Hydro Québec TransÉnergie

Requirements and Procedures for Reporting Information and Data Needed to Operate the Main Transmission System (RTP) of the Quebec Interconnection

Prepared by: *David Lambert, Eng.*

Reviewed by: *Sophie Gagnon, Eng., and Jean-Michaël Bissada, Jr. Eng.*

Effective date: *2018/06/30*

Revision: *2*

Table of Contents

Version history iii

1. Purpose 4

2. Functions covered 5

3. Data and information for real-time monitoring and control 6

3.1 Measurements and signals for RTP elements and non-RTP designated elements 6

3.2 Measurements and signals for load-shedding devices 8

3.3 Measurements and signals for special protection systems (SPS/RAS) 9

3.4 Measurement reporting requirements 10

3.4.1 Measurements of electrical quantities 10

4. Modeling data and test results 12

5. Data and information related to outage management 14

6. Forecast data, mitigating actions and other data needed for generation/load balancing 16

6.1 Data needed to calculate operating reserves 16

6.2 Data needed to calculate or correct Area Control Error (ACE) 18

6.3 Load forecasting 19

6.3.1 Short-term data 19

6.3.2 Long-term data 21

6.4 Forecast generation (generation plan and operating reserve) 22

6.5 Interchange forecasts 23

6.6 Mitigating actions 23

6.6.1 Sequence of Hydro-Québec Production mitigating actions 23

6.6.2 Interruptible loads 24

7. Additional data and information 26

7.1 Other data and information for analysis and forecasting purposes 26

7.2 Documentation associated with special protection system (SPS/RAS) operation 27

8. Notification of a modification or change in status 28

8.1 Real time 28

8.2 Off line 28

9. Other conditions 30

9.1 Data reporting 30

9.2 Inconsistent data 30

9.3 Security protocol 30

10. References 31

Version history

Version	Description of changes	Date
1	New document	2016/12/23
2	– Hydro-Québec's Direction principale – Contrôle des mouvements d'énergie et exploitation du réseau (CMEER) [system control and operations] department becomes the Reliability Coordinator for Québec – Removal of reference to IRO-010-1a – Document: Updating of functions covered Removal of telecommunications service providers and computer service providers Addition of transmission service providers (TSP) and resource planner (RP) Titles added to some tables – Section 1: Changes to text – Section 2: Changes to list of entities covered – Section 3: Reorganization of subsections – Section 3.1: Addition of measurements and signals now required for non-RTP designated elements New SOR hyperlink Removal of file on busbars since it is no longer needed Removal of file on load-shedding devices (see Section 3.2) – Section 3.2: New section, "Measurements and signals associated with load-shedding devices" – Section 3.4: New section, "Measurement reporting requirements" – Section 4: Table, addition of "Functions covered" column – Section 5: Changes to text Table, merger of rows associated with generating and transmission facilities – Section 6: Reorganization of some tables and changes to text – Section 7: Reorganization of section and changes to text – Section 8: New section, "Notification of a modification or change in status" – Section 9: Changes to text Change in email address to which entities should send data and information – Section 10: Updating of references	2018/06/30

1. Purpose

The purpose of this document is to ensure that Hydro-Québec TransÉnergie's Direction principale – Contrôle des mouvements d'énergie et exploitation du réseau (CMEER) department has all the data and information necessary for it to monitor and meet its obligations to assess the operation of the Québec Interconnection, including to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessment, as Reliability Coordinator (RC), Balancing Authority (BA) and Transmission Operator (TOP), in accordance with the IRO-010-2 and TOP-003-3 reliability standards.

This data specification includes, but is not limited to :

- A list of the data and information needed by the RC, BA and TOP, including non-RTP data and external system data, as deemed necessary by CMEER
- Provisions for the notification of any current protection system and special protection system status or degradation that may impact System reliability
- A periodicity for providing data
- The deadline by which the specified data must be provided

CMEER's data and information requirements are already set out in several documents referenced herein. This document is therefore an "integrating" document that collates all the data and information CMEER needs to fulfill its RC, BA and TOP roles.

In addition, the scope of this document is extended to include functions not covered by the IRO-010-2 and TOP-003-3 reliability standards, in accordance with other applicable standards (see References).

