Responses from Deze Energy Corporation to Indian and Northern Affairs Canada's preliminary Water Quality and ARD questions in advance of formal Information Requests

**Answers were provided by Deze Energy Corporation on June 8, 2009 (with follow-up answers provided June 18, June 25 and July 15, 2009)

Q.1 Water quality

a) It would be useful if a references to the Appendices such as 9.3a were made in the text (if they were please point us to those sections).

A.1a part 1

Appendix 9.3a (Taltson Flow Model; Rescan 2008) is referenced throughout section 9.3 (Taltson Basin Hydrology), in section 13.3 (Taltson Water Quantity) and 14.3 (Alterations of [Trudel Creek] Water Quantity).

Could you also clarify where water quality baseline data for Zones 3 and 5 is found? Overall variations in water quality in and between each hydrological zone (Nonacho and zones 1 to 5) would be beneficial to verify the assumptions made on water quality and would also assist in construction and operations follow-up monitoring and adaptive management programs.

A.1a part 2

Section 13.4.2 presents the baseline water quality data for Nonacho and Zones 1 through 4. Section 14.4.2 presents the baseline water quality data for Zone 5 (Trudel Creek).

b) It was noted that in section 14.4 there were only 2 water samples taken upstream of SVS. A minimum of 3 is preferred. The other sites had 4-5 samples taken. Can an explanation be provided for this difference?

A.1b

Deze has contacted a lead scientist that conducted the field work and is awaiting a reply.

c) Could an explanation be provided as to why is the predicted dissolved oxygen level higher in the winter for the 56MW than the 36MW?

Would DO monitoring during the winter be considered in future monitoring?

A.1c

The number of ice cover days was increased from 181 (baseline) to 211 under the Expansion Project for both the 36 and 56 MW options. However, the DO model under the 56 MW expansion was run for 181 days of ice cover. The DO levels under the 56 MW expansion, assuming 211 days of ice cover are:

Gertrude Lake: 8.78 mg/L

Trudel Lake: 7.10 mg/L

Unnamed Lake: 5.23 mg/L

The predictions are all lower than the predictions under the 36 MW expansion, as expected given that water levels in Trudel lakes will be lower under the 56 MW expansion relative to the 36 MW expansion. The model results for the 36 MW expansion (as presented in the DAR) are:

Gertrude Lake: 8.86 mg/L

Trudel Lake: 7.23 mg/L

Unnamed Lake: 5.42 mg/L

The corrected DO model results for the 56 MW expansion will be submitted to the MVEIRB.

d) The Klohn Crippen Berger Ltd 2009 report (Ch 14.4 appendix) recommendation for additional mapping at low flow to quantify the existing erosion and depositional areas along the entire length of Trudel Creek and recommended monitoring for these parameters at pre and post construction was not specifically included in the Table of Commitments. We recommend it be included.

A.1d

The general understanding of erosion along Trudel Creek and the Expansion Project is as follows: Trudel Creek has been experiencing erosion at specific locations along the river since the construction of the SVS (1960's). The Expansion Project will significantly reduce this on going negative impact. Deze intends to develop the aquatic effects monitoring program in cooperation with multiple agencies and

stakeholders. Therefore Deze has not identified specific indicators or VC monitoring programs at this time, and intends to use the MVEIRB EA process coupled with the recommendation of INAC in their draft guide to aquatic effects monitoring program design, to commence engagement towards development of such a program

Q. 2 Monitoring

a) As per the Terms of Reference, Deze must clearly distinguish which of the following meanings is meant with each use of the term "monitoring" in the DAR: compliance, environmental monitoring, follow up. With regards to water quality/quantity (ch 13/14) we did not notice this. If you are able to point us to sections where this has been noted (other then the EMS section) this would be helpful.

A.2a Monitoring

Each effects assessment section of the chapters 13 and 14 include a sub-section ("Future Monitoring"). Future monitoring is briefly described in each of these sections.

Deze recognizes that these "Future Monitoring" sections do not provide details. Deze hopes to work with the Parties to develop robust monitoring programs that address the areas of potential concern surrounding the Expansion Project.

b) We noted that Ch.13 mentions a Trudel Creek monitoring plan is to be developed in consultation with regulatory agencies, etc. However in Ch.14 there is no mention of a Taltson Basin Monitoring Plan. Has this been considered? The Terms of Reference state that the DAR must include a description of any follow up programs.

A.2b

See answer to question 2a above.

