

Kemess North Copper-Gold Mine Project



Joint Review Panel Report Summary

September 17, 2007

EXECUTIVE SUMMARY

Main Panel Finding

The Kemess North Mine Joint Review Panel (the "Panel") has concluded that development of the Kemess North Copper/Gold Project (the "Project") in its present form would not be in the public interest. In the Panel's view, the economic and social benefits provided by the Project, on balance, are outweighed by the risks of significant adverse environmental, social and cultural effects, some of which may not emerge until many years after mining operations cease. The Panel recommends to the federal and provincial Ministers of the Environment that the Project not be approved as proposed.

The Panel's main finding is based on a comprehensive synthesis and analysis of the information provided to the Panel regarding adverse and beneficial Project effects. These effects were used as the basis for the assessment of the pros and cons of Project development from a range of perspectives. One of the most important components of a panel review is to integrate public values, as well as government policy expectations, into the review process. In order to weigh the Project development pros and cons in the context of public values and policy expectations, the Panel chose to adopt what it considered to be an appropriate sustainability assessment framework. In developing this framework, the Panel consulted recent mining sector sustainability initiatives, as well as the B.C. government's 2005 Mining Plan. The framework was used to determine whether or not the Project is in the public interest.

The Panel has considered the Project from five sustainability perspectives: Environmental Stewardship; Economic Benefits and Costs; Social and Cultural Benefits and Costs; Fairness in the Distribution of Benefits and Costs; and Present versus Future Generations. The Panel notes that the Project's benefits accrue for only a relatively short period (two years of construction and 11 years of mining production). This period could be reduced if the Project, which is not economically robust, were to close prematurely. Key adverse effects include the loss of a natural lake with important spiritual values for Aboriginal people, and the creation of a long-term legacy of environmental management obligations at the minesite to protect downstream water quality and public safety. These obligations may continue for several thousand years, and include ongoing treatment of poor quality water from the open pit (the "North Pit"), and regular monitoring and maintenance of the waste disposal impoundment (the "Duncan Impoundment") and its three dams, to preserve the desired water balance and water chemistry in the Impoundment and to ensure the health of its aquatic ecosystem. The Panel also notes that it may be difficult for Aboriginal people to increase their share of Project benefits, although as the region's primary residents and users, they would experience first-hand any impacts on traditionally-used resources.

The Panel has prepared a comprehensive report that attempts to summarize and examine all of the information considered in the review process. The detail and scope of the report reflects the complexity of the Project and the challenges posed in weighing its pros and cons. The Panel's intent in preparing a detailed report is to allow interested parties the opportunity to consider all of the information that the Panel has taken into account in reaching its conclusions and recommendations.

Acknowledging that Ministers could disagree with the Panel's advice and approve the Project, the Panel has included thirty-two recommendations in this report which, in its view, would help to enhance Project benefits and facilitate efforts to manage and minimize adverse effects, should the Project proceed.

Project and Setting

The Proponent proposes to develop the Kemess North copper and gold deposit, which is located 6 km north of its existing Kemess South Mine, approximately 250 km northeast of Smithers, B.C., and 450 km northwest of Prince George, B.C. The Project represents an expansion of the existing Kemess South mine, and includes development of a new open pit, modification of the existing mill, and related infrastructure. Much of the infrastructure already in place for the Kemess South mine, including a 400 km access road, 383 km power line, mill, camp and airstrip, would be used for the expansion. The Project has the potential to increase the productive life of the existing infrastructure by 11 years. The development of the Kemess North mine would mean a continuation of the economic and social benefits provided by the Kemess South mine, including the 475 current jobs.

Ore milling capacity would be increased from the current 55,000 tonnes per day to up to 120,000 tonnes per day. Over the life of the Project, the Proponent estimates that 397 million tonnes of tailings and 325 million tonnes of waste rock would be generated. Due to the high sulphide content, much of this material would be prone to metal leaching (ML) and acid rock drainage (ARD) processes if not properly managed. To prevent ML/ARD, Northgate proposes to place most of the waste rock and tailings underwater in a natural water body – Duncan (Amazay) Lake. The Duncan Impoundment would be created by constructing three dams to expand the Lake's storage capacity, and would be managed to ensure a pH that is at least neutral, to minimize dissolved contaminants.

Within a few years after mine closure, various site reclamation activities would be completed, including decommissioning of facilities no longer required, recontouring and revegetation of terrestrial disturbances, dam spillway construction and replacement of lost wetland habitat in the Impoundment. Within five years after mine closure, the water quality of the Impoundment is expected to have stabilized and to be suitable for direct discharge to Duncan Creek. Once this commences, hydrological regimes are expected to revert to approximately their pre-mining condition. Late in the review, the Proponent committed to re-introduce functioning aquatic systems to the Impoundment once water chemistry is stable and acceptable. Some 40 to 80 years after closure, the contaminated waters of the North Pit lake would overflow. The overflow would require water treatment before being discharged to the Impoundment, to ensure that it does not adversely affect the Impoundment's water chemistry. The treatment process would generate sludge which would be stored in a landfill.

The Project has a well-defined construction phase (~2 years), operational phase (~11 years) and closure phase (up to 5 years). After closure, the minesite would need to be actively managed throughout an indefinitely long post-closure phase (likely lasting thousand of years) to ensure that the environment and public safety are protected. For convenience, the Panel has divided the post-closure period into two phases: (1) "early post-closure", the period of 40 to 80 years following closure prior to North Pit lake treatment; and (2) "longer-term post-closure", the period following commencement of North Pit water treatment and sludge disposal.

Throughout post-closure, site management activities would include dam inspection and maintenance, and monitoring of Impoundment water balance and water quality to ensure that any necessary measures are taken to maintain an adequate water cover over potentially reactive wastes and preserve acceptable water chemistry. Aquatic ecosystems established in the Impoundment after closure would also need to be monitored to ensure that they remain healthy if the water balance and water chemistry fluctuate over time. During the longer-term post closure period, both the water treatment plant and sludge landfill facility would require operation and maintenance until North Pit lake water quality was suitable for untreated discharge into the Impoundment. This would be expected to take at least several hundred years.

The proposed North Pit is located 2 km east of Duncan Lake (referred to as Amazay Lake by local Aboriginal people) in the Attycelley Creek watershed, which drains into the Finlay River immediately downstream of Thutade Lake. The closest communities by road are Germansen Landing and Manson Creek (respectively 230 km and 250 km from the mine). The closest communities by air are Kwadacha (approximately 70 km) and Tsay Keh Dene (approximately 120 km). Four Aboriginal traditional territories include or lie adjacent to the project location - the Kwadacha, Tsay Keh Dene, Takla Lake and Gitxsan House of Nii Kyap traditional territories. The first three groups have collectively identified themselves to the Panel as the Tse Keh Nay.

