Fisheries & Oceans Canada

INTERVENTION COMMENTS

Doris North Underground Gold Mine Project

August 13, 2007

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EXECUTIVE SUMMARY

Fisheries and Oceans Canada (DFO) has reviewed the application, supporting documents and technical hearing information supplement, submitted to the Nunavut Water Board (NWB) by Miramar Hope Bay Limited (MHBL), and took into consideration the outstanding items as a result of the environmental review process that were to be addressed during the regulatory review process. Therefore, the purpose of these comments is to provide expert advice to the NWB. The comments are generally classified under the categories listed in NWB's pre-hearing decision report.

Type and Amount of Security

DFO has obtained financial securities for the construction of the rock spurs off the jetty and those located near shore, west of the jetty. The amount of securities obtained is $67,608 in the form of an irrevocable letter of credit.

Financial securities in the form of irrevocable letters of credit will also be required from the proponent, specifically for the construction and monitoring of the rearing habitat in Doris Lake at two locations and for the construction of the north tailings dam, prior to the issuance of the *Fisheries Act* subsection 35(2) authorization. One of the rearing areas will be located at the north end of Doris Lake in a bay near where Tail Lake Outflow flows into Doris Lake and the other rearing area will be located in Doris Lake near the inlet from Ogama Lake.

The use of fish bearing Tail Lake as a Tailings Impoundment Area (TIA) requires an amendment to the Metal Mining Effluent Regulations (MMER). These regulations were made under Sub-Section 36(5) of the *Fisheries Act* and provide conditions under which the deposit of deleterious substances into fish frequented waters will be allowed for metal mine tailings. Under the MMER, if a proposed tailings impoundment area is proposed to be constructed in a natural waterbody that is fish frequented, then the water body in question must be added to Schedule II of the regulations prior to tailings deposition. This process requires an amendment to the regulation itself which must be approved by the Governor-in-Council (GiC) of Canada.

The regulatory amendments for MMER can only be initiated following the completion of the environmental assessment and once Fisheries and Oceans Canada has determined that impacts to fish habitat are acceptable and can be mitigated and/or compensated. Once these steps are completed, Environment Canada (EC) can develop the Regulatory Impact Assessment Statement (RIAS) at which time the amendment can be forwarded to GiC for consideration. Following the completion of the environmental assessment for Doris North Project, DFO forwarded a letter to Environment Canada in December 2006, requesting the initiation of the process to amend the regulations.

It is a requirement of the Metal Mining Effluent Regulations (MMER) to obtain financial security, in the form of an irrevocable letter of credit, from the proponent for fish habitat features that will compensate for the use of Tail Lake as a Tailings Impoundment Area. DFO will require MHBL to provide an estimate regarding the amount of security for the construction and monitoring of the fish habitat compensation works including the creation of rearing habitat in

Doris Lake (three shoals at different locations at the south end and one shoal at the north end of Doris Lake); the removal of a fish barrier in Roberts Lake outflow; and the enhancement of stream habitat in Tributary E09 of Roberts Lake.

Construction

Jetty in Roberts Bay: DFO acknowledges that the NWB may advise and make recommendations to government agencies respecting any marine area, specifically regarding the works or activities in Roberts Bay (marine environment). DFO authorized the Harmful Alteration, Disruption and Destruction (HADD) of fish habitat associated with the jetty construction in July 2007. MHBL has completed the core structure of the jetty prior to the restricted fisheries timing window.

Floatplane and Boat Dock: The floatplane and boat dock is a floating structure, located in a small bay of Doris Lake immediately southeast of the proposed mill. The dock portion will be a pre-fabricated modular unit, approximately 25 m long and about 4 m wide, and will be held in place by six bollards. The floating plane and boat dock will be removed along with the six bollards during the mine closure stage. DFO is of the opinion that MHBL has proposed sufficient measures to avoid and mitigate adverse impacts to fish and fish habitat from the construction, operation, and removal of the floatplane and boat dock structure in Doris Lake.

Doris Creek Bridge: A clear-spanning bridge will be installed over Doris Creek to accommodate the Tailings Impoundment Area access road. No in-stream activity will be required with its design and construction. DFO is of the opinion that MHBL has proposed sufficient measures to avoid and mitigate adverse impacts to fish and fish habitat in relation to the Doris Creek Bridge and approach design.

Water Use

Water Intake: The water intakes in Doris Lake will be connected to a floating pump shack avoiding any footprint on the lake bottom. The construction, operation, and removal of the water intake structures will not adversely affect fish and fish habitat in Doris Lake, provided that the proposed mitigation measures are implemented.

