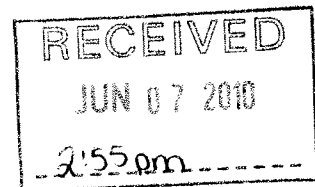


7 June 2010

Yvonne Bessette
 Box 2 Site 1
 Keno, Yukon
 Y0B 1M0
 Phone: 995-3151
 email: yvonne@northwestel.net



*replaces version
 received at 10:19 am

Yukon Water Board
 #106 – 419 Range Road
 Whitehorse, Yukon
 Y1A 3V1

Attention: Ms. Carola Scheu

RE: Intervention to Type A Water License Application QZ09-092
 Alexco Keno Hill

I would like to be part of the Public Hearing for this water license. Please incorporate this intervention with my intervention of 24 May 2010.

In my intervention of 24 May 2010 I made an error on the total zinc levels at Christal Lake from sampling done by Laberge Environmental Services on 11 July 1995. The only results I have seen for Christal Lake come from sampling done by Laberge in 1994 and 1995.

The correct total zinc readings, in mg/L for Christal Lake and other inputs sampled to the lake:

LES 31-B (11 July 1995) Galkeno 900 decant from pond #2 – zinc 0.05
 LES 31F (11 July 1995) seep near swamp effluent – zinc 7.66
 LES 31G (11 July 1995) flow along old path, 5 m upstream Christal Lake – zinc 4.89
 LES 31H (11 July 1995) seep below wetland access road – zinc 10.1
 LES 53 (11 July 1995) old Galkeno freshwater pumphouse water – zinc 0.062
 LES 55 (12 July 1995) inflow to south end of Christal Lake – zinc 0.339
 LES 56 (11 July 1995) Christal Lake – zinc 0.124
 LES 66 (12 July 1995) spring along Duncan Creek Road – zinc 0.118

Is the mine approval process capable of evaluating a project located beside an existing community?

YESAB states on page (i) of their Evaluation Report on Alexco's Type A Water License Application:

“The assessor determined that the project will have significant adverse effects on environmental quality, aquatic resources and health and safety. Mitigations proposed by

the proponent in addition to those recommended by the assessor are considered adequate to eliminate, reduce or control the significant adverse effects of the project.”

I don't believe this water license application has met the burden of proof required to eliminate, reduce or control the significant adverse effects of the project, and some very important recommendations from YESAB were totally disregarded by Govt. of Yukon. Alexco should find a virgin piece of ground, do all necessary studies and tests, then move their portable mill there, away from our town. They have no regard for our well being or health. Our concerns are dismissed. YESAB said that was all right that Alexco changed the location of the mill from Christal Lake to Flame & Moth site, four days before end of comments and submissions, due to concerns raised.

The concern was the proximity of the mill to our town. So Alexco moved the mill to the Flame & Moth site, in even closer proximity to our town. Alexco has no regard for us and neither does Govt. of Yukon.

I am not assured that the Flame& Moth site is the appropriate place for a mill that will produce 400 tonnes/day in years 3, 4 and 5 of operation. Besides a desk top study on groundwater, there is no information. A desk top study is inadequate. The mill should be placed on a virgin piece of ground so the effects of it can be studied before it is built. First the area would be carefully studied for ground and surface water by hydro-geologists, results recorded. Then the ground and surface water can be studied after the mill is in operation.

Alexco has chosen to build a mill in an area that was previously disturbed. They were allowed to build the mill last fall without any studies being done on the groundwater or surface water and none of the baseline environmental studies recommended by YESAB.

In their Water License Application Report, 1.3 on the Water Board registry, Alexco states on page 7-12:

“7.5.4 Christal Lake Characterization Study: To document local environmental conditions in Christal Lake an initial Characterization study will be conducted. The purpose of this study will be to document limnological characteristics of Christal Lake and will be undertaken during the first year of construction/operation. The program will involve the collection of lake sediments, phytoplankton, zooplankton and water quality using recognized guidance protocols. The program will be conducted three times during the open water season for phytoplankton only and one time sampling for other parameters....”

After the mill has been built and or in operation is not the time to do a Characterization Study. This should have been done before the mill was built. The initial Characterization Study they offer has been changed in YTG's Decision Document, item 9.2 on YWB's Registry to “This will form part of the ‘Environmental Effects Monitoring Plan’.

No groundwater studies have been done. All Alexco offers is a desktop study, which concludes the potential impact on water supply in the groundwater well in Keno City is

negligible. A computer cannot study the groundwater. Qualified professional independent hydro-geologists are required to study the groundwater. From page 48 of the Main Application Report, 1.3 on the YWB Registry:

“The desktop analysis that has been completed and included in the project proposal documents provide a basic conceptual hydro-geologic model of groundwater distribution at the site relative to the Keno City well. Although there are no historical baseline groundwater data and there remain some uncertainties of the surface water – groundwater interactions in the area, the report indicates that the potential impact on water supply in the groundwater well in Keno City is negligible.”