The Review Process

The Project is subject to the requirements of the British Columbia Environmental Assessment Act and the Canadian Environmental Assessment Act. The Panel was established in May 2005 to conduct an assessment of the potential environmental, economic, social, health and heritage effects of the Project, including such effects on Aboriginal people. The Proponent filed an Environmental Impact Assessment (EIA) in October 2005, as well as several subsequent submissions which were intended to respond to concerns raised by review participants. Opportunities for participation by interested parties, including three comment periods, were provided during the panel review process. Public hearings were held initially in October, November and December 2006 in Prince George, Smithers and Kwadacha. The hearings provided interested parties the opportunity to better understand the Project and its consequences and to present their views and concerns to the Panel. Public hearings were reconvened in Smithers in May 2007 to obtain additional information from Aboriginal people, particularly information on traditional land use and socio-economic conditions, and to give an opportunity for other parties to provide final submissions to the Panel.

Assessment of Alternatives

The Proponent conducted extensive geochemical testing to determine the potential for ML/ARD processes associated with the Project's waste rock and tailings. The Proponent's geochemical assessments, which characterized most of these materials as having significant ML/ARD potential, were supported by most technical specialists. The Panel concludes that the risk of significant adverse effects on water quality and fisheries linked to ML/ARD is a central and fundamental issue for this review. As a result, alternatives assessments have focussed primarily on the identification of waste rock and tailings disposal options which would be suitable for preventing ML/ARD. The Panel agrees with the waste disposal approach proposed by the Proponent, which is to store these materials underwater, thereby suppressing ML/ARD processes. Again, this approach was supported by most technical experts. In the Panel's view, other technology-based disposal alternatives pose greater environmental management risks.

The Proponent initially considered several sites for underwater waste disposal, and presented two options in its EIA. Option 1 (the Proponent's preferred option) centred on the use of Duncan (Amazay) Lake and the Kemess South Pit for underwater disposal of waste materials. Option 2 would have entailed flooded disposal of wastes in multiple on-land impoundments. The Panel concludes that Option 2 would pose a greater risk of adverse environmental effects than Option 1, even recognizing that Option 1 entails the loss of Duncan (Amazay) Lake. In addition, based in part on advice from independent economic consultants, the Panel agrees with the Proponent's own conclusion that Option 2 would not be economically feasible. The Panel, therefore, concludes that Option 1 is the only waste disposal alternative which is environmentally effective, and technically and economically feasible.

The Panel recognizes the consistently strong Aboriginal opposition, not necessarily to the Project, but to the use of Duncan (Amazay) Lake for mined waste disposal, and appreciates the need to consider Aboriginal traditional use, social and cultural/heritage values, including the spiritual values that Aboriginal groups attribute to an intact Duncan (Amazay) Lake. Conversion of Duncan (Amazay) Lake into a waste disposal facility would entail substantial environmental, social and cultural implications which the Panel addresses later.

Environmental Effects

Water Management and Water Quality

Long-term legacy — The Panel considers the water management and water quality protection challenges posed by the Project to be among the most important issues to emerge during the course of the review. For this Project, environmental protection entails a very long-term post-closure legacy of site management (monitoring, operations and maintenance), to ensure that, far into the future, downstream water quality would still be protected. In the Panel's view, no party is in a position to provide reliable assurance that the necessary oversight regime would still be in place that far into the future to guarantee implementation of all necessary measures to protect the environment. If site management efforts weakened or lapsed, downstream hydrological regimes, water quality and aquatic systems could experience adverse effects. The magnitude of any such effects is uncertain, but they could potentially be significant.

Water management — The Project's water management plan, which is integral to water quality protection, has the potential to affect surface water and groundwater flows, both on and off the minesite, particularly given the planned use of Duncan (Amazay) Lake for mined waste disposal. Issues included the adequacy of baseline climatic and hydrological data inputs used in modeling the Project's water balance, and also the potential downstream effects of water use and diversion at each stage of Project development. Some uncertainties are very difficult to address, such as the nature of local and global climatic trends thousands of years from now, and their effects on the ability to maintain an adequate water cover over reactive wastes in the Impoundment. If the Project proceeds, the Panel is recommending additional baseline hydrological data collection and detailed planning of the means for managing the Impoundment's water balance over the long term.

The Panel concludes that, if the Project is approved, the Proponent's water management plans for each phase of the Project would be generally acceptable, providing that the Proponent's various water management commitments and proposed mitigation measures (including ongoing site management requirements) continue to be implemented throughout the longer term post-closure phase. The Panel believes that the Project would not have significant adverse effects on hydrological regimes (flows, temperature and icing issues) in the Project area, although a failure of the long-term water management regime could adversely affect water quality.

A failure of water balance management to preserve adequate water cover over potentially reactive wastes could lead to re-exposure of these wastes. The requirement to maintain a permanent water cover over reactive wastes means managing the Impoundment water balance throughout post-closure. This represents one important component of the Project's overall longer-term post-closure site management legacy. The Panel recommends that, if the Project is approved, the general scheme for maintaining this water balance be defined in greater detail at the permitting stage, through discussions with agencies. These discussions should involve potentially affected Aboriginal groups, if they are willing to participate.

Water quality— The Project's water quality issues largely revolve around the potential downstream effects of the proposed conversion of Duncan (Amazay) Lake into a mined waste disposal impoundment. The Panel's primary water quality concern is that the delicately balanced Impoundment water chemistry must be maintained throughout post-closure. Water chemistry is susceptible to changes in potential contaminant sources, as well as in local hydrological patterns.

A failure of the proposed water treatment plant to ensure effective ongoing treatment of the North Pit discharge could degrade Impoundment water quality by contributing acidic waters containing dissolved metals and other contaminants. The Panel considers the required water treatment and sludge disposal systems to be another important component of the Project's overall longer-term post-closure site management legacy. The Panel is aware that long-term water treatment is one of the province's least preferred strategies for managing ML/ARD risks, and from a government policy perspective, is characterized as a last resort.

The Panel concludes that the Proponent's general approach to modeling Duncan Impoundment water quality is sound, having been substantially improved during the panel process through iterations between the Proponent, its consultants and government agency experts. The Panel generally supports the proposed water quality mitigation and contingency measures (including the Proponent's commitments). The Panel believes that, if the Project proceeds, these measures would be effective in ensuring that all applicable receiving water quality standards, guidelines and objectives can be met at all stages, providing that the ongoing site management regime remains effective throughout the post-closure period. If that proviso were satisfied, the Panel believes that the Project would not have a significant adverse effect on downstream water quality in the Project area. Again, the Panel questions whether this proviso can be reliably assured

In the interests of protecting downstream water quality, the Panel supports the Proponent's contingency commitment to pump Impoundment water to the North Pit for a period of up to five years following closure while water quality stabilizes, and becomes suitable for discharge to the receiving environment. The Panel concludes that dam seepage quality could remain poor after closure. The Panel recommends that the Proponent's contingency proposal to collect and pump poor-quality seepage back into the Impoundment or the North Pit for the longer-term post-closure be made a firm condition of any approval.