Q.3 Adaptive Management/Contingency planning

a) The Terms of Reference states that the DAR must include a description of any contingency plans or adaptive management programs. We did not see specific mention of these plans/programs in the KLOI for Taltson and Trudel, as well as the first two SONs.
The only mention of adaptive management that we found was in section 10.35 where it is stated that adaptive management would be implemented if monitoring detects effects not predicted. Are there any other

sections discussing adaptive management? If not, can you expand on the statement in 10.35

A.3a

See answer to question 2a above.

b) With regards to contingency planning, what would be the contingency plan should the annual maintenance shutdown planned to coincide with freshet comes before or after freshet?

A.3b

Deze has scheduled the annual maintenance of the turbines to coincide with the onset of freshet. Deze is fairly flexible in the timing of said activity. Deze discussed the scheduling of the maintenance with various scientists to determine the least detrimental time for this to occur considering all those potentially impacted. If, through review of the DAR, it is determined that impacts could be further reduced by altering the scheduling of turbine maintenance, Deze will make all efforts to add this as mitigation.

Deze plans to work with the Parties during the review of the DAR to identify key areas of concern. One the effects presented in the DAR are reviewed and key issues identified, further contingency planning can take place to address specific negative effects.

Q.4 Climate Change

a) We recommend the investigation into climate change reference a dam safety review study for the Snare River by AGRA Monenco (ca.2000) for NTPC which concluded the variability of annual peak floods had significantly changed over the last forty years (possibly as a result of climate change). Although similar evidence was not found for Taltson to date there remains a possibility that this effect will, in time, occur on the Taltson River as well. It is therefore recommenced that this study be reviewed and an update provided accordingly.

A.4a Climate Change

Recent changes in Taltson River flows were identified upon review of the 45 year record of flow. The recent observed trend is increase in precipitation and by result flows within the Taltson River Watershed. This is discussed in section 16.1.1.2 (see Figures 16.1.2a and 16.1.2b). Given the extensive dataset available for Taltson, it

was deemed unnecessary to look at smaller, neighbouring watersheds for insight into changing trends within the Taltson River Watershed.

A more detailed review of the available hydrology can be found in sections 9.3.1 and 9.3.2

b) Could you direct us to a section where climate change effects on the water balance are specifically addressed?

A.4b

This is addressed in section 16.1 Climate Change

Q. 5 Camps

a) We were not able to find a discussion of potential impacts from camps to the aquatic environment or potential impacts from accidents and/or malfunctions during construction of the transmission line in the DAR. Were these specifically discussed?

A.5a Camps

Deze completed a comprehensive review of potential accidents and malfunctions during both construction and operations. Accidents and Malfunctions is chapter 17 of the DAR.

Section 6.5.3 discusses Construction Accommodations. As waters and waste waters would meet Federal guidelines, no effects pathway was identified for assessment.

b) The DAR states that barge camps will be used in the East arm, however there is no discussion regarding waste management/potential impacts to the aquatic environment including accidents/malfunctions on the barges themselves. Please provide further information, similar to that provided for land based camps. Barge camps should also be addressed as part of the draft spill contingency plan.

A.5b

Deze will consult their engineering/design team in regard to this question.

Note from INAC: the following answers were subsequently provided June 18 and June 25, 2009 by Deze after INAC's IR submission June 11, 2009*.*

In regard to Q5 and A 5b) below, we want to clarify that at this time, Deze has not finalized the type of camp at the barge landings (i.e. on-barge camp or land-based

camp with barge support). If land-based, the camps would meet the same regulations and licencing criteria as any of the other land-based camps. (June 25, 2009)

A. 5b) (June 18, 2009)
The specific waste management for the barge camps will be dependent on the specific barge being contracted. Deze commits to contracting only barge camps that are appropriately permitted and which meet or exceed permit and/or regulatory requirements. For liquid effluent, the barge camps would have an on-board packaged treatment system. Treated water would either meet or exceed permit requirements for discharge to the environment. Solids would be contained in an on-board holding tank that would be emptied at a licenced waste water facility, or buried on-site under permit. Other wastes (eg: food wastes; scrap; personal garbage) would be managed and contained on-board and transported to a licenced recycling and/or waste disposal facility. The camp contractor may choose to apply for an incineration permit. An incinerator would be appropriately located on land, and meet or exceed all permit requirements.

The two barge-camp sites proposed are comprised of rock and/or coarse gravels. It is anticipated that these barges will moor for only a few days as they unload equipment and supplies. Both barge sites are free of submergent or emergent vegetation. Mooring would be set so barges have minimal movement. Therefore, no or negligible aquatic effects are anticipated from regular operations. Only products to support the camp are contained on the barge, (eg propane for cooking, etc.). Accidents and/or malfunctions of the camp are unlikely, but not dissimilar to those of land based operations.

We appreciate the identification of the need to include the barge camps in the draft spill contingency plan, and commit to including barge camps in the plan.

c) Section 6.8.4.3 discusses reclamation of a possible sewage lagoon, however there is no mention of a sewage lagoon in the camp descriptions (6.5). Please clarify.

