

## Québec Balancing Authority Area Procedure

### *Maximum Real and Reactive Power Verification at Generation Facilities of 50 MVA or Higher Capacity*

October 18, 2010



Title		Number	
<b>Maximum Real and Reactive Power Verification at Generation Facilities of 50 MVA or Higher Capacity</b>		<b>IQ-P-001-A</b>	
		Revised version <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
		Replaces procedure <b>IQ-P-001-A (2009-10-16)</b>	
		Effective date	
		<b>2010-10-18</b>	
Issued to <b>Generator Owners and Generator Operators in the Québec Balancing Authority Area</b>			
Drafted by	Modified by	Verified by	Approved by
Martin Boisvert	<i>Sophie Gagnon, ing.</i> Sophie Gagnon, Eng.	<i>B. Pelletier</i> pour Bernard Pelletier	<i>L. O. Rioux</i> Louis-Omer Rioux

**TABLE OF CONTENTS**

**PURPOSE** ..... 3

**1. APPLICATION** ..... 3

**2. COMPLIANCE** ..... 3

**3. CONFIDENTIALITY OF DATA** ..... 3

**4. VERIFICATION CONDITIONS** ..... 3

**4.1. WIND FARMS** ..... 3

**4.2. HYDROELECTRIC GENERATING STATIONS, THERMAL PLANTS AND GAS-FIRED PLANTS** ..... 3

        4.2.1. The Generator Owner’s and the Generator Operator's responsibilities..... 4

        4.2.2. Station test ..... 4

        4.2.3. Unit test ..... 4

        4.2.4. Test duration ..... 4

        4.2.5. Waiver request for conducting the station test..... 5

        4.2.6. Other test constraints ..... 5

**4.3. EXEMPTIONS** ..... 6

        4.3.1. Generation facilities with a capacity less than 50 MVA..... 6

        4.3.2. Station tests in the summer period..... 6

        4.3.3. Gross Power..... 6

        4.3.4. Other exemptions..... 6

**5. TEST PROCEDURE – HYDRO, THERMAL AND GAS-FIRED GENERATING STATIONS**..... 7

**5.1. SCHEDULING THE TESTS** ..... 7

        5.1.1. Generating stations connected to the Hydro-Québec TransÉnergie system ..... 7

        5.1.2. Generating stations connected to a private system and for the Churchill Falls Generating Station..... 8

**5.2. CONDUCTING THE TESTS**..... 8

        5.2.1. Communications before and during the test ..... 8

            5.2.1.1. Generating stations connected to the Hydro-Québec TransÉnergie system ..... 8

            5.2.1.2. Generating stations connected to a private system and for the Churchill Falls Generating Station..... 9

        5.2.2. Framework test procedures ..... 10

            5.2.2.1. STATION TEST – Maximum real and reactive power of a generating station ..... 10

            5.2.2.2. UNIT TEST – Maximum real and reactive power of each unit at a generating station..... 10

        5.2.3. Retesting ..... 11

        5.2.4. After testing ..... 11

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5.3. COMMUNICATING RESULTS .....	11
5.4. DISCREPANCIES IN RESULTS .....	11
6. TEST PROCEDURE – WIND FARMS .....	12
6.1. VERIFICATION METHOD.....	12
6.2. COMMUNICATING RESULTS .....	12
6.3. DISCREPANCIES IN RESULTS .....	12
7. INABILITY TO ACHIEVE THE DECLARED CAPABILITIES .....	13
8. CONTACTS.....	14
9. HISTORY OF UPDATES .....	15
APPENDIX A PROCESS – SCHEDULING THE TESTS.....	17
APPENDIX B PROCESS – CONDUCTING THE TESTS .....	19
APPENDIX C HYDRO-SAGUENAY GENERATING STATIONS – PARTICULAR PROCESS FOR SCHEDULING AND CONDUCTING THE TESTS .....	21
APPENDIX D STATION TEST – MAXIMUM REAL AND REACTIVE POWER VERIFICATION .....	23
APPENDIX E UNIT TEST – MAXIMUM REAL AND REACTIVE POWER VERIFICATION .....	24
APPENDIX F PERFORMANCE DATA FOR WIND FARMS .....	25

## PURPOSE

The purpose of this Procedure is to provide guidance for verifying the maximum real and reactive power of a generating station (station test) and of each generating unit (unit test), and for compiling the performance data of wind farms.

This must be done in order to update real-time system operations databases and evaluate available resources in the Québec Balancing Authority Area. The results of unit tests help validate official specifications for generating units provided by Generator Owners or Generator Operators and used for system planning, operations studies and steady-state system models.

This verification must comply with the requirements of Hydro-Québec TransÉnergie, which sends a letter every year to each Generator Owner and Generator Operator notifying it that verification must be done.

### 1. APPLICATION

This Procedure applies to the Generator Owners (GOs) and the Generator Operators (GOPs) of generation facilities with a capacity of 50 MVA or more, located in or considered part of the Québec Balancing Authority Area.

### 2. COMPLIANCE

This Procedure is in compliance with the NERC Reliability Standards [TOP-002-2a](#) (R13 and R14) and with the NPCC criteria included in Directories [D9](#) and [D10](#).

### 3. CONFIDENTIALITY OF DATA

In accordance with the [Transmission Provider Code of Conduct](#) and the [Reliability Coordinator Code of Conduct](#), Hydro-Québec TransÉnergie staff participating in this Procedure keeps data submitted by GOs and GOPs confidential.

### 4. VERIFICATION CONDITIONS

#### 4.1. WIND FARMS

Because of the intermittent nature of the wind, 50 MVA or more wind farm GOs or GOPs must submit required data as specified in section 6. Wind farms performance tracking replaces maximum real and reactive power tests. Also, each GO and GOP is in charge of compiling the performance data and making sure that the criteria in this Procedure are followed.

#### 4.2. HYDROELECTRIC GENERATING STATIONS, THERMAL PLANTS AND GAS-FIRED PLANTS

For hydroelectric generating stations, thermal plants and gas-fired plants, 2 types of tests are used to verify maximum real and reactive power:

- The station test, used to verify the maximum real and reactive power that a generating station can develop under peak conditions;
- The unit test, used to verify the characteristics of generating units.

#### 4.2.1. The Generator Owner's and the Generator Operator's responsibilities

Each GO and GOP is in charge of scheduling and conducting the tests and making sure that the criteria in this Procedure are followed.

Although, during the tests, the GO and the GOP may test or measure other generating unit parameters for its own purposes provided this does not change test conditions and does not lead to power variations.

