



**AKHM**

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**2011 Alexco Keno Hill Resource Corp.  
Annual Report Addendum**

**Quartz Mining License QML-0009  
May 2012**

**BELLEKENO PROJECT**

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Prepared for:

**Yukon Government Energy, Mines and Resources**

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## 1.0 Introduction

Road construction and traffic management are integral parts of the mining operations at the Bellekeno Minesite located near Keno City, YK. In particular, the upgrade of Christal Lake Road, the Bellekeno Haul Road, and the construction of a Keno City Bypass road were all top priorities in the success of the Bellekeno Mine and Mill.

A number of agencies including YESSA, Water Resources, Energy Mines & Resources, and Yukon Workers Compensation Health and Safety Board all contributed to the design, construction, use, and monitoring of both the Lightning Creek Bypass Road and the Christal Lake Roads.

In response to these inputs during the application and approval process of the the Type A Water Use & Quartz Mining License's, Alexco Keno Hill Mining Corp. (AKHM) developed several management and construction plans to address items such as traffic level, access control, wildlife incidents and any other incidents that relate to traffic management.

## 2.0 AKHM YESAA Project Proposal for Type A Water Use & Quartz Mining License Applications

The follow section outlines AKHM's proposal for the haul roads to the Bellekeno Mine and Mill:

### *Section 2.4 HAUL ROADS*

*This road will be used to haul run of mine ore from the Bellekeno East Portal to the Christal Lake Mill for processing. Filtered tailings will be backhauled using this road for backfill underground.*

*The majority of this road is former haul road but will be upgraded and rehabilitated as needed. The haul road from the Bellekeno mine is along an existing haul road built along the power line to the mine. An existing haul road from the mill site to the Duncan Creek road will be upgraded to enable truck traffic to bypass Keno City. As a result of consultation with Keno City (see Section 4.5, Consultation – Oct 30, 2008) Alexco plans to build a new segment of Haul Road including a new bridge across Lightning Creek which will bypass Keno City. This mitigative measure was brought forward to address community concerns about haulage through town.*

## 3.0 AKHM YESSA Decision Document (File 2009-0030)

Sections 1 through 9, and 78 through 80 of the YESSA Decision Document describe the detailed requirements in response to Alexco's Project Proposal with regards to the Lightning Creek Bypass and the Christal Creek upgrades. These sections detail the requirements of

Aquatic Resources, Canadian Fisheries and Oceans, and outline procedures to ensure Environmental Quality.

This document can be seen in Attachment A.

In response to these sections of the YESSA Decision Document, in addition to the requirements of the Quartz Mining License issued (QML-0009), AKHM developed both the Traffic Management Plan (submitted to EMR in March 2009) as well as the Lightning Creek Construction and Operation Plan (submitted to EMR in April 2010).

#### **4.0 Lightning Creek Bypass Construction and Operation Plan (includes relevant Traffic Management Plan sections)**

Excerpts from the LC Bypass Construction and Operation Plan and TMP outline the steps taken in response to both the YESSA DD and the QML. These sections are summarized in the following paragraphs:

During Alexco's public consultation with local Keno City residents during the design phase of the Bellekeno Mine, it became apparent that the potential for haul traffic noise and safety concerns in town was a significant concern. Alexco therefore originally proposed to construct a bypass road after ramping up to full 400 tonnes per day production, but later amended that commitment to construct the bypass prior to any ore haul to the mill or tailings backhaul to the mine. This corporate commitment became entrenched in the YESAA Decision Document.

The Lightning Creek Bypass Road Construction and Operation Plan were prepared to describe construction and operation of that road. Particular attention was paid to design and construction methods for haul road construction in order to maintain compliance with relevant legislation and regulations (Yukon Waters Act, Fisheries Act, Quartz Mining Act) in addition to the Decision Document (YESAA File 2009-0030) and the specific licences that have been granted for the project (QML-0009) and their subsequent conditions. The second focus of the plan described measures taken for haul road design and operation which were taken in order to ensure public and employee health and safety as well compliance with the Yukon Occupational Health and Safety Act and Regulations. This included a detailed plan describing construction and traffic management for all haul roads between the mine and mill.

In the summer of 2009 Alexco conducted a walking tour of the proposed bypass route with key stakeholders to determine issues and concerns, if any. Participants included Keno City Residents.

The Keno City residents had differing views on bypass routing, however they did not identify concerns with the bypass in general, as this road was being built in order to reduce impacts on

Keno City. The Mayo Mining Lands Officer had no concerns. There was expected to be occasional light vehicle traffic within Keno City and possibly some heavy traffic during the construction phase. Alexco has secured a highway permit for these occasional events, and regularly advises Keno City residents when this is scheduled to occur. Alexco has committed that all ore haul traffic will be redirected through the Keno City Bypass at the commencement of production.

Periodic grading and resurfacing as deemed necessary will be employed in order to keep the haul roads in good repair. During the winter, haul roads will be plowed and sanded to ensure proper traction is maintained.

For the purposes of traffic management between the Bellekeno Mine and the Flame and Moth, signs will be posted at all intersections which enter onto private haul roads. These signs indicate that road is not for public entry and only for authorized traffic. Traffic will be monitored by employees to ensure that only authorized vehicles are on the private haul road. Entrances to the mill site may be gated if deemed necessary.

Speed limits will be enforced for mine traffic along haul routes and posted along the access and site roads (maximum 50 km/hr, reduced to 20 km/hr at blind corners and bridge crossings). In order to provide an additional level of public safety, portions of the haul route which are shared with public traffic (short segment of Sourdough Trail and Duncan Creek Road, see Figure 3) speed limits will be reduced to 30 km/hr. All haul and auxiliary vehicle traffic between the Bellekeno Mine and the mill site will be radio controlled for safety and speed control.

Employees and contractors will be educated on safety including traffic protocols and speed limits during mandatory orientation. Routine traffic inspections and/or speed indicator signs will be used to encourage safe and responsible driving and ensure that Alexco's traffic and safety protocol are adhered to.

Alexco will investigate and take appropriate modification of policy and/or disciplinary action in the event of any traffic incidents or complaints.

Stop signs will be used at all points of ingress and egress to public roads. Permits for construction or modification of access have been secured for the intersections of the Christal Lake Road with the Silver Trail highway and the Duncan Creek road. These permits were presented as Attachments 1 and 2 of the Traffic Management Plan.

Included in the Traffic Management Plan (submitted in 2009) the following figure shows the estimated traffic volume during operations:

**Figure 1: Estimated Daily Traffic Count – Operations Phase**

	Travel Direction	Shift Change	Day Shift	Shift Change	Night Shift
		6:00 AM	7:00 AM	4:00 PM	7:00 PM
Vehicle Type - One way traffic count		8:00 AM	7:00 PM	6:00 PM	7:00 PM
Light Trucks (< 1 ton) and Autos	Elsa to mine/mill	4	8	4	6
Buses	Elsa to mine/mill	2		2	
Heavy Trucks (> 5 tonne), bulk materials	Elsa to mine/mill		8		
Ore Trucks (>20 tonne) hauling ore	mine to mill		14		
Ore Trucks (>20 tonne) hauling tailings or empty	mill to mine		14		
Total round trips per day		6	44	6	6

**Notes:**

- 1) Warehouse receiving and shipping normally confined to hours between 8:00 AM and 4:00 PM. This will minimize heavy truck traffic during shift changes. Normally no heavy truck deliveries on night shift.
- 2) Bulk materials includes fuel, reagents, materials and supplies and concentrate haulage.
- 3) Above values are considered typical of daily traffic anticipated during operations. Variations up to 50 % are possible on any given day.
- 4) Based on 408 t/d production rate which results in highest ore haulage traffic count

**5.0 2010 Construction Activities**

The majority of construction occurred in 2010. Approximately 1.5 km of new haul road was constructed from the Sourdough Trail (BKR 5) to the Keno Hill District Mill crusher.

