APPLICABILITY: Reliability Coordinator

I. Purpose

Provide the Reliability Coordinator System Operator (RCSO) with established procedures for the identification of Disturbance Control Standard (DCS) events, monitoring of Disturbance Control Performance upon loss of resources, and issuance of directives for corrective actions as necessary.

II. Introduction

All terms used herein shall have the meaning provided in the *NERC Glossary of Terms used in NERC Reliability Standards*:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbance Control Standard (DCS)</td>
<td>The reliability standard that sets the time limit following a Disturbance within which a Balancing Authority must return its Area Control Error to within a specified range.</td>
</tr>
<tr>
<td>Reportable Disturbance</td>
<td>Any event that causes an ACE change greater than or equal to 80% of a Balancing Authority’s or Reserve Sharing Group’s most severe contingency. The definition of a reportable disturbance is specified by each Regional Reliability Organization. This definition may not be retroactively adjusted in response to observed performance.</td>
</tr>
<tr>
<td>Contingency Reserve</td>
<td>The provision of capacity deployed by the Balancing Authority to meet the Disturbance Control Standard (DCS) and other NERC and Regional Reliability Organization contingency requirements.</td>
</tr>
<tr>
<td>Operating Reserve</td>
<td>That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.</td>
</tr>
<tr>
<td>Area Control Error (ACE)</td>
<td>The instantaneous difference between a Balancing Authority’s net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error.</td>
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</table>

Per NERC Standard BAL-002-1 – Disturbance Control Performance, and any subsequent revisions thereto, the purpose of the DCS is to ensure Balancing Authorities (BAs) are able to utilize 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 the DCS is limited to the loss of supply and does not apply to the loss of load.

III. Reserve Sharing Group Participation

RCSOs are required to monitor BA parameters to ensure adequate reserves are available to meet DCS requirements.\(^1\) A BA may elect to fulfill its Contingency Reserve obligations by participating as a member of a Reserve Sharing Group (RSG). In such cases, the RSG shall have the same responsibilities and obligations as each BA with respect to monitoring and meeting the requirements of Standard BAL-002.\(^2\)

There are three RSGs in the Western Interconnection. Their BA members are as follows:

<table>
<thead>
<tr>
<th>RSG</th>
<th>Members</th>
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<tbody>
<tr>
<td>Desert Southwest Reserve Sharing Group (SRSG)</td>
<td>o Arizona Public Service Company (APS)</td>
</tr>
<tr>
<td></td>
<td>o Constellation Energy(^3)</td>
</tr>
<tr>
<td></td>
<td>o Arlington Valley (DEAV)</td>
</tr>
<tr>
<td></td>
<td>o Gila River Power (GRMA)</td>
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<td></td>
<td>o Griffith (GRIF)</td>
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<tr>
<td></td>
<td>o Harquahala Generating Company (HARQ)</td>
</tr>
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<td></td>
<td>o El Paso Electric Company (EPE)</td>
</tr>
<tr>
<td></td>
<td>o Imperial Irrigation District (IID)</td>
</tr>
<tr>
<td></td>
<td>o Public Service Company of New Mexico (PNM)</td>
</tr>
<tr>
<td></td>
<td>o Salt River Project (SRP)</td>
</tr>
<tr>
<td></td>
<td>o Tucson Electric Power Company (TEP)</td>
</tr>
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<td></td>
<td>o Western Area Power Administration – Lower Colorado (WALC)</td>
</tr>
<tr>
<td>Rocky Mountain Reserve Sharing Group (RMRG)</td>
<td>o Public Service Company of Colorado (PSCO)</td>
</tr>
<tr>
<td></td>
<td>o Western Area Power Administration – Colorado/Missouri (WACM)</td>
</tr>
<tr>
<td>Northwest Power Pool Reserve Sharing Group</td>
<td>o Alberta Electric System Operator (AESO)</td>
</tr>
<tr>
<td>(NWPP)</td>
<td>o Avista Corporation (AVA)</td>
</tr>
</tbody>
</table>

\(^1\) NERC Standard IRO-005-3.1a Requirement R2  

\(^2\) NERC Standard BAL-002-1 Requirement 1.1  

\(^3\) Constellation Energy is not a registered BA within the RC Area but, through operating agreements, is providing the BA services for these Registered Entities.
It is important to note that there are several non-BA RSG members, some of which have the ability to request assistance from the RSG on behalf of a BA upon loss of resources. The RCSOs shall monitor BA disturbance control performance only as DCS is applicable to BAs and RSGs.