#### 4.2.2. Station test

Since loads on the Hydro-Québec TransÉnergie system are not heavy in summer, the Direction *Contrôle et exploitation du réseau* (DCER), assuming the role of Transmission Operator for the Québec Balancing Authority Area, specified that station test must be conducted **every 3 years** in anticipation of the winter peak in the winter period that is from **November 1<sup>st</sup> to February 28<sup>th</sup>**.

A station test can be conducted outside this period provided that a waiver is granted to the GO or to the GOP by the Direction DCER. Refer to section 4.2.5 for the application details.

The station tests must be conducted for all generating stations with a capacity of 50 MVA or more according to a 3 years schedule drawn up by the GOs and the GOPs. The schedule must be revised **every year** and sent no later than **October 31<sup>st</sup>** to:

- The Regional Outage Scheduler for generating stations connected to the Hydro-Québec TransÉnergie system;
- The System Control Outage Scheduler for generating stations connected to a private system or for the Churchill Falls Generating Station;
- Direction DCER.

#### 4.2.3. Unit test

The unit test must be conducted **every 6 years** or as soon as changes are made that affect the generating unit's real or reactive power. Furthermore, it can be realized in any period of the calendar year.

The unit tests must be conducted for all generating units of generating stations with a capacity of 50 MVA or more according to a 6 years schedule drawn up by the GOs and the GOPs. This schedule must be revised **every year** and sent no later than **December 1<sup>st</sup>** to:

- The Regional Outage Scheduler for generating stations connected to the Hydro-Québec TransÉnergie system;
- The System Control Outage Scheduler for generating stations connected to a private system or for the Churchill Falls Generating Station;
- Direction DCER.

#### 4.2.4. Test duration

For hydroelectric generating stations, thermal plants and gas-fired plants:

- The minimum duration of the station test must be 1 hour 15 minutes;
- The minimum duration of the unit test must also be 1 hour 15 minutes.

#### 4.2.5. Waiver request for conducting the station test

A station test can be conducted outside the winter period provided that a waiver is granted to the GO or to the GOP by the Direction DCER.

A waiver request can be submitted by the GO or the GOP to the Direction DCER if the following conditions are met:

- Permanent conditions so that it is impossible to achieve the maximum power of the generating station when conducting the station test in the winter period as is required in section 5.2.2.1;
- Possibility of conducting the station test of the generating station outside the winter period and achieve the maximum power of this generating station as is required in section 5.2.2.1.

The waiver request shall be submitted with the following information:

1. Generating station for which a waiver request is done.
2. Identification of the winter period for which a waiver request is done.
3. Proposition of a different period for conducting the station test of the generating station.

The waiver request must be submitted by the GO or the GOP to the Direction DCER no later than **October 31<sup>st</sup>** before the date scheduled for conducting the station test of the generating station.

The Direction DCER must, **within 30 days** following receipt of the waiver request from the GO or the GOP, notify the latter of the acceptance or the refusal of the request.

#### 4.2.6. Other test constraints

1. Maximum real and reactive powers are tested in compliance with any operating restrictions which may apply to generating stations, generating units or related equipment. Operating constraints to prevent damage to generating units (e.g., on axial pulsing, vibrations and temperature) must not be exceeded.
2. Testing must not lead to contravening operating criteria (e.g., minimum operating reserves and maximum power flows). Testing may be limited or interrupted at the request of a System Control Dispatcher should a system limit be reached and system reliability compromised.
3. The maximum real and reactive powers tests of hydroelectric generating stations with interdependent water levels or flows potentially affecting the results must be tested at the same time.
4. The maximum real and reactive powers tests of generating stations, whose the reactive power generation mutually affect each other depending on the maximum voltage of their common collector system, must be tested at the same time.
5. It is preferable that generating stations or units capable of being islanded to a neighbouring system be tested when the generating units are synchronized to the Québec grid. If that is not possible, the System Control Outage Scheduler or System Control Dispatcher – Interconnections, depending on the horizon, analyzes the impact of testing on maintaining interchange schedules.
  - Testing is conducted if power fluctuations are negligible or can be compensated on the quantity of inadvertent energy generated, and provided the System Control Dispatcher – Interconnections and counterpart Operator in the affected Balancing Authority Area reach agreement. Otherwise, testing is postponed to a later date.

6. During the maximum real and reactive powers test, the GO or the GOP must identify in the "Comments" section of forms in Appendices D and E any condition or other factor which could influence test results, and where the Declared Net Capabilities in MW or in Mvar cannot be reached.

### 4.3. EXEMPTIONS

#### 4.3.1. Generation facilities with a capacity less than 50 MVA

Generation facilities with a capacity less than 50 MVA are exempted from performing the maximum real and reactive power verification described in this Procedure because Hydro-Québec TransÉnergie consider these generation facilities all together in the generation/load forecasts.

#### 4.3.2. Station tests in the summer period

Generation facilities with a capacity of 50 MVA or more are exempted from performing the station tests described in this Procedure in the summer period because system conditions are not adequate at that time of the year (high voltages and light loading).

#### 4.3.3. Gross Power

As Net Power is more significant for Hydro-Québec TransÉnergie and, in most case, the difference between Net and Gross Power is negligible, it is not required that GOs and GOPs verify generation facilities Gross Power.

However, GOs and GOPs are required to provide real and reactive powers readings of generation facilities service loads during the verification.

#### 4.3.4. Other exemptions

- If a GO or a GOP cannot perform maximum real and reactive powers verification specified in this Procedure because of one of the reasons listed below, he must provide a written explanation to the Direction DCER **as soon as possible**.
  - Potential damage to the GO's or to the GOP's equipment;
  - Environment conditions;
  - Governmental regulatory or operating license limitations.

The Direction DCER must, **within 30 days** following receipt of the written explanation from the GO or the GOP, notify the latter that he is exempted from performing the verification, but he must provide historical data of maximum real and reactive powers reached in the current year in winter conditions and the normal load of its station services (MW and Mvar).

- In case where GO or GOP temporarily suspends its operations, he is exempted from performing the verification described in this Procedure. However, during the year where the operations are resumed, the verification must be performed according to the current Procedure.

## 5. TEST PROCEDURE – HYDRO, THERMAL AND GAS-FIRED GENERATING STATIONS

### 5.1. SCHEDULING THE TESTS

The scheduling process is the same for both station and unit tests.

Under special circumstances where opportunities for testing arise on short notice, GOs or GOPs may send outage request that do not allow the normal time for processing. Hydro-Québec TransÉnergie will do its best to accommodate such tests provided power system conditions so permit and system reliability is not compromised.

**Note:** The scheduling process for the Hydro-Saguenay Generating Stations is particular. Please refer to the scheduling process described in Appendix C of the current Procedure for more details.

#### 5.1.1. Generating stations connected to the Hydro-Québec TransÉnergie system

*Reference – Process A1 in Appendix A*

1. The GO or the GOP must send its testing request as an outage request, and include its testing procedure with it. The outage request is submitted to the Regional Outage Scheduler for its area.