No historical baseline groundwater data. And still no current baseline groundwater data, except what was generated by a computer. The statement that some uncertainties of the surface water – groundwater interactions in the area beg that the water be properly studied. And the mill has already been built before these important studies were done.

From YESAB’s Evaluation Report on Alexco’s application, page 42:

“5.3.3.2 Operation of Flame & Moth mill and Bellekeno Mine Site waste water treatment facilities & related infrastructure: Further Baseline Information Required in Upper Christal Creek and Christal Lake.

The Flame & Moth Mill treatment pond will discharge into Christal Creek and baseline information is necessary at sites upstream and downstream of the effluent discharge point to evaluate potential effects from the project. Monitoring stations KV-50 and KV51 are currently being monitored under Water License QZ06-074. A new monitoring station is required, depending on the location of the effluent discharge point, to ensure that locations both upstream and downstream of the discharge are monitored. It will be important to begin baseline characterization of this new monitoring location as soon as possible and prior to effluent discharge into the creek.”

“Christal Lake is receiving water from a number of potential contaminant sources associated with the project, including the Flame & Moth Mill Site, but the lake is not currently being sampled under a Water License. A sampling program must be initiated on the lake to monitor water and sediment quality. Two monitoring stations, one each end of the lake must be sampled. This will address the issue, raised throughout the comment period that the Flame & Moth mill will be discharging to a previously affected water body. Information submitted during the assessment indicates that Christal Lake may have been poisoned with toxaphene in the 1960s

The establishment of baseline (pre-mill) water, sediment, phytoplankton and zooplankton data will enable potential effects from the mill to be separated from pre-existing contamination (eg. Concentrations of zinc, cadmium, lead in Christal Creek and Lake). In addition, site water quality modeling and a site water balance can then be performed to predict Christal Creek and Christal Lake receiving water quality from the resulting discharges. The effect of discharging Mill/DSTF effluent into the receiving waters of Christal Creek, without first predicting and understanding water quality conditions, could be significant and adverse

Recommended Mitigation:

Christal Creek

- baseline data must be collected from a site at Christal Creek pre-project
- sample sediment & benthic invertebrates to characterize annual variation & the summer season during time of maximum biological activity
- the Christal Creek site shall be added to the monitoring program and the Adaptive Management Plan.”

These were YESAB’s recommendation #10 and #11, which YTG states “This will form part of the ‘Environmental Effects Monitoring Plan’ to be designed with the proponent and approved by the regulator”, which takes it out of the environmental assessment process.

YESAB stressed the importance of collecting baseline data at Christal Creek pre-project. Having it as part of an “Environmental Effects Monitoring Plan” as Govt. of Yukon turned the recommendation into, that is to be designed at some future date does not provide the baseline data required pre-project. The mill was built last fall before baseline data was collected.

Govt. of Yukon states in their Decision Document, item 9.2 of YWB Registry: “...Decision: The Mayo Designated Office, pursuant to section 56(1)(b) of the Yukon Environmental & 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.”

Many very important recommendations were disregarded by Govt. of Yukon, important baseline studies that should have been done before the mill was built last September were not done. Why were they allowed to build the mill before the studies were done? In particular because they claim the area has been previously disturbed.

Some of YESAB’s recommendations were listed as accepted in YTG’s Decision Document, item 9.2 of the YWB Registry but were in fact changed, such as:

YESAB recommendation

Christal Creek: #10 Baseline data must be collected from a site at Christal Creek pre-project.

Govt. of Yukon:

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.

YESAB recommendation:

Christal Creek #11 Sample sediment and benthic invertebrates to characterize annual variation and the summer season during time of maximum biological activity.

Govt. of Yukon:

Christal Creek #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.

YESAB recommendation:

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).

Govt. of Yukon:

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.

YESAB recommendation:

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

Govt. of Yukon:

Christal Lake #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.

YESAB Recommendation:

#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 Dept. of Fisheries & Oceans; and

-initial dilution and mixing zones as defined by the appropriate regulator

Govt. of Yukon

#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 Dept. of Fisheries & 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.

YESAB recommendation:

#57 Groundwater conditions down-gradient 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.

Govt. of Yukon:

#57 Groundwater conditions down-gradient 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.

YESAB recommendation:

#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.
- 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
- covering ore haul truck beds to reduce the loss of dust from the truck during transport
- 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
- potential dispersal of contaminants from DSTF to Keno must be qualified based on wind dispersion models and local meteorological conditions and provided to appropriate regulator.”

Government of Yukon:

#68 Best management practices for the industry indicate that dust release 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.”

