System Impact Assessment Addendum Report

Final Report - Public

CAA ID: 2018-633
Project: Leamington TS DESN # 2
Connection Applicant: Hydro One Networks Inc.

November 17, 2020

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Acknowledgement

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

Disclaimers

IESO

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the project is based on information provided to the IESO by the connection applicant and Hydro One at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed project to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. This report does not in any way constitute an endorsement of the proposed connection for the purposes of obtaining a contract with the IESO for the procurement of supply, generation, demand response, demand management or ancillary services.

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Hydro One

The results reported in this report are based on the information available to Hydro One, at the time of the study, suitable for a System Impact Assessment of this connection proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed facilities on load and generation customers.

In this report, short circuit adequacy is assessed only for Hydro One circuit breakers. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One circuit breakers and identifying upgrades required to incorporate the proposed facilities. These results should not be used in the design and engineering of any new or existing facilities. The necessary data will be provided by Hydro One and discussed with any connection applicant upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and facility loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed facilities have been identified to the extent permitted by a System Impact Assessment under the current IESO Connection Assessment and Approval process. Additional facility studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

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Project Description

To provide electric supply to the expected load growth in the Leamington area, Hydro One Networks Inc. (the "connection applicant" and "transmitter") had proposed a load increase at the existing Dual Element Spot Network (DESN) switchyard at Leamington Transformer Station (TS), and to add a new DESN switchyard at the existing Leamington TS (the "project").

In September 2019, the IESO completed the System Impact Assessments (SIA) for the project and issued the original final SIA report for a total peak load at Leamington TS of 369 MW. The connection applicant energized the new DESN switchyard in December 2019, obtained the required exemption from ORTAC load security and restoration criteria in February 2020 and placed the required local voltage schemes and revised Leamington SPS in-service in August 2020.

In May 2020, the connection applicant updated the winter and summer load forecast for Leamington TS as shown in Table 1 and Table 2. The updated peak load forecast exceeds the previously assessed peak load forecast by 41 MW in the winter and reaches a maximum of 410 MW by Q1, 2022; therefore, additional studies were performed to assess the project's impact on system reliability as documented in this addendum.

Notice of Conditional Approval

This assessment concludes that the proposed connection of the project with the updated load forecast is not expected to materially reduce the reliability of the integrated power system, provided that all requirements in the original SIA report and this report are implemented. Therefore, the assessment supports the release of the Notification of Conditional Approval for connection of the project with the updated load forecast.

Assessment Findings

The updated load forecast was assessed for impact on system reliability of the IESO-controlled grid, and based on our study results, we have identified the following changes to the findings presented in the final SIA report for CAA 2018-633:

1. With all transmission elements in-service and with Brighton Beach CGS out of service, under peak load conditions and with no transfers on J5D, the incorporation of the updated load forecast could result in:

    a. increased thermal overloads and voltage criteria violations following the loss of C21J or C22J. Up to 251 MW, instead of 210 MW, of load would need to be rejected by the Leamington contingency-based SPS to prevent Ontario Resources and Transmission Assessment Criteria (ORTAC) thermal and voltage criteria violations. However, under these system conditions, rejecting more than 150 MW of load is a violation of the ORTAC load security criteria. In addition, Mastron II CTS or Aphria CTS would be interrupted by configuration, for a maximum of 304 MW, instead of 263 MW, of load being interrupted.

    b. increased thermal overloads and voltage criteria violations for the following recognized double contingencies: simultaneous loss of C21J and C23Z, simultaneous loss of C22J and C24Z,

simultaneous loss of C23Z and C24Z, failure of Chatham DL21 breaker, failure of Chatham L21L47 breaker, failure of Chatham DL44 breaker, and failure of Keith C21J in-line breaker. The worst recognized double contingency is the simultaneous loss of C21J and C23Z, which requires up to 298 MW, instead of 257, of load to be rejected by the revised Leamington contingency-based SPS (see section 4.13 in the final SIA reports for CAA 2018-633, CAA 2018-638 and CAA in 2018-642) to prevent ORTAC thermal and voltage criteria violations. In addition, up to 53 MW of load at Mastron II CTS would be interrupted by configuration, for a total of 351 MW, instead of 310 MW, of load being interrupted. However, interrupting 351 MW of load is acceptable under ORTAC load security criteria for these system conditions.

