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## Project QC-2020-02

### PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding

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#### 1. OVERVIEW OF THE STANDARDS

##### 1.1. Applicability

PRC-006-NPCC-2 standard applies to the following set of functions and facilities:

**Functions covered:**

- Generator Owner (GO)
- Planning Coordinator (PC)
- Distribution Providers (DP) that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators
- Transmission Owners (TO) that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators

**Facilities covered:**

This standard only applies to the Facilities of the Main Transmission System (RTP).

##### 1.2. Purpose of the Reliability Standard

The NPCC Automatic Underfrequency Load Shedding (UFLS) Regional Reliability Standard establishes more stringent and specific Northeast Power Coordinating Council (NPCC) Underfrequency Load Shedding (UFLS) program requirements than the NERC continent-wide PRC-006 standard. The program is designed such that declining frequency is arrested and recovered in accordance with established NPCC performance requirements<sup>1</sup>.

The Regional Reliability Standard PRC-006-NPCC-2 removes duplicity with the continent-wide PRC-006 standard and adds specificity to allow retirement of the NPCC UFLS Directory 12, it contains more stringent UFLS performance criteria and harmonizes the requirements and criteria of all these documents.

##### 1.3. Regulatory Context

This is the first regulatory filing to the Régie de l'énergie ("the Régie") to approve Reliability Standard PRC-006-NPCC and its associated violation risk factors and violation severity levels, implementation plan, and effective dates.

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<sup>1</sup> NPCC is not an "interconnection-wide" Regional Entity and its standards are intended to apply only to that part of the Eastern Interconnection within the NPCC geographical footprint and Québec.

North American Electric Reliability Corporation (NERC) submitted a Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-006-NPCC-2<sup>2,3</sup> to the Régie on January 9, 2020.

The PRC-006-NPCC Standard was originally developed to ensure the development of an effective automatic UFLS program in order to preserve the security and integrity of the BPS (NPCC) during declining system frequency events, in coordination with the NERC UFLS reliability standard characteristics.

PRC-006-NPCC-2 is an evolution of PRC-006-NPCC-1. NPCC regional standard PRC-006-NPCC-1 Automatic UFLS was effective in the United States on July 2015. The standard is revised to align with the continent-wide PRC-006-2 UFLS standard which became effective on October 2015 and PRC-006-3 UFLS Standard, which includes the Regional Variance for the Québec Interconnection, which became effective on October 2017.

On February 10, 2019, proposed Regional Reliability Standard PRC-006-NPCC-2 was approved by the NPCC ballot body with a 95.9% percent affirmative vote at 80.0% quorum. The Proposed Regional Reliability Standard PRC-006-NPCC-2 was approved by the NPCC Board of Directors on May 1, 2019. NERC posted the Regional Reliability Standard for a 45-day comment period concluding on June 21, 2019. The single commenter agreed that NPCC's process was open, inclusive, balanced, transparent, and that due process was followed. On September 5, 2019, the NPCC Board of Directors approved the correction of an errata to the proposed Regional Reliability Standard. On November 5, 2019, the NERC Board of Trustees adopted the proposed Regional Reliability Standard PRC-006-NPCC-2.

On February 19, 2020, the Federal Energy Regulatory Commission (FERC) issued a Delegated Letter Order, Docket No. RD20-1-000<sup>4</sup>, approving proposed Reliability Standard PRC-006-NPCC-2, the associated VRFs and VSLs, the Effective Date, as well as the retirement of the currently effective Regional Reliability Standard PRC-006-NPCC-1. The effective date for Reliability Standard PRC-006-NPCC-2 in the United States is April 1st, 2020.

The revisions to the PRC-006-NPCC-1 Automatic Underfrequency Load Shedding have been developed to address the following concerns<sup>5</sup>:

- To determine if the applicability of the standard needs to be revised in accordance with Project 2014-01 Dispersed Generation Resources<sup>6</sup>.
- To determine if the performance requirements, as contained in the criteria of NPCC Directory 12 Sections 5.1.1 and 5.1.2, should be explicitly included in the requirements of the Regional Standard and potential retirement of Directory 12 Automatic UFLS Program.