A bridge was installed over Lightning Creek (Type B Water License MS10-029) for the haul road 350 meters downstream from the Sourdough Trail crossing.

The Christal Lake road was upgraded and a new, 250 m spur, was build to allow direct access to the Keno Hill District Mill from the Silver Trail Highway, bypassing Keno City. This road was used for essentially all construction deliveries and will remain the primary access for operations.

All operations traffic has been re-routed to this bypass road to eliminate the need for regular traffic through Keno City. Traffic signs have been posted and speed limits adhered too.

**6.0 2011 Construction Activities**

Upon inspection by the Yukon Workers Compensation Health and Safety Board in April 2011, it was noted that several areas of the haul road and Christal Lake Road required upgrades in order to comply with the design characteristics as submitted and approved in the QML-0009 license.

By May 30, 2011 an assessment of the haul roads had been done and a plan for upgrades submitted. These plans included the following outline:

1. Updated survey and an asbuilt prepared.
2. Existing asbuilt contours were offset from the berm side to the ditch side to accommodate sections of the road designated as single width (2x largest vehicle width) and double width (3X the largest vehicle width). By offsetting the contours Alexco established areas that needed to either be cut or filled to comply with the design width criteria.
3. The “gap” areas were scheduled to be surveyed and staked. Alexco or contract personnel would then assess which areas were to be cut and which areas, which areas were to be filled in order to construct the safest design while not compromising existing infrastructure or environmental degradation.
4. Review of the new asbuilt and offset contours suggested that over 50% of the road was already compliant and the remainder of the cut and fill did not require extensive construction.
5. Signage currently in place:
  - a. Stop signs at the BK bypass road and Duncan Creek
  - b. Warning signs to general public and Alexco or Contractors that the roads are radio controlled and only authorized personnel may use the road.
  - c. Signage for the general public showing public routes to access the Sourdough trail
  - d. Additional stop signs are onsite and will be placed as per the license application
6. Dust sampling areas had already been designated and samples collected.
7. Calcium Chloride had recently been applied to the road as well as daily or required watering for dust mitigation control.
8. Vehicles and Driving policies were presented to every employee or contractor and include the radio and driving protocol. Personnel are required to sign and adhere to this policy.
9. Large freight transport trucks and all (B-trains) were escorted to and from site for deliveries.
10. Construction Plan: Temporary waste rock storage areas for assessed run of mine development rock had been or were being filled in anticipation of construction and expansion of the road. Areas of permafrost would be assessed and possibly stripped of vegetation so that those areas can dry out/drain during the summer months

This new construction plan was approved by the Yukon Workers Compensation Health and Safety Board on August 24<sup>th</sup>, 2011 (See Attachment B). Construction was initiated in the following months, and completed by December 2011. Updated surveys and as-builts were submitted on December 20<sup>th</sup>, 2011 and as Appendix G of the 2011 QML-0009 Annual Report submitted to EMR on March 31<sup>st</sup>, 2011.

## 7.0 2011 Public Access

The BKR haul road crosses two public roads in the Keno City area, both Duncan Creek road and the access to the Sourdough Trail. Several encounters occurred in 2011 that involved public citizens / tourists walking or using ATV's on parts of the BKR private road. The AKHM practice regarding these circumstances includes radio call-out by AKHM employees notifying all other personnel of the location and number of persons on the roads. If safe to do so, employees should discuss with the persons that they are on private roads which heavy equipment traffic is frequent, and could potentially be a safety concern. If persons do not make their way off the private road, then AKHM management is informed and will decide how best to manage the situation.

## 8.0 2011 Vehicle Wildlife Encounters

The Keno Hill District, including Elsa, the Silver Trail Highway, BK Mine and Mill Sites, and all associated haul roads are frequented by natural wildlife in the area. This wildlife includes fox, bear, moose, wolverine, rabbit, lynx, and a number of other species of animal and birds. Wildlife encounters are recorded in a log located in the Elsa Admin Office. Any encounters between vehicles and wildlife are reported to both the Safety and Environmental departments for documentation and if required, incident investigation. 2011 saw no encounters between AKHM vehicles and wildlife.

## 9.0 2011 Vehicle Personnel Encounters

There were four vehicle incidents of note in 2011 that are discussed below; none involved major injuries to employees or public persons.

One occurrence involved a light vehicle traveling from Mayo to the Elsa camp for a crew rotation. The vehicle lost control due to winter conditions and resulted in the vehicle getting stuck in the ditch. Only minor injuries (bruises) were noted. Employees were reminded of speed limits and driving with care in winter conditions.



A second incident involved a haul truck travelling from the mill to the mine on the BKR haul road. The truck encountered slippery conditions due to rain/snow conditions which resulted in the rear box of the truck sliding and tipping over. The rear box was empty, and the cab of the truck remained upright. There were no major injuries to vehicle or person. Additional road maintenance in the area resolved this problem and prevented future occurrences.

A third incident involved a haul truck travelling to the mill from the mine on the Lightning Creek Bypass road near the coarse ore pads located at the mill. The truck encountered slippery road conditions due to freshly fallen snow that resulted in the box of the truck tipping over, while the cab of the truck remained upright. There were no major injuries to vehicle or person. Ore was placed on the coarse ore pads and road maintenance occurred.

The fourth incident involved the crane truck driving up the shop road in Elsa, losing traction due to early winter conditions, and sliding into the ditch. There were no major injuries to people or equipment, and the road was closed for use for the remainder of the winter.

## 10.0 2011 Traffic Volume

The original estimated traffic volume (seen in the Table 3 of the Traffic Management Plan) was a conservative estimate, as well as based on full production of 400 tpd and full staffing requirements. 2011 was the first year of operations for the Bellekeno Mill and Mine, and therefore only operating at an average of 250 tpd and not fully staffed. Due to these factors, the daily average vehicle number for both CLR and BKR ranged from approximately 15-20 for all light vehicles/crew transportation/general support and 5-10 for haul trucks. This differs from the estimated 36 light vehicles/crew transportation/general support and 28 for haul trucks from the Traffic Management Plan.

Several changes can be noted throughout the year with regards to traffic through Keno City to the BKR road. Early in the year it can be seen that a portion of the traffic did pass through Keno City to the Bellekeno Mine Haul Road (BKR). The majority of this traffic volume was due to incomplete construction of the road upgrades, as well as enforcement of Alexco's policy with new employees. By the fall of 2011 haul road upgrades were completed, and almost all traffic (minus a few light vehicles) were redirected to use the Christal Lake Road (CLR), to Keno City Bypass Road, to the Bellekeno Mine Haul Road (BKR). Strict enforcement of this policy has been put in place and continues into 2012.

