ONTARIO ENERGY BOARD

A PROCEEDING TO DESIGNATE
A TRANSMITTER TO CARRY OUT DEVELOPMENT WORK
FOR THE EAST-WEST TIE LINE

SUBMISSIONS OF THE INDEPENDENT ELECTRICITY SYSTEM OPERATOR ("IESO")

On February 2, 2012, the Ontario Energy Board (the "Board") initiated a proceeding to designate an electricity transmitter to undertake development work for a new electricity transmission line between Northeast and Northwest Ontario: the East-West Tie Line. The Board adopted a two-stage process for the designation proceeding. On March 4, 2013, the Board issued Procedural Order No. 6 establishing a process and schedule for Phase 2 submissions.

The Independent Electricity System Operator ("IESO") respectfully submits its Phase 2 submission below.

Introduction

To promote long-term reliability, the IESO works closely with the Ontario Power Authority (OPA) to ensure that transmission enhancement plans comply with reliability standards while fulfilling Ontario's electricity needs. In support of the OPA's preliminary needs assessment[1], the IESO performed a feasibility study[2] to address the technical requirements for reinforcing the East-West tie to achieve a transfer capability of approximately 650 MW westwards, while respecting double-circuit contingencies at all times. In the IESO's feasibility study, the IESO offered 2 options:

Option 1 A new 230-kV double-circuit line installed between Wawa TS and Lakehead TS, and

Option 2 A new 230-kV high-capacity, single-circuit line installed between Wawa TS and Lakehead TS.

The objects of the IESO are set out in section 5 of the *Electricity Act, 1998*. Specifically, section 5.c) requires the IESO to maintain the reliability of the IESO-controlled grid. The IESO's submission in this proceeding will focus on the configuration that would yield the more reliable

[1] "*Long-Term Electricity Outlook for the Northwest and Context for the East-West Tie Expansion". June 30, 2011.*
[2] "*An Assessment of the Westward Transfer Capability of Various Options for Reinforcing the East-West Tie". August 18, 2011.*

and flexible solution –The IESO submits that a double-circuit line to reinforce the East-West tie is the best option.

Long-term planning that involves expensive long-life assets has inherent risk primarily due to forecast uncertainty. Reliable long-term plans must not only target the most likely scenario but also accommodate a credible range of future needs. Reasonable extra costs to provide this flexibility is generally acceptable to manage the risk of evolving future needs.

East-West Tie Reinforcement: IESO Preference for Double-Circuit over Single-Circuit Design

The IESO submits that enhancing the transmission transfer capability into northwestern Ontario is an important component in managing the area's long-term supply reliability. A stronger connection to the southern Ontario system will provide a reliable supply to the northwest when local hydro-electric resources are experiencing drought conditions and will eliminate congestion for those same resources when there is surplus energy.

While the IESO has determined that both a double-circuit and a single-circuit design can provide the minimum targeted transfer capability of 650 MW, as described by the OPA in its needs assessment, it should be noted that not all designs that satisfy the IESO's reliability criteria are equally reliable. The IESO submits that a double-circuit design is superior to the high-capacity single circuit line as it will provide significant benefits in the form of increased reliability, scalability and maintainability, all of which are discussed in more detail below.

1. Reliability

With a total of four circuits in-service (after the addition of a new double circuit line), the East-West tie will be more reliable than with only three circuits (following the addition of a new single circuit line).

A double-circuit design is inherently more reliable than a single-circuit design as double-circuit contingencies are far less common than single-circuit contingencies. With one element out of service (i.e. the new single-circuit line), should a double-circuit contingency occur, the East-West Tie would be severed. For the same situation with the East-West Tie reinforced with a new double-circuit line, one circuit would remain in-service.

While both double and single-circuit designs can meet the required transfer capability with all elements in service, the double-circuit design has material advantages when considering the actions that will be invoked following contingencies. The IESO estimates that the single-circuit design would require an additional 175 MW of control actions following a single-circuit contingency, compared with the double-circuit design. These additional control actions carry an increased operating cost as typically they are provided by scheduling additional operating reserves on an hourly basis.

The double-circuit design is also expected to be more reliable as it is not susceptible to restrictions arising from outages to the additional series compensation equipment associated with the single-circuit design.

2. Scalability

The IESO submits that the proposed enhancements to the East-West tie may be scaled up to approximately 800 to 850 MW capabilities. The double-circuit design will be more amenable than the single-circuit design to scaling up to these levels. The IESO expects an 800 to 850 MW transfer capability can be achieved by the double-circuit design with the installation of additional shunt compensation equipment. By comparison, the single-circuit design not only requires the same shunt facilities, but would also require series compensation of approximately 50% on both the Wawa to Marathon, and the Marathon to Lakehead sections of the new line. The cost of this additional equipment would erode any initial savings of the single-circuit design.

It should also be noted that for the single-circuit design, not all choices of conductor configurations can be scaled to achieve an 800 MW transfer capability. Designs using single conductors will have a higher reactance than bundled conductors with a comparable cross-sectional area. Achieving the same transfer capability will therefore require much higher levels of series compensation and more complicated control equipment, which will be more costly and may not be technically practical.

Further, to accommodate future tapped connections to the new circuits, conventional station arrangements of breakers and disconnects could be used for the double-circuit design. The single-circuit design, on the other hand, would require modifications to the series compensation, at a material extra cost.

3. Maintainability

All installed equipment will require maintenance. The double-circuit design will avoid the additional maintenance requirements associated with the series compensation equipment.

The double-circuit design, with its less onerous control action requirements, will provide wider maintenance windows than the single-circuit design. With its expanded transfer capability whenever one circuit is out of service, the double-circuit design will also make maintenance outages easier to schedule.

The IESO appreciates the opportunity to provide its submission in this matter, and looks forward to the Board's designation decision and to working with the designated transmitter.

All of which is respectfully submitted this 9th day of May, 2013.

Independent Electricity System Operator

655 Bay Street, Suite 410
P.O. Box 1
Toronto, Ontario M5G 2K4

Tam Wagner
Senior Regulatory Analyst
Tel: (905) 403-4291
Fax: (905) 855-6371
Email: tam.wagner@ieso.ca