Purpose

Defines the criteria and procedures for testing Black Start Resources.

1. Responsibilities

| CAISO Operations Planning | · Review and approve Black Start Test Plan and one line electrical diagram showing the electrical system configuration.  
|                           | · Coordinate with PTO Operations Engineers to determine PTO Black Start testing requirements and results.  
|                           | · Approve or deny Black Start test results. |
2. **Scope/Applicability**

2.1. **Background**

Black Start Resources must meet certain criteria as specified by NERC and WECC Standards. Additionally, these Standards stipulate that the California ISO (CAISO) must oversee the testing of Black Start resources.
2.2. Scope/ Applicability

This operating procedure applies to all resources designated by the CAISO and the PTOs as Black Start Resources according to the CAISO System Restoration Plan and the respective Black Start agreements between the CAISO, PTOs, and Black Start Resource Owners.

Black Start tests shall be completed at least once every three (3) years.

3. Procedure Detail

3.1. Test Criteria

The minimum criteria for testing a Black Start Resource are as follows:

1. The Black Start Resource must have the capability to start when isolated with no support from the Bulk Electric System or remain energized without connection to the remainder of the system.

2. The Black Start Resource must have the capability to energize the high-side bus using one of the following methods:
   - Energize the high-side bus for a minimum of five minutes from the time of breaker closing, to demonstrate that resource can remain energized and stable, or
   - Affirm the capability to energize the high-side bus where operational conditions do not allow energization of the high-side bus solely for testing purposes.

3. The Generator shall verify that the resource breaker can be closed using one of the following methods:
   - The resource breaker shall be isolated with the resource at rated voltage and frequency, closed for five minutes to demonstrate that the resource will remain stable when the breaker is closed.
   - The resource breaker close coil relay can be energized with the voltage and frequency monitor controls disconnected from the synchronizing circuits.

3.2. Submit Test Plan

Perform the following steps to develop and submit a Black Start Resource Test Plan.

*Note: Once a test plan has been approved by the CAISO, the plan applies to all subsequent Black Start Resource testing. However, if circumstances dictate a change to the test plan,*
the Black Start Resource Owner must submit an updated test plan to the CAISO prior to the planned test date.

**Black Start Resource Owner**

2. Submit an electronic copy to ASNotifications@caiso.com at least thirty (30) calendar days prior to the planned test date.

**CAISO Resource Test Administrator**

1. Send Test Plan to the CAISO Operations Planning for the applicable PTO area.

**CAISO Operations Planning**

1. Review the Black Start Test Plan and
2. Route approval or denial of the Plan through the CAISO Resource Test Administrator.
3. If denied, include instructions on how to correct any deficiencies.

**CAISO Resource Test Administrator**

1. Once a response has been received from CAISO Operations Planning, do one of the following:
   - **Contact** the SC and formally approve the test plan.
   - **Request** any additional information needed to approve the test plan.
     - Upon receipt, **send** to CAISO Operations Planning to repeat step above.

### 3.3. Schedule Test

Perform the following actions to schedule a Black Start test.

**Scheduling Coordinator (SC), Black Start Resource Owner**

1. Submit an electronic copy of a (CAISO Operating Procedure) 5360A Black Start Resource Test Request Form to ASNotifications@caiso.com at least two (2) weeks prior to the planned test date.

**Note:** The Scheduling Coordinator (SC) or Black Start Resource Owner shall communicate the above information to the applicable Participating Transmission Owner (PTO) to which the Black Start Resource is connected.
# Black Start Resource Testing

## CAISO Resource Test Administrator
1. **Verify** an approved Black Start Test Plan for the Black Start Resource is on record.
   - If there is no approved Test Plan on file, **request** a Test Plan.
2. **Review and route** test request to CAISO Operations Planning for the applicable PTO area.

## CAISO Operations Planning
1. **Review** test request and **coordinate** with applicable PTO Operations Engineer to determine requirements of the PTO for the Black Start performance test.
2. **Route** approval or denial of request for Black Start Resource test request through the CAISO Resource Test Administrator.

## CAISO Resource Test Administrator
1. Once a response has been received from CAISO Operations Planning, do one of the following:
   - **Contact** the SC and approve the test request.
   - **Request** any additional information needed to approve the test request.
     - Upon receipt, **route** to CAISO Operations Planning to repeat steps above.

## Scheduling Coordinator (SC), Black Start Resource Owner
1. Once the test request has been approved,  
   - **Schedule** the Black Start test per CAISO Outage requirements.
   - **Refer** to CAISO Operating Procedure 3220 Generation Outages.
   - **Submit** an outage request to the CAISO for the Black Start Test using the “Unit Testing” nature of work.
   - **Submit** an outage request to the applicable PTO. This request is for the outages required to facilitate the Black Start Test (i.e., transmission equipment controlled by the PTO and/or the CAISO).
   - If applicable, the PTO should then **request** appropriate clearances from the CAISO in accordance with CAISO Outage requirements.
     - **Refer** to CAISO Operating Procedure 3210 Transmission Outages.