In scheduling the test, the GO or the GOP takes such facility-specific factors into account (e.g., as the time of local ice cover formation).

The GO or the GOP must complete test scheduling **before noon, four working days** before the test date.

2. The Regional Outage Scheduler analyzes the request in terms of its impact on regional power system reliability.
  - a. If regional power system reliability and transmission equipment security are not compromised, he forwards the request to the System Control Outage Scheduler. The latter studies the request received in terms of the main power system. The request is approved, provided reliability of the main power system is not compromised.
  - b. Should either the Regional Outage Scheduler or the System Control Outage Scheduler refuse the request, the GO or the GOP representative is so informed and given the reasons for the refusal.

In the case of refusal, the Regional Outage Scheduler will propose a new date for performing the test to the GO or the GOP representative.

### 5.1.2. Generating stations connected to a private system and for the Churchill Falls Generating Station

*Reference – Process A2 in Appendix A*

1. The GO or the GOP must send its testing request as an outage request, and include its testing procedure with it. The outage request is submitted to the System Control Outage Scheduler.

In scheduling the test, the GO or the GOP takes such facility-specific factors into account (e.g., as the time of local ice cover formation).

The GO or the GOP must complete test scheduling **before noon, four working days** before the test date.

2. The System Control Outage Scheduler analyzes the request received from GO or GOP in terms of the main power system.
  - a. Provided that reliability of the main power system is not compromised, the request is approved.
  - b. Should he refuse the request, the GO or the GOP representative is so informed and given the reasons for the refusal.

In the case of refusal, the System Control Outage Scheduler will propose a new date for performing the test to the GO or the GOP representative.

## 5.2. CONDUCTING THE TESTS

*Reference – Process B1 and B2 in Appendix B*

### 5.2.1. Communications before and during the test

**Note:** The communications before and during the test for the Hydro-Saguenay Generating Stations are particular. Please refer to the test conducting process described in Appendix C of the current Procedure for more details.

#### 5.2.1.1. Generating stations connected to the Hydro-Québec TransÉnergie system

*1 hour prior to the test*

1. On the day of testing, one hour before testing is to begin, the GO or the GOP representative contacts the Regional System Control Dispatcher to ask him to authorize the test.
2. The Regional System Control Dispatcher analyzes the impact of testing on regional power system reliability. Provided testing does not compromise regional power system reliability, the Regional System Control Dispatcher asks the System Control Dispatcher to authorize the test.

If it does compromise reliability, the Regional System Control Dispatcher cancels the test and informs the GO or the GOP representative of the reasons for doing so. The latter must then reschedule the test as set out in section 5.1.1.

3. The System Control Dispatcher analyzes the impact that testing will have on main transmission system reliability. Provided the request does not compromise main transmission system reliability and has no major effect on interchange schedules, he authorizes the Regional System Control Dispatcher to proceed. The Regional System Control Dispatcher contacts the GO or the GOP representative so that testing begins on schedule.

If it does compromise reliability, the System Control Dispatcher so notifies the Regional System Control Dispatcher. The Regional System Control Dispatcher informs the GO or the GOP representative, who must then reschedule the test as set out in Section 5.1.1. The reasons for denying the test are also given to the GO or the GOP representative.

At the beginning of the test

At the scheduled time of test or the time specified by the Regional System Control Dispatcher, the latter asks the GO or the GOP representative at the generating station to perform the test following standard procedures. The Regional System Control Dispatcher must notify the System Control Dispatcher of the exact time testing start.

During the testing

The designated operator of the generating station notes any unusual situation arising during the testing and sends that information to the Regional System Control Dispatcher, who records it.

### **5.2.1.2. Generating stations connected to a private system and for the Churchill Falls Generating Station**

1 hour prior to the test

1. On the day of testing, one hour before testing is to begin, the GO or the GOP representative contacts the System Control Dispatcher to ask him to authorize the test.
2. The System Control Dispatcher analyzes the impact that testing will have on main transmission system reliability. Provided the request does not compromise main transmission system reliability and has no major effect on interchange schedules, he authorizes the GO or the GOP representative to proceed.

If it does compromise reliability, the System Control Dispatcher so notifies the GO or the GOP representative. The latter must then reschedule the test as set out in Section 5.1.2. The reasons for denying the test are given to the GO or the GOP representative.

At the beginning of the test

At the scheduled time of test or the time specified by the System Control Dispatcher, the latter asks the GO or the GOP representative at the generating station to perform the test following standard procedures. The GO or the GOP representative must notify the System Control Dispatcher of the exact time testing start.

During the testing

The designated operator of the generating station notes any unusual situation arising during the testing and sends that information to the System Control Dispatcher, who records it.

## 5.2.2. Framework test procedures

### 5.2.2.1. STATION TEST – Maximum real and reactive power of a generating station

For hydroelectric generating stations, thermal plants and gas-fired plants, the station test lasts at least **1 hour 15 minutes** and follows the steps below:

1. For a minimum duration of **1 hour**, test the maximum real power of the generating station (all generating units simultaneously) accounting for the reactive power (Mvar) required by the state of the power system at the time of testing.
2. For **the first 15 minutes** of the second hour, maintain the state described in step 1, then check the reactive power (Mvar) developed by raising the generator output voltage setpoint until the limit for one of the following is reached:
  - Generator output voltage;
  - Transmission system voltage;
  - Stator current or rotor current.

This way of testing, given its impact on regional power systems, must be coordinated with Hydro-Québec TransÉnergie staff.

### 5.2.2.2. UNIT TEST – Maximum real and reactive power of each unit at a generating station

The purpose of unit test is to check the electrical characteristics of generating units. 2 types of tests check the characteristic curve (P-Q curve) of a generating unit at the generating unit's maximum real power (MW).

#### 1. *Unit test of reactive power produced (lagging test)*

For the hydroelectric generating stations, thermal plants and gas-fired plants, the Generator Operator increases the generating unit's real power to its maximum, then checks:

- For a minimum duration of **1 hour** (or until the temperature stabilizes), the reactive power (Mvar) developed by raising the generator output voltage setpoint until the stator current limit or rotor current limit is reached.

#### 2. *Unit test of reactive power absorbed (leading test)*

Once the unit test is complete for the production of reactive power, the Generator Operator must keep the generating unit at its maximum real power (MW) and check:

- For a minimum duration of **15 minutes**, the reactive power (Mvar) obtained by lowering the generator output voltage setpoint until the stator current limit or polar angle limiter has been reached.

### 5.2.3. Retesting

Test must be run again at a different time should the state of the power system at the time of testing not allow one of the following limits to be reached: generator output voltage, stator current or rotor current.