Any entity unable to provide the data or information required under this document as of its effective date must inform CMEER of that fact as soon as possible. The entity must then agree with CMEER on a timetable for providing the data or information within two months of the effective date of this document.

Please note that this document does not under any circumstances exempt covered entities from complying with other reliability standard requirements applicable to them. The data and information reporting requirements set out in this document complement the requirements of other applicable reliability standards.

This document can be found in the Documentation section of the website of the Reliability Coordinator for Québec.

2. Functions covered

Entities performing the functions listed below must provide the data and information indicated in this document to CMEER whenever applicable:

- Reliability coordinators (RC) adjacent to the Québec Interconnection
- Transmission operators (TOP) adjacent to the Québec Interconnection (TOP-adj)
- Balancing authorities (BA) adjacent to the Québec Interconnection (BA-adj)
- Generator Owners (GO)
- Generator Operators (GOP)
- Transmission Owners (TO)
- Load Serving Entity (LSE)
- Distribution Providers (DP)
- Planning Coordinator (PC)
- Transmission Planner (TP)
- Transmission Service Providers (TSP)
- Resource Planner (RP)

3. Data and information for real-time monitoring and control

Element measurements and signals are used by both operating personnel and several computer applications critical to real-time decision-making by CMEER system operators. Measurements and signals must be provided through ICCP[1] points or via another CMEER-specified communication tool. When CMEER updates the following list of data and information to be provided, it will grant entities a reasonable time to submit the new measurements and signals.

3.1 Measurements and signals for RTP elements and non-RTP designated elements

The table below lists HQT's Standard Operating Requirements (SORs), which specify CMEER's requirements for real-time measurements and signals related to main transmission system (RTP) elements.

SORs are available through the following link: SORs ("fiches BENEX").

In addition, real-time measurements and signals required by CMEER for certain designated elements not associated with the RTP are also indicated in the SORs.

Please note that CMEER sends each covered entity a list of non-RTP elements for which measurements or signals are required.

In the SORs, measurements and signals required for RTP elements are shown in uppercase, and measurements and signals required for non-RTP designated elements are shown in lowercase.

1 Inter-Control Center Communications Protocol

Table 3.1: Measurements and Signals for RTP elements and designated elements

Element	SOR	Functions covered
Generators	BNX-N-ALT	GOP
Series compensators (CXC)	BNX-N-CXC	TO/TOP-adj
Static compensators (CLC)	BNX-N-CLC	TO/TOP-adj
Synchronous compensators (CS)	BNX-N-CS	TO/TOP-adj
Capacitors (XC)	BNX-N-XC_SHUNT	TO/TOP-adj
Converters (GC)	BNX-GC	TO/TOP-adj
Circuit breakers	BNX-N-DISJ	GOP/TO/TOP-adj
Wind turbines[2]	BNX-N-EOLIEN	GOP
Reactors	BNX-N-INDUCTANCE_SHUNT	GOP/TO/TOP-adj
Lines	BNX-N-LIGNE	TO/TOP-adj
Disconnect switches (except disconnect switches that only serve to isolate a circuit breaker)	BNX-N-SECTIONNEUR	GOP/TO/TOP-adj
Transformers	BNX-N-TRANSFO_ART	GOP/TO/TOP-adj
Generating stations and dams	BNX-N-CENTRALES	GOP
Buildings	BNX-N-BATIMENT	TO

2 All measurements and signals required from wind farms are grouped under the same equipment category (i.e., Wind turbines).

3.2 Measurements and signals for load-shedding devices

The load-shedding devices covered are those that are controlled by special protection systems (SPS/RAS) and underfrequency load shedding systems.

The covered TOs and DPs are those who own or operate these load-shedding devices.

Data/Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Deadline for reporting data/information (when applicable)
Measurement of voltage on high-voltage side of substation where load-shedding device is located	kV	TO/DP	Every 5 s	HQT "Serial load-shedding device" protocol	Serial (RS-232)	N/A
Load-shedding device status (ON/OFF)	N/A	TO/DP				
For control substations only (point calculated at the telecontrol center (CT) used by DCY [rotating load shedding] software), calculated total real power of facility (sum of transformer power)	MW	TO/DP				

3.3 Measurements and signals for special protection systems (SPS/RAS)

The list of special protection systems (SPS/RAS[3]) monitored by the CMEER system control center (CCR) may be released on request subject to the signature of a confidentiality agreement between CMEER and the requester. CMEER nevertheless reserves the right to refuse to release this list if it considers that the required conditions have not been met to its entire satisfaction or that there are insufficient grounds for the request.

