Fisheries and Oceans Canada

Final Intervention to the Nunavut Impact Review Board on the Doris North Gold Project

January, 2006

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Executive Summary

This executive summary provides a brief overview of Fisheries and Oceans Canada's (DFO) comments to the Nunavut Impact Review Board (NIRB) concerning the proposed development of the Doris North Gold Mine Project.

The Constitution Act (1982) provides the federal government with exclusive authority for seacoastal and inland fisheries within Canada's territorial boundaries. Fisheries and Oceans Canada 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. Our comments to the Nunavut Impact Review Board on the Doris North project are related to our mandate to manage and protect fish and marine mammals and their habitats.

Miramar Hope Bay Limited has identified four aspects of the Doris North Project that will result in the Harmful Alteration, Disruption or Destruction of Fish Habitat and will require a *Fisheries Act* sub-section 35(2) authorization. Three of these aspects include; the dewatering of Tail Lake outflow and the construction of the tailings dam; the construction of the float plane and boat dock; and the construction of the Roberts Bay Jetty. When combined the total amount of habitat impacted from these aspects of the project is estimated at 0.247 hectares (approximately 2470 square metres). The fourth aspect of the project also calls for the complete destruction of Tail Lake for use as the Tailings Impoundment Area, this will result in the loss of approximately 77 hectares (770 000 square metres) of Lake Trout habitat. Currently, MHBL has indicated there will be no habitat losses associated with the work for the water intake system, or the culverts/ bridge crossings.

The fish habitat compensation being proposed consists of fish passage enhancement between Roberts Bay and Roberts Lake, rearing habitat improvements in Doris Lake, and creation of rearing and feeding areas (rock spurs) in Roberts Bay.

During the previous review of the Doris North Project, the NIRB noted 5 key areas that were deficient in sufficient information to allow them to make a decision on the project. Specifically, these included; the alternatives assessment for Tail Lake; Tail Lake water quality and management plan; the design of the jetty and related issues; the wildlife monitoring and mitigation plan and the socio-economic impact of the project. DFO has provided comments related to the first three of these topics as well as providing a summary of other review considerations in an "other" category.

On the topic of the alternatives assessment for Tail Lake, following the receipt of the final environmental impact statement, DFO and Environment Canada had requested additional information to support the use of Tail Lake as the preferred tailings alternative for the Doris North Project. MHBL has provided much of the information that was requested during the course of review and has provided a much clearer indication of their rationale for the choice of Tail Lake as the tailings impoundment area than was provided in the previous review of the project. That said, the overall objective of the *Policy for the Management of Fish Habitat* is a net gain of the productive capacity of fish habitats. The Policy describes several means to achieve this objective including, active conservation of the current productive capacity of habitats, the restoration of damaged fish habitats, and the development of new habitats. Where there is a risk of potential damage to habitat, the Department is guided by a hierarchy of preferences to achieve no net loss of productive capacity of fish habitats. In accordance with this Policy and associated guidelines, DFO prefers to maintain natural habitat as much as possible because the factors and processes involved in making a habitat productive are highly complex, and maintaining natural fish production areas will help ensure fish production and genetic diversity in perpetuity. For these reasons, when the fishery resource and its supporting habitat are put a risk by a proposed development project, the preferred options are relocation or redesign to avoid impacts, followed by mitigation to reduce or eliminate impacts. Only after relocation, redesign, and mitigation have been considered, will the Department consider habitat compensation to replace the productive capacity through habitat creation or improvement.

The impacts associated with the use of Tail Lake will have a substantial impact on natural fish habitat relative to the short two-year mine life proposed for the Doris North project. As such and in accordance with our Policy and Guidelines, DFO's preferred option would be selection of a tailings alternative that reduces or eliminates the impacts to fish and fish habitat for this project. However, DFO notes that, as a less preferred option, the proponent has developed a no net loss plan (including monitoring) which DFO believes will compensate the habitat losses in Tail Lake with habitat gains elsewhere, thereby achieving DFO's no net loss objectives. DFO recognizes the significance and magnitude of the decision that is before the Board and that the Board will need to weigh considerations in addition to that of fish and fish habitat in rendering its decision. Should the board deem that the project, employing the Tail Lake option, can proceed to the regulatory phase, DFO will forward the Tail Lake option for Cabinet's consideration on whether to amend the Metal Mining Effluent Regulations to include Tail Lake in Schedule II, once the recommended updates to the tailings alternatives assessment can be completed