### 5.2.4. After testing

When testing ends, the designated operator of the generating station must notify the Regional System Control Dispatcher or System Control Dispatcher, accordingly, of any restriction, constraint or alarm that occurred during the test and was related to the equipment tested. The Regional System Control Dispatcher, for generating stations connected to the Hydro-Québec TransÉnergie system (excluding Churchill Falls Generating Station), records this information and forwards it to the System Control Dispatcher.

When testing ends, the Regional System Control Dispatcher, after having received instructions from the System Control Dispatcher, directs the designated operator of the generating station to adjust generation to the scheduled value or another value depending on the state of the power system at that time. For generating station connected to a private system or for the Churchill Falls Generating Station, the System Control Dispatcher directs the Generator Operator to set the generation at the scheduled level.

**Note:** The testing end for the Hydro-Saguenay Generating Stations is particular. Please refer to the test conducting process described in Appendix C of the current Procedure for more details.

## 5.3. COMMUNICATING RESULTS

The GO or the GOP must send the compiled test results to the Direction DCER:

- **Every year** and no later than **April 1<sup>st</sup>** for station tests conducted during the previous winter period, that is from November 1<sup>st</sup> to February 28<sup>th</sup>.
- **Every year** and no later than **January 31<sup>st</sup>** for unit test conducted between January 1<sup>st</sup> and December 31<sup>st</sup> of the previous year.

Furthermore, the GO or the GOP is in charge of recording the test results. To do so, he must use the forms in Appendices D and E. However, it is allowed to use a different form which contains at least the information requested in Appendices D and E.

## 5.4. DISCREPANCIES IN RESULTS

If the difference between the results of station tests or unit tests and the Declared Capability (i.e. calculated theoretical values established from the parameters provided by the GO or the GOP for this generating station in conditions similar to the test conditions) is **4 % or more**, an explanation must be provided to the Direction DCER by the GO or the GOP **within 30 days** following transmission of the compiled test results. In addition, the GO or the GOP must provide a plan to address the discrepancies.

As needed, the GO or the GOP will have to update parameters provided for this generating station. If the GO or the GOP is not able to explain the discrepancy, the GO or the GOP will have to retest.

## 6. TEST PROCEDURE – WIND FARMS

### 6.1. VERIFICATION METHOD

The verification method for wind farms consists of providing performance data recorded in normal operations conditions at the connecting point as described below:

- Installed capacity of wind generator in MW and in Mvar (for each model);
- Number of wind generators (by model);
- Service Factor (%);
- Minimum real power output (10 minutes average MW) obtained in the current year, date, hour and horizontal wind speed (10 minutes average from the highest captor);
- Maximum real power output (10 minutes average MW) obtained in the current year, date, hour and horizontal wind speed (10 minutes average from the highest captor).

For wind farms equipped with a secondary voltage control (included in Wind Farm Manager Systems "WFMS") the following data are also required:

- Minimum reactive power output (10 minutes average Mvar) obtained in the current year, date, hour and horizontal wind speed (10 minutes average from the highest captor);
- Maximum reactive power output (10 minutes average Mvar) obtained in the current year, date, hour and horizontal wind speed (10 minutes average from the highest captor).

### 6.2. COMMUNICATING RESULTS

Performance data of wind farms must be submitted **every year** to the Direction DCER as soon as available, but no later than **January 31<sup>st</sup>** for the period between January 1<sup>st</sup> and December 31<sup>st</sup> of the previous year.

The compilation of the performance data must be done by the GO or the GOP in the form supplied in Appendix F of this Procedure. However, it is allowed to use a different form, which contains at least the information requested in Appendix F.

### 6.3. DISCREPANCIES IN RESULTS

If the difference between the performance data of a wind farm and the performance data of the previous year is **4 % or more**, an explanation must be provided to the Direction DCER by the GO or the GOP **within 30 days** following transmission of the compiled performance data. Also, the GO or the GOP must provide a plan to address the discrepancies.

The GO or the GOP will have to update parameters provided for this wind farm, as needed.

## 7. INABILITY TO ACHIEVE THE DECLARED CAPABILITIES

At any time, when a generating unit, a generating station or a wind farm cannot achieve the Declared Capability in MW or in Mvar because of equipment issues, the GO or the GOP must notify **as soon as possible**:

- The Regional Outage Scheduler for generation facility connected to the Hydro-Québec TransÉnergie system;
- The System Control Outage Scheduler for generation facility connected to a private system or for the Churchill Falls Generating Station.


The GO or the GOP must also notify in writing the Direction DCER of the situation as soon as possible but no later than within **10 days**, and provide a plan to address the discrepancies.

If the Declared Capability cannot be achieved all the time, the GO or the GOP must:


- For hydroelectric generating stations, thermal plants and gas-fired plants, conduct the maximum real and reactive power verification again, and send the test results to the Direction DCER within **60 days** following the acknowledgement;
- For wind farms, update parameters of the concerned wind farm.

















8. CONTACTS

**For submitting your results or for any questions related to this Procedure, please write to:**

 [CME\\_Verification\\_PQ\\_max@hydro.qc.ca](mailto:CME_Verification_PQ_max@hydro.qc.ca)

Direction – Contrôle et exploitation du réseau  
Complexe Desjardins, tour est, 19<sup>e</sup> étage  
C.P. 10000, succ. pl. Desjardins  
Montréal (Québec) H5B 1H7  
Fax: 514 879-4691

<b>System Control Centre (CCR) in Montreal</b>	
System Control Dispatchers	 514 289-4990 514 289-4991 514 289-4992

<b>Regional Outage Schedulers</b>	
Chicoutimi	 418 696-3854 or 3815  <a href="mailto:Agent_Planification_Nord@hydro.qc.ca">Agent_Planification_Nord@hydro.qc.ca</a>
Rouyn-Noranda	 819 764-5124 Ext. 4326, 4320 or 4374  <a href="mailto:Agent_Planification_Nord@hydro.qc.ca">Agent_Planification_Nord@hydro.qc.ca</a>
Baie-Comeau	 418 296-8450 Ext. 3775  <a href="mailto:Agent_Planification_Est@hydro.qc.ca">Agent_Planification_Est@hydro.qc.ca</a>
Québec	 418 624-5555 Ext. 5404 or 5476  <a href="mailto:Agent_Planification_Est@hydro.qc.ca">Agent_Planification_Est@hydro.qc.ca</a>
Trois-Rivières	 819 694-2422 or 2433  <a href="mailto:Agent_Planification_Est@hydro.qc.ca">Agent_Planification_Est@hydro.qc.ca</a>
Montréal	 514 289-5410, 5413, 5416 or 5451  <a href="mailto:Agent_Planification_Sud@hydro.qc.ca">Agent_Planification_Sud@hydro.qc.ca</a>
Saint-Jérôme	 450 431-3102, 3103, 3104 or 3130  <a href="mailto:Agent_Planification_Sud@hydro.qc.ca">Agent_Planification_Sud@hydro.qc.ca</a>
<b>System Control Outage Schedulers</b>	
Montréal	 514 289-4363, 4364, 3845 or 5998 Fax: 514 289-4689  <a href="mailto:PCME-Retrait@hydro.qc.ca">PCME-Retrait@hydro.qc.ca</a>

**Note:** To contact the Regional System Control Dispatchers, please refer to the telephone numbers indicated in the Common System Operating Instructions.

