

Information in a Regional Standard Authorization Request (RSAR)

The tables below identify information to be submitted in a Regional Standard Authorization Request to the NPCC Regional Standards Process Manager, NPCCstandard@npcc.org. The NPCC Regional Standards Process Manager shall be responsible for implementing and maintaining this form as needed to support the information requirements of the standards process.

Regional Standard Authorization Request Form

Title of Proposed Standard: PRC-006-3--Automatic Underfrequency Load Shedding – Variance for the Quebec Interconnection	
Request Date:	June 2, 2015

RSAR Requester Information

<i>Name:</i> Patrick Doyle Lee Pedowicz	RSAR Type (Check box for one of these selections.)	
<i>Company:</i> Hydro-Québec TransÉnergie Northeast Power Coordinating Council, Inc. (NPCC)	<input type="checkbox"/>	New Standard
<i>Telephone:</i> 1-514-879-4100 ext 5429 1-212-840-1070	<input checked="" type="checkbox"/>	Revision to Existing Standard
<i>Fax:</i> 1-212-302-2782	<input type="checkbox"/>	Withdrawal of Existing Standard
<i>Email:</i> doyle.patrick@hydro.qc.ca lpedowicz@npcc.org	<input type="checkbox"/>	Urgent Action

Purpose (Describe the purpose of the proposed standard – what the standard will achieve in support of reliability.)

The purpose of this RSAR is to address the two problems mentioned below by modifying only those sections that are specific to the Quebec Interconnection (PRC-006-2 Section D. Regional Variances, Part D.A. Regional Variance for the Quebec Interconnection, and Attachment 1A (Quebec)). Revisions to the standard will ensure the continuity of System reliability in the Quebec Interconnection.

Industry Need (Provide a detailed statement justifying the need for the proposed standard, along with any supporting documentation.)

The industry need for this RSAR is to address two specific problems regarding UFLS requirements for the Quebec Interconnection :

1 - To meet the PRC-006-2 59.3 Hz requirement for scenarios where Quebec has a small generation deficiency (between 4 and 6 percent) those scenarios would require modifications to the current settings of the UFLS program to the threshold of 59.3 Hz which would cause unacceptable and frequent load shedding without any improvement to System reliability.

2 – Because the Quebec Interconnection itself is an island with unique generation characteristics and SPS applications, Section D.A.3 in PRC-006-2 needs to be revised to define a more accurate generation deficiency scenario applicable to the Quebec Interconnection.

Brief Description (Describe the proposed standard in sufficient detail to clearly define the scope in a manner that can be easily understood by others.)

A description of the two specific problems is as follows:

1 - The Quebec Interconnection has a low inertia compared to other Interconnections. This makes it subject to large frequency deviations during normal operation. Small generation deficiencies (4 to 6 percent) can lead to acceptable frequency deviations without triggering any UFLS thresholds, but still stabilize under a PRC-006-2 Attachment 1A performance curve. The scope of this SAR is to modify the performance curve in Attachment 1A to better reflect the design, performance, and modeling of the Quebec Interconnection and avoid unnecessary load shedding.

2 - The Quebec Interconnection is an island by itself and is the only island considered when performing the Quebec UFLS program assessment. No under-generated island can be created within the Quebec Interconnection. Under current planning and operational criteria, the largest generation deficiency scenarios are limited to the loss of the largest power plant not covered by a SPS. Using the peak case scenario, these generation deficiencies are far from the required 25%. Section D.A.3 should be revised to account for the characteristics of the Quebec Interconnection.

Reliability Functions

The Standard will Apply to the Following Functions (Check all applicable boxes.)		
<input type="checkbox"/>	Reliability Coordinator	The entity that is the highest level of authority who is responsible for the reliable operation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systems beyond any Transmission Operator's vision.
<input type="checkbox"/>	Balancing Authority	The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.
<input type="checkbox"/>	Interchange Authority	Authorizes valid and balanced Interchange Schedules.
<input checked="" type="checkbox"/>	Planning Coordinator	The responsible entity that assesses the longer-term reliability of its Planning Coordinator Area.
<input type="checkbox"/>	Transmission Service Provider	The entity that administers the transmission tariff and provides Transmission Service to Transmission Customers under applicable transmission service agreements.
<input checked="" type="checkbox"/>	Transmission Owner	The entity that owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	The entity responsible for the reliability of its "local" transmission system, and that operates or directs the operations of the transmission facilities.
<input type="checkbox"/>	Transmission Planner	The entity that develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within its portion of the Planning Authority Area.
<input type="checkbox"/>	Resource Planner	The entity that develops a long-term (generally one year and beyond) plan for the resource adequacy of specific loads (customer demand and energy requirements) within a Planning Authority Area.
<input type="checkbox"/>	Generator Operator	The entity that operates generating unit(s) and performs the functions of supplying energy and Interconnected Operations Services.
<input type="checkbox"/>	Generator Owner	Entity that owns and maintains generating units.
<input type="checkbox"/>	Purchasing-Selling Entity	The entity that purchases or sells, and takes title to, energy, capacity, and Interconnected Operations Services. Purchasing-Selling Entities may be affiliated or unaffiliated merchants and may or may not own generating facilities.

