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2016 04 07

Tracey Braun
Director – Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
123 Main Street, Suite 160 (Box 80)
Winnipeg, MB R3C 1A5

Dear Ms. Braun:

**RE: KEYYASK GENERATION PROJECT – ALTERATION REQUEST
EXTEND FOOTPRINT OF CENTRAL DAM COFFERDAM AND TAILRACE SUMMER LEVEL
COFFERDAM
ENVIRONMENT ACT LICENCE NO. 3107, CLIENT FILE 5550.00**

Manitoba Hydro, in its delegated authority to manage construction of the Keeyask Generation Project on behalf of the Keeyask Hydropower Limited Partnership, is requesting an alteration to Environment Act Licence (EAL) No. 3107 to:

- Extend the Central Dam Cofferdam beyond the footprint limits; and
- Re-align the Tailrace Summer Level Cofferdam beyond the footprint limits.

The attached document outlines the description of the work and the potential environmental effects. The work on the Central Dam Cofferdam is proposed to occur prior to May 15, 2016 and the work on the Tailrace Summer Level Cofferdam from July 16 – September 14, 2016. It should be noted that a request to conduct in-stream work during the restricted activity timing window will be made to DFO.

If there are any questions or concerns with this request, please contact Jodine MacDuff at 204-360-5539.

Yours truly,

A handwritten signature in black ink, appearing to read 'Dave Bowen'.

Dave Bowen, P. Eng, M.Sc
Keeyask Project Manager
Generation Operations

Att.

Keeyask Generation Project
Central Dam Cofferdam Extension and Tailrace Summer Level Cofferdam Modification
Description of Construction and Potential Environmental Effects

Manitoba Hydro, in its delegated authority to manage construction of the Keeyask Generation Project on behalf of the Keeyask Hydropower Limited Partnership, is requesting:

An alteration to *Environment Act* Licence (EAL) No. 3107 to:

- Extend the Central Dam Cofferdam beyond the footprint limits; and
- Re-align the Tailrace Summer Level Cofferdam beyond the footprint limits.

An amendment to the *Fisheries Act* Authorization to:

- Conduct in-stream work on the Central Dam Cofferdam Extension during the fall and spring restricted activity timing window (up to May 15); and
- Conduct in-stream work on the Tailrace Summer Level Cofferdam during the fall restricted activity timing window (up to September 15).

Central Dam Cofferdam Extension

A proposal is being made to extend the Central Dam Cofferdam (CDCD) to a nearby island (the island) immediately downstream of the CDCD prior to May 15, 2016. This work will involve extending the CDCD by constructing two additional short cofferdams to connect the existing CDCD to the island (see attached figure).

Construction of the Central Dam requires that the area immediately upstream of the CDCD be dry and in a dewatered state. In the fall of 2015, seepage at the CDCD was much greater than the expected design seepage rate due to unforeseen geological conditions. Activities on the CDCD to reduce the seepage were completed December 4, 2015 and seepage was reduced to a manageable level but remained higher than the design seepage rate.

In areas where seepage is concentrated, excavation for the Central Dam will require it to be deeper than originally designed because the bedrock is lower than expected. As the excavation deepens the expected seepage is expected to increase. The intentions are to manage the seepage with additional pumps; however, alternative options are being examined to reduce the seepage.

Constructing the additional cofferdams is expected to reduce the differential head across the CDCD, which would reduce seepage and allow for the Central Dam excavation and construction to occur in the dry. Maintaining the area behind the CDCD in a dewatered state is imperative to be able to construct the Central Dam.

Each of the two, proposed cofferdams will consist of a rock-filled groin with a sand filter and impervious blanket on the upstream side. Construction methods will follow those described in the Environmental Impact Statement (Section 3.4.4 of the Project Description Supporting Volume).

The anticipated duration of the construction of the extension is 2-3 weeks and is proposed to commence in April and be completed by May 15, 2016, this will avoid construction delays on the Central Dam. Should construction of the rockfill portion of the cofferdams not be complete by May 15, the remaining in-stream work to complete the cofferdams will be deferred until July 16, 2016. If the rockfill portion of the cofferdam is complete by May 15, placement of the sand filter and impervious blanket on the upstream side will continue.

Once constructed, the area between the two cofferdams will be dewatered. The dewatering and fish salvage is expected to be completed after May 15. An area of 1.7 ha will be impacted as a result of the new structures.

The CDCD extension will be removed which can start once the Central Dam is constructed to an elevation that is the same as the CDCD.

Potential Environmental Effects and Mitigation

In-stream work will take approximately 2-3 weeks commencing in April and will be complete by May 15, 2016. Effects of this work on fish and fish habitat include:

1. Dewatering 1.7 ha of Gull Rapids during the restricted activity timing window

High water velocity at the location of the proposed CDCD extension and the timing of the proposed work (late winter) makes it unlikely there will be many fish at this location and, based on fish salvages conducted in the central channel of Gull Rapids and within the spillway cofferdam, the majority of large-bodied fish present likely will be juvenile Longnose Sucker.