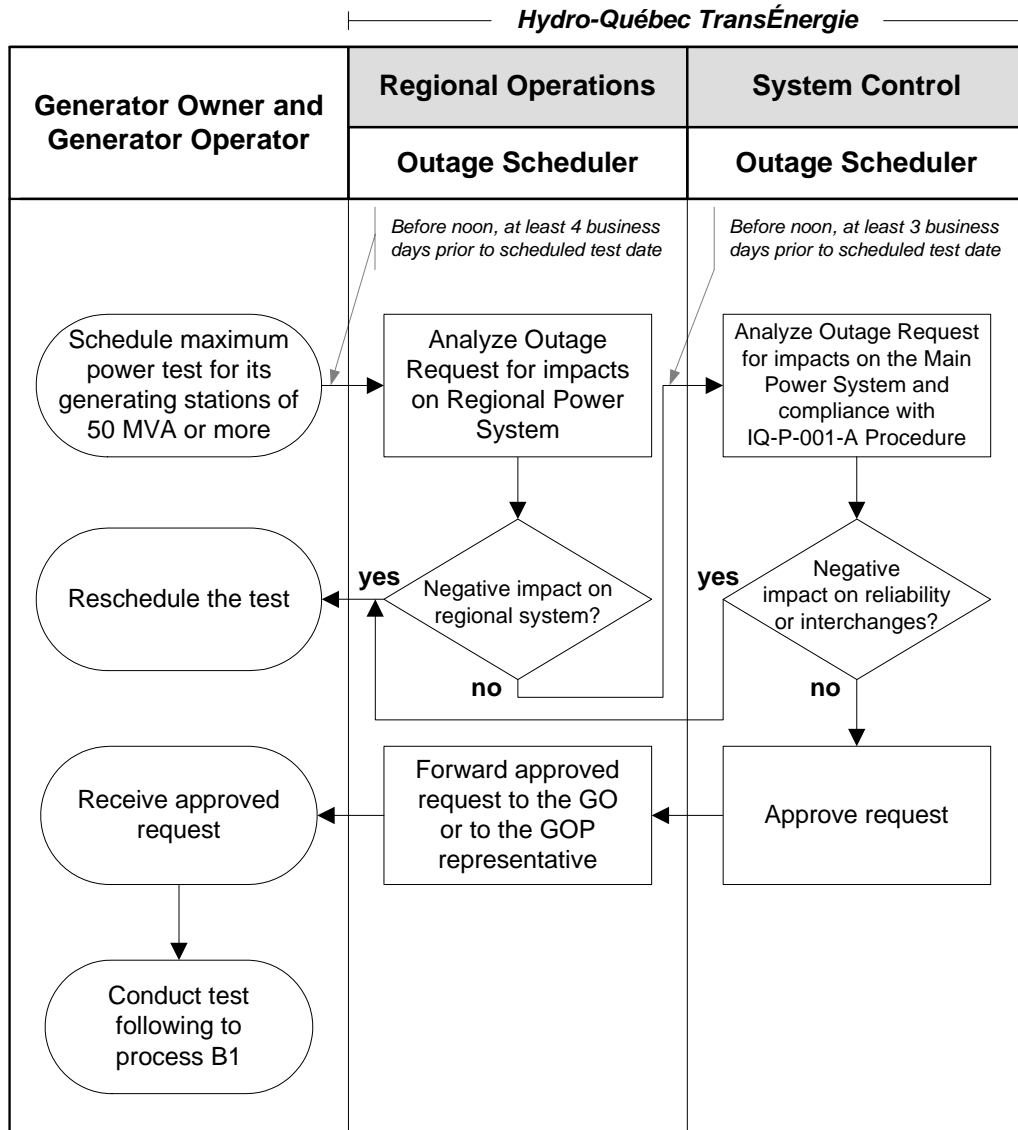
**9. HISTORY OF UPDATES**

<b>Date</b>	<b>Modification</b>	<b>Reason</b>
2005-10-21	Initial effective date	New procedure
2007-10-26	<ul style="list-style-type: none"> <li>• Modification to most sections, to all Appendices and to all process;</li> <li>• Sections 7 and 9 added;</li> <li>• Sub-sections 5.4 and 6.1.1 added;</li> <li>• Process 1B and 2B added;</li> <li>• Appendix C added.</li> </ul>	<ul style="list-style-type: none"> <li>• Control Areas are now called Balancing Authority Areas;</li> <li>• Administrative changes in Hydro-Québec TransÉnergie;</li> <li>• Compliance to NPCC A-13 Criteria;</li> <li>• Standardization of vocabulary used (French version only).</li> </ul>
2008-10-14	<ul style="list-style-type: none"> <li>• Minor modifications to most sections, to process and to Appendices in order to make certain points clear;</li> <li>• Section 3, addition of a reference: Reliability Coordinator Code of Conduct;</li> <li>• Section 4.4.4, addition of a exemption condition when a Generator Owner suspends his operations;</li> <li>• Appendices A and B, consider status of the stabilizers and of the voltage regulator during the tests;</li> <li>• Section 9, deletion of the telephone numbers of the Regional System Control Dispatcher and addition of a note.</li> </ul>	<ul style="list-style-type: none"> <li>• Updates;</li> <li>• New phone system in the Regional System Control Centres for the Regional System Control Dispatchers.</li> </ul>
2009-10-16	<ul style="list-style-type: none"> <li>• Modifications, sections 2, 4.3.4, 5.4, 6.3, and 7, and Appendices E, F and G;</li> <li>• Modification, Purpose;</li> <li>• Reorganization of the section 4;</li> <li>• Section 4.2.2, modification to the deadlines for submitting the schedule and make distinction between station and unit tests;</li> <li>• Modification, sections 4.2.3 and 5.2.2.1;</li> <li>• Modifications, sections 5.1 and 5.2.1;</li> </ul>	<ul style="list-style-type: none"> <li>• Update of the compliance; new NPCC Directories D9 and D10 and Criteria A-03 cancelled;</li> <li>• Addition of the verification method for wind farms;</li> <li>• Make a distinction between the verification conditions of the generating stations and the wind farms;</li> <li>• Accuracy concerning the global test schedule;</li> <li>• For hydroelectric generating stations and thermal plants, the minimum duration of the station test is 1 h 15 instead of 2 h; For all generating stations, the minimum unit test duration is 1 h 15;</li> <li>• Separate the procedures for generating stations connected to the HQT system and for the generating stations connected to a private system (including the Churchill Falls Generating Station);</li> </ul>

