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IESO Market Rules Exemption Application

Exemption Plan and Submissions in Support of Exemption Application

NAMEWAMINIKAN HYDROELECTRIC PROJECT

IESO CAA ID NUMBER: 2007-285

March 6, 2009

1.0 DESCRIPTION OF PROJECT

Namewaminikan Hydro, an affiliate of the AXOR Group, is proposing to develop a hydroelectric generating facility near the town of Beardmore located in Northwestern Ontario. The Namewaminikan Hydroelectric Project was retained for development as a result of the MNR's competitive release process (CRP-06-05) in March of 2006.

The development will consist of two (2) separate powerhouse sites, Long Rapids and Twin Falls, with an installed capacity of 4.5 MW and 5.5 MW respectively. Both sites are connected to the proposed Namewaminikan Substation via a 12.8 km 34.5 kV circuit. The Namewaminikan substation will tap into the 115 kV circuit A4L approximately 3km from Beardmore DS (figure 1) .

The Twin Falls powerhouse, located 21.5 km from Namewaminikan substation, consists of two (2) generating units rated at 2.5 MVA with a combined maximum output of 4.5 MW. The Long Rapids powerhouse, located 13.2 km from Namewaminikan substation, consists of two (2) generating units rated at 3.1 MVA with a combined maximum output of 5.5 MW. Both sites will be stepped up from 34.5 kV to 115 kV via a 16MVA transformer at Namewaminikan Substation.

The proposed facility will participate in the Ontario Power Authority's (OPA) *Northern Hydroelectric Initiative* (NHI) and if qualified, will participate in the Ontario Electricity Market.

The facility is expected to be in-service in December 2010.

2.0 RELEVANT MARKET RULES

The IESO has completed an System Impact Assessment (SIA) on the Namewaminikan Hydro Project (CAA ID 2007-285), for which the relevant findings pertaining to the present exemption application are the following:

The total impedance between the NRP generator terminals and the point of connection to the IESO-controlled grid calculated on total MVA rating of the generation facilities of 11.2 MVA is 21.7%. Hence, the impedance exceeds the benchmark of 13% required to ensure reactive power capability compliance with the Market Rules. This high impedance will limit the delivery of the required reactive power to the IESO-controlled grid by increasing the reactive power losses within the development and by limiting the utilization of generators' reactive power capability.

The required reactive power range for the 10 MW facility is 6.8 MVAr at the point of connection, that is the sum of the reactive power produced by the facility when operating in lagging power factor mode (3.5 MVAr) plus reactive power absorbed by the facility when operating in leading power factor mode (-3.3 MVAr).