Tailings Impoundment Area

As it relates to water quality objectives and legal requirements under MMER, DFO defaults to EC's recommendations for the tailings impoundment area (TIA) in Tail Lake and other general water quality parameters as they relate to the Doris North Project.

In relation to fish and fish habitat related concerns stemming from the use of Tail Lake as a TIA, MHBL has proposed to compensate for the loss of fish habitat through the creation of rearing habitat in Doris Lake (4 locations), the removal of a fish barrier in Roberts Lake outflow, and the enhancement of stream habitat in Tributary E09 of Roberts Lake. According to section 27.1 of the MMER, the No-Net-Loss Plan must be submitted and approved by DFO before depositing deleterious substances into a tailings impoundment area that is added to Schedule 2. DFO recommends that MHBL provide a comprehensive No-Net-Loss Plan to DFO by September 15, 2007 for review and approval.

Tail Lake Outflow: The construction of the north tailings impoundment dam and dewatering of the Tail Lake outflow stream will result in the harmful, alteration, disruption or destruction (HADD) of fish habitat. Where the HADD is unavoidable Authorizations are not issued unless

acceptable measures to compensate for the habitat losses are implemented by the proponent. MHBL has proposed two locations for the creation of rearing habitat in Doris Lake to compensate for the loss of ninespine stickleback habitat in the Tail Lake outflow stream. DFO recommends that MHBL provide a comprehensive No-Net-Loss Plan to DFO by September 15, 2007 for review and approval.

Fish Salvage Program: Works or undertakings occurring in fish-bearing waters have the potential to destroy fish and therefore, requires a program to salvage and relocate or allocate fish as appropriate prior to construction. MHBL is required to provide DFO with an updated fish out protocol which is appropriately designed for the Doris North Project and has agreed to solicit local community input on the ultimate use of fish salvaged from impacted lakes.

Monitoring

It is a requirement under the MMER that an Environmental Effects Monitoring (EEM) program be developed, to evaluate the potential effects of effluent on the fish population, on fish tissue and on the benthic invertebrate community in accordance with the requirements and within the periods set out in Schedule 5 of the MMER. In addition, monitoring of the fish habitat compensation works in Roberts Lake outflow, Tributary E09 of Roberts Lake, and Doris Lake will be required under MMER. Under the *Fisheries Act* authorization, compliance and effectiveness monitoring is also required for the fish habitat compensation works in Roberts Bay and two locations in Doris Lake.

Closure and Reclamation

MHBL has committed to the removal of the floatplane and boat dock as well as the six bollards at the mine closure stage at DFO's recommendation. Furthermore MHBL has committed to the removal of all in-water infrastructures associated with water withdrawals, the decommissioning of the jetty in Roberts Bay to below the high water elevation, the reclamation and restoration of Tail Lake and its outflow channel and the decommissioning of the north tailings dam. DFO recommends that MHBL provide detailed plans by September 15, 2007, regarding breaching of the north dam to ensure that potential negative impacts to fish and fish habitat can be mitigated.

Conclusion

Overall, the environmental review and the regulatory phases have identified potential impacts to fish and fish habitat. DFO is generally satisfied that the proposed mitigation measures presented in the NWB submission, in addition to our recommendations, will adequately address the identified concerns. Furthermore, DFO is confident the No Net Loss Plan will adequately address residual losses to fish habitat through the development of enhancements that demonstrate no net loss of fish habitat productive capacity within the affected watersheds. DFO looks forward to participating in the NWB Final Hearings and encourages the NWB to consider our recommendations in minimizing the impacts to fish and fish habitat.

1. INTRODUCTION

The *Constitution Act* (1982) provides the federal government with authority for sea, coastal and inland fisheries within Canada's territorial boundaries. DFO exercises this authority under the *Fisheries Act*. Specifically, DFO is responsible for the management and protection of fish and marine mammals and their habitats. There are two fundamental provisions in the *Fisheries Act* that pertain to the conservation and protection of fish habitat. One is section 35 of the Act that prohibits the harmful alteration, disruption or destruction of fish habitat without an authorization from the Minister of Fisheries and Oceans or through a regulation under the *Fisheries Act*. The other is section 36 that prohibits the deposit of deleterious substance into fish bearing waters unless authorized by a regulation under the Act or by another law of Parliament. Environment Canada, on behalf of the Minister of Fisheries and Oceans, administers section 36 of the *Fisheries Act*. DFO relies upon advice provided by Environment Canada regarding issues pertaining to the control of pollutants affecting fish and fish habitat. There are other sections of the *Fisheries Act* that pertain to the conservation and protection of fish and fish habitat and these include sections 20 (fishways), 30 (fish guards) and 32 (destruction of fish) among others.

