

**Dezé Energy Corporation
Taltson Hydroelectric Expansion Project**

Fisheries and Oceans Information Request

IR Number: DFO_01
Source: Fisheries and Oceans Canada
To: Dézé Energy Corporation
Subject: Minimum flow release levels
DAR Section: 6.4.4, Table 6.10.3, 13.1.2.1
ToR Section: 3.1.6.4 (d)

Preamble:

The Terms of Reference require the proponent to provide a description of the biological environment which includes:

d) Any known issues currently affecting fish and aquatic life forms in the development (e.g. contamination of food sources, changes in water level and temperature).

As stated in section 6.4.4 and Table 6.10.3 of section 6.10.4, the existing water license (#N1L4-0154) for the Taltson facility requires a minimum flow of 28 m³/s into the Taltson river below Elsie Falls and 14 m³/s between the outflow of the Nonacho Lake control structure and the Forebay. Maintaining these minimum flow requirements during operation of the Project has been described as one of the mitigation measures to reduce impacts to aquatic resources in the Taltson River Basin. The information collected on the aquatic ecosystem for this environmental assessment may prove useful in verifying that the prescribed minimum flows are indeed adequate to maintain the ecological integrity of the aquatic resources in the Taltson River.

Request:

- 1) That the Dézé Energy Corporation conduct an assessment of the adequacy of the minimum flows prescribed in the existing water license (#N1L4-0154) in maintaining the ecological integrity of the aquatic resources of the Taltson River.

IR Number: DFO_02
Source: Fisheries and Oceans Canada
To: Dézé Energy Corporation
Subject: Flow Control over Tronka Chua Gap
DAR Section: Table 6.10.1, 13.3.3.3.1, 13.9
ToR Section: 4.1.2

Preamble:

The continued unregulated release of flow into the Tronka Chua system through Tronka Chua Gap is identified in Table 6.10.1 as a mitigation feature for potential environmental effects to Zone 2 as it would maintain some flow into the upper reaches of that system when Nonacho Lake levels are above the natural saddle. In section 13.3.3.3.1 of the DAR, it states that under baseline conditions Tronka Chua Gap always carries some flow, while over a 13 year period under the 36 MW and 56 MW options, unregulated releases from Nonacho Lake would only result in flow occurring 65% and 30% of the time, respectively. Based on the Tronka Chua Gap Flow Exceedance Curves (Figure 13.3.19) the baseline flow for 95% exceedance is around 4m³/s while the same flow rate shows exceedance rates of 50% for the 36 MW option and only 15% for the 56 MW option. Changes to flow predicted at Tronka Chua Gap would continue downstream through Zone 2 until Lady Grey Lake where Zone 2 would return flow back into the mainstem of the Taltson River.

As per Table 13.9.7, due to the change in flow over Tronka Chua Gap associated with the Project, effects to fish habitat structure, cover and food supply are predicted in Zone 2. The Dezé Energy Corporation has not conducted any baseline studies on aquatic or fisheries resources, or provided an assessment of fish habitat in Zone 2. Should the flow regime, as described above, be considered for the Project operation, a more detailed examination of the influence of hydrological changes and effect assessment on fish and fish habitat as a result of the changes to flow through Tronka Chua Gap associated with the Project should be conducted for Zone 2.

Request:

- 1) That Dezé Energy Corporation provide a flow control plan for the new Nonacho Dam underflow gates that allows flow under the hydro expansion options to be routed via the Gap which will maintain flow rates that are more consistent with existing flows. The plan should include an assessment which demonstrates how the proposed flows will mitigate potential impacts to fish and fish habitat in Zone 2 downstream of the Gap and eliminate the need for a more detailed assessment of impacts within Zone 2.

IR Number: DFO_03
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: In-Stream Works
DAR Section: 6.5, 7.3, 3.4.4 of the Erosion and Sediment Control Plan
ToR Section: 3.2.1, 4.1.2 (j), Table 7-1

Preamble:

The Terms of Reference states that the proponent must identify all proposed mitigation measures for the pathways where predicted impacts are likely to occur. In-stream works are proposed in order to complete the rehabilitation or replacement of the dam, the excavation of a new inlet channel and the raising of the spillway at Nonacho Lake, at the new inlet canal, tailrace, the connection of a by-pass canal at the Twin Gorges site, and the construction of the minimum release facility at the South Valley Spillway.