Date	Modification	Reason
2009-10-16	<ul style="list-style-type: none"> <li>• Sections 5.3 and 6.2, modification to the deadlines for submitting the test results and the performance data;</li> <li>• Sections 4.2.4, 5.3 and 6.2, use the supplied forms for compiling the test results or the performance data;</li> <li>• Modification of the title of procedure;</li> <li>• Section 8, removal of the Senior agent – System Operations’ information;</li> <li>• Appendices A and B, modification of the numbering of the process and removal of columns and notes;</li> <li>• Addition of Appendices C and D and reference to these appendices in the main text.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce the number of yearly transmissions of test results of the generating stations and give an extension for the wind farms;</li> <li>• Standardization of the submitted data;</li> <li>• Updates;</li> <li>• Describe the peculiarities of the test scheduling and test conducting for the Hydro-Saguenay Generating Stations and the Chats Falls Generating Station.</li> </ul>
2010-10-18	<ul style="list-style-type: none"> <li>• This procedure also applies to Generator Operators;</li> <li>• Direction "Contrôle des mouvements d'énergie" is now "Contrôle et exploitation du réseau";</li> <li>• Section 2, modification;</li> <li>• Section 4.2.2, station test must be conducted every 3 years instead of every year;</li> <li>• Section 4.2.3, unit test must be conducted every 6 years instead of every 5 years;</li> <li>• Sections 4.2.2 and 4.2.3, the schedules must be also sent to Direction DCER;</li> <li>• Section 4.2.5, new section "Waiver request for conducting the station test";</li> <li>• Section 8, contacts modification (phone numbers);</li> <li>• Appendices A and B, update to the process;</li> <li>• The Appendix "Chats Falls Generating Station – Particular process for scheduling and conducting the tests" has been removed from this document.</li> </ul>	<ul style="list-style-type: none"> <li>• Update of the compliance according to NERC Standard TOP-002-2a;</li> <li>• Update;</li> <li>• Update of the compliance;</li> <li>• New requirements;</li> <li>• Allow the conducting of the station test outside the winter period under certain conditions;</li> <li>• Update;</li> <li>• It is not necessary any more to conduct tests at the Chats Falls Generating Station because this Generating Station is located in the Ontario Balancing Authority Area.</li> </ul>

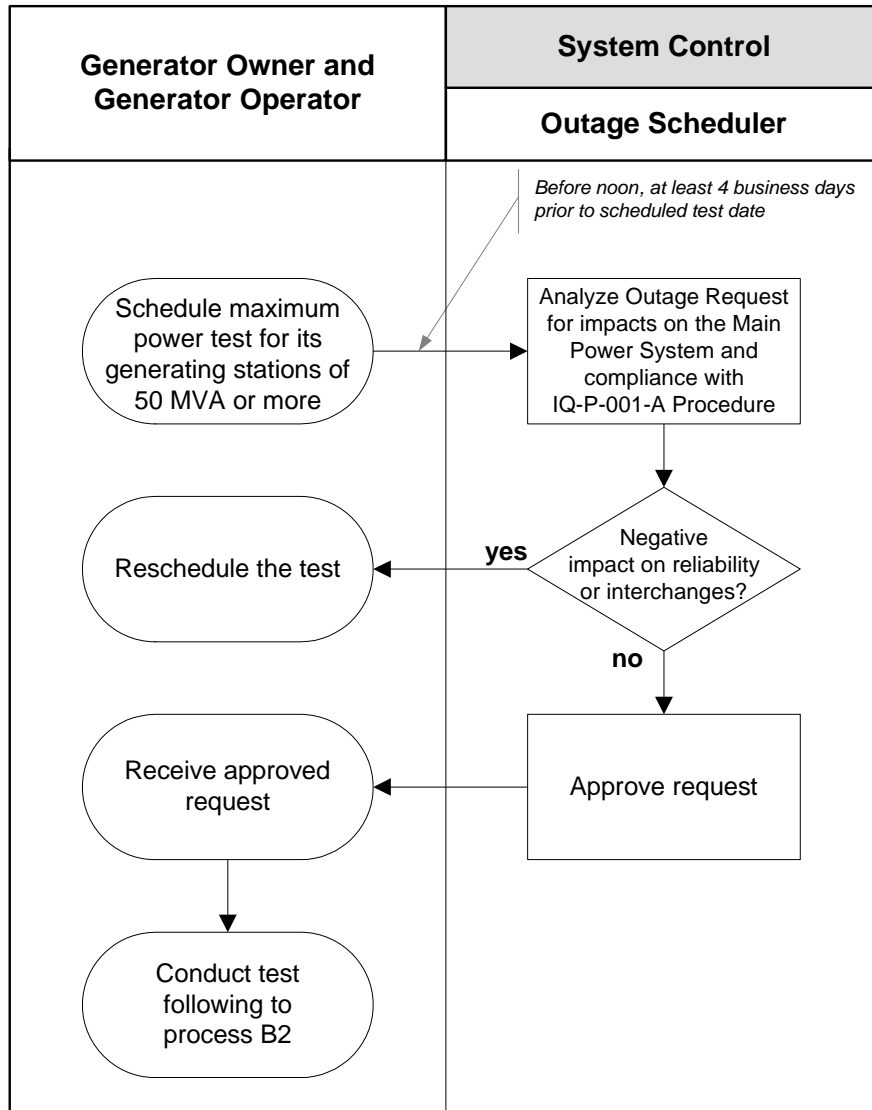
APPENDIX A PROCESS – SCHEDULING THE TESTS

