

Québec Balancing Authority Area Procedure

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

October 16, 2009



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Maximum Real and Reactive Power Verification at Generation Facilities of 50 MVA or Higher Capacity		IQ-P-001-A	
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		2009-10-16	
Issued to Generator Owners in the Québec Balancing Authority Area			
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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 each Generator Owner 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 notifying it that verification must be done.

1. APPLICATION

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

2. COMPLIANCE AND REFERENCES

This Procedure is in compliance with the NERC Reliability Standards [TOP-002-2](#) (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 Generator Owners confidential.

4. VERIFICATION CONDITIONS

4.1. WIND FARMS

Because of the intermittent nature of the wind, 50 MVA or more wind farm Generator Owners must submit required data as specified in section 6. Wind farms performance tracking replaces maximum real and reactive power tests. Also, each Generator Owner 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 responsibilities

Each Generator Owner 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 Generator Owner 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. Test schedule

4.2.2.1. Station test

Since loads on the Hydro-Québec TransÉnergie system are not heavy in summer, the Direction – *Contrôle des mouvements d'énergie* (CME), assuming the role of Transmission Operator for the Québec Balancing Authority Area, specified that station test must be conducted **every year** in anticipation of the winter peak in the winter period, that is from **November 1st to February 28th**.

The System Control Outage Scheduler must grant an exemption for a generating station's maximum real and reactive power to be tested outside that period. If a request for an exemption is refused, the System Control Outage Scheduler will so notify the Generator Owner representative, specifying the reasons for the refusal.

The station tests must be conducted for all generating stations with a capacity of 50 MVA or more according to a schedule drawn up by the Generator Owners every year. The schedule, covering the period between November 1st and February 28th, must be sent **every year** no later than **October 31st** 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.

4.2.2.2. Unit test

The unit test must be conducted **every 5 years** or as soon as changes are made that affect the generating unit's real and 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 5 year schedule drawn up by the Generator Owners. This schedule must be revised **every year** and sent no later than **December 1st** before the beginning of the cycle of 5 years 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.

4.2.3. 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.

4.2.4. 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 Generator Owner must identify in the "Comments" section of forms in Appendices E and F 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 Generator Owners verify generation facilities Gross Power.

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

4.3.4. Other exemptions

- If a Generator Owner 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 – CME **as soon as possible**.
 - Potential damage to the Generator Owner's equipment;
 - Environment conditions;
 - Governmental regulatory or operating license limitations.

The Direction – CME must, **within 30 days** following receipt of the written explanation from the Generator Owner, 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 Generator Owner temporarily suspends its operations, he is exempted from performing the verification described in this Procedure. However, once 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, Generator Owners 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 Chats Falls Generating Station and the Hydro-Saguenay Generating Stations is particular. Please refer to the scheduling process described in Appendices C and D 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 Generator Owner 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 Generator Owner takes such facility-specific factors into account (e.g., as the time of local ice cover formation).

The Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner takes such facility-specific factors into account (e.g., as the time of local ice cover formation).

The Generator Owner must complete test scheduling **before noon, four working days** before the test date.

2. The System Control Outage Scheduler analyzes the request received from Generator Owner 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 Generator Owner 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 Generator Owner 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 Chats Falls Generating Station and the Hydro-Saguenay Generating Stations are particular. Please refer to the test conducting process described in Appendices C and D 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner 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 Generator Owner representative to proceed.

If it does compromise reliability, the System Control Dispatcher so notifies the Generator Owner 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 Generator Owner 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 Generator Owner representative at the generating station to perform the test following standard procedures. The Generator Owner 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 D of the current Procedure for more details.

5.3. COMMUNICATING RESULTS

The Generator Owner must send the compiled test results to the Direction – CME:

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

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

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 Generator Owner for this generating station in conditions similar to the test conditions) is 4 % or more, an explanation must be provided to the Direction – CME by the Generator Owner **within 30 days** following transmission of the compiled test results. In addition, the Generator Owner must provide a plan to address the discrepancies.

