

- (i) the adverse ecosystemic and socio-economic effects are not likely to be significant, or
- (ii) the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology.

Subsection 12.4.2(c) instructs NIRB to give greater weight to the provisions of 12.4.2(a) in determining whether a review is required or not.

PROCEDURAL HISTORY AND BACKGROUND

On February 25, 2013 the Nunavut Impact Review Board (NIRB or Board) received Qulliq Energy Corporation's (QEC; the Proponent) "Iqaluit Hydroelectric" project proposal (the Project) directly from the QEC. On March 19, 2013 the NIRB received a referral to screen the Project from the Nunavut Water Board (NWB, File No. 4AH-IHP----). The NIRB notes that a conformity determination from the Nunavut Planning Commission was not required for this file as the proposed project is located in an area which does not currently have an approved land use plan in place. The NIRB assigned this project proposal file number 13UN006 and commenced screening pursuant to NLCA Article 12, Part 4.

On March 21, 2013 the project proposal was distributed to community organizations in Iqaluit, Kimmirut and Pangnirtung, as well as to relevant federal and territorial government agencies, and Inuit organizations. The NIRB requested that interested parties review the proposal and provide the Board with any comments or concerns by April 11, 2013 regarding:

- Whether the project proposal is likely to arouse significant public concern; and if so, why;
- Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;
- Whether the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (providing any recommended mitigation measures); and
- Any matter of importance to the Party related to the project proposal.

On or before April 11, 2013, the NIRB received comments from the following interested parties:

- **Environment Canada (EC)**
- **Aboriginal Affairs and Northern Development Canada (AANDC)**
- **Fisheries and Oceans Canada (DFO)**
- **Natural Resources Canada (NRCan)**
- **Transport Canada (TC)**
- **Government of Nunavut (GN)**
- **Nunavut Tourism**

Following the close of the public commenting period, the NIRB also received submissions from the following agencies regarding this project proposal:

- **Qikiqtani Inuit Association (QIA)**
- **City of Iqaluit**
- **Hamlet of Kimmirut**

Please note that all comment submissions, including those received following the close of the public commenting period, have been included in their entirety within **Appendix A** and were considered by the Board in arriving at this decision.

PROJECT ACTIVITIES

The proposed project is located within the Qikiqtani (South Baffin) region. Two project sites are proposed, located at the Armshow River and at Jaynes Inlet which are located approximately 30 and 60 kilometres (km) southwest of the City of Iqaluit, respectively. The Proponent intends to develop hydroelectric facilities at each site to supply electricity to the City of Iqaluit to meet the following objectives:

- Meet the energy requirements of the City of Iqaluit with a cost-effective and renewable source of energy;
- Stabilize and potentially reduce the overall energy costs to QEC and consumers;
- Reduce reliance on fossil fuels, thereby reducing the City's carbon footprint; and
- Reduce QEC's exposure to fuel price risks/market volatility related to the usage of fossil fuels in energy generation.

QEC has proposed a two phased development, beginning with the construction of the Jaynes Inlet hydroelectric facility to commence in 2016, followed by the development of a hydroelectric facility at the Armshow South site, proposed to be brought into operation between 2030 and 2035.

The activities and components associated with this proposal include:

- Construction, operation and decommissioning of barge landing sites at both of the Jaynes Inlet and Armshow South locations;
- Shipment of equipment, materials and fuel during construction phase (open water season);
- Development and decommissioning of laydown areas to store equipment and materials;
- Development and decommissioning of access roads to support construction and operation at the Jaynes Inlet and Armshow South sites;
- Construction, operation and decommissioning of a temporary 75-person camp at or near the coast of Jaynes Inlet and the Bay of Two Rivers during the construction phase at the Jaynes Inlet and Armshow South sites, respectively. The temporary camp would include:
 - Storage of approximately 550,000 liters (L) of fuel every construction season. Diesel (400,000 L) and gasoline (100,000 L) would be stored in double-walled iso-containers while aviation fuel (41,000 L) would be stored in drums;
 - Disposal of sewage (15 cubic metres per day (m^3/day)) using a packaged sewage treatment plant;
 - Disposal of greywater ($6 \text{ m}^3/\text{day}$) and drilling brine ($1 \text{ m}^3/\text{day}$) through a sump; and;
 - Disposal of solid waste through incineration in a camp incinerator and/or transportation to Iqaluit for disposal.

- Equipment proposed to be brought onsite for the construction phase includes helicopters, snowmobiles for personnel transportation, rock coring drills, dozers, loaders, boom and haul trucks and crushers.
- Construction, operation and decommissioning of a 10 to 14.6 Megawatt (MW) storage hydroelectric facility at **Jaynes Inlet** would consist of:
 - 30 m high reservoir at the outlet of the upper lake;
 - Concrete gravity buttress and intake structure;
 - 5.7 kilometre (km) long surface penstock;
 - Powerhouse with two Pelton turbines (each rated at 5 to 7.5 MW). The powerhouse would have a gate that opens for the discharge of water to the stream during the open water season;
 - 3.2 km long tailrace to discharge water from the powerhouse to the lower lake during the winter. The tailrace outfall structure would be fitted with an energy diffuser;
 - Permanent operator accommodation facility, workshop and accommodation facilities for maintenance crews; and
 - Access road from powerhouse to barge landing.
- Construction, operation and decommissioning of a 6 to 8.8 MW storage hydroelectric facility at the **Armshow South** site would consist of:
 - 25 m high dam at the outlet of upper lake;
 - 5.96 km long surface penstock;
 - Powerhouse with two Pelton turbines (each rated at 3 to 4.4 MW). The powerhouse would have a gate that opens for the discharge of water to the stream during the open water season;
 - 0.6 km long tailrace to discharge water from the powerhouse to the lower lake during the winter. The tailrace outfall structure would be fitted with an energy diffuser;
 - Permanent operator accommodation facility, workshop and accommodation facilities for maintenance crews; and
 - Access road from powerhouse to barge landing.
- The volume of daily water utilized at the intake of the hydroelectric dams is expected to be 765,000 m³;
- Construction, operation and decommissioning of a 69 kV transmission line approximately 84 km long, from the powerhouse at Jaynes Inlet to a substation adjacent to the QEC main diesel generating plant in Iqaluit;
- Construction, operation and decommissioning of a 69 kV transmission line that would cross the Armshow River near the powerhouse at Armshow South. This transmission line would be tied in to the line at the proposed Jaynes Inlet site which would connect to Iqaluit; and
- Possible construction, operation and decommissioning of a small airstrip at both the Jaynes Inlet and Armshow South sites to facilitate access.

COMMENTS AND CONCERNS

Most of the comments received from Parties indicated that due to the nature and scale of the proposed activities and components, the proposed project may cause significant adverse effects

on the ecosystem and on surrounding wildlife habitat, and further, that there may be significant adverse socio-economic effects on northerners. Many comments from Parties further suggested that the Board consider recommending that this project be subject to a Review pursuant to Part 5 or 6 of Article 12 of the NLCA.

The following represents a *summary* of the comments and concerns received during the public commenting period for this file; please note that the original comment submissions have been included in their entirety in **Appendix A**:

Aboriginal Affairs and Northern Development Canada (AANDC):

- Due to the nature and scale of the proposed project's activities and components having potential to cause significant adverse environmental impacts and socio-economic effects on northerners, AANDC recommended that a review be required under 12.4.2(a) of the Nunavut Land Claims Agreement (NLCA).
- AANDC noted the following in regards to its determination that the project would be likely to arouse significant public concern in the following areas:
 - Impacts of helicopter use to those using the land;
 - Potential impacts to ice fishing at the Armshow South site; and
 - Potential impacts to the travel routes between Kimmirut and Iqaluit.
- AANDC noted the following in regards to its determination that the project would be likely to cause significant adverse ecosystemic and socio-economic effects:
 - Impoundment of water at the Jaynes Inlet and Armshow South site has the potential to alter the hydrology of both these surface water systems;
 - The proposed impoundment and channelling of water through penstocks from the dam to the powerhouse would dewater the river downstream of the dam at both sites resulting in eco-systemic impacts, in particular to Arctic Char habitat;
 - The construction, operation and decommissioning of the proposed project would result in the loss of vegetation and habitat for wildlife and birds due to ground disturbances and an increase in water level of the impounded lakes;
 - Excavation activities at both sites for quarry and dam development would alter landforms and potentially impact permafrost;
 - Development of both sites has the potential to affect ground stability and to affect permafrost;
 - The construction, operation and decommissioning of the project has the potential to disrupt traditional land use activities through the use of aircraft, drilling and blasting at site and barging of materials during open-water season; and
 - There are potential socio-economic impacts associated with the Armshow South site as the development in that area may have impacts on the travel route from Iqaluit to Kimmirut.
- AANDC has jurisdictional responsibility in relation to the proposed project, particularly Ministerial responsibilities for the approval of water licencing, the administration of Crown land and it anticipates offering expertise in several areas.