DFO's Policy for the Management of Fish Habitat ("the Habitat Policy"), introduced in 1986, provides general guidance on the application of the habitat protection provisions of the *Fisheries Act* and applies to all projects that have the potential to harm fish habitat. The long-term objective of DFO is to achieve a net gain in the productive capacity of fish habitat for Canadian fisheries resources. A fundamental strategy for achieving this is to prevent the further loss of productive capacity of existing habitats. Productive capacity is defined in the Habitat Policy to mean the maximum natural capacity of habitats to produce healthy fish, safe for human consumption, or to support or produce aquatic organisms upon which fish depend. DFO will apply the No Net Loss principle by avoiding impacts, applying mitigation and, failing that, balance unavoidable habitat losses through habitat compensation on a project-by-project basis. The Habitat Policy also places emphasis on integrated resource planning and review of project proposals on an ecosystem basis taking into account Fish Habitat Management plans and/or Fisheries Management Plans where they exist.

Under the Nunavut Land Claims Agreement, DFO participates in the regulatory review process led by the Nunavut Water Board (NWB). In this context, DFO has reviewed the Water Licence application, supporting documents and technical meeting information supplement, as submitted by MHBL for impacts to fish and fish habitat. DFO respectfully submits the following comments as expert advice to the NWB to assist in their review of this project. Should new information be obtained, any changes in DFO's recommendations will be brought to the attention of NWB.

2. REGULATORY REVIEW AND RECOMMENDATIONS

2.1. TYPE AND AMOUNT OF SECURITY

2.1.1. Fish Habitat Compensation under the *Fisheries Act*

2.1.1.1. Rock Spurs in Roberts Bay

DFO has obtained financial securities for the construction of the rock spurs off the jetty and those located nearshore, west of the jetty. The amount of securities obtained is $67,608 in the form of an irrevocable letter of credit.

Resolution/Recommendations:

DFO is satisfied with the amount of financial securities obtained for the rock spurs in Roberts Bay.

2.1.1.2. Creation of Rearing Habitat in Doris Lake (2 locations)

DFO will require financial securities in the form of irrevocable letter of credit for the construction and monitoring of the rearing habitat at two locations in Doris Lake as well as for the construction and monitoring of the tailings dam. One of the rearing areas will be located at the north end of Doris Lake in a bay near where Tail Lake Outflow flows into Doris Lake and the other rearing area will be located in Doris Lake near the inlet from Ogama Lake. The creation of rearing habitat is proposed to compensate for fish habitat loss due to the disruption in the natural flow path from dewatering the Tail Lake Outflow stream, and habitat destruction from construction of the north tailings dam.

Resolution/Recommendations:

MHBL is to provide an estimate relating to the financial security for the construction and monitoring of the rearing habitat in Doris Lake (two locations) and for the construction and monitoring of the north tailings dam.

2.1.2. Fish Habitat Compensation under the Metal Mining Effluent Regulations

The use of fish bearing Tail Lake as a Tailings Impoundment Area (TIA) requires an amendment to the Metal Mining Effluent Regulations (MMER). These regulations were made under Sub-Section 36(5) of the *Fisheries Act* and provide conditions under which the deposit of deleterious substances into fish frequented waters will be allowed for metal mine tailings. Under the MMER, if a proposed tailings impoundment area is proposed to be constructed in a natural waterbody that is fish frequented, then the water body in question must be added to Schedule II of the regulations prior to tailings deposition. This process requires an amendment to the regulation itself, which must be approved by the Governor-in-Council (GiC) of Canada.

The regulatory amendments for MMER can only be initiated following the completion of the environmental assessment and once Fisheries and Oceans Canada has determined that impacts to fish habitat are acceptable and can be mitigated and/or compensated. Once these steps are completed, Environment Canada can develop the Regulatory Impact Assessment Statement (RIAS) at which time the amendment can be forwarded to the GiC for consideration. Following the completion of the environmental assessment for Doris North Project, DFO forwarded a letter to Environment Canada in December 2006, requesting the initiation of the process to amend the regulations.

It is a requirement of the Metal Mining Effluent Regulations (MMER) to obtain financial security, in the form of an irrevocable letter of credit, from the proponent for fish habitat features that will compensate for the use of Tail Lake as a Tailings Impoundment Area. DFO will require MHBL to provide an estimate regarding the amount of security for the construction and monitoring of the fish habitat compensation works including the creation of rearing habitat in Doris Lake (three shoals at different locations at the south end and one shoal at the north end of Doris Lake); the removal of a fish barrier in Roberts Lake outflow; and the enhancement of stream habitat in Tributary E09 of Roberts Lake.