As needed, the Generator Owner will have to update parameters provided for this generating station. If the Generator Owner is not able to explain the discrepancy, the Generator Owner 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 – CME as soon as available, but no later than **January 31st** for the period between January 1st and December 31st of the previous year.

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

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 – CME by the Generator Owner **within 30 days** following transmission of the compiled performance data. Also, the Generator Owner must provide a plan to address the discrepancies.

The Generator Owner 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 Generator Owner 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 Generator Owner must also notify in writing the Direction – CME 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 Generator Owner 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 – CME 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

Direction – Contrôle des mouvements d’énergie
2 Complexe Desjardins, tour Est, 19^e étage
C.P. 10000, Succ. Desjardins
Montréal (Québec) H5B 1H7
Fax: 514-879-4691

System Control Centre (CCR) in Montreal	
System Control Dispatchers	 514 289-4991 514 289-4992

Regional Outage Schedulers	
Chicoutimi	 418 696-3854 or 3815  Agent_Planification_Nord@hydro.qc.ca
Rouyn-Noranda	 819 764-5124 Ext. 4326, 4320 or 4374  Agent_Planification_Nord@hydro.qc.ca
Baie-Comeau	 1 866 561-5697 Ext. 3909  Agent_Planification_Est@hydro.qc.ca
Québec	 1 866 561-5697 Ext. 3906  Agent_Planification_Est@hydro.qc.ca
Trois-Rivières	 1 866 561-5697 Ext. 3900, 3901, 3902, 3903, 3904 or 3905  Agent_Planification_Est@hydro.qc.ca
Montréal	 514 289-5410, 5413, 5416 or 5451  Agent_Planification_Sud@hydro.qc.ca
Saint-Jérôme	 450 431-3102, 3103, 3104 or 3130  Agent_Planification_Sud@hydro.qc.ca
System Control Outage Schedulers	
Montréal	 514 289-2211 Ext. 4363, 4364, 3845 or 5998 Fax: 514 289-4689  PCME-Retrait@hydro.qc.ca