For the tail lake water quality and management plan, DFO limited our comments to the potential impacts to fish and fish habitat from the proposed water management strategy. Since DFO has an agreement with Environment Canada (EC) wherein they administer those sections of the *Fisheries Act* relating to water quality, DFO has left comments and recommendations on this topic to them. With respect to fish habitat, there are predicted impacts to fish habitat associated with the construction and operation of a tailings impoundment area at Tail Lake. The construction of the north dam would result

in a destruction of fish habitat from the footprint of the dam. Likewise, the resulting de-watering of the Tail Outflow channel due to the diversion of water from the existing watercourse to the decant line will result in the disruption of habitat in Tail Outflow until the natural flow regime could be returned post closure. MHBL has presented impact predictions for impacts to fish and fish habitat from the altered flow regime. MHBL has also presented fish habitat enhancement works that could be undertaken to offset the predicted impacts to fish habitat. DFO agrees that these enhancement works are acceptable to compensate for the predicted losses in habitat, we have requested additional monitoring be conducted in, Doris Lake, Doris Creek to ensure that the impact predictions they have made are accurate.

During the previous review of the Doris North project, several alternatives were brought forward for the jetty design in Roberts Bay. MHBL had refined the options presented during the previous review and has brought the rock-filled jetty options forward as the preferred alternative. MHBL has committed to building rock spurs in Roberts Bay to offset any losses to fish habitat associated with the construction of the jetty. During the technical meetings MHBL indicated that they would be re-visiting the depth profiles they had taken at Roberts Bay and may be able to shorten the jetty to 60 metres rather than the currently proposed 103 metres. DFO has requested that NIRB require MHBL to re-assess the length of jetty required to reach sufficient water depths and that the jetty be shortened to the extent possible. DFO has also requested longer tem monitoring of the jetty following its regrading below water level in the post closure phase.

Other aspects of the proposed development that were considered and discussed during the course of the DFO intervention include; the loss of habitat in Tail Lake; the Boat and Float Plane Dock; the water intake structures; the bridges and culverts; water quality; the MHBL fishing policy; the use of explosives, the monitoring grogram and; navigation. No specific recommendations were made for these categories but updates are provided on changes in these areas since the previous review of the project for the benefit of the board.

In summary, DFO has provided a number of comments and specific recommendation for the Board's consideration in their deliberations on the Doris North project. If new information is presented at the final hearings that influences the recommendations or comments provided to this intervention, DFO will bring any changes forward to NIRB for their consideration

1.0 Introduction

This intervention summarizes Fisheries and Oceans Canada's (DFO) review and comments concerning the proposed development of the Doris North Gold Mine Project. These comments are initiated from a detailed review of the Final Environmental Impact Statement (FEIS), the associated appendices, reports and supplemental information provided by Miramar Hope Bay Ltd. (MHBL). The purpose of these comments is to provide expert advice to the Nunavut Impact Review Board (NIRB) to assist in their assessment of potential environmental impacts associated with this proposal.

DFO is providing our comments and recommendations under the six headings outlined in NIRB's letter of January 11, 2006 . Specifically, these headings include; intervener mandate, relevant legislation, policies and guidelines; the alternatives assessment for Tail Lake; Tail Lake water quality and management plan; the design of the jetty and related issues; the wildlife monitoring and mitigation plan; the socio-economic impact of the project and; other issues.

The following comments and recommendations are made relative to DFO's mandate, the pertinent legislation and policies as described in Section 2 below, and constitute our advice to NIRB on components of the Doris North Proposal that could impact fish or their habitats. The recommendations presented in this submission may be modified as additional information is brought forward by the proponent or identified during the public hearings. Should new information be obtained, any changes in DFO's recommendations will be brought to the attention of the NIRB.

2.0 Mandate, Relevant Legislation, Policies and Guidelines

The Constitution Act (1982) provides the federal government with exclusive authority for seacoastal and inland fisheries within Canada's territorial boundaries. Fisheries and Oceans Canada exercises this authority under the *Fisheries Act (Reference 1)*. 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 water quality.

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.

The Habitat Management Program is responsible for conducting environmental assessments under the *Canadian Environmental Assessment Act* (CEAA) before issuing an authorization under subsection 35(2) of the *Fisheries Act*.