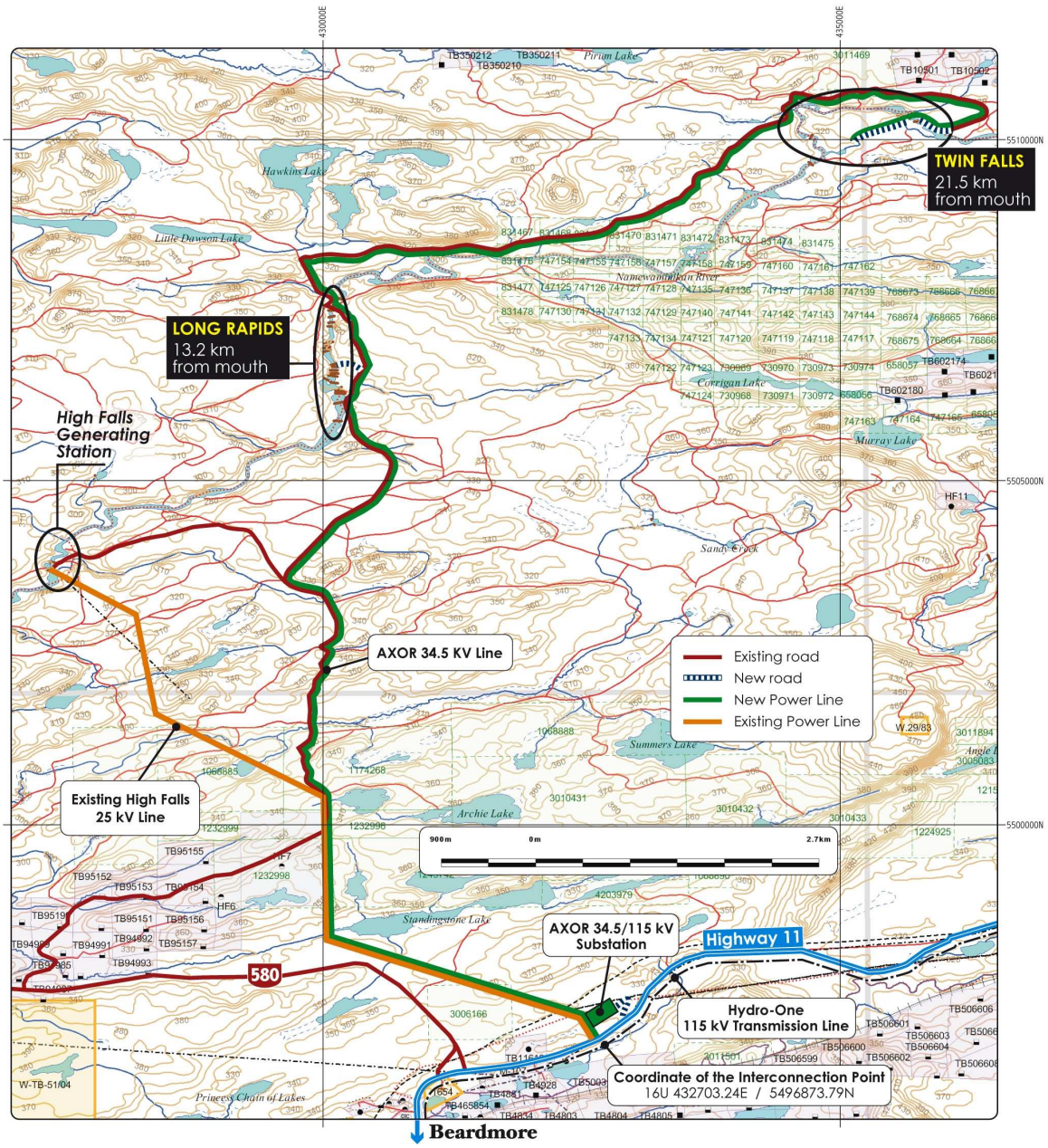

Figure 1: Namewaminikan Hydroelectric Project Facilities.

Study results indicated that the amount of reactive power supplied at the connection point is dependent on step-up transformers tap positions. Proper selection of the taps would allow generators to operate close to 0.9 lagging power factor. In this case, with taps set to Tap1=Tap2=1.025 and Tap3=1.0764, the proposed development would be capable of supplying 2.6 MVAr to the IESO-controlled grid and in absorbing -2.2 MVAr of reactive power from the IESO-controlled grid. Thus, at best the actual NRP's reactive power range would be about 4.8 MVAr.

With taps set to Tap1=Tap2=1.025 and Tap3=1.0472, the development would be able to meet the absorbing reactive power requirement of -3.3 MVAr. This would mean that for

the one constant system voltage and by varying the 115/34.5 kV transformer ULTC, the NRP would be capable of providing reactive power range of 5.9 MVAr at the point of connection. Therefore, the facility would still be deficient in supplying 0.9 MVAr to the IESO-controlled grid.

In light of these findings, and in reviewing the requirements for generation facilities under the market rules, the IESO has determined that the Namewaminikan project will require an exemption as set out below:

Each market participant shall ensure that its equipment connected to the IESO-controlled grid meets all applicable performance standards in Appendix 4.1 and each generator, connected wholesale customer, distributor connected to the IESO-controlled grid and transmitter shall ensure that its equipment connected to or forming part of the IESO-controlled grid meets all applicable performance standards in Appendices 4.2 to 4.4, respectively.[1]

Specifically, Reference 1 of Appendix 4.2 requires the following:

…A non-embedded generation unit within a generation facility shall have the capability to supply its entire range of reactive power for at least one constant voltage at a connection facility terminal greater than 50 kV….

3.0 EXEMPTION PLAN

The generation facility will be transferred via 34.5 kV system and injected into the existing Alexander SS 115 kV radial circuit A4L in the proximity of the existing Beardmore DS #2. Namewaminikan Hydro takes the position that modifications to proposed generation equipment to meet the prescribed reactive power requirements should be waived.