Resolution/Recommendations:

MHBL is to provide an estimate relating to the financial security for the construction and monitoring of the rearing habitat in Doris Lake (three shoals at different locations at the south end and one shoal at the north end of Doris Lake), and the habitat enhancements at Roberts Lake outflow and Tributary E09 of Roberts Lake.

2.2. CONSTRUCTION

2.2.1. Jetty in Roberts Bay

DFO acknowledges that the NWB may advise and make recommendations respecting any marine area, specifically regarding the works or activities in Roberts Bay (marine environment).

The construction of the jetty in Roberts Bay includes a footprint (103 metres long by 6 metres wide) that will result in a Harmful Alteration, Disruption and Destruction (HADD) of fish habitat. The HADD of fish habitat is prohibited under sub-section 35(1) of the *Fisheries Act* unless authorized by DFO under sub-section 35(2). Where the HADD is unavoidable Authorizations are not issued unless acceptable measures to compensate for the habitat losses are implemented by the proponent. The proposed compensation for the HADD of fish habitat involves creating additional rearing and foraging habitat through the construction of rocks spurs off the jetty and nearshore west of the jetty.

Resolution/Recommendations:

MHBL has updated the Net Loss Summary Table (Table 18) and monitoring plan required for the *Fisheries Act* subsection 35(2) Authorization.

DFO recommends that the updated Table 18 and the complete monitoring plan be included in the No Net Loss Plan, to be provided by September 15, 2007.

DFO has issued the *Fisheries Act* subsection 35(2) authorization for the harmful alteration, disruption and destruction of fish habitat in Roberts Bay associated with the jetty construction.

2.2.1.1. Rock Spurs in Roberts Bay

Fish habitat compensation for the loss of habitat associated with the jetty footprint, within the ordinary high water mark elevation, included the addition of eight rock spurs off of the jetty, and eight shorefast rock spurs located along the shore of Roberts Bay, to provide a total of 1200 m^2 of riprap as submerged rearing and foraging habitat for fish. The interstices between the riprap-sized rocks are intended to provide increased cover for juvenile fish (in comparison to the existing predominantly sand and silt substrate), and will provide substrate for colonization by marine benthic fauna, which will provide forage for juvenile fish.

MHBL proposed a 100-metre access road from the jetty road to the shoreline to facilitate the summer construction of the shorefast spurs. Through discussions at the pre-hearing, MBHL has eliminated the requirement for the road through proposing construction of the nearshore rock spurs west of the jetty, during winter conditions. MHBL has informed DFO that the two jetty rock spurs closest to shore will not be constructed due to the shallow water depth. MHBL has committed to adding an equal amount of habitat to the nearshore spurs west of the jetty.

Resolution / Recommendations:

MHBL has committed to constructing the nearshore rock spurs west of the jetty during the winter of 2007/2008.

MHBL has committed to adding an equal amount of habitat to the nearshore spurs west of the jetty.

MHBL has committed to providing DFO with a detailed fish habitat compensation plan for the rock spurs, including revised plans on or before September 15, 2007.

MHBL has agreed to avoid the use of geogrid under the nearshore rock spurs.

DFO recommends that all in-water works and undertakings in Roberts Bay be completed outside of the construction timing restriction window of July 15 to August 30. All in-water works are to be completed by June 30, 2008, as per the *Fisheries Act* subsection 35(2) authorization for the HADD associated with the jetty construction.

2.2.2. Floatplane and Boat Dock on Doris Lake

The previous design of the floatplane and boat dock was a rock-filled structure that was to be installed at the northwest end of Doris Lake. Construction of the structure would have required blasting to remove bedrock within Doris Lake.

The current design for the floatplane and boat dock is a floating structure, located in a small bay of Doris Lake immediately southeast of the proposed mill. The dock portion will be a pre-fabricated modular unit, approximately 25 m long and about 4 m wide, and will be held in place by six bollards.

Resolution / Recommendations:

DFO is of the opinion that MHBL has proposed sufficient measures to avoid and mitigate adverse impacts to fish and fish habitat in relation to the floatplane and boat dock.