In the event that Impoundment water quality is poor after closure, and fails to respond to various other available contingency measures, the Proponent, late in the review process, suggested the installation of a water treatment plant to treat the entire Impoundment discharge to Duncan Creek. While the Panel believes, based on water quality modeling, that such a plant is not likely to be required, any need to treat the Impoundment discharge would create the same type of long-term legacy as the North Pit water treatment plant, but on a larger scale.

Fish and Fish Habitat

The proposed conversion of Duncan (Amazay) Lake to a tailings and waste rock disposal area would result in the alteration of fish habitat in various water bodies, including Duncan Creek and lower Attycelley Creek. Potentially significant adverse effects include the loss of fish habitat in Duncan (Amazay) Lake for an indeterminate period, the alteration of downstream habitat caused by Lake dewatering during the construction phase, and flow reductions in Attycelley and Duncan Creeks during mine operations. The Proponent has proposed an array of fish and fish habitat mitigation and compensation measures to address these effects, including replacing and enhancing fish habitat elsewhere, and transplanting fish from the Lake to preserve genetic stocks. Towards the end of the review

process, the Proponent committed to returning the Impoundment to a fully functioning ecosystem after water quality has stabilized.

The Panel agrees that it is possible to compensate for the loss of productive fish habitat, and the Panel acknowledges that the conceptual plans set forth by Northgate to accomplish this task appear to be acceptable to the Department of Fisheries and Oceans (DFO). Taking into account government policy, the Panel concludes that the Proponent's fish and fish habitat mitigation and compensation proposals are generally acceptable. Providing that the Proponent's various impact management commitments and proposed mitigation measures (including ongoing site management requirements) continue to be effectively implemented throughout all Project phases, the Panel concludes that the Project is not likely to result in significant adverse effects on fish and fish habitat. However, if site management efforts weakened or lapsed over time, fish and fish habitat could experience adverse environmental effects, and these could possibly be significant. The Panel notes that Northgate has committed to all measures that were recommended by both DFO and the B.C. Ministry of Environment (MOE), and recommends, should the Project proceed, that these commitments be incorporated as conditions into any permits that may be issued by DFO or MOE.

Taking into account the high cost of the proposed compensation measures and fish transplants, and the risk that some measures may not meet with complete success, the Panel offers the opinion that the net public benefit of implementing fish compensation as proposed, while satisfying DFO policy, may not be optimal. If the Project is approved, the Panel recommends that DFO consider whether it might not serve the larger public interest better to accept financial compensation in place of any compensation measures for which the likelihood of success is uncertain. Such financial compensation would provide more flexibility for DFO to invest in fishery protection and enhancement measures that would maximize the compensation benefits realized, for example, by Aboriginal groups who are most affected by the Project. The Panel recommends that Aboriginal groups be consulted on the final design of the fisheries compensation and fish transplant programs.

Terrestrial Resources

Wetlands — The Project, if it proceeds, would result in the loss of 15.5 ha of wetlands in Duncan (Amazay) Lake which Northgate has committed to replace during closure. The Panel recommends that wetland replacement planning for the Impoundment be based on re-introducing the same types of wetlands that would be lost. Taking into account the Proponent's commitment to compensate for the loss of wetlands and the limited extent of this effect, the Panel is of the view that the Project's adverse effects on wetlands would not be significant, but with the important proviso that post-closure site management is effective in preserving the Impoundment's water quality. The Panel also recommends that the Proponent monitor downstream hydrological conditions and how any detected changes may affect downstream wetland habitats. If effects are noted, they should be mitigated to the satisfaction of MOE and Environment Canada.

Wildlife — The EIA focused primarily on the effects of the Project on Woodland caribou, Mountain goats, moose and Grizzly bears. During the hearings, Aboriginal people also voiced concerns about possible effects on Hoary marmots (groundhogs).

The Panel found that the Proponent's wildlife assessments generally provided only limited population data. The Panel and technical specialists representing other review participants were challenged to make informed judgments about population effects. Relying in particular on the professional judgment of MOE staff, the Panel concludes that, if the Project is approved, effects on regional wildlife populations are not expected, although locally, some animals would be affected by direct habitat loss and other disturbances. The Panel endorses the MOE recommendation that, if the Project is approved, the Proponent

should complete thorough population surveys of specified wildlife species (including Woodland caribou and Mountain goats) during the permitting stage, and prior to construction disturbance. Northgate has committed to such surveys.

The Proponent was unable to provide information on the effects of trace metals in the environment on wildlife species, since information on local and regional trace metal concentrations in plant and animal tissues is lacking. As a result, risks due to trace metals have not been assessed. If the Project proceeds, the Panel recommends that, at the permitting stage, the Proponent collect additional baseline trace metal information in the vicinity of the minesite, and that government agencies and the Proponent develop a collaborative approach to a program of regional trace metal assessments, involving Aboriginal groups if they are willing to participate.

The Panel heard that Hoary marmots are an important species for Aboriginal people. The Panel believes that some marmot habitat is likely to be lost due to mine development in alpine and subalpine environments, but that this effect is unlikely to represent a threat to the regional marmot population. The Panel recommends that, if the Project is approved, reclamation research be initiated, with the involvement of Aboriginal people, to develop methods for restoring habitat values for marmots in areas of higher-elevation mine disturbance.

Listed species — Assessments of Project effects on listed species, other than Grizzly bear and Woodland caribou, focused on one blue-listed plant species, Alpine draba, and also on the potential effects of the proposed fish transplants in Mulvaney Lake on Long-tailed ducks, a species formerly blue-listed by the province.

The Panel endorses the Proponent's proposal to conduct a study of the status of draba and a local seed collection program. The Panel also recommends that the Proponent work in close cooperation with MOE and the Ministry of Energy, Mines and Petroleum Resources (MEMPR) to develop a mutually agreeable mitigation strategy for draba that would adequately compensate for the loss of approximately 100 Alpine draba plants. Taking into account the results of the assessment and the mitigation measures proposed by Northgate and government agencies, the Panel concludes that the Project is unlikely to result in significant adverse effects on rare plants.

The Panel concludes that the sighting of a pair of breeding Long-tailed ducks on Mulvaney Lake, and the potential for transplanted fish to compete for food with Long-tailed ducks, could be a crucial concern, although insufficient information was provided for the Panel to make a decision on the significance of this potential effect. If the Project is approved, the Panel recommends further investigation of this potential conflict. If a significant conflict is demonstrated, it is possible that the proposed fish transplant would not be acceptable, and that an alternative fish transplant plan may be needed.