In section 7.3, the proponent states that DFO has standard operating procedures that relate to issues surrounding erosion and sedimentation. DFO has developed operational statements which describe conditions and mitigation measures for specific routine projects which are known to be of low risk to fish and fish habitat. The above mentioned in-water works do not appear to comply with any of these operational statements. Copies of DFO's Operational Statements applicable for the Northwest Territories can be found on the DFO website at <http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/provinces-territoires-territoires/nt/index-eng.htm>.

The proponent should develop mitigation during the construction of these in-water works that are adequate to avoid or reduce impacts to fish and fish habitat.

With regards to fish species potentially impacted during the lowering of Nonacho Lake starting in October, in order to complete the rehabilitation or replacement of the control structure, section 15.2.3.2.9 states:

“Of the known fish species present in Nonacho Lake (Fig. 15.2.6) northern pike, lake chub, lake cisco, longnose sucker and burbot are shallow water spawners.”

As per section 13.9.1, lake trout may spawn at shallow in-shore areas at depths of 0.12m to 55m. Lake trout in northern lakes can spawn at very shallow depths. Given that the spawning period is in September through October, lake trout are likely to be impacted by the lowering of the water level in Nonacho Lake in October. As lake trout were omitted as potentially impacted species, no mitigation measures have been identified to prevent impacts to spawning lake trout or incubating eggs during the completion of these works.

Request:

That the Dezé Energy Corporation:

- 1) Confirm that all concrete work for the construction of the Taltson project will be isolated from any waterbody/watercourse, that is, completed in the dry.
- 2) Identify the source of the “standard operating procedures that relate to issues surrounding erosion and sedimentation” that was used in the development of the Erosion and Sediment Control Plan, or were intended to be used in the implementation of the plan during construction.

- 3) Complete an assessment of impacts to lake trout as a result of the lowering of water level in Nonacho Lake necessary for the completion of in-water works on the Nonacho Lake Control Structure. This assessment should include a description of mitigation measures that will be implemented to prevent impacts to spawning or incubating eggs.

IR Number: DFO_04
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Fish Mortality from Entrainment and Displacement
DAR Section: Table 15.2.12, 15.3
ToR Section: 5.2.2

Preamble:

As per 5.2.2 of the Terms of Reference, the Dezé Energy Corporation is required to provide:

- b) An assessment of the impact on fish and fish passage through the conveyance canal and turbines; and*
- c) Identification of mitigation measures to minimize impacts to fish and fish passage through conveyance canal and turbines.*

DFO notes the following regarding the assessment of effects of entrainment of fish:

- While the rationale for the assessment of effects of entrainment of fish, including mortality and injury is valid, the potential effects on fish populations upstream of the barriers proposed at Nonacho Lake Control Structure and Twin Gorges facilities has not been undertaken.
- The effects assessment provides a literature review and survival rate calculations based on the general habitat utilization and species composition of fish within proximity of the proposed barriers in order to produce mortality estimates. While species composition and habitat utilization may be important factors, movement characteristics and timing of movement by life history stages may be more important with respect to incidental entrainment. As life history movement and habitat utilization (e.g. depths and zones within the reservoir) may vary by species, assuming that fish with the highest relative densities are at greatest risk to entrainment may not be valid. As such, entrainment probability should not be assessed based on general habitat utilization alone.

- The assessment considers entrainment due to the service turbine operation at Nonacho Lake Control Structure, but does not include the potential for entrainment in the Control Structure itself.
- The presence of Lake Trout immediately below the Nonacho Lake Control Structure suggests that there is either: displacement of adult Lake Trout from Nonacho Lake and/or, downstream populations of Lake Trout exhibit upstream movements related to life history needs. These needs could be extended to other fish species.