YESAB, while doing the Environmental Review on this project, assumed the crushers would be located indoors. YESAB says of the dust in their Evaluation Report:

“6.2.2.1 Contaminants: A variety of sources of dust generation are associated with the mine and mill activities. The key sources of dust that have the potential to impact the community and surrounding ecosystems include

- primary crusher
- haul road
- DSTF and non-AML rock storage operation causing disturbance of surfaces
- mine ventilation (intermittent source, generally only after blasting)
- fugitive dust from disturbed areas not otherwise reclaimed

...Uncontrolled dust from the activities listed above have the potential to impact human health and the environment as a result of the mineralization present in the materials being mined, transported and processed. Specifically, metals such as copper, arsenic, molybdenum and zinc can be present in ore-grade concentrations in dust and can cause health and ecological impacts....

...Chronic exposure to dust by workers and residents can cause health impacts if not controlled.”

Significance Determination: ...I am of the opinion that despite the mitigations proposed by the proponent, additional mitigation is required to ensure that the significant adverse effects related to air contamination do not occur.

Recommended Mitigations: In order to ensure dust does not become an issue from operations, the following additional mitigations are required:

-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

-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

-covering ore haul truck beds to reduce the loss of dust from the truck during transport....”

This is YESAB’s recommendation #68. Govt. of Yukon said of the recommendations:

“Note: The crusher is not proposed to be inside but this could be considered as a contingency plan.”

and “Note: The primary crusher is not proposed to be inside but this could be considered as a contingency plan.”

Govt. of Yukon Varies the following:

28. Sludge from settling ponds at the Flame & 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: Sludge from settling ponds at the Flame & 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.”

YESAB states of the sludge, on page 46 of their Evaluation Report:

“Sludge from settling ponds at the Flame & Moth mill and Bellekeno 625 and sediment collected in Bellekeno East settling ponds will 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.

Rationale: This measure ensures that sludge, which may contain high concentrations of metals and ammonia, will be managed properly.”

Alexco now plans to mix the sludge with the tailings and put them in the DSTF. This did not go through the environmental review. This sounds very dangerous as the resulting product of mixing tailings with sludge will seep into the ground for all eternity, with no liner under the tailings. YESAB assessed the project as the DSTF having a liner under them. They did not assess mixing sludge with tailings and stacking it up for all eternity.

I am very nervous about the mill at the Flame & Moth site. There are already sources of zinc which haven't even been identified. YESAB states on page 48 of their report:

“In consideration of site-specific conditions, some of which may be naturally occurring and others which are historical, it is reasonable to assert that at a minimum, water quality should be no worse than what is already naturally occurring upstream of the site...”

Govt. 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 & Oceans Canada has stated that his department did not place toxaphene in Christal Creek. This toxic product is outside the scope of the project.

Replaced with: 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.

I am requesting that the sediments in Christal Lake be tested for toxaphene. I was told by the Chairman of the Contaminants Committee the test can only be done in winter by a team from Winnipeg. That the Contaminants Committee wouldn't test Christal Lake because it was not on settlement land. Govt. of Yukon states Dept. of Fisheries & Oceans stated they did not place toxaphene in Christal Creek. It is not Christal Creek I believe was poisoned in 1961. It was Christal Lake. Dept. of Fisheries put 90 gallons of toxaphene in nearby Hanson Lake in 1963. Hanson Lake has an outlet to the South McQuesten River. DFO states many dead fish were found in Hanson Lake after the poisoning. I believe they poisoned Christal Lake in 1961, before they placed Rainbow Trout Eggs in it, as an experiment maybe. \

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by
Yukon
Water
Board
Staff
JH

Alexco states in 3.1.1.1 Christal Lake, Appendix F- Environmental Conditions Report:

“Beaver activity at the lake outlet controls water levels in the lake”.

There are no beaver in Christal Lake. But it is a popular feeding spot for moose. The moose eat the vegetation of the lake. If there is toxaphene in the sediments, how will this affect the meat of the moose we eat. In 3.3 Wildlife, Appendix F – Environmental Conditions Report, they state:

“The health of the local wildlife populations near the Galen – Keno Hill area has not been studied. Within the last two years local people have expressed concern over the health of local wildlife which are routinely consumed. Government programs have attempted to address this issue by collecting wildlife muscle, kidney and liver tissue; particularly for caribou and moose, and analyzing these tissues for metal and organo-chlorine levels. To date, a limited number of moose (2 samples) and caribou samples have been specifically collected from the South McQuesten River area....”

This is the identical passage as Access Consultants 1996 Site Characterization Report, referenced in this application:

“3.5 Wildlife (page 3-31) The health of the local wildlife populations near the Galena-Keno Hills area has not been studied. Within the last two years local people have expressed concern over the health of local wildlife which are routinely consumed. Government programs have attempted to address this issue by collecting wildlife muscle, kidney and liver tissue, particularly for caribou & moose, and analyzing these tissues for metal and organo-chlorine levels. To date, a limited number of moose (2 samples) and caribou samples have been specifically collected from the South McQuesten River area....”