Potential Accidents and Malfunctions

Comments and concerns from interested stakeholders during the review mainly focused on the probability and potential effects of failures of the Impoundment dams, especially the North Dam. Taking into account the proposed prevention and mitigation measures, and anticipated additional permit-level requirements, the Panel concludes that, if the Project is approved, the risk of any type of dam failure would be low, providing that there is adequate dam maintenance. The proposed dam monitoring and maintenance measures would need to be effectively implemented throughout all phases of the Project, including the longer-term post-closure phase. The Panel believes that the long-term dam monitoring and maintenance obligations represent an important component of the long-term site management legacy.

While any dam failures, if they occurred, would likely be partial and incremental in nature, the Panel recognizes that if a catastrophic failure of the North Dam were to occur, it would result in significant adverse effects on downstream water quality, aquatic systems, and conceivably even on public safety (which is a concern of Kwadacha residents, located 165 km downstream). However, the Panel is of the view that the probability of a catastrophic failure of the North Dam is extremely remote, when taking into account the design of the dams, even if dam maintenance efforts were to lapse at some point in the future. For example, the Southwest Dam is designed with a lower crest height than the North Dam, so that in the unlikely event of dam overtopping, it would be the Southwest Dam which would be overtopped. In the extremely unlikely event that the Southwest Dam was to fail catastrophically, the effects would be experienced primarily in Attichika Creek and Thutade Lake.

With regard to other potential types of accidents and malfunctions identified by the Proponent during the review process, the Panel has concluded, taking into account the proposed prevention and mitigation measures, and the anticipated additional permit requirements, that no significant adverse effects are likely to occur. However, the Panel recommends that, if the Project is approved, further attention be given to long-term pitwall stability design during the permitting stage, given that the mined out North Pit would be very deep, with parts of the pitwall system exceeding 800 m in height. The Panel also notes that further attention should be given at the permitting stage to the implications of any malfunction of the water treatment plant during the longer-term post-closure period.

Cumulative Environmental Effects

The Panel is satisfied with the Proponent's cumulative environmental effects assessment methodology, which, in its view, is consistent with federal policy expectations. The Panel agrees with the conclusion that cumulative effects on wilderness resources, water quality and fisheries resources are unlikely to be significant. However, the Panel has some outstanding concerns with respect to potential cumulative wildlife effects.

The Panel concludes that Mountain goat population trends locally and regionally over the past 20 to 30 years are not well understood. The Panel is concerned about reports of severe declines in these populations from some sources. The Panel considers it possible that, if goat populations are declining, this may be linked to some extent to increased activity brought about by the Omineca Resource Access Road, which has stimulated regional mining-related activities, including extensive mineral exploration and the development of the Kemess South mine. The Panel believes that efforts are needed to establish more reliable estimates of goat population trends, and to implement strategies that will stabilize population numbers in areas around the existing minesite. The Panel recommends, as suggested by the Proponent, that a wildlife monitoring program be designed by MOE to determine whether mining and associated activities are causing a long-term decline in key wildlife populations in and around the Kemess area. Northgate should play a key role in the implementation of this monitoring program.

The Panel heard concerns raised by Aboriginal people regarding the broader issue of cumulative effects of development across their asserted traditional territories. However, the Panel is of the view that many of the issues raised with respect to other activities do not overlap with the environmental effects specifically attributable to the Project under review, and are therefore beyond the scope of this environmental assessment.

Reclamation and Closure

The Proponent's conceptual reclamation and closure plan indicates that the development of the Kemess North Project is expected to result in the disturbance of almost 1100 ha,

including all disturbed terrestrial areas and the 269 ha currently occupied by Duncan (Amazay) Lake.

The Proponent's primary reclamation and land use objectives relate to preventing ML/ARD processes, and meeting water quality objectives for environmental protection downstream of the Duncan Impoundment. Under provincial mine reclamation policy, the Proponent is not required to reclaim most of the large North Pit disturbance (including the pitwalls and the flooded pit floor). The Proponent's terrestrial reclamation planning, therefore, has focused on 207 ha of non-pit disturbance.

Duncan (Amazay) Lake, in its natural condition, would be lost very early in the mine plan as a result of dewatering and dam construction activities. The Proponent's closure concepts for the Duncan Impoundment initially focused on mitigating potential water quality concerns and providing a basic platform for future development of aquatic habitat. Late in the review process, the Proponent made a commitment to re-introduce functioning biological systems to the Impoundment as and when water quality permits. Few implementation details were provided. The Panel notes that, if aquatic habitat was to be restored in the Duncan Impoundment, more than half of the overall area disturbed by mining would then be returned to a productive use. If the Project is approved, the Panel recommends that lake restoration planning (once water quality is suitable) be incorporated as a requirement in the Closure and Reclamation Plan.

The need for long-term water treatment for the North Pit overflow was confirmed during the review process, and there is now a commitment from the Proponent to build and operate a high-density lime sludge treatment facility over the long term. Water treatment, and the disposal and containment of the sludge that would be produced by this process, would represent a long-term ongoing liability. Another liability issue that has prompted a high level of concern is the requirement for long-term monitoring and maintenance of the tailings dams. Oversight of the process of ensuring that these dams are inspected and maintained over the long term is ultimately the business of the government. The Panel has concerns over the potential for unforeseeable events, perhaps in the longer-term post-closure, to disrupt scheduled maintenance and inspection activities, leading potentially to adverse consequences for public safety and the environment.

The Panel recommends that, if the Project is approved, the financial security (reclamation bond) required should be both highly protective of the public interest and, for all long-term liabilities, that it should be required before start-up. Providing that the security is adequate to cover any costs of site management throughout all Project phases, including the longer-term post-closure period, the Proponent may be said to bear the liability. If at any time there is inadequate security to cover necessary costs, and Northgate is no longer available to cover these costs, the liability would revert to government. The Panel believes that there is uncertainty associated with bonding for liabilities which may or may not materialize for hundreds or thousands of years.

Socio-Economic Issues

Employment and Economic Benefits

The Proponent states that the development of the Kemess North mine would maintain the economic and social benefits provided by the existing Kemess South mine, including the 475 current jobs, until about 2023. The Panel agrees that, if the Project is approved and proceeds, it may be expected to continue to provide employment, procurement and government revenue benefits on a similar scale to those provided by the existing mine. Providing that the full 11-year mine plan is implemented, the Project would provide significant positive economic benefits, as well as contributing incrementally to diversifying the northern B.C. economy in the face of the expected downturn in the forest sector due

to market conditions and the pine beetle infestation. However, given the Project's lack of economic robustness, there is a risk that these benefits may not flow for the full 11 years of the proposed mine life. Ultimately, commodity markets and currency exchange rates will determine the lifespan of this mine. If the Project were to not proceed, or were to proceed and then terminate prematurely, the Panel recognizes that loss of employment would cause considerable inconvenience, disruption and transition costs for many workers.