2. During either C21J or C22J outages and with Brighton Beach CGS in-service, under peak load conditions and with no transfers on J5D, the updated load forecast could result in:

    a. increased pre-contingency under voltages and voltage stability margin violations at Leamington TS. 66 MW, instead of 25 MW, of the load at Leamington TS and Aphria CTS (or Mastron II CTS) would need to be curtailed or transferred to Kingsville TS when system conditions allow to address voltage criteria violations. However, under these system conditions, interrupting any load is a violation of the ORTAC load security criteria;

    b. increased thermal overloads on C22J following the loss of a single Brighton Beach CGS unit or for the loss of the entire Brighton Beach CGS plant, and excessive low voltages at Leamington TS, Aphria CTS and Mastron II CTS following the loss of the entire Brighton Beach CGS. The issues could be mitigated by rejecting up to 251 MW, instead of 210 MW, of load through arming of the revised Leamington contingency-based SPS. However, under these system conditions, rejecting more than 150 MW of load is a violation of the ORTAC load security criteria;

    c. increased thermal overloads on C22J following the simultaneous loss of C23Z and C24Z. The overloads could be mitigated by rejecting up to 141 MW, instead of 100 MW, of load through arming of the revised Leamington contingency-based SPS, which is acceptable under the ORTAC load security criteria for these system condition;

    d. increased excessive low voltages at Leamington TS, Aphria CTS and Mastron II CTS following simultaneous loss of C23Z and C24Z, or failure of Chatham DL44 breaker. These conditions were found to be the most restrictive of those required to be studied under ORTAC. Although they may impact the local reliability of supply to the Leamington TS, Aphria CTS and Mastron II CTS loads; the impact on the bulk system is acceptable and there is no violation to applicable reliability standards.

3. No thermal or voltage violations were identified under maximum historical J5D export levels (400 MW) if Brighton Beach CGS is in-service after the incorporation of the project.

4. The C22J thermal rating will become limiting during export to Michigan when Brighton Beach CGS is out of service, when the maximum exports on J5D under summer and winter conditions with planning thermal ratings are 169 MW and 59 MW, respectively, instead of 220 MW and 100 MW, respectively.

    In addition, post-contingency voltage violations were identified when J5D export exceeds 59 MW, instead of 100 MW, with Brighton Beach out of service. The required local voltage schemes in

section 4.13 in CAA 2018-633, CAA 2018-638 and CAA in 2018-642 mitigate these violations and allow higher J5D exports when the pre-contingency thermal ratings are not limiting, as follow:

a. following any contingency that includes the loss of C21J, C22J, Chatham D bus, and the simultaneous loss of C23Z and C24Z contingency, the local under-voltage L/R schemes prevent excessive low voltage. Up to 410 MW, instead of 369 MW, of load at Leamington TS, Apria CTS, and Mastron II CTS would need to be rejected to prevent criteria violations;

b. following the inadvertent breaker operation of the in-line 230 kV circuit breaker CF on circuit J5D at Michigan Waterman, the local over-voltage capacitor switching schemes at Lauzon TS and Keith TS prevent excessive high voltages in the Windsor area.

5. After the incorporation of the project, up to 608 MW, instead of 567 MW, of load along the Chatham to Keith corridor could be interrupted with C21J and C22J out of service. However, under the system conditions of finding # 5, interrupting more than 600 MW of load is a violation of the ORTAC load security criteria. This is a new violation of the ORTAC load security criteria caused by the increased load forecast.

   The ORTAC load restoration criterion requires all load in excess of 250 MW be restored within 30 minutes and Hydro One has indicated that this restoration target cannot be met. The original SIA report concluded this was a violation of the ORTAC load restoration criteria and the violation is exacerbated by the increased load forecast as more load will be impacted.

6. Chatham to Longwood and Chatham to Lambton circuits are part of the North East Power Coordinating Council (NPCC) Bulk Power System (BPS) system. Following the loss of one circuit, the system needs to be re-prepared within 30 minutes to be able to withstand next recognized contingency. After a forced outage to L28C, L29C, W44LC, W45LS or S47C circuits under peak load conditions, the system cannot be re-prepared to withstand the simultaneous loss of L28C and L29C, W44LC and W45LS, or W44LC and S47C if local generation is out of service; this is because, with the exception of East Windsor CGS, all local generators are slow starting. Up to 231 MW, instead of 190 MW, of load at Leamington TS, Aphria CTS, and Mastron II CTS would need to be curtailed until enough local generation is online and avoid declaring emergency conditions. The SPS identified in section 4.14 in CAA 2018-633, CAA 2018-638 and CAA in 2018-642, with the capability to arm load rejection for the four BPS circuits indicated earlier, avoids the load curtailment.

