

# CENTER for SCIENCE in PUBLIC PARTICIPATION

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*"Technical Support for Grassroots Public Interest Groups"*

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Herb Klassen  
Major Projects Review Unit  
Canadian Department of Fisheries and Oceans  
300-555 West Hastings Street  
Vancouver, B.C. V6B 5G3

July 15, 2004

Dear Mr. Klassen:

Subject: Outstanding Issues Regarding the Tulsequah Chief Mine Project

Thank you for the opportunity to review the response from Redfern Resources Limited to DFO's letter of June 18, 2002. I am assisted in this response by David Chambers, Executive Director of the Center for Science in Public Participation. We will focus our comments on fishery and water quality issues, the adequacy of the project assessment process, and financial assurances needed to protect the public interest from the risks and liabilities associated with using public funds to clean up long and short-term pollution from mine sites.

I have been involved with the review of the Tulsequah Chief Mine since the late 1980's, first as a representative of the Department of Environmental Conservation for the State of Alaska, then as a representative of the Douglas Indian Association on the Project Review Committee convened by the Environmental Assessment Office. I continue to work as technical consultant to the Transboundary Watershed Alliance and Southeast Alaska Conservation Council.

My goal throughout the last 15 or so years of this review is to ensure that the resources of the Taku Watershed are protected for future generations. Despite years of evaluation, there are still many strategic issues that remain unresolved. These are "show stoppers", and must be addressed fully within the Federal CEAA review before proceeding with permits for this project.

The current review process was extremely difficult for several reasons. Critical documents were not available causing the public to spend much of the extremely short review time tracking them down. This is an extremely inefficient way to conduct a project review and annoying, to say the least. The review was further complicated by the inadequacy of the public record, lack of document availability, and DFO's inexplicable restriction of the review breadth. In summary, in my 20+ years of reviewing environmental assessments for resource development projects, overall this project ranks as the most convoluted and poorly run of them all.

Sincerely,

Amy Crook  
Alaska/BC program coordinator

Cc: Transboundary Watershed Alliance  
SEACC

**Summary of outstanding strategic issues:**

- ❖ Metal concentrations already exceed water quality standards due to continual pollution from existing mines. MLWAP has further documented metal exceedences in the Taku River. Quantification of existing impacts to aquatic resources must be completed before any additional effluent discharges are considered.
- ❖ The un-quantified risks of pollution (chronic and acute) are an economic threat to a multi-million dollar fishery resource. Despite BC's recent rush to approve the project, no guarantees have been made that the water quality and fisheries resources in the Taku will be protected. Degradation of this resource will have direct, harmful effects on the TRTFN and the economy of Southeast Alaska.
- ❖ The ongoing concern that the Tulsequah Chief project could violate the Boundary Waters Treaty and the Pacific Salmon Treaty. For years Alaskan politicians, agencies, fishermen, landowners and conservation groups have requested that the project be referred to the International Joint Commission (IJC) to settle the Boundary Waters Treaty issue. Full consultation of the Pacific Salmon Commission is needed to advise US and Canadian governments whether the Tulsequah Chief project violates the Pacific Salmon Treaty.
- ❖ The lack of assurance that pollution from leaking tailing storage facilities, effluent discharges and non-point sources will be adequately controlled through out the mine life and in perpetuity (hundreds, if not thousands of years into the future),
- ❖ The lack of proof that Redfern Resources Limited has the financial capability to post an adequate bond to cover the extensive short and long-term costs associated with monitoring environmental impacts, maintaining the tailings impoundment and wastewater treatment plants- possibly in perpetuity, and closing, reclaiming and restoring the mine site.
- ❖ A full and adequate assessment of cumulative impacts to the Taku Watershed from the long-term operation of an access road. The Provincial government has clearly stated their intent to keep the road open and to use it to attract additional development in the area from new mining, power, and tourism projects. Opening up access into this roadless wilderness will change it forever. The State of Alaska recognized this, and started a watershed planning process in 2001 as a way to fully understand the cumulative impacts from future development in the area and take proactive planning steps towards minimizing harm to threatened wildlife and fishery resources. This planning effort must be completed as part of the CEAA process, before any permits are issued or construction starts on any project within the Taku watershed.
- ❖ The inadequate project review process. The B.C. Ministers of Sustainable Resource Management and Energy and Mines used very little of the new information generated from the reconvened EAO project review committee in their December 2002 decision to re-certify the mine, despite almost two years worth of work and thousands of hours of time from US and Canadian agencies, First Nations and public. Their decisions were largely based on inadequate analysis completed before 1999 by the original project review committee.
- ❖ An inadequately designed tailings storage impoundment including: stability of location, alternatives, design adequacy, long-term viability, transfer of toxins downstream, perpetual maintenance, contingency plan for collection/pumping/treatment of seepage.
- ❖ A Wastewater treatment system with questionable efficacy: design adequacy, location of discharge, toxic impacts to fish and wildlife, unpermissibility of mixing zone needed for dilution, lack of info on discharge characteristics and toxicity.