2.2.3. Doris Creek Bridge and Approaches

A clear-spanning bridge will be installed over Doris Creek to accommodate access to the Tailings Impoundment Area. No in-stream activity will be required with its design and construction. A pre-fabricated modular steel bridge will be assembled on two rock fill abutments. The roadway will be widened to 10 m on either side of the stream crossing and raised for a bridge approach angle slope of less than 5%. The nature of the free-span bridge will avoid adversely affecting fish habitat in Doris Creek.

Resolution / Recommendations:

DFO is of the opinion that MHBL has proposed sufficient measures to avoid and mitigate adverse impacts to fish and fish habitat in relation to the Doris Creek Bridge and approach design.

2.3. WATER USE

2.3.1. Water Intake Structure in Doris Lake

The withdrawal of water from waterbodies frequented by fish has the potential to entrain and impinge fish, and the potential to alter downstream water flows which could negatively impact fish habitat utilization. Prior to the technical meeting, the proposed design, involving a single pump intake (100 mm diameter HDPE pipe) set on the bottom of the lake and covered by clean rockfill to anchor it in place. This has been changed back to the original design submitted during the Nunavut Impact Review Board environmental assessment review process.

The current design includes two water intake structures to be installed at the northwest end of Doris Lake for process water and potable water supply. The water intakes will be connected to a floating pump shack avoiding a footprint on the lake bottom. The construction, operation, and removal of the water intake structures were assessed as not adversely affecting fish habitat within Doris Lake, provided that the proposed mitigation measures are implemented. The proposed water withdrawal rates and quantities are also not expected to adversely affect fish and fish habitat in Doris Lake.

Resolution / Recommendations:

MHBL has returned the water intake structure design to what was originally assessed by the Nunavut Impact Review Board and to a design that is not likely to adversely affect fish and fish habitat.

2.4. TAILINGS IMPOUNDMENT AREA

2.4.1. Tail Lake Outflow - Construction of Tailings Dam and Dewatering of Outflow Stream

2.4.1.1. Creation of Rearing Habitat in Doris Lake (2 Locations)

The construction of the north dam at the outlet of Tail Lake will result in a destruction of fish habitat directly from its footprint, as well, as a disruption in habitat downstream in Tail Lake Outflow due to the change in the natural flow path. The fish habitat compensation involves the creation of rearing habitat at two locations within Doris Lake. One of the rearing areas will be located at the north end of Doris Lake in a bay near where Tail Lake Outflow flows into Doris Lake and the other rearing area will be located in Doris Lake near the inlet from Ogama Lake. The placement of large substrate would create a shallow area with interstitial spaces that will provide rearing and nursery habitat for juvenile fish species, specifically lake trout.

Resolution / Recommendations:

DFO acknowledges and appreciates the fact that MHBL has substantially completed a No-Net-Loss Plan for the mitigation and compensation for the HADD of fish habitat associated with the north tailings dam construction and dewatering of Tail Lake Outflow.

2.4.2. Fish Salvage Program

DFO has developed a *General Fish-Out Protocol for Lakes to be Lost due to Mining Development*. Works or undertakings occurring in fish-bearing waters has the potential to destroy fish and therefore, should include a program to salvage and relocate or allocate fish to an appropriate location prior to construction. DFO recommends that the proponent work with the assistance of the local hunters and trappers organizations (HTOs) to remove the fish from the lake prior to construction. The fish removal is planned to occur using a modified version of the DFO *General Fish Out Protocol for Lakes to be Lost Due to Mining Development*. Once removed from the system fish will be frozen and sent to communities as requested.

Resolution / Recommendations:

DFO recommends that community interests be taken into consideration in the implementation of the Fish Salvage program and the use of the fish.

DFO recommends that discussions with MHBL, the local HTOs, and the Nunavut Wildlife Management Board (NWMB) be held to finalize the details of the fish out protocol.

2.4.3. General Conditions No-Net-Loss Plan for Fish Habitat

According to Section 27.1 of the MMER, fish habitat compensation is a requirement for the use of a natural waterbody frequented by fish as a Tailings Impoundment Area. MHBL has proposed to compensate for the loss of fish habitat through the creation of rearing habitat in Doris Lake (three shoals at different locations at the south end and one shoal at the north end of Doris Lake), the removal of a fish barrier in Roberts Lake outflow, and the enhancement of stream habitat in Tributary E09 of Roberts Lake.

Resolution / Recommendations:

DFO recommends that the Net Loss Summary (Table 18) be updated to reflect changes in components of in-water infrastructure and fish habitat compensation measures.

DFO recommends that MHBL submit the comprehensive No-Net-Loss Plan to DFO by September 15, 2007.