**Process A1**  
**Generating stations connected to the**  
**Hydro-Québec TransÉnergie system**



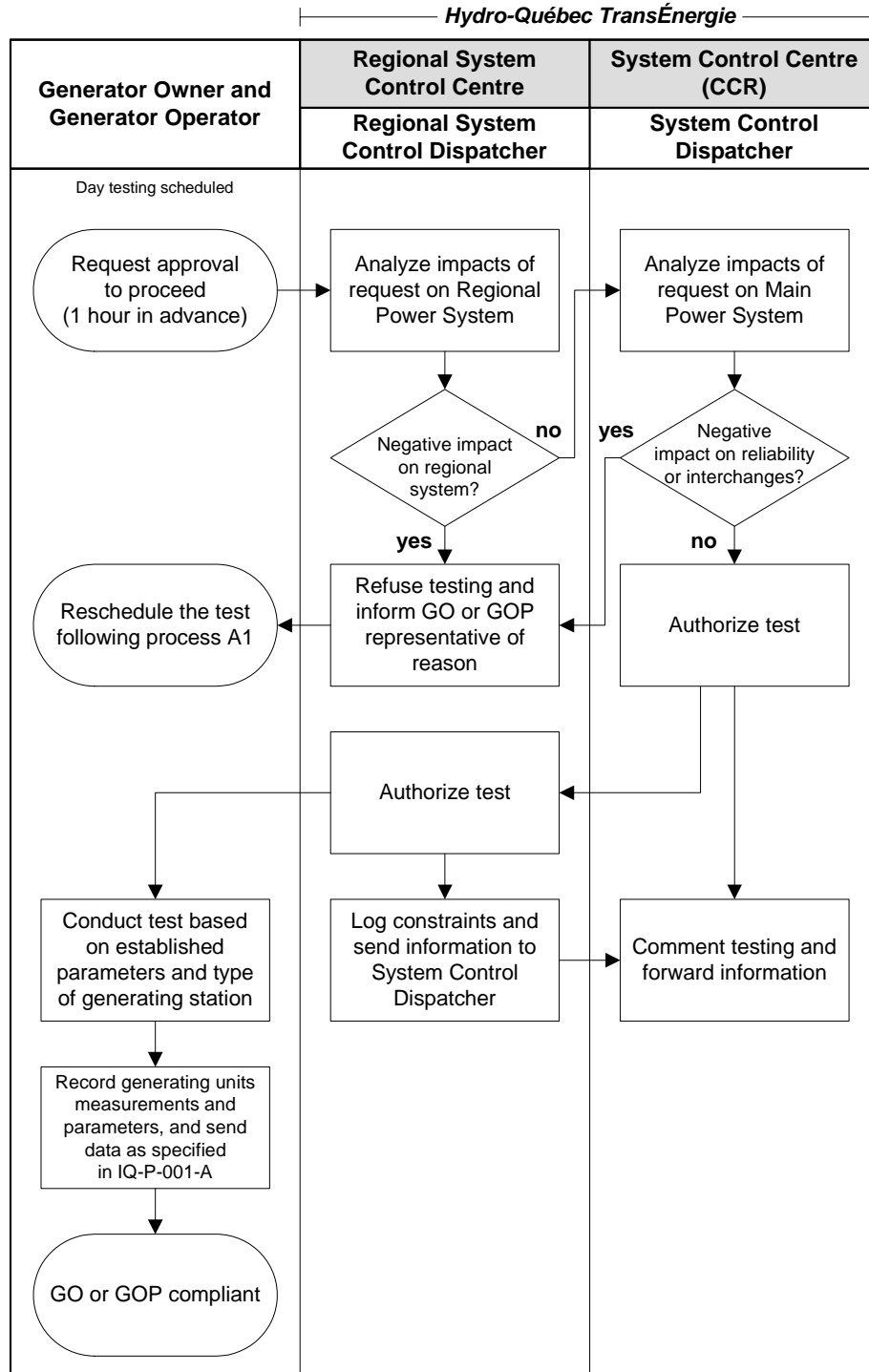
## Process A2 Generating stations connected to a private system and Churchill Falls Generating Station

— Hydro-Québec TransÉnergie —



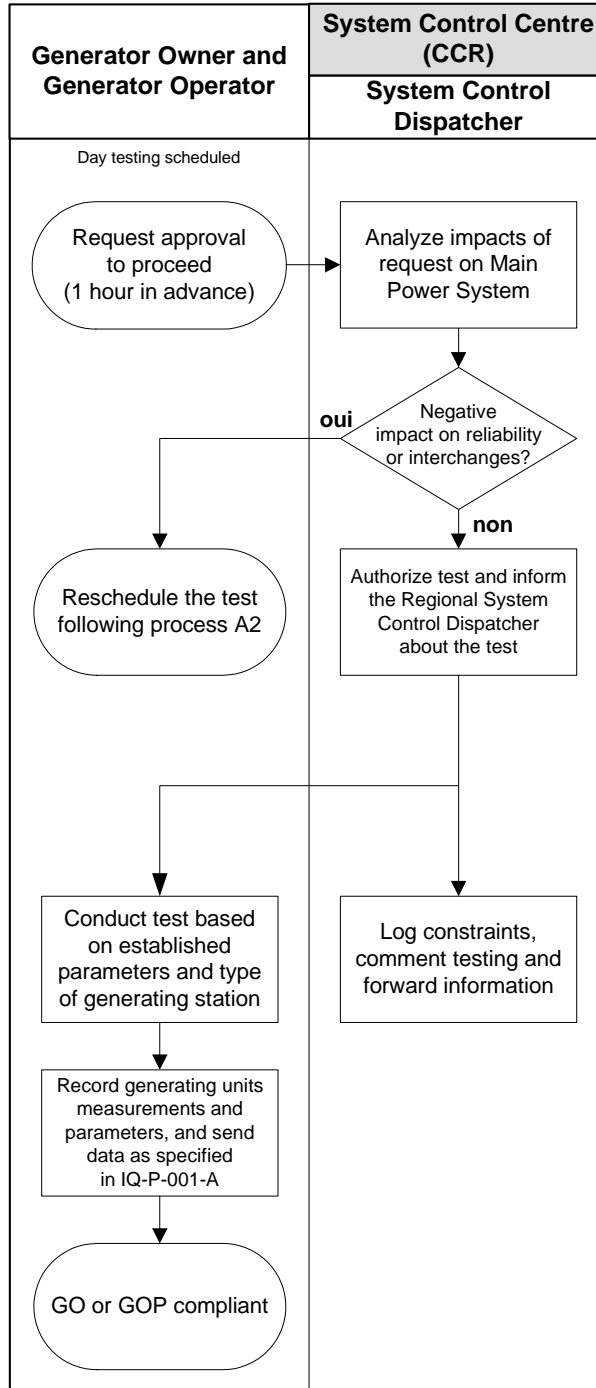
APPENDIX B PROCESS – CONDUCTING THE TESTS

**Process B1**  
**Generating stations connected to the**  
**Hydro-Québec TransÉnergie system**



**Process B2**  
**Generating stations connected to a private system**  
**and Churchill Falls Generating Station**

Hydro-Québec TransÉnergie



## APPENDIX C HYDRO-SAGUENAY GENERATING STATIONS – PARTICULAR PROCESS FOR SCHEDULING AND CONDUCTING THE TESTS

The private power system of the Abitibi-Bowater inc. Company (Hydro-Saguenay division) is connected to the power system of Rio Tinto Alcan (RTA), but it is commercially fed by Hydro-Québec. Because of this peculiarity, scheduling and conducting the tests must be made by the way described below.