The detailed 2011 Traffic Log can be seen in Attachment C.

## 11.0 2012 Construction and Traffic

2012 will see changes to traffic through Keno City as there is an increase in activity for the development of both the Lucky Queen and Onek mines. These mines are currently in the Advanced Exploration stages and are under review for YESSA assessment. Additional traffic management practices to include these areas will be included in the 2012 QML-0009 Annual Report.

No road construction or upgrades are scheduled for 2012. Regular maintenance that includes periodic grading and resurfacing will be conducted to keep the haul roads in good repair. During the winter, haul roads will be plowed and sanded to ensure proper traction is maintained.



**2011 Annual Report Addendum**

**Quartz Mining License QML-0009**

**May 2012**

**Attachment A**

**YESSA Decision Document (YESSA File 2009-0030)**

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## ***Yukon Environmental & Socio-economic Assessment Act Decision Document***

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This document meets the Yukon government's requirements as a Decision Body as set out in the *Yukon Environmental & Socio-economic Assessment Act*.

### **Decision Document Issued By:**

<b>YG Decision Body:</b>	EMR Mineral Resources
<b>Federal Decision Body(ies):</b>	
<b>First Nation Decision Body(ies):</b>	

### **Project:**

<b>Project Name:</b>	Bellekeno Mine Development	<b>YESA File Number: 2009-0030</b>
<b>Proponent Name:</b>	Alexco Keno Hill Mining Corporation	

### **Project Scope**

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The scope of the project for this assessment has been determined to be as follows. The principal project involves mine development at Bellekeno. This includes continued underground development and operations. It will also involve construction of a conventional flotation mill at the Flame and Moth Mill Site. This site is within the Christal Creek drainage upstream of Christal Lake and will be used for the processing and production of minerals. The project timeline is 10 years and includes mine construction, production, reclamation and closure. The project area includes: the Bellekeno Mine site; Bellekeno waste rock storage facility; the Flame and Moth Mill Site; the Flat Creek camp; the Thunder Gulch/Lightning Creek drainage to where it joins with Duncan Creek; and the Christal Creek drainage to where it meets South McQuesten River.

### **Principal Activities**

- Underground development and mining involving the movement of approximately 500,000 tonnes of waste rock and 600,000 tonnes of ore to the surface.
- Construction of a series of narrow, elongated waste rock disposal areas near the Bellekeno 625 adit for non-AML waste rock.
- Construction of a conventional flotation mill at the Flame and Moth site upstream from Christal Lake for processing ore and producing concentrate. Processing will occur at a rate of approximately 250 tonnes per day and produce 25,500 tonnes of mill concentrate per year for years one and two. This will ramp up to 400 tonnes per day and 48,500 tonnes of concentrate per year for years three to five.
- Use of mill chemicals.
- Temporary storage of mill tailings and mineralized rock in stock piles.
- Storage and disposal of mill tailings in a dry-stack tailings facility.
- Placement of pyritic tailings below water level in the Bellekeno Mine.
- Haulage of ore to the mill and haulage of potentially-AML waste rock to the Bellekeno



- Waste Rock Storage Facility. Dry tailings will be hauled to a dry stack tailings facility and also back to the Bellekeno Mine for use underground.
- Construction of surface infrastructure to support the mill including: coarse ore stockpile; plant services; fuel storage area; portal; and settling ponds.

**Accessory Activities**

- Expansion of the Flat Creek Camp from a capacity of 100 to approximately 150 personnel.
- Reconstruction/upgrading of the existing Bellekeno Mine power line haul road and the existing Christal Lake haul road from Duncan Creek road to the Mill Site.
- Construction of a segment of new haul road around Keno City, including a new bridge across Lightning Creek for hauling ore and filtered tailings between the mine and mill.
- Installation of electrical power distribution system (i.e. power poles, transformers) to service the mill and ancillary buildings.
- Construction of water treatment facility to treat mill waste water.
- Use of water for mill operations from three potential sources: Dry Stack Tailings
- Facility/Mill pad runoff collection pond, Christal Lake, and local groundwater wells. Use of water for dust suppression, cooling and dry tailings rehydration from Lightning Creek or Thunder Gulch.
- Depositing Bellekeno mine waste water using existing water treatment facilities at
- Bellekeno 625. Treated wastewater from Flame and Moth mill will be deposited to Christal Creek.
- Inspection and maintenance of water treatment infrastructure to ensure discharge standards are achieved.
- Shipping mill concentrate to various smelters.
- Environmental monitoring and sampling programs.

**Other Decision Bodies:**

<b>Other Decision Body Consultation:</b>	▪ [list decision bodies consulted where applicable]
<b>Consolidated Decision Document:</b>	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> No <input type="checkbox"/> Yes ▪ [list decision bodies consolidated with where applicable]

**Non-Self Governing First Nations:**

<b>Non-Self Governing First Nation Consultation:</b>	▪ [list First Nation consulted where applicable]
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**Decision**

The Mayo Designated Office, pursuant to section 56(1)(b) of the *Yukon Environmental and Socio-economic Assessment Act*, recommends to the decision bodies that the project be allowed to proceed, subject to specified terms and conditions, as the Designated Office has determined that the project will have significant adverse environmental or socio-economic effects in or outside of Yukon that can be mitigated by those terms and conditions.

Pursuant to ss.75, 76 and 80, the Yukon government has considered the YESAA Assessment and:

a) Accepts the following recommendation(s):

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b) Rejects the following recommendation(s) as follows for the reason(s) specified:

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c) Varies the following recommendation(s) as follows for the reason(s) specified:

**Note: When a term and condition is not “stand-alone” refer to the previous term and conditions for guidance.**

**Government of Yukon accepts the following:**

**Aquatic Resources**

1. All road construction and upgrades that utilize non-AML waste rock shall be done in accordance with project-specific developed quality assurance and quality control practices (*i.e.* periodic screening and sampling of waste rock used for road material) that govern the project’s waste rock management plan and in a manner conducive to monitoring run-off as per the Adaptive Management Plan.
  - Run-of in areas utilizing non-AML waste rock shall be monitored.
  - Monitoring of these areas must be added to the Adaptive Management Plan

**Note: Numbers 2-9 represent the Canada Fisheries and Oceans Operational Statement for installation of clear-span bridges that meet the following requirements, without the further need for a Fisheries Authorization:**

- the bridge is placed entirely above the **High Water Mark (HWM)**,
  - there is no alteration of the stream bed or banks or infilling of the channel,
  - the bridge is no greater than two vehicle lanes in width, does not include sidewalks and biking lanes and does not encroach on the natural channel width by the placement of abutments, footings or rock armouring below the **HWM**,
  - the work does not involve the clearing of riparian vegetation – removal of select plants with the road right-of-way can occur to meet operational and/or safety needs,
  - your project does not require multiple bridge crossings over the same watercourse, and you incorporate the **Measures to Protect Fish and Fish Habitat when Constructing Clear-Span Bridges** listed below in this Operational Statement.
2. The key Best Management Practices (“BMP”) that will be implemented to protect fish and fish habitat when constructing the Lightening Creek clear span bridge include:
    - Minimize the riparian area temporarily disturbed by access activities along the adjacent upland property. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation.



