potentially affected. The necessity of subsequent monitoring will be determined in consultation with the AuRico-TKN EMC and the EMC (EAO condition #12); and will also be in accordance with AuRico's commitment to a strategy of Adaptive Environmental Management, an Ecosystem-based Approach, the Precautionary Principle and Sustainable Development, as defined in the Impact Benefit Agreement (IBA) with TKN.

Information on Low environmental risk accidents and malfunctions will be reported in accordance with internal procedures. For Tsay Keh Nay, reporting of low risk events will be via the EMC (i.e., the TKN-AuRico committee and not the EMC of Condition #12 of the BC EA Certificate). Gitxsan Wilp Nii Kyap will receive quarterly reports on low environmental risks accident and malfunctions. Subsequent monitoring will be in accordance with the terms of the relevant management plan unless the indigenous determines that adjustments are needed.

3.3 MANNER OF NOTIFICATION AND OPPORTUNITIES TO ASSIST

Aboriginal Group communities will initially be notified by AuRico of an accident or malfunction by telephone to the Band office in the event of a high or moderate risk event, as defined in Table 3.3-1, followed by an e-mail or fax with confirmation of receipt requested. In the event of low risk events, these will be communicated to the EMC by e-mail and information about these events will be located in a repository of information that AuRico has committed to establishing with the EMC.

Table 3.3-1. Types of Accident or Malfunction and Corresponding Timeline of Notification

Type of Accident or Malfunction	Timeline of Notification
KUG TSF East Dam Failure	Within 24 hours
KUG TSF East Dam or pit wall overtopping	Within 24 hours
Leak/spill of hazardous substances stored on site	Within 24 hours
Leak/spill during road, air or water transport	Within 24 hours
Fires or explosions	Within 24 hours
Discharge water quality exceedance to receiving waterbody	Within 24 hours

Signs posted on the Omineca Resource Access Road will encourage other users of the area to report their presence, approximate location and method of communication to Kemess security personnel so that AuRico can attempt to contact them in the event of an emergency at site.

Any opportunities for the Indigenous groups to assist in response to the accident or malfunction will be communicated to the the Tse Keh Nay designated Business Opportunities Committee members who have committed to maintaining a TKN Business Registry and to the Gitxsan Wilp Nii Kyap.

Communities and other users of the area will have the opportunity to assist in the response to the accident or malfunction if they have provided information about their potential services and their contact details to AuRico.

Per condition 2.11 of the CEAA Decision Statement, the reports related to accidents and malfunctions and this Communications Plan will be published on the Company’s website, <https://www.centerragold.com/operations/kemess>, in the section related to the KUG Project.

3.4 CONTACT INFORMATION

First Nations

First Nation and Local Stakeholders	Contact Information
Kwadacha First Nation	250-471-2302
Prince George Office	250-563-4161
Tsay Keh Dene	250-993-2100
Prince George Office	250-562-8882
Takla Lake First Nation	250-564-9321
Prince George Office	250-996-7877
Gitxsan Wilp Nii Kyap	250-842-6780
Ron Steffey – Moose Valley Guide Outfitters	604-484-8278
Jean Tom, lead spokesperson, Trapline 0739T006	250-596-4649

AuRico Metals and Kemess Mine Site

Prince George Office		Toronto Office		
AuRico Metals Inc 177 Victoria St Suite 100, Prince George, BC V2L 5R8		AuRico Metals Inc. 1 University Ave Suite 1500 Toronto, ON Canada M5J 2P1 T: (416) 204-1953 F: (416) 204-1954		
Name	Title	Ext.	Direct	Mobile
Ron Hampton	Project Manager			250-614-4851
Bruce Grau	Site Superintendent	13825	778 724-4425	NA
Gord Shepherd	Site Superintendent	13825	778-724-4425	NA
Chris Werbicki	Environmental Coordinator	13833	778-724-4420	604-813-6756
Security Gatehouse		3802	778 724 4431	NA

3.5 REPORTING AND RECORDKEEPING

CEAA shall be notified of the accident or malfunction, as soon as possible, in writing. Within 30 days of the accident or malfunction a written report will be submitted to the Agency which includes:

- a description of the accident or malfunction and of its adverse environmental effects;
- the measures that were taken by the Proponent to mitigate the adverse environmental effects of the accident or malfunction;

- any views received from Indigenous groups, Gitxsan Wilp Nii Kyap, and relevant authorities with respect to the accident or malfunction, its adverse environmental effects, and measures taken by the Proponent to mitigate adverse environmental effects;
- a description of any residual adverse environmental effects and any modified or additional measures required by the Proponent to mitigate residual adverse environmental effects;
- details concerning the implementation of the emergency response plan referred to in condition 9.3; and

Furthermore, a written report will be submitted to the Agency, no later than 90 days after the day on which the accident or malfunction took place, on the changes made to avoid a subsequent occurrence of the accident or malfunction, and on the implementation of any modified or additional measures to mitigate and monitor residual adverse environmental effects and to carry out any required progressive reclamation, taking into account the information in the written report submitted within 30 days of the accident or malfunction.

These reports will be published on the Company's website, <https://www.centerragold.com/operations/kemess>.

3.6 COMMUNICATION PLAN REVISIONS

TKN and Gitxsan Wilp Nii Kyap will be notified and consulted about revisions to the Accidents and Malfunctions Communications Plan. This Plan, and any amendments thereto, will be developed and implemented throughout Construction, Operations, Closure and Post Closure to the satisfaction of EAO.

In addition to the reciprocal obligation to notify parties of changes to contact information, AuRico and the TKN through the IBA have committed to an annual review of Management Plans and that commitment applies to this Plan.

REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

1985a. *Fisheries Act*, RS. C. F-14. s. 1.

1985b. *Hazardous Materials Information Review Act*, RSC. C. 24 (3rd Supp.), Part III. s. 9.

1985c. *Hazardous Products Act*, RSC. C. H-3.

1992. *Transportation of Dangerous Goods Act*, SC. C. 34.

1996a. *Mines Act*, RSBC. C. 293.

1996b. *Workers Compensation Act*, RSBC. C. 492.

1999. *Canadian Environmental Protection Act, 1999*, SC. C. 33.

2002. *Environmental Assessment Act*, RSBC. C. 43.

2003. *Environmental Management Act*, SBC. C. 53.

2012. *Canadian Environmental Assessment Act, 2012*, SC. C. 19. s. 52.

Workplace Hazardous Materials Information System Regulation (Mines), BC Reg. 257/88.

Spill Reporting Regulation, BC Reg. 263/90.

Occupational Health and Safety Regulation, BC Reg. 296/97.

Controlled Products Regulations SOR/88-66.

Transportation of Dangerous Goods Regulations, SOR/2001-286.

Environmental Emergency Regulations, SOR/2003-307.