For all special protection systems (SPS/RAS) in Québec, there is a Standard Operating Requirements (SOR) specification setting out CMEER's requirements in regards to measurements and signals. At a minimum, the ON/OFF status of all special protection systems (SPS/RAS) is reported to the system control center (CCR). CMEER will contact entities involved in one or more special protection systems (SPS/RAS) on this list to inform them of the requirements regarding measurements and signals.

Data/Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Deadline for reporting data/information (when applicable)
Status of special protection systems (SPS/RAS) and their components (ON/OFF and degradation)	N/A	GOP TO	On change of status	ICCP	N/A	N/A
Status of special protection systems (SPS/RAS) that may affect main transmission system (RTP) or interconnection operating limits or the protection of their components against severe system events (ON/OFF and degradation)	N/A	TOP-adj	On change of status	ICCP	N/A	N/A

Since each special protection system (SPS/RAS) has unique features, states and signal elements, it is essential to review their Standard Operating Requirements (SORs) to identify any additional information that must be provided.

3 Remedial Action Scheme (RAS) and Special Protection System (SPS)

3.4 Measurement reporting requirements

Unless there are different instructions from DPCMEER, data reporting requirements are set out in detail below.

3.4.1 Measurements of electrical quantities

3.4.1.1. Measurement chain uncertainty

The table below shows the tolerated uncertainty for each parameter measured.

Reading uncertainty characteristics			
Parameter	**Range p.u.**	**Analog chain ±% reading (RSS[4])**	**IED[5] chain ±% reading (RSS)**
Voltage	1.1	≤1.25	≤0.85
	1	≤1.3	≤0.85
	0.9	≤1.35	≤0.85
Current	1	≤1.15	≤0.75
	0.6	≤1.55	≤0.75
	0.2	≤3.3	≤0.92
Real power ±	1	≤1.4	≤1
	0.5	≤1.95	≤1
	0.1	≤6.25	≤1
Reactive power ±	1	≤1.4	≤1.75
	0.5	≤1.95	≤1.75
	0.1	≤6.25	≤1.75
Frequency (generator)	1.08	≤0.3	≤0.2
	1	≤0.35	≤0.2
	0.92	≤0.35	≤0.2
Frequency (system)	1.08	≤0.3	≤0.2
	1	≤0.35	≤0.2
	0.92	≤0.35	≤0.2
Energy		As per needs (hydrology and business commitments) and Measurement Canada requirements	

Note 1 : These requirements do not consider uncertainty caused by dead band. The displayed value may differ from the actual value if it is within the dead band defined in Section 3.4.1.3.

4 Root Sum Square

5 Intelligent Electronic Device. IEDs receive data from sensors, equipment (electrical and mechanical), and can issue control commands, such as tripping circuit breakers if they detect voltage or current anomalies, or rise/fall the voltage levels to maintain the desired level. Types of IEDs are protection relays, tap-changer controllers, automatic reclosing devices, voltage regulators, temperature monitoring units, etc.

Note 2 : A minimum threshold display value of 0.5% of the nominal (rated) value is allowed; below this, zero may be displayed.

Measurement chain uncertainty for interconnection lines must be defined at the design stage.

3.4.1.2. Measurement units and resolution

The table below shows the unit prefix and symbol, and desired resolution for each parameter.

Parameter	Unit prefix and symbol	Resolution (display)
Voltage $_{>44kV}$	kV	Unit
Voltage $_{\leq 44kV}$	kV	Tenth
Voltage $_{\text{s.a. 600 V}}$	V	Unit
Current	A	Unit
Real and reactive power	MW, MX	Tenth
Real and reactive power $_{\text{s.a. 600 V}}$	kW, kX	Tenth
Energy	MWh	Unit
Frequency **Note3**	Hz	Tenth

Note 3 : Target range: 55–65 Hz

3.4.1.3. Dead band

The dead band for all measurement parameters must not exceed four tenths of one percent (0.4%) of full scale. The dead band is usually set at 4 counts out of 1,600, i.e., 0.25%.