Government of Nunavut (GN):

- The GN indicated that the proposed project could have significant effects including:
 - Aquatic environment;

- Katannilik Territorial Park;
- Itijjagial Trail and Park facilities;
- Ecosystemic and socio-economic impacts due to:
 - Noise, vibration and dust;
 - Transfer of fuel, fuel spills and waste disposal; and
 - Low-flying aircraft.
- Cumulative effects and climate change; and
- The impact of housing demand and changes in income as it relates to the Public Housing rent scale in Iqaluit during the construction phases of the proposed project.
- The GN recommended that the Board issue a decision consistent with Article 12.4.4(b) under the NLCA, noting that most of the ecosystemic and socio-economic impacts of the proposed project would be felt within the Nunavut Settlement Area and therefore recommended that the project proceed to a review under Part 5 of Article 12 of the NLCA.

Environment Canada (EC):

- EC noted that the proposed project may cause significant adverse effects on the ecosystem.
- Potentially impacted ecosystem components falling under EC's mandate include:
 - Surface freshwater as a result of changing lake levels, nutrient input from blasting and sewage treatment, suspended sediments as a result of construction activities, surface runoff from blasting and crushed rock, and accidents and malfunctions;
 - Air quality as a result of project site activities including operation of an incinerator, operation of equipment on site and along transmission corridor, and marine shipping;
 - Migratory birds as a result of habitat loss at the proposed site facilities and transmission corridor; and
 - Species at risk as a result of habitat loss and disturbance at proposed site facilities and transmission corridor.
- EC indicated that the project should be referred to a review under Article 12, Section 12.4.4(b) of the NLCA due to the potentially significant adverse impacts to ecosystem components resulting from the proposed project.

Fisheries and Oceans Canada (DFO)

- DFO indicated that the development of the proposed project may cause harmful alteration, disruption or destruction of fish and fish habitat and may require Authorization under subsection 35(2) of the *Fisheries Act*.
- DFO also noted that certain aspects of the proposed project may result in the following potential impacts to fish and fish habitat:
 - Flow reduction affecting fish passage and fish habitat in rivers and tributaries affected by this Project;
 - Effects to fish and fish habitat as a result of lake drawdown during dam operations;
 - Changes to water quality and stream morphology;

- Reduction in invertebrate production;
- Creation of barriers to fish passage; and
- Effects in the marine environment as a result of additional freshwater inputs due to dam operations.

Natural Resources Canada (NRCan):

- NRCan indicated that it would likely have regulatory responsibility for the project and may issue a licence pursuant to paragraph 7(1)(a) of the *Explosives Act* for the proposed explosives storage facility associated with the project.
- NRCan noted that the proposed project would likely have the potential to result in environmental effects related to the aquatic environment (i.e. reduction of downstream water flows, impacts to water quality) and the terrestrial environment (i.e. changes to landforms).
- Matters of importance noted by NRCan included:
 - Indication by the Proponent that the Armshow South site is considered a “high risk dam” due to unknown bedrock depth in the right abutment;
 - The Proponent’s indication of the inability of finding a suitable foundation without considerable excavation for the Armshow South site, and that the possible alternative is an earthfill dam which is risky when built on permafrost foundations; and
 - Indication by the Proponent that the “entire hillslope may be creeping towards the river” at the Armshow South site, and that the maintenance of the penstock may present design challenges.
- NRCan suggested that the results of baseline geology, geotechnical and terrain studies that the Proponent intends to conduct will be an important consideration in the process of qualifying and quantifying potential adverse environmental effects of the proposed project.
- NRCan indicated that it expects to offer expertise in the areas of geology, permafrost, geological hazards and geomorphology.

Transport Canada (TC):

- TC provided comments outlining areas specific to its mandate:
 - Proposed works in navigable waters regarding barge landings, dams and works, access roads and transmission lines;
 - Marine-based activities regarding vessels, fuel storage and transfer, ship routing and compliance with marine security;
 - Civil aviation security regarding the development of airstrips; and
 - Transportation of dangerous goods.

Nunavut Tourism:

- Nunavut Tourism indicated that this project is very important to Iqaluit and Nunavut, and Nunavut Tourism encourages the development of “green” power.
- Nunavut Tourism noted some concerns about the project as proposed, indicating that it could have a significant impact on popular tourist locations.

- Nunavut Tourism recommended that the project proceed in a manner that will allow all (multiple) uses of the area to co-exist, with minimal impacts on one another.
- The following comments related to tourism in the area were provided:
 - The integrity of the Katannilik Park boundaries and ecosystems should be maintained;
 - Effective waste management is important as wilderness is a big selling point;
 - The economic impact of the snowmobile route through Katannilik to Kimmirut needs to be recognized to include people purchasing supplies as well as restaurants and hotel businesses at both ends of the trail. The proposed dam development and potential creation of an ice wall could significantly interfere with snowmobile traffic, thus Nunavut Tourism requested that the dam development at the Armshow South site as proposed be re-examined and planned in a way that will minimize or mitigate negative impacts to the trail;
 - The area proposed for development is a major recreational sports fishing area, used regularly by guides and local people in the summer and for ice fishing in the winter/spring. The proposed dam and changes to the water level could cause significant impacts to this fishery. Increased boat traffic caused by the shipment of goods to the site could also adversely affect fish migration patterns and the quality of fish in the area;
 - Environmental safety is important in relation to potential fuel and sewage spills and every precaution is encouraged to avoid harm to the unique environment;
 - Incineration of waste is a concern as foul smells and particulate matter which could negatively affect the flora and fauna of the area could be released into the park area, depending upon wind conditions. Tundra environments are very delicate and take a very long time to recover from damage.

Submissions from the following parties were received following the close of the public commenting period, but were given full consideration by the Board in making its determination:

Oikiqtani Inuit Association (QIA):

- The QIA recommended that the project be subject to a Part 5 Review and that more research be conducted by the Proponent in the following areas:
 - Impacts of freshwater flow into the ocean and potential of changes in ocean hydrology;
 - Impacts to human health due to increase in mercury levels in the water due to flooding of terrain around the proposed dam sites;
 - Potential impacts to wildlife and their habitat during all phases of the proposed project;
 - Identification of more potential customers which could mean looking at alternative sites;
 - Determination of Inuit Impact and Benefit Agreements, commercial leasing and water compensation agreements in the early phases of the project as these agreements may affect project feasibility; and
 - Potential impacts to tourism in Iqaluit due to the proximity of the proposed project to the Katannilik Territorial Park.

City of Iqaluit

- The City of Iqaluit noted that it has regulatory authority over the routing of the proposed transmission line from the proposed hydroelectric development sites where the line enters the municipal boundary (City of Iqaluit By-law no. 363 (61), General Plan By-law 703 and Zoning By-law 704);
- The City of Iqaluit indicated that where the Proponent has committed to providing detailed transmission line routing plans to the City for review, the City intends to conduct a detailed land use review to identify suitable routing options for the transmission line within City boundaries; and
- The City of Iqaluit acknowledged that over the past number of years the Proponent had been in communication with Council to make presentations on the proposed project and the City looks forward to continued engagement on the project.

Hamlet of Kimmirut:

- The Hamlet Council provided the following comments during its Regular Council Meeting on April 9, 2013:
 - Iqalumiut need to deal with this project as it is for Iqaluit; and
 - Long term planning is required before any hydroelectric connectivity is extended to Kimmirut as discussed during initial meetings.

ASSESSMENT OF THE PROJECT PROPOSAL IN ACCORDANCE WITH NLCA 12.4.2

Subsection 12.4.2(a) of the NLCA directs the NIRB, when screening a project, to recommend a public review when in its judgement:

- (i) the project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities,
- (ii) the project may have significant adverse socio-economic effects on northerners,
- (iii) the project will cause significant concern, or
- (iv) the project involves technological innovations for which the effects are unknown.

Pursuant to Subsection 12.4.2(b), a review is generally not required when, in NIRB's judgement, the project is unlikely to arouse significant public concern and;

- (i) the adverse ecosystemic and socio-economic effects are not likely to be significant, or
- (ii) the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology

Subsection 12.4.2(c) instructs NIRB to give greater weight to the provisions of 12.4.2 (a) in determining whether a review is required or not.