There are three BAs within the Western Interconnection that are not members of an RSG:

- California Independent System Operator (CAISO)
- Los Angeles Department of Water and Power (LDWP)
- Comisión Federal de Electricidad (CFE)

In real-time situations involving DCS compliance, the RCSO shall communicate directly with the deficient BA regardless of whether the BA is a member of an RSG. The RCSO shall monitor BA Area Control Error (ACE) and system frequency as well as BA performance and direct any necessary rebalancing to return to DCS compliance.5

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4 Constellation Energy is not a registered BA within the RC Area but, through operating agreements, is providing the BA services for these Registered Entities.

5 NERC Standard IRO-005-3.1a Requirements R1.6, R5 and R8
IV. RCSO Responsibilities

The following NERC Standard requirements are applicable to the RCSO and include instruction related to DCS:

Each RCSO shall monitor its BAs’ parameters to ensure that the required amount of operating reserves is provided and available as required to meet the Control Performance Standard (CPS) and DCS requirements. If necessary, the RCSO shall direct the BAs in the RC Area to arrange for emergency assistance from neighboring BAs. The RCSO shall issue Energy Emergency Alerts (EEA) as needed and at the request of its BAs and Load-Serving Entities. Refer to the Capacity and Energy Emergencies procedure for further guidance on declaration of an EEA.

Each RCSO shall monitor system frequency and its BAs’ performance and direct any necessary rebalancing to return to CPS and DCS compliance. The Transmission Operators (TOP) and BAs shall utilize all resources, including firm load shedding, as directed by the RCSO to relieve the emergent condition. Refer to the Monitoring of System Frequency and Balancing Authority Performance procedure for further information on the monitoring of system frequency and BA performance.

The RCSO shall coordinate with TOPs, BAs, and Generator Operators (GOP) as needed to develop and implement action plans to mitigate potential or actual System Operating Limit (SOL), Interconnection Reliability Operating Limit (IROL), CPS, or DCS violations. The RCSO shall coordinate pending generation and transmission maintenance outages with TOPs, BAs, and GOs as needed in both the real-time and next-day reliability analysis timeframes. Refer to the Monitoring of Real-Time SOL and IROL Exceedances and the Operations Planning procedures for additional information on mitigation of actual or potential SOLs and IROLs in the real-time and next-day timeframes.

The RCSO shall identify sources of large ACE that may be contributing to Frequency Error, Time Error, or Inadvertent Interchange and shall discuss corrective actions with the appropriate BA. The RCSO shall direct its BA to comply with CPS and DCS.

RCSOs are responsible for disseminating information within the RC Area. RCSOs who foresee a transmission problem, including but not limited to off-nominal frequency, loss of transmission elements, and any other event or disturbance that could impact BES reliability within the Western Interconnection, shall without delay issue an alert to all impacted TOPs and BAs within the RC Area.

6 NERC Standard IRO-005-3.1a Requirement R2
7 NERC Standard IRO-005-3.1a Requirement R5
8 NERC Standard IRO-005-3.1a Requirement R6
9 NERC Standard IRO-005-3.1a Requirement R8
10 NERC Standard IRO-005-3.1a Requirement R4
RCSOs shall communicate with TOPs and BAs contributing to and/or affected by the disturbance or event to determine potential causes and coordinate viable mitigation. RCSOs shall disseminate information to all impacted TOPs and BAs and notify all impacted TOPs, BAs, when the transmission problem has been mitigated. RCSOs shall notify adjacent RCs and the Alberta Electric System Operator (AESO) of system events within the RC Area in accordance with established operating agreements. Please refer to the Coordination Among Reliability Coordinators procedure for additional instruction on events that require communication with adjacent RCs and AESO.

V. DCS Events: RCSO Actions

RCSOs shall monitor the disturbance control performance of the BA responding to a DCS Reportable Disturbance. A BA 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 BA shall return its ACE to its pre-disturbance value. The Disturbance Recovery Period is 15 minutes.

RCSOs monitor individual BA performance by evaluating their ACE, total generation, total load, actual/scheduled interchange, and total spinning and operating reserves via EMS/PI displays. If the BA is an RSG member, their individual BA PI display also includes the RSG’s ACE, Most Severe Single Contingency (MSSC) and actual/required reserve amounts. The RCSO receives audible alarms via the Energy Management System (EMS) when a BA ACE deviation greater than 80% of its MSSC is detected. Upon receiving such an alarm, the RCSO shall evaluate EMS data to determine the magnitude of the ACE deviation, generation resource lost (including MW output) and whether or not the affected entity is a participant in an RSG. If the BA is participating in an RSG at the time of the event, the RCSO should identify whether the ACE deviation was greater than 80% of the RSG MSSC. A Reportable Disturbance is greater than 80% of the BA MSSC for a BA not participating in an RSG or greater than 80% of the RSG MSSC for a BA participating in an RSG at the time of the Disturbance.