A.5c

Deze will consult their engineering/design team in regard to this question.

Note from INAC: the following answers were subsequently provided June 18, 2009 by Deze after INAC's IR submission June 11, 2009.

A sewage lagoon may be feasible at the Twin Gorges camp site to treat camp effluent discharges. The potential feasibility of a lagoon will be determined during the detailed design and pre-regulatory permit applications. If a sewage lagoon is not feasible, (eg does not meet regulatory required perk tests, areas, offset limits,

etc.), a packaged effluent treatment system would be proposed during permit applications. Based on the current knowledge of the Nonacho camp area, a lagoon is not feasible at that site and a packaged system will be required.

The design of the lagoon and packaged effluent treatment system options will be identified prior to permitting application and presented in the applications and will be developed according to GNWT and INAC camp permitting requirements for septic or sewage treatment. The lagoon specifications will meet or exceed the permit requirements, and monitoring of the system and water quality will be carried out as required.

d) To what level will waste be treated before entering septic fields?
Have wastewater treatment options been proposed for smaller camps?

A.5d

Deze will consult their engineering/design team in regard to this question.
Note from INAC: the following answers were subsequently provided June 18, 2009 by Deze after INAC's IR submission June 11, 2009*.*

Water will be treated to meet or exceed all regulatory requirements. Smaller camps would have packaged treatment systems and solids would be removed from site to a licenced facility, or buried on site under permit.

Q. 6 ARD

As mentioned during the meeting, the ABA tests completed to date are adequate for defining the preliminary risk within each of the 5 units. We recommend Deze perform additional ABA tests on the same units at different stages throughout the excavation process (perhaps an additional 2 sampling regimes), to help ensure that the material being excavated is similar to the preliminary work completed. We also recommend Deze analyze the total elemental composition of the samples to describe the range in elemental composition and where and which elements occur in high concentrations. Both tests are required for a complete geochemical risk assessment.

A.6 ARD

Deze thanks you for your recommendations and looks forward to developing a detailed plan going forward.

Q. 7 Explosives

a) We await your confirmation regarding the vaporizing potential of the water-remittent explosives proposed for in or near stream blasting.

A.7 Explosives

Deze will consult their engineering/design team in regard to this question.
Note from INAC: the following answers were subsequently provided June 18, 2009 by Deze after INAC's IR submission June 11, 2009*.*

The project proposes use of ANFO prills (pellets) as the primary explosives product for terrestrial blasting. ANFO is the most common construction, rock, and quarry explosive product used in North America. Explosive residue can occur from use of ANFO as well as other blasting products. ANFO residue (ammonia or nitrates), is a result of explosive material losses, either through spillage or incomplete detonation. Limiting losses through storage, handling, and use can reduce residues to negligible amounts (eg: undetectable). Use protocols may include specified primers and borehole sizes to ensure complete consumption of product.

In discussion with the engineering/design team, the product to be used for instream and near-stream wet-hole conditions has not been finalized at this time. The product is anticipated to be packaged Water Resistant ANFO, Emulsion, or WaterGel (packaged refers to 'cartridge' or 'stick' where the product is contained in a stick-form). The selection of product would be dependent on the anticipated moisture content of the hole (i.e. damp vs completed submerged). Table 1 below is taken from Practical Methods to control explosives losses and reduce ammonia and nitrate levels in mine water. Revey, G.F. 1996. Mining Engineering. P. 61-64. As the instream blasts are relatively small, loading and blasting is anticipated to occur in a short time-frame.

TABLE 1

Percentage of nitrates leached from explosive*

Time, hr	ANFO	WR ANFO	WaterGel	Emulsion
0.1	~25	—	—	—
1	> 50	~25	—	—
6	—	—	24.6	0.6
144	—	—	> 75	1.2

* When 25% of the nitrates are dissolved, the explosive is probably no longer detonable.

Note from INAC: further clarification was provided July 15, 2009 by Deze after INAC asked for clarification on the above table and vaporizing potential*.*

Thanks for following up with us on our response to your Question 7a regarding the vaporization of Water Resistant explosives. We have discussed this with an

explosives manufacturer. There are three ways nitrates from explosives can enter the environment: spillage during handling, leaching of explosives from blast holes prior to detonation, and incomplete detonation of explosives.

There are many types of explosives. The "standard" is Ammonium Nitrate Fuel Oil (ANFO). Use of standard ANFO can lead to nitrate contamination via all three pathways discussed above. Deze has committed to using a modified explosive in or in close proximity to water where risk of contamination is high, to significantly reduce the potential for nitrate contamination via the above pathways.