The Panel agrees with some review participants that, to the extent that natural resource capital is degraded at and around the Project site, these costs (which typically are not readily expressed in dollar terms) would be most noticeable to the people who are resident and active in the area. The evidence before the Panel indicates that, apart from the mine staff, the area is most used (for traditional and other purposes) by the area's current residents, who are predominantly Aboriginal people. It appears unlikely that more than a relatively small proportion of the economic benefits generated by the mine would remain in Aboriginal communities closest to the Project.

Land Use

The Project is located within Resource Management Zone #7 (RMZ #7) of British Columbia's Mackenzie Land and Resource Management Plan (Mackenzie LRMP), with recognized values for guiding, trapping, mineral resource exploration and development, and recreation. RMZ #7 is a Special Resource Management Zone, within which activities are expected to be sensitive to park and protected area values in neighbouring zones. Tatlatui Provincial Park is located west of the minesite, while both the Finlay Russel Park and Protected Area and the Muskwa-Kechika Management Area straddle the Finlay River downstream of the minesite. The Panel has concluded that there is little basis for any concern that the Project's construction, operations and closure phases would affect parks and protected areas, which are located some considerable distance from the mineral property. It is conceivable that if, at some point during the earlier or longer-term post closure phases, the site management regime failed to maintain acceptable water quality, downstream water quality and aquatic systems in the two protected areas which straddle the Finlay River could be affected to some uncertain (but possibly significant) extent.

Aboriginal Issues

Aboriginal Presence and Traditional Use

Prior to the May 2007 hearings in Smithers, information presented to the Panel concerning the traditional use of the Project area by Aboriginal people was obtained by the Proponent primarily from indirect sources, and through interviews with members of the extended Bob Patrick family. Bob Patrick family members are registered Takla Lake members, and hold a trapline that encompasses the existing and proposed Kemess mines. The Proponent reported that the Bob Patrick family has traditionally used the area for hunting, trapping, fishing and gathering.

Based on the additional information provided by Aboriginal groups for the May 2007 hearings, the Panel now considers the available traditional use information sufficient for assessment purposes. In the Panel's view, sufficient evidence exists to show that Aboriginal people were present in the area at the time of European contact, and probably for several thousand years before that, and that they are still active in the area today. The Duncan (Amazay) Lake area has had a history of Aboriginal traditional use, and the Lake is considered by Aboriginal people to be endowed with spiritual values. Based on available evidence of a semi-nomadic type of traditional existence in the area prior to, and at the time of, contact, it appears that Aboriginal use of the Lake and surrounding area has not been very intensive, likely moderate at most.

Both the Tse Keh Nay and the Gitksan claim an interest in the Project area. Historically, the Thutade Lake area appears to have functioned as a frontier zone between ancestors of the Tse Keh Nay and Gitksan people, and both groups have oral histories which tell of meeting each other in the area, and of battles between them. Both groups recall activities in the Duncan (Amazay) Lake basin. The Tse Keh Nay references to use of the lake basin were more frequent and typically more concrete. The Gitksan link their current interest in the Project area to the Gitksan land tenure system, Gitksan governance, historical and current use of the territory, and family marriage connections demonstrated through their genealogies. No group disputes the fact that Bob Patrick family members are currently present on the land, and that they have had a historic presence.

Potential Impacts on Traditional Use

The Proponent has maintained that the current traditional users of the Project area are members of the Bob Patrick family, and that it is to this family that potential effects of the Project would be greatest. To mitigate these effects, the Proponent has offered to compensate the Bob Patrick family for trapping and sustenance losses, and has already negotiated some compensation provisions with them.

Throughout the hearings and in various submissions, the Aboriginal groups involved in this process have clearly and explicitly stated that they do not support the Project going forward, based primarily on their opposition to the use of Duncan (Amazay) Lake as a tailings and waste rock disposal impoundment. Both the Gitksan and the Tse Keh Nay have stated that water is sacred to them, and that the destruction of a natural lake goes against their values as Aboriginal people. The loss of the natural lake would be viewed as culturally and socially detrimental by Aboriginal people, and the Panel considers this effect to be significant.

The Proponent proposed a package of seven proposals for moving forward which, if acted upon, would represent a substantial level of Aboriginal involvement in Project planning and implementation. These proposals are all predicated on the acceptance of lake disposal of mined wastes. Since the Panel has seen no evidence that Aboriginal groups would embrace the Project on that basis, the prospects for negotiation and agreement on a package of such measures do not appear to be promising.

Employment and Economic Benefits

The Proponent reported that Aboriginal people currently make up 18% of the Kemess South workforce and that, should the Kemess North project proceed, this percentage is likely to increase given Northgate's Aboriginal training program. The Proponent noted that, should the Project not proceed, the loss of these jobs to Aboriginal people would produce a significant adverse economic effect.

The evidence suggests to the Panel that it would be difficult for Aboriginal people to increase their participation in the Kemess North Project over current levels experienced at the existing Kemess South mine. Partly as a result of the ready ability to bring workers from far away, the benefits of the existing mine have tended to bypass those communities which are in closest proximity to the Project, the three Aboriginal communities of the Tse Keh Nay. Aboriginal communities seem to have participated relatively little in the benefits provided by the existing mine prior to mid-2006, when a financial compensation agreement was concluded with the Tse Keh Nay, entailing payment of \$1 million for each remaining year of Kemess South mine production. The Proponent's offer to arrange flights to and from Aboriginal communities may make more regular "fly-in/fly-out" Aboriginal participation in the Project's workforce possible. If the Project is approved, this proposal should be pursued. However, by itself, this would not address difficulties that may be

experienced by Aboriginal people in reconciling the demands of regular mine employment with their traditional values and economy.

The Panel recognizes that, based on the Proponent's May 4, 2007 submission, there is an opportunity for local Aboriginal groups to receive \$1 million per year for the life of the Project, continuing the agreement already in place with the Tse Keh Nay for the remaining years of the existing mine. The Panel considers this a substantive offer, and presumably the opportunity is there to use the offer as a starting point for negotiations on a benefits package. However, Aboriginal people have identified what they claim to be substantial potential impacts on their enjoyment of local traditional use opportunities. In particular, the Panel was told repeatedly that there was no price that Aboriginal people would agree to place on the loss of Duncan (Amazay) Lake and its spiritual values and that, in order to embrace this Project, they would have to make an unacceptable trade-off which cannot be readily costed in dollar terms. The Panel has no reason to doubt the sincerity of this Aboriginal concern.

Health

The Panel believes that during the construction, operational and closure phases, there is little likelihood of significant Project-related physical health effects on users of the land off the minesite, other than possibly with respect to trace metal levels. The Panel has recommended that, if the Project is approved, both the Proponent and government undertake additional studies of baseline trace metal levels in plants and animals, and the potential for the Project to affect these. The Panel believes that, while it may be possible that existing trace metal levels off the minesite are problematic, the Project is not likely to exacerbate this problem during the construction, operations and closure stages.