IESO Requirements for Connection

The connection applicant shall meet all the specific and general requirements in the original SIA report and the following additional specific requirements:

1. Since the violations for the ORTAC load security criteria identified in CAA 2018-633 are exacerbated as identified in findings #1, #2, # 3 and # 4, and a new violation occurs as per finding # 5, Hydro One is required to obtain a new exemption from satisfying the load security criteria, as per section 7.5 of the ORTAC, for the new 41 MW of load supplied by Leamington TS.

2. Since the violations for the ORTAC load restoration criteria are increased by 41 MW as identified in finding #5, Hydro One is required to obtain a new exemption from satisfying the load

restoration criteria, as per section 7.5 of the ORTAC, for the new 41 MW of load supplied by Leamington TS.

Recommendation

To address the finding #6, Hydro One is recommended to install the contingency-based L/R SPS identified in section 4.14 of the original SIA.

Appendix A: Updated Load Forecast

Table 1: Winter Load Forecast in MW for Leamington TS

Station	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Leamington TS DESN 1	201.5	204.7	204.7	204.8	204.8	204.8	204.8	204.8	204.8	204.8	204.83
Leamington TS DESN 2	202.5	205.5	205.5	205.5	205.5	205.5	205.5	205.5	205.5	205.5	205.56
Total	404.1	410.2	410.2	410.3	410.3	410.3	410.3	410.3	410.3	410.3	410.39

Table 2: Summer Load Forecast in MW for Leamington TS

Station	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Leamington TS DESN 1	147.8	147.3	147.3	147.4	147.4	147.4	147.4	147.4	147.5	147.6	147.68
Leamington TS DESN 2	73.77	74.59	74.68	76.05	76.05	76.05	76.05	76.05	76.05	76.05	76.05
Total	221.6	221.9	222.0	223.5	223.5	223.5	223.5	223.5	223.6	223.7	223.73

Appendix B: Detailed Study Results

The technical studies focused on identifying the impact of the updated load forecast at Leamington TS on the reliability of the integrated power system. The study assumptions used in this addendum were the same as those documented in the original SIA report. All the studies in the original SIA were re-performed using the updated load forecast.

B.1 Thermal Assessment

S1-All elements in-service: Pre-contingency

The pre-contingency flows on all monitored elements are within their continuous ratings under both summer and winter conditions.

S1-All elements in-service: Post-contingency

The increased load forecast does not cause new thermal violations. However, the post-contingency thermal overloads identified in section 4.5 in CAA 2018-633 under "S1-All elements in-service: Post-contingency" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected for the worst-case single contingency of loss of C21J from 210 MW to 251 MW, and the worst-case double contingency of simultaneous loss of C21J and C23Z from 257 MW to 298 MW.

S1- Forced outage to one of the BPS circuits L28C, L29C, W44LC, W45LS, and S47C

The increased load forecast does not cause new thermal violations. However, the post-contingency thermal overloads identified in section 4.5 in CAA 2018-633 under "S1- Forced outage to one of the BPS circuits L28C, L29C, W44LC, W45LS, and S47C" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS, and Mastron II CTS that should be armed for rejection for the subsequent simultaneous loss of W44LC and W45LS, of W44LC and S47C or of L28C and L29C from 190 MW to 231 MW.

S1-C21J or C22J out of service: Pre-contingency

The most critical outages are C21J and C22J. To prevent the pre-contingency flows on the monitored elements from exceeding their LTE ratings, Brighton Beach GS needs to be fully dispatched during those outages under both summer and winter conditions with the project in-service. The increased load forecast does not cause new thermal violations.

S1- C21J or C22J out of service: Post-contingency

The updated load forecast does not cause new thermal violations. However, the post-contingency thermal overloads identified in section 4.5 in CAA 2018-633 under "S1- C21J or C22J out of service: Post-contingency" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected for the loss of the entire Brighton Beach CGS from 210 MW to 251 MW. Additionally, the increased load forecast will increase the maximum amount of load that would need to be rejected for the simultaneous loss of C23Z and C24Z from 100 MW to 141 MW.

B.2 Voltage Level and Voltage Change Assessment

S1-All elements in-service: Pre-contingency

The pre-contingency voltage levels on all monitored buses are within ORTAC criteria with the required capacitors banks in CAA 2018-638 for Aphria CTS and CAA 2018-642 for Mastron II CTS installed and in-service

S1-All elements in-service: Post-contingency

The updated load forecast does not cause new voltage violations. However, the post-contingency voltage violations identified in section 4.6 in CAA 2018-633 under "S1-All elements in-service: Post-contingency" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected for the worst-case single contingency of loss of C21J from 48 MW to 89 MW, and the worst-case double contingency of simultaneous loss of C21J and C23Z from 140 MW to 181 MW.