In determining whether or not a public review is necessary, the NIRB considered a number of factors, in addition to soliciting and reviewing comments received from responsible government departments, Inuit organizations and interested parties. Upon completion of the Board's

Screening assessment and consistent with the criteria as stated in 12.4.2 (a) of the NLCA, the NIRB has determined, based on the nature of QEC's proposed Iqaluit Hydroelectric project, that:

1. The project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities;
 2. The project may have significant adverse socio-economic effects on Northerners;
 3. The project will cause significant public concern; and
 4. The project involves technological innovations for which the effects are unknown.
- 1) The project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities - 12.4.2(a) (i):

The NIRB, commenting parties and the Proponent have identified a number of potentially significant adverse effects that could be associated with this project. A selection of information and comments identifying potential adverse effects is listed below:

Site-specific tables were provided by the Proponent in its project proposal which identified a number of potential adverse ecosystemic impacts of the proposal, including: "effects to aquatic species due to construction in and near fish bearing waters... lost fish habitat due to damming and changing flows, including annual raising and lowering of lake levels... effects to hydrology and limnology due to water takes during construction... effects to sediment and soil quality due to quarry development... effects to sediment quality due to tailrace discharge to Armshow River... loss of vegetation due to ground disturbance and raising the upper lake water level... effects to wildlife and birds due to loss of habitat... effects to wildlife and birds due to zone of influence disturbances..." (Tables 10.3 and 10.4, p. 88 to 91) – *Qulliq Energy Corporation*

"The Nunngarut (also known as Bay of Two Rivers) area has been a heritage resource as well as a traditional area for Inuit usage for fishing and other harvesting activities since time immemorial and more consultations and involvement with the Iqaluit Hunters and Trappers Organization (HTO), the Iqaluit Community Lands and Resources Committee (CLARC) and other citizens of Iqaluit is required by the QIA prior to any development in the area." – *Qikiqtani Inuit Association*

"Failing to maintain an in-stream flow requirement during the summer months may negatively affect fish populations by reducing habitat, restricting fish passage and altering thermal conditions in streams. Although natural barriers to fish passage such as small waterfalls currently exist in the streams in question, the proposed project has the potential to drastically alter stream flow, the shape of waterways, and the makeup of the stream beds over time. Such changes could result in changes to fish migration patterns." – *Government of Nunavut*

"The construction, operation and decommissioning of the proposed project will result in the loss of vegetation and habitat for wildlife and birds due to ground

disturbances and an increase in water level of the impounded lakes.” – *Aboriginal Affairs and Northern Development Canada*

“Flow reduction affecting fish passage and fish habitat in rivers and tributaries affected by this Project; effects to fish and fish habitat as a result of lake drawdown during dam operations; changes to water quality and stream morphology; reduction in invertebrate production; creation of barriers to fish passage; and effects in the marine environment as a result of additional freshwater inputs due to dam operations.” – *Fisheries and Oceans Canada*

2) The project may have significant adverse socio-economic effects on Northerners - 12.4.2 (a) (ii):

The NIRB, commenting parties, and the Proponent have identified potential socio-economic effects that could be caused by the proposed project. A selection of the comments outlining socio-economic considerations is presented below:

“The Armshow South site experiences a higher level of land use. The upper lake is located within the boundaries of the Katannilik Territorial Park, which covers a traditional travel route between Iqaluit and Kimmirut. Park shelters are located both immediately east of the upper lake and on the west side of the upper lake. While the park receives limited tourist use in the order of 1 to 2 groups per year, the route is more heavily used to travel between Iqaluit and Kimmirut by snowmobile during the winter months. Several pools on the Armshow mainstem, and pools and small lakes on a north tributary of the Armshow River, support overwintering populations of Arctic char that are fished through the ice by Iqaluitmiut. Additionally, a number of cabins are located on the coastal mainland south of the Bay of Two Rivers and on the islands opposite the mouth of the Armshow River.” – *Qulliq Energy Corporation*

“During the winter and spring months, the snowmobile route through Katannilik to Kimmirut is a major tourism activity, both for tourists from outside the territory and local residents from Iqaluit and Kimmirut. The economic impact of this trail needs to be recognized to include people purchasing supplies for trips, as well as restaurant and hotel traffic at both ends. The proposed damming of the lake will cause an ice wall that could significantly interfere with this snowmobile traffic.” – *Nunavut Tourism*

“The area proposed for development is a major recreational sports fishing area, used regularly by guides and local people in the summer and for ice fishing in the winter/spring. The proposed dam and changes to the water level could cause significant impacts to this fishery. Increased boat traffic caused by the shipment of goods to the site could also adversely affect fish migration patterns and the quality of fish in the area.” – *Nunavut Tourism*

3) The project will cause significant public concern - 12.4.2 (a) (iii):

After soliciting comments from the public and interested parties, and completing an internal technical review, it is the opinion of the NIRB that the Iqaluit Hydroelectric Project will cause significant public concern, and that this would be best addressed through the course of a public review pursuant to Part 5 or 6 of Article 12 of the NLCA. The Proponent and most commenting parties have identified and/or recommended to the NIRB that the Iqaluit Hydroelectric Project be subject to a Review under Section 12.4.4 (b) of Article 12 of the NLCA. A selection of the comments regarding public concern is summarized below:

“QEC has identified the staged development of the Jaynes Inlet site followed by the Armshow South site as the preferred development plan. Collectively, this Project is the subject of a feasibility study, and is expected to undergo an environmental review by the Nunavut Impact Review Board (NIRB).” – *Qulliq Energy Corporation*

“There is a concern over the Kimmirut trail, which begins around the proposed Armshow South Dam area, being affected due to the proposed project. The Iqaluit Community Lands and Resources Committee (CLARC) expressed that they would like to see that area to remain the main trail entrance (basically untouched) since it has been used for many generations and it would be a hardship to try and reroute people that have been using it for traditional, heritage and recreational purposes for so long.” – *Qikiqtani Inuit Association*

“The proposed hydroelectric dam project for the Jaynes Inlet and Armshow South waterways poses concerns for native fish populations. Arctic char is an anadromous migrating species found in these waterways and is an integral part of the Arctic ecosystem and of traditional diets. Potential risks to this species include habitat loss and the creation of barriers to fish passage. The Jaynes Inlet and Armshow South waterways are important locations for fishing and other traditional activities, and the development of these areas is likely to arouse significant public concern.” – *Government of Nunavut*

“The GN recommends that the NIRB issue a decision consistent with Article 12.4.4(b) of the NLCA.....the GN believes that most of the ecosystemic and socio-economic impacts will be felt within the Nunavut Settlement Area and therefore recommends that the project proceed to a review as set out under Part 5 of Article 12 of the NLCA.” – *Government of Nunavut*

“AANDC has reviewed the project proposal and is of the opinion that due to the nature and scale of the proposed project’s activities and components having potential to cause significant adverse environmental impacts and socio-economic effects on northerners, a review is required under 12.4.2(a) of the Nunavut Land Claims Agreement.” – *Aboriginal Affairs and Northern Development Canada*

“Due to the potentially significant adverse impacts to....ecosystem components resulting from the project, it is EC’s opinion that a review be recommended by the

NIRB as required under Article 12, Section 12.4.4(b) of the Nunavut Land Claims Agreement.” – *Environment Canada*

“Shipping aspects of the project may likely arouse public concern, as it is proposed to utilize barges for shipment of equipment, materials and fuel to the project site.” – *Transport Canada*

4) The project involves technological innovations for which the effects are unknown - 12.4.2 (a) (iv):

The Board notes that hydroelectric development has not yet been assessed constructed and/or operated within Nunavut. Accordingly, and based upon some of the comments provided by Parties, the Board believes that uncertainty exists relating to the effects which may result from the construction and operation of a hydroelectric development in the Arctic in general, and from the development of the proposed Iqaluit Hydroelectric project in particular. As such, the Board is of the opinion that additional assessment of the details and related environmental impacts of this type of development is necessary, and that subjecting the proposal to public review would contribute to greater knowledge regarding effects and offer the level of rigour required for this assessment.

ADDITIONAL ISSUES OF CONCERN TO NIRB

Following the NIRB’s technical review of the project proposal and consideration of the potential impacts associated with this type of project development as it pertains to ecosystemic and socio-economic impacts as well as the public concerns expressed, the Board has identified a number of issues which require further attention and clarification by the Proponent in order to ensure a thorough environmental impact assessment:

1) Potential Socio-economic Impacts of the Project

The Board has identified several socio-economic impacts that may be associated with the proposed project:

- Altered hydrology of the surface water at the two proposed sites which is likely to impact fish and fish habitat and that may, in turn, affect local, sports and commercial fisheries in terms of subsistence harvesting and/or local economy;
- The proximity of the proposed site to the Katannilik Territorial Park may impact tourism in the area, and the traditional use of the snowmobile route from Iqaluit to Kimmirut; and
- Impacts associated with the potential loss of access to the traditional snowmobile route from Iqaluit to Kimmirut due to the development of the proposed Armshow South site, including the potential loss of economic opportunity due to the closure of the snowmobile trail.

As a result of these considerations, the Board is of the opinion that additional consultation with affected communities is necessary to ensure that the potential socio-economic impacts are fully understood and assessed to the extent possible and that appropriate measures to mitigate potential impacts are identified.