The DFO timing window for in-stream construction for northern Manitoba includes May 1-15 for spring-spawning fish. However, site-specific information collected during the Keeyask environmental studies indicates that conditions are typically not suitable for spring-spawning species in the mainstem of the Nelson River until at least May 15, due to the persistence of ice and low water temperatures. For example, at the beginning of June 2015, water temperature in Gull Lake was 5-8°C, which is the range when spring-spawning species may spawn, and ice was still present on the bays. Therefore, no spring-spawning species are expected to be moving into Gull Rapids prior to May 15.

Given that water temperatures will likely be at or near freezing, fish salvage will not be feasible prior to May 15. Temperatures will be monitored and the fish salvage will be conducted at the time it can be successful.

The proposed work will occur during the in-stream timing window for fall-spawning fish. It is not known whether Lake Whitefish spawned last fall/winter in the CDCD area that will be de-watered, though tracking of fish movements as part of the *Aquatic Effects Monitoring Plan (AEMP)* suggests that they continue to spawn in Gull Rapids despite construction activities. Any eggs within the confines of the cofferdam would be destroyed. The Keeyask EIS predicted that Lake Whitefish would experience weaker than normal year-classes during the construction period, due to the loss of spawning habitat in Gull

Rapids. The EIS indicated that no significant effect to the Lake Whitefish population in Stephens Lake was anticipated due to the presence of other spawning habitat in Stephens Lake, the relatively short duration of the construction period, and the construction of alternate spawning habitat at the end of the construction period.

2. Permanent loss and/or alteration of fish habitat in Gull Rapids

The proposed cofferdam falls within the area identified in the *Fisheries Act Authorization* as permanent alteration of habitat (dewatering of rapids downstream of spillway). Placement of this structure will not result in a change to the permanent effects to fish and fish habitat predicted in the EIS.

3. Release of sediments to the aquatic environment

Construction of the cofferdam will result in the release of sediments to the Nelson River. Experience with previous cofferdams has demonstrated that sediment inputs from cofferdam construction *per se* are not large. The real-time turbidity loggers used to track sediment inputs as per the *Sediment Management Plan for In-Stream Construction (SMP)* are currently not installed as it is the shoulder season and will not be in place during the construction of the CDCD extension. As discussed above, Lake Whitefish may have spawned in the vicinity of the cofferdam, and eggs may be adversely affected by elevated TSS. The area affected by elevated TSS is not expected to be large, due to rapid dilution within the flow of the Nelson River.

During cofferdam dewatering, if water is discharged directly to the Nelson River, total suspended solids (TSS) will be less than 25 mg/L.

Modifications to the Tailrace Summer Level Cofferdam Alignment and Construction Timing

The location and general construction methodology used to build the Tailrace Summer Level Cofferdam are described in the *Keeyask Generation Project Environmental Impact Statement Response to the Environmental Impact Statement Guidelines (EIS) and Project Description Supporting Volume*.

Early in 2014, Manitoba Hydro engaged the general civil contractor (GCC) to review the designs and construction methodologies for river management. At that time, the GCC proposed that the Tailrace Summer Level Cofferdam should be combined with the Powerhouse Stage I Cofferdam and the resulting single Powerhouse Cofferdam would be constructed during the summer/fall of 2014. The in-stream construction timing of the single Powerhouse Cofferdam was included in the Keeyask Application for Authorization under Paragraph 35 (2)(b) of the *Fisheries Act Regulation (KAFA)* (June 2014) in Table 4 A and in Table 3 B of the *Fisheries Offsetting and Mitigation Plan (FOMP)*. Table 3 B, was submitted to Manitoba Conservation and Water Stewardship in June 2015. During construction of the single Powerhouse Cofferdam, it was determined that it would not be possible to complete the construction, dewatering and fish salvage prior to freeze up. Therefore, the GCC reverted back to constructing the original Powerhouse Stage I Cofferdam which was completed in the fall of 2014 and the Tailrace Summer Level Cofferdam was not constructed.

The Tailrace Summer Level Cofferdam described in the EIS must now be constructed as originally planned in the EIS, but changing the year in which it is built. According to Section 3.4.3 of the *Project Description Supporting Volume*, the Tailrace Summer Level Cofferdam was identified to be constructed between July 16 and September 14, 2018. The GCC previously indicated that the Tailrace Summer Level Cofferdam would need to occur in the summer/fall of 2017 and excavation of the Powerhouse Discharge Channel in the summer of 2018. They are now working on advancing this cofferdam to the summer of 2016, with in-stream construction scheduled to take place between July 16 and September 14. Advancing construction of the cofferdam to 2016 enables most of the discharge channel excavation to occur in 2017 and reduces the construction activities in 2018. If the cofferdam is not advanced, the work in 2018 will include dewatering, channel excavation and cofferdam removal over a short period of time which puts the construction schedule at considerable risk. Based on the construction schedule, it is not feasible to construct the Tailrace Summer Level Cofferdam in 2018 as stated in the EIS.