3.4.1.4. Availability

In the event of an auxiliary AC power supply outage, whether partial or total, all measurements must remain functional. A backup measurement is required at the Panel Control[6]. It can be provided by a dedicated measuring device, a protective relay or an intelligent electronic device (IED). When the measurement is provided by a protective relay and there are redundant protection systems (protections “A” and “B”), the default measurement at the central control unit must be provided by protection A and the backup must be provided by protection B, with switching assured via an automatic device. For Medium-voltage[7] line feeders with two metal-clad circuit breakers, the current for each circuit breaker must be measured at the Panel Control, and the currents must then be added together at the Central Control Unit[8].

6 Control from a panel, plant panel or auxiliary service cabinet.
7 Part of the system having a nominal phase-to-phase voltage of between 750 V and 34.5 kV inclusively.
8 Main control level of the facility. Includes all the elements required for the operation and is located at the control room of the main building.

4. Modeling data and test results

The Planning Coordinator (PC) for the Québec Interconnection must make validated modeling data for the RTP elements available to CMEER. Among other things, this data serves as input to the system control center (CCR) computer tools used for real-time and planning assessments. These tools are primarily used for pre- and post-contingency analyses. Their uses include calculating stability limits.

Table 4.1: Transmission System Modeling Data

Element to be modeled	Functions covered	Parameters to be provided	Data reporting method and format	Update frequency and deadline, when applicable
Generation (e.g., generators and step-up transformers)	PC	See Section 3*	See Section 7*	See Section 7.2*
Transmission (e.g., lines, transformers, busbars, reactors and compensation equipment)	PC	See Section 4*	See Section 7*	See Section 7.2*
Load modeling	PC	See Section 5*	See Section 7*	See Section 7.2*

* Document: Transmission System Modeling Data Requirements and Reporting Procedures

The data regarding the tests specified in procedure IQ-P-001 (Verification of Maximum Real and Reactive Power Capabilities of Marin Transmission System (RTP) Generating Facilities and Synchronous Compensators) must be sent to CMEER as indicated in the following table.

Table 4.2: Maximum Real and Reactive Power Testing Data

Data/Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Data on station testing of maximum real and reactive power	MW/Mvar	GO	See document IQ-P-001			
Data on unit testing of maximum real and reactive power	MW/Mvar	GO TO				

5. Data and information related to outage management

Other than Hydro-Québec divisions, entities covered by this document have a document signed by the entity and HQT entitled "Common Operating Instructions" containing a section on outage management. The Common Operating Instructions set out in detail the data and information required by CMEER. Entities must provide the data and information as specified in those instructions.

At HQT, outages are managed in accordance with standard TEC-GES-N-02, Outage Management, and operating procedure GEN-D-007, Outages Requiring System Operations and Control (DCME) Approval. At HQP, outages are managed in accordance with procedure PP-01-00-00, Generation Outage Request Management.

Outages may be requested for maintenance (scheduled or unscheduled), long-term operability or expansion purposes; however, such outages must be coordinated in order to ensure safe, reliable main transmission system (RTP) operation. Emergency outage requests must also be sent to CMEER.

Table 5.1: Outage Management Related Data and Information

Data/Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
RTP and non-RTP designated elements	N/A	Associated GO or GOP TO TOP-adj	Annual planning OR Scheduled, unscheduled or emergency outage request	Telephone, email or web interface (HQ internal)	See above-referenced documents	
Equipment[9] associated with a telecommunication system, special protection system (RAS/SPS) or other protection system	N/A	Associated GO or GOP TO TOP-adj	Annual planning OR Scheduled, unscheduled or emergency outage request	Telephone, email or web interface (HQ internal)	See above-referenced documents	

9 Outages of this type of equipment can affect special protection systems (RAS/SPS) and/or other protection systems that are used to ensure the stability and safety of the main transmission system (RTP), interconnections, and related facilities. As soon as any component of such systems is incapable of performing its function, its status must be reported to CMEER immediately, with no intentional delay.