DFO's Policy for the Management of Fish Habitat (the Habitat Policy), introduced in 1986, (Reference 2) 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 erosion 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.

In reviewing project proposals under the Habitat Policy, DFO applies the No Net Loss principle, according to which DFO will strive on a project-by-project basis to maintain the productive capacity of habitats supporting fisheries resources. Under this principle, DFO works to achieve No Net Loss by avoiding impacts, by the application of mitigation and, failing that, to balance unavoidable habitat losses through habitat compensation. 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.

The *Species at Risk Act* (SARA) came into force in June 2003; while the direct prohibitions against harming listed species at risk and their habitats came into force in June 2004. The purposes of SARA are to: prevent Canadian indigenous species, subspecies and distinct populations of wildlife from being extirpated or becoming extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming endangered or threatened. The Minister of Fisheries and Oceans is the competent minister for listed aquatic species including fish (as defined in section 2 of the *Fisheries Act*) and marine plants (as defined in section 47 of the *Fisheries Act*).

Another key piece of legislation pertinent to the review and approval of metal mines is the *Metal Mining Effluent Regulations* (Reference 3), DFO's primary involvement in this process occurs if a fish bearing waterbody is proposed as a potential tailings impoundment area. In these instances, DFO must be satisfied that the impacts to the waterbody are acceptable and the Environmental Assessment must determine that decisions can be taken for a project to proceed. If these conditions are met, DFO will make a recommendation to Environment Canada to initiate the process to amend the MMER to include the proposed waterbody on schedule II as a Tailings Impoundment

Area. While Environment Canada will coordinate the administrative process of bringing the regulatory change forward, the ultimate decision on whether to amend the regulation will be made by Governor in Council.

Governments have long been called upon to address new or emerging risks of harm and to manage issues where there is a lack of full scientific certainty. The precautionary approach/principle is a distinctive approach within science-based risk management. It recognizes that the absence of full scientific certainty shall not be used as a reason to postpone decisions where there is a threat of serious or irreversible harm. The Department applies the precautionary approach/principle in a manner that reflects current Canadian practices and support consistent, credible and predictable policy and regulatory decision-making.

3.0 Alternatives Assessment for Tail Lake

MHBL provided an alternatives assessment in the final environmental impact statement and the supplemental document entitled Integrated Tailings Disposal Alternatives Assessment submitted as a separate document on January 18, 2006. The later of these two documents combines the technical, environmental, and socio-economic criteria that were considered when choosing the tailings impoundment alternative in a traditional multiple accounts analysis. The Integrated Tailings Disposal Alternatives Assessment provided by MHBL indicated that Tail Lake remained their preferred alternative for tailings disposal.

3.1 Discussion

The Integrated Tailings Disposal Alternatives Assessment submitted by MHBL on January 18, 2006 provided much more clarity to the criteria applied to the selection of tailings alternatives for the Doris North project. This updated report greatly assisted DFO in our understanding of MHBL selection of the preferred tailings disposal alternative. However, DFO still has a number of concerns relating to the current alternatives assessment as follows:

- In the overall ranking presented in the Integrated Tailings Disposal Alternatives Assessment, the highest ranking alternative(s) were not brought forward for detailed analysis. Land Based Tailings Disposal Alternative #5 which was brought forward for detailed analysis in Appendix A3 ranked 7th of 9. The Alternatives Assessment should bring the most preferred/viable alternatives forward for further consideration.
- In the recent Integrated Tailings Disposal Alternatives Assessment, Table 4 lists a total of 8 environmental criteria applied to each of the tailings alternatives. Table 5 lists 11 aquatic and terrestrial VEC's against which, the effects of each tailings alternative were considered. However, in the Options Analysis and scoring matrix the same criteria listed in Tables 4 and 5 were not used. It is unclear how

the criteria listed in the Options Analysis and scoring matrix were related to the criteria listed in Tables 4 and 5.

More generally, tailings from the Doris North deposit do not have high acid rock drainage (ARD) or metal leaching (ML) potential. However, MHBL is proposing to use a sub-aqueous disposal methodology to provide further assurance that ARD and ML will not be problematic. While it is outside the current scope of review for the Doris North Project, it has also been indicated that Tail Lake could meet the needs for tailings disposal for the potential future deposits in the Hope Bay Belt, thereby eliminating the need for multiple tailings facilities. However, MHBL also indicates that the tailings disposal methodology would need to be altered to sub-aerial deposition if future deposits are brought forward. Other known deposits in the Hope Bay Belt have substantiated ARD and ML concerns. Therefore additional TIA's may ultimately be required to facilitate future developments in the Hope Bay Belt if sub-aerial deposition of tailings is not considered appropriate for these deposits.