While the Proponent predicted that the potential post-closure risk of a dam failure would be low, the Panel heard from Aboriginal people that the uncertainty of the risk is contributing to cultural stress, and to the notion of "cumulative effects" as defined from an Aboriginal perspective. The Panel expects that the Project would adversely affect peoples' sense of well-being and quality of life.

Archaeology

The proponent's archaeological consultants characterized the Duncan (Amazay) Lake area as having had low and intermittent use. This conclusion was supported by the B.C. Archeology Branch. However, archaeological reports commissioned by the Tse Keh Nay point to evidence of more intensive use over a long period of time.

The Panel is not convinced that the B.C. Archaeology Branch's conclusions on the characterization of the archaeological resources in the area are supported by the available physical evidence of human occupation. The Panel believes that there is a possibility of locating more archaeological evidence through further survey, including possibly human burial sites. If the Project is approved, the Panel recommends that this possibility be more fully examined through additional survey work prior to Project construction.

Panel Conclusions and Recommendations

One of the most important objectives of a panel review is considered to be the integration of public values into the review process. The Panel heard strong views expressed both for and against the Project, and there is no broad public consensus on the Project to help guide the Panel. By the time the hearing record closed in May 2007, federal and provincial government agencies had advised the Panel that, in most important respects, the Project could be implemented in a manner consistent with their respective programming and regulatory objectives. While this is an important consideration, the Panel recognizes that

most agencies examine the question of Project acceptability primarily from the relatively narrow perspective of their own well-defined mandates. The Panel believes that it is also necessary to evaluate Project effects holistically, and to incorporate values expressed by the public. In the Panel's view, compatibility with government requirements does not necessarily mean that the Project would not cause adverse effects, at least in the view of some interested parties, or would be in the public interest.

The Panel believes that the central concern in the assessment of the Project relates to water management issues, and the potential for significant adverse effects on water quality. The future integrity of the surface drainage and groundwater system in the Project area could be placed at risk by mined waste disposal and open pit excavation unless adequate mitigation and preventive measures are implemented throughout the post-closure period.

The implications of the use of Duncan (Amazay) Lake for mined waste disposal and the need to treat North Pit drainage are important to consider, and include:

- ◆ loss of a natural lake;
- ◆ impacts on Aboriginal traditional use and related interests
- ◆ displacement of the Lake's fisheries, and resulting need for fish habitat compensation;
- ◆ need for Lake restoration; and
- ◆ long-term site management legacy (and liability) to maintain acceptable Impoundment water quality and water balance, maintain Impoundment dams and treat North Pit water.

The Panel considers these implications to be important, particularly in the context of the short mine life and marginal project economics.

The Panel concluded that it needed to take a broad perspective in considering these implications, and the relevant government agency views and public values. The Panel decided to adopt a sustainability framework for its overall assessment of whether or not the Project is in the public interest. In determining a suitable sustainability framework, the Panel consulted various recent mining sector sustainability initiatives. In addition, the Panel considered the rationale behind the "B.C. Mining Plan", a comprehensive and recent strategic planning initiative led by the provincial government, and involving consultation with industry and other stakeholders.

For its evaluation, the Panel examined the Project from five sustainability perspectives:

1. ***Environmental Stewardship*** – The Panel considers the creation of a long-term site management legacy to be a significant outstanding environmental concern. The Panel is satisfied, taking into account the Proponent's commitments and proposed mitigation and compensation measures, that the Project would not likely result in significant adverse environmental effects, providing that these commitments and measures are effectively implemented throughout all phases of the Project, including the post-closure phase.

The Panel has stressed that a rigorous site management regime would need to be in place throughout the post-closure period to ensure adequate environmental protection, and has identified doubts about how much assurance can be provided that this site management regime would remain effective over such a very lengthy period.

2. ***Economic Benefits and Costs*** – The Project has the potential to continue to provide the stream of significant benefits currently accruing to mine workers and suppliers, government coffers and company shareholders. The Panel has significant concerns with respect to the short duration of the incremental economic benefits (2 years of construction and 11 years of mining production). Moreover, given the Project's lack of economic robustness, premature closure is possible, and the period of benefits may be shorter. Most Project "costs" (such as the long-term site management legacy and the loss of the lake and its spiritual value) are not readily priced in dollar terms, and it is not possible to state whether, in dollar terms, total benefits would exceed total costs.
3. ***Social and Cultural Benefits and Costs*** – The Panel agrees that the Project would continue to make a significant contribution to social wellbeing and community stability in communities where workers live and service suppliers operate. Moreover, the Panel recognizes that the "fly-in, fly-out" workforce model effectively shares risks as well as benefits, shielding individual communities from the adverse socio-economic effects of negative events such as premature mine closure. However, the Panel considers the socio-cultural implications of the Project for Aboriginal people, and the obstacles to their participation in Project benefits, to be a significant drawback. The Aboriginal proportion of mine employees at the existing mine, although growing in response to Proponent recruitment and training initiatives, remains relatively small, and is likely to stay small. Aboriginal communities appear unlikely to embrace either the Project or the financial compensation and other potential benefits offered to them by the Proponent. To do so would entail accepting the loss of the spiritual values of Duncan (Amazay) Lake, and Aboriginal groups have said that these values are beyond price.
4. ***Fair Distribution of Benefits and Costs*** – The Panel believes that there will likely be inequities in the distribution of benefits and costs between those interests which receive most of the benefits (workers, suppliers, government revenue coffers and company shareholders) and those people who incur most of the costs (locally-based, primarily Aboriginal, people). Aboriginal people would experience first-hand any impacts on traditionally-used environmental resources. Unless, as seems unlikely, Aboriginal people embrace the Project, they would incur most of the costs, which accrue locally, without enjoying a corresponding proportion of Project benefits. Some costs, such as the loss of the natural lake and the creation of a long-term environmental management liability, would still be incurred even if the Project closed prematurely. Premature mine closure would widen still further the gap between the benefits and costs accruing to local people. The established way of addressing this kind of inequity is through negotiation of a mutually agreed benefits agreement with Aboriginal people. In this case, there is no such agreement.
5. ***Present versus Future Generations*** – The Panel believes that the creation of a long-term legacy of substantial minesite management and maintenance obligations, lasting for thousands of years, represents a major imposition on future generations. Depending on the reliability of long-term minesite management oversight, any weakening in effective site management could translate, in the near or far future, into uncertain (and possibly significant) downstream adverse effects. In addition, if the financial bond posted by the Proponent to cover site management liabilities proves to be insufficient, and the Proponent is not available to carry out necessary site management activities, government would then have to bear the liability.

Based on an analysis of the pros and cons of Project development, evaluated individually for each of these five sustainability perspectives, and then in combination, the Panel has concluded that overall, from a public interest perspective, the benefits of Project development do not outweigh the costs. The Panel recommends to the federal and provincial Ministers of the Environment that the Project not be approved, as proposed.