It appears no more testing of moose has occurred since Access Consultants wrote the 1996 report. I have been eating moose from this area since 1976. Is it safe to consume moose year round, year after year? When airborne toxaphene was found in Lake Laberge it was closed to a commercial fishery. What about 90 gallons of toxaphene being deposited directly into a lake. Is this not a concern, that proper testing of the sediments and moose hasn't been done?

I believe this project will have significant adverse environmental effects. There is no baseline data and there won't be until some future date when they develop an "Environmental Effects Monitoring Plan". There will be no liner under the DSTF, as YESAB had assumed. There is no liner included in the engineering design of the DSTF. Mixing the sludge from the treatment ponds will be mixed with the tailings and placed in the DSTF. This did not go under YESAB's review. Although it appears YESAB evaluated the crushers as being indoors, they will be outdoors.

The water license application currently being reviewed differs in many ways from the application that was reviewed by Mayo's YESA office. Some examples:

- No environmental review was done on mixing sludge with tailings and putting that in the DSTF
- the importance of a Characterization Study of the mill area was stressed by YESAB, this was changed by Govt. of Yukon to "This will form part of the 'Environmental Effects Monitoring Plan'"
- the crusher was assessed as being enclosed in a building. Govt. of Yukon changed this to "The crusher is not proposed to be inside but this could be considered as a contingency plan."
- the primary crusher was assessed as being enclosed in a building. Govt. of Yukon changed this to "The primary crusher is not proposed to be inside but this could be considered as a contingency plan."
- the DSTF was assessed as having a liner under them. Govt. of Yukon changed this to "There is no liner proposed for the DSTF but we have already accepted this as groundwater monitoring as captured by term #29."
- the sludge from the settling ponds at Flame & Moth mill and Bellekeno 625 and sediment collected in Bellekeno East settling ponds shall be removed and transported to a site or paddy cell. They now plan to mix the sludge with the tailings and put the mess in the DSTF.

These changes have not had an environmental review. Recommendations for environmental monitoring pre-project have been ignored and turned into an "Environmental Effects Monitoring Plan" that has not even been designed yet. The water license application has had so many changes since it was submitted to the YWB last September that it is impossible to follow the threads without the paper copies. As a community totally affected by the operation of a large industrial complex 950 m from us, we should be considered as a stakeholder. We're not. Alexco has not given us the paper copies of this application, but they gave it to a stakeholder in Mayo, probably last September when this application was submitted to the YWB.

In section 4.3 of the YWB Registry is a letter to Alexco from the YWB of 21 April 2010 requesting further information/clarification. The letter states in part:

"There have been numerous changes and additions to the information provided in the original Application and its Appendices. Currently, these changes are only reflected in the supplemental correspondence provided by the Proponent. In some cases information, such as tables and figures, has been modified several times in the received documents that you provided. We believe that the review of the application by the Board

and third parties would be greatly facilitated by having the corrections and additions transferred into a revised application.”

In section 1.11 of the YWB Registry is a letter from Alexco to the YWB of 28 April 2010 in response to the YWB letter dated 21 April. The letter states in part:

“7.0 Revision of Application: We accept the comment that with multiple information requests it may now be more difficult to follow our application. We agree that a consolidation and re-issue of our entire application incorporating all amendments would be ideal. Given the benefit of enough time, we would consolidate all of the materials in support of our application into one document. However, we have long passed the time in our license processing schedule where this work may be completed without material risk to our critical path to our proposed project. Over the past several months during the adequacy review period, we understood from your office that the way that we have proceeded was and would continue to be an acceptable approach to responding to adequacy review questions.

However, for ease of review by Board members and interveners and for the purposes of the public hearing, we will prepare a document that will consolidate and present the critical changes to our application in a manner that makes the application easier to follow and consider.

In order to streamline the review of our application, we intend to hold a series of one-on-one meetings with various stakeholders and specialist regulatory departments (including those who indicated interest in the Bellekeno mine application during YESAA screening) in the few weeks leading up to the public hearing in order to help them navigate through the materials.”

We are a stakeholder living beside their project. It is now 7 June, the deadline for filing interventions. We have not been contacted to have one-on-one meetings, we haven't been given a “document that will consolidate and present the critical changes to our application in a manner that makes the application easier to follow and consider”.

We have been offered no help from Alexco in “navigating through the materials”. From a letter from Alexco to YWB dated 20 May 2010:

“As discussed in our meeting with you on 12 May, we are herewith submitting a Table of Errata and Clarifications. This table is organized according to the Main Application Report, showing the erratum or clarification made and the correction reference in the responses to information requests from the board. We are also submitting a second table which present a summary of additional information presented in the responses to information requests from the Board which are beyond the original Main Application Report. We hope that these tables facilitate the review process for the Board and any interveners”.

The table of Erratum or Clarification is 5 pages. The table of Additional Information in response to YWB requests is 2 pages.

