NPCC, Inc.

NORTHEAST POWER COORDINATING COUNCIL, INC.
1040 AVE. OF THE AMERICAS, NEW YORK, NY 10018 (212) 840-1070 FAX (212) 302-2782

April 28, 2021

Subject: Posting of TFSS Technical Comparison and Directory#12 Retirement Recommendation

On February 18, 2020 FERC issued a final rule approving revised Regional Reliability Standard PRC-006-NPCC-02 *Automatic Underfrequency Load Shedding* and its corresponding NPCC Implementation Plan.

The approved Standard includes revisions to align the Regional Standard with the latest version of the NERC PRC-006 continent wide standard and the incorporation of criteria attributes not included in Version #1 of the Standard to facilitate retirement of NPCC Regional Reliability Directory #12 *Automatic Underfrequency Load Shedding*.

Accordingly, the NPCC Task Force on System Studies (TFSS) initiated a comparison of the criteria requirements in Directory #12 with the requirements of PRC-006-NPCC-02 and the latest version of PRC-006 to assess the reliability impact of retiring all or part(s) of the criteria contained within Directory #12. Based on this comparison and a mapping of the criteria requirements to the Regional and continent-wide standards, the TFSS has recommended the retirement of Directory #12 subject to Provincial adoption of PRC-006-NPCC-2 in all NPCC Areas.

Please find attached the following documents for your review and comment:

- TFSS Technical Comparison and Recommendation.
- Mapping document demonstrating where the Directory#12 criteria maps to in PRC-006-NPCC-02 and the latest version of PRC-006.

Comment Period:

In accordance with the NPCC Directory Development and Revision Manual, comments on the proposed retirement of Regional Reliability Directory #12 *Automatic Underfrequency Load Shedding* will be received for forty-five days through June 12, 2021.

The NPCC Open Process review may be accessed through the following link:

https://www.npcc.org/program-areas/standards-and-criteria/regional-criteria/in-development/detail/automatic-underfrequency-load-shedding-program-requirements

Please contact me with any questions regarding the NPCC Open Process or the content of these documents.

Thank you.

George Fatu
Chair – NPCC Task Force on System Studies
Senior Engineer, Transmission Planning – Interfaces & Interties
Independent Electricity System Operator (IESO)
T: (905) 855-6151
george.fatu@ieso.ca

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Task Force on System Studies

Retirement Recommendation

NPCC Directory#12
Automatic Underfrequency Load Shedding (UFLS) Program Requirements

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Executive Summary

The Northeast Power Coordinating Council, Inc. (NPCC) is responsible for promoting and enhancing the reliability of the international, interconnected bulk power system in Northeastern North America. One of the ways NPCC carries out its mission is through the development and maintenance of regionally specific criteria.

NPCC Reliability Directories have been developed consistent with the NPCC Bylaws which provide for the establishment of regionally specific reliability criteria, guidelines, and procedures; within each Directory NPCC's reliability criteria are periodically reviewed to ensure that the criteria are not inconsistent with the ERO standards as required by the NERC Rules of Procedure.

Additionally, NPCC under the NERC Regional Delegation Agreement (RDA) must adhere to the NERC Rules of Procedure (RoP).

In Appendix 2 of the RoP, NERC has defined Regional Criteria as *"...reliability requirements developed by a Regional Entity that are necessary to implement, to augment or to comply with Reliability Standards, but which are not Reliability Standards. Such Regional Criteria may be necessary to account for physical differences in the Bulk Power System but are not inconsistent with Reliability Standards nor do they result in lesser reliability. Such Regional Criteria are not enforceable pursuant to NERC delegated authorities but may be enforced through other available mechanisms. Regional Criteria may include specific acceptable operating or planning parameters, guides, agreements, protocols or other documents."*

Consequently, NPCC must continually evaluate its regional criteria requirements to ensure that they remain consistent with the NERC Reliability Standards as those standards are developed or revised and to consider if there is a continued reliability need for the criteria based on the evolving NERC standards.