- ❖ Inadequate closure and remediation of mine: inadequate plan, inadequate bond to cover all costs of mine closure, need for perpetual treatment of acid mine drainage and metals leaching, lack of long-term environmental affects monitoring program.
- ❖ The access road, causeways and airstrip will open the area to further resource extraction and development without adequate planning, design, quantification of impacts to water quality, fishery, wildlife and cultural resources, reclamation and closure plan, access limitation plan, long-term maintenance, impacts to migration corridors, spill response plan, and safety and traffic plans along haul road.
- ❖ The cumulative effects assessment for fish and wildlife is non-existent. Allowing isolated incremental development without a full assessment of impacts, economic and cultural sustainability, ecological risk assessment, watershed effects of the road, encouragement of additional development in watershed, and no mitigation proposed for habitat destruction and wildlife impacts constitutes the default of DFO, EC and Provincial statutory responsibilities.
- ❖ Due to the huge number of outstanding strategic issues, no development on any aspect of the project (road or airstrip construction, power infrastructure) should be allowed until a full and complete CEAA assessment (including cumulative impacts, a full risk assessment, and watershed planning) with full opportunity for all interested parties to participate in an adequate public review process is completed.

My specific comments on several of the questions that DFO posed to Redfern Resources Limited are below.

### **Fisheries and Water Quality Issues Related to the Mine and Minesite Seepage from tailings facilities**

#### **1. Unclear whether Redfern plans to install a second poly liner to the tailings facility or under what circumstances**

*Redfern response in italics.*

*“During construction, a reinforced polyethylene (RPE 15) liner will be placed over the face of the embankment and over the entire foundation base to limit seepage.”*

It is not clear whether a liner will be installed under the entire tailings facility. I believe Redfern is proposing a single-liner, as opposed to a double liner with leak detection, or a liner only on the upstream face of the tailings dam/impoundment. These comments are based on the assumption that a single liner will underlie the entire tailings storage facility.

*“For the operation phase, the tailings, being extremely fine ground material, are anticipated to consolidate to low permeability to minimize seepage.”*

and;

*“By way of comparison, the Rose Creek Tailings Impoundment at the Anvil Range Mine in Faro, Yukon ... have been deposited since 1969 in a series of unlined impoundments, directly overlying a large sand and gravel glaciofluvial aquifer. The ... monitoring down-gradient of this impoundment has yet to detect zinc concentrations in excess of CCME aquatic life guidelines, much less the license Standards.”*

Low permeability tailings do not guarantee no or low seepage. There are many examples of tailings impoundments with low-permeability tailings that have significant leakage. Using the example of one nearby mine to support the argument that the Tulsequah Chief impoundment will not have significant leakage is not valid.

Ultimately, the need for a liner should be based on the value of the aquifer or ecosystem to be protected. If seepage from the tailings impoundment (and any mine drainage or seepage from waste rock) can reach an ecologically important area, then additional preventative precautions are warranted. Correction and/or mitigation are never as successful as preventing the damage in the first place.

*“Evolution of contamination from tailings takes a long time, so the use of single versus double liner is immaterial. At the same time, natural attenuation capacity of the receiving environment should be recognized in light of the potential contaminant loading rates, ...”*

First, double liners have significantly increased greater protective value than a single liner. A double liner not only gives double containment protection, but also allows the detection and quantification of leaks through the top liner when a leak-detection system is incorporated between the two liners. Leak detection systems are standard when a double liner is installed, and the leak detection allows the operator to know where and how much is leaking through the top liner. Without the leak detection, a leak can go undetected for a long time, and can be very difficult to locate. It should, or course, be a goal to keep this escaping contamination to a minimum.

Second, the reference to “...*natural attenuation capacity of the receiving environment...*” is just an indirect way of saying dilution with natural ground and surface waters will ultimately render the level of any contaminants that escape the tailings inconsequential. This attitude from Redfern is extremely disturbing, especially given that metals levels in the Taku River are already exceeding water quality standards. This problem has been more fully documented in the recent work by Ian Sharpe and colleagues (Lough and Sharpe, 2003. Tulsequah and Taku Rivers Mass Balance Water Quality Report).

For several years now ADF&G has questioned whether ground water flow levels are actually adequate to provide the level of dilution Redfern Resources is depending on. This is a strategic issue. We more fully address the inadequacy of Redfern Resources’ response to toxicity issues below.

*“Installation of any additional liner or any high density polyethylene liner is not proposed as this option is considered to be: ...*

*a) Unnecessary for the above reasons and*

*b) will create bowl-like containment of all tailings slurry with no possibility of draining the waters from the tailings at closure and hence making the tailings site reclamation and revegetation exceedingly difficult.”*

This wording seems to imply that effluent from the low-permeability tailings will indeed drain to the underneath aquifer, contrary to what is implied in Redfern’s comments about the effectiveness of a liner and the low-permeability of the tailings themselves. Water buildup in the tailings can easily be engineered to protect capping vegetation by placing drains at an appropriate level in the final impoundment, and then collecting the effluent for treatment, if required, or for dispersal. The argument that the absence of a liner would prevent unacceptable buildup of water in the tailings is an argument that the impoundment will leak at a significant rate. This is further cause for worry that downstream ground and surface water will be negatively impacted, resulting in harm to aquatic and wildlife resources.