These tables don't clarify anything. The application is a confusing mess, and even more confusing for Keno City residents as we have to compare what they stated in their

application to YESSAB and what they are stating in this application to the YWB, both applications being for the same project. A person needs three computers, one for each application and another one to type notes on.

I believe Alexco's water license application should be rejected. All the baseline and groundwater studies, etc., should be carried out. YESAB's recommendation on environmental monitoring should be carried out before the mill is allowed to operate. The project is rushing to implementation with very serious concerns about contamination to the creek beside the mill, McLeod Creek, which flows into Christal Lake, Christal Creek then to South McQuesten River. We have concerns about contamination of groundwater from sludge and tailings mixed and piled thirty feet high, to be exposed to air 364 days each year, and covered on day 365. We have concerns with the air we will breathe, the crushers having gone through YESAB's review as being indoors, while Govt. of Yukon said they would not be.

Christal Creek is portrayed as being so impacted that fish don't come up it. By their own admission there are two barriers to fish in Christal Creek which don't allow the fish to cross. Which they had already pointed out in their 1996 Site Characterization Report. No effort was made in all these years to remove the barriers.

Flat Creek is portrayed as being so impacted there are no fish. Without pointing out the only suitable habitat for fish is at the mouth of Flat Creek, because Flat Creek is a natural wetland. That is why it is called Flat Creek. The Fish & Fish Habitat 1996 report, Appendix VII of the 1996 Site Characterization Report explains the wetland, which explains why there are no fish.

Using the 1996 Site Characterization Report is not relevant to today. Very important current data has not been collected. From the YWB Registry, Volume IV, Section 1.10, question #41:

#41: Table 6-5 of the Main Application Report indicates that the estimated daily runoff from the dry stack tailings facility is 26.1 m³/day. Please explain the basis of that estimate. It is noted that the mean annual precipitation for the mill site is based on the 1996 dataset and therefore excludes a significant amount of data (1997-2009) that should be available to confirm that the mean annual precipitation estimates are reasonable".

The dataset is much older than 1996. As stated in Alexco's Main Application Report, Section 1.3 of the Registry:

"6.1.1 Climate Overview: This section presents an overview of basic variables which affect the water balance at each of the three points of water use and discharge in this project. Data from two historical Environment Canada Atmospheric Environment Service weather stations in the Keno Hill area (Elsa townsite from 1948-1965, and 1974-1989; and Keno Hill from 1974-1982) were used to predict climactic parameters for the three site locations within the Bellekeno Mine and Mill Development Project.

"The most important variables are average precipitation and average evaporation. These two parameters were considered the key parameters in developing the water balance for the Keno Hill area as a whole, which was presented in the 1996 Site

Characterization Report prepared by Access Consultants for UKHM (see Appendix H in Volume 3).”

This data is far too old. The most recent data is for Elsa, up to the year 1989. That was twenty-one years ago. And for Keno Hill, the most recent data is 1982. That is twenty-eight years ago. The climate has changed considerably since then.

During the environmental review by the Mayo office, Environment Canada posted a letter on 22 April 2009 with the comment:

“No calculations of mass loadings to the environment from dust emissions from the DSTF are provided. For example, a dry stack tailings facility for the Kupol Gold Project in Russia was proposed and then reconsidered as the metal and process chemical loadings due to dust emissions during operations was considered a risk to the environment. Has the potential loadings of metals and process chemicals been assessed to the aquatic environment?”

If this was addressed in Alexco’s water license application, I can’t find it. Not only will there be dust emissions from the DSTF, but the crushers will be located outdoors.

YESAB recommendation #29:

Groundwater information is needed to quantitatively assess the available groundwater resources (eg. 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 & Moth site and at the Christal Lake site.

Supporting Report: Appendix N – SRK Effects of water extraction at Christal Lake on water levels in the Keno City community well.

Appendix N is in Volume 3, 1.3.14 on YWB Registry: “Keno Hill water treatment systems sludge management plan QZ06-074, prepared by Elsa Reclamation & Development Co., May 2009, Revision No. 2”

I don’t see what this has to do with their referral to Appendix N – SRK –Effects of water extraction at Christal Lake on water levels in the Keno City community well
Appendix N has nothing to do with groundwater studies.

I am asking the Yukon Water Board to scrutinize the water at and near the location of Alexco’s mill, located at the Flame & Moth site. Why would Alexco be able to mill ore at a previously disturbed site, near Christal Lake where, they claim, tailings of a mill that operated for a short time in the 1950s are influencing the lake. In an area that they claim the decant from Galkeno 300 and Galkeno 900 adits are sent. Where they claim Onek water enters the lake, at 61.0 mg/L zinc. And the natural spring at the south end, with 5.0 mg/L zinc. Then there’s the infiltration well KV52 at Mackeno Creek (no such creek) 0.13 mg/L zinc.