S1-One element out of service: Pre-contingency

The updated load forecast does not cause new voltage violations. However, the post-contingency voltage violations identified in section 4.6 in CAA 2018-633 under "S1-One element out of service: Pre-contingency" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be curtailed or transferred to Kingsville TS during C21J or C22J outages, with Brighton Beach GS fully dispatched, from 25 MW to 66 MW.

S1-One element out of service: Post-contingency

The updated load forecast does not cause new voltage violations. However, the post-contingency voltage violations identified in section 4.6 in CAA 2018-633 under "S1-One element out of service: Post-contingency" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected following the loss of Brighton Beach CGS when either C21J or C22J is out of from 100 MW to 141 MW. Furthermore, the increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected following simultaneous loss of C23Z and C24Z when either C21J or C22J is out from 40 MW to 81 MW. Moreover, the increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected following the failure of Chatham DL44 breaker when either C21J or C22J is out of service by the local under-voltage L/R schemes from 40 MW to 81 MW.

B.3 Steady-State Voltage Stability Margin Assessment

To assess the project's impact on the steady state voltage stability, the transfer from the generation east of Chatham SS to the load at Leamington TS was used for all subsequent scenarios. The loads at Aphria CTS and Mastron II CTS were assumed at their maximum level.

The Leamington contingency-based SPS can be armed for rejection following all contingencies that include the loss of C21J or C22J, the loss of a unit at Brighton Beach CGS, the loss of the entire Brighton Beach CGS, and the simultaneous loss of C23Z and C24Z. Arming this scheme for the aforementioned contingencies ensures that the new load forecast has no adverse impact on the post-contingency voltage stability of the system. Therefore, the impact of the new load forecast on post-contingency voltage stability at Leamington TS was not studied for these contingencies.

S1-All elements in-service

The pre-contingency voltage instability occurs at Leamington TS when its load exceeds 510 MW. Since Leamington TS load with the new load forecast is not expected to be more than 410 MW, the pre-contingency voltage stability margin is greater than 10 %, meeting the ORTAC requirement.

The post-contingency voltage instability would occur when Leamington TS load exceeds 440 MW following Chatham DL44 breaker failure contingency, which was identified as the worst-case contingency. Since Leamington TS load with the new load forecast is not expected to be more than 410 MW based, the post-contingency voltage stability margin is greater than 5 %, meeting the ORTAC requirement.

S1-One element out of service

The updated load forecast does not cause new voltage stability margin violations. However, the post-contingency voltage stability margin violations identified in section 4.7 in CAA 2018-633 under "S1-One element out of service" are exacerbated.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be curtailed or transferred to Kingsville TS during C21J or C22J outages, with Brighton Beach GS fully dispatched, from 25 MW to 66 MW. This is consistent with the low voltage assessment findings in section B.2.

The increased load forecast will increase the maximum amount of load at Leamington TS, Aphria CTS and Mastron II CTS that would need to be rejected in post-contingency by Leamington under-voltage L/R scheme following Chatham DL44 breaker failure contingency from 7 MW to 48 MW.

B.4 Transient Voltage Performance Assessment

The transient post-contingency voltages in the Windsor area system were examined following a LG fault on W44LC close to Chatham SS and a Chatham DL44 breaker failure under S1 winter conditions, which were identified as the worst-case scenarios. The new load forecast decreases the minimum transient post-contingency voltage from 204 kV to 198 kV (i.e. 86 % based on a nominal voltage of 230 kV) which still meets the ORTAC criteria threshold of 80%.

B.5 Load Security and Restoration Assessment

With the updated load forecast, the loss of C21J or C22J will interrupt Mastron II CTS load (53 MW) or Aphria CTS load (60 MW) by configuration, respectively. Furthermore, the loss of C21J in section B.1 requires load rejection of up to 251 MW, instead of 210 MW, via the Leamington contingency-based SPS when Brighton Beach CGS is out of service. Therefore, a maximum of 304 MW, instead of 263 MW, of load will be interrupted following the loss of C21J. This load interruption violates the load security criteria in section 7.1 in ORTAC, where with one element out of service, a maximum of only 150 MW of load can be interrupted by configuration and planned load rejection.

With the updated load forecast, the simultaneous loss of tower sharing circuits C21J and C23Z when Brighton Beach CGS is out of service requires planned load rejection of up to 298 MW, instead of 257 MW, via the Leamington contingency-based SPS, as detailed in section B.1. In addition, up to 53 MW of load at Mastron II CTS would be interrupted by configuration, for a total of 351 MW, instead of 310 MW, of load being interrupted. This does not violate the load security criteria in section 7.1 in ORTAC, where a maximum of 150 MW plus Brighton Beach CGS capacity, i.e. 490 MW, but not more than 600 MW of load can be interrupted by configuration and by planned load curtailment or load rejection, excluding voluntary demand management with two elements out of service.

