

A. Introduction

1. **Title:** **Disturbance Control Performance**
2. **Number:** BAL-002-1
3. **Purpose:** The purpose of the Disturbance Control Standard (DCS) is to ensure the Balancing Authority is able to utilize its Contingency Reserve to balance resources and demand and return Interconnection frequency within defined limits following a Reportable Disturbance. Because generator failures are far more common than significant losses of load and because Contingency Reserve activation does not typically apply to the loss of load, the application of DCS is limited to the loss of supply and does not apply to the loss of load.
4. **Applicability:**
 - 4.1. Balancing Authorities
 - 4.2. Reserve Sharing Groups (Balancing Authorities may meet the requirements of Standard 002 through participation in a Reserve Sharing Group.)
 - 4.3. Regional Reliability Organizations
5. **(Proposed) Effective Date:** The first day of the first calendar quarter, one year after applicable regulatory approval; or in those jurisdictions where no regulatory approval is required, the first day of the first calendar quarter one year after Board of Trustees' adoption.

B. Requirements

- R1.** Each Balancing Authority shall have access to and/or operate Contingency Reserve to respond to Disturbances. Contingency Reserve may be supplied from generation, controllable load resources, or coordinated adjustments to Interchange Schedules.
 - R1.1.** A Balancing Authority may elect to fulfill its Contingency Reserve obligations by participating as a member of a Reserve Sharing Group. In such cases, the Reserve Sharing Group shall have the same responsibilities and obligations as each Balancing Authority with respect to monitoring and meeting the requirements of Standard BAL-002.
- R2.** Each Regional Reliability Organization, sub-Regional Reliability Organization or Reserve Sharing Group shall specify its Contingency Reserve policies, including:
 - R2.1.** The minimum reserve requirement for the group.
 - R2.2.** Its allocation among members.
 - R2.3.** The permissible mix of Operating Reserve – Spinning and Operating Reserve – Supplemental that may be included in Contingency Reserve.
 - R2.4.** The procedure for applying Contingency Reserve in practice.
 - R2.5.** The limitations, if any, upon the amount of interruptible load that may be included.
 - R2.6.** The same portion of resource capacity (e.g. reserves from jointly owned generation) shall not be counted more than once as Contingency Reserve by multiple Balancing Authorities.
- R3.** Each Balancing Authority or Reserve Sharing Group shall activate sufficient Contingency Reserve to comply with the DCS.
 - R3.1.** As a minimum, the Balancing Authority or Reserve Sharing Group shall carry at least enough Contingency Reserve to cover the most severe single contingency. All Balancing Authorities and Reserve Sharing Groups shall review, no less frequently

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than annually, their probable contingencies to determine their prospective most severe single contingencies.

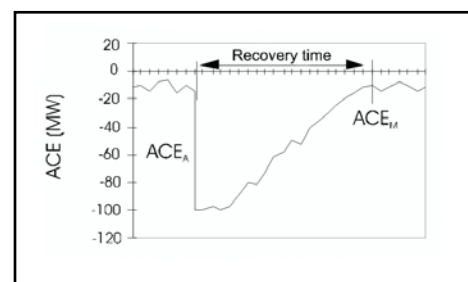
- R4.** A Balancing Authority or Reserve Sharing Group shall meet the Disturbance Recovery Criterion within the Disturbance Recovery Period for 100% of Reportable Disturbances. The Disturbance Recovery Criterion is:
- R4.1.** A Balancing Authority shall return its ACE to zero if its ACE just prior to the Reportable Disturbance was positive or equal to zero. For negative initial ACE values just prior to the Disturbance, the Balancing Authority shall return ACE to its pre-Disturbance value.
- R4.2.** The default Disturbance Recovery Period is 15 minutes after the start of a Reportable Disturbance.
- R5.** Each Reserve Sharing Group shall comply with the DCS. A Reserve Sharing Group shall be considered in a Reportable Disturbance condition whenever a group member has experienced a Reportable Disturbance and calls for the activation of Contingency Reserves from one or more other group members. (If a group member has experienced a Reportable Disturbance but does not call for reserve activation from other members of the Reserve Sharing Group, then that member shall report as a single Balancing Authority.) Compliance may be demonstrated by either of the following two methods:
- R5.1.** The Reserve Sharing Group reviews group ACE (or equivalent) and demonstrates compliance to the DCS. To be in compliance, the group ACE (or its equivalent) must meet the Disturbance Recovery Criterion after the schedule change(s) related to reserve sharing have been fully implemented, and within the Disturbance Recovery Period.
- or
- R5.2.** The Reserve Sharing Group reviews each member's ACE in response to the activation of reserves. To be in compliance, a member's ACE (or its equivalent) must meet the Disturbance Recovery Criterion after the schedule change(s) related to reserve sharing have been fully implemented, and within the Disturbance Recovery Period.
- R6.** A Balancing Authority or Reserve Sharing Group shall fully restore its Contingency Reserves within the Contingency Reserve Restoration Period for its Interconnection.
- R6.1.** The Contingency Reserve Restoration Period begins at the end of the Disturbance Recovery Period.
- R6.2.** The default Contingency Reserve Restoration Period is 90 minutes.