In Alexco’s Water License Application Report, item 1.3 on the YWB Registry, they state on page 5-27:

“Two estimates can be made to estimate the amount of zinc load entering the Christal Lake receiving environment as a result of the dry stacked tailings and mill operations. The first approach is an estimate of the total soluble load within the DSTF over time as presented in Table 5-6. The annual estimate is based on a measured zinc concentration in tailings porewater from testwork (Process Research Assoc. 2009) of 20.31 mg/L zinc, with the assumption that infiltrated precipitation of approximately 1900 m³ would displace porewater with that concentration. Similar to the approach made with the WRDA, this estimated load is not directly released into the receiving environment as it will be attenuated.”

Will be attenuated how? That is a lot of zinc.

On the YWB Registry, Volume IV, section 1.8.3: Alexco’s response to review of adequacy & supplemental info, attachment C by EBA Engineering, the DSTF Preliminary Engineering Design and Management Plan, dated 19 January 2010:

“4.1 Surface conditions: There is disturbance in the area from previous surface earthwork and historic mining....
 4.2 Subsurface conditions...The gravel in the area of the DSTF was found in both frozen and unfrozen states...All silt & sand till encountered in the area of the DSTF was frozen
 4.4 Permafrost: Permafrost was encountered throughout the proposed DSTF. The permafrost encountered ranged from non-visible, non-excess ice to massive ice lenses. Ice volumes estimated as a percentage of the total soil volume vary between less than 5% and nearly 100%.”

This is not how the YESA Board assessed the area. From 7.2.5.2 DSTF Site in their Evaluation Report:

“...The EBA report outlines that permafrost is not anticipated in the area previously disturbed by mining activities, but it is possible that permafrost exists in the undisturbed areas. The 6 May 2009 Alexco report assumes permafrost is not present at the DSTF site.”

The later report by EBA states there is permafrost in the area. The fact that YESAB assessed the DSTF as having a liner, and the fact that Alexco will not be using a liner under the DSTF should have an environmental review.

YESAB’s Evaluation Report: 5.3.3.4 Operation of Flame & Moth mill and Bellekeno mine site waste water treatment facilities and related infrastructure; proposed effluent limits (page 48):

“...In consideration of site-specific conditions, some of which may be naturally occurring & others which are historical, it is reasonable to assert that at a minimum, water quality should be no worse than what is already naturally occurring upstream of the site; this assumes that care and maintenance activities are being properly implemented as per the corresponding water license (QZ06-074/QZ07-078)”

There are no care and maintenance activities upstream of the mill. It has nothing to do with the care and maintenance activities.

My question is, what is “already occurring upstream of the site”? I have looked at hundreds of pages of documents in Alexco’s water license application and can still not find any water quality data for the site where the mill has been built. I would like to know the pH and zinc levels of:

- McLeod Creek beside the mill
- Hinton Creek upstream of McLeod Creek
- McLeod Creek downstream of Hinton Creek
- the natural spring at the south end of Christal Lake
- exactly where is the water, in Access Consultants schematic, entering from the south, at 5 ppm, and what is this water
- Christal Lake
- the spring at the south end of Christal Lake
- Christal Creek
- all sites in the area that had been sampled in 1994 and 1995 by Laberge Environmental Services, Access Consultant’s 1996 UKHM Site Characterization Report, Technical Appendix VII

This area seems to be impacted enough, from natural sources. It does not need the mill adding more zinc to McLeod Creek, which is beside the mill, which flows into Christal Lake. The only sampling done in the area, except in 1994 and 1995 when Stephen Powell had sampling done by Laberge Environmental Services, has been Christal Creek at Silver Trail Highway. That is a long way from Christal Lake, which has never been sampled except in 1994 and 1995.

There never was a background station established for monitoring Galkeno 900 adit, above Christal Lake. The only sampling done was downstream of Christal Creek a long ways, at the Silver Trail Highway. No mention was made about “tailings” in Christal Lake influencing anything. There was no mention of the zinc-laden water entering McLeod Creek from the south, as is shown in Access Consultant’s schematic. Access says Onek flows into Christal Lake. This is impossible, but still, was never considered in the past.

Nobody seems to know what is “historical” and what is “naturally occurring” in the area. To state that water quality from the mill effluent “should be no worse than what is already naturally occurring upstream at the site” is a license to pollute. Access Consultants claim there is water entering McLeod Creek beside the mill, upstream, as shown in their schematic, at 5 ppm zinc. This water has not been identified. What is this water, where does it come from?