6. Forecast data, mitigating actions and other data needed for generation/load balancing

6.1 Data needed to calculate operating reserves

Data/ Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Normal effective capacity for each generator	MW	GOP	At least once per hour	IT transfer or dynamic calculation module	Numerical value, or data needed to calculate it	N/A
Stability effective capacity for each generator, or data needed to calculate it in real time	MW	GOP	At least once per hour	IT transfer or dynamic calculation module	Numerical value, or data needed to calculate it	N/A
Upper regulating margin for power plants assigned to Automatic Generation Control (AGC/RFP)	MW	GOP	At least once per hour	IT transfer or dynamic calculation module	Numerical value, or data needed to calculate it	N/A
Lower regulating margin for power plants assigned to Automatic Generation Control (AGC/RFP)	MW	GOP	At least once per hour	IT transfer or dynamic calculation module	Numerical value, or data needed to calculate it	N/A

Data/ Information	Unit of measurement	Functions covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Capacity that is recallable or load can be interrupted in less than 10 or 30 minutes	MW	BA-adj	At least once per hour	Interchange schedules with neighboring system or contractual value agreed upon with customer	Hourly schedule in a text file or via an e-Tag in webTag	N/A
Capacity that is callable in less than 10 or 30 minutes	MW	BA-adj	At least once per hour	Interchange schedules with neighboring system or contractual value agreed upon with customer	Hourly schedule in a text file or via an e-Tag in webTag	N/A

6.2 Data needed to calculate or correct Area Control Error (ACE)

The power system has two systems for controlling frequency: primary regulation, which involves active speed governor control, and secondary regulation, which is related to a special protection system (SPS/RAS) called “Réglage Fréquence-Puissance” (RFP) [Automatic Generation Control (AGC)]. The required data below is related to secondary regulation by AGC/RFP.

Data/ Information	Unit of measurement	Functions/ Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Frequency	Hz	HQT (TO)	<1 s	Interdepartmental exchange CME–HQT (TO)	N/A	N/A
Automatic Generation Control (AGC/RFP) control status of units	ON/OFF	GOP with AGC participation	On change of status	ICCP	N/A	N/A

The actual output of units is also needed by AGC/RFP, but that data is already required under the SORs listed in Section 3.

The accuracy of measurement data must stay within the ranges specified in Section 3.4.

6.3 Load forecasting

Please note that the data and information required under this section is used to forecast the Québec Interconnection energy requirements, i.e., the "Besoins Québécois" (BQ) [Québec requirements]. If the Balancing Authority needs additional data or information, it may request it, as stipulated in reliability standard MOD-031-2.

6.3.1 Short-term data

6.3.1.2 Québec requirements (BQ) forecasting

Please note that the data/information listed below does not include weather data, which is obtained through public /government departments (e.g., Environment Canada).

This section includes the data and information required by CMEER to determine the validated actual last 7-day and forecast next 42-day hourly variations of major customers[10] by BQ region and subsystem. Electricity-use data calculations also take into account actual hourly data from the CMEER data acquisition system.

The required data and information may be reported to CMEER through Hydro-Québec Distribution (HQD) when an agreement is in place between the DP and HQP.

Data/ Information[11]	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Actual last 7-day hourly consumption of major customers	MW	DP	Twice daily AND on request	IT transfer Email or phone (on request)	Oracle File (on request)	8:00 a.m. and 2:00 p.m.

10 A major customer is any customer whose consumption is 5 MW or more.

11 Quebec requirements (BQ) forecast calculations also take into account the following items provided by CMEER every 5 minutes: Gross actual last 1-day consumption per minute by BQ region and subsystem, and calculations, configurations, adjustments and hourly corrections.