The objective of the *Policy for the Management of Fish Habitat* is a net gain of the productive capacity of fish habitats. The Policy describes several means to achieve this objective including, active conservation of the current productive capacity of habitats, the restoration of damaged fish habitats, and the development of new habitats. Where there is a risk of potential damage to habitat, the Department is guided by the hierarchy of preferences to achieve no net loss of productive capacity of fish habitats. The application of this hierarchy is detailed in the Habitat Conservation and Protection Guidelines (1998) (Reference 4). As outlined in this Policy and Guideline, DFO prefers to maintain natural habitat as much as possible because the factors and processes involved in making a habitat productive are highly complex, and maintaining natural fish production areas will help ensure fish production and genetic diversity in perpetuity. For these reasons, when the fishery resource and its supporting habitat are put a risk by a proposed development project, the preferred options are relocation or redesign to avoid impacts, followed by mitigation to reduce or eliminate impacts. Only after relocation, redesign, and mitigation have been considered, will the Department consider habitat compensation to replace the productive capacity through habitat creation or improvement.

The impacts associated with the use of Tail Lake will have a substantial impact on natural fish habitat relative to the short two-year mine life proposed for the Doris North project. As such and in accordance with our Policy and Guidelines, DFO's preferred option would be selection of a tailings alternative that reduces or eliminates the impacts to fish and fish habitat for this project. However, DFO notes that, as a less preferred option, the proponent has developed a no net loss plan (including monitoring) which DFO believes will compensate the habitat losses in Tail Lake with habitat gains elsewhere, thereby achieving DFO's no net loss objectives. DFO recognizes the significance and magnitude of the decision that is before the Board and that the Board will need to weigh considerations in addition to that of fish and fish habitat in rendering its decision. Should the board deem that the project, employing the Tail Lake option, can proceed to the regulatory phase, DFO will forward the Tail Lake option for Cabinet's

consideration on whether to amend the Metal Mining Effluent Regulations to include Tail Lake in Schedule II, once the recommended updates to the tailings alternatives assessment can be completed

3.2 Recommendations

DFO requests that MHBL revise the Tailings Alternative Assessments into one cohesive document that includes information from Appendix A3, Section 3.3.1 of the Final Environmental Impact Statement, and the Integrated Tailings Disposal Alternatives Assessment. It is recommended that this document be created with active participation by DFO.

The Integrated Tailings Disposal Alternatives Assessment provided by MHBL indicated that Tail Lake remained their preferred alternative for tailings disposal. Mine backfill scored higher than Tail Lake but was eliminated as a primary alternative due to its inability to contain the predicted volume of tailings from the Doris North Project. MHBL has indicated that during operations they will look for opportunities to use mine backfill when possible. DFO recommends that the NIRB include a condition in the Project Certificate requiring MHBL use mine backfill to the greatest extent possible. During the regulatory phase, detailed plans should be developed by MHBL to indicate how mining might proceed using mine backfill to its fullest potential.

4.0 Tail Lake Water Quality and Management Plan

As stated previously, Environment Canada administers those sections of the *Fisheries Act* that relate to water quality issues. As such, DFO will not comment on water quality issues but offers the following comments and recommendations relating to potential impacts to fish and fish habitat associated with the proposed water management strategy. In order to contain water and tailings within the Tailings Impoundment Area (TIA), two dams are proposed north and south of Tail Lake. The north dam will be constructed across the channel outflow of Tail Lake and the south dam on land to prevent the TIA from spilling into another watershed. The decant line from the TIA will decant water from Tail Lake into Doris Outflow immediately upstream of the waterfall. Decant is proposed to occur from Tail Lake during the open water season when water quality in Tail Lake meets MMER water quality parameters. While the dam is in place, water will no longer flow from Tail Lake into Doris Lake via Tail Outflow but will be diverted to Doris Outflow via the decant line.

The construction of the north dam at will result in a destruction of fish habitat from the footprint of the dam. Likewise, the resulting de-watering of the Tail Outflow channel due to the diversion of water from the existing watercourse to the decant line will result in the disruption of habitat in Tail Outflow.