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

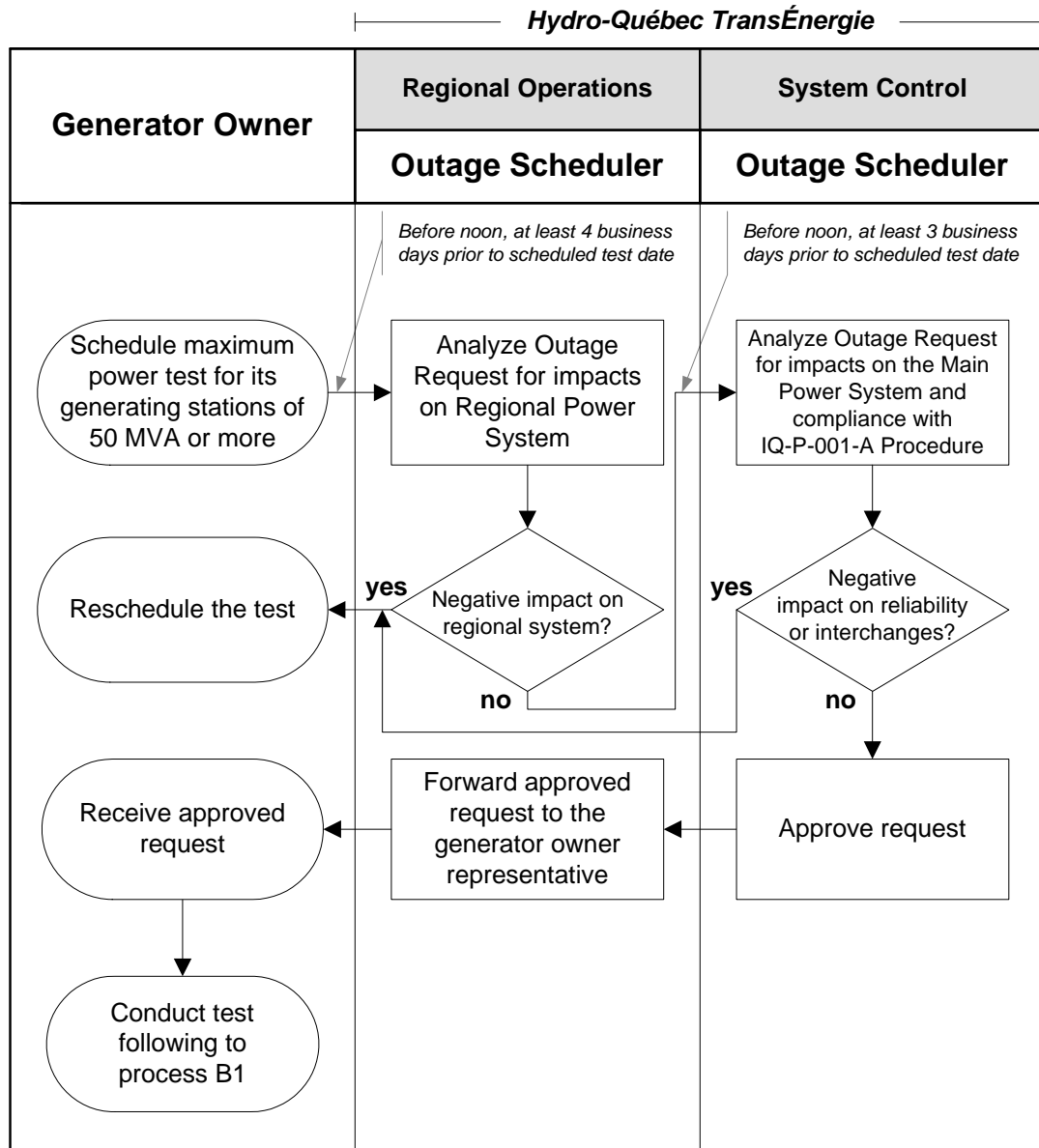
9. HISTORY OF UPDATES

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

Date	Modification	Reason
2009-10-16	<ul style="list-style-type: none"> • Sections 5.3 and 6.2, modification to the deadlines for submitting the test results and the performance data; • Sections 4.2.4, 5.3 and 6.2, use the supplied forms for compiling the test results or the performance data; • Modification of the title of procedure; • Section 8, removal of the Senior agent – System Operations’ information; • Appendices A and B, modification of the numbering of the process and removal of columns and notes; • Addition of Appendices C and D and reference to these appendices in the main text. 	<ul style="list-style-type: none"> • Reduce the number of yearly transmissions of test results of the generating stations and give an extension for the wind farms; • Standardization of the submitted data; • Updates; • Describe the peculiarities of the test scheduling and test conducting for the Hydro-Saguenay Generating Stations and the Chats Falls Generating Station.