Data/ Information[11]	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
One-off and calendar month forcasts of consumption variations (drops and interruptions) of major customers	MW	DP	Weekly AND on demand	Email	File	
Daily and monthly energy values of meters	MWh	GOP TO for inter-TO lines	Twice daily	Integration bus (HQT interdepartmental exchanges)	XML	8:00 a.m. and 2:00 p.m.
Monthly energy values of meters for each calendar month	MWh	GOP TO for inter-TO lines	Monthly	Email	File	First week of next month

6.3.2 Long-term data

Data/ Information[12]	Unit of measurement	Functions/ Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Two-year monthly forcast of the Electric Power Carrier's[13] local load and energy	MW and GWh	DP	Annual planning	Emailed	Excel file	End of July
Ten-year forcast of the Electric Power Carrier's local load and energy	MW and GWh	DP	Annual planning	Email	Email	End of July
Normalized peak power of a feeder connected to a load-shedding device	MW	DP	Annually	Email	Excel file	October 1st every calendar year
Feeder priority	Rank	DP	Annually	Email	Excel file	October 1st every calendar year

12 Long-term data also includes the calculations, configuration, and hourly and weekly adjustments provided by CMEER every year at the end of September.

13 Hydro-Québec when carrying on electric power transmission activities as defined in the Act respecting the Régie de l'énergie of Québec (R-6.01).

6.4 Forecast generation (generation plan and operating reserve)

The required data or information may be transmitted to CMEER through Hydro-Québec Distribution (HQD) or Hydro-Québec Production (HQP) when an agreement is in place between the GOP and HQD, or the GOP and HQP.

Data/ Information[14]	Unit of measurement	Functions/ Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Wind generation (by wind farm and/or grouped generation)	MW	GOP	7-day schedule corrected every hour	Web service/IT transfer	File containing hourly schedules	N/A
Forecast generation schedule for run-of-river and small generating stations (maximum and forecast)	MW	GOP	At least once a day for next 240 hours	Web service/IT transfer	File containing hourly schedules	Before 10:00 a.m.
Forecast generation schedule for thermal power plants	MW	GOP	Once a day for next 240 hours	Web service/IT transfer	File containing hourly schedules	N/A
Hourly generation schedule for -1 (validated actual) to +28 (forecast) days for independent power producer (IPP) output by BQ region and subsystem	MW	GOP	Twice daily Twice daily	FTP or SFTP	ASCII	9:00 a.m. and 2:00 p.m.

14 In the event of a loss of real-time data acquisition, the forecast maximum capacity of main transmission system (RTP) generating stations is used as the default value. This information is provided by CMEER once a day, before 10:00 a.m., for the next 240 hours.

6.5 Interchange forecasts

The required data and information may be reported to CMEER through Hydro-Québec Distribution (HQD) when an agreement is in place between the DP and HQP.

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Interchange forecast	MW	TSP	Once a day for next 240 hours	Web service/IT transfer	File containing hourly schedules	N/A
One-year forecast of hourly independent power producer (IPP) output	MW	GOP	6 months	Email	Excel file	End of July and end of January
Current and future official independent power producer (IPP) list		RP	On demand	Email	Excel file	

6.6 Mitigating actions

6.6.1 Sequence of Hydro-Québec Production mitigating actions

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
List of mitigating actions[15]	N/A	HQP (GOP)	Once an hour	FTP or SFTP	.CSV	Every hour at 40 minutes past the hour

15 This list includes interruptible loads under contract with Hydro-Québec Production (HQP). Please note that the data/information required under Section 6.6.2 is also required for such interruptible loads.

6.6.2 Interruptible loads

Please note that changes to the interruptible load schedule should only be allowed between March 31 and December 1 to ensure a quality peak load forecast.

In addition, notice of any change to the schedule must be emailed to CMEER at least one week in advance.

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Prior notice – Weekdays	h	HQD (DP/RP) HQP (GOP)[16]	Annually or when changed	Email	File	December 1st every calendar year
Prior notice – Weekend	Hour/ Day	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year
Maximum number of interruptions per day	Integer	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year

16 Hydro-Québec Production (HQP) is the only Generator Operator (GOP) that transmits interruptible load data in order to provide its Interconnected Operations Services (operating reserves).

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Minimum time between 2 successive interruptions	h	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year
Maximum number of interruptions per winter period	Integer	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year
Duration of interruption	h	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year
Maximum duration of interruptions per winter period	h	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year
Contract validity period	Days or months	HQD (DP/RP) HQP (GOP)	Annually or when changed	Email	File	December 1st every calendar year

7. Additional data and information

7.1 Other data and information for analysis and forecasting purposes

Other data and information is also required for analysis and forecasting purposes. The data listed below is needed for the proper operation of several CMEER applications (e.g., climate monitoring). Such applications are used by system operators to support decision-making. CMEER will inform the Transmission Owners (TOs) and Generator Owners (GOs) of the list of targeted facilities 24 months before the data is required.