Request:

That the Dezé Energy Corporation:

- 1) Revise section 15.3.2.6 of the DAR to include common mitigation techniques available to prevent the entrainment and mortality of fish at hydroelectric facilities;
- 2) Provide examples of hydro projects where intake canals were designed to be unsuitable as fish habitat, and not screened, as a measure to prevent fish from entering hydro turbine and assess if these were successful in preventing fish entrainment.
- 3) Provide an assessment of population-level effects on fish stocks in the Forebay due to entrainment or displacement of fish downstream of the Twin Gorges facilities. These population-level effects should be included in the analysis of the magnitude of effect.
- 4) Provide a rationale, and additional information on the specific life history movement characteristics of the fish species that may utilize the canal, to support the three assumptions presented in section 15.3.2.8.1.5.
- 5) Revise the proposed mortality estimates provided in section 15.3.2.8.1.5 based on the age and size compositions of fish populations known to utilize the Forebay around the North Gorge Canal and South Gorge Spillway areas.
- 6) Provide an assessment of the potential for downstream displacement or entrainment of fish during the operation of the Nonacho Lake Control Structure as well as the requirement for fish passage for lake trout and/or other species.
- 7) Provide an assessment of potential population-level impacts and fish movement characteristics for lake trout, northern pike and lake whitefish in Nonacho Lake. Data or studies should be provided to justify that only a small proportion of fish populations may be entrained as stated in section 15.3.3.8.1.

These population-level effects should be included in the analysis of the magnitude of effect.

IR Number: DFO_05
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Ice structure and Under Ice Dissolved Oxygen Levels
DAR Section: 13.6.7, 13.6.11, 14.4.3.4.6, 14.4.3.3.6, 14.8.5.1.2.2
ToR Section: 4.1.2 (b, c, d, g, h, i)

Preamble:

The qualitative assessment of potential changes in ice structure was based on three ice field studies within the Taltson River watershed and on predictive hydrologic modeling.

Given that flow levels through Tronka Chua Gap and over the South Valley Spillway will decrease under both the 36 MW and 56 MW expansion options, it is important to understand the predicted ice conditions in these two areas. Reduced flows could result in build up of ice downstream of the Gap and less oxygen to overwintering habitat in the downstream lakes, which may lead to adverse impacts to fish and fish habitat. In section 13.6.7, the Dezé Energy Corporation acknowledges that more studies are required in Zone 2 to fully characterize ice freeze-up and mid-winter conditions.

Sections 14.4.3.3.6 and 14.4.3.4.6 compare predicted dissolved oxygen (DO) to the CCME guidelines of 6.0 mg/O₂/L for sensitive early life stages and 5.5 mg/O₂/L for all other life stages of fish. These thresholds were intended for warm water waterbodies. The analysis should be based on the cold water values of 9.5 and 6.5 mg/O₂/L provided in the CCME guidelines. A review of the predicted DO values for Gertrude, Trudel and Unnamed Lakes under both options indicate that DO levels would below the recommended values for sensitive early stages for all lakes as well as below the recommended values for all other life stages in Unnamed Lake.

Using the warm water values, it was acknowledged in the DAR that the minimum value for sensitive early stages would not be met under either option in Unnamed Lake but it was concluded that uncompromised connectivity along Trudel Creek throughout the winter would allow for sufficient inflow of oxygenated water thus increasing DO concentrations to levels above the CCME guidelines. Should connectivity throughout the Trudel Lake system not be achieved during ice conditions, winter fish kills may be induced.

Request:

That the Dezé Energy Corporation:

- 1) Provide a detailed quantitative assessment of changes in flow condition on ice structure based on local river hydraulics and stream morphology for Zones 2 and 5, and assess the potential impacts to fish and fish habitat. As part of this assessment, the impacts of lower flows on water depths and oxygen levels in downstream overwintering habitat should also be included.
- 2) For the 56MW option, provide an assessment of impacts to overwintering fish in Tronka Chua Lake due to reduced dissolved oxygen levels as a result of flow not being maintained through Tronka Chua Gap over the winter season.
- 3) Re-assess the potential impacts to aquatic life using the cold water DO values presented in the CCME guidelines (1999).
- 4) Provide any data collected on dissolved oxygen (DO) during the ice observation field visits along the Taltson River and Trudel Creek. If this information was not collected, the Dezé Energy Corporation should commit to conducting baseline DO sampling during the winter season in Zones 2 and 5, at a minimum, to verify the conclusion reached by the model. Year round sampling of DO for Zones 2 and 5 should form part of the Project's DO monitoring program.
- 5) Provide supporting evidence to the conclusion that the reduced flow expected during the winter season will be sufficient to uphold the concentration of DO as prescribed in the CCME guidelines for cold water.