<input checked="" type="checkbox"/>	Distribution Provider	Provides and operates the “wires” between the transmission system and the customer.
<input type="checkbox"/>	Load-Serving Entity	Secures energy and transmission service (and related Interconnected Operations Services) to serve the electrical demand and energy requirements of its end-use customers.

Reliability and Market Interface Principles

Applicable Reliability Principles <i>(Check all boxes that apply.)</i>	
<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input checked="" type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input checked="" type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.
Does the proposed Standard comply with all of the following Market Interface Principles? <i>(Select ‘yes’ or ‘no’ from the drop-down box.)</i>	
Recognizing that reliability is a Common Attribute of a robust North American economy:	
1.	A reliability standard shall not give any market participant an unfair competitive advantage. Yes
2.	A reliability standard shall neither mandate nor prohibit any specific market structure. Yes
3.	A reliability standard shall not preclude market solutions to achieving compliance with that standard. Yes
4.	A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes

Detailed Description (Provide enough detail so that an independent entity familiar with the industry could draft a standard based on this description.)

1 - Because of the characteristics of the Quebec Interconnection, 0.5-1.5 Hz frequency deviations resulting from small losses of generation occur frequently. The System is designed and operated such that these small generation losses are acceptable, do not pose any threat to System reliability, and do not lead to unnecessary automatic load shedding. The adjustment of the UFLS anti-stall threshold to meet the PRC-006-2 performance curve would cause frequent and unacceptable load shedding operations without any improvement to System reliability. This is clearly shown by recent UFLS program assessment studies, planning and operational studies, and the analysis of generation loss scenarios in the Quebec Interconnection.

During the 2014 assessment of the NPCC Underfrequency Load Shedding Program, studies showed that for small generation deficiencies (between 4 and 6 percent) in the Quebec Interconnection using the minimum spinning reserve requirement, the simulated frequency deviation does not meet the PRC-006-2 requirement of 59.3 Hz from Attachment 1A. However, further investigation determined that such scenarios result in acceptable frequency deviations without crossing any UFLS thresholds while stabilizing between the PRC-006-2 curve (59.3 Hz in Attachment 1A) and the upper UFLS (anti-stall) threshold (59.0 Hz) that is defined in PRC-006-NPCC-1 UFLS Table 4 - Quebec Interconnection. Meeting the PRC-006-2 59.3 Hz requirement for those scenarios would require modifications to the current settings of the UFLS program. The subsequent adjustment of the UFLS anti-stall threshold to 59.3 Hz would cause unacceptable and frequent load shedding without any gain to System reliability.

2 - The Quebec Interconnection is an island by itself and it is the only island considered when performing the Quebec UFLS program assessment. Due to the nature of the Quebec System's design (main generation centers located in the north, remote from the main load centers in the south), no other viable island with generating deficiencies can be created within the Quebec Interconnection. Under current planning and operational criteria, the largest generation deficiency scenarios are limited to the loss of the largest power plant not covered by a SPS. Assuming the Hydro-Quebec peak case scenarios, none of them would result in a 25% generation deficiency. To reach the 25 % criteria using a design (normal or extreme) contingency and viable island, a light load scenario was used while studying the loss of the largest power plant. This methodology is currently used in Hydro-Quebec and has been used since the JWG-2 Phase II (NPCC Joint Working Group for the review of adequacy of procedures for protection against off-nominal frequency operation) Report was published in 1993. However, further studies and investigations have shown that using the peak case scenario, the integrity of the Quebec Interconnection could not be preserved using a UFLS program for a 25% generation deficiency. Since there is no design contingency that can produce a generation deficiency of 25%, multiple extreme contingencies, such as the loss of more than one substation, need to be applied simultaneously on the peak case scenario in order to reach that level of generation deficiency. Using the peak load case scenario, these generation deficiencies do not meet the required 25%. Section D.A.3 should be revised to reflect the characteristics of