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Phasor or data needed to calculate angular displacement	Real and imaginary voltage values	TO	1/60 s	Macrodyne OR equivalent (e.g., C37.118)	Macrodyne or equivalent data (e.g., synchrophasor or PMU)	N/A
Voltage harmonic distortion OR data needed to calculate it (e.g., even harmonic values)	% (or real and imaginary harmonic values)	TO	<5 s	Macrodyne OR equivalent	Macrodyne OR equivalent	N/A
Latitude/longitude of lightning strike	Degrees	TO	On detection	Modem	Owner	N/A
Time of lightning strike	Month/day/hour/ minute/s/ms	TO	On detection	Modem	Owner	N/A

Data/ information	Unit of measurement	Entities covered	Update frequency	Communication protocol or interchange method	Format	Reporting deadline (when applicable)
Lightning discharge	kA	TO	On detection	Modem	Owner	N/A
Temperature	Degrees C	TO	<1 minute	Modem	Owner	N/A
Humidity	%	TO	<1 minute	Modem	Owner	N/A
Wind speed	m/s	TO	<1 minute	Modem	Owner	N/A
Wind direction	Degrees	TO	<1 minute	Modem	Owner	N/A
Number of frost sensor resets	Integer	TO	<1 minute	Modem	Owner	N/A
Accumulated weight of ice	Newton (N) (force sensor)	TO	<1 minute	Modem	Owner	N/A
Functional status of sensors	Fault/Alarm/Normal	TO	<1 minute	Modem	Owner	N/A

7.2 Documentation associated with special protection system (SPS/RAS) operation

Entities owning one or more special protection systems (SPS/RAS), covered in Section 3.3 of this document, must also send CMEER technical documentation describing the operating logic of these special protection systems (SPS/RAS). Microsoft Office and PDF file formats are accepted.

8. Notification of a modification or change in status

8.1 Real time

In the event of an unplanned outage of 30 minutes or more affecting telemetering and control equipment, monitoring and assessment capabilities, or associated communication channels between CMEER and a GOP, TO or neighboring TOP, the entities in question must advise the system control center (CCR) operator immediately.

Reference: TOP-001-3 Requirement 9.

The neighboring TOP and the neighboring BA must notify the system control center (CCR) operator of any change in the status of their special protection systems (SPS/RAS) and protection systems in their area or any degradation of these systems that affects the Québec Interconnection. The neighboring TOP and the neighboring BA must take corrective action as soon as possible.

Reference: PRC-001-1 Requirement 6, TOP-003-3 Requirements 1, 1.2, 2 and 2.2, TOP-001-3 Requirements 10 and 10.2.

The GOP and the TO must notify the system control center operator of any change in the status of their special protection system (SPS/RAS) and protection systems or any degradation of such systems that affects system reliability. The GOP and the TO must take corrective action as soon as possible.

Reference: PRC-001-1 Requirements 2, 2.1, 2.2 and 6, TOP-003-3 Requirements 1, 1.2 and 2.2, TOP-001-3 Requirements 10, 10.1 and 11.

The GOP and TO must report any real-time change in the rating of a component (e.g., limitation of a generating unit) to the system control center operator.

8.2 Off line

The GO and TO must each provide CMEER with facility ratings for their solely or jointly owned facilities that are new, modified or re-rated, at least three months prior to commissioning of such facilities. If applicable, these entities must also provide the designation of the most limiting facility component at the same time.

Reference: FAC-008-3 Requirements 7 and 8.

The TO, GO, GOP or DP reporting to reliability agencies under standard EOP-004-2 must send CMEER a copy of any such report immediately.

Reference: EOP-004-2 Requirements 1 and 2.

The GOP, TO and neighboring TOP must coordinate all new protection systems and all protection system changes with CMEER at least three months prior to commissioning of such systems.