2.4.4. Specific Conditions No-Net-Loss Plan for Fish Habitat

2.4.4.1. Creation of Rearing Habitat in Doris Lake

To provide additional rearing habitat for lake trout and other species in Doris Lake, shallow reefs, created using riprap rockfill, will be constructed at four locations in Doris Lake. Three shoals will be placed at different locations at the south end of Doris Lake and one shoal will be placed at the north end of Doris Lake. Placement of large substrate would create a shallow (<0.25 m deep) area with interstices that will provide rearing and nursery habitat (e.g., cover for feeding and hiding), thereby reducing predation on the juveniles by adult lake trout or other predators.

The rock substrate will be colonized by periphyton and invertebrates; thereby providing additional food source for rearing fish (i.e., in comparison to the bedrock or silt substrates). This in turn should result in increased survival of the juvenile fish, and increase the benthic productivity in the enhanced areas. Appropriate design drawings for the proposed rearing habitat areas in Doris Lake have been provided.

Resolution / Recommendations:

DFO acknowledges and appreciates the fact that MHBL has substantially completed a No-Net-Loss Plan for the rearing habitat at four different locations in Doris Lake.

2.4.4.2. Roberts Lake Outflow Fish Passage

Currently, the boulder section of Roberts Lake outflow presents a migration hindrance or blockage in low to moderate flow years, resulting in the delay or loss of migrating Arctic char during the periods of low flow. Field studies have shown that during these low flow periods, large numbers of adult fish returning to Roberts Lake become stranded in the boulder reach and perish. The loss of these fish returning to overwinter and/or spawn in the Roberts Lake system represents a loss of biomass and reproductive potential to this system.

The proposed habitat compensation includes the modification of Roberts Lake outflow to facilitate adult fish passage for most low and moderate flow conditions, without affecting the hydraulic control at the outlet of Roberts Lake. The works will involve the use of small hand tools and methods that can be serviced by helicopter or float plane. The design of the works includes creating a low flow passage channel through the area where stranding generally occurs. There is a potential to use explosives to remove the boulders. DFO's *Guidelines for the Use of Explosives in or near Canadian Fisheries Water* was developed to provide information to proponents on the conservation and protection of fish and fish habitat from impacts arising from the use of confined or unconfined explosives.

Resolution / Recommendations:

MHBL has committed to developing a detailed construction plan in the summer of 2007 to describe the construction method, specific boulders to be broken and/or moved, and placement locations for the relocated boulders.

MHBL has committed to using DFO's *Guidelines for the Use of Explosives in or near Canadian Fisheries Water,* if blasting is required at the Robert's Lake outflow. DFO advises that if the guidelines cannot be met, a *Fisheries Act* section 32 authorization may be required.

DFO recommends that the boulders removed from this reach of the channel be more widely distributed in the channel upstream and/or downstream to provide current breaks and cover for fish and aquatic invertebrates. The removed boulders should not be used to line the banks of the channel.

DFO recommends that MHBL submit the additional information to DFO by September 15, 2007.

2.4.4.3. Stream Habitat Enhancement in Tributary E09 of Roberts Lake

The No-Net-Loss Plan included provisions for additional stream rearing habitat in a tributary to Roberts Lake. In Revision 5 of the No-Net-Loss Plan, it was proposed that a rock ledge along a lip of a pool be removed to provide access by juvenile Arctic char to a second pool, thereby increasing rearing habitat. However, during a detailed survey in 2006, it was determined that the low streamflow in most years would make the proposed enhancement unfeasible. As a consequence, an alternative enhancement opportunity, similar to that proposed in previous versions of the NNLP, has been developed. This involves the construction of two additional pools in stream E09 at the south end of Roberts Lake. The objective of the creation of additional small pool habitat in the stream is to increase the summer rearing habitat for Arctic char. In previous field studies in Roberts Lake, Arctic char juveniles were observed to use these small pools within the tributaries for rearing and likely as a mechanism to avoid predation by larger lake trout and Arctic char in the main body of Roberts Lake. By increasing the amount of rearing habitat (i.e., small pools in the narrow tributary stream), it is expected that there will be a small increase in the juvenile Arctic char survival and growth in this tributary.

While DFO supports this approach in principle, only conceptual and generic design drawings are provided for the proposed compensation works in Stream E09. Exact locations are not indicated and no information is provided on existing habitat conditions in stream E09.

Note: Stream E09 channel bankfull width appears to range from approximately 0.5m to 2.0m.

Resolution / Recommendations:

DFO recommends that MHBL identify the specific reach that is to be enhanced in stream E09 and provide a detailed description of existing fish habitat conditions.