APPENDIX 1 – LIST OF RECOMMENDATIONS

Water Management

Baseline Hydrological information

Recommendation #1: The Panel recommends that, if this Project is approved, the Proponent make effective use of the time available before construction start-up to collect additional local baseline hydrological, hydrogeological and climatic information prior to Project construction, in order to address concerns raised by federal and provincial agencies during the environmental assessment. The additional baseline data to be collected should be determined through discussions with the B.C. Ministry of Environment and Environment Canada (p.58).

Operations-Stage Downstream Icing and Stream Morphology Effects

Recommendation #2: The Panel recommends that, if the Project is approved, the Proponent, at the permitting stage, develop detailed measures to address operations-stage icing concerns in downstream drainages, and to ensure that any downstream sedimentation and stream morphology effects are reversible at closure. This work should be conducted in conjunction with, and to the satisfaction of, the Department of Fisheries and Oceans, Environment Canada and the B.C. Ministry of Environment (p.68).

Long-term Impoundment Water Level Fluctuations

Recommendation #3: The Proponent has predicted that Impoundment water levels would fluctuate by ± 0.5 m over the long term. The Panel notes doubts about the completeness of the Proponent's hydrological baseline information, as well as the importance of maintaining an adequate depth of water cover over potentially reactive mined wastes. The Panel recommends that, if the Project is approved, the proponent work the B.C. Ministry of Environment and Environment Canada at the permitting stage to ensure, to their satisfaction, that long-term Impoundment water level fluctuations have been reliably determined (p.74).

Post-Closure Management of Poor Quality Dam Seepage

Recommendation #4: Given that the quality of dam seepage escaping the Impoundment could remain poor for an indefinite period after closure, the Panel recommends that the Proponent's contingency proposal to collect and pump poor-quality seepage back into the Impoundment or the North Pit for as long as is necessary be made a firm condition of approval (p.75).

Long-term Post-Closure Impoundment Water Balance Management

Recommendation #5: The Panel recommends that, if the Project is approved, the general scheme for long-term maintenance of a water balance which would keep reactive wastes permanently flooded be defined in greater detail at the permitting stage, through discussions with agencies. These discussions should involve potentially affected Aboriginal groups, if they are willing to participate (p.76).

Water Quality

Baseline Water Quality Information

Recommendation #6: If the Project is approved, the Panel recommends that additional baseline water quality information be collected pre-construction and that data collection be continued during construction and operations, to monitor actual effects on water quality, and degree of compliance with impact management objectives (p.83).

Maintaining Adequate Depth of Water Cover over Flooded Reactive Wastes

Recommendation #7: The Proponent argued that the appropriate depth of water cover to suppress ML/ARD and particle re-suspension process would vary at different points in the Impoundment, and should be determined in detail during the permitting stage. If the Project is

approved, the Panel recommends, as part of addressing Recommendation #5, that the Proponent work with key agencies at the permitting stage to establish water cover depth criteria which are protective of both near-term and very-long-term water quality in the Impoundment and downstream (p.112).

Post-Closure Biological Recovery of Duncan Impoundment

Recommendation #8: The Panel recommends that, if the Project is approved, the Proponent should be required, at the permitting stage, to prepare a detailed strategy for biological recovery of the Impoundment to support fully developed aquatic systems. The strategy should be protective of Impoundment water quality, and should incorporate triggers for specific actions which are clearly linked to specific thresholds in the improvement of water quality at and after closure (p.112).

Preventing Depression of Phreatic Surface

Recommendation #9: Given the potentially negative water quality and fisheries effects of sub-aerial exposure of flooded reactive wastes in the Duncan Impoundment, the Panel recommends, if the Project is approved, that the measures proposed by the Proponent for preventing depression of the phreatic surface in tailings, beaches and dams be designed in more detail at the permitting stage. This work should form part of a broader detailed assessment of all mechanisms which could potentially lead to re-exposure of reactive wastes, with detailed adaptive management measures developed to address all identified risk factors (p.115).

Total Suspended Solids Levels in Duncan Impoundment

Recommendation #10: The Panel acknowledges the Proponent's expectation that total suspended solids (TSS) levels in the Impoundment at or shortly after closure would fall below the mandatory Metal Mines Effluent Regulations limit of 15 mg/L, but notes that this was not supported by detailed modeling. The Panel recommends that, if the Project is approved, TSS levels be modeled in detail at the permitting stage (p.128).

Minimizing of Escaped Poor Quality Seepage

Recommendation #11: Unresolved uncertainties remain with respect to the effects of escaped North Dam seepage on water quality in Duncan Creek and further downstream, despite the Proponent's commitment to recover poor quality seepage during operations and for as long as is necessary after closure. The Panel recommends that, if the Project is approved, Commitments #36, #38, #39 and #57, which address updating of seepage quality predictions, compliance with water quality objectives, design of the seepage recovery system, and ongoing seepage monitoring, and any other necessary strategies for minimizing water quality effects, be implemented in close cooperation with, and to the satisfaction of, the B.C. Ministry of Environment (p.140).

Fish and Fish Habitat

Fish and Fish Habitat Mitigation and Compensation Measures

Recommendation #12: The Panel notes that Northgate has committed to all measures that were recommended by both the Department of Fisheries and Oceans (DFO) and the B.C. Ministry of Environment (MOE) for mitigating and compensating for potential effects on fish and fish habitat, and recommends, should the Project proceed, that these commitments be integrated as conditions in any permits that may be issued by DFO or MOE (p.158).

Alternatives to Policy-based Fish Habitat Compensation Approaches

Recommendation #13: The Panel notes that there is uncertainty about the likelihood of success of some of the proposed fish habitat compensation initiatives. The Panel recommends that, if the Project is approved, DFO consider whether it might not serve the larger public

interest better to accept financial compensation in place of compensation measures in some cases. Such financial compensation would provide DFO with more flexibility in investing in fishery protection and enhancement measures. For example, some efforts could be refocused on initiatives that would provide some benefits to the Aboriginal groups who are most affected by the Project (p.158).

Aboriginal Involvement in Designing Fish Habitat Compensation Measures

Recommendation #14: The Panel recommends that, if the Project is approved, Aboriginal groups be consulted in the final design of the fisheries compensation program (p.158).

Terrestrial Resources

Impacts of Hydrological Changes on Downstream Wetlands

Recommendation #15: Should the Project proceed, the Panel recommends that the Proponent monitor downstream hydrological conditions and how any detected changes may affect downstream wetland habitats. If effects are noted, they should be mitigated to the satisfaction of the B.C. Ministry of Environment and Environment Canada (p.160).

Replacement of Lost Wetland Habitats

Recommendation #16: The Panel recommends that wetland replacement planning for the Impoundment be based on replacing the same types of wetlands (in terms of function and form) that would be lost when Duncan (Amazay) Lake is converted to a mined waste disposal facility (p.160).