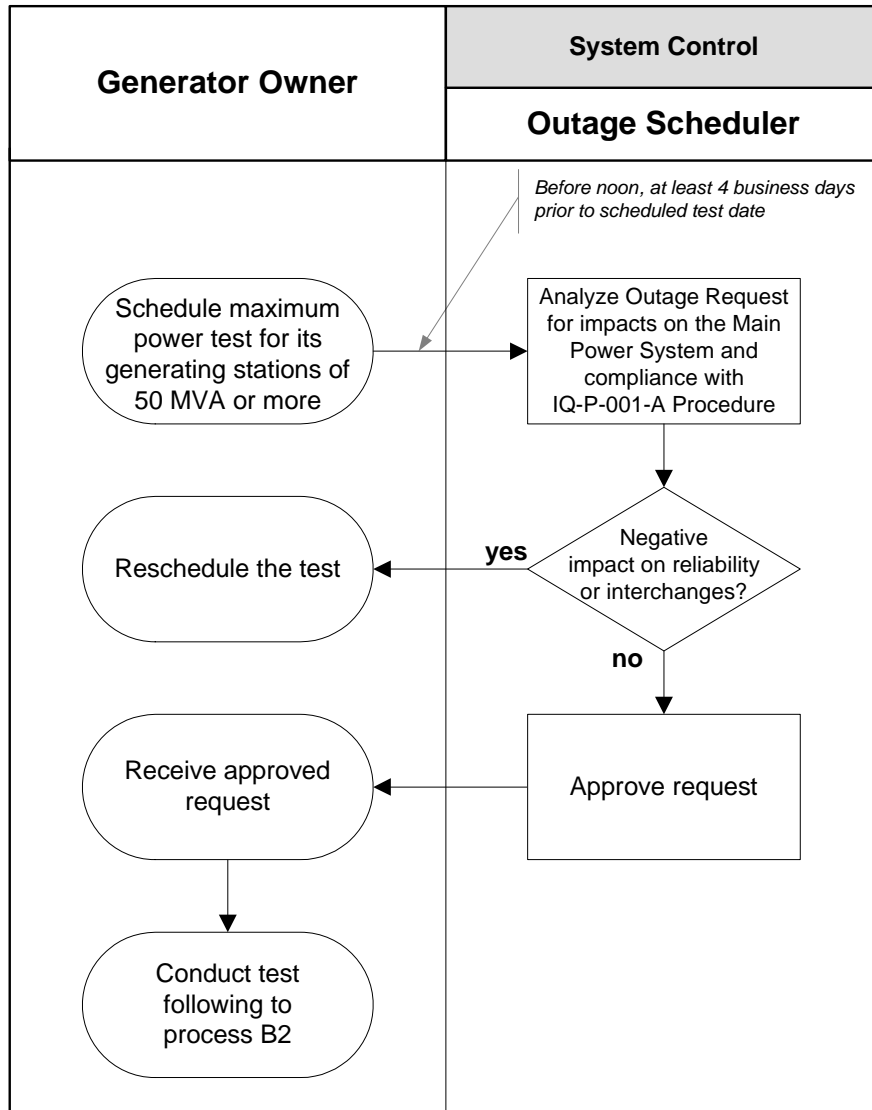
APPENDIX A PROCESS – SCHEDULING THE TESTS