3.1 ASSESSMENT OF COSTS AND DELAYS OF COMPLYING

Since the generating facility is deficient in meeting the reactive power requirements at the point of connection to the IESO-controlled grid, the following alternatives were considered:

A. Reducing the total impedance between generators and the IESO-controlled grid, to allow the development to inject/absorb the required reactive power range by varying the ULTC of the 115/34.5 kV step-up transformer.

B. Reducing the total impedance between the generators and IESO-controlled grid by connecting to the IESO-controlled grid via 115 kV connection arrangement. This would eliminate the 115/34.5 kV step-up transformer and with proper selection of the transformers and conductor significantly reduce the connection impedance.

C. Installing an additional dynamic reactive device to provide required reactive power capability at the connection point. If this option is to be selected, size and location of a device would be

[1] Chapter 4: Grid Connection Requirements, section 3.1.2.

determined taking into consideration two possible issues: 34.5 kV system overvoltages and an effect of transient voltage changes due to device switching on the generators.

In considering options A, B and C, the IESO indicated its preference in selecting option B. Namewaminikan concurs with their position. However, making the required alterations to the proposed generation equipment would require significant cost to Namewaminikan Hydro (approximately 2 M$) with limited benefit to the IESO-controlled grid given the margin by which the generation facility falls short of the requirements and the fact that the generation facility will not inject substantial output into the IESO-controlled grid. In addition to the costs of complying, performing the required work will incur delays up to 3 months to the planned construction schedule.

3.2 MODIFICATIONS AND TIME FOR BECOMING COMPLIANT

Namewaminikan Hydro is asking the IESO to consider a permanent exemption (i.e. for the lifetime of the generation equipment) for the generation facility and therefore it does not plan to modify the generation facility in order to alter the amount of reactive power available.

3.3 NON-DISCRIMINATORY ACCESS TO THE IESO GRID

As described above, Namewaminikan Hydro is developing the generation facility pursuant to a CRP contract with the MNR. Therefore, Namewaminikan Hydro has participated in a competitive process. The issue of non-discriminatory access is not a factor in this exemption application.

3.4 ESTIMATE OF COSTS IMPOSED ON THE IESO OR OTHER MARKET PARTICIPANTS

Namewaminikan Hydro does not expect that the granting of the exemption would impose any costs on other market participants or the IESO as Namewaminikan Hydro does not expect that any specific technical works would have to undertaken by other market participants as a result of the exemption being granted. In fact, Market rules contemplate that reactive power deficiencies can be addressed across the system. For example, Market rule Chapter 4, section 3.2.3 provides that a generator may substitute the provision of reactive power by obtaining reactive power from other generating units or market participants. In such a case, the IESO is able to determine whether these other generating units or market participants are sufficiently close in electrical proximity to the non-compliant generating unit to provide the comparable or equivalent reactive power.

3.5 NO UNDUE PREFERENCE WITHIN THE IESO ADMINISTERED MARKETS

As mentioned in section 3.4, a work-around is specifically contemplated within the Market Rules. Consequently, Namewaminikan Hydro takes the position that granting an exemption would not amount to undue preference for Namewaminikan Hydro.

3.6 NO RELIABILITY RISK TO THE IESO-CONTROLLED GRID

Namewaminikan Hydro has received the finalized Customer Impact Assessment (CIA) from Hydro-One on January 20, 2009. The Customer Impact Assessment Report presents the results of short circuit, and voltage performance study analyses. The overall findings of this CIA provided that the above recommendations are implemented are:

- The results of the short circuit analysis showed that some area's stations encountered small (insignificant) increases in fault level at the connection points. These increases were within the capability of the existing facilities. However, the customers connected in

the area should review the fault levels at their connection points to confirm their equipment is capable of withstanding the increased fault and voltage levels.

- When in operation, the Namewaminikan Hydroelectric Project will assist in supporting the voltages seen by the connected customers under system disturbances and will not adversely impact the local voltage performance in the local area

In summary, the study has confirmed that the proposed 10 MW Generation at Namewaminikan GS can be incorporated without any adverse impact on Hydro One customers.