2) Potential Impacts to the Ecosystem

The Board has identified several impacts to the ecosystem that may arise due to the proposed project:

- Potential degradation of the environment within the Territorial Park due to incineration, construction works, etc.;
- Potential loss of fish habitat due to changes in surface water hydrology;
- Potential loss of vegetation and bird/wildlife habitat due to ground disturbances and an increase in water level of impounded lakes; and
- Impact of developing land in areas surrounding the project site (e.g. access roads, penstock, transmission lines, etc.)

In consideration of the ecosystemic components that may be affected, NIRB has determined that additional information is required to determine the magnitude of the proposed project on the surrounding environment as well as the corresponding mitigation options that can be applied to manage these impacts.

3) Safety Risks of Dam Design

As indicated by commenting parties, the proposed design of the dam particularly at the Armshow South site identifies several design challenges and discusses uncertainty in the design safety of the dam structure. The NIRB believes that further investigation into the project design may be required to ensure that all available options are considered and that the option with the lowest practicable design and operational safety risk is chosen to protect the safety of the ecosystem and the surrounding communities.

4) Potential Human Health Impacts

The proposed project has the potential to alter surface water hydrology and to change the sedimentation regime in the proposed lake sites, which in turn may result in the volatilization of heavy metals from lake sediments, potentially resulting in unexpected and/or unmanaged risks to human health. Additional consultation and research into this potential for impact to human health is warranted as part of the environmental review process for the proposed project.

5) Climate Change Effects Assessment

The Arctic climate is highly vulnerable to the effects of climate change. The proposed project has the potential to significantly change the hydrology and limnology of the surrounding areas, which could result in significant ecosystemic and socio-economic effects. These impacts could potentially be more pronounced and variable owing to the effects of a changing climate. The Board is of the opinion that a thorough climate change effects assessment is essential to the consideration of this major development project and should be assessed through a public review.

6) Long-term Lifespan of Development

As indicated by the Proponent, the NIRB recognizes that hydroelectric facilities are rarely decommissioned but instead are permanent structures which undergo regular maintenance, and periodic retrofits or maintenance programs. The NIRB is of the opinion that more detail is required to assess the adequacy of proposed maintenance programs and retrofits for the long term operation of these hydroelectric facilities. The potential for future decommissioning in the event the facilities are not operated in the long term as predicted due for example, to changes in power needs or the advent of new technology, should also be given consideration.

In the NIRB's view, these issues would best be addressed through the public review process pursuant to Part 5 or 6 of Article 12 of the NLCA.

REGULATORY REQUIREMENTS AND OTHER CONSIDERATIONS

The Proponent has applied for, or will require, the following authorizations for this project:

- Authorization of transmission lines within municipal bounds of Iqaluit – City of Iqaluit
- Type A Water Licence – NWB
- Class A Land Use Permit– AANDC
- Lease and/or easement – AANDC
- Quarry Permits – AANDC and/or QIA
- Authorization for Harmful Alteration, Disruption or Destruction of Fish or Fish Habitat– DFO
- Licence pursuant to the *Explosives Act* – NRCan
- Approval under the *Navigable Waters Protection Act* and the *Navigable Waters Protection Program* – TC

In addition, the Board has identified that following legislation and guidelines may apply to the project as proposed:

- | | |
|--|---|
| ▪ <i>Aeronautics Act</i> | ▪ <i>Emergency Medical Aid Act</i> |
| ▪ <i>Arctic Waters Pollution Prevention Act</i> | ▪ <i>Engineers, Geologists and Geophysicists Act</i> (Nunavut) |
| ▪ <i>Apprenticeship, Trade and Occupations Certification Act</i> | ▪ <i>Environmental Protection Act</i> (Nunavut) |
| ▪ <i>Boilers and Pressure Vessels Act</i> | ▪ <i>Explosives Act</i> |
| ▪ <i>Camp Sanitation Regulations</i> (Nunavut) | ▪ <i>Explosives Use Act</i> (Nunavut) |
| ▪ <i>Canada Shipping Act</i> | ▪ <i>Fisheries Act</i> |
| ▪ <i>Canada Transportation Act</i> | ▪ <i>Fire Prevention Act</i> (Nunavut) |
| ▪ <i>Canada Marine Act</i> | ▪ <i>Gas Protection Act</i> |
| ▪ <i>Canada Water Act</i> | ▪ <i>Hospital Insurance and Health and Social Services Administration Act</i> |
| ▪ <i>Canada Wildlife Act</i> | ▪ <i>Labour Standards Act</i> (Nunavut) |
| ▪ <i>Canadian Environmental Protection Act</i> | ▪ <i>Liquor Act</i> |
| ▪ <i>Child and Family Services Act</i> | ▪ <i>Marine Transportation Security Act</i> |
| ▪ <i>Commissioner's Land Act</i> | ▪ <i>Migratory Birds Convention Act</i> |
| ▪ <i>Dominion Water Power Act</i> | ▪ <i>Navigable Waters Protection Act</i> |
| ▪ <i>Electrical Protection Act</i> | |

- *Nunavut Act*
- Nunavut Archaeological and Paleontological Sites Regulations
- Nunavut Land Claims Agreement
- Proposed *Nunavut Planning and Project Assessment Act*
- *Nunavut Waters and Surface Rights Tribunal Act*
- *Public Health Act* (Nunavut)
- *Safety Act*
- *Scientists Act*
- *Species At Risk Act*
- *Territorial Lands Act*
- *Territorial Parks Act* (Nunavut)
- *Transportation of Dangerous Goods Act*
- *Wildlife Act*
- *Worker's Compensation Act*

RECOMMENDATION TO THE MINISTER

Collectively, the Board has carefully considered the factors set out in sections 12.4.2(a) and 12.4.2(b) of the NLCA. The Board is of the opinion, based on the submissions of the Parties as set out in the preceding sections of this Screening Decision, that this Project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities; adverse socio-economic effects on northerners; will cause significant public concern; and involves technological innovations for which the effects are unknown.

Therefore, pursuant to Section 12.4.4(b) of the NLCA, the Board recommends to the Minister that Qulliq Energy Corporation's "Iqaluit Hydroelectric" project proposal requires review pursuant to Part 5 or 6 of NLCA Article 12.

The NIRB looks forward to receiving your decision and will respond in a timely and efficient manner to your direction once received.

Sincerely,



Elizabeth Copland
Chairperson
Nunavut Impact Review Board

cc: Honourable Peter Kent, Government of Canada, Minister of Environment
Honourable Keith Ashfield, Government of Canada, Minister of Fisheries and Oceans
Honourable Joe Oliver, Government of Canada, Minister of Natural Resources
Honourable Denis Lebel, Government of Canada, Minister of Transport, Infrastructure and Communities
Honourable Monica Ell, Government of Nunavut, Minister responsible for the Qulliq Energy Corporation
Thomas Kabloona, Chairperson, Nunavut Water Board
Okalik Eegeesiak, President, Qikiqtani Inuit Association
John Graham, Mayor, City of Iqaluit

Attachments: Appendix A: Comment Submissions Received by Parties

Appendix A
Comment Submissions Received by Parties



Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
13UN006
Our file - Notre référence
5510-5-24-2

April 11th, 2013

Jaswir Dhillon
Technical Advisor
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU, X0B 0C0
Via electronic mail to: info@nirb.ca

Re: Notice of Part 4 Screening for Qulliq Energy Corporation's "Iqaluit Hydroelectric" Project Proposal.

Ms. Dhillon,

On March 21, 2013 the Nunavut Impact Review Board (NIRB) invited parties to comment on the Part 4 Screening for Qulliq Energy Corporation's (QEC) "Iqaluit Hydroelectric" project proposal. Aboriginal Affairs and Northern Development Canada (AANDC) appreciates the opportunity to provide comments, and offers the following for the NIRB's consideration.

AANDC has reviewed the project proposal and is of the opinion that due to the nature and scale of the proposed project's activities and components having potential to cause significant adverse environmental impacts and socio-economic effects on northerners, a review is required under 12.4.2 (a) of the Nunavut Land Claims Agreement.

AANDC has conducted a preliminary assessment of the proposal and identified comments pertaining to the NIRB's request:

Whether the project is likely to arouse significant public concern; and if so, why;

- Public concern has been expressed in community consultations regarding the impacts of helicopter use to those using the land (Table 7.5 p 78¹);
- Public concern has been expressed in community consultations regarding the potential impacts to ice fishing at the Armshow South site and potential impacts to travel routes between Kimmirut and Iqaluit (Table 7.5, p 78²).