Upon decommissioning of the mine, and once the water quality in Tail Lake meets CCME water quality guidelines MHBL proposes to breach the dam to allow for a natural flow regime to return to Tail Outflow.

4.1 Discussion

4.1.1 Effects on fish and fish habitat in Tail Outflow

The entire length of Tail Outflow will be affected by the construction for the tailings dam and the altered flow regime. Tail outflow is approximately 600 metres long and has an average width of 0.45 metres, substrate material is primarily organic in nature. Studies conducted by MHBL have determined that Ninespine stickleback are present within the channel and their habitat will be impacted by way of the development. To offset habitat losses in Tail outflow from the construction of the dam and dewatering of the watercourse, MHBL has proposed habitat compensation that includes the construction of rearing areas in Doris Lake near the inlets of Tail inflow and Ogama inflow. Detailed design of these rearing areas will be required during the regulatory phase of the project.

4.1.2 Effects on fish and fish habitat in Doris Lake Wetland

A wetland area at the confluence of Doris Lake and Tail Outflow was identified by MHBL at the previous hearings held June 2004. In subsequent correspondence DFO requested an analysis of potential effects on fish and fish habitat in Doris Lake as a result of the loss of flow to the wetland during the diversion. MHBL has presented information that indicates that the wetland is used by ninespine stickleback but that it will remain during the period of diversion since some water will flow into Tail Outflow from its immediate watershed, and the backwater effect from Doris Lake. Therefore, MHBL contends that there will be no impact on fish or fish habitat resulting from impacts to the wetland.

4.1.3 Effects on fish and fish habitat in Doris Lake and Doris Creek

The effects of the altered flow regime are not predicted by MHBL to influence water levels in Doris Lake or Doris Outflow. However, as was noted in DFO's information request dated November 25, 2005, these predictions were made based on 2 years of stage discharge data and derived weekly runoff data from a different system (Ellice River). As such, there is uncertainty involved with the dataset used to make predictions on changes in flow to Doris outflow and it is possible that actual conditions could differ from the predicted conditions.

It is noted in Appendix A2 of the information supplemental to the Doris North Final EIS that a weir is proposed in the Doris outflow upstream of the waterfall to allow for measurements of flow. It should be noted that this area is available habitat for fish in Doris Lake and as such any weir that is constructed should not impede migration of fish.

4.2 Recommendations

The direct impacts associated with the construction of the dam and dewatering of Tail outflow have been reasonably detailed and it is anticipated that impacts to Tail outflow can be off set through the implementation of the compensation measures. However, there remains some uncertainty associated with the predictions made on the potential effects on the wetland at Doris Lake and the water flows and levels in Doris Outflow.

It is recommended that MHBL monitor stage and flow in Doris outflow upstream and downstream of the decant line to ensure that their impact predictions for this watercourse are correct. MHBL should also be prepared to adjust operations accordingly to protect fish habitat as necessary should their impact predictions prove inaccurate.

Further, it is recommended that MHBL undertake monitoring at the wetland located at the confluence of Doris Lake and Tail Outflow to ensure that, as per their predictions, the wetland is not reduced in size due to the proposed water management regime, and subsequently that fish habitat is not reduced.

5.0 The Design of the Jetty and Related Issues

MHBL is proposing the construction of a jetty at the south end of Roberts Bay to facilitate loading and off loading of equipment and supplies. The jetty is proposed to be constructed of rock infilled into Roberts Bay perpendicular to shore. Under the current design the jetty would occupy a footprint of 0.180 hectares (approximately 103 metres in length, 6 metres in width, with a 25 metre mooring face).

5.1 Discussion

DFO is interested in minimizing the footprint of the proposed jetty design such that the destruction of fish habitat can be minimized. During the course of review, several alternative designs were brought forward for discussion. Due to engineering constraints the preferred alternative proposed by MHBL is a solid rock infill. MHBL has committed to reviewing and updating their bathymetry data in Roberts Bay to look for opportunities to shorten the jetty to as little at 60 metres, if possible.

Fish habitat enhancements proposed for the Roberts Bay Jetty include the construction of eight rock spurs and placement of riprap in the vicinity of the jetty to increase habitat structure for rearing and foraging habitat within the Bay. The resulting habitat enhancements are projected to create 0.190 hectares of habitat. At closure, MHBL has committed to lowering the height of the jetty such that it will effectively become an underwater reef. MHBL is proposing to monitor the jetty and associated compensation structures during the operating life of the mine and during the early phases of closure.