On August 10, 2017 the NERC Board of Trustees adopted PRC-006-03 *Automatic Underfrequency Load Shedding* which revised the regional variance for the Quebec Interconnection as necessary to account for the physical characteristics and operational practices of that Interconnection. This eliminated the need for related requirements in the Regional Standard or Directory.

Additionally, on February 18, 2020 FERC issued a final rule approving revised Regional Reliability Standard PRC-006-NPCC-02 *Automatic Underfrequency Load Shedding* and its corresponding NPCC Implementation Plan.

Accordingly, the NPCC Task Force on System Studies initiated a comparison of the criteria requirements in Regional Reliability Directory #12 with the requirements of PRC-006-NPCC-02 and the latest version of PRC-006 to assess the reliability impact of retiring all or part(s) of the criteria contained within Directory #12. Based on this comparison and a mapping of requirements to the Regional and continent-wide standards, the NPCC Task Force on System Studies has recommended retirement of Directory #12.

Background

NPCC Directory #12 was originally developed and approved by the NPCC Full Members to establish program requirements contained in the 2006 Assessment of Underfrequency Load Shedding Adequacy Part III – Assessment of Program Modifications and the 2008 Assessment of Underfrequency Load Shedding Adequacy – Quebec Area for the NPCC Region.

After the approval of Directory #12, work began on the development of a Regional Standard that established more stringent and specific NPCC UFLS program requirements than the NERC continent wide standard PRC-006. Accordingly, PRC-006-NPCC-01 was approved in 2012 and contained the performance requirements of the regional UFLS program.

Every 5 years, FERC approved standards are required to be reviewed for revision, reaffirmation, or retirement. In 2016 an NPCC Regional Standard Drafting Team initiated a review of PRC-006-NPCC-01, which included the incorporation of criteria attributes in Directory#12 not included in Version #1 of the regional standard to facilitate retirement of Directory#12 and to align the Regional Standard with the latest version of the NERC PRC-006 continent-wide standard.

On February 18, 2020 FERC issued its Final Rule approving both the NPCC Regional Reliability Standard PRC-006-NPCC-02 *Automatic Underfrequency Load Shedding* and its corresponding implementation plan.

Additionally, the performance requirements for the Quebec interconnection are contained in the Interconnection wide variance within the latest version of continent-wide standard PRC-006.

Eastern Interconnection Comparison of Directory#12 with PRC-006-NPCC-02

Program Requirements:

The NPCC Automatic Underfrequency Load Shedding Program specific requirements for the Eastern Interconnection are contained in Section 5.2.1 of Directory #12. The program consists of five stages of load shedding to be provided for entities with 100 MWs or more of end-use load connected to its facilities.

For entities between 50MWs and 100MWs, and for entities between 25MWs and 50MWs of end use load, the program requirements are defined in Sections 5.2.2 and Section 5.2.3 respectively.

These program requirements can be found in PRC-006-NPCC-02 Requirement R3 Attachments A, B and C along with the associated threshold settings, block sizes and total operating time.

Generator Underfrequency Protection Requirements:

Directory #12 Figure #1 provides the Generator Underfrequency Protection requirements such that Generators shall not be tripped in the area above the curve on Figure #1.

This requirement is contained in PRC-006-NPCC-02 Requirement R10.

However, Directory #12 and the Regional Standard both recognize exceptions where individual generator design characteristics may dictate that the generator trip in the region above the curve.

Applicability:

Directory #12 is applicable to the Generator Owner, Transmission Operator and Balancing Authority.

PRC-006-NPCC-02 is applicable to the Generator Owner, Transmission Owner, Distribution Provider, and Planning Coordinator.

Quebec Interconnection Performance Requirements

Program Requirements:

The NPCC Automatic Underfrequency Load Shedding Program specific requirements for the Quebec Interconnection are contained in Section 5.3 of Directory #12. The program consists of five threshold stages and four rate of change of frequency (slope) stages of automatic underfrequency load shedding.

These performance requirements are contained within an Interconnection-wide variance applicable in the Quebec Interconnection which replace in their entirety Requirements R3 an R4 in the latest version of PRC-006.

