



March 9, 2022

Revised: April 7, 2022

Submission in Support of Exemption Application for West of Chatham Transmission Development

- Exemption Applicant: Hydro One Inc.
- Facility: Load at South Middle Road Transformer Station
- Ontario Resource and Transmission Assessment Criteria (ORTAC)
- Exemption: ORTAC 7.1 (load security criteria); ORTAC 7.2 (load restoration criteria)

Hydro One Inc is developing the West of Chatham Transmission project which includes the establishment of load stations at South Middle Road Transformer Station. The above Market Rules exemptions are needed to incorporate load at this location. The exemptions request is based on the findings of the System Impact Assessment (SIA) report for this project, CAA ID: 2019-666, dated February 4, 2022.

Project Description

The West of Chatham Transmission Development consists of the following four projects planned for the Windsor – Essex Region:

- Transmission reinforcements:
 - Building a transmission station, Lakeshore TS, near Leamington Junction, and bussing all the existing 230 kV circuits at this junction into the station. It is planned to be in-service in Q2, 2022.
 - Establishment of a new 230 kV 2-circuit Chatham SS x Lakeshore TS line which is planned to be in-service in Q4, 2025.
 - Developing a 2-DESN transformer station, South Middle Road TS, in the vicinity of Lakeshore TS.
 - DESN #1, a 230/27.6-27.6 kV DESN, connecting 206 MW of load is planned to be in-service in Q2, 2022
 - DESN #2, a 230/27.6-27.6 kV DESN, connecting 206 MW of load, is planned to be in-service in Q3, 2025

Description of the Relevant IESO Requirements

This exemption application refers to two requirements outlined in the Ontario Resource and Transmission Assessment Criteria ([ORTAC](#)).

Section 7.1: Load Security Criteria

The transmission system must be planned to satisfy demand levels up to the extreme weather, median-economic forecast for an extended period with any one transmission element out of service. The transmission system must exhibit acceptable performance, as described below, following the design criteria contingencies defined in sections 2.7.1 and 2.7.2. For the purposes of this section, an element is comprised of a single zone of protection.

With any one element out of service, not more than 150MW of load may be interrupted by configuration and by planned load curtailment, or load rejection, excluding voluntary demand management.

With any two elements out of service, planned load curtailment or load rejection exceeding 150 MW is permissible only to account for local generation outages. Not more than 600 MW of load may be interrupted by configuration and by planned load curtailment, or load rejection, excluding voluntary demand management.

Section 7.2: Load Restoration Criteria

The IESO has established load restoration criteria for high voltage supply to a transmission customer. The load restoration criteria below are established so that satisfying the restoration times below will lead to an acceptable set of facilities consistent with the amount of load affected.

- All load must be restored within approximately 8 hours.
- When the amount of load interrupted is greater than 150MW, the amount of load in excess of 150MW must be restored within approximately 4 hours.
- When the amount of load interrupted is greater than 250MW, the amount of load in excess of 250MW must be restored within 30 minutes.

Exemption Requirements

Exemptions are sought for the following violations of the Ontario Resource and Transmission Assessment Criteria (ORTAC):

a) Requirement #2 in the SIA report CAA ID 2019-666

Requirement #2 in the SIA report CAA ID 2019-666 required Hydro One Networks Inc. to obtain an exemption from satisfying section 7.1 load security criteria in ORTAC, for the loads supplied by South Middle Road TS and stations supplied from circuits H38 and H39 under the following system conditions:

- 1- Following the loss of L28C or L29C, over 150 MW of load would have to be rejected, as identified in finding #2a of the report;
- 2- During outage of L28C or L29C with Brighton Beach CGS in-service under peak load conditions, load would have to be curtailed, as identified in finding #4 of the report;
- 3- Following the loss of Brighton Beach CGS during outage of L28C or L29C with no transfers on J5D under peak load conditions, over 150 MW of load would have to be rejected, as identified in finding #5a of the report;

- 4- Following the loss of Z1E or Z7E under peak load conditions with Brighton Beach CGS in-service and maximum import level from Michigan, over 150 MW of load would have to be rejected, as identified in finding #7 of the report;
- 5- Following the loss of J5D under peak load conditions and maximum import level from Michigan with Brighton Beach CGS out-of-service, over 150 MW of load would have to be rejected, as identified in finding #8b of the report.

b) Requirement #3 in the SIA report CAA ID 2019-666

Requirement #3 in the SIA report CAA ID 2019-666 required Hydro One Networks Inc. to obtain an exemption from satisfying section 7.2 load restoration criteria in ORTAC, for the loads supplied by South Middle Road TS and stations supplied from circuits H38 and H39 under the following system conditions:

- 1- Following the completion of the West of Chatham Transmission project more than 250 MW of load may be interrupted as identified in finding #11 of the report, for the following conditions: loss of L28C or L29C, or loss of L29C and L24L, or loss of W44LC and S47C, or loss of W44LC and W45LS, or loss of Z1E or Z7E with rejection of Brighton Beach generation, or loss of J5D.
- 2- Before the incorporation of C87H and C88H more than 250 MW of load may be interrupted as identified in finding #15 of the report, for the following conditions: loss of C42H and C64H, or loss of C43H and C65H.