5.2 Recommendations

DFO requests that a condition be added to the project certificate requiring MHBL to re-assess the length of jetty required to reach sufficient water depths, and that the jetty be shortened to the extent possible.

Currently no post-closure (i.e: after the jetty is lowered) monitoring of the jetty is proposed. DFO recommends that MHBL include a post-closure monitoring plan to allow for confirmation that the proposed mitigation and habitat enhancement measures, including lower of the jetty height are achieving the desired result of achieving no net loss of fish habitat

6.0 The Wildlife Monitoring and Mitigation Plan including Cumulative Impacts

Fisheries and Oceans Canada does not have any comments relating to the Wildlife Mitigation and Monitoring Plan.

7.0 The Socio-Economic Impact of the Project on Affected Residents and Communities of Nunavut

Fisheries and Oceans Canada does not have any comments relating to the socio-economic impacts of the proposed project on affected residents and communities of Nunavut.

8.0 Other Issues

In the category of other issues, DFO would like to re-state issues that were brought forward during the last NIRB hearings and to comment on developments that have occurred on these issues during the course of the most recent review. Our comments will be broken down by heading in the following order; Loss of habitat in Tail Lake; Boat and Float Plane Dock; Water Intake Structures; Bridges and Culverts; Water Quality; Fishing Policy; Use of Explosives, Monitoring Program and; Navigation.

8.1 Loss of Habitat in Tail Lake

Fish habitat within Tail Lake will be permanently lost if Tail Lake is approved as the location of the tailings impoundment area due to reductions in water quality associated with the deposition of tailings and the loss of deep water overwintering habitat for fish. Tail Lake is a 77 hectare lake containing a self-sustaining population of lake Trout. The lake is relatively shallow with a maximum depth of approximately 6 metres.

8.1.1 Discussion

For the loss of Tail Lake for use as the Tailings Impoundment Area, fish habitat compensation proposed includes the following: creation of a fishway to eliminate a partial barrier to Arctic Char migration between Roberts Bay and Roberts Lake, creation of 3 rearing habitat areas in southern portion of Doris Lake and the construction of stream rearing habitat areas on a small tributary to Roberts Lake by improving access to upstream pool habitats. Conceptual drawings have been provided for the fishway design however, more detailed design will be required at the regulatory phase in order to authorize these undertakings.

MHBL has committed to removal of the fish from Tail Lake prior to deposit of tailings. Details of the fish out plan and a final location for the removed fish can be finalized during the regulatory phase of the project.

MHBL has also committed to a long term monitoring program that will monitor both the structural stability of the proposed enhancement works but also any long term increases in production of Arctic Char that could be attributed to the compensation work. MHBL has also identified several other areas where additional fish habitat enhancement work could be undertaken in the event that the proposed compensation works do not function as intended.

8.2 Boat and Float Plane Dock

A float plane and boat docking facility is proposed at the northwest end of Doris Lake. During the previous review two design options, a floating structure and a rock filled structure were brought forward for consideration. Since the previous review MHBL has further refined the design to establish that a rock filled structure will be constructed. This option will cause the infill of approximately 400 square metres of fish habitat within Doris Lake. The substrate in the area chosen for the float plane and dock is noted to be primarily bedrock with minimal use by fish. Blasting in the nearshore area is required for the construction of a shoreline pad.

8.2.1 Discussion

To offset impacts to fish habitat associated with the footprint of the boat and float plane dock, MHBL has provided a plan to undertake a habitat enhancement project involving the construction of a 25 metre by 25 metre rearing area in Doris Lake in the vicinity of the dock. MHBL has also committed to adhering to the DFO *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters (Reference 5)* with modifications to lower the allowable overpressures to further reduce risk in Arctic Environments.

During the regulatory phase, DFO will require detailed design information on both the dock, the blasting program, and the proposed habitat enhancement works.

8.3 Water Intake

Two water intake structures are proposed at the northwest end of the Doris Lake, one for potable water and the other for process water and emergency fire water. These water intakes will be connected to a floating pump shack that will freeze into the ice during winter months.