C. Measures

- M1.** A Balancing Authority or Reserve Sharing Group shall calculate and report compliance with the Disturbance Control Standard for all Disturbances greater than or equal to 80% of the magnitude of the Balancing Authority's or of the Reserve Sharing Group's most severe single contingency loss. Regions may, at their discretion, require a lower reporting threshold. Disturbance Control Standard is measured as the percentage recovery (R_i).

For loss of generation:

if $ACE_A < 0$
then



Adopted by Board of Trustees: August 5, 2010

Adopted by the Régie de l'énergie (Decision D-2013-176): October 30, 2013

$$R_i = \frac{MW_{Loss} - \max(0, ACE_A - ACE_M)}{MW_{Loss}} * 100\%$$

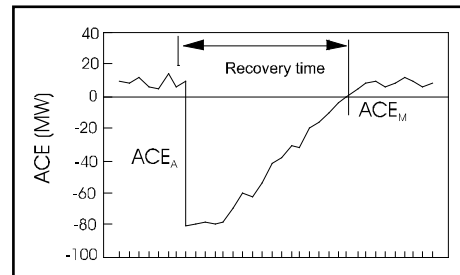
if $ACE_A \geq 0$

then

$$R_i = \frac{MW_{Loss} - \max(0, -ACE_M)}{MW_{Loss}} * 100\%$$

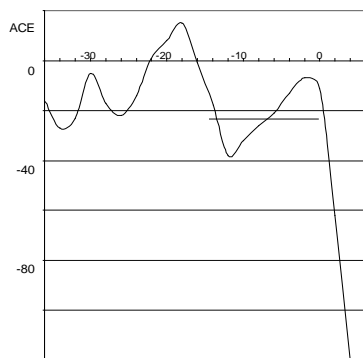
where:

- MW_{LOSS} is the MW size of the Disturbance as measured at the beginning of the loss,
- ACE_A is the pre-disturbance ACE,
- ACE_M is the maximum algebraic value of ACE measured within the fifteen minutes following the Disturbance. A Balancing Authority or Reserve Sharing Group may, at its discretion, set $ACE_M = ACE_{15 \text{ min}}$, and



The Balancing Authority or Reserve Sharing Group shall record the MW_{LOSS} value as measured at the site of the loss to the extent possible. The value should not be measured as a change in ACE since governor response and AGC response may introduce error.

The Balancing Authority or Reserve Sharing Group shall base the value for ACE_A on the average ACE over the period just prior to the start of the Disturbance (10 and 60 seconds prior and including at least 4 scans of ACE). In the illustration below, the horizontal line represents an averaging of ACE for 15 seconds prior to the start of the Disturbance with a result of $ACE_A = -25 \text{ MW}$.



The average percent recovery is the arithmetic average of all the calculated R_i 's for Reportable Disturbances during a given quarter. Average percent recovery is similarly calculated for excludable Disturbances.

D. Compliance

1. Compliance Monitoring Process

Compliance with the DCS shall be measured on a percentage basis as set forth in the measures above.

Each Balancing Authority or Reserve Sharing Group shall submit one completed copy of DCS Form, “NERC Control Performance Standard Survey – All Interconnections” to its Resources Subcommittee Survey Contact no later than the 10th day following the end of the calendar quarter (i.e. April 10th, July 10th, October 10th, January 10th). The Regional Entity must submit a summary document reporting compliance with DCS to NERC no later than the 20th day of the month following the end of the quarter.

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Timeframe

Compliance for DCS will be evaluated for each reporting period. Reset is one calendar quarter without a violation.

1.3. Compliance Monitoring and Enforcement Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

The data that support the calculation of DCS are to be retained in electronic form for at least a one-year period. If the DCS data for a Reserve Sharing Group and Balancing Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved.

1.5. Additional Compliance Information

Reportable Disturbances – Reportable Disturbances are contingencies that are greater than or equal to 80% of the most severe single Contingency. A Regional Reliability Organization, sub-Regional Reliability Organization or Reserve Sharing Group may optionally reduce the 80% threshold, provided that normal operating characteristics are not being considered or misrepresented as contingencies. Normal operating characteristics are excluded because DCS only measures the recovery from sudden, unanticipated losses of supply-side resources.