IR Number: DFO_06
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Wetlands
DAR Section: 13.7
ToR Section: 3.1.6.4 (a,b)

Preamble:

Dezé concluded in their report that wetland extent did not need to be quantified for Zones 2, 3 and 4 as it was predicted that Nonacho Lake and Zone 1 would have the greatest potential for effects. However as stated in section 13.7.9.1.2:

Water levels in Tronka Chua Lake (Zone 2) are expected to drop an average of 26 cm over the year but would be down approximately 50 cm during the growing season. This would change the hydrology of riparian marshes and would lead to an alteration of extent and function in this part of the zone.

[...] Water levels in Tsu Lake (Zone 4) are expected to drop an average of 33 cm in the growing season. This would elicit a low to moderate reduction in riparian marsh extent and function.

The decision to not include Zones 2, 3 or 4 in the wetland baseline study was rendered when only the 36 MW option was being considered and it was determined that potential effects to wetlands in these zones would be minimal. However, in considering the 56 MW option, and the substantial water level differences likely to occur in Zone 2, additional wetland surveys in Zones 2, 3 and 4 are warranted.

Request:

- 1) That the Dezé Energy Corporation complete additional wetland surveys in Zones 2, 3 and 4. Timelines for the completion of these studies should be provided.

IR Number: DFO_07
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Fisheries Impacts Pathway Validation
DAR Section: 13.9.9.3
ToR Section: 3.2.1

Preamble:

The “rule of thumb” criteria that was used to evaluate flow management for the Taltson basin with regards to migration and/or access to habitats and to food supply was based on whether changes in the water level would be within the range of baseline variation for that month. Both pathways were ranked as either “Minor” if the anticipated average water level was found to be within the baseline range or “Valid” if the anticipated water level was found to be outside of that range.

In terms of ranking criteria, comparing average water depths to the baseline range may underestimate the impacts if the comparison reflects only minimum baseline water depths. Ranking criteria based on water depths above or below the average baseline value would provide a better understanding of the frequency of these pathways.

Validation of the food supply pathway appeared to focus on water levels related to the reduction of fish access to shoreline riparian vegetation and limitation of food supply introduced via seed/detritus and insect drop. It is unclear whether food supply based on items transported along the water course via flowing water was also considered in this pathway. Reduced flow rates may reduce or limit the food supply in some parts of the Taltson watershed where access to shoreline vegetation is limited.

Request:

That the Dezé Energy Corporation:

- 1) Provide background information on the rule-of-thumb criteria used to assess significance of impacts for changes in water level, including examples of where it has been used previously and evidence of it being a valid method of assessment.
- 2) Indicate whether the food supply pathway included items being transported by flowing water to areas of the watercourse where there is no or limited access to shoreline vegetation. If this was not done, please provide a rationale.

IR Number: DFO_08
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Trudel Creek – Weighted Useable Area Analysis
DAR Section: 14.8
ToR Section: 3.2.1, 4.1.3 (a,b)

Preamble:

In order to assess the potential impacts to the fish habitat in Trudel Creek a weighted useable area analysis was used to compare available habitat for the baseline condition (existing flow) and for the 36 and 56 MW expansion options for the three valued ecosystem components of fish species: northern pike, lake whitefish and walleye.

On Page 10 of the Trudel Creek Fish and Fish Habitat Effects Assessment and page 2 of the Trudel Creek Minimum Flow Interim Report it states that the methods used for the assessment follow those recommended in the British Columbia Instream Flow Methodology (Lewis et al, 2004). It should be noted that the procedures presented in these documents do not follow those outlined in Lewis et al. (2004), specifically the critical stages of approach provided on pages 36 through 44 and notably Points 1 through 7 on page 37. If the assessment of flow-related impacts did not follow the rationale and approach of Lewis et al. (2004), the actual rationale and supporting information should be presented.

The assessment does not include linear distances or area-based assessment of riverine habitats, or a rationale specific to habitat utilization and critical life histories of the species in these reaches. The sections modelled may not be representative of flow-sensitive habitats or critical habitats.