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2 NERC Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-006-NPCC-2, consulted online on May 29, 2020, at <https://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Quebec%20PRC-006-NPCC-2%20Filing.pdf>

3 NERC Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-006-NPCC-2 (attachments), consulted online on May 29, 2020,

<https://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/Attachments%20to%20PRC-006-NPCC-2%20Filing.pdf>

4 Petition of the North American Electric Reliability Corporation for Approval of Proposed Regional Reliability Standard PRC-006-NPCC-2, Docket No. RD20-1-000, February 18, 2020, consulted online on May 29, 2020, at <https://www.nerc.com/FilingsOrders/us/FERCOrdersRules/RD20-1-000%20Delegated%20Letter%20Order.pdf>

5 PRC-006-NPCC-2 - Information in a Regional Standard Authorization Request (RSAR), consulted online on May 29, 2020, at <https://www.npcc.org/Layouts/ViewDocument.aspx?documentId=137082>

6 Project 2014-01 Dispersed Generation Resources, consulted online on May 29, 2020, at <https://www.nerc.com/pa/Stand/Pages/Project-2014-01-Standards-Applicability-for-Dispersed-Generation-Resources.aspx>

- Review Attachment C in PRC-006-NPCC-1 to address the implications of the design assessment, in accordance with Requirement R4 of PRC-006-1/PRC-006-2, of not meeting the program performance characteristics as identified in Requirement R3 of PRC-006-1/PRC-006-2.
- Review and revise Table 4 in Attachment C to reflect the modified Québec UFLS program parameters as recommended in the 2013 NPCC UFLS Adequacy Assessment. Additionally, the applicability of Requirements R4 and R5 will be reviewed to consider that Hydro-Québec is not part of the Eastern Interconnection.

The following summarizes an overview of the proposed modification to Standard PRC-006-NPCC-2. For more details, please refer to the complete Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-006-NPCC-2 submitted to the Régie on January 9, 2020, Mapping Document - Draft NPCC Regional Automatic Underfrequency Load Shedding - Standard PRC-006-NPCC-2<sup>7</sup> and the Summary of Changes prepared by the NPCC<sup>8</sup>.

- 1) Remove redundancies with the most recent of the continent-wide NERC Standard PRC-006-3. Some of the redundancies removed from the Regional Standard PRC-006-NPCC-2 are those related to:
  - The Québec Interconnection portion of NPCC shall implement an automatic UFLS program in accordance with Attachment C Table 4. (Table 4 was removed from Attachment C);
  - Requirements for a UFLS Database;
  - Notification of changes to load distribution needed to satisfy UFLS program performance characteristics;
  - Development of an implementation plan when changes to load distribution are needed.
- 2) Ensure that UFLS island boundaries, once identified, are provided upon request to affected entities.
- 3) Minimum time UFLS relay time delay added to Attachment C tables and removed as a separate requirement.
- 4) Added the ability for a TO or DP to calculate net load shed for UFLS if direct metering is not available.
- 5) A number of minor clarifications were made to the standard such as requiring the Underfrequency trip relay must be set to operate “on or below” the appropriate curve. In Version 1 it currently states below and questions arose whether settings on the curve were considered in compliance.
- 6) Clarification that any compensatory load shedding for non-conformance with the Underfrequency trip specification for generation (in service prior to July 1, 2015) must be within the same island as the generator resides.

Please note that there are incorrect references in the Violation Severity Levels (VSL) table (R4, R9 and R13 among others) and in Attachment B. Based on communication with the NPCC, any required corrections to the VSL would have to be classified as substantive, not errata. As such, any modifications would need to go through the entire NPCC standards development process, beginning with the Regional Standard Authorization Request (RSAR). As such, the Reliability Coordinator will not correct the above-mentioned incorrect references in the Québec Appendix. It is important that the standard, as approved by the FERC,

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<sup>7</sup> Mapping Document - Draft NPCC Regional Automatic Underfrequency Load Shedding - Standard PRC-006-NPCC-2, , consulted online on May 29, 2020, at <https://www.npcc.org/Layouts/ViewDocument.aspx?documentId=137354>

<sup>8</sup> Summary of changes - NPCC Regional Standard, PRC-006-NPCC-02 “Automatic Underfrequency Load Shedding” for NERC BOT Consideration and Adoption, , consulted online on May 29, at, [https://www.nerc.com/pa/Stand/RegionalReliabilityStandardsUnder%20Development/PRC-006-NPCC-2\\_Summary\\_of\\_Changes.pdf](https://www.nerc.com/pa/Stand/RegionalReliabilityStandardsUnder%20Development/PRC-006-NPCC-2_Summary_of_Changes.pdf)

be considered based on the reliability merits and the incorrect references will be corrected in the next version of the Standard.