¹ All references are from QEC's Iqaluit Hydroelectric Project Proposal prepared by Knight Piésold Consulting, February 12, 2013 unless otherwise stated



Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;

- The impoundment of water at both Jaynes Inlet and the Armshow South sites has the potential to alter the hydrology of both these surface water systems (Section 1.3, p 2-7);
- The proposed impoundment and channelling of water through penstocks from the dam site to the powerhouse will dewater a section of river downstream of the dam at both sites resulting in eco-systemic impacts, in particular to Arctic Char habitat (Section 2.5, p 28; Section 8, p 79);
- The construction, operation and decommissioning of the proposed project will result in the loss of vegetation and habitat for wildlife and birds due to ground disturbances and an increase in water level of the impounded lakes (Table 10.3, p 88; Table 10.4 p 90);
- Excavation activities at both sites for both quarry development and the dams will alter landforms and potentially impact permafrost;
- The development of both these sites has the potential to effect ground stability and soil permafrost (Table 10.3, p 88; Table 10.4 p 90);
- The construction, operation and decommissioning of the project has the potential to disrupt traditional land use activities through the use of aircraft, drilling and blasting at site and barging of materials during open-water season (Section 3.6, p 48; Section 4.6, p 58);
- There are potential socio-economic impacts associated with the Armshow South site as the development in that area may impact on a travel route from Iqaluit to Kimmirut (Table 7.5, p 78).

Any matter of importance to the Party related to the project proposal;

- The proponent has indicated that the Armshow South site is considered a “high risk dam” due to the unknown depth of bedrock in the right abutment (Section 4.1, p 51)
- The proponent recognized that suitable foundations may not be found at the Armshow South site without considerable excavation, and the possible alternative design for the site, an earthfill dam, has many risks when built on permafrost foundations (Section 4.2, p 53);
- The proponent has indicated that the “*entire hillslope may be creeping towards the river*” at the Armshow South site, and the maintenance of a penstock may present a design challenge (Section 4, p 51);
- The proponent anticipates the project proposal to undergo a Part 5 Review under the Nunavut Land Claims Agreement (Section 1.8, p 18), and has included this review in the “Project Development Schedule” (Figure 1.6, p 16).

² Concerns regarding the route from Kimmirut to Iqaluit reported in QEC's bi-monthly update, February-March, 2013



Accordingly, AANDC has jurisdictional responsibility in relation to the proposed project, particularly: Ministerial responsibilities for approval of the water licence and administration of Crown land. Furthermore, AANDC appreciates being of assistance to the NIRB throughout the impact assessment process, and expects to offer expertise in the following:

- Geotechnical engineering and permafrost considerations
- Site water management
- Surface water quality and quantity and groundwater quality
- Wastewater treatment
- Waste management plan (hazardous and non-hazardous)
- Quarry design and construction
- Emergency response and spill contingency plan
- Closure and reclamation planning
- Environmental monitoring and management plans
- Cumulative effects and alternatives assessment
- Proposed mitigation measures
- Socio-economic impact and benefits analysis

AANDC looks forward to working with the NIRB and the Proponent throughout the environmental assessment of this project. Should you have any questions, please contact James Neary at (867) 975-4567 or by e-mail at james.neary@aandc-aadnc.gc.ca.

Sincerely,

[original signed by]

Margaux Brisco
Manager, Impact Assessment



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 2 (867) 975-7870
 3 www.gov.nu.ca

Appendix

Aquatic Environment

The proposed hydroelectric dam project for the Jaynes Inlet and Armshow South waterways poses concerns for native fish populations. Arctic char is an anadromous migrating species found in these waterways and is an integral part of the Arctic ecosystem and of traditional diets. Potential risks to this species include habitat loss and the creation of barriers to fish passage. The Jaynes Inlet and Armshow South waterways are important locations for fishing and other traditional activities, and the development of these areas is likely to arouse significant public concern.

Failing to maintain an in-stream flow requirement during the summer months may negatively affect fish populations by reducing habitat, restricting fish passage, and altering thermal conditions in streams. Although natural barriers to fish passage such as small waterfalls currently exist in the streams in question, the proposed project has the potential to drastically alter stream flow, the shape of the waterways, and the makeup of the stream beds over time. Such changes could result in changes to fish migration patterns. Fish ladders are the conventional approach to mitigate barriers to fish passage. However, their effectiveness for Arctic char remains poorly understood.

A thorough understanding of baseline conditions is required to assess the impacts of the proposed project on aquatic life. A combination of traditional knowledge and scientific studies should be used. Population size, movement patterns and contaminant load in fish will provide valuable insight into fish population health. The flooding of land has the potential to increase mercury levels in the waterway and in turn increase levels found in fish. Routine monitoring of population size, movement patterns and contaminant load in fish following the implementation of this project will be necessary to ensure the health of fish populations.

Should this project proceed, the construction period will inevitably fall during the open water season, which overlaps with the Arctic char spawning period. The impacts of heavy machinery in and around stream beds should be minimized to reduce the amount of sediment which drains into waterways. Construction also poses concerns for local hunters harvesting marine mammals and birds. Noise from low-level flying helicopters, a potential airstrip, and drilling, blasting, and excavation at construction camps may detrimentally affect the success of local hunters. Other construction associated activities such as barges landing on the coast may also affect harvests. Consultation with local hunters will be required to mitigate such risks.

The project proposal is likely to cause significant adverse eco-systemic effects. The information which has been provided to date is not sufficient to comment on the completeness and suitability of baseline studies. This project may present research collaboration opportunities with hunter and trapper organizations, government, or other research bodies. Such collaborations should be sought out to better understand baseline conditions and monitor systems during and following installation.

Katannilik Territorial Park

According to the Project Proposal, a portion of the proposed hydro development site is to be located within the boundaries of the proposed Katannilik Territorial Park. The primary focus of the proposed Katannilik Park is the Soper River valley, which was designated as a Canadian Heritage River in 1992 for its cultural and natural heritage and recreational opportunities. The proposed park also includes land that connects the Soper River at Mount Joy to the shores of Frobisher Bay to facilitate travel between Kimmirut and Iqaluit (known as the Itijjagial Trail). The proposed park is home to unique geology and landforms that are not typical of the South Baffin and Nunavut eco-regions. The lands were identified with the goal of providing protection to a highly significant ecosystem and creating a major backcountry recreation destination in the region.

The Park Master Plan highlights the following goals for the park:

- To provide high quality recreational opportunities that will assist visitors in appreciating and understanding the local and regional environment and its cultural context
- To protect the natural and cultural resources within the park that combine to make the area recreationally significant and to ensure continued benefit of these resources by residents.
- To achieve these goals, the Master Plan outlines the following objectives:
- To encourage and promote the appropriate use and understanding of the park through a variety of wilderness activities and interpretive opportunities.
- To develop and maintain support facilities and services at appropriate locations in support of those activities
- To maintain the integrity of the natural and cultural resources of the park
- To recognize Inuit rights in the park
- To encourage participation in park planning, development and operation of facilities and services
- To encourage the cooperative development of regional recreation and tourism opportunities

The Government of Nunavut has managed and operated these lands similarly to a “Natural Environment Recreation Park” under the Territorial Parks Act (the “Act”) since 1993. Natural Environment Recreation Parks are established “to preserve the natural environment in those parks for the benefit, education and enjoyment of the public”. It is the GN’s goal to have the lands designated as a Territorial Park under the Act.

It is important for the proponent to recognize that any proposed development must adhere to the values and objectives for which the park lands have been chosen for designation and to develop options that will ensure that the integrity of the natural, cultural and recreational resources of the proposed park are maintained.

In keeping with the IIBA and NLCA, Territorial parks are planned and managed jointly with Inuit. The review of any development or conditions associated with a proposed development would

also require approvals from a Community Joint Planning and Management Committee (or equivalent) under the terms and conditions of the Territorial Parks IIBA.

Itijjagial Trail and Park facilities

As indicated in Figure 1.4, Section 2.5.2, and Section 4 of the Project Proposal, the Armshow South hydro site and associated transmission lines will have a significant impact on users of the Itijjagial Trail. The Itijjagial Trail traverses the Meta Incognita Peninsula west of Frobisher Bay eastward towards the confluence of the Soper and Joy Rivers and carries on to Kimmirut through the Soper River Valley. This is an important travel and recreation destination year round, but it is especially utilized in the late winter and early spring months by a variety of user groups. The proposed damming and flooding of Armshow South Lake will have a significant impact on park trail users and potentially current park infrastructure (Katannilik Park – Cabin #1 and #2 are located adjacent to the flooding zone). Section 4.2 of the Project Proposal suggests the dam will “raise the current lake level by a maximum of approximately 25 meters”. This is a significant increase and more information and analysis is required by the proponent (including flooding modeling and methodology) to properly assess and potentially mitigate the short, medium and long-term impacts to park users, wildlife, aquatic life and park infrastructure in the Armshow South study area.

In light of its proximity to the communities of Iqaluit and Kimmirut, and its potential to run visible interference with waterways that are popular fishing sites, this project proposal is likely to arouse significant public concern. This is particularly the case as the project will likely undergo the vast majority of its construction during the same months during which traditional use of the waterways and surrounding areas is at peak levels.