Request:

- 1) Provide the rationale and approach used to develop the methods for conducting the assessment of flow-related impacts in Trudel Creek.
- 2) As part of the assessment, identify flow-sensitive habitats in Trudel Creek and conduct an assessment of flow-related impacts to these specific areas. This assessment should be expanded to other waterbodies where there anticipated impacts to fish habitat from construction or operation activities, such as Nonacho Lake.
- 3) If a rationale for the current assessment is not available, then a draft Terms of Reference for an in-stream flow assessment should be drafted for DFO review. The terms of reference should address these key items:
 - Watersheds and reaches that will have flows modified by the proposed project, and the degree of modification of flows in terms of: magnitude, frequency and duration of flows; timing of key hydrologic events; and, duration and frequency of biologically significant flows such as temperature-based or open water flows.
 - A rationale for selection of key systems, reaches and habitats used in the in-stream flow assessment.
 - Identification and periodicity of key fish species.
 - Metrics and variables that will be used to assess impacts to quantity and quality of fish habitat (See IR DFO_10 for additional details).
- 4) The terms or reference for the in-stream flow assessment (TOR) should explicitly address procedures presented in Lewis et al. (2004), specifically the critical stages of approach provided on pages 36 through 44, notably Points 1 through 7 on page 37.

IR Number: DFO_09
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Trudel Creek – Weighted Useable Area Analysis
DAR Section: 14.8
ToR Section: 14 (a,b,d)

Section 14.8.6.2.1.1 of the DAR states:

The mean monthly flows were used in conjunction with the WUA curves to determine the habitat availability for northern pike, lake whitefish and walleye during the life-stage period. As many of the life-stage periods extend for more than one month and the mean monthly flows vary, minimum and maximum values of habitat availability were determined as summarized in Table 14.8.5, Table 14.8.6 and Table 14.8.7 respectively.

The use of mean flow values in the WUA calculations does not provide information on the variation in magnitude and frequency of the WUA. Mean flow values may be misleading in terms of the WUA that will be available during low flow years. A preferred approach would be to generate habitat exceedance curves relating weighted usable area to percent exceedance for various species and life stages of concern (examples can be provided). These curves could then be used to determine habitat limiting flows.

Request:

- 1) With regards to the referenced statement from section 14.8.6.2.1.1, that the Dezé Energy Corporation indicate whether the minimum and maximum habitat availability values were based on the minimum and maximum of the mean monthly flows, or the absolute minimum and maximum monthly flow values during the given life-stage period.
- 2) To better quantify the potential impact of the proposed 4 m³/s minimum flow release on fish habitat in Trudel Creek, DFO requests that the proponent develop habitat exceedance curves for the various valued components species and life-stages. As part of this analysis, a summary of the equivalent percent habitat exceedance values corresponding to the 4 m³/s minimum flow release should be provided.

IR Number: DFO_10
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Littoral Vegetation Impacts
DAR Section: 13.8, 13.9, 14.7, 14.8
ToR Section: 3.2.1, 3.2.7.1, 4.1.2 (f,i,k), 4.1.3 (a,b,d,e,f), Table 7-10

Preamble:

The importance of wetlands and littoral vegetation to the functioning of the aquatic ecosystem is well documented in the DAR. Many impacts associated with the loss of littoral vegetation caused by reduced flows in Trudel Creek and lowered water levels in Nonacho Lake are predicted to be reversible due to the assumption that submergent and emergent vegetation, equivalent in quality and quantity to that that was lost, will re-establish within a few growing seasons. This assumption was deemed realistic based on field observations and aerial data.

Studies on re-vegetation rates of littoral zones in northern climates are limited at best. The referenced study site in Odland and Moral (2002), was not subject to the freeze-up conditions found in the Northwest Territories, had a rich seed bank, and may not have experienced the same extreme variations in flows that are expected in the Trudel system due to scheduled and unscheduled ramping events.

Given the uncertainty surrounding the time required for the successful re-establishment of submergent and emergent vegetation in the Taltson basin and the dependence of aquatic and fisheries resource on these littoral zones, further analysis is needed of potential impacts should the period of re-establishment extend beyond one to three years. Additional measures may be needed to reduce impacts to the littoral areas.