Simultaneous Contingencies – Multiple Contingencies occurring within one minute or less of each other shall be treated as a single Contingency. If the combined magnitude of the multiple Contingencies exceeds the most severe single Contingency, the loss shall be reported, but excluded from compliance evaluation.

Multiple Contingencies within the Reportable Disturbance Period – Additional Contingencies that occur after one minute of the start of a Reportable Disturbance but before the end of the Disturbance Recovery Period can be excluded from evaluation. The Balancing Authority or Reserve Sharing Group shall determine the DCS compliance of the initial Reportable Disturbance by performing a reasonable

estimation of the response that would have occurred had the second and subsequent contingencies not occurred.

Multiple Contingencies within the Contingency Reserve Restoration Period – Additional Reportable Disturbances that occur after the end of the Disturbance Recovery Period but before the end of the Contingency Reserve Restoration Period shall be reported and included in the compliance evaluation. However, the Balancing Authority or Reserve Sharing Group can request a waiver from the Resources Subcommittee for the event if the contingency reserves were rendered inadequate by prior contingencies and a good faith effort to replace contingency reserve can be shown.

2. Levels of Non-Compliance

Each Balancing Authority or Reserve Sharing Group not meeting the DCS during a given calendar quarter shall increase its Contingency Reserve obligation for the calendar quarter (offset by one month) following the evaluation by the NERC or Compliance Monitor [e.g. for the first calendar quarter of the year, the penalty is applied for May, June, and July.] The increase shall be directly proportional to the non-compliance with the DCS in the preceding quarter. This adjustment is not compounded across quarters, and is an additional percentage of reserve needed beyond the most severe single Contingency. A Reserve Sharing Group may choose an allocation method for increasing its Contingency Reserve for the Reserve Sharing Group provided that this increase is fully allocated.

A representative from each Balancing Authority or Reserve Sharing Group that was non-compliant in the calendar quarter most recently completed shall provide written documentation verifying that the Balancing Authority or Reserve Sharing Group will apply the appropriate DCS performance adjustment beginning the first day of the succeeding month, and will continue to apply it for three months. The written documentation shall accompany the quarterly Disturbance Control Standard Report when a Balancing Authority or Reserve Sharing Group is non-compliant.

3. Violation Severity Levels (no changes)

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0	February 14, 2006	Revised graph on page 3, “10 min.” to “Recovery time.” Removed fourth bullet.	Errata
1	TBD	Modified to address Order No. 693 Directives contained in paragraph 321.	Revised.

Standard BAL-002-1 — Disturbance Control Performance

Appendix QC-BAL-002-1 Provisions specific to the standard BAL-002-1 applicable in Québec

This appendix establishes specific provisions for the application of the standard in Québec. Provisions of the standard and of its appendix must be read together for the purposes of understanding and interpretation. Where the standard and appendix differ, the appendix shall prevail.

A. Introduction

1. **Title:** Disturbance Control Performance
2. **Number:** BAL-002-1
3. **Purpose:** No specific provision
4. **Applicability:** No specific provision
5. **Effective Date:**
 - 5.1. Adoption of the standard by the Régie de l'énergie: October 30, 2013
 - 5.2. Adoption of the appendix by the Régie de l'énergie: October 30, 2013
 - 5.3. Effective date of the standard and its appendix in Québec: April 1, 2015

B. Requirements

No specific provision

C. Measures

No specific provision

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

The Régie de l'énergie is responsible, in Québec, for compliance enforcement with respect to the reliability standard and its appendix that it adopts.

The NERC remains responsible for compliance monitoring of the Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

No specific provision

1.3. Compliance Monitoring and Enforcement Processes

No specific provision

1.4. Data Retention

No specific provision

1.5. Additional Compliance Information

No specific provision

2. Levels of Non-Compliance

No specific provision

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**Appendix QC-BAL-002-1
Provisions specific to the standard BAL-002-1 applicable in Québec**

3. Violation Severity Levels

Requirement	Lower	Moderate	High	Severe
R1	N/A	N/A	The Balancing Authority did not operate Contingency Reserve to respond to a Disturbance.	The Balancing Authority did not have access to Contingency Reserve to respond to a Disturbance.
R1.1	N/A	N/A	N/A	The Balancing Authority has elected to fulfill its Contingency Reserve obligations by participating as a member of a Reserve Sharing Group and the Reserve Sharing Group has not provided the same responsibilities and obligations as required of the responsible entity with respect to monitoring and meeting the requirements of Standard BAL-002.
R2	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify 1 of the following sub-requirements.	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify 2 or 3 of the following sub-requirements.	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify 4 or 5 of the following sub-requirements.	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify all 6 of the following sub-requirements.
R2.1	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify the minimum reserve requirement for the group.