- Avoid building on meander bends, braided streams, alluvial fans, active flood plains, or any other area that is inherently unstable and may result in the alteration of natural stream functions or erosion and scouring of the bridge structure
  - Removal of select plants within the road right-of-way (ROW) may be required to meet operational and/or safety concerns for the crossing structure and the approaches.
  - This removal should be kept to a minimum and within the road right-of-way. When practicable, prune or top the vegetation instead of uprooting.
    - Trees will be felled away from watercourses to reduce damage to stream banks and beds. To maintain bank stability, trees within 10 m of watercourses will be close cut and stumps left in place except along the trench line.
  - Ensure that the clear span bridge is properly designed to address river and channel processes at flows above the ordinary high water mark.
  - Design and construct approaches so that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
  - Design the bridge so that storm water runoff from the bridge deck, side slopes and approaches is directed into a retention pond or vegetated area to remove suspended solids, dissipate velocity and prevent sediment and other deleterious substances from entering the watercourse.
  - Generally there are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activities with the potential to disrupt sensitive fish life stages (e.g. crossing of watercourse by machinery), these shall adhere to the timing window outlined above.
    - Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use.
    - To exercise this option, the stream bed at the fording site must be comprised of stable gravel or bedrock and the stream banks must be low and stable.
    - If minor rutting is likely to occur, stream bank and bed protection methods (e.g. swamp mats, pads) shall be used provided they do not constrict flows or block fish passage.
    - Grading of the stream banks for the approaches shall not occur.
    - If the stream bed and banks are steep and highly erodeable (e.g. dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice shall be used to protect these areas.
    - Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing window.
    - Fording shall occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
3. Install effective sediment and erosion control measures, such as silt fencing, temporary diversion berms, clear crush check dams or straw bales, before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
- Work that will disturb soils shall be stopped during periods of high precipitation if it is likely to lead to sediment deposition into Lightning Creek.

4. Operate machinery on land (above the ordinary high water mark) and in a manner that minimizes disturbance to the banks of the watercourse.
  - Minimize grading on steep watercourse approach slopes. Use approved access where available to limit equipment and vehicle traffic on steep approaches.
  - Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks, invasive species and noxious weeds.
  - Wash, refuel and service machinery and store fuel and other materials for the machinery at least 15m away from top-of-bank to prevent any deleterious substance from entering the water.
  - Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
  - Restore banks to original condition if any disturbance occurs.
5. Use measures to prevent deleterious substances such as new concrete (i.e. it is pre-cast, cured and dried before use near the watercourse), grout, paint, ditch sediment and preservatives from entering the watercourse.
6. No debris shall remain within the high-water mark or placed into a stream.
7. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps, berms or planting them with preferably native grass or shrubs.
8. Vegetate any disturbed areas by planting and seeding with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. All seeding and/or planting trees shall follow the DFO guidance on Riparian Revegetation. If there is insufficient time remaining in the growing season, the site shall be stabilized (e.g. cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
  - Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
9. Instream turbidity levels and sediment control measures shall be monitored during construction and following major storm events.

#### *Christal Creek*

10. Baseline data must be collected from a site at Christal Creek pre-project.  
**Note: This will form part of the “Environmental Effects Monitoring Plan” to be designed with the proponent and approved by the regulator.**
11. Sample sediment and benthic invertebrates to characterize annual variation and the summer season during time of maximum biological activity.  
**Note: This will form part of the “Environmental Effects Monitoring Plan” to be designed with the proponent and approved by the regulator. Timing may vary.**



12. Methods shall follow the protocol used in the Keno Valley Stream Sediment and Benthic Invertebrate Monitoring Programs, 2007 (Laberge 2008) and the BC Field Sampling Manual 2003.

**Note: This as well as other methodologies will be considered by the regulator.**

13. The Christal Creek site shall be added to the monitoring program and the Adaptive Management Plan.

#### *Christal Lake*

15. Conduct sediment sampling to characterize annual variation and the summer season during times of maximum biological activity (to be consistent with sediment sampling times at other stations).

**Note: This will form part of the “Environmental Effects Monitoring Plan” to be designed with the proponent and approved by the regulator. Timing may vary.**

16. Sample phytoplankton (at spring overturn, mid-summer and fall) and zooplankton (one time in late summer).

**Note: This will form part of the “Environmental Effects Monitoring Plan” to be designed with the proponent and approved by the regulator. Timing may vary.**

17. Methods must follow the protocol used in the Keno Valley Stream Sediment and Benthic Invertebrate Monitoring Programs, 2007 where possible (Laberge 2008) and the BC Field Sampling Manual 2003.

**Note: This as well as other methodologies will be considered by the regulator.**

18. Sites shall be added to the monitoring program and the Adaptive Management Plan.

19. Conduct benthic invertebrate and fisheries sampling/monitoring of populations in Christal Creek, Flat Creek, South McQuesten River and Lightning Creek to confirm species presence and diversity over time throughout the life of project (annual sampling).

**Note: This is already being done under licence QZ06-074, only the Lightning Creek site is new. This needs to compliment licence QZ06-074.**

20. The proponent shall continue to develop and modify sampling and analysis procedures to characterize contaminant levels in treated effluent as part of the Adaptive Management Plan.

**Note: This is accepted as a best management practice.**

21. Quarterly sampling shall continue at KV-37 (Lightning Creek u/s of Hope Gulch), KV-39 (Hope Gulch u/s of Lightning Creek) and KV-40 (Charity Gulch u/s of Lightning Creek) for flow, conductivity, pH, temperature, total and dissolved metals. These sites are relevant to activities at the mine.

22. Water samples from treatment facilities at a minimum shall be collected end-of-pipe in addition to any additional sampling points required as per the Adaptive Management Plan. Record and provide to the appropriate regulator the following information:

- Water flow rate measurements from mill pad and DSTF at Flame and Moth Mill;
- Water flow rate measurements from treatment pond at Flame and Moth Mill;
- Water flow rate measurements from Bellekeno East adit during underground development;
- Water flow rate measurements of discharge from Bellekeno East settling pond either directly to Thunder Gulch or Bellekeno 625 treatment pond;
- Water flow rate measurements from Bellekeno 625 adit;
- Water flow rate measurements from Bellekeno 625 treatment pond; and
- Water flow rate measurements of water extracted from upper Christal Creek to the Flame and Moth Mill Site.

**Note: this is accepted where there is flow. Collection will be at end-of-pipe or first point of control.**

23. The location for achieving the site specific water quality shall be determined by the appropriate regulator and based in part on consideration of:

- Point in receiving waters where significant fish habitat values exist as defined by the Department of Fisheries and Oceans; and
- Initial dilution and mixing zones as defined by the appropriate regulator.

**Note: The location should also be based in part on consideration of the overall site Closure Plan being developed to deal with historic liabilities.**

24. Construct and/or maintain water treatment and retention infrastructure so that non-compliant water is not released into the environment.

25. Settling ponds shall have a freeboard of no less than 0.4 m to prevent risk of overtopping.

26. Settling ponds shall have a high level discharge (i.e. spillway) to prevent destructive overtopping in the event of high water volumes.