After completing an initial analysis of a DCS Reportable Disturbance, the RCSO shall perform the following actions:

- Contact the BA experiencing the loss to verify the time of event and the total amount of the resource lost. RCSOs shall discuss mitigating actions that the BA has or is planning to take including, but not limited to, activation of BA Contingency Reserves, request for assistance from the RSG, increasing generation, and/or load shedding. The RCSO shall confirm the timeframe in which the BA believes DCS will be recovered through the mitigation and shall determine if BA mitigation appears viable in light of system conditions. Initial communications with the involved entity should be clear and concise as the BA system operator should be focused on carrying out the necessary corrective action.

11 NERC Standard IRO-005-3.1a Requirement R12

12 NERC Standard BAL-002-1 Requirement R4.1
The RCSO shall consult that PI display for the applicable BA or RSG to identify quick-start and peaking generation status and transmission capacity available. If the RCSO believes that the BA’s proposed mitigation is not viable, he or she shall advise the BA of alternate or additional mitigating activities to return frequency and ACE within limits and comply with DCS. If the RCSO determines that the mitigation being proposed or already taken by the BA and/or RSG will not be adequate or timely, the RCSO shall issue a Reliability Coordinator Directive to the BA stating the specific corrective action to be taken as well as a timeline for completion.

If after discussing corrective action with the BA, the RCSO feels the BA will be able to recover its ACE within the 15-minute timeframe, the RCSO shall continue to monitor system conditions and BA parameters. If circumstances indicate the BA will not be able to restore its ACE within the 15 minute Disturbance Recovery Period, the RCSO shall immediately issue the BA a Reliability Coordinator Directive stating specific corrective action (i.e., increasing or redispatching generation, load shedding, etc.) based on system conditions as well as an expected timeline for the completion of corrective action. Reliability Coordinator Directives should, if possible, include options previously discussed with the BA and should not include corrective actions that are not viable.

If the 15 minute timeframe expires and the BA has yet to restore its ACE, the RCSO shall immediately issue the BA a Reliability Coordinator Directive stating specific corrective action that is expected to most quickly restore ACE to pre-disturbance levels based on system conditions. The Reliability Coordinator Directive should, if possible, include options previously discussed with the BA and should include a timeline for completion of the corrective action.

RC Directives must be given in a clear, concise and definitive manner. The RCSO shall inform the receiving party that they are about to receive a RC Directive prior to issuing the directive. When issuing a RC Directive, the issuer is responsible for ensuring all parties use Three-Part Communication Protocol and must make certain that the recipient repeats back the directive correctly and must acknowledge the response as correct. If the recipient fails to repeat the directive back correctly, the RCSO must repeat the directive until any misunderstanding is resolved.

General Example:

“I am issuing you a Reliability Coordinator Directive to shed (MWs) of load in the XX area by hh:mm.”

The example above is provided only for the purposes of illustration. When issuing a RC Directive, RCSOs must evaluate the disturbance and/or current and expected system conditions and detail the specific corrective actions to be taken and the expected time of accomplishment. RCSOs shall focus on identifying the loss of resources that has occurred, evaluating disturbance control performance, and ensuring that Interconnection frequency returns to nominal within an acceptable amount of time. If the event involves multiple DCS Reportable Disturbances that
occur within a 15-minute period, the RCSO shall use his or her best judgment to evaluate system conditions and determine the best course of action.

VI. Restoration of Contingency Reserves

A BA or RSG shall fully restore its Contingency Reserve within the Contingency Reserve Restoration Period for its Interconnection. The Contingency Reserve Recovery Period in the Western Interconnection is 60 minutes and begins at the initiation of the event. If a BA or RSG fails to restore its Contingency Reserve within the defined period, the RCSO shall contact the deficient entity and discuss potential mitigation. This may include an arrangement for emergency assistance from neighboring BAs or the declaration of an EEA.

If a BA is observed to be continually deficient in Operating Reserve and no DCS event has occurred, the RCSO shall perform the following actions:

- Contact the deficient BA to discuss the nature and causes of the deficiency. This discussion should include but is not limited to the following:
  - Verify the actual/required spinning and total Operating Reserve values.
  - Discuss the nature of the deficiency, possible mitigation, and timeframe of expected recovery.
  - Determine whether adequate Operating Reserve is available to meet the CPS and DCS requirements. If the BA is an RSG member, this should involve evaluation of the group’s total required contingency reserve as well.