Again, the need for a liner should be based on the value of the resource that is at risk from the mine waste.

**4. Unclear what flow return periods would be used for design of proposed tailings dam (hydrologic monitoring and modeling of Shazah Creek flows inadequate for tailings storage dam design owing to washed-out hydrograph).**

*“For a flood event up to a PMF (Probable Maximum Flood) that is more severe than the design 200-year event, some damage may be expected to the facilities as presently designed. However, such damage may not result in a breaching or failure of the impoundment and consequent release of tailings material to the environment.*

*During the final design process for the project, consideration will be given to providing additional protective measures which would be designed to further decrease the probability of damage to, or failure of, the impoundment to low or negligible levels.*

It appears from this statement that the tailings facility has not been designed for long-term closure. It is usually more difficult and expensive to retrofit closure design to mine facilities after initial construction. Final design considerations should be engineered now, and then re-evaluated later. Closure considerations should not be left until after the project has been approved for design consideration. If a safe design cannot be engineered at a reasonable cost, this needs to be known before the project is approved.

Finally, the Probable Maximum Flood, not the 200-year event, should be used for flood design purposes. This facility will have to bear the brunt of natural forces for millennia, not for just 200 years.

#### **Questions 5 and 6. Mine effluent discharge and adequacy of treatment facility design.**

The First Nations, US and Canadian agencies, and the public have been requesting a full analysis of the toxicity of the effluent, both chronic and acute. To date this work, if it is completed, has not been released for review. The above listed review participants have clearly and repeatedly stated their concerns that metals levels in many areas of the Taku watershed, but primarily below the Tulsequah Chief mine, already exceed mine effluent regulations. During the EAO project review committee meetings, MELP stated that it would agree with the EPA's view on a lack of assimilative capacity in the Taku river if there was a demonstrated link between the current metal levels and discharges from the former mines. Now their own research has proven this fact in the recent work of the Ministry of Water, Air and Land Protection (Lough and Sharpe, 2003. Tulsequah and Taku Rivers Mass Balance Water Quality Report). We now have clear documentation that there is no assimilative capacity in the Taku River below the Tulsequah Chief mine to absorb more metal discharges.

Canadian Federal and Provincial agencies have repeatedly said they would implement site specific water quality standards as protective as Alaskan regulations. Under US regulations, a mixing zone for this mine is not permissible for metals that already exceed water quality standards. To adequately protect aquatic life and fishery resources, this mine would need to operate with a zero discharge wastewater treatment system for significant portions of the year.

There is no indication that Redfern Resources is capable or willing to design, operate, maintain and pay for this sophisticated of a treatment facility. This is a strategic “go, no go” issue that must be addressed now, not at permitting. We need to have the assurance from Redfern Resources that they are willing and capable of designing and operating a treatment facility that consistently operates at this level of efficacy.

Besides needing to remove metals from the effluent, the wastewater treatment process must not result in elevated total dissolved solids (TDS) levels, a common by-product of metal stripping. Recent research conducted in Alaska has shown TDS to be acutely lethal to salmon eggs during their most vulnerable stage, the few hours between being laid and egg hardening. It is unconscionable to trade one form of toxicity for another; metals for TDS through the wastewater treatment process.

Toxicity tests are generally not designed to test for toxicity this early in egg development, starting only after the eggs harden. Thus, for many years, TDS toxicity has been missed because of inadequate testing protocols. All chronic toxicity tests conducted in support of this project must include expose of eggs to toxins before they harden up.

**Questions 7 and 8. Inadequate details of post closure plans and unclear what criteria for financial instruments could be used to ensure satisfactory bond levels.**

**post-closure actions are undertaken regarding the following**

- **collection and treatment of mine drainage;**
- **water management/drainage/erosion control;**
- **ongoing Aquatic Effects Monitoring;**
- **contingency collection/pumping of seepage;**
- **contingency treatment of seepage;**
- **long-term riprap supplies for maintaining tailings dike;**
- **transport of personnel and supplies to maintain tailings dike;**
- **maintenance of equipment to maintain tailings dikes;**
- **equipment storage;**
- **equipment replacement;**
- **equipment and materials (fill and soils) to create proposed domed top for tailings;**
- **tailings area reclamation - seeding/planting of domed top;**
- **monitoring revegetation;**
- **maintenance of revegetation;**
- **decommissioning roads, causeways, airstrip, effluent discharge system**

“All of the above issues will be covered under a detailed reclamation plan to be submitted as part of the Mines Act Reclamation Permit application under the BC Ministry of Energy and Mines.”

How these reclamation and closure issues can/will be addressed, and as importantly – how much they will cost (for financial assurance purposes) – is an important part of the review process for determining whether (1) the engineering solutions are feasible, and (2) these solutions are affordable. Preliminary calculations need to be done upfront to ensure the project proponent is financially capable of posting an adequate bond. This determination should be used as “thumbs up or down” determination before the agencies, public and the proponent spend lots of time and money on a permit process.

If this information is not disclosed before project approval, then the public is placed at financial and environmental risk.