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



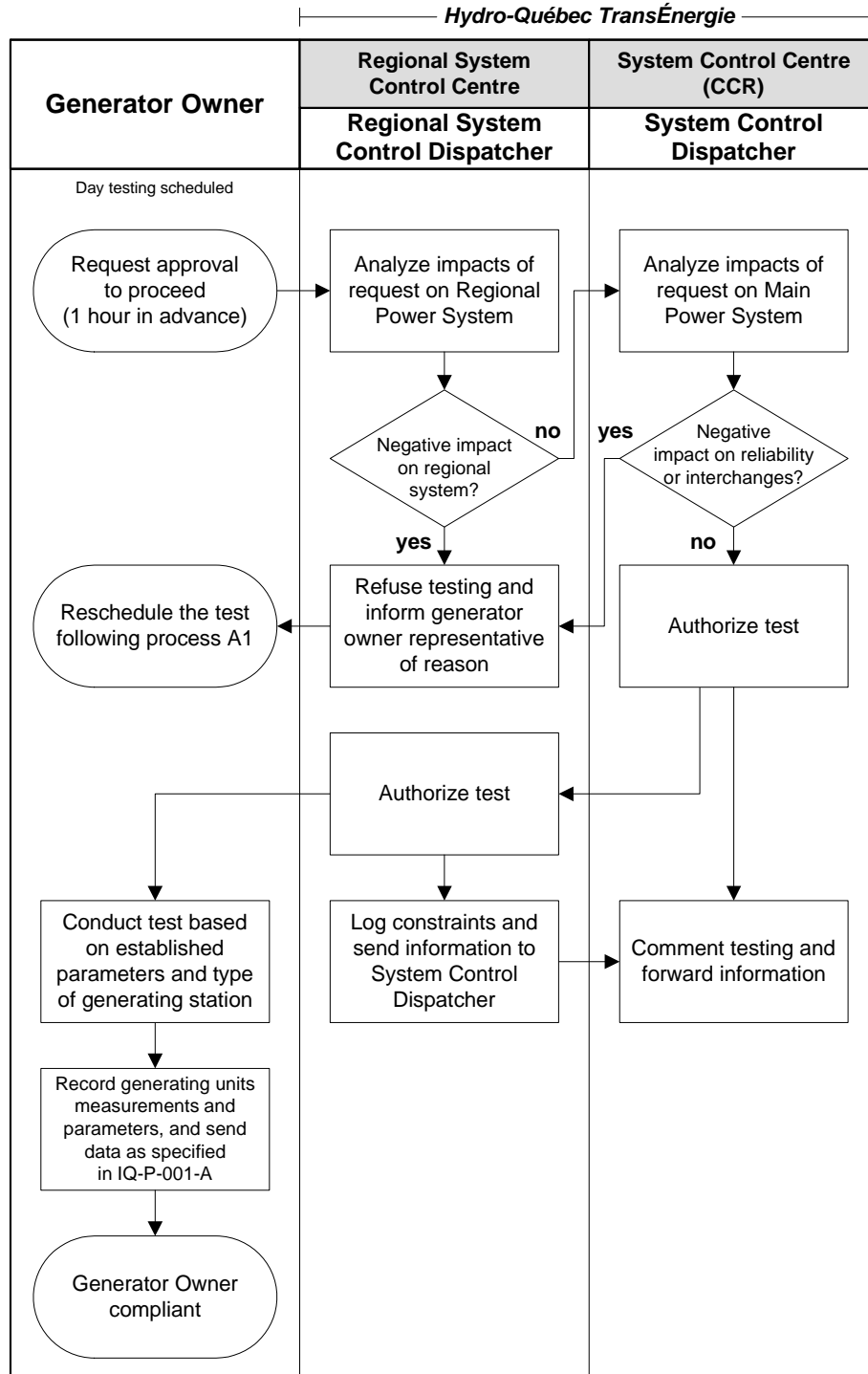
Process A2 Generating stations connected to a private system and Churchill Falls Generating Station

— Hydro-Québec TransÉnergie —

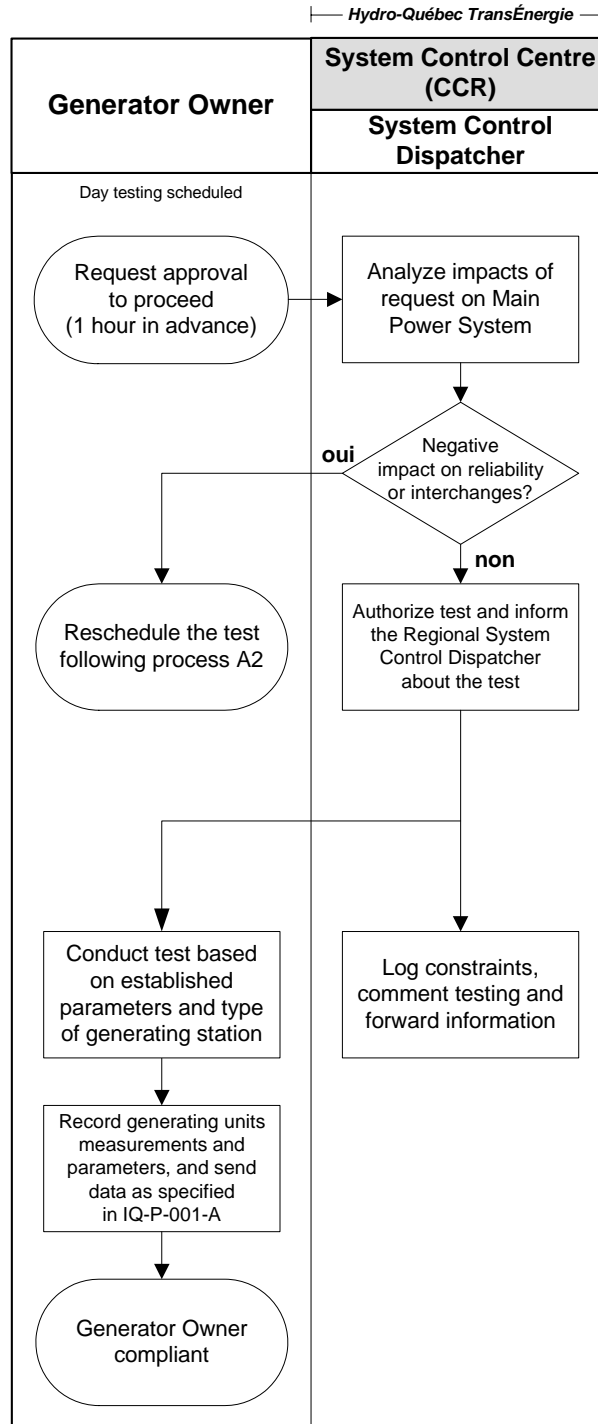


APPENDIX B PROCESS – CONDUCTING THE TESTS

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



APPENDIX C CHATS FALLS GENERATING STATION – PARTICULAR PROCESS FOR SCHEDULING AND CONDUCTING THE TESTS

As half of the production of the Chats Falls generating station belongs to Hydro-Québec Production (HQP), but that generating station is also owned by Ontario Power Generation (OPG), particular process must be follow for scheduling and conducting the tests.

Scheduling the test

1. HQP sends a maximum real and reactive power test request to OPG at least **10 days** before the scheduled test date.
2. Then, OPG sends a maximal real and reactive power test request to IESO (*Independent Electricity System Operator*) by respecting the requirements established by this latter.
3. Afterward, IESO communicates with the System Control Outage Scheduler in order to ensure coordination on the interconnection lines.
4. The System Control Outage Scheduler verifies that reliability of the main power system is not compromised and makes sure that the effective rules are respected.
5. The System Control Outage Scheduler issues an « IPR » in Spectrum application for the System Control Dispatcher – Interconnections.
6. The System Control Outage Scheduler makes sure with the Exchange Coordinator that, for the scheduled date and hour, HQP has a transaction corresponding to the scheduled deliveries. If it is not, the System Control Outage Scheduler communicates with the Energy trading floor in order to make sure that a transaction request in due form is submitted to him.

Conducting the test

The test appears as an interchange transaction for the System Control Dispatcher – Interconnections. Also, the latter must coordinate the variations of reactive power, according to the type of test, with IESO.

For this above process, HQP is in charge of the coordination with OPG, and also in charge of transmitting the test results to the Direction – CME, according to this Procedure.

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

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

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

UNITS		DECLARED CAPABILITY		MW	Mvar	kV	G.O. ³ (%)	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:									

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

By: _____ Company: _____
 Email: _____ Phone: _____

Compiling Date: _____

APPENDIX F UNIT TEST – MAXIMUM REAL AND REACTIVE POWER VERIFICATION

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

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

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

¹ Water temperature: temperature of cool water at the generator cooling system intake

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

³ G.O.: Gate opening

⁴ For specified generating stations only

By: _____ Company: _____

Compiling Date: _____

Email: _____ Phone: _____

APPENDIX G 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)
PERFORMANCE DATA	Minimum – MW							
	Maximum – MW							
	Minimum – Mvar							
	Maximum – Mvar							

Wind farm		Total Output	
		(MW)	(Mvar)
DECLARED CAPABILITY	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: _____

Company: _____

Compiling Date: _____

Email: _____

Phone: _____