### Scheduling the test

1. Hydro-Saguenay must send its testing request as an outage request, and include its testing procedure with it. The outage request is submitted to the RTA – Outage Scheduler. The latter sends a copy of this outage request to the Regional Outage Scheduler (Regional Operations at Chicoutimi) and to the System Control Outage Scheduler.

In scheduling the test, Hydro-Saguenay takes such facility-specific factors into account (e.g., ice cover formation period).

Hydro-Saguenay must complete test scheduling **before noon, four working days** before the test date.

2. The RTA – Outage Scheduler analyzes the request received from Hydro-Saguenay in terms of its impact on his power system reliability.
  - a. Provided that reliability of his power system is not compromised, the request is approved.
  - b. Should he refuse the request, Hydro-Saguenay is so informed and given the reasons for the refusal. Also, the RTA – Outage Scheduler will propose a new date for performing the test to Hydro-Saguenay.

The RTA – Outage Scheduler also communicates his decision to the Regional Outage Scheduler (Regional Operations at Chicoutimi) and to the System Control Outage Scheduler.

### Conducting the test – Communications before and during the test

#### 1 hour prior to the test

1. On the day of testing, one hour before testing is to begin, Hydro-Saguenay contacts the RTA – System Control Dispatcher to ask him to authorize the test.
2. The RTA – System Control Dispatcher analyzes the impact that testing will have on his transmission system reliability. Provided the request does not compromise his transmission system reliability, he authorizes Hydro-Saguenay to proceed.

If it does compromise reliability, the RTA – System Control Dispatcher so notifies Hydro-Saguenay. The latter must then reschedule the test as set out in the previous section. The reasons for denying the test are given to Hydro-Saguenay.

The RTA – System Control Dispatcher also communicates his decision to the Regional System Control Dispatcher (Regional Operations at Chicoutimi) and to the System Control Dispatcher.

#### At the beginning of the test

At the scheduled time of test or the time specified by the RTA – System Control Dispatcher, the latter asks the Hydro-Saguenay to perform the test following standard procedures. The RTA – System Control Dispatcher must notify the Regional System Control Dispatcher (Regional Operations at Chicoutimi) and the System Control Dispatcher of the exact time of the test will start.

*During the testing*

Hydro-Saguenay notes any unusual situation arising during the testing and sends that information to the RTA – System Control Dispatcher, who records it.

*After testing*

When testing ends, Hydro-Saguenay must notify the RTA – System Control Dispatcher of any restriction, constraint or alarm that occurred during the test and was related to the equipment tested. The RTA – System Control Dispatcher records this information and forwards it to the Regional System Control Dispatcher (Regional Operations at Chicoutimi) and the System Control Dispatcher

**Note:** Communicating results must be done according to the section 5.3 of the current Procedure.

**APPENDIX D STATION TEST – MAXIMUM REAL AND REACTIVE POWER VERIFICATION**

Test date (yyyy-mm-dd): [      -      -      ]

Generating station	Station service load	Time	Total Output		Water temp. <sup>1</sup> (hydro generating station) (° C)	Air temp. <sup>2</sup> (° C)	Upstream level (m)	Down-stream level (m)	Comments
			(MW)	(Mvar)					
	MW:	Start:							
	Mvar:	End:							

UNITS		DECLARED CAPABILITY		MW	Mvar	kV	G.O. <sup>3</sup> (%)	Stabilizers (ON/OFF)	Voltage regulator (auto/manual)	Comments
		(MW)	(Mvar)							
	Start:									
	After 1 h of testing:									
	After 1 h 15 of testing:									
	Start:									
	After 1 h of testing:									
	After 1 h 15 of testing:									
	Start:									
	After 1 h of testing:									
	After 1 h 15 of testing:									
	Start:									
	After 1 h of testing:									
	After 1 h 15 of testing:									

<sup>1</sup> Water temperature: temperature of cool water at the generator cooling system intake  
<sup>2</sup> Air temperature: temperature of cool air at the cooling system outlet or generator rotor intake  
<sup>3</sup> G.O.: Gate opening

By: \_\_\_\_\_ Company: \_\_\_\_\_  
 Email: \_\_\_\_\_ Phone: \_\_\_\_\_

Compiling Date: \_\_\_\_\_

**APPENDIX E UNIT TEST – MAXIMUM REAL AND REACTIVE POWER VERIFICATION**

Test date (yyyy-mm-dd): [       -       -       ]

Generating station	Station service load	Time	Total Output		Water temp. <sup>1</sup> (hydro generating station) (° C)	Air temp. <sup>2</sup> (° C)	Upstream level (m)	Down-stream level (m)	Comments
			(MW)	(Mvar)					
	MW:	Start:							
	Mvar:	End:							

UNITS		DECLARED CAPABILITY		MW	Mvar	kV	G.O. <sup>3</sup> (%)	Stabilizers (ON/OFF)	Voltage regulator (auto/manual)	Comments
		(MW)	(Mvar)							
	Start:									
	End:									
	Leading test <sup>4</sup> :									
	Start:									
	End:									
	Leading test <sup>4</sup> :									
	Start:									
	End:									
	Leading test <sup>4</sup> :									
	Start:									
	End:									
	Leading test <sup>4</sup> :									

<sup>1</sup> Water temperature: temperature of cool water at the generator cooling system intake

<sup>2</sup> Air temperature: temperature of cool air at the cooling system outlet or generator rotor intake

<sup>3</sup> G.O.: Gate opening

<sup>4</sup> For specified generating stations only

By: \_\_\_\_\_ Company: \_\_\_\_\_

Compiling Date: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

**APPENDIX F PERFORMANCE DATA FOR WIND FARMS**

Date of collect data (yyyy-mm-dd): [      -      -      ]

Wind farm	Generation	Date	Time	Outside temperature (° C)	Wind speed (km/h)	Total Output (MW or Mvar)	Station service load	
							(MW)	(Mvar)
<b>PERFORMANCE DATA</b>	Minimum – MW							
	Maximum – MW							
	Minimum – Mvar							
	Maximum – Mvar							

Wind farm		Total Output	
		(MW)	(Mvar)
<b>DECLARED CAPABILITY</b>	Minimum Generation		
	Maximum Generation		

**Wind Generator description**

Manufacturer	Number installed	Installed capacity		Power Factor	Operating range (wind in km/h)	Maximum Operating Temperature (° C)	Comments
		(MW)	(Mvar)				

**Service Factor**

	%
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By: \_\_\_\_\_  
 Email: \_\_\_\_\_

Company: \_\_\_\_\_  
 Phone: \_\_\_\_\_

Compiling Date: \_\_\_\_\_