#### **1.4. Proposed Effective Dates**

The United States effective date for PRC-006-NPCC-2 was April 1, 2020 for all Requirements except R3 which will be effective on April 1<sup>st</sup> 2021 in the United States and neighbouring NPCC regions. Under the NERC implementation plan<sup>9</sup>, the Regional Reliability Standard became effective on the first day of the first calendar quarter following the applicable governmental and regulatory approvals. Applicable registered entities would be required to comply with all proposed Requirements, except for proposed Requirement R3, on that date. Proposed Requirement R3 would become enforceable on the first day of the first calendar quarter 12 months following applicable governmental and regulatory approvals.

The proposed implementation plan of PRC-006-NPCC-2 is to have all the Requirements of the Standard effective in the Québec Interconnection simultaneously with Requirement R3 in the other NPCC regions. The NPCC will withdraw Directory 12 once all of PRC-006-NPCC-2 Requirements are effective in all NPCC regions.

Since Québec must harmonize the standard with neighbouring NPCC regions and in order to allow the NPCC to withdraw Directory 12, thus eliminating the implementation issues in the Québec Interconnection with respect to Directory 12, the proposed Reliability Standard PRC-006-NPCC-2 must be adopted in a timely manner. As such, the proposed adoption date by the Régie of PRC-006-NPCC-2 should be before January 29, 2021. All Requirements of the standard shall become effective on the first day of the first calendar quarter that is 60 days after the adoption date by the Régie, no later than April 1, 2021. Note that Requirement R3 is not applicable to the Québec Interconnection, therefore, the 12 months delay allowed for R3, in other regions, is not required.

#### **1.5. Standards or Requirements to withdraw**

None

#### **1.6. Modifications to the Glossary**

None

### **2. ASSESSMENT OF RELEVANCE**

The proposed Reliability Standard PRC-006-NPCC-2 satisfies the reliability standards criteria and is just, reasonable, not unduly discriminatory or preferential, and in the public interest. As described more fully herein, the proposed Regional Reliability Standard provides reliability benefits for the BPS (NPCC) in the NPCC region by establishing more stringent and specific NPCC UFLS program requirements than the NERC continent-wide PRC-006 Reliability Standard and ensuring that the program is designed such that declining frequency is arrested and recovered in accordance with established NPCC performance requirements stipulated in the proposed Regional Reliability Standard.

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<sup>9</sup> Implementation Plan Regional Reliability Standard PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding 2020, at <https://www.nerc.com/pa/Stand/RegionalReliabilityStandardsUnder%20Development/PRC-006-NPCC-2%20Implementation%20Plan.pdf>

These modifications are as relevant in Québec as elsewhere in North America. The proposed Reliability Standard PRC-006-NPCC-2 includes specific requirements for the Québec Interconnection to address its specificity and therefore the Standard should also be effective and enforceable in the Québec Interconnection.

As already mentioned, PRC-006-NPCC-2 removes duplicity with the continent-wide standard and adds specificity to allow retirement of the NPCC UFLS Directory 12, it contains more stringent UFLS performance criteria and harmonizes the requirements and criteria of all these documents. Thus, PRC-006-NPCC-2 will contribute to the efficiency of the UFLS program.

Specifically regarding NPCC Directory 12, it should be noted that it cannot be implemented in its integrity in the Québec Interconnection. In fact, table 2 of Directory 12 is outdated and does not represent the UFLS Program that is currently fully implemented in the Québec Interconnection. An alternative UFLS Program for the Québec Interconnection was approved by the NPCC Reliability Coordinating Committee on December 2<sup>nd</sup> 2014, to address Directory 12 obsolescence and has been completely implemented by Hydro-Québec TransÉnergie (HQT). Therefore, since the Québec Interconnection specificities are covered within the proposed Regional Reliability Standard PRC-006-NPCC-2, this justifies the withdrawal of Directory 12 in a timely manner and its replacement with PRC-006-NPCC-2.