Plan to Achieve Compliance

The need for exemption is the result of the weakness of the existing transmission system. This transmission system is unable to adequately support the substantially increased load growth in the region while meeting ORTAC requirements. The exemption requirements will be eliminated with sufficient strengthening of the existing transmission network.

The IESO has responsibility for making decisions and plans relating to improvements to the transmission system. In this regard, the IESO has requested Hydro One to develop the following project to reinforce the transmission system:

- Establishment of a 230 kV 2-circuit Chatham SS x Lakeshore TS line (planned in-service Q4, 2025).
- Establishment of a 230 kV 2-circuit Chatham SS x Lambton TS line (planned in-service Q4, 2028).

With the incorporation of these projects, compliance with ORTAC is expected to be met. The final SIA report (CAA ID: 2019-666) has been completed and the Environmental Assessment for Chatham SS x Lakeshore TS line is in progress and awaiting the Minister of the Environment's decision on the Section 16 Order requests that have been submitted. Furthermore, Hydro One has submitted an SIA application (CAA ID: 2021-699) to the IESO and has commenced the Environmental Assessment for Chatham SS x Lambton TS line.

Further, the IESO has, in addition to the 230kV double-circuits noted above, as part of its Bulk System Plan, *Need for Bulk System Reinforcements West of London*¹, published September

¹ <https://www.ieso.ca/en/Get-Involved/Regional-Planning/Southwest-Ontario/Southwest-Ontario-Bulk-Planning-Initiatives>

2021, outlined the following recommendations to ensure the adequacy and reliability of supply up to the year 2050:

- The continued operation of the Brighton Beach Generating Station to support the immediate localized need in the near-term until the Lambton to Chatham line is in-service; and
- A new single 500 kV transmission line from Longwood to Lakeshore to be in-service in 2030, and 550 MW of local resources that can be met by reacquiring resources whose contracts have expired or by acquiring new resources.

Operation Over the Period When the Exemption Would be in Effect

The request for this exemption is due to the urgent need for Hydro One's customers to connect load at South Middle Road TS prior to planned transmission reinforcements.

The noted exemption requirements have been discussed with Hydro One Distribution, the customer for South Middle Road TS DESN#1 and DESN#2. Hydro One Distribution was also provided with a copy of the SIA report.

The impact of the exemption on customers is expected to be marginal since the contingency events which result in the noted violations are categorically rare events. Further, the IESO will leverage existing operating policy actions to limit impact on customers. This includes the use of local generation and managing intertie flows to avoid pre-contingency customer outages or restore load post-contingency where possible. Consistent with this policy, customers may be subject to manual or automatic load interruption should an outage event occur. Load restoration may require returning transmission equipment to service or starting local generation. Hydro One will leverage all available measures to limit the risk of load interruption, including allowing the use of higher equipment ratings, quickly restoring transmission elements, and coordinating or avoiding planned outages.

Over the five-year period (July 2015 to June 2020) circuit L28C had one forced outage; the corresponding number for circuit L29C is two. These forced outages were of less than 1-minute duration (typically lightning). Over the same period circuit Z1E had two outages, each outage of less than 1-minute duration, while circuit Z7E had one outage which was prolonged. Over the same period circuits J3E and J4E had three outages each, and while each J3E outage was prolonged, each J4E outage was of less than 1-minute duration. Circuit J5D had ten forced outages over the same five-year period, of which three were of 1-minute or less duration while seven were prolonged.

Hence on the average, in a five-year period, the L28C contingency may occur once, the L29C outage twice, the Z1E outage twice, the Z7E outage once, the J3E outage thrice, and the J4E outage thrice. For each of these twelve outages, except four, all load was restored within a minute by automatic autoreclosure at the circuit terminals.

Over the same five-year period, there was no simultaneous forced outage of circuits C42H and C64H, or C43H and C65H.

The time it takes to restore load generally depends on the nature of the contingency. If the contingency is due to a lightning strike, the affected circuit(s) would be returned to service in a matter of seconds with automatic reclosure operation at circuit terminals. The rejected load would then be restored. It is expected that all rejected load would be restored within 30 minutes.

For a more permanent contingency, it would take longer to return the affected circuit(s) to service, but generally, the circuit(s) would be put back to service and all load rejected load would be

restored within 8 hours. The requirement to restore 162 MW of load (i.e. load in excess of 250 MW) in 30 minutes may be challenging depending on the nature of the contingency.

Cost Imposed on the IESO or other Market Participants with Exemption Granted

Hydro One will leverage all available measures, including allowing higher ratings, restoring transmission elements, and coordinating or rescheduling planned outages, to limit:

- Impacting the IESO's ability to ensure non-discriminatory access to the IESO-controlled grid;
- Increasing costs for market participants;
- Increasing costs for the IESO.

Consideration of Exemption Criteria in Market Manual 2.2, Section 1.5.2

- Hydro One assessments indicate that granting the exemption will not give the Hydro One undue preference in the IESO-administered markets.
- The ORTAC criteria to which the exemption application relates were issued prior to the construction of South Middle Road TS.
- Hydro One has the capability to operate South Middle Road TS consistent with the terms of the proposed exemption.