Construction methods will follow those described in the EIS (Section 3.4.4 of the Project Description Supporting Volume).

The Tailrace Summer Level Cofferdam as described in the EIS would tie into the Stage I Powerhouse Cofferdam. This would require the outer rock groin and some of the impervious fill from the Stage I Powerhouse Cofferdam to be excavated and removed down to the river bed, which is challenging and extensive, especially since the Powerhouse Cofferdam was raised 7 metres to mitigate against high ice and water levels during the winter of 2014/15. To keep the Stage 1 Powerhouse Cofferdam and winter protection intact, it is proposed that the Tailrace Summer Level Cofferdam be realigned to tie into the Central Dam Cofferdam as shown in the attached Figure.

The additional, temporary in-stream footprint resulting from the re-alignment of the Tailrace Level Cofferdam is approximately 1 hectare and falls within the area identified in the *Fisheries Act* Authorization as permanent alteration of habitat (permanently dewatered area and altered flows). However, this area is beyond the limits identified as the “Planned or Possibly Disturbed Footprint Area” but within the “Altered Water Footprint Area”, shown on Map 5 of the *Keeyask Generation Project Environmental Impact Statement Updates to Project Description Information* (June 2013). This area is within the water lot owned by the Keeyask Hydropower Limited Partnership.

The removal of the Tailrace Summer Level Cofferdam is scheduled to occur in the fall of 2018.

Potential Environmental Effects and Mitigation

The proposed in-stream work would occur from July 15 to September 14, with the intent of finishing early enough in the fall to allow for effective fish salvage. Habitat conditions, fisheries surveys, and fish movement studies suggest that a large number of Lake Sturgeon (adults and juveniles), Walleye and Lake Whitefish may be present during some period of the open water season in this area.

Effects of this work on fish and fish habitat include:

1. Dewatering habitat within the cofferdam within the restricted activity timing window

The in-stream work will extend until September 15, which is included in DFO's timing window for fall spawning fish in northern Manitoba. This activity was included in the EIS and associated habitat alterations were considered in the KAFA. As discussed in the KAFA, information gathered during the Keeyask environmental studies indicates that temperatures suitable for Lake Whitefish spawning typically occur after mid-September, suggesting that a timing window beginning on September 15 is more appropriate. Therefore, no adverse effects to Lake Whitefish spawning as a result of in-stream work extending to September 15 are anticipated. Based on experience with cofferdams constructed in the north and central channels, the following mitigative measures will be employed in order to conduct an effective fish salvage:

- Site staff will work closely with the contractor to ensure that a sufficient number of pumps are available for dewatering;
- Work progress and the construction schedule will be closely monitored to confirm completion dates are met; and
- If the cofferdam cannot be sealed, de-watered and fish salvage conducted prior to freeze up, it will remain in a condition suitable for the survival of fish over winter.

2. Permanent loss and/or alteration of fish habitat in Gull Rapids through construction of the tailrace cofferdam extension.