Mapping

A mapping document has been developed which provides a reference to identify where the existing reliability criteria in Directory#12 is now located within either PRC-006-NPCC-02 or the most recent version of PRC-006.

NPCC Glossary Terms

Since the defined NPCC Glossary terms within Directory#12 are also used in other Directories, there is no recommendation to retire NPCC Glossary terms concurrent with the proposal to retire Directory#12.

Conclusion and Recommendation

The NPCC Task Force on System Studies has compared the criteria in NPCC Directory #12 with the requirements of PRC-006-NPCC-2 and the latest version of PRC-006 and has determined that there would be no impact to the reliability of the NPCC Bulk Power System by retiring the regional reliability criteria contained in Directory #12.

The NPCC Task Force on System Studies recommends that NPCC Directory #12 be retired in accordance with the NPCC "*Directory Development and Revision Manual,"* and upon implementation of all requirements of NPCC's Regional Standard PRC-006-NPCC-02 and the latest version of NERC continent-wide standard PRC-006 by all applicable governmental and regulatory authorities within the NPCC Region.

Mapping Document

Retirement of Directory#12 UFLS Program Requirements

Directory#12	PRC-006-NPCC-02	Comment
Section 1.3 Objective	Section A.3 Introduction	
Section 1.5 Background	N/A	Directory#12 Criteria and the program requirements of PRC-006-NPCC-02 were both developed from the recommendations and implementation plans provided in the study reports: 2006 Assessment of Under frequency Load Shedding Adequacy Part III – Assessment of Program Modifications and 2008 Assessment of Under frequency Load Shedding Adequacy – Québec Area, approved by the Reliability Coordinating Committee on November 19, 2008. These program requirements were updated in 2018 and approved by the RCC on December 4, 2018.
Section 1.6 Applicability	Section A.4 Applicability	Applicability slightly different. PRC -006-NPCC -02 applicable to PC and DP.

Section 2 Defined Terms	N/A	Any NPCC Glossary terms residing only in D12 will be retired.
Section 3 ERO Reliability Standards	N/A	D#12 and PRC -006-NPCC-02 are both more specific than the latest version of PRC -006.
Section 4 Regional Standard Requirements	N/A	
Section 5.1.1 Frequency Decline	R1	Figure #1 in PRC -006-NPCC-02 and see the latest version of PRC -006 for Quebec Variance
Section 5.1.2 Frequency Decline	R1	Figure #1 in PRC -006-NPCC-02
Section 5.2.1 UFLS Program Specific Requirements Eastern Interconnection Program Design	R3 Attachment C Table #1	
Section 5.2.2 UFLS Program Specific Requirements Eastern Interconnection Program Design	R3 Attachment C Table #2	
Section 5.2.3 UFLS Program Specific Requirements Eastern Interconnection Program Design	R3 Attachment C Table #3	
Section 5.2.4 UFLS Program Specific Requirements Eastern Interconnection Exclusions	R3 Attachment C Table #3	Table #3 designed for DP and TO between 25 and 50MWs.
Section 5.2.5 UFLS Program Specific Requirements Eastern Interconnection Exclusions	R3 Attachment C Tables #2 and #3.	

Section 5.2.6 UFLS Program Specific Requirements Eastern Interconnection Relay Operating Time	R3 Attachment C Tables #1, #2 and #3 Footnote #1	
Section 5.3.1 UFLS Program Specific Requirements Quebec Interconnection Program Design	N/A	See latest version of PRC -006 for Quebec Variance Attachment 1A
Section 5.4 Generator Under frequency Protection Requirements	R10	
Section 5.4.1 Generator Under frequency Protection Exclusions	R13, R14, R15	
Section 5.4.2 Generator Under frequency Protection Exclusions	R13.1	
Section 5.5.1 UFLS Program Assessment Requirements	N/A	See latest version of PRC -006 R3
Section 5.5.2 UFLS Program Assessment Requirements	N/A	See latest version of PRC -006 R4