Noise, Vibrations and Dust and Impact to Users

Figure 1.4 and Section 4.6 of the Project Proposal indicate that a large array of equipment (see table 3.1) is needed for the construction of the 25 meter high dam at the outlet of the upper lake, establishment of a rock quarry near the dam location, 5.96 km long surface penstock, construction of a Powerhouse, 0.6 km long tailrace to discharge water from the power house, and access road from the powerhouse to the proposed barge landing. These elements of the project fall within proposed park boundaries and may have negative eco-systemic and socio-economic effects. In particular, Nunavut Parks has concerns about the negative impacts this activity will have on the integrity of the natural, cultural, and recreational resources found within proposed park boundaries. Updated and site specific construction, operation, and decommissioning details and mitigation plans are essential to ensure that the effect of noise and dust on recreational users within park boundaries is adequately mitigated.

Transmission lines

As indicated in Section 5 and Figure 1.4 of the Project Proposal, the proposed transmission line route between Jaynes Inlet, Armshow South river and onward to Iqaluit will pass through the proposed boundaries of Katannilik park. Nunavut Parks has communicated that negative visual

impacts on the landscape caused by the transmission line crossing Katannilik Park must be minimized. Further, the integrity of the natural, cultural and recreational resources with the park boundary must also be maintained.

Cumulative Effects and Climate Change

The proposed project entails a long temporal timeline for development, operation and decommissioning. The proponent indicates that following NIRB approval and finalization of an IIBA, a 3-year construction phase will begin in 2016 for the proposed Jaynes Inlet hydro site. Construction on the Armshow South hydro site is expected to begin between 2025-2030. Conditions can change over a 15 year time period and a precautionary approach should be applied. The GN asks that the proponent provide details of how the effects of climate change (for example, forecasted precipitation levels over the next 50 years) and potential cumulative and residual effects of increased activity in the area will affect the proposed project. The GN also asks that the proponent provide the assumptions made about the effects and future effects, and detail approaches to minimize these effects with specific emphasis on the Armshow South hydro project within the proposed territorial park boundaries.

Aircraft

Section 4.6 of the Project Proposal indicates that the proponent will use one L4 to B2 Helicopter and one large transport helicopter in the construction and operation phases of the Armshow South river hydro site. Nunavut Parks has concerns over the impact of low-level flying within the proposed park's boundaries to user groups and wildlife. Best practice low level flying standards should be applied within the boundaries of the proposed territorial park to minimize disturbance to wildlife and park users. The proponent should work with GN, DOE to develop a policy and procedure for aircraft flight in the park.

Fuel Storage, Spills and Waste

The transportation, storage or transfer of fuel is a potential health, safety and environmental hazard and should be minimized within the boundaries of the proposed park. Waste disposal and management during the construction, operation, and decommissioning phases also poses a concern. Complete fuel, waste and storage, and spill contingency management plans are required.

Socio-Economic

Housing

It is suggested that QEC conduct an assessment of the project's impact on housing demand factors, as well as the impact of changes in income on Public Housing rent scale. As two Public Agencies, QEC and NHC can work closely to ensure that the Project does not negatively affect the housing situation in Iqaluit.

The Project proposal, section 1.3.4, pg. 7-10 states: “Each site will be constructed over three years, or possibly over two years...” and “Construction crews will likely work either 4-week on 2-week off or 6-week on / 2-week off work rotations, and all crew changes from Iqaluit will be by helicopter.”

NHC recognizes the importance of the project in reducing overall energy costs in Nunavut. If the project construction causes speculative in-migration to Iqaluit from other Nunavut communities, or from outside the territory, there may be an increase in demand for housing in Iqaluit. Public, private, or GN staff housing may be affected.

Changes in income for individuals involved in project construction may cause rental rate adjustments for those living in Public Housing. A thorough knowledge of these expected changes will be important for NHC’s planning and assessment of project impacts.



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April 11, 2013

EC file : 4703 004 019
NIRB file: 12UN006

Jaswir Dhillon
Technical Advisor
Nunavut Impact Review Board
PO Box 1360, 29 Mitik
Cambridge Bay, NU X0A 0C0

Via email: info@nirb.ca

RE: NIRB 13UN006: Notice of Part 4 Screening for Qulliq Energy Corporation's "Iqaluit Hydroelectric" project proposal

Thank you for the opportunity to provide input into the Nunavut Impact Review Board's (NIRB) Part 4 Screening decision for Qulliq Energy Corporation's proposed Iqaluit Hydroelectric Project. The following specialist advice has been provided pursuant to the *Canadian Environmental Protection Act 1999*, the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

After reviewing the project proposal and supporting documents Environment Canada (EC) is of the opinion that the proposed project may cause significant adverse effects on the ecosystem. This advice is based on the scale of the proposed project and the anticipated environmental impacts that may occur if the project proceeds. Potentially impacted ecosystem components falling under EC's mandate include, but may not be limited to:

- Surface freshwater as a result of changing lake levels, nutrient input from blasting and sewage treatment, suspended sediments as a result of construction activities, surface runoff from blasting and crushed rock, and accidents and malfunction;
- Air quality as a result of project site activities including operation of an incinerator, operation of equipment on site and along transmission corridor, and marine barge shipping;
- Migratory birds as a result of habitat loss and disturbances at the proposed site facilities and transmission corridor; and,
- Species at risk as a result of habitat loss and disturbance at proposed site facilities and transmission corridor.

Due to the potentially significant adverse impacts to these ecosystem components resulting from the project, it is EC's opinion that a review be recommended by the NIRB as required under Article 12, Section 12.4.4(b) of the Nunavut Land Claims Agreement.

If there are any changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact Paula C. Smith with any questions or comments with regards to the foregoing at (867) 975-4631 or by email at Paula.C.Smith@ec.gc.ca.

Regards,



Susanne Forbrich
Manager, Environmental Assessment and Marine Programs

cc Carey Ogilvie, Head, Environmental Assessment North, EA and Marine Programs Division, EC



Fisheries and Oceans
Canada

Pêches et Océans
Canada

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April 8, 2013

Your file *Votre référence*
13UN006

Our file *Notre référence*
12-HCAA-CA7-00020

Jaswir Dhillon
Technical Advisor
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU
X0B 0C0

Dear Ms. Dhillon:

Subject: DFO Comments, Review of Project Proposal for Qulliq Energy's Iqaluit Hydroelectric Project.

On March 27, 2013 Fisheries and Oceans Canada received Qulliq Energy Corporations Project Proposal for the Iqaluit Hydroelectric Project. On March 22, 2013, the Nunavut Impact Review Board notified parties of the commencement of the Part 4 Screening Review for the Project and requested comment on the Proposal.

Based on information that was presented at a preliminary meeting held with environmental representatives from the Iqaluit Hydroelectric Project on December 13, 2012 and taking into consideration the written project description dated March 11, 2013 (received 27th), it was determined by DFO that the development of the Project may cause a harmful alteration, disruption or destruction of fish and fish habitat, and may require an Authorization under subsection 35(2) of the *Fisheries Act*. Aspects of the Project that may result in impacts to fish and fish habitat include:

- The potential for flow reduction affecting fish passage and fish habitat in rivers and tributaries affected by this Project
- The potential for affects to fish and fish habitat as a result of lake drawdown during dam operations
- The potential for changes to water quality and stream morphology
- The potential for reduction in invertebrate production
- The potential for creation of barriers to fish passage
- The potential for effects in the marine environment as a result of additional freshwater inputs due to dam operations

- The potential for impacts to fish habitat as a result of barge construction and operation; as well as potential requirement for dredging to support the barge landing site

Fisheries and Oceans Canada appreciates the opportunity to provide comments on the Project which are based on our understanding of the supporting documents submitted by the Proponent to date. DFO is committed to working with NIRB, Qulliq Energy and other Federal and Territorial Agencies during the regulatory review of this development proposal.

Should you have any questions or comments, please contact me directly by telephone at (867) 979-8019, or by e-mail at Elizabeth.Patreau@dfo-mpo.gc.ca.

Yours sincerely,

Elizabeth Patreau
Senior Fish Habitat Biologist

c.c.: Julie Dahl – Manager, Fisheries Protection Program



April 11, 2013

Jaswir Dhillon
Technical Advisor
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU X0B 0C0

NIRB File#: 13UN006
NRCan File#: NT-076

Via email: info@nirb.ca, jdhillon@nirb.ca

Re: Natural Resources Canada's Comments regarding the Nunavut Impact Review Board's (NIRB/Review Board) Notice of Part 4 Screening for the Iqaluit Hydroelectric Project proposal

On March 21, 2013 the Nunavut Impact Review Board (NIRB) invited parties to comment on the Part 4 Screening for Qulliq Energy Corporation's (QEC) Iqaluit Hydroelectric project proposal. Natural Resources Canada (NRCan) appreciates the opportunity to provide comments, and offers the following for the NIRB's consideration.

Based on the information in the project proposal (February 12, 2013) and supporting documents, NRCan has determined that the department is likely to have regulatory responsibilities for the project, as we may issue a licence pursuant paragraph 7(1)(a) of the *Explosives Act*, for the explosive storage facilities that will be required for the three year construction period of the project.