8.3.1 Discussion

Some shoreline disturbance is expected during the installation of the water intake structures however, MHBL has proposed mitigation measures such as the use of sediment control devices to prevent these shoreline disturbances from impacting on fish habitat. MHBL has also committed to screening the intake pipes to ensure that they meet the DFO *Freshwater Intake End-of-Pipe Fish Screen Guideline (Reference 6)* to prevent the entrapment or entrainment of fish. Since the water intake structures will have no footprint on the lake bed and the impacts during installation can be mitigated through proper installation and screening of the intake there should be no impact to fish and fish habitat resulting from this aspect of the proposal. However, DFO will require detailed design of the intake structure and plans for its installation during the regulatory review.

8.4 Bridges and Culverts

To facilitate the road network to service the mine, ten watercourse crossings are required along the length of the road. Nine of these of these crossing are proposed as culvert crossings with one bridge crossing over Doris Outflow. The information provided by MHBL indicates that the watercourses where culverts are proposed are not fish bearing and therefore there should not be an impact on fish habitat provided they are installed with the proper mitigation.

The location of the proposed bridge crossing at Doris Outflow has a width of approximately 14 metres and is known fish habitat. MHBL has designed the bridge crossing to be a single span of 15 metres with a clearance of 4.1 metres above ordinary water level. MHBL has also indicated that culverts will be removed upon closure of the mine and watercourses returned to their pre-construction condition.

8.4.1 Discussion

Since the bridge will completely span the banks of the watercourse and MHBL has committed to no in-water work during the construction of the bridge, there should be no impacts to fish habitat associated with this component of the proposed project provided appropriate mitigation is carried out to prevent the entry of sediment and other deleterious substances to the watercourse from construction activities. Since the watercourses where culverts are proposed are not fish bearing and MHBL has proposed

mitigation to prevent downstream effects (i.e: proper sizing of culverts to prevent erosion, construction at non-sensitive times for fish, etc.), impacts to fish habitat are likely to be avoided during the installation of the culverts as well.

During the regulatory phase, detailed design information on each of the proposed culverts and the bridge will be required. For the bridge construction, DFO now has standard mitigation measures outlined in operational statements that could benefit MHBL in final design and application of mitigation measures.

8.5 Water Quality

Under agreement with DFO, Environment Canada (EC) administers section 36(3) of the *Fisheries Act* which prohibits the deposit of deleterious substances into fish frequented waters, unless authorized by regulation made under the *Fisheries Act*. While many aspects of water quality are administered by EC, DFO maintains an interest in potential increases in suspended sediment due to the potential for sediments to smother habitats once out of suspension.

8.5.1 Discussion

Tail Lake is proposed as the tailings impoundment area for the Doris North project. Current plans indicate water from the tailings containment area will be decanted during the open water period via a pipeline from Tail Lake to Doris Outflow. Water quality in Tail Lake will be monitored and decant will not be released unless it meets Metal Mining Effluent Regulation (MMER) requirements. Based on discussions with EC, they are generally satisfied that the proposed decant regime is likely to allow MHBL to meet MMER discharge criteria. Based on this expert advice provided by EC, DFO accepts that the proponent is likely to meet MMER requirements and has no recommendations or additional comment to provide NIRB related to this matter.

As previously noted, DFO maintains an interest in avoiding increases to suspended sediments due to construction or operation practices at the Doris North site. Sediment load in watercourses could be increased as a result of in-water or near shore works or undertakings that expose erodible soils adjacent to watercourses. MHBL has committed to implementation of mitigative measures, such as the installation of silt curtains to ensure that construction and operation activities do not increase suspended sediment levels. However, detailed plans and specifications for the chosen sediment and erosion control measures will be required by DFO during the regulatory phase.

8.6 Fishing Policy

MHBL acknowledges that increased recreational fishing pressure by mine personnel can have adverse effects on fish populations. MHBL has committed to the

implementation of a no-fishing policy for mine personnel. Adherence to this policy will be a condition of hire.

8.6.1 Discussion

DFO agrees that the implementation of a no-fishing policy by MHBL is an adequate measure to ensure that local fish populations are not over-exploited during the proposed mine lifespan.

8.7 Use of Explosives

Explosives are expected to be used in the Doris North project as part of the underground mining process as well as during quarrying activities and for the construction of the float plane and boat dock. No in-water blasting is expected as part of the project however, near shore blasting is required for the above noted activities.