DFO further recommends that a fluvial geomorphological assessment (or equivalent) be completed to determine the appropriate natural channel cross-section, longitudinal section, plan form configuration and substrate type.

DFO also recommends that site-specific design drawing(s) be prepared, including details on site access and methods of construction.

MHBL has committed to conducting an additional site reconnaissance and detailed survey of the Roberts Lake tributaries, prior to finalizing the design.

DFO recommends that MHBL provide the design drawings in the comprehensive No-Net-Loss Plan to DFO by September 15, 2007.

2.5. MONITORING

It is a requirement under the MMER that an Environmental Effects Monitoring (EEM) program be developed and submitted to the Director of Environment Canada – Prairies and Northern Region, to evaluate the potential effects of effluent on the fish population, on fish tissue and on the benthic invertebrate community in accordance with the requirements and within the periods set out in Schedule 5 of the MMER. In addition, monitoring of the fish habitat compensation works in Roberts Lake outflow, Tributary E09 of Roberts Lake, and Doris Lake (three shoals at different locations at the south end and one shoal at the north end of Doris Lake) is also a requirement under the MMER.

Under the *Fisheries Act* authorization, compliance and effectiveness monitoring will be required for the fish habitat compensation works in Roberts Bay and two locations in Doris Lake.

2.5.1. Jetty and Rock Spurs

Monitoring of the rock spurs will provide an indication of the success of the establishment of primary and secondary productivity as well as documentation of the use of the structures for rearing and feeding habitat for the fish species in Roberts Bay. Fish sampling will also be conducted to monitor fish presence along enhanced and reference sites.

DFO's approved Monitoring Plan for the jetty and the rock spurs involves the following monitoring schedule: the year of mine construction (i.e. 2008), Year-2 of mine operation (i.e. 2010), Year-2 of active mine post-closure (i.e. year prior to jetty lowering to below high water level 2012), Year-1 post-lowering of jetty (i.e. 2013), and Year-2 post-lowering of jetty (i.e. 2014).

Resolution / Recommendations:

DFO is satisfied with the monitoring program, proposed by MHBL, in relation to the jetty and rock spurs.

According to the *Fisheries Act* authorization, MHBL is to provide DFO with a written report and photographic record of the all works and undertakings that have been completed according to the approved Plan and conditions of the *Fisheries Act* authorization related to the jetty construction, on or before December 31 of each year, according to the monitoring schedule.

2.5.2. Creation of Rearing Habitat in Doris Lake (6 Locations)

Monitoring of the rearing habitat will occur annually during the operation of the mine (two years) and again in Year 1 and Year 5 from mine closure. This monitoring program will attempt to document the success of the rearing habitat through the demonstration that these areas have

established primary and secondary productivity. Fish sampling will also be conducted to assess use of these areas by juvenile lake trout.

Resolution / Recommendations:

DFO acknowledges and appreciates the fact that MHBL has substantially completed a monitoring plan for the rearing habitat in Doris Lake.

2.5.3. Roberts Lake Outflow Fish Passage

The proposed monitoring program will monitor the smolt (i.e. first time migrants to the ocean) out-migration to determine if Arctic char are spawning and recruitment is successful. The program will be repeated annually for a total of ten years to document variations in out-migration run size and composition both prior to, as well as for a lengthened period after channel enhancement, to determine any changes in smolt production that could be attributable to the enhancement program. The measure of success would be the increase of smolt production in Roberts Lake by an average of 25% over the pre-enhancement average. The proposed monitoring program will also aid in determining the number of fish utilizing the system and the number of fish that are able to migrate through the boulder garden.

Fish fences have been used to monitor fish migration through the Roberts Outflow boulder garden; these fences will be installed and monitored annually at the upstream and downstream ends of the boulder garden during the operational period of the mine (two years) and will also be monitored again in Year-1, Year-5, and Year-10 from decommissioning, as described in Revision 5 of the NNLP dated October 2005.

In the updated Monitoring and Follow-Up Plan revised July 2007, it is noted that the monitoring schedule has been revised to include monitoring during the first summer of construction and again in Year-9 or Year-10. In order to ensure that the habitat enhancement provides increased access to Roberts Lake, DFO recommends that the schedule for monitoring follow that previously described in Revision 5 of the No-Net-Loss Plan dated October 2005.

Resolution / Recommendations:

DFO recommends that the schedule for monitoring follow the program schedule previously described in Revision 5 of the No-Net-Loss Plan dated October 2005.

DFO recommends that the revised monitoring program be included in the No-Net-Loss Plan and that MHBL provide it to DFO by September 15, 2007.