NRCan has conducted a preliminary assessment of the proposal and identified the following comments pertaining to the NIRB's request:

- ***Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;***

Based on NRCan's review of the project proposal (February 12, 2013) and our experience in providing geoscience advice for the assessment of other hydroelectric projects across Canada, we do note that hydroelectric projects of this scale have the potential to result in environmental effects related to the aquatic environment (e.g. reduction of downstream water flows, impacts to water quality), and the terrestrial environment (e.g. changes to landforms). NRCan is not in a position to provide comments on the significance of the eco-systemic effects as this is outside our area of technical expertise.

- ***Whether the project is likely to arouse significant public concern; and if so, why;***

NRCan notes that the project proposal includes a summary of public concerns that were expressed in community consultations regarding the potential impacts of helicopter use to those using the land, potential impacts to ice fishing at the Armshow South site and potential impacts to travel routes between Kimmirut and Iqaluit (Table 7.5 p 78)¹. We are not aware however of any additional concerns about this project raised by the public.

¹ Knight Piésold Consulting. February 12, 2013. QEC's Iqaluit Hydroelectric Project Proposal.



- ***Any matter of importance to the Party related to the project proposal;***

From a geoscience perspective, NRCan notes that there is currently some uncertainty with respect to the geology and terrain of the proposed site. Specifically:

- The proponent has indicated that the Armshow South site is considered a “high risk dam” due to the unknown depth to bedrock in the right abutment (Section 4.1, p 51)²
- The proponent recognized that suitable foundations may not be found at the Armshow South site without considerable excavation, and the possible alternative design for the site, an earthfill dam, has many risks when built on permafrost foundations (Section 4.2, p 53)³;
- The proponent has indicated that the “*entire hillslope may be creeping towards the river*” at the Armshow South site, and the maintenance of a penstock may present a design challenge (Section 4, p 51)⁴;

The proponent has indicated that they intend to conduct baseline geology, geotechnical and terrain studies in order to gain a better understanding of the site conditions. The results of these analyses will be an important consideration when completing the design of the project and qualifying and quantifying potential adverse environmental effects of the project.

NRCan appreciates the opportunity to provide comments on the project proposal. Should the project be referred for further review, NRCan may be in a position to provide more detailed scientific and technical advice to the NIRB in the following areas of expertise: geology, permafrost, geological hazards and geomorphology.

If you have any questions regarding the foregoing please contact Kathleen Cavallaro at (613) 996 0055 or via email at Kathleen.Cavallaro@nrcan.gc.ca.

Sincerely,

Original Signed by

John Clarke
Director, Environmental Assessment SPI
Natural Resources Canada

cc: Rob Johnstone, Natural Resources Canada
Anoop Kapoor, Natural Resources Canada

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*



Transport
Canada

Transports
Canada

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Your file / Votre référence
13UN006

Our file / Notre référence
7075-70-1-117

April 11, 2013

Jaswir Dhillon
Technical Advisor
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU X0B 0C0

RE: NIRB's Review of the "Iqaluit Hydroelectric Project"

Dear Ms. Dhillon:

Transport Canada received the Nunavut Impact Review Board (NIRB) letter dated March 21, 2013, which requested parties to review and provide comments on the proposed Iqaluit Hydroelectric Project.

Transport Canada is responsible for the transportation policies and programs that promote a safe transportation system, ensuring that they work effectively and in an integrated manner. After reviewing the project proposal, Transport Canada has identified a particular interest in several components and activities that would pertain to our mandate and area of expertise of our department.

Proposed Works in Navigable Waters

Barge Landings – The proponent indicates that the project includes barge landings on Frobisher Bay. If the barge landings include any existing or proposed works in, on, over, under, through or across a navigable water, an application for Approval under the Navigable Waters Protection Act (NWPA) to the Navigable Waters Protection Program (NWPP) will be required.

Dams and associated works – The dams at Jaynes Inlet and Armshow South may be on navigable waters. If any portion of the generating stations include any existing or proposed works in, on, over, under, through or across a navigable water, an application to the NWPP will be required.

Access Roads - The proponent has indicated that they will be building access roads. These crossings should be assessed against the criteria of the Minor Works and Waters (NWPA) Order, specifically the minor waters and winter crossing sections. Any crossings not meeting these criteria will require application to the NWPP.

Canada 

Transmission Lines - The proponent has indicated that they will be constructing transmission lines. The proponent should assess each individual waterway crossing against the Minor Works and Waters (NWPA) Order and confirm whether the waterway crossings meet the criteria of the Order. Waterway crossings which do not meet the criteria of the order will require an application to the NWPP.

Any other works or proposed works in, on, over, under, through or across a navigable water may require an application to the NWPA. Additionally, any depositing of materials in a navigable water or water that flows into a navigable water is prohibited under the NWPA and may require a Proclamation of Exemption from the Governor in Council prior to proceeding. The proponent should contact the NWPP for more information regarding the NWPA, the application process and these prohibitions.

Marine Based Activities:

Vessels - All vessels transiting through and operating in Canadian Arctic waters are required to comply with the *Arctic Waters Pollution Prevention Act* (AWPPA); the *Canada Shipping Act* (CSA 2001); and their associated regulations - including any requirements for vessel construction and operations. The proponent must confirm that vessels utilized meet the above regulatory requirements. In addition, oil barges should comply with *Standards and Guidelines for the Construction, Inspection and Operation of Barges that Carry Oil in Bulk* (TP 11960). The proponent has proposed that barges will be beached at the project site. As such, Transport Canada requires detailed information regarding the proposed beaching operations.

Fuel Storage and Transfer – Transport Canada is the lead federal regulatory agency responsible for the National Marine Oil Spill Preparedness and Response Regime. Part 8 of the CSA 2001 and its associated regulations and standards govern the regime, which is built upon the polluter-pay principle. Part 8 and its regulations require oil handling facilities (OHFs) to have emergency plans and prevention plans. Additionally, the proponent should refer to the *Arctic Waters Oil Transfer Guidelines* (TP 10783).

Ship's Routing – The proponent must confirm that adequate bathymetric information is researched and available for the route that will be utilized by barges and vessels to the project site.

Compliance with Marine Security - Should the project be approved, Transport Canada will need to know which company is supplying the barges, and if the barges conduct international voyages. If they do, the *Marine Transportation Security Regulations* would come into force and a security assessment and security plan would need to be completed for these barges. Once the barges interface with the site/land when delivering the supplies and equipment, the location would become an occasional-use marine facility and Transport Canada would meet with the proponent to develop security procedures for the site. If the barges are strictly domestic, conducting business in Canada only, Marine Security regulations are not triggered.

Shipping aspects of the project may likely arouse public concern, as it is proposed to utilize barges for shipment of equipment, materials and fuel to the project site.

Civil Aviation Safety

Should an airstrip be constructed at the Jaynes Inlet project site or the Armshow South project site, Transport Canada suggests that the Proponent register the airstrip. The advantages of this free service would be to mark their locations on maps and in GPS databases so pilots can find them easier, and allow instrument approach procedures to the sites to be developed when required.

The proposed airstrip development should be constructed as close as possible in accordance with TP 312 Aerodrome Standards and Recommended Practices; in particular the width of runway shoulders and the set back distances for apron parking areas from the runway so as not to interfere with runway operations.

The guidance provided in *Land Use in the Vicinity of Airports* (TP 1247) should be considered when locating any landfill sites.

Transportation of Dangerous Goods

Persons that handle, offer for transport, transport or import dangerous goods must comply with the TDG Regulations. There is no requirement for permits or licences in order to handle/offer for transport/transport/import dangerous goods. One exception would be for dangerous goods that require an Emergency Response Assistance Plan (ERAP) under Section 7 of the *Transportation of Dangerous Goods Act, 1992* (e.g. certain explosives, propane in 3000 L or greater size tanks). If the Proponent was to offer for transport or import dangerous goods that required an ERAP, they would have to submit a plan to Transport Canada, who would review the plan and, if it is found to be adequate, approve it. ERAPs are intended to assist local emergency responders by providing them with technical experts and specialized equipment at an accident site.

Transport Canada appreciates the opportunity to provide comments on the Iqaluit Hydroelectric Project proposal. These comments are based upon our understanding of the supporting documents submitted by the Proponent.

Should you have any questions regarding Transport Canada's comments concerning this project, please contact me via email at jackie.barker@tc.gc.ca or by telephone at (204) 983-4042.

Regards,



Jackie Barker
Environmental Affairs

Nunavut Impact Review Board

Re : NIRB File No. 13UN006

March 25, 2013

Please accept our comments on the Notice of Part 4 Screening for Qulliq Energy Corporation's "Iqaluit Hydroelectric" project proposal. This is a very important project for Iqaluit, and Nunavut. Nunavut Tourism encourages the development of more "green" power, but has some concerns about this project we would like you to be aware of.