27. Ensure that all settling ponds are lined and monitored to prevent release of non-compliant water through ground.

30. It will be necessary to begin, as soon as feasible (but prior to project construction and operation), baseline characterization of any groundwater resources that will be affected by the project site. This must include an evaluation of:

- Groundwater quality and quantity in the area;
- Groundwater flow rates and directions

31. Additional on-going monitoring during operations will be required to determine:

- The effects of operations on groundwater resources in the area since historical baseline groundwater data are limited, establishing an on-going groundwater monitoring strategy, which is scoped with on-going surface water monitoring programs, is required to assess overall project effects on local groundwater resources. This detailed information on current

groundwater conditions will inform the final decisions on post-closure remediation activities at the site's adits.

32. Design criteria and flow capacity for a channelized drainage system are required. Additionally, a flow control structure and monitoring program are required to demonstrate discharges from the pond are effectively managed, both during operations and post-closure.

**Note: The pond is being taken to mean the settling pond at Flame & Moth.**

33. Design and installation of a channelized drainage system (e.g. pipe or stream channel) to drain the pond is required. Plans for the pond drainage system proposed at Christal Lake may be used to guide the implementation of a new system at the Flame and Moth site, however consideration for the differences in slope and distance to Upper Christal Lake must be included in the plan. The plan must be approved by a geotechnical engineer.

**Note: When the assessor specifies “geotechnical engineer” Government of Yukon will be asking for an “engineer licensed to practice in the Yukon”.**

34. Complete water balance for the site must be developed and be continued throughout operations.
35. Minimum and maximum flows for both wet and dry years must be annually re-assessed to assist planning the water extraction adaptive measures.
36. Characterize the local climate conditions and climate variability with locally derived and recent climate data.
37. Climate station monitoring must be maintained throughout mine operations. This information must be input to the water balance calculations for the site.
38. Prepare a detailed quality assurance/quality control plan as part of the overall Waste Rock Management Plan that stipulates regular and frequent checks (including lab and field screening techniques) that will yield a high confidence for waste rock classifications. This might include the recording of information for all work related to:
- Categorization of rock types from blast rounds including the results of field screens and geochemical characterizations;
  - Subsequent rock management:
    - Determination of non-AML, AML or mineralized rock;
    - Segregation, temporary storage location and relative volumes of rock types;
    - Long-term storage location and relative volumes of rock types (i.e. transport of bulk mineralized sample off property; location and volume of non-AML rock used for roads and AML rock brought to the Bellekeno Pit). Detailed field tracking procedures that describe origin (i.e. blast unit, mineable unit), transportation, destination and AML classification of all waste rock 39. Provide all recorded information to the appropriate regulator.
39. Provide all recorded information to the appropriate regulator.



41. Upon initiating this project, the relationship between field observations (i.e. tests and geochemical characterization) and the proposed calcium, sulphur, lead and zinc thresholds shall be continuously confirmed by sampling and laboratory analysis of rock. The results of laboratory analysis shall either confirm thresholds and the rock categorization and segregation approach or require adjustment
42. The Temporary Conditional Waste Rock Classification Platform area shall have lined pads that are sloped in order to facilitate gravity drainage and collection of runoff water. Drainage that is collected shall either be:
  - Contained until analysis shows that it is within an acceptable standard for release; or
  - Sent to the Bellekeno 625 water treatment facility.
46. Place all potentially AML waste rock from underground exploration activities into Bellekeno Pit.  
**Note: Bellekeno Pit is taken to mean the AML waste rock dump.**
47. Create berms to divert surface run-off around Pit to minimize exposure to water, potential ARD and the requirement for frequent removal of accumulated effluent.  
**Note: Bellekeno Pit is taken to mean the AML waste rock dump.**
49. Store AML waste rock on impermeable liner with collection system to ensure that any noncompliant water draining from the waste rock may be properly treated prior to release to the receiving environment.
50. Install a low permeable cover overtop AML waste rock at end of project to reduce/eliminate water infiltration.
51. Drainage from the waste rock placed in the Bellekeno Pit shall be contained until analysis shows that it is within an acceptable standard for release.  
**Note: Bellekeno Pit is taken to mean the AML waste rock dump.**
53. Location of the Bellekeno Pit to be approved by a qualified geotechnical engineer.  
**Note: Bellekeno Pit is taken to mean the AML waste rock dump.**
56. Measures that are addressed in the Water Use/Management section.  
**Note: This is believed to be a header.**
57. Groundwater conditions downgradient of the DSTF must be characterized to help demonstrate that the liner has not failed. This might include the use of monitoring wells to measure changes in water levels, sample water quality and run recovery tests to help evaluate flow directions and velocities.  
**Note: There is no liner proposed for the DSTF but we have already accepted this as groundwater monitoring as captured by term # 29.**
60. A groundwater monitoring program must be initiated by the start of the mine operations. Information gained from this program will establish contemporary baseline conditions at the site and will assist with planning for post-closure groundwater quality monitoring. The

Maintenance and Monitoring program proposed for surface water at the site must incorporate flow monitoring (for quantity and quality) at all treatment ponds.

61. This plan must include maintenance of water diversion structures at all tailings stacks.

64. Results will be reported to the regulators.

**Note: This is taken as referring to the monitoring requirements under the Adaptive Management Plan.**

## Health and Safety

65. Conduct a noise impact study prior to project implementation. The study must aim to achieve the following:

- Analyze baseline conditions during conditions of low ambient noise.
- Calculate the potential noise emissions from all activities that generate significant noise.
- Calculate the noise emission level that the closest receiver may experience due to those activities. Consideration must be given to local environmental conditions (*e.g.* terrain, temperature inversions, and downwind conditions relative to sensitive receivers) and proposed mitigations.
- Calculate the cumulative noise emission of this project in combination with existing and proposed activities (*e.g.* care and maintenance, Keno City).

66. Develop a noise abatement and management plan based on the results of the noise impact study. The plan must aim to achieve the following.

- Identify appropriate measures to reduce noise emissions.
- Incorporate these measures into project design and implementation.

67. Upon commencement of each block of operations (*e.g.* crusher; bypass construction; ore traffic), a verification study will be conducted. This will consist of continuous monitoring over a two week period. Monitoring will aim to capture the ambient noise levels at sensitive receivers, inclusive of what the project is contributing. If unacceptable noise levels are identified further measures to reduce the noise levels are required.

68. Best management practices for the industry indicate that dust releases must be minimized through the application of a number of preventative measures, including the following.