I believe Alexco should find a virgin piece of ground to get a fresh start. Go somewhere where the water is “naturally” clean, set the mill up there. Then it can be monitored. This license they are applying for is for 5 years of milling. There are no cumulative impacts considered for a time range past 5 years. Alexco has a 10 year drilling program. Is it not

reasonable to assume the mill will operate for much longer than 5 years? And, more importantly, where will all the tailings go? There is not sufficient ground to hold them, even stacked up 30 feet high. And with the DSTF having no liner, what will become of the ground water and surface water and McLeod Creek beside the DSTF, and Christal Lake and Christal Creek and the South McQuesten River, a salmon spawning stream of a critically endangered population of salmon. Will it be the taxpayer that will pay for long term damage, will it be the proponent or will it be the salmon?

Christal Creek should have the barriers to fish passage removed before it is condemned as unsuitable for fish. Access Consultants have been aware of these barriers since at least 1994 when they got the fish and fish habitat data from White Mountain Environment Consultants (WMEC). WMEC reported the barriers in Christal Creek. Access Consultants state in Volume II – 1.3.6.8 Appendix H – 2008 Fisheries Investigation Summary Report:

“(page 1)...Barriers to fish movement, previously identified on Christal Creek, were investigated further in this assessment and recommendations regarding their removal are included in this report.”

“(page 5) The sample area had just undergone a considerable period of above normal precipitation and, as a result, most sample locations were experiencing elevated flow rates, above normal discharge and increased turbidity”.

And on page 18 of Appendix H, quoting from White Mountain’s 2006 Fisheries Investigation:

“...Approximately 250 meters upstream of the C4 site (non-barrier) was a debris barrier apparently formed around the remnants of an old bridge. It formed a blockage that was likely complete for most fish species, with an approximate one meter differential in water elevation.”

There are pictures of Christal Creek. The water is very high and the barriers cannot be clearly seen. The creek should be assessed by experts at low water to see what the barriers are and how best to remove them, and the barriers should be removed by experts.

There are no current fish studies. In 1.10 of YWB Registry is a response from Access Consultants concerning fish studies:

Water Board Remark, page 9 of 46: “I was unable to find any reference to the 2009 fisheries study referenced in your response. Exhibit 1.3.6.8 present the results of only 2008 studies. Clarify if fisheries studies were completed in 2009 and if so submit the results of those studies as part of this application”.

Access Consultants response:

“The work conducted in 2008 and 2009 by Access Consulting with respect to fisheries was an investigation to assess fisheries habitat at tributaries that may be impacted by the access road. This work, although sufficient to determine the absence of fish habitat was not extensive enough to warrant a full report...”

Access Consultants state they reviewed previous environmental assessments. In the Screening Report done for Stephen Powell when he was applying for a Type A License, under the Canadian Environmental Assessment Act, 26 March 1997 by INAC, reference is made to developments at Onek. The Onek pit has been slated by Alexco for an Acid Metal Leaching Waste Rock Storage Facility (ALMSF). INAC states on page 22:

“7.1.1 Development of Onek: The Keno City residents have expressed the following comments regarding proposed development of Onek. Keno City is becoming a tourist destination. Residents are interested in the potential impacts from the reopening of Onek and their resolution. There are four historic cabins near Onek and locals are concerned about the possible impacts on the cabins. In addition, the potential expansion of the dump site may have negative implications from a tourist perspective. The residents also want assurance that the ground water of the community will not be impacted.”

Recommendation: Before further consideration of the development of Onek, UKHM should discuss their plans with the residents of Keno City to ensure that their issues have been addressed and mitigated. The outcome of the discussion between UKHM and Keno City residents (the issues identified and the proposed mitigation) should be incorporated into the mine development plan”.

Access Consultants have not followed any of INAC recommendations. Stephen Powell, while he owned the mine March 1994 to 19 January 2001, tried to resolve the historic cabin issue by selling part or all of the 142 acres UKHM had. Both levels of government refused.

Alexco did a desktop study on groundwater. They were fully aware the “four historic cabins near Onek” were privately owned and certainly did not belong to UKHM. They dealt with the cabins by drawing a by-pass road over them, included they say “by mistake”, in the environmental review of the present application.

In Volume II – 1.3.6.7 is Appendix G – Environmental Conditions Report, Water Quality Assessment Report. This is a report prepared for ERDC by Minnow Environmental Inc in July 2008. Page (i):

“...All water quality data were downloaded from the water quality database developed and managed for UKHM by Access Consulting. At the time the data were downloaded, sample results were available for the period up to June 2007. Water quality data for 20 stations were analyzed in detail....”

This was a report prepared for ERDC. More recent data at sites more relevant to the mill site would be more relevant. What about water quality data for McLeod Creek, Hinton Creek, Christal Lake, and other sites as identified in Access Consultants schematic in Volume IV, section 1.5 “Revised Figure 3-4: Christal Creek Mass Loading Node Inputs and Metal Concentration Schematic”. What about a discussion of the Lightning Creek water Access Consultants identify, at the south end of their schematic, zinc 0.114 mg/L. A discussion of the Onek water at 61.0 mg/L which Access Consultants have entering Christal Lake from the east would be essential. This is simply not possible. Onek has a very small amount of water, a very long way from Christal Lake.