With the updated load forecast, the simultaneous loss of tower sharing circuits C21J and C22J will interrupt load by configuration at Malden TS, Leamington TS, Aphria CTS, and Mastron II CTS of up to 608 MW, instead of 567 MW. This causes a new violation of the load security criteria in section 7.1 in ORTAC, where only up to 600 MW of load can be interrupted by configuration with two elements out of service.

With the updated load forecast, following the simultaneous loss of C21J and C22J, up to 358 MW, instead of 317 MW, of load will need to be restored within approximately 30 minutes, up to 458 MW, instead of 417 MW, of load will need to be restored within approximately 4 hours, and the total load will need to be restored within approximately 8 hours according to the load restoration criteria in section 7.2 in ORTAC.

B.6 Export Conditions on J5D

This assessment assumed the arming requirements for the Leamington contingency-based SPS identified in sections 4.5 and 4.6 of CAA 2018-633, CAA 2018-638 and CAA in 2018-642 are met in order to mitigate all violations identified with zero exports. From this point, the flow on J5D was gradually increased by dispatching generation outside the Windsor area until the flow on J5D reached its typical maximum pre-contingency flow, i.e. 400 MW. Pre- and post-contingency thermal and voltage analysis were performed to identify if there are additional thermal overloads or voltage limit violations restricting export capability.

The flow on J5D was gradually increased by dispatching generation outside the Windsor area until the flow on J5D reached its typical maximum pre-contingency flow, i.e. 400 MW. Pre- and post-contingency thermal and voltage analysis were performed to identify if there are new thermal overloads or voltage limit violations restricting export capability.

S2-Maximum export on J5D based on pre-contingency conditions

The limits on J5D exports identified in section 4.11 in CAA 2018-633 under "S2-Maximum export on J5D based on pre-contingency conditions" were decreased from 220 MW to 169 MW in the summer and from 100 MW to 59 MW in the winter due to the increase in forecasted load.

If Brighton Beach CGS is in-service, then the exports on J5D can reach 400 MW without any thermal or voltage violations.

S2-Maximum export capability on J5D based on post-contingency conditions

With Brighton Beach fully dispatched in-service, there were no thermal or voltage violations observed for export levels up to 400 MW.

With Brighton Beach out of service, since the C22J planning rating limits pre-contingency J5D export to 59 MW, post-contingency thermal analysis was not performed. However, operational thermal ratings may be less restrictive than the planning rating; therefore, post-contingency voltage analysis was performed for export levels up to 400 MW under peak winter conditions.

S2-Post-contingency voltage analysis

The updated load forecast does not cause new voltage violations. However, the post-contingency voltage violations identified in section 4.11 in CAA 2018-633 under "S2-Post-contingency voltage analysis" are exacerbated.

The increased load forecast will increase the maximum amount of load that would need to be rejected by local under-voltage L/R schemes for the worst-case double contingency of loss of Chatham DL44 breaker from 369 MW to 410 MW.

The excessive high voltages in the Windsor area following the inadvertent breaker operation of the in-line 230 kV circuit breaker CF on circuit J5D at Michigan Waterman were mitigated with the installation of the local over-voltage capacitor switching schemes at Lauzon TS and Keith TS as required in CAA 2018-633.

B.7 Import Conditions on J5D

This assessment assumed the arming requirements for the Leamington contingency-based SPS identified in sections 4.5 and 4.6 of CAA 2018-633, CAA 2018-638 and CAA in 2018-642 are met in order to mitigate all violations identified with zero exports. From this point, the flow on J5D was gradually increased by dispatching generation outside the Windsor area until the flow on J5D reached its typical maximum pre-contingency flow, i.e. 400 MW. Pre- and post-contingency thermal and voltage analysis were performed to identify if there are additional thermal overloads or voltage limit violations restricting export capability.

The flow on J5D was set to its typical maximum pre-contingency import flow assuming the new projects in-service, i.e. 320 MW in the winter and 200 MW in the summer. Pre- and Post-contingency thermal and voltage analysis were performed to identify if there are additional thermal overloads or voltage limit violations restricting import capability.

S3-Maximum import capability on J5D based on pre-contingency conditions

The updated load forecast does not cause new thermal or voltage violations.

S3-Post-contingency analysis

The updated load forecast does not cause new thermal or voltage violations.

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