- If excess dust is produced in the crusher, the proponent must be prepared to use air filtration/dust collection equipment to collect the indoor crusher air and removal of particulate from the exhaust.  
**Note: The crusher is not proposed to be inside but this could be considered as a contingency plan.**
- Enclosure of the primary crusher and the use of air filtration/dust collection equipment to collect the indoor crusher air and removal of particulate from the exhaust.  
**Note: The primary crusher is not proposed to be inside but this could be considered as a contingency plan.**

- Covering ore haul truck beds to reduce the loss of dust from the truck during transport.  
**Note: Ore does not usually create a dust impact, but haul trucks carrying material that has potential to create dust impact will be covered.**
- Use of dust suppression techniques, such as the application of water as necessary, to the Dry Stack Tailing Facility, non-AML rock storage and the haul road, if and when dusting conditions occur. Other dust suppression products and chemicals are available on the market at higher cost and potentially uncertain efficacy. Under no circumstances shall waste oil or other hydrocarbon product be used for dust suppression.
- Reduce the area of dust producing surfaces through timely reclamation (covering). The proponent has indicated only a small percentage of the DSTF will be exposed at any given time in order to accomplish this dust suppression goal.
- Haul road surfacing – frequently used roads near Keno shall be hard surfaced to the extent possible.
- Vehicle wheel and chassis wash to the extent possible.
- Site layouts – Design operational areas to minimize pollution from dust. For example, take account of prevailing wind conditions, use buildings as screens or enclosures, and use natural topography and vegetation as screening.  
**Note: Government of Yukon accepts these as best management practices and contingency plans.**

69. Monitoring dust conditions is an important step in controlling dust impacts. Simple TSP (dustfall) monitoring is a simple and inexpensive way to determine dust deposition at the sampling locations. This test can be done at the site by the proponent with little cost or training necessary.

70. If warranted by initial dustfall measurements indicating TSP concentrations in excess of 150 micrograms per cubic metre (the BC Air Quality Objectives and Standards Level A criteria) at the fence line, the proponent shall conduct more sophisticated monitoring with high volume samplers and re-evaluate and improve dust suppression techniques to achieve the TSP objective.

71. Potential dispersal of contaminants from Dry Stack Tailings Facility to Keno must be qualified based on wind dispersion models and local meteorological conditions and provided to appropriate regulator.

72. The proponent shall ensure that the bridge is capable of supporting the weights that will be crossing it and provide documentation to that effect to the regulator.

73. The proponent shall submit the bypass road plans to the regulator for review and approval.

74. Proponent shall ensure the following is achieved with respect to the health and safety of workers.

- Comprehensive safety program is in place with ongoing updates.
- Compliance with the OHS Act and Regulations.
- Emergency plan in place with ongoing updates.



- Mine Rescue Training and Equipment in place.
  - Back up plan for mine rescue assistance; (agreement in place with other U/G mines for assistance in event of an emergency).
  - Contractor Safety Management Plan in place; (especially during plant construction phase).
  - Return to Work Program for Injured Workers.
75. Complete details of all other camps to be used need to be provided to Environmental Health Services. The details must include total population, accommodation, food service, potable water supply and sewage disposal.
76. Camps must comply with the requirements of the *Public Health and Safety Act*, Camp Sanitation Regulations.  
**Note: Non-discretionary.**

### **Environmental Quality**

78. Prior to constructing the new access road to the Flame and Moth Mill site and the Keno City bypass, the proponent must demonstrate that soil conditions beneath and in proximity to the proposed right-of-way are stable to support the intended construction and use.
79. New road construction shall not cause degradation of permafrost.
80. All potential roadway design and construction must be signed off by a qualified geotechnical engineer.  
**Note: When the assessor specifies “geotechnical engineer” Government of Yukon will be asking for an “engineer licensed to practice in the Yukon”.**
81. From borehole drilling throughout the various sites surrounding the Keno City region, evidence of permafrost was generally not encountered. It is acknowledged that the non-AML waste rock site is situated on a north facing slope more prone to permafrost, however the consequences of intermittent permafrost or altering the permafrost regime with the placement of the non-AML waste rock could be severe given the design assumptions for the slope stability assessment. Additional boreholes must be drilled throughout the areas of placement of the waste rock, especially throughout the lower toe area and extending westward along Lightning Creek. All boreholes must be extended to bedrock and several should be fitted with temperature reading devices to confirm the location and depth of permafrost. It would be expected that temperature monitoring would occur over several seasons. Several peizometers must also be installed to monitor supra-permafrost groundwater level conditions.
82. The detailed slope stability assessment discussed in Appendix E of the Project Proposal must be revised to include the additional geotechnical information. A discussion on the permafrost layer depth and how this may be altered by the placement of the waste rock must be given to document how the permafrost is to be protected and how the shear strength parameters could change with the degradation of the permafrost. A discussion of the rock placement protocol must be given, and should include a placement scenario from the bottom of the slope upwards so as not to create slope stability issues during fill placement. The detailed slope stability assessment must be presented in a comprehensive report signed off by a qualified

geotechnical engineer.

**Note: When the assessor specifies “geotechnical engineer” Government of Yukon will be asking for an “engineer licensed to practice in the Yukon”.**

83. The shear strength of the foundation soils as outlined in Appendix E of the Project Proposal must be clarified. Based upon the drilling program, the foundation soils in this area consist of silty, gravelly sand. The assumed shear strength parameter of an undrained shear strength of 10kPa refer to a cohesive material (*i.e.* a material containing clay sized particles). Materials such as sand are non-cohesive and generally have a corresponding cohesion of 0kPa. These shear strength parameter assumptions may have a significant impact on the slope stability assessment, especially for very shallow potential slip surfaces (as likely in this case) with very low normal stresses.
84. The reports state “there is a terrace of mined placer tailings between the slope and Lightning Creek... (which) could lead to long term stability issues.” Relative to this concern, the non-AML waste rock storage area should be designed such that it does not cause degradation of the underlying warm permafrost, and that design must be signed off by a Geotechnical engineer.
85. The geotechnical investigation and final design must therefore be of sufficient detail to identify permafrost (*i.e.* temperature readings in both disturbed and non disturbed areas), identify the groundwater levels (piezometers), and characterize the native soils (both within the non-disturbed and disturbed areas) so that a detailed stability assessment can be performed.  
**Note: This refers to the DSTF.**
86. The stability assessment must include potential settlements of the native soil caused by the tailings placement, site preparation required prior to tailing placement, stability assessment during tailings placement, and the long term stability under design loading conditions.  
**Note: This refers to the DSTF.**
87. Detailed design of the mill building so as not to disturb permafrost.
88. All placement methodologies must be signed off by a qualified geotechnical engineer.  
**Note: This refers to the DSTF, and when the assessor specifies “geotechnical engineer” Government of Yukon will be asking for an “engineer licensed to practice in the Yukon”.**
89. To evaluate the potential risks associated with this site as a AML storage facility and the potential effects this may have on the environment, detailed design information will need to be supplied outlining existing site conditions (native soils, permafrost, groundwater conditions, etc.), and rock placement methodology and geometry. The generic waste containment documentation can then be tied to the placement methodology on the slope.
90. All placement methodologies must be signed off by a qualified geotechnical engineer. **Note: This refers to the AML waste rock disposal site. When the assessor specifies “geotechnical engineer” Government of Yukon will be asking for an “engineer licensed to practice in the Yukon”. This matter has been dealt with in # 53.**



**Government of Yukon varies the following:**

14. Conduct water quality monitoring including dissolved oxygen and temperature profiles and toxaphene, sampled at spring overturn, mid-summer and fall.

***Justification:***

*Toxaphene is not contemplated for this project, and the Minister of Fisheries and Oceans Canada has stated that his department did not place toxaphene in Christal Creek. This toxic product is outside of the scope of the project.*

**Replaced with:**

14. Conduct water quality monitoring, including dissolved oxygen and temperature profiles, sampled at spring overturn, mid-summer and fall.