8.7.1 Discussion

Blasting creates shock waves that radiate outward from the point of detonation. The detonation of explosives adjacent to fish habitat has been demonstrated to cause disturbance, injury, and/or death to fish and marine mammals, and/ or the harmful alteration, disruption or destruction of fish habitat. Section 32 of the *Fisheries Act* prohibits the destruction of fish by means other than fishing. The *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky, 1998) offer guidance on the use of explosives to ensure no harm to fish and fish habitat. In the north, DFO uses a more protective threshold of 50 kPa for overpressure over that prescribed in the Guidelines in order to take the intensifying effects of ice cover into consideration.

MHBL has committed to meeting the *Guidelines for the use of Explosives in or near Canadian Fisheries Waters (Wright and Hopky, 1998)* as well as using the lower 50 kpa threshold for over pressures. This should ensure that fish are not harmed or destroyed during the blasting program. Additional detail on the specifics of the blasting program will be required at the regulatory phase to ensure that these Guidelines can be met.

8.8 Monitoring Programs

As part of the *Metal Mining Effluent Regulations* all metal mines are required to undertake Environmental Effects Monitoring. As required by the regulation, MHBL has committed to undertaking biological studies on water quality and fish associated with the discharge from their tailings impoundment area.

Monitoring of the effectiveness of the various fish habitat enhancement techniques proposed will also be undertaken. All fish habitat enhancement works conducted under

the No Net Loss Plan will be monitored to ensure their effectiveness at offsetting losses to habitat.

8.8.1 Discussion

For the habitat losses in Tail Lake associated with the construction of a Tailings Impoundment Area, compensation proposed includes the following: creation of a fishway to eliminate a partial barrier to Arctic Char migration between Roberts Bay and Roberts Lake, creation of 3 rearing habitat areas in Doris Lake and increasing accessibility to rearing pools in a tributary to Roberts Lake. Conceptual drawings have been provided for the fishway design and the pool habitat features.

The monitoring program outlined by MHBL in the No Net Loss Plan, Revision 5 and supplemental information is generally satisfactory to DFO. In the previous review of the file DFO has indicated that monitoring programs on the barrier removal proposed for the Roberts outflow needed to be further developed. During the course of this most recent review, DFO and MHBL have engaged in additional discussions to ensure that the monitoring program would be effective in determining the success of the habitat enhancement techniques. Miramar has subsequently committed to monitoring the barrier mitigation project in Roberts outflow to ensure that it is able to pass fish as intended. In addition, they have also committed to monitoring downstream migration of Arctic Char smolts for a ten year period to enumerate any increases in char production that could be attributable to the barrier removal. MHBL has also identified 3 other potential sites where fish habitat enhancements could be undertaken if the enhancements at Roberts Bay are unsuccessful in increasing Char production.

8.9 Navigation

In the previous review of the Doris North Project, DFO provided comment on behalf of the Navigable Water Protection Program (NWPP) and their concerns and recommendations related to the project. Subsequently, the NWPP has been moved from Fisheries and Oceans Canada to Transport Canada and as such, DFO no longer has comments or recommendations relating to Navigation Issues.

9.0 Conclusion

As outlined in this report, DFO has a number of recommendations for the NIRB to consider in their deliberations on the Doris North Gold Project. Again, DFO would like to reiterate that these recommendations are made relative to DFO's mandate, the pertinent legislation and the policies that were described previously in this document.

The recommendations presented in this submission may be modified as additional information is brought forward by the proponent or identified during the public hearings.

Should new information be obtained, any changes in DFO's recommendations will be brought to the attention of the NIRB.

DFO is hopeful that our comments and recommendations will assist the NIRB in making their decision regarding this project.

10.0 References

Originals of the following documents will be providing during the course of the final hearings.

10.1 The Habitat Protection Provisions of the Federal *Fisheries Act* can be found at the following website: http://laws.justice.gc.ca/en/F-14/60751.html#rid-60827

10.2 The Policy for the Management of Fish Habitat can be found at the following website: http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/legislation-lois/policies/fhm-policy/index_e.asp

10.3 The Metal Mining Effluent Regulations can be found at the following website: http://laws.justice.gc.ca/en/F-14/SOR-2002-222/index.html

10.4 The Habitat Conservation and Protection Guidelines can be found at the following website: http://www.dfo-mpo.gc.ca/Library/240756.htm

10.5 Guidelines Use of Explosives In or Near Canadian Fisheries Waters can be found at the following website: http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/explosguide/index_e.asp

10.6 Freshwater End of Pipe Fish Screen Guideline can be found at the following website: http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/pipe/index_e.asp