- Maintain continuous evaluation of actions being taken to address the deficiency and, if the actions taken are not appropriate or sufficient, direct corrective actions as necessary. This may include arranging for assistance from neighboring BAs or declaration of an EEA.

VII. Reference Flowchart

A reference flowchart is included below to provide a summary overview of the DCS Reportable Disturbance process. RCSOs should refer to the written details in this document for a full understanding of the requirements and expectations.

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13 NERC Standard BAL-002-1 Requirement 6

14 NERC Standard BAL-STD-002-0 WR1d
DCS Reportable Disturbance Flowchart

1. **Monitor BA performance**
   - ACE deviation > 80%
     - BA is actively participating in MSSC
     - BA ACE deviation > 80% of the RSGs MSSC
   - BA is not actively participating in MSSC
     - Continue mitigation

2. **Verify event time and amount of loss**
   - Actual interchange, load shed, and/or generation loss
   - Confirm mitigation timeframe

3. **Identify quick start and peaking generation status**
   - BA ACE deviation > 80%
     - BA is actively participating in MSSC
     - BA ACE deviation > 80% of the RSGs MSSC
   - BA is not actively participating in MSSC
     - Continue mitigation

4. **Contact BA**
   - Mitigation plan viable?
     - Yes: Advise BA of alternate/additional activities
     - No: Continue mitigation

5. **Able to restore ACE in 15 min.?**
   - Yes: Issue RC Directive
     - ACE normal?
       - Yes: Continue mitigation
       - No: End
     - No: Continue mitigation

6. **15 min. time limit exceeded?**
   - Yes: End
     - No: Continue mitigation

7. **Verify event time and amount of loss**
   - Actual interchange, load shed, and/or generation loss

8. **Discuss mitigating actions**
   - RSG, increase gen, and/or load shed

9. **Confirm mitigation timeframe**
   - Clear, concise and definitive communication;
     - Specific actions directed;
     - Expected timeframe for completion;
     - Use of Three Part Communication Protocol;
     - Verification that action was completed.

10. **End**
    - No
    - Yes: Continue mitigation

**NERC Standard IRO-005-3.1a**
## Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Action</th>
<th>By</th>
<th>Change Tracking</th>
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<tr>
<td>1.0</td>
<td>01/01/2009</td>
<td>Issued for implementation</td>
<td></td>
<td>Original WECC RC Procedure</td>
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<tr>
<td>2.0</td>
<td>12/17/2009</td>
<td>Revised and Reissued</td>
<td></td>
<td>Provided additional RC actions taken to monitor DCS events and included specific items for consideration.</td>
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<tr>
<td>3.0</td>
<td>10/28/2011</td>
<td>Revised and Reissued</td>
<td>Michael Cassiadoro</td>
<td>Procedure title changed from “Disturbance Control Performance/Loss of Resources” to “Monitoring of Disturbance Control Performance”. Provided additional information on RSGs operating within WECC. Referenced tool enhancements to assist RCS with monitoring disturbance control performance. Included specific actions to be taken by the RC upon exceeding the 15 minute Disturbance Recovery Period or when circumstances indicate an entity will not be able to restore its ACE within the 15 minute period.</td>
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<tr>
<td>4.0</td>
<td>09/21/2012</td>
<td>Revised and Reissued</td>
<td>Michael Cassiadoro</td>
<td>Added definition table to section 2. Revised section V to include additional instruction for communicating with affected entities to determine viable mitigating actions during a DCS event. Added language to emphasize the need for Reliability Coordinator Directives to be specific to circumstances and included a general directive example to reflect the same. Removed portion of procedure related to multiple and additional contingencies that were irrelevant to the 15-minute Disturbance Recovery Period.</td>
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<tr>
<td>5.0</td>
<td>08/12/2013</td>
<td>Revised and Reissued</td>
<td>J Hoyt</td>
<td>Added Section VII Flowchart</td>
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<tr>
<td>6.0</td>
<td>12/19/2013</td>
<td>Revised and Reissued</td>
<td>J Hoyt, M Granath</td>
<td>Clarified section V directive example, updated to Peak Reliability template and modified associated language.</td>
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<tr>
<td>7.0</td>
<td>1/20/2014</td>
<td>Revised and Reissued</td>
<td>M Mizumori, J Hoyt</td>
<td>Added language in Section V to revise monitoring of Reportable Disturbance to be 80% of RSG MSSC for BAs participating in RSGs. Updated VII flowchart as appropriate.</td>
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