**Note: This will form part of the “Environmental Effects Monitoring Plan” to be designed with the proponent and approved by the regulator. Timing may vary.**

**Government of Yukon varies the following:**

28. Sludge from settling ponds at the Flame and Moth Mill and Bellekeno 625 and sediment collected in Bellekeno East settling ponds shall be removed and transported to Valley Tailings Area at the existing sludge storage area. Sludge resulting from Bellekeno mine operations will be stored in a separate paddy cell located in the valley tailings in order to keep liabilities separate.

***Justification:***

*The location of the paddy cell at the Valley Tailings area may not adequately separate current from historic liabilities. Also, the storage approach could be something different than a paddy cell.*

**Replaced with:**

28. Sludge from settling ponds at the Flame and Moth Mill and Bellekeno 625 and sediment collected in Bellekeno East settling ponds shall be removed and transported to a site or paddy cell that has the prior approval of the regulator, and that will keep liabilities separate.

**Government of Yukon varies the following:**

29. Groundwater information is needed to quantitatively assess the available groundwater resources (e.g. quantity and quality) at the site, to identify flow directions and rates, and to identify any existing contaminant levels of groundwater resources. Monitoring wells shall be established at the site near the DSTF at Flame and Moth site, near the potential AML storage facility, and at the Christal Lake site.

***Justification:***

*The AML storage area is a temporary engineered structure that has an impermeable liner with no discharge to the environment. The permanent site for potential A/ML waste is underground, so this site should be excluded from requiring a monitoring well.*

**Replaced with:**

29. Groundwater information is needed to quantitatively assess the available groundwater resources (e.g. quantity and quality) at the site, to identify flow directions and rates, and to identify any existing contaminant levels of groundwater resources. Monitoring wells shall be established at the site near the DSTF at Flame and Moth site and at the Christal Lake site.

**Government of Yukon varies the following by removing:**

40. Test and establish a more conservative approach for categorizing and segregating rock that is focused on determining non-reactivity.

***Justification:***

*The existing approach appears quite to be relatively conservative. When an approach is too conservative it can lead to problems such as unnecessary management of excess material.*

**Government of Yukon varies the following by removing:**

43. Bulk sample material must be covered to the extent practical to reduce contact with precipitation.
44. Bulk sample shall not be stored at the temporary facility for more than 6 months following removal from the excavation, unless a complete characterization and classification that demonstrates it to be non-AML rock is conducted.
45. Prior to any excavation of Bellekeno East, an engineered design with sufficient details of the waste rock cover is to be submitted by the proponent to the appropriate regulator for approval.

***Justification:***

*These are activities assessed and permitted in the exploration program and not part of the scope of this project. However, a plan will be required for the management of ore stockpiles that will address any ARD/ML issues.*

**Government of Yukon varies the following by removing:**

48. AML waste rock to be stored in a manner that eliminates exposure to air and water during placement, before capping and after capping.

***Justification:***

*It is impossible and unnecessary to eliminate exposure to air and water during placement and before capping and further it is stored in an engineered structure and is eventually planned to go underground.*

**Government of Yukon varies the following by removing:**

52. Effluent from Bellekeno Pit shall be monitored to document any potential changes to water quality resulting from AML waste rock storage in the Bellekeno pit.

**Note: Bellekeno Pit is taken to mean the AML waste rock dump.**

***Justification:***

*No effluent will be discharged; it is in a lined and contained structure.*

**Government of Yukon varies the following by removing:**

54. Berms must be constructed to divert surface run-off generated outside the waste rock storage area around the facility and to contain surface run-off generated within the storage area.

**Note: Taken to be AML waste rock dump.**

55. Surface water inside the berm will be collected in a sump, monitored and treated as necessary to meet water quality guidelines. Options for treating the effluent include the use of treatment ponds similar to the ones proposed for the Flame and Moth Mill Site and Bellekeno Mine Site or pumping the effluent to the nearby Bellekeno Mine site for treatment there. Management of the pond, including monitoring of untreated and treated water quality, flow rates and sediment removal will be as discussed above for the Flame and Moth Mill Site and Bellekeno Mine treatment ponds. Due to the level of uncertainty in the proposed waste rock storage plan, these measures are necessary to avoid a significant adverse effect on water quality in Lightning Creek.

***Justification:***

*The proposal is to contain the AML waste water within a lined, engineered structure which has already been approved.*

**Government of Yukon varies the following by removing:**

58. Hydrostatic pressure of the underground adits used for waste backfill must be monitored for as long as possible to demonstrate complete saturation of the tailings backfill.

59. Incorporate monitoring results into ongoing adaptive management of the mine operations and monitoring programs.

***Justification:***

*Paste backfill will only be placed in areas of the mine that will be submerged at closure.*

**Government of Yukon varies the following by removing:**

62. Water quality triggers should either be closer to baseline levels (perhaps 50% above baseline but still substantially under criteria) or monitoring must be done more often to detect trends sooner



63. Water discharge thresholds must be developed from seasonal baseline data with prescribed thresholds based on effects rather than using arbitrary 24 month averages.

**Justification:**

The combination of Water Use Licence discharge standards, and loadings and flows considerations give ample and effective variety to the Adaptive Management Plan. Government of Yukon will be asking the proponent to update the AMP to include the new facets of the project and will seek justification for some of the proposed triggers.

**Government of Yukon varies the following by removing:**

77. Use an alternate Yukon Government regulated site for waste disposal as per guidance from Yukon Government.

**Justification:**

This comment was retracted by the technical expert as the proponent has a licensed waste disposal site on the property.

**Dates**

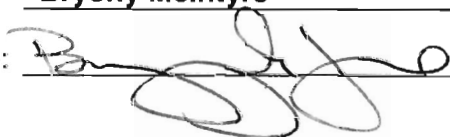
<b>Project Recommendation Issued:</b> June 11, 2009	<b>Decision Document Issued:</b> July 10, 2009
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**Recommendation Received From:**

Designated Office	<input checked="" type="checkbox"/>	Location PO Box 297 Mayo, YK Y0B1M0
Executive Committee	<input type="checkbox"/>	
Panel	<input type="checkbox"/>	a) Panel of the YESAB
	<input type="checkbox"/>	b) CEAA Panel
	<input type="checkbox"/>	c) Joint Panel (YESAB and other assessment body)

**Authorization**

By signing below, the Yukon government has exercised its authority as per YESAA s. 75 or s. 76 to issue a decision document on this project.