## Participating Transmission Owner (PTO) Outage Coordinator, CAISO Operations Planning
1. **Approve** or **deny** outage request for Black Start Resource testing.
Scheduling Coordinator (SC), Black Start Resource Owner

1. If the outage is not approved by the CAISO and PTO,
   - **Determine** a new test date and time; and
   - **Resend** an updated (CAISO Operating Procedure) [5360A Black Start Resource Test Request Form](#) for approval.

3.4. **Conduct Test**

Perform the following actions to conduct a Black Start Resource test.

Scheduling Coordinator (SC), Black Start Resource Owner

1. **Contact** the applicable PTO to coordinate switching on the desired test date.
2. **Notify** the CAISO Generation Desk at least one (1) hour before the start of the test and **confirm** the test can start as scheduled.

CAISO Generation Desk

1. **Confirm** whether Black Start Resource testing can be conducted as scheduled.
   - If “Yes,” do the following:
     - **Issue** verbal Exceptional Dispatch for the unit to **go to PMin**.
     - **Create** ED in the ED tool with the start time equal to the time of the verbal dispatch using Instruction Type of “TEST”.
     - **Manage** Outage Card status in OMS.
     - **Maintain** adequate regulating margin.
   - If “No”, do the following:
     - **Cancel** the Outage Card and
     - **Request** Scheduling Coordinator and Black Start Resource Owner to **identify** another date and
     - **Repeat** test request steps.

Scheduling Coordinator (SC), Black Start Resource Owner

1. If the test must be postponed,
   - **Notify** the PTO and
   - **Determine** a new test date and time; otherwise, **continue** to next step.
2. **Start** the outage in OMS.
Operating Procedure

Procedural No. 5360
Version No. 3.2
Effective Date 7/28/2022

Black Start Resource Testing

Distribution Restriction: None

Scheduling Coordinator (SC), Black Start Resource Owner

3. Conduct the Black Start Test according to the approved Black Start Test Plan for the Black Start Resource.
   • The test should be monitored by the Scheduling Coordinator, PTO, and CAISO.

4. Schedule energy in the CAISO markets as appropriate per CAISO Tariff and BPMs.

5. Once the test has been completed,
   • Terminate the outage in OMS and
   • Request the CAISO to end the Black Start Test Exceptional Dispatch and
   • Instruct the Black Start Resource to return to its previously determined schedule.

CAISO Generation Desk

1. End the Black Start Exceptional Dispatch in the ED Tool.
2. Notify the CAISO Resource Test Administrator that the test has been completed by emailing ASNotifications@caiso.com.

3.5. Evaluate Test Results

Upon completing the Black Start Resource testing, as defined in Section 3.4, perform the following actions:

Scheduling Coordinator (SC), Black Start Resource Owner

1. Analyze the test results for the Black Start Resource.
   • If the test results meet or exceed all aspects of the Black Start Test Plan,
     o Go to Step 2; otherwise, go to Step 3.

2. Submit electronic copies of a (CAISO Operating Procedure) 5360B Black Start Resource Test Report Form to ASNotifications@caiso.com within fourteen (14) days of test completion:
   • Skip Step 3.

   Note: CAISO will share the entire Black Start Test Package with the applicable PTO to which the Black Start Resource is connected.

3. Reschedule any failed tests.

   Note: Failure to implement corrective actions and successfully complete the retest within 90 days will result in the loss of Black Start capability status.
CAISO Resource Test Administrator


CAISO Operations Planning

1. Route test results to PTO engineering team for review.
2. Review test results.
3. After review,  
   - If both CAISO Ops Planning and PTO Engineering teams approved,  
     - Alert the CAISO Resource Test Administrator and  
     - Complete DocuSign task once received.
   - If denied, include instructions on how to correct any deficiencies.