Note that there is no difference in the vaporization percentage between standard ANFO and water-resistant ANFO. Both will vaporize completely under ideal conditions. Thus Deze has not selected a modified explosive to improve vaporization. The explosive product that Deze has committed to will minimize the release of nitrates into the environment by eliminating or marginalizing the three pathways of contamination.

Spillage – explosives can be spilled during handling. Standard ANFO comes in prill form. If spilled and left to environmental exposure (i.e. not cleaned up), the prills eventually lead to release of nitrates. Deze has committed to using an explosive product for in-stream blasting that comes in a package, either in the form of a stick or sausage, depending on the product. Packaged explosives are much larger then prills and easy to pickup should one be dropped. Thus the use of packaged explosives will reduce spillage.

Leaching of Explosives – explosives can leach nitrites into the environment between deployment and detonation if they are exposed to water for various periods of time, depending on the product. For instream works, Deze has committed to using a water-resistant explosive to reduce the amount of nitrate leaching during deployment and detonation; see table for percent reduction of leached nitrates for three different water-resistant explosive products. The final product selection is the responsibility of the blaster, who will determine which product or combination of products is best suited to the rock type, detonation requirements, and duration of potential exposure to water, if any.

Incomplete Detonation – sometimes, blast holes don't detonate as planned. If a hole does not detonate as planned, some explosives could be lost to the environment and leach nitrate. Deze has committed to using packaged explosives for instream works. Packaged explosives reduce the potential for lack of detonation due to the package confinement which enables the blaster greater product controls when loading holes.

Deze's commitment to using water-resistant, packaged explosives near and in water will reduce the three sources of nitrate contamination that can occur while using "standard" explosives.

b) A blast management plan will be required, and we recommend mitigation measures be discussed should explosives not completely evaporate and chemicals enter the surrounding water bodies.

A.7b

Deze will consult their engineering/design team in regard to this question.
Note from INAC: the following answers were subsequently provided June 18, 2009 by Deze after INAC's IR submission June 11, 2009.

Deze commits to developing a drill & blast management plan to ensure compliance with the required standards, protection of the environment, and personnel safety. The plan will identify the storage, handling, and use of explosives to minimize loss. The plan will also provide mitigation measures in the event of product loss. This would include single-incident-point loss (eg spills) and on-going losses from improper use. Mitigation measures may include preventative measures such as best management practices, monitoring of contained waste water and runoff, and contingency plan in the event of continued loss. The plan would also include further information on the management of waste water based on the anticipated volumes.

Storage, handing and appropriate use of explosive product is the legal responsibility of the licenced blaster who will be in control of all blasting activities. The blaster will not be identified until the construction contract is awarded, post-permitting. Therefore, Deze will develop a preliminary drill & blast management plan pre-permitting, with the commitment to finalize the plan with input from the successful construction contractor and blaster.

c) Could you describe the plan for the pumping out the water in the blast area?

A.7c

Deze will consult their engineering/design team in regard to this question.
Note from INAC: the following answers were subsequently provided June 18, 2009 by Deze after INAC's IR submission June 11, 2009.

Waste water from drilling operations and blast areas of the gorges will be directed to waste water settling and polishing ponds. Ponds will be used to contain water to allow for particulate matter settlement if required. Where possible, water will be re-circulated for continued use in the drilling operation. Waste water that is not re-circulated would be discharged in accordance with waste water permit requirements. Discharge may include pumping directly to an approved environmental discharge point (ie terrestrial or aquatic), or pumped into a waste water truck and transported to the discharge site.

d) DFO mentioned during the meeting that there is a DFO sediment control operational statement does not exist. With this in mind, have best practices been described for blasting/filling in-stream?

A.7d

Details of the construction methodology and the potential impacts are presented in section 6.5 (Construction) and 15.2 (Canal Construction).

Q. 8 Mercury

a) We would like to note that mercury in the local environment is not only from long range transport sources (section 13.4.3.2) . Local geology is a contributing factor throughout the NWT. There have been several studies to this effect through the Northern Contaminants Program (www.inac.gc.ca/ncp)

A.8 Mercury

It is noted that local geology is a contributing factor to mercury levels in the aquatic and terrestrial environments. The DAR notes this as well in section 13.4.2.1.7 Major Ions and Trace Elements.

b) Could you explain why there will be no future monitoring of mercury in lakes? Section 13.4.9 states mercury is not a concern in creeks/rivers. Please clarify.

A.8b

Sections 13.4, 13.5 and 14.4 include an effects assessment for water quality, and specifically for mercury, in the Taltson River Watershed (including Trudel Creek). The findings of this effects assessment are that potential effects on water quality (including mercury) are low. This stems from the nature of the Expansion Project; no new flooding and no long term effluent discharge. As such, a monitoring program that focuses on changes to water quality and specifically changes in mercury levels was not presented.