PRC-006-NPCC-2 Regional Reliability Standard establishes more stringent and specific NPCC UFLS program requirements than the NERC continent-wide PRC-006 standard, among others, the PRC-006-NPCC-2:

- Covers GO functions, whereas the NERC continent-wide Standard PRC-006-3 does not;
- Requires that the PC provides UFLS island boundaries, as identified per the NERC continent-wide PRC-006 Standard, to affected entities upon request;
- Adds the ability for a TO or a DP to calculate net load shed for UFLS if direct metering is not available;
- Adds specific requirements to GOs with a new generating unit or an existing generator thereby increasing its net capability by greater than 10%;
- Adds specific requirements for existing non-nuclear units in service prior to July 1, 2015 that have underfrequency protections set to trip above the appropriate curve in Figure 2.

It is important to note that PRC-006-NPCC-2 Regional Reliability Standard considers that the Québec Interconnection is not part of the Eastern Interconnection. Thus, all Requirements that only refer to the Eastern Interconnection are not applicable for the Québec Interconnection.

The PRC-006-NPCC-2 Regional Reliability Standard Requirements applicable to GOs in the Québec Interconnection are the following:

- R10 : generator underfrequency trip relay setting according to figure 2. This Requirement is already covered by Standard PRC-024-1. The PRC-006-NPCC-2 figure 2 Québec Interconnection Generator Tripping setting represents the same requirements as PRC-024-1 Appendix 1 Québec Interconnection table.
- R11 : GO shall transmit the generator underfrequency trip setting and time delay. NERC PRC-024-1 R4 allows for a 60 calendar days whereas PRC-006-NPPC-2 allows for 45 calendar days;
- R12 : adds new specific requirements to GO with a new generating unit, or an existing generator increasing its net capability by greater than 10%. This Requirement adds design specificities for the GOs. In the Québec Interconnection, “Technical Requirements for the Connection of Generating Stations to the Hydro-Québec Transmission System” sections 6.3 and 6.3.3 have similar design

requirements for the generating stations. Therefore, R12 is not a new requirement but it will now be enforceable through PRC-006-NPCC-2;

- R13: specific requirements are provided for existing non-nuclear units in service prior to July 1, 2015, that have underfrequency protections set to trip above the appropriate curve in Figure 2. Again, since figure 2 has the same requirements as Standard PRC-006-3 Attachment 1A (Québec) and PRC-024-1 Appendix 1 Québec Interconnection table, compliance to figure 2 should not be an issue in the Québec Interconnection. If the GO cannot meet figure 2 requirement, the PC shall arrange for compensatory load shedding that is adequate to compensate for the loss of generator(s) due to early tripping that is within the UFLS island. After verification with the PC, there is only one Facility in the Québec Interconnection that cannot meet figure 2.

It should be noted that HQT is the only entity that is identified as DP or TO responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the PC in the Register of Entities Subject to Reliability Standards. Therefore, all Requirements pertaining to DP or TO are only applicable to HQT in the Québec Interconnection.

In accordance with the agreement signed in 2009 between the Régie, NERC and the NPCC and with the authorization of the Québec government,<sup>10</sup> this standard was developed and approved by external agencies in North America, including Québec. In the opinion of the Reliability Coordinator, this standard is relevant for system reliability in Québec and the standard contributes to harmonization with neighbouring systems.

### 3. PRELIMINARY IMPACT ASSESSMENT

This section presents the Reliability Coordinator's preliminary impact assessment.

PRC-006-NPCC-2	Low	Moderate	High
Implementation of the standard	X		
Enforcement of the standard	X		
Compliance monitoring	X		

#### Legend:

- Low:** Normal industry practice that only requires minor adjustments to existing processes or practices.
- Moderate:** Change that requires allocation of some physical, human or financial resources to implement the proposed standard, maintain it or monitor its compliance.
- High:** Change that requires allocation of significant physical, human or financial resources to plan and implement the proposed standard, maintain it or monitor its compliance.

### 4. FINAL IMPACT ASSESSMENT

This section shall be completed upon receipt of the impact assessment forms and at the conclusion of the consultation process prior to filing of reliability standards with the Régie.

10. Agreement entered into in accordance with Order-in-Council 443-2009 dated April 8, 2009.