CAISO Resource Test Administrator

1. Route the test results for the Black Start Resource if approved, via DocuSign to Ops Planning for signature.
2. Submit electronic copies of test results to the Black Start Testing email distribution list, CAISO Operations Planning, and the respective SC.
3. If the Resource has passed all Black Start testing:

<table>
<thead>
<tr>
<th>Newly Certifying Resource</th>
<th>Existing Resource Re-Certifying</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Route</strong> Black Start Acceptance Letter via DocuSign CAISO Ops Planning and CAISO Contracts.</td>
<td><strong>Update</strong> CAISO Operating Procedure <a href="#">4610A Black Start, Dual Fuel Units and Generator Operator</a></td>
</tr>
<tr>
<td><strong>Ensure</strong> that all required Black Start agreements have been finalized.</td>
<td></td>
</tr>
<tr>
<td><strong>Confirm</strong> with CAISO Operations Planning to verify that the Resource has been studied and</td>
<td></td>
</tr>
<tr>
<td><strong>Confirm</strong> PTO approves test results.</td>
<td></td>
</tr>
<tr>
<td><strong>Update</strong> CAISO Operating Procedure <a href="#">4610A Black Start, Dual Fuel Units and Generator Operator</a></td>
<td></td>
</tr>
<tr>
<td><strong>Notify</strong> MF to update Black Start Flag Y and include <a href="mailto:OperationsCompliance@caiso.com">OperationsCompliance@caiso.com</a></td>
<td></td>
</tr>
</tbody>
</table>

4. If the Resource failed Black Start testing:  
   - Work with the SC to schedule a Black Start retest within 90 days.
5. If the Resource fails all Black Start testing within 90 days:

<table>
<thead>
<tr>
<th>Newly Certifying Resource</th>
<th>Existing Resource Re-Certifying</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Send an email notification to the Black Start Testing email distribution list.</td>
<td>• Update CAISO Operating Procedure 4610A Black Start, Dual Fuel Units and Generator Operator to indicate the Resource cannot provide Black Start capability.</td>
</tr>
<tr>
<td>• Work with SC to retest.</td>
<td>• Notify MF to update Black Start Flag N.</td>
</tr>
</tbody>
</table>

4. Supporting Information

Operationally Affected Parties

Shared with the Public.

References

Resources studied in the development of this procedure and that may have an effect upon some steps taken herein include but are not limited to:

<table>
<thead>
<tr>
<th>CAISO Tariff</th>
<th>Section 8.3.4, Certification and Testing Requirements. Appendix K Ancillary Service Requirements Protocol (ASRP)</th>
</tr>
</thead>
</table>
| CAISO Operating Procedure | 4610 System Restoration  
4610A Black Start, Dual Fuel Units and Generator Operator  
5360A Black Start Resource Test Request Form  
5360B Black Start Resource Test Report Form  
5360C Black Start Resource Test Plan Template |
| NERC Requirements | EOP-005-3 R1 |
| WECC Criterion | |
| Other References | |
Definitions

Unless the context otherwise indicates, any word or expression defined in the Master Definitions Supplement to the CAISO Tariff shall have that meaning when capitalized in this Operating Procedure.

The following additional terms are capitalized in this Operating Procedure when used as defined below:

None

Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Change</th>
<th>Date</th>
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<tr>
<td>2.1</td>
<td>Section 3.3: Added back steps 7, 8, and 9 and in Section 3.4: Added back steps 4, 5, 6, and 7.</td>
<td>7/16/15</td>
</tr>
<tr>
<td>2.2</td>
<td>Updated formatting and grammar; version to 2.2.</td>
<td>12/30/16</td>
</tr>
<tr>
<td>2.3</td>
<td>Annual Review: rewrite of procedure, changes are highlighted.</td>
<td>10/18/17</td>
</tr>
<tr>
<td>2.4</td>
<td>Responsibilities Section: Updated ISO Generation. Section 3.4: Updated ISO Generation Desk actions and added ISO Generation Desk action table at the end. Minor formatting and grammar updates.</td>
<td>4/26/18</td>
</tr>
<tr>
<td>2.5</td>
<td>Changed ED Instruction Type from BS to TEST. Minor format and grammar updates.</td>
<td>7/20/18</td>
</tr>
<tr>
<td>3.0</td>
<td>Periodic Review: Updated review criteria to every three years, added document controlled footer, minor grammar and format updates.</td>
<td>7/24/20</td>
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<tr>
<td>3.1</td>
<td>Responsibilities Section and Section 3.5: Clarifications of process and requirements related to Black Start testing results (submission, review, and approvals). Operationally Affected Parties: Removed “and the RC.” References: Updated NERC reference. Replaced all instances of ISO with CAISO and Blackstart with Black Start. Removed history prior to 5-years. Minor format and grammar updates.</td>
<td>4/01/21</td>
</tr>
<tr>
<td>3.2</td>
<td>Section 2.1: Minor edit spelling out first instance of CAISO. Updated all procedure references for 5360B with link, as they were incorrect.</td>
<td>7/28/22</td>
</tr>
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</table>
5. Periodic Review Procedure

Review Criteria & Incorporation of Changes

There are no specific criteria for reviewing or changing this document, follow instructions in CAISO Operating Procedure 5510.

Frequency

Every three (3) years.

Appendix

5360A Black Start Resource Test Request Form
5360B Black Start Resource Test Report Form
5360C Black Start Resource Test Plan Template