Namewaminikan Hydro has also received the finalized System Impact Assessment (SIA) from the IESO and Notification of Conditional Approval for Connection on February 24, 2009. The final approval for the connection will be granted only upon successful completion of the Market Entry process. The review concludes that the proposed project will not result in a material adverse effect on the reliability of the IESO-controlled grid, provided all the requirements described in the System Impact Assessment report are met.

As a result of these reports and by conducting its own assessment on the exemption, the IESO will be able to determine the effect of the Generation Facility as it is proposed to operate, will not pose any reliability risk to the IESO-controlled grid.

3.7 OPERATING THE FACILITY CONSISTENT WITH THE TERMS OF THE EXEMPTIONS

Namewaminikan Hydro will be capable of operating the facility consistent with the terms of the exemptions. For informative purposes, the operating philosophy is included in **Appendix A**.

APPENDIX A: OPERATING PHILOSOPHY

OPERATING MODE

Both the Long Rapids and Twin Falls developments will run-of-river hydroelectric generating stations. The operating mode will consist of producing power according to the available water flow in the Namewaminikan river. Consequently, the total output and the number of units in operation will fluctuate. During very low flows, when there is too little water flow to produce energy, the line breaker of the powerhouse will be opened.

START-UP SEQUENCE

When all circuit breakers are opened and all disconnect switches are closed, the starting sequence will proceed according to these steps:

1- Close the line breaker (52L-NA1) to energize the power transformer (Tx-NA)
2- Close the line breaker (52L-NA2) to energize the transmission line (L34-NA, L34-LS & L34-US)

Depending on which powerhouse we want to connect on the grid:

3- Close the generator breaker (52G-LS1 or 52G-US1)
4- Start the first turbine (G1 at Long Rapids or G1 at Twin Falls)
5- Synchronize the generator with the grid and close the line breaker (52L-LS or 52L-US)

If the next unit on the powerhouse needs to be connected on the grid

6- Start the next turbine (G2 at Long Rapids or G2 at Twin Falls)
7- Synchronize the generator with the grid and close the generator breaker (52G-LS2 or 52G-US2)

MAINTENANCE OUTAGE

During maintenance, all breakers, disconnect switches, head gates, production equipment, etc.. will be locked according to a procedure that meets safety standards.

MAINTENANCE AT A POWERHOUSE

If maintenance is required for the generator or electrical equipment downstream of the generator breaker, the appropriate generator breaker will be opened and withdrawn from its rack. Once maintenance is completed, the generator breaker will be put back in position and the unit will resume synchronization with the grid.

If maintenance is required for the 4,16kV common bus or for the dry transformer, the line breaker will be opened and withdrawn from its rack. Once maintenance is completed, the line breaker will be put back in position and both units may resume synchronization with the grid.

If maintenance is required on the 34,5kV equipment, the line breaker will be opened, withdrawn from its rack and the 34,5kV powerhouse disconnect switch will be opened. When the maintenance work is complete, the disconnect switch is closed, the line breaker will be put back in its place and both units both units may resume synchronization with the grid.

MAINTENANCE OF 34,5KV LINE:

L34-US
Twin Falls powerhouse needs to be shut down. The disconnect switch 89-US is then opened. After, the disconnect switch 89-JP is opened. The maintenance of the line may proceed while the Long Rapids station is in production. When the maintenance is completed, the disconnect switches 89-US and 89-JP are closed and the powerhouse unit may resume synchronization with the grid.

L34-LS and L34-NA
Twin Falls and Long Rapids powerhouses are both shut down. The disconnect switches 89-US, 89-LS and 89T-NA3 are opened. The earthing switch 89T-NA3 may be closed to drain the line. Once the maintenance is completed, the earthing switch is opened and the disconnect switches 89-US, 89-LS and 89T-NA3 are closed and all units may resume synchronization with the grid.

MAINTENANCE OF THE SUBSTATION

Both the Twin Falls and Long Rapids powerhouses are shut down. The disconnect switches 89T-NA1 and 89T-NA2 are opened. The earthing switch 89T-NA1 may be closed to drain the energy in the substations. When the maintenance is completed, the earthing switch is opened and the disconnect switches 89T-NA1 and 89T-NA2 are closed and all units may resume synchronization to the grid.