A pilot study on the re-vegetation of the littoral zone within the Trudel system, following the reduced flow regime, may prove useful to validate the assumptions of this assessment and further refine predictions for future environmental assessments.

Requests:

- 1) That the Dezé Energy Corporation provide an assessment of the potential impacts to fish and benthic invertebrates should re-establishment of littoral zones not occur in the best case scenario of one to three years.
- 2) For Nonacho Lake, it states in 13.9.11.2.1 that “the re-establishment of the new water level regime depends on the currently submerged substrate and the inundation characteristics of the proposed water management scheme.” DFO requests that the Dezé Energy Corporation indicate whether it is possible to adjust the water management scheme to reduce the amount of littoral vegetation lost and assist in re-establishing vegetation.
- 3) That the Dezé Energy Corporation develop an adaptive management plan for addressing impacts to the aquatic ecosystem should the littoral vegetation in Nonacho Lake or the Trudel system not occur within the predicted time frame.

IR Number: DFO_11
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Impacts to Aquatic Resources
DAR Section: 13.8, 14.7
ToR Section: 3.1.6.4 (b), 3.2.7

Preamble:

Information on aquatic resources and habitat quality in littoral areas within Zones 1-4 seems to be very limited. As stated in the DAR regarding aquatic resources:

No data exists for the remaining lakes and the majority of reaches of the Taltson River within the Project Area, including the areas immediately downstream of the Nonacho dam and the power generating station. (13.8.1.1)

[...] the paucity of aquatic community baseline data or detailed bathymetry in each zone limits quantitative analysis of potential changes from the project.
(13.8.2.1)

With only one benthos survey conducted in 2008, baseline data on aquatic resources in the Trudel Creek system are also insufficient considering the potential impacts from changes in water levels and flow.

As stated in the DAR, aquatic resources (i.e., zooplankton, benthic invertebrates) are effectively used in bio-monitoring programs for a variety of anthropogenic stressors. Existing gaps in baseline information, including bathymetry data, should be filled in order to ensure potential impacts are properly assessed and sufficient information is available for an effective aquatic effects monitoring program. Baseline and monitoring data should be collected in a consistent manner in order for comparisons to be made between conditions before, during, and after the Expansion Project. In planning additional baseline studies, DFO recommends that Dezé review the new Aquatic Effects Monitoring Plan guidelines recently developed by INAC.

Request:

- 1) That the Dezé Energy Corporation commit to conducting additional baseline studies on aquatic resources in Zones 1 through 5, including bathymetric surveys, in order to better predict potential impacts to aquatic resources and to form the basis of any future bio-monitoring programs. Timelines for the completion of these studies should be provided.

IR Number: DFO_12
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Impacts to Fish and Fish Habitat – White Suckers
DAR Section: 14.8.6.2.2
ToR Section: 4.1.3 (f)

Preamble:

In section 14.8.6.2.2 it states that two side channels adjacent the South Valley Spillway currently drain into a large pool before continuing into Trudel Creek. Large numbers of young-of-year white sucker were found in the pool habitat indicating that the side channel and pool are important habitat for white sucker spawning and rearing. Under the expansion project it is proposed that these side channels be dewatered. The possibility of using one of these side channels for the minimum flow release should be considered to preserve this habitat.

Request:

- 1) That the Dezé Energy Corporation indicate whether it would be feasible to utilize one of the side channels adjacent to the South Valley Spillway as the outlet for the minimum flow release into Trudel Creek in order to preserve the white sucker habitat currently found in this area.

IR Number: DFO_13
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Fish Stranding due to Scheduled and Unscheduled Ramping Events
DAR Section: 14.8.6.3.2, 17.4
ToR Section: 3.2.7, 4.1.3 (e)

Preamble:

Ramping events in Trudel Creek from scheduled outages are predicted to occur 6 out of 13 years for the 36 MW option and 1 out of 13 years for the 56 MW option. This would see an increase in flow in Trudel of 4 m³/s to 82 m³/s over 10 to 18 hours, under the 56 MW option, remaining at elevated levels until the subsequent reduction in flow back to 4 m³/s at the end of the three week maintenance period.