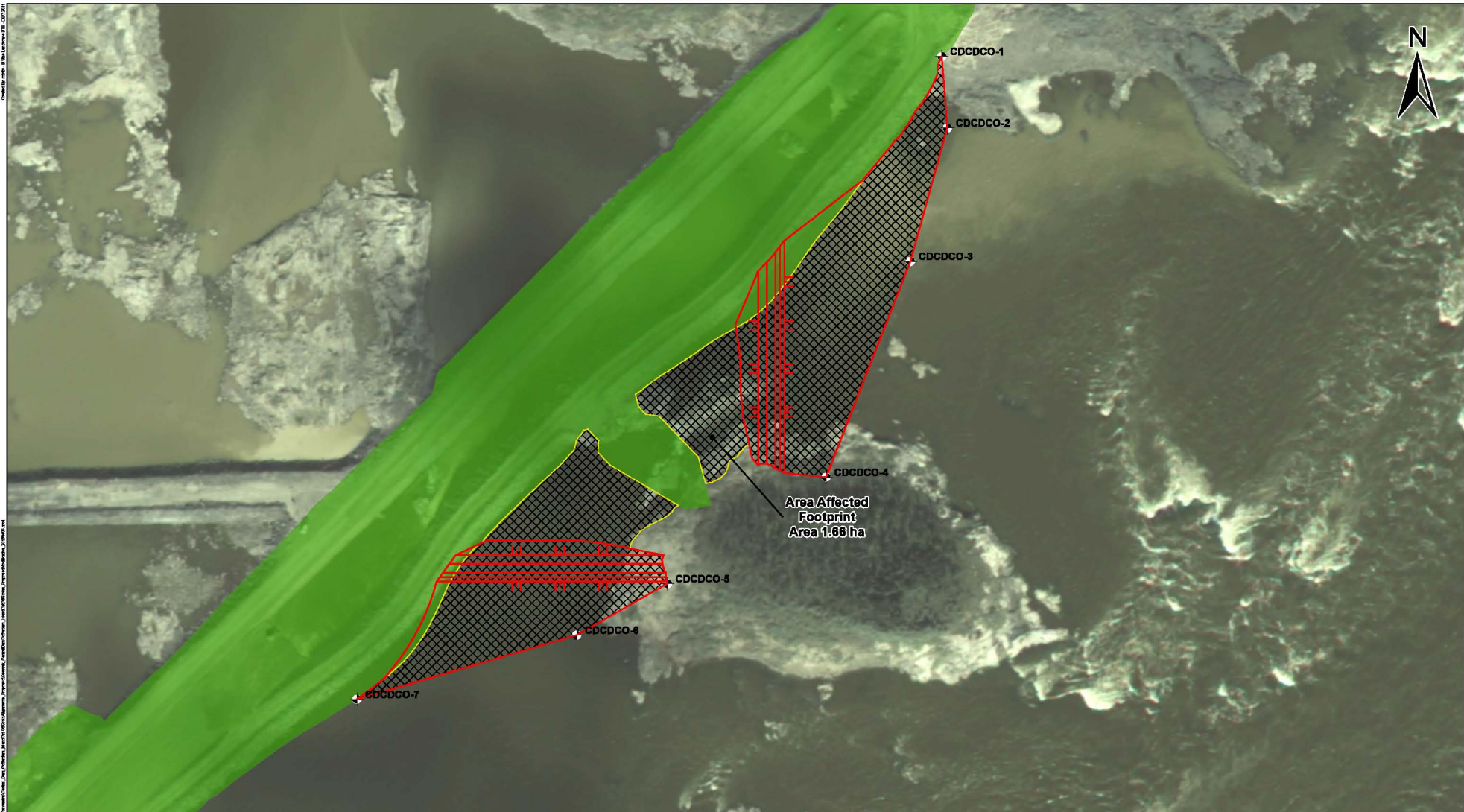

The proposed cofferdam falls within the area identified in the *Fisheries Act* Authorization as permanent alteration of habitat (alteration of rapids to forebay reservoir). The KAFA identified offsetting habitat for the loss of Gull Rapids through the creation of constructed spawning habitat at the tailrace and along the south bank of the Nelson River, and a Lake Sturgeon stocking program. The proposed cofferdam extension will be removed at the completion of construction; therefore the final disposition of habitat remains the same.

3. Release of sediments to the aquatic environment

The proposed changes in Tailrace Summer Level Cofferdam alignment and construction timing are not expected to increase the inputs of sediments to the water above what was predicted in the EIS and has occurred with other cofferdams.

Summary

As a result of the extension of the CDCD and modifications to the Tailrace Summer Level Cofferdam, effects on aquatic habitat and fish greater than that presented in the EIS and the Authorization under the *Fisheries Act* are not anticipated.



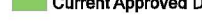
DATA SOURCES:
Manitoba Hydro; Government of Manitoba; Government of Canada;
Worldview 2 Image (Color, 50m, August 2016)

CREATED BY:
Manitoba Hydro - GIS Studies

COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 01-APR-16	REVISION DATE: 05-APR-16
VERSION NO.: 1.0	DATE:	

0 0.015 0.03 Kilometers
0 0.015 0.03 Miles

Legend

-  Proposed Structure
-  Additional Cofferdam Area Affected (Stage IV vs Stage V Modification)
-  Current Approved Design

Central Dam Cofferdam Extension
Proposed Design Modification
April 1, 2016



DATA SOURCE: Manitoba Hydro; Government of Manitoba; Government of Canada; Worldview 2 Image (Color, 50cm, August 2016)			
CREATED BY: Manitoba Hydro - GIS Studies			
COORDINATE SYSTEM: UTM NAD 1983 Z15N		DATE CREATED: 23-MAR-16	REVISION DATE: 23-MAR-16
		VERSION NO.: 1.0	DRAWN:

Legend	
	Additional Cofferdam Area
	Current Approved Design

**Powerhouse Tailrace
 Summer Level Cofferdam
 Extension**
 Proposed Design Modification
 March 23, 2016

DRAFT: For Discussion Purposes Only

Imagery September 2015