This project could have a significant impact on very popular tourist areas. We want to encourage that the multiple uses of this area be considered, and the project proceed in a manner that will allow these uses to co-exist, with minimized impacts on each other.

Our basic comments are :

- That however the project is carried out, the integrity of the Katannilik Park boundaries and ecosystems be maintained. The Park encompasses very unique landscapes and it is critical that these are preserved. It provides unique tourism opportunities not found elsewhere in Nunavut, and the Soper River is one of only two designated heritage rivers in Nunavut.
- If future plans call for a road to the site, it should be done in a way that it will not detract from the "wild" aesthetic of the area. Nunavut's wilderness is one of its biggest selling points and a road lined with cabins and strewn with garbage would be a huge detraction.
- During the winter and spring months, the snowmobile route through Katannilik to Kimmirut is a major tourism activity, both for tourists from outside the territory and local residents from Iqaluit and Kimmirut. The economic impact of this trail needs to be recognized to include people purchasing supplies for trips, as well as restaurant and hotel traffic at both ends. The proposed damming of the lake will cause an ice wall that could significantly interfere with this snowmobile traffic. We urgently ask that this be examined and be planned in a way that any negative impact to the trail would be minimized or mitigated in some way.
- The area proposed for development is also a major recreational sport fishing area, regularly used by guides and locals in summer and for ice fishing in late winter/spring. The proposed dam and changes to the water levels of the lake and stream could have a significant impact on this fishery. The increased boat traffic caused by shipment of goods to the site could also adversely affect fish migration patterns and quality of fish in the area.

- Environmental safety is paramount regarding potential fuel and sewage spills. We encourage every precaution be taken not to harm these unique environments.
- The incineration of waste is also a concern. If this method of disposal is utilized, fould smells could be released into park area, depending on wind conditions. Our other concern with incineration is that depending on what is burned particulate matter may be released which could negatively affect flora and fauna in the area. As you are aware the tundra environments are very delicate and take a very long time to recover from damage.

Thank you for the opportunity to express our concerns. If you require more information, please do not hesitate to contact me.

A handwritten signature in black ink, appearing to read "C. Dupuis". The signature is fluid and cursive, with a large initial "C" and a stylized "Dupuis" following.

Colleen Dupuis
CEO
Nunavut Tourism

COMMENT FORM FOR NIRB SCREENINGS

The Nunavut Impact Review Board (NIRB) has a mandate to protect the integrity of the ecosystem for the existing and future residents of Nunavut. To assess the environmental and socio-economic impacts of the project proposal, NIRB would like to hear your concerns, comments and suggestions about the following project proposal application:

Project Proposal Title: <u>Iqaluit Hydroelectric</u>	
Proponent: <u>Qulliq Energy Corporation</u>	
Location: <u>Iqaluit</u>	
Comments Due By: <u>April 11, 2013</u>	NIRB #: <u>13UN006</u>

Indicate your concerns about the project proposal below:

<input type="checkbox"/> no concerns <input checked="" type="checkbox"/> water quality <input checked="" type="checkbox"/> terrain <input type="checkbox"/> air quality <input checked="" type="checkbox"/> wildlife and their habitat <input checked="" type="checkbox"/> marine mammals and their habitat <input checked="" type="checkbox"/> birds and their habitat <input checked="" type="checkbox"/> heritage resources in area	<input checked="" type="checkbox"/> traditional uses of land <input checked="" type="checkbox"/> Inuit harvesting activities <input checked="" type="checkbox"/> community involvement and consultation <input checked="" type="checkbox"/> local development in the area <input checked="" type="checkbox"/> tourism in the area <input checked="" type="checkbox"/> human health issues <input checked="" type="checkbox"/> fish and their habitat <input type="checkbox"/> other: _____
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Please describe the concerns indicated above:

The Qikiqtani Inuit Association (QIA) would like to express concern over the QEC Iqaluit Hydro project regarding the lack of information pertaining to the following:

- Flow of water into the ocean and if there is a potential of fresh water altering the hydrology of the ocean and what possible impacts may be;
- Potential causes to the formation of ice due to impacts caused by this development at both Jaynes Inlet and Armshow South areas;
- The terrain that may be affected around the proposed dams at Jaynes Inlet and Armshow South, including and not limited to the potential impacts to human health of increased levels of mercury in the water caused by the flooding;
- The potential affects to wildlife during any and all phases of this development, as well as impacts to their habitats;
- The Nunngarut (A.K.A. Bay of Two Rivers) area has been a heritage resource as well as a traditional area for Inuit usage for fishing and other harvesting activities since time immemorial and more consultations and involvement with the Iqaluit Hunters and Trappers Organization (HTO), the Iqaluit Community Lands and Resources Committee (CLARC) and other citizens of Iqaluit is required by the QIA prior to any development in the area;
- There is a concern over the Kimmirut trail, which begins around the proposed Armshow South Dam area, being affected due to the proposed project. The Iqaluit Community Lands and Resources Committee (CLARC) expressed that they would like to see that area to remain the main trail entrance (basically untouched) since it has been used for many generations and it would be a hardship to try and reroute people that have been using it for traditional, heritage and recreational purposes for so long;
- QIA would like to express that further consideration be made on QEC needing to find

8. Comment Form Distribution

<p>more potential customers which could mean looking at alternative sites;</p> <ul style="list-style-type: none">• QIA places importance on the need to sort out Inuit Impact and Benefit Agreements, Commercial leasing, and water compensation agreements as early as possible where said agreements could affect the feasibility of the project;• Other issues that have been brought up with QIA include the amount of local development the project may bring to Iqaluit; and,• Research on the potential impacts to tourism in Iqaluit is needed especially considering its proximity to the Katannilik Territorial Park.
<p>Do you have any suggestions or recommendations for this application?</p> <p>The QIA recommends a Part 5 Review under the Nunavut Impact Review Board as well as more research into the above mentioned topics where the findings are shared with QIA.</p>
<p>Do you support the project proposal? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Any additional comments?</p>
<p>Name of person commenting: Megan Pizzo-Lyall of Qikiqtani Inuit Association</p>
<p>Position: <u>Project Coordinator</u> Organization: <u>Qikiqtani Inuit Association</u></p>
<p>Signature: _____ Date: <u>April 17, 2013</u></p>

130412-13UN006-Hamlet of Kimmiut Comments-1A1E
From: Senior Administrative Officer <saokim@qiniq.com>
Sent: April -12-13 11:30 AM
To: 'Info at NIRB'
Subject: RE: NIRB 13UN006: Comments Received for Qulliq Energy Corporation's

"Iqaluit Hydroelectric" project proposal

Good afternoon Derek:
Council at their Regular Council Meeting on April 9, 2013 was presented the above subject. Council felt that Iqalumiut need to deal with the project as it is for Iqaluit. In the meantime, Council indicated that long term planning is required before any extension, potentially Kimmiut that some day may be able to get hydroelectric connectivity with Iqaluit during initial meetings. Joe Arlooktoo and Maliktoo Lyta represented Kimmiut during initial survey before funding depleted. I have also informed that Qulliq Energy Corporation's representative will be visiting Kimmiut time to time for input/concerns/comments to the proposed project "Iqaluit Hydroelectric" Sincerely,

Saqiqtaq Temela
Senior Administrative Officer
Municipality of Kimmiut
Tel: 867 939 2247
Fax: 867 939 2045

From: Info at NIRB [mailto:info@nirb.ca]
Sent: Friday, April 12, 2013 12:00 PM
To: 'Distribution List'
Cc: 'skerr'; Richard Cook
Subject: NIRB 13UN006: Comments Received for Qulliq Energy Corporation's "Iqaluit Hydroelectric" project proposal

Dear Parties,

On March 21, 2013 the Nunavut Impact Review Board (NIRB) requested comments from this distribution list regarding Qulliq Energy Corporation's (QEC) "Iqaluit Hydroelectric" project (NIRB File No.13UN006). The NIRB requested that these comments be provided by April 11, 2013.

Please be advised that on or before April 11, 2013 the NIRB received comments from the following parties:

? Government of Nunavut
? Nunavut Tourism
? Environment Canada
? Aboriginal Affairs and Northern Development Canada
? Department of Fisheries and Oceans
? Natural Resources Canada
? Transport Canada

Submissions have been uploaded to the NIRB's online public registry and are available at the following link:

ftp://ftp.nirb.ca/01-SCREENINGS/ACTIVE%20SCREENINGS/13UN006-QEC%20Iqaluit%20Hydro/02-DISTRIBUTION/COMMENTS/

130412-13UN006-Hamlet of Kimmirut Comments-IA1E

Should you have any questions or require additional information, please contact Jaswir Dhillon, NIRB's Technical Advisor, at jdhillon@nirb.ca or 867-983-4609.

Best regards,

Derek Ehaloak
Environmental Administrator

Nunavut Impact Review Board
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