Unscheduled outages, predicted to occur once every five years, could potentially result in 150 m³/s to 210 m³/s of flow being directed into Trudel Creek, with 30 m³/s being directed into the South Gorge Spillway, with a staggered restarting of the turbines designed to reduce the impacts from the sudden reduction in flow back to pre-outage levels. The proponent has indicated that the staggered start-up will be one mitigation measure identified in the operational plan for controlled and emergency shutdowns. DFO would be interested in reviewing this draft plan, once it has been developed.

In both scheduled and unscheduled events, fish may become stranded as the flow recedes back to pre-outage levels. The proponent must have an effective plan in place in order to identify and recover fish stranded due to these scheduled and unscheduled events.

Request:

That the Dezé Energy Corporation:

- 1) Identify the mitigation measures that will be implemented to prevent fish from being stranded in Trudel Creek and the South Gorge Spillway as a result of scheduled and unscheduled ramping events
- 2) Confirm that effective monitoring and adaptive management plans will be developed for addressing fish being stranded during ramping events.

- 3) Confirm that the South Gorge Spillway will be designed with manual or secondary operating mechanisms to ensure that it may be operated during complete power outages.

IR Number: DFO_14
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Erosion and Sediment Impacts below Twin Gorges
DAR Section: 13.3.4.2
ToR Section: 4.1.2 (a, i)

Preamble:

As per 13.3.4.2, flows into the Twin Gorges power facilities are to increase from 30 to 50 m³/s under baseline conditions to 180 m³/s and 240 m³/s for the 36MW and 56MW options, respectively. In the event of an outage, the South Gorge by-pass spillway would be opened to allow for up to 30 m³/s of excess flow to enter the Taltson River just below the Twin Gorges site.

Request:

That the Dezé Energy Corporation:

- 1) Provide an assessment of the potential for localized scour and erosion at the points where:
 - a. flows from where the Twin Gorges facilities enters the Taltson River; and,
 - b. flow directed into the spillway and enters the river below the Twin Gorges Dam.
- 2) If there is the potential for scour or erosion, identify any mitigation measures that may be implemented, including features within the spillway intended to reduce the velocity of flow.

IR Number: DFO_15
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Impacts of Reduced Flow on Fish and Fish Habitat
DAR Section: Table 14.3.4, 14.7.7.15
ToR Section: 4.1.2 (a), 4.1.3 (b,c)

Preamble:

In Table 14.3.4, the model's results indicate that the annual freshet, under the 36MW and 56MW options, would be delayed by one month, from April/May to June in Trudel Creek.

As per 14.7.7.15, low flows years resulting in freshet flows not exceeding the minimum 4 m³/s would occur in Trudel Creek every two years under the 36 MW option and once every ten to fifteen years under the 56 MW expansion.

The year-round reduced flows into Trudel Creek were predicted to increase water temperature by 2 to 3 °C degrees. This increase in water temperature was assessed as being not sufficient to trigger a shift in timing of certain stages of life history that may be initiated by thermal cues (section 14.8.5.1.3.6). However, given that the deeper and cooler habitat within Trudel Creek will be significantly reduced, it is possible that species that prefer these types of habitat may retreat from the creek to the lakes, potentially causing a change in species composition throughout the system.

Request:

That the Dezé Energy Corporation:

- 1) Address the potential impacts to fish that spawn in the spring due to:
 - a. the one month delay in the freshet; and,
 - b. low flow years when no freshet would occur in Trudel Creek.
- 2) Assess the potential for a change in fish species composition within the Trudel system due to the rise in temperature in Trudel Creek resulting from lowered water levels.
- 3) That the Dezé Energy Corporation clarify whether it is expected that areas of sufficient depth will remain to provide overwintering habitat.

IR Number: DFO_16
Source: Fisheries and Oceans Canada
To: Dezé Energy Corporation
Subject: Impacts of the Altered Hydrograph
DAR Section: 13.3
ToR Section: 4.1.2 (d)

Preamble:

As per 13.3.3, under the 36 MW option, peak annual flows for Zones 1, 3, 4 and below the Twin Gorges facilities would occur during winter months (January or February) as opposed to the summer (July) under baseline conditions.

Request:

- 1) That the Dezé Energy Corporation assess the possibility that higher flows in the winter will initiate early spawning by fish species that normally spawn in the spring, in correlation with the annual freshet.