Name: Bryony McIntyre Position: A/Director, Mineral Resources  
 Signature:  Date: July 10, 2009



**Copies Forwarded to (as required by YESAA):**

- |                                     |                                      |                   |  |
|-------------------------------------|--------------------------------------|-------------------|--|
| <input type="checkbox"/>            | Other Decision Bodies                | [list]            | _____                                      |
| <input checked="" type="checkbox"/> | Project Proponent                    | [name]            | <u>Alexco Keno Hill Mining Corporation</u> |
| <input checked="" type="checkbox"/> | DAP Branch, Executive Council Office |                   | _____                                      |
| <input checked="" type="checkbox"/> | YESAB Designated Office              | [location]        | _____                                      |
| <input type="checkbox"/>            | YESAB Executive Committee            | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Minister Environment (Canada)        | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Yukon Surface Rights Board           | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Yukon Water Board                    | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Land Use Planning Commission:        | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Independent Regulatory Agency        | [when applicable] | _____                                      |
| <input type="checkbox"/>            | Other Body/Person as Required        | [List]            | _____                                      |



**2011 Annual Report Addendum**

**Quartz Mining License QML-0009**

**May 2012**

**Attachment B**

**Yukon Workers Compensation Health and Safety Board  
Proposal Letter of Acceptance 2011 Construction Plan**

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**YUKON WORKERS'  
COMPENSATION  
HEALTH AND  
SAFETY BOARD**

401 STRICKLAND STREET, WHITEHORSE, YUKON Y1A 5N8 TELEPHONE: (867) 667-5645 FAX: (867) 393-6279 TOLL FREE: 1-800-661-0443

Mr. Tim Hall  
Mine Manager  
Alexco Resources

Sent by email:

August 24, 2011

Dear Mr. Hall

**RE: Bellekeno Haul Road Plan**

Thanks for providing me the large diagram of the Bellekeno haul road. This makes the assessment of the proposal easy to understand. I have now reviewed and accept your proposal. Please make sure you adhere to the required widths and that you ensure the required berm does not encroach on these defined widths.

Regards, Bob

Robert R Scott  
Chief Mines Inspector  
Yukon Workers' Compensation Health and Safety Board

C: Arlene Kyle; Kurt.Dieckmann; Scott Smith; Tom Fudge; David Hillier; Vanessa Benwood;  
Neil Bottrell; Al House; Brad Thrall; Mike McGregor; Ethan Allen; Scott Davidson



**2011 Annual Report Addendum**

**Quartz Mining License QML-0009**

**May 2012**

**Attachment C**

**2011 AKHM Traffic Log**

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**Alexco Keno Hill Mining Corp.**  
**Bellekeno Mine Operations - 2011 Traffic Summary**

<b>Christal Lake Road</b>		<b>Jan-11</b>	<b>Feb-11</b>	<b>Mar-11</b>	<b>Apr-11</b>	<b>May-11</b>	<b>Jun-11</b>	<b>Jul-11</b>	<b>Aug-11</b>	<b>Sep-11</b>	<b>Oct-11</b>	<b>Nov-11</b>	<b>Dec-11</b>
Mine Haul Trucks	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	0	0
	Average/Day	0	0	0	0	0	0	0	0	0	0	0	0
Concentrate Trucks	Rountrips/Month	29	32	33	41	37	37	39	34	36	43	43	45
	Average/Day	0.9	1.1	1.1	1.4	1.2	1.2	1.3	1.1	1.2	1.4	1.4	1.5
Fuel/Propane	Rountrips/Month	1	3	5	3	4	4	3	3	2	3	6	6
	Average/Day	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
General Freight	Rountrips/Month	3	5	4	6	6	3	2	4	1	2	7	3
	Average/Day	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.1
General Support (Vacuum/Water/Service Trucks and Equipment)	Rountrips/Month	101	84	55	85	41	48	42	45	42	44	44	70
	Average/Day	3.3	3.0	1.8	2.8	1.3	1.6	1.4	1.5	1.4	1.4	1.5	2.2
Bus/Van Crew Transportation	Rountrips/Month	62	56	62	60	62	60	62	62	60	62	242	246
	Average/Day	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	8.1	7.9
Light Vehicles	Rountrips/Month	248	224	248	240	248	240	248	248	240	248	240	248
	Average/Day	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Total	Rountrips/Month	444	404	407	435	399	392	397	396	381	403	583	617
Total - Average/Day	Average/Day	14.3	14.4	13.1	14.5	12.9	13.1	12.8	12.8	12.7	13.0	19.4	19.9

<b>Keno City - Bellekeno Mine Haul Road</b>		<b>Jan-11</b>	<b>Feb-11</b>	<b>Mar-11</b>	<b>Apr-11</b>	<b>May-11</b>	<b>Jun-11</b>	<b>Jul-11</b>	<b>Aug-11</b>	<b>Sep-11</b>	<b>Oct-11</b>	<b>Nov-11</b>	<b>Dec-11</b>
Mine Haul Trucks	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	0	0
	Average/Day	0	0	0	0	0	0	0	0	0	0	0	0
Concentrate Trucks	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	0	0
	Average/Day	0	0	0	0	0	0	0	0	0	0	0	0
Fuel/Propane	Rountrips/Month	7	6	6	4	2	4	3	4	2	4	0	0
	Average/Day	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
General Freight	Rountrips/Month	9	17	13	19	19	29	8	20	24	14	0	0
	Average/Day	0.3	0.6	0.4	0.6	0.6	1.0	0.2	0.6	0.8	0.4	0.0	0.0
General Support (Vacuum/Water/Service Trucks and Equipment)	Rountrips/Month	62	56	62	60	62	60	62	62	60	62	0	0
	Average/Day	2	2	2	2	2	2	2	2	2	2	0	0
Bus/Van Crew Transportation	Rountrips/Month	62	56	62	60	62	60	62	62	60	62	0	0
	Average/Day	2	2	2	2	2	2	2	2	2	2	0	0
Light Vehicles	Rountrips/Month	186	168	186	180	186	180	186	186	180	186	180	186
	Average/Day	6	6	6	6	6	6	6	6	6	6	6	6
Total	Rountrips/Month	326	303	329	323	331	333	321	334	326	328	180	186
Total - Average/Day	Average/Day	10.5	10.8	10.6	10.8	10.7	11.1	10.3	10.8	10.9	10.6	6.0	6.0

<b>Keno City Bypass Road</b>		<b>Jan-11</b>	<b>Feb-11</b>	<b>Mar-11</b>	<b>Apr-11</b>	<b>May-11</b>	<b>Jun-11</b>	<b>Jul-11</b>	<b>Aug-11</b>	<b>Sep-11</b>	<b>Oct-11</b>	<b>Nov-11</b>	<b>Dec-11</b>
Mine Haul Trucks	Rountrips/Month	190	83	315	289	257	246	101	137	210	198	275	271
	Average/Day	6.1	3.0	10.2	9.6	8.3	8.2	3.3	4.4	7.0	6.4	9.2	8.8
Concentrate Trucks	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	0	0
	Average/Day	0	0	0	0	0	0	0	0	0	0	0	0
Fuel/Propane	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	6	5
	Average/Day	0	0	0	0	0	0	0	0	0	0	0.2	0.2
General Freight	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	12	9
	Average/Day	0	0	0	0	0	0	0	0	0	0	0.4	0.3
General Support (Vacuum/Water/Service Trucks and Equipment)	Rountrips/Month	0	0	0	0	0	0	0	0	0	0	44	70
	Average/Day	0	0	0	0	0	0	0	0	0	0	1.5	2.3
Bus/Van Crew Transportation	Rountrips/Month	62	56	62	60	62	60	62	62	60	62	60	62
	Average/Day	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Light Vehicles	Rountrips/Month	248	224	248	240	248	240	248	248	240	248	240	248
	Average/Day	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Total	Rountrips/Month	500	363	625	589	567	546	411	447	510	508	637	665
Total - Average/Day	Average/Day	16.1	13.0	20.2	19.6	18.3	18.2	13.3	14.4	17.0	16.4	21.2	21.5