The GOP must notify CMEER prior to any changes in generation or operating conditions that could require changes to a TO's protection systems, by email, at the address specified in Section 9 of this document.

The neighboring TOP must notify CMEER prior to any changes in generation, transmission, load or operating conditions that could require changes in a TO's protection systems, by email, at the address specified in Section 9 of this document.

Reference: PRC-001-1 Requirements 3, 4 and 5.

The GO and TO shall report any addition, replacement, modification or dismantling of a component of a facility or a special protection system (SPS/RAS) to CMEER at least three months before the component in question is to be commissioned or dismantled, by email, at the address specified in Section 9 of this document.

The neighboring TOP and the neighboring BA shall report any addition, replacement, modification or dismantling of a component of a facility or special protection system (SPS/RAS) whose commissioning or dismantling affects the Québec Interconnection, at least three months before the component in question is to be commissioned or dismantled, by email, at the address specified in Section 9 of this document.

9. Other conditions

In this document, CMEER has specified, when available, the data formats, communication protocols and interchange methods that are acceptable to it. Any entity wishing to propose alternatives must submit a request to the email address shown in the next section.

9.1 Data reporting

Data and information may be reported in accordance with the terms and conditions already agreed upon with the relevant entities. All communications regarding requirements and procedures for reporting the data and information needed to plan the operation of the Québec Interconnection main transmission system (RTP) must be sent to the following email address:

CMEDonneespourlafiabilite@hydro.qc.ca

Should a computer or telecommunication problem prevent real-time data reporting to CMEER, the affected entity must contact CMEER either directly or through a HQT regional business place, as stipulated in the Common Operating Instructions.

9.2 Inconsistent data

If CMEER detects inconsistent data, it will contact the entity concerned. CMEER will work with the entity to resolve the inconsistency in a manner that is acceptable to both parties and that ensures main transmission system (RTP) reliability.

9.3 Security protocol

CMEER and Reliability Coordinators (RCs), Transmission Operators (TOPs) and Balancing Authorities (BAs) adjacent to the Québec Interconnection shall use NERCnet for data exchanges. NERC is responsible for NERCnet technical support and maintenance.

Hydro-Québec units may also submit their data through Hydro-Québec's file storage system, HydroDoc (Enterprise Connect).

CMEER will ensure that data transfers comply with the security protocol jointly selected with the other entities.

10. References

[1] BAL-005-0.2b “Réglage automatique de la production” [Automatic Generation Control]

[2] EOP-004-2 “Déclaration des événements” [Event Reporting]

[3] FAC-008-3 “Caractéristiques assignées des installations” [Facility Ratings]

[4] IRO-010-2 “Spécification et collecte des données du coordonnateur de la fiabilité” [Reliability Coordinator Data Specification and Collection]

[5] IRO-017-1“Coordination des retraits” [Outage Coordination]

[6] MOD-020-0 “Fourniture des données des demandes interruptibles et de la gestion des charges modulables aux répartiteurs et aux coordonnateurs de la fiabilité” [Providing Interruptible Demands and Direct Control Load Management Data to System Operators and Reliability Coordinators]

[7] MOD-025-2 “Vérification et déclaration des capacités de puissance active et réactive des groupes de production et de la capacité de puissance réactive des compensateurs synchrones” [Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability]

[8] MOD-031-2 Demand and Energy Data (for the recurring data and information required by the BA)

[9] MOD-032-1 “Données pour la modélisation et l’analyse des réseaux électriques” [Data for Power System Modeling and Analysis]

[10] PRC-001-1 “Coordination de la protection du réseau” [System Protection Coordination]

[11] TOP-001-3 “Opérations de transport” [Transmission Operations]

[12] TOP-003-3 “Données sur la fiabilité de l’exploitation” [Operational Reliability Data]

[13] “Exigences et procédures relatives à la transmission de données pour la modélisation du réseau de transport” [Transmission System Modeling Data Requirements and Reporting Procedures]

[14] IQ-P-001 “Vérification des puissances actives et réactives maximales des installations de production et des compensateurs synchrones faisant partie du RTP” [Verification of Maximum Real and Reactive Power Capabilities of MTS [RTP] Generating Facilities and Synchronous Compensators]