Woodland Caribou Population Surveys

Recommendation #17: The Panel endorses the B.C. Ministry of Environment recommendation (and acknowledges the Proponent commitment) that, if the Project is approved, the Proponent should complete a thorough Woodland caribou population survey during the permitting stage, and prior to construction. This study should be designed to allow follow-up monitoring to accurately assess any effects of mine development on local populations and herd structure (p.164).

Elevated Trace Metal Concerns

Recommendation #18: The Panel recommends that, if the Project is approved, further studies should be undertaken of the effects of trace metal uptake on Woodland caribou (and other potentially affected species, notably moose and Grizzly bears). The Proponent should be responsible for local studies, in the vicinity of the minesite, and these local studies should be conducted at the permitting stage. The Panel also believes that a regional assessment of trace metal uptake is warranted, and recommends that government agencies and the Proponent (and Aboriginal groups, if they are willing to participate) develop a collaborative approach to a regional assessment (p.164).

Woodland Caribou Management Program

Recommendation #19: The Panel recommends that, if the Project is approved, the measures proposed by both the Proponent and the B.C. Ministry of Environment to reduce the effects of the mine operation on the more critical caribou winter feeding habitats (including careful redesign of disturbance areas, limiting ground traffic and helicopter over flights and restricting access to the mined wastes deposited in the Impoundment, should be made conditions of approval, and developed into a caribou Management Program for the mine area. This program should evaluate caribou movements and habitat use to ensure that Project effects are minimized with the findings used to adjust management strategies and mitigation measures if monitoring indicates that effects are greater than predicted (p.165).

Restoring Disturbed Woodland Caribou Habitat

Recommendation #20: If the Project is approved, the Panel recommends that the conditions of approval include a requirement for the Proponent to engage in reclamation research on restoring disturbed caribou habitat, particularly lichen habitat (p.165).

Mountain Goat Population Studies

Recommendation #21: The Panel recommends (as the Proponent has suggested) that, if the Project is approved, a Mountain goat population study designed by the B.C. Ministry of Environment, should be initiated prior to any construction disturbance in the Project area to determine whether mining and associated activities are causing a long-term decline in populations in and around the Kemess area. This study should be a collaborative effort involving the Proponent, the Ministry of Environment and Aboriginal groups (if they are willing to participate). The study should make further efforts to establish historical population trends, and should be designed to allow follow-up monitoring to accurately assess the effects of mine development on local populations (p.168).

Management of Moose Impacts

Recommendation #22: The Panel recommends that, if the Project proceeds, the Proponent's environmental management plan for wildlife include a moose management plan to evaluate moose movements and habitat use, and to ensure that Project effects are minimized by adjusting management strategies and mitigation measures (p.170).

Restoring Disturbed Hoary Marmot Habitat

Recommendation #23: The Panel recommends that, if the Project is approved, reclamation research be initiated with the involvement of Aboriginal groups (if they are willing to participate) to develop methods for restoring habitat values for marmots in higher-elevation mine disturbances that can be implemented at closure (p.173).

Rare Species – Mitigation of Impacts on Alpine Draba Plants

Recommendation #24: The Panel recommends that the Proponent work in close cooperation with the B.C. Ministry of Environment and the B.C. Ministry of Energy, Mines and Petroleum Resources to develop a mutually agreeable mitigation strategy for Draba plants that would adequately compensate for the loss of approximately 100 Alpine draba plants (p.176).

Rare Species – Mitigation of Impacts on Breeding Long-tailed Ducks

Recommendation #25: The Panel recommends further investigation of the potential for a conflict for food between fish transplanted to Mulvaney Lake and Long-tailed ducks which are known to breed there. If a significant conflict is demonstrated, it is possible that the proposed fish transplant would not be acceptable, and that an alternative plan may be needed (p.176).

Accidents and Malfunctions

Addressing Malfunctions of North Pit Lake Water Treatment Plant

Recommendation #26: The Panel recommends that, at the permitting stage, the Proponent, in conjunction with the B.C. Ministry of Environment, should assess the implications and potential effects of possible malfunctions of the water treatment plant during the longer-term post-closure period, and remedial options (p.185).

Long-term Impoundment and Dam Stability Issues

Recommendation #27: The Panel recommends that assessments proposed by Natural Resource Canada with respect to the definition of dam life and maintenance requirements, stability assessments of the valley walls above the Impoundment and the slopes above the spillways, and means of addressing any major piping problems, be implemented at the

permitting stage, should the Project proceed. These assessments should be completed to the satisfaction of the relevant regulatory agencies (p.185).

Long-term Pitwall Stability Issues

Recommendation #28: The Panel recommends that, should the Project proceed, environmental impact and public safety issues related to any ongoing post-closure pitwall instability should be further investigated during the permitting stage, leading to appropriate conditions to minimize post-closure stability problems. Pitwall stability issues should fall within the mandate of the proposed independent geotechnical review panel, and that panel's work should continue into the post-closure period (p.185).

Reclamation and Closure

Financial Security Requirements

Recommendation #29: The Panel recommends that, if the Project is approved, the financial security (reclamation bond) required should be highly protective of the public interest. For all long-term liabilities, security should be required before start-up (p.197).

Aboriginal Issues

Further Archaeological Assessments

Recommendation #30: The Panel believes that there is a possibility of locating more archaeological evidence through further survey, including possibly human burial sites. If the Project is approved, the Panel recommends that additional archaeological survey work be implemented prior to Project construction (p.229).

Panel Conclusions and Recommendations

Overall Panel Recommendation on Project

Recommendation #31: The Panel recommends to the federal and provincial Ministers of the Environment that the Project not be approved as proposed (p.245).

Working Relationship with Aboriginal Groups

Recommendation #32: If the Project does proceed, substantive efforts should be made to foster a working relationship between the Proponent, government and potentially affected Aboriginal groups. The Panel believes that this approach would increase opportunities for the Project to provide considerably more benefits to Aboriginal people than they are likely to realize without such a working relationship (p.246).

Fully Integrated Long-term Post-Closure Site Monitoring and Management Planning

Recommendation #33: The Panel believes that, should the Project be approved, a detailed and integrated long-term monitoring plan, with built-in adaptive management measures, would best meet the long-term post-closure management needs of the Project site. The Panel agrees with the commitments made by Northgate with respect to the monitoring and adaptive management proposed for fish and fish habitat, but believes that long-term fisheries monitoring should be just one component of a larger initiative. The Panel envisages an integrated long-term monitoring and maintenance initiative which addresses: 1) water quality; 2) hydrology and hydrogeology, including seepage under the dam; 3) dam and pit slope stability; 4) fisheries compensation, including fish transplants; 5) the new post-closure Impoundment ecosystem; and 6) terrestrial wildlife monitoring (p.246).