Access Consultants refer to the 1996 Closure Report they wrote for UKHM (UKH/96/02). From page 27:

“Dye studies by Environmental Protection (personal communication 1996) show that Onek surface water flows to Christal Lake via the spring north of the old Mackeno mill site.”

I asked Environment Canada to repeat the test for me as I did not believe this. They refused.

In the joint intervention by Dept. of Fisheries and Environment Canada on Alexco's Bellekeno Advanced Underground Exploration and Development, Yukon Water License Application QZ07-078, dated 25 July 2008:

Recommendation: The proponent should provide, within 120 days of the license issuance, a detailed Onek Pit hydrology and hydrogeology report to demonstratively show that the addition of ARD/ML generating waste rock to the pit will not incrementally degrade: water quality, flow, or metal loadings of the Onek drainage; and, potential receiving waters.

Rationale: Data from Onek adit discharges show historical elevated concentrations of cadmium, arsenic, zinc and selenium, with the discharges flowing through the town of Keno and in the vicinity of occupied houses. While the proponent has stated that it is unknown where the eventual discharge of the Onek drainage is, by inference based on the local hydrology and hydro-geology, one can assume that the loadings from the discharge to eventually report to Christal Creek. No studies have been presented or fully completed to refute or confirm this supposition.....”

As can be seen from this submission, the dye test by Environment Canada, held up by Access Consulting since the 1996 reports they wrote for UKHM, no studies to date have been presented to prove this. If there is water that is entering Christal Lake at 61.0 mg/L, this should be examined by independent experts. I certainly don't believe this is Onek water.

Alexco's response to the joint intervention of Dept. of Fisheries and Environment Canada was, from their letter to the Yukon Water Board 8 August 2008:

“Alexco believes that the measures taken to prevent any drainage from exiting the waste rock storage cell (impermeable liner, drainage collection/sampling/education culvert, etc.) make it unnecessary to undertake theoretical studies of the hydro-geology of this abandoned mine.”

In INAC's Screening Report under the Canadian Environmental Assessment Act, 26 March 1997, page 31:

8.6 Potential Impact on Keno Well Water: The flow path of discharge from the Onek adit is unclear. Local aquifers provide drinking water for Keno residents. There may be potential drinking water issues if the deeper ground water becomes contaminated. The plan for monitoring a potential connection between Onek and the Keno well will be to take advantage of the well known tendency for metals to be attenuated in ground water flow paths compared to sulphate. Onek discharges are high in SO₄ (500 mg/L); thus if a

plume of Onok water were to be impacting the water well, SO₄ would be detected. If an increase of SO₄ (to three times background) is detected, then one to three monitoring wells will be placed between the adit and the potable well to define the situation. Potential mitigation would be to pump from the aquifer to reverse the gradient or to relocate the Keno potable water well.

In Volume III – 1.3.14 Appendix N – Sludge Management Plan, prepared by ERDC, there is no mention of the sludge management plan Access Consultants have come up with, mixing the sludge with the tailings and putting them in the DSTF.

I think placing the mill at the Flame & Moth site is ill-conceived. None of the baseline environmental studies recommended by YESAB, which were supposed to be done before the mill was built, were done. Access Consultants state there is a beaver in Christal Lake that affects lake levels. There is no beaver in Christal Lake.

I wish to participate in the Public Hearing for this license. In spite of having been threatened after a public meeting in Mayo on 21 July 2004 by the then

I was a water sampler and analyzed the samples (with a totally accurate atomic absorption machine) for UKHM from 13 June 1997 to 15 May 2001. I worked through the three periods of time there was non-treatment of the mines. I sampled Christal Creek at Silver Trail Highway every day and knew the zinc did not go to Christal Creek. I was told by a very honest INAC employee that there was no environmental benefit to treating the water, as the water from the mines did not go to a creek or the South McQuesten River. That they found out the 1st time there was non-treatment of the water, in the period 18 December 1998 to 27 January 1999.

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I was “laid off” on 15 May 2001. INAC should have to produce the results from the three periods of time UKHM had non treatment of the water:

18 December 1998 to 27 January 1999

8 January to 20 March 2000

9 January to 29 January 2001

They should in particular have to produce the results of the 9 January to 29 January 2001 period. INAC seized the mine 20 January. And from Access Consultants, I would like to know the current zinc levels in Christal Lake, McLeod Creek beside the mill, Hinton Creek upstream of McLeod Creek, McLeod Creek downstream of Hinton Creek, which flows into Christal Lake, Christal Creek as it flows out of Christal Lake, Christal Creek at Silver Trail Highway and all other sites around the area that were sampled in 1994 and 1995 by professional water samplers Laberge Environmental Services. How can a closure plan for the mill be prepared when there is no baseline data and Alexco is not required to get any?

Yvonne Bessette

Yvonne Bessette