2.5.4. Stream Habitat Enhancement in Tributary E09 of Roberts Lake

The monitoring program for the habitat enhancement in Tributary E09 of Roberts Lake will assess the successful utilization of the pools as well as increased access to the pools for juvenile Arctic char. Monitoring will also involve sampling for Arctic char juveniles with backpack electrofishing surveys. This will be conducted annually during the operational period of the mine (two years) and monitored again in Year 1 and Year 5 from decommissioning.

Resolution / Recommendations:

DFO is generally satisfied with the monitoring program, proposed by MHBL, in relation to habitat enhancement in Tributary E09 in Roberts Lake.

2.5.5. Doris Lake Riparian Vegetation Monitoring

The dewatering of Tail Lake Outflow may have negative impacts to the riparian vegetation, specifically willow trees, and to the rearing habitat for ninespine stickleback. Monitoring of the shoreline will include a detailed survey of the willow habitat as well as permanent photographic survey stations. The monitoring will be conducted once prior to construction, once during operations and once during closure. If unforeseen effects on the shoreline habitat of Doris Lake in this area are identified, additional mitigation or compensation measures will be identified and discussed with DFO, prior to implementation.

Resolution / Recommendations:

DFO recommends that the monitoring schedule is extended to capture the success of the riparian vegetation after the mine closure.

DFO recommends that the revised monitoring program be included in the No-Net-Loss Plan and that MHBL provide it to DFO by September 15, 2007.

2.6. CLOSURE AND RECLAMATION

2.6.1. Jetty

All mooring bollards and anchor points will be removed from the rockfill jetty at Roberts Bay. The rockfill jetty will be partially removed through excavation of rock from the surface of the jetty. There will be a minimum one metre of water depth over the jetty and no part of the jetty will extend above the water line.

Resolution / Recommendations:

DFO is satisfied with the reclamation plan in relation to the jetty decommissioning in Roberts Bay since it will allow for fish to re-colonize the area.

2.6.2. Floatplane and Boat Dock on Doris Lake

The floating floatplane and boat dock will be removed along with the six bollards and will be disposed of in a landfill. Clean rock fill (0.1 metre thick) will be placed over any holes left in the bottom of the lake after removal of the bollards at or below the lake bottom elevation.

Resolution / Recommendations:

MHBL has committed to the removal of the permanent bollards at or below the lake bed during reclamation at Doris Lake floatplane and boat dock.

2.6.3. Water Intake

The freshwater intake pump house and piping will be removed.

Resolution / Recommendations:

MHBL has committed to removing the freshwater intake pump house and piping during the mine closure stage.

2.6.4. Tailings Impoundment Area - North Dam

The water quality in Tail Lake must meet the MMER guidelines and that in Doris Creek must meet the Canadian Council of Ministers of the Environment (CCME) guidelines, prior to water being discharged at an allowable rate. During the mine operation and for an additional three years after mining and milling ceases, the volume of water to be released from Tail Lake will exceed the natural inflow into Tail Lake. By the third year following cessation of mining and milling, the water released should be equal to the natural inflow. After the water has met the appropriate water quality guidelines in the Tailings Impoundment Area and the water level is above the elevation of 28.3 metres, the water will be pumped and discharged into Doris Creek to allow for the north dam to be breached.

Once the water level in Tail Lake is at an elevation of 28.3 metres, the north tailings dam will be cut through the construction of a 20 metre wide slot, with 4H: 1V side slopes on either sides. The cut slopes will be covered with a 2.5 metre thick layer of run of quarry material to ensure physical and thermal stability. Tail Lake Outflow will be re-established along the base of the dam and suitable bedding material will be put in place to ensure erosional stability of the channel.

Resolution / Recommendations:

DFO recommends that MHBL provide detailed plans (i.e. staging methods, type of equipment, timelines, sediment and erosion control measures) by September 15, 2007, regarding breaching of the north dam to ensure that potential negative impacts to fish and fish habitat can be mitigated.

3. CONCLUSION

Overall, the environmental review and the regulatory phases have identified potential impacts to fish and fish habitat. DFO is generally satisfied that the proposed mitigation measures presented in the NWB submission, in addition to our recommendations, will adequately address the identified concerns. Furthermore, DFO is confident the No-Net-Loss Plan will adequately address residual losses to fish habitat through the development of enhancements that demonstrate no net loss of fish habitat productive capacity within the affected watersheds. DFO looks forward to participating in the NWB Final Hearings and encourages the NWB to consider our recommendations in minimizing the impacts to fish and fish habitat.