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**Appendix QC-BAL-002-1
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Requirement	Lower	Moderate	High	Severe
R2.2	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify the allocation of reserves among members.
R2.3	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify the permissible mix of Operating Reserve – Spinning and Operating Reserve – Supplemental that may be included in Contingency Reserve.
R2.4	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to provide the procedure for applying Contingency Reserve in practice.
R2.5	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has failed to specify the limitations, if any, upon the amount of interruptible load that may be included.

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Provisions specific to the standard BAL-002-1 applicable in Québec

Requirement	Lower	Moderate	High	Severe
R2.6	N/A	N/A	N/A	The Regional Reliability Organization, sub-Regional Reliability Organization, or Reserve Sharing Group has allowed the same portion of resource capacity (e.g., reserves from jointly owned generation) to be counted more than once as Contingency Reserve by multiple Balancing Authorities.
R3	<p>The Balancing Authority or Reserve Sharing Group’s average percent recovery per the NERC DCS quarterly report was less than 100% but greater than or equal to 95%.</p> <p>OR</p> <p>The Balancing Authority or Reserve Sharing Group failed to review its probable contingencies to determine its prospective most severe single contingencies annually as specified in R3.1.</p>	<p>The Balancing Authority or Reserve Sharing Group’s average percent recovery per the NERC DCS quarterly report was less than 95% but greater than or equal to 90%.</p>	<p>The Balancing Authority or Reserve Sharing Group’s average percent recovery per the NERC DCS quarterly report was less than 90% but greater than or equal to 85%.</p>	<p>The Balancing Authority or Reserve Sharing Group’s average percent recovery per the NERC DCS quarterly report was less than 85%.</p> <p>OR</p> <p>The Balancing Authority or Reserve Sharing Group failed to carry at least enough Contingency Reserve to cover the most severe single contingency as specified in R3.1.</p>
R3.1	N/A	N/A	N/A	N/A

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**Appendix QC-BAL-002-1
Provisions specific to the standard BAL-002-1 applicable in Québec**

Requirement	Lower	Moderate	High	Severe
R4	The Balancing Authority or Reserve Sharing Group met the Disturbance Recovery Criterion within the Disturbance Recovery Period for more than 90% and less than 100% of Reportable Disturbances.	The Balancing Authority or Reserve Sharing Group met the Disturbance Recovery Criterion within the Disturbance Recovery Period for more than 80% and less than or equal to 90% of Reportable Disturbances.	The Balancing Authority or Reserve Sharing Group met the Disturbance Recovery Criterion within the Disturbance Recovery Period for more than 70% and less than or equal to 80% of Reportable Disturbances.	The Balancing Authority or Reserve Sharing Group met the Disturbance Recovery Criterion within the Disturbance Recovery Period for more than 0% and less than or equal to 70% of Reportable Disturbances.
R4.1	N/A	N/A	N/A	N/A
R4.2	N/A	N/A	N/A	N/A
R5	The Reserve Sharing Group met the DCS requirement for more than 90% and less than 100% of Reportable Disturbances.	The Reserve Sharing Group met the DCS requirements for more than 80% and less than or equal to 90% of Reportable Disturbances.	The Reserve Sharing Group met the DCS requirements for more than 70% and less than or equal to 80% of Reportable Disturbances.	The Reserve Sharing Group met the DCS requirements for more than 0% and less than or equal to 70% of Reportable Disturbances.
R5.1	N/A	N/A	N/A	N/A
R5.2	N/A	N/A	N/A	N/A
R6	The Balancing Authority or Reserve Sharing Group failed to restore 5% or less of its contingency reserves during the Contingency Reserve Restoration Period.	The Balancing Authority or Reserve Sharing Group failed to restore more than 5% up to (and including) 10% of its contingency reserves during the Contingency Reserve Restoration Period.	The Balancing Authority or Reserve Sharing Group failed to restore more than 10% up to (and including) 15% of its Contingency Reserve during the Contingency Reserve Restoration Period.	The Balancing Authority or Reserve Sharing Group failed to restore more than 15% of its Contingency Reserves during the Contingency Reserve Restoration Period.
R6.1	N/A	N/A	N/A	N/A
R6.2	N/A	N/A	N/A	N/A

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Provisions specific to the standard BAL-002-1 applicable in Québec

E. Regional Differences

No specific provision

Revision History

Revision	Adoption Date	Action	Change